

# **Dunmore Sand and Soil Quarry**

## **Traffic Management Plan**

---

Prepared for Dunmore Sand and Soil Pty Ltd

July 2023

# Dunmore Sand and Soil Quarry

## Traffic Management Plan

Dunmore Sand and Soil Pty Ltd

J210315 RP#1

July 2023

Version	Date	Prepared by	Approved by	Comments
5	14 April 2023	Abdullah Uddin	Dr Timothy Brooker	All DPE comments are incorporated
6	5 July 2023	Abdullah Uddin	Dr Timothy Brooker	Additional 3 DPE comments are incorporated
7	31 July 2023	Abdullah Uddin	Dr Timothy Brooker	TfNSW comment dated 25/7/23 incorporated

Approved by



**Dr Timothy Brooker**  
Associate Transport Planner  
31 July 2023

Ground floor 20 Chandos Street  
St Leonards NSW 2065  
PO Box 21  
St Leonards NSW 1590

This report has been prepared in accordance with the brief provided by Dunmore Sand and Soil Pty Ltd and has relied upon the information collected at the time and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of Dunmore Sand and Soil Pty Ltd and no responsibility will be taken for its use by other parties. Dunmore Sand and Soil Pty Ltd may, at its discretion, use the report to inform regulators and the public.

© Reproduction of this report for educational or other non-commercial purposes is authorised without prior written permission from EMM provided the source is fully acknowledged. Reproduction of this report for resale or other commercial purposes is prohibited without EMM's prior written permission.

# TABLE OF CONTENTS

---

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Background	1
1.2	Project overview	0
1.3	Stage 5 Operations	2
1.4	Operating hours	2
1.5	Construction Hours	2
1.6	Access	3
1.7	Report preparation	5
1.8	Consultation	5
<b>2</b>	<b>Environmental requirements</b>	<b>7</b>
2.1	Legislative framework	7
2.2	Standards and guidelines	7
2.3	Approval conditions	7
<b>3</b>	<b>Existing conditions</b>	<b>9</b>
3.1	Road network	9
<b>4</b>	<b>Traffic management</b>	<b>12</b>
4.1	Site access	12
4.2	Site operation	13
4.3	Weighbridge	14
4.4	Wheel wash bay	15
4.5	Vehicle Covers	15
4.6	Site safety	15
4.7	Queuing on Riverside Drive	15
4.8	Dust control	15
4.9	Haulage routes	15
4.10	Vehicle types	16
4.11	Condition 56j and 56k	16
<b>5</b>	<b>Driver code of conduct</b>	<b>18</b>
5.1	Purpose of the code	18
5.2	General requirements	18
5.3	Heavy vehicle speed	18
5.4	Driver fatigue	19

5.5	Heavy vehicle control	19
5.6	Load covering	19
5.7	Cleanness	19
5.8	Vehicle arrival and departure	20
5.9	Vehicle departure and arrival (avoiding convoys)	20
5.10	Breakdown and incidents	20
5.11	Complaint management	20
5.12	Pedestrian management within the site	21

## Appendices

Appendix A	Concept design for site proposed access	A.1
Appendix B	Correspondence from TfNSW, SCC and KMC	B.1
Appendix C	Dilapidation report	C.1

## Tables

Table 1.1	Operating hours	2
Table 1.2	Stage 5 VENM Importation – Estimated Truck Volumes	4
Table 1.3	Combined SCC and KCC comments and EMM responses	5
Table 1.4	TfNSW comments and EMM responses	6
Table 2.1	Independent Planning Commission Mod 2 approval condition and EMM responses	7
Table 3.1	Princes Highway	10
Table 3.2	Riverside Drive	10
Table 5.1	Emergency contact details	20

## Figures

Figure 1.1	Stages 5A and 5B extraction areas	1
Figure 3.1	Road hierarchy near site	9
Figure 4.1	Site layout Stage 5A	13
Figure 4.2	Site layout Stage 5B	14
Figure 4.3	Haulage routes to/ from the site	16

## Plates

Plate 1.1	Location of the proposed vehicular access (opposite to Kiama Waste Recycling Depot)	3
Plate 1.2	Access to Fig Hill Lane from Riverside Drive	4
Plate 3.1	Princes Highway (west of the site looking south)	10
Plate 3.2	Riverside Drive (north of the site looking north-west)	11
Plate 4.1	Site access from Riverside Drive	12

# 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 and Environment (DPE) 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 12 m 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 16<sup>th</sup> 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<sup>1</sup> (Appendix K). For consistency, traffic related information has been extracted from that TIA in preparation of this TMP.

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

## 1.2 DPE's review of the TMP

DPE has reviewed the EMM <sup>2</sup>TMP in June 2021 and provided a number of comments on the approval conditions. Subsequently the <sup>3</sup>TMP has been updated by incorporating DPE comments, except conditions 56 (j) and 56 (k).

This updated TMP incorporates all DPE conditions 56 (a to k). DPE comments and EMM responses are provided in Table 1.1.

DPE has further reviewed the updated TMP dated 14 April 2023 where they have made additional comments. DPE comments and EMM responses are provided in Table 1.2.

<sup>2</sup> Report dated 25 June 2021

<sup>3</sup> Report dated 5 July 2021

**Table 1.1 DPE initial comments on the TMP and EMM responses**

Traffic Management Plan – DA195-8-2004, Schedule 3, Condition 56	Satisfactory (Yes/No/Partial)	DPE Comments	Action Required	EMM responses
<p>Prior to undertaking any construction transportation activities relating to Modification 2, the Applicant must prepare a Traffic Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:</p>				
<p>a) be prepared by suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;</p>	<p>Partial</p>	<ul style="list-style-type: none"> <li>Section 1.7. Update this section to include information that Abdullah Uddin from EMM Consulting was endorsed by the Planning Secretary as suitably qualified and experienced person to prepare the plan, and the date he was endorsed.</li> <li><u>Optional</u> - a copy of the letter from Matthew Sprott Director Resource Assessments, as the nominee of the Planning Secretary, endorsing the Abdullah Uddin could be included as an attachment to the Traffic MP.</li> </ul>	<p>Yes</p>	<p>DPE endorsement of Abdullah Uddin is attached in Appendix D. Section 1.8 of this report has been updated.</p>
<p>b) be prepared in consultation with TfNSW, Shellharbour Council and Kiama Council;</p>	<p>Partial</p>	<ul style="list-style-type: none"> <li>Update Section 1.8 with and Attachment B with the additional responses received from Kiama and Shellharbour Councils, how the TMP addresses the comments / responses, and section references where the comments have been addressed.</li> </ul>	<p>Yes</p>	<p>Table 1.5 and Table 1.6 in Section 1.9 have been updated with cross references.</p>
<p>c) include details of all transport routes and traffic types to be used for development-related traffic;</p>	<p>Partial</p>	<ul style="list-style-type: none"> <li>Sections 4.9 and 4.10.</li> <li>Include discussions of construction traffic routes and types.</li> <li>Update Table 2 to include construction traffic volumes (light and heavy vehicles)</li> </ul>	<p>Yes</p>	<p>Sections 4.9 and 4.10 have been updated with construction related information.</p>
<p>d) describe the processes in place for the control of truck movements entering and exiting the site;</p>	<p>Partial</p>	<ul style="list-style-type: none"> <li>Section 4</li> <li>Include controls for construction traffic – see (f) below.</li> </ul>	<p>Yes</p>	<p>Refer to Sections 4.8 and 5.5.</p>
<p>e) include details of the measures to be implemented to minimise traffic safety issues and disruption to local road users associated with quarry operations;</p>	<p>Yes</p>	<ul style="list-style-type: none"> <li>Section 5</li> </ul>	<p>No</p>	<p>This matter is closed.</p>

**Table 1.1 DPE initial comments on the TMP and EMM responses**

Traffic Management Plan – DA195-8-2004, Schedule 3, Condition 56	Satisfactory (Yes/No/Partial)	DPE Comments	Action Required	EMM responses
f) detail the specific protocols to be observed for the construction of ancillary site infrastructure and site 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;	No	<ul style="list-style-type: none"> <li>• Include protocols to be observed for the construction of ancillary site infrastructure and site 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.</li> <li>• Locations for any VMS to be installed during construction and initial operational phase for introduction of the new right hand turn from Riverside Drive into Stage 5 area needs to be discussed.</li> <li>• Figures showing construction (and operational if possible) management controls should be considered.</li> </ul>	Yes	Refer to Sections 1.6, 1.7.1, 1.7.3, 4.1, 4.9 and 4.10.
g) include a Drivers' Code of Conduct that includes procedures to ensure that drivers: (iv) adhere to posted speed limits or other required travelling speeds; (v) adhere to designated transport routes; and (vi) implement safe and quiet driving practices;	Partial	<ul style="list-style-type: none"> <li>• Section 5</li> <li>• Update for construction traffic as necessary.</li> </ul>	Yes	Refer to Sections 5.3, 5.5, 5.8, 5.10 and 5.11.2.
h) describe the measures to be put in place to ensure compliance with the Drivers' Code of Conduct;	Yes	<ul style="list-style-type: none"> <li>• Section 5</li> </ul>	No	This matter is closed.
i) propose measures to minimise the transmission of dust and tracking of material onto the surface of public roads from vehicles exiting the site;	Yes	<ul style="list-style-type: none"> <li>• Sections 4.4, 4.5 and 4.8</li> </ul>	No	This matter is closed.
j) propose measures (such as the installation of inclinometers) to monitor detect any ground movement adjacent to the Princes Highway as a result of the extraction in Stage 5B; and	No	<ul style="list-style-type: none"> <li>• Section 4.11 notes these conditions would be addressed prior to commencement of Stage 5B extraction.</li> </ul>	Yes	Section 4.11 has been updated.

**Table 1.1 DPE initial comments on the TMP and EMM responses**

Traffic Management Plan – DA195-8-2004, Schedule 3, Condition 56	Satisfactory (Yes/No/Partial)	DPE Comments	Action Required	EMM responses
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.		<ul style="list-style-type: none"> <li>The Traffic MP has been prepared for the construction, Stage 5A and Stage 5B. Consequently, these conditions relating to Stage 5B should be addressed.</li> </ul>	Yes	Section 4.11 has been updated.
56A The Applicant must implement the Traffic Management Plan as approved by the Planning Secretary	Yes	Entire document	No	This matter is closed.

**Table 1.2 June 2023 DPE comments and EMM responses**

Development Consent Reference	Condition	Sub Section	Is the condition satisfied?	DPE Comments	EMM comments
53A. Stage 5 Access	Prior to any heavy vehicle access to the Stage 5 extraction areas, the Applicant must construct a channelised right turn intersection with appropriate line marking from Riverside Drive to the Stage 5A extraction area, to the satisfaction of the relevant road’s authority and in accordance with the Austroads Guide to Road Design Part 4: Intersections and Crossings – General		Partial	The Department notes that the 2022 Annual Review indicates that extraction in the Stage 5 areas has commenced and that the new access from Riverside Drive has been constructed. Recommend updating relevant sections of the Plan to reflect this (eg. section 1.7.1).	Refer to Section 1.7.1 which has been updated with further information.

**Table 1.2 June 2023 DPE comments and EMM responses**

Development Consent Reference	Condition	Sub Section	Is the condition satisfied?	DPE Comments	EMM comments
56. Traffic Management Plan	Prior to undertaking any construction transportation activities relating to Modification 2, the Applicant must prepare a Traffic Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:	b) be prepared in consultation with TfNSW, Shellharbour Council and Kiama Council;	Partial	Consultation for previous revision included in Table 1.4, Table 1.5 and Appendix B.	<p>The TMP, version 5, dated 14 April 2023, was sent to TfNSW by email on 5 June 2023.</p> <p>On 3 July 2023, TfNSW letter has been received with the following comment:</p> <p><i>“TfNSW will need to be advised of the trigger value and precise locations of the inclinometers when this information is available. Please advise TfNSW by contacting <a href="mailto:development.south@transport.nsw.gov.au">development.south@transport.nsw.gov.au</a>.”</i></p> <p>On the same day (3 July 2023), the proponent sent an email to TfNSW by addressing the trigger value and locations of the inclinometers. All correspondences are attached in (Appendix B).</p>

**Table 1.2 June 2023 DPE comments and EMM responses**

Development Consent Reference	Condition	Sub Section	Is the condition satisfied?	DPE Comments	EMM comments
		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.	Partial	<p>Section 4.11 states that a trigger value will be established to identify any notable ground movements. Should such ground movement occur, Geomatrix will be contacted to confirm the reading. If the reading is confirmed, TfNSW will be advised via email.</p> <p>More detail is required as to what the trigger value will be and what will constitute a notable ground movement.</p> <p>No measures are included to address any detected material ground movements. Please include clear actions that would be taken in the event that material ground movements are detected.</p> <p>This section should clearly describe how the long term stability of the stage 5B extraction area on the Princess Highway Road reserve will be demonstrated.</p> <p>Please also update in response to any comments from TfNSW if necessary.</p>	<p>Geomatrix has advised that a 20 mm trigger value for the inclinometers will be sufficient to ensure any significant ground movements trigger alerts. It is possible that the inclinometers will read variations due to multiple inputs, from heat of the day, extreme tides, local flooding, local depression of ground water in periods of extended dry. Also slumping caused by the extraction may occur over time. As such, a few months of data will provide an ability to calculate what extent of ground movement is characteristic of these natural phenomena.</p> <p>20 mm of ground movement was selected as a trigger value as this extent of ground movement is considered significant enough to warrant an investigation.</p> <p>If Boral trucks exceed this Site Specific Trigger Value (SSTV), Boral will conduct an internal investigation using data analysis to determine the cause of the movement.</p> <p>To date all trends in ground movement have been very linear and small. Therefore, in the future it will be very easy to determine if Boral trucks cause any issues or not.</p> <p>Boral is currently undertaking a weekly analysis on daily ground movement results. They will continue to carefully monitor the data and report any anomalies (value over 20 mm) to TfNSW.</p>

### 1.3 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 25 m truck and trailer combination and will be tipped directly into the pit(s) and spread with a dozer.

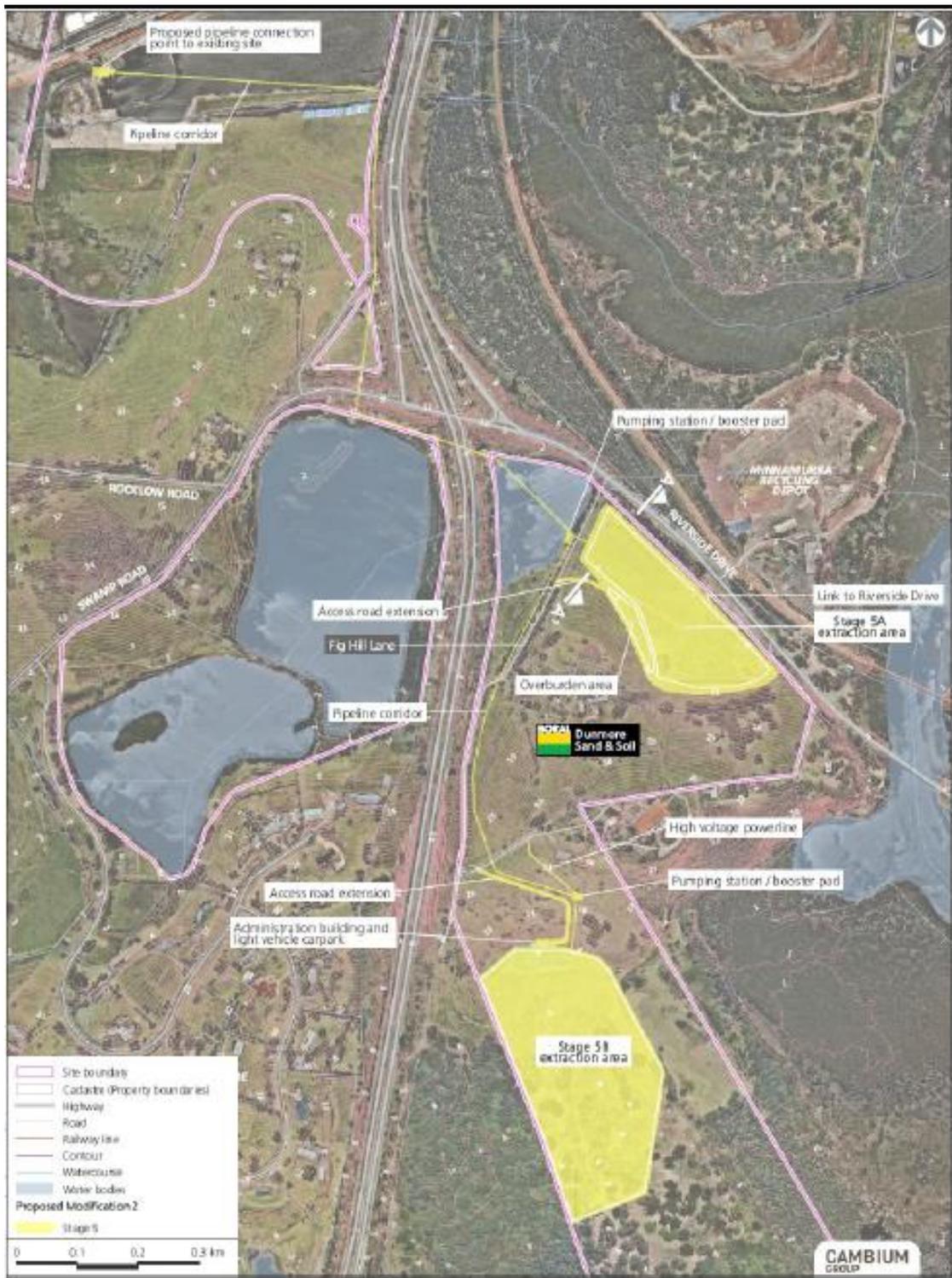


Figure 1.1 Stages 5A and 5B extraction areas

## 1.4 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.

## 1.5 Operating hours

The quarry will operate during the approved hours in accordance with development consent Table 2, Condition 14 (see Table 1.3 below).

**Table 1.3** 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.

## 1.6 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.

## 1.7 Access

### 1.7.1 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<sup>4</sup> 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 Appendix 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 Depot)

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).

Construction of the intersection and required road works has commenced in line with Condition 53A and 53B of the Conditions of Consent. No Heavy Vehicles including VENM trucks will access the Stage 5 extraction areas until the intersection and all required road works are completed.

<sup>4</sup> <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

### 1.7.2 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 1.4:

**Table 1.4** 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 m from the new access opposite Fig Hill Lane access. For the northbound traffic, the VMS board will be placed 140 m 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.

### 1.7.3 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.

## 1.8 Report preparation

This report has been prepared by Abdullah Uddin who has 19 years of experience in the traffic engineering and transport planning. Abdullah has been endorsed by DPIE and the Planning Secretary to prepare this report. The endorsement letter has been attached in Appendix D.

## 1.9 Consultation

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

- Transport for NSW (TfNSW)
- Shellharbour City Council (SCC)
- 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 1.5 and Table 1.6 along with EMM responses. The email correspondence from EMM to the agencies is provided in Appendix B.

**Table 1.5 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 1.6 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 (Section 1.7.1). 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 1.7.2) 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:

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

### 2.2 Standards and guidelines

The guidelines relevant to this TMP are:

- Manual of Uniform Traffic Control Devices: AS1742
- Austroads Guides to Traffic Management
- 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 1.8
(b)	be prepared in consultation with TfNSW, Shellharbour Council and Kiama Council;	Section 1.9
(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
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

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

Condition No 56	Condition relating to TMP	Relevant report section
(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

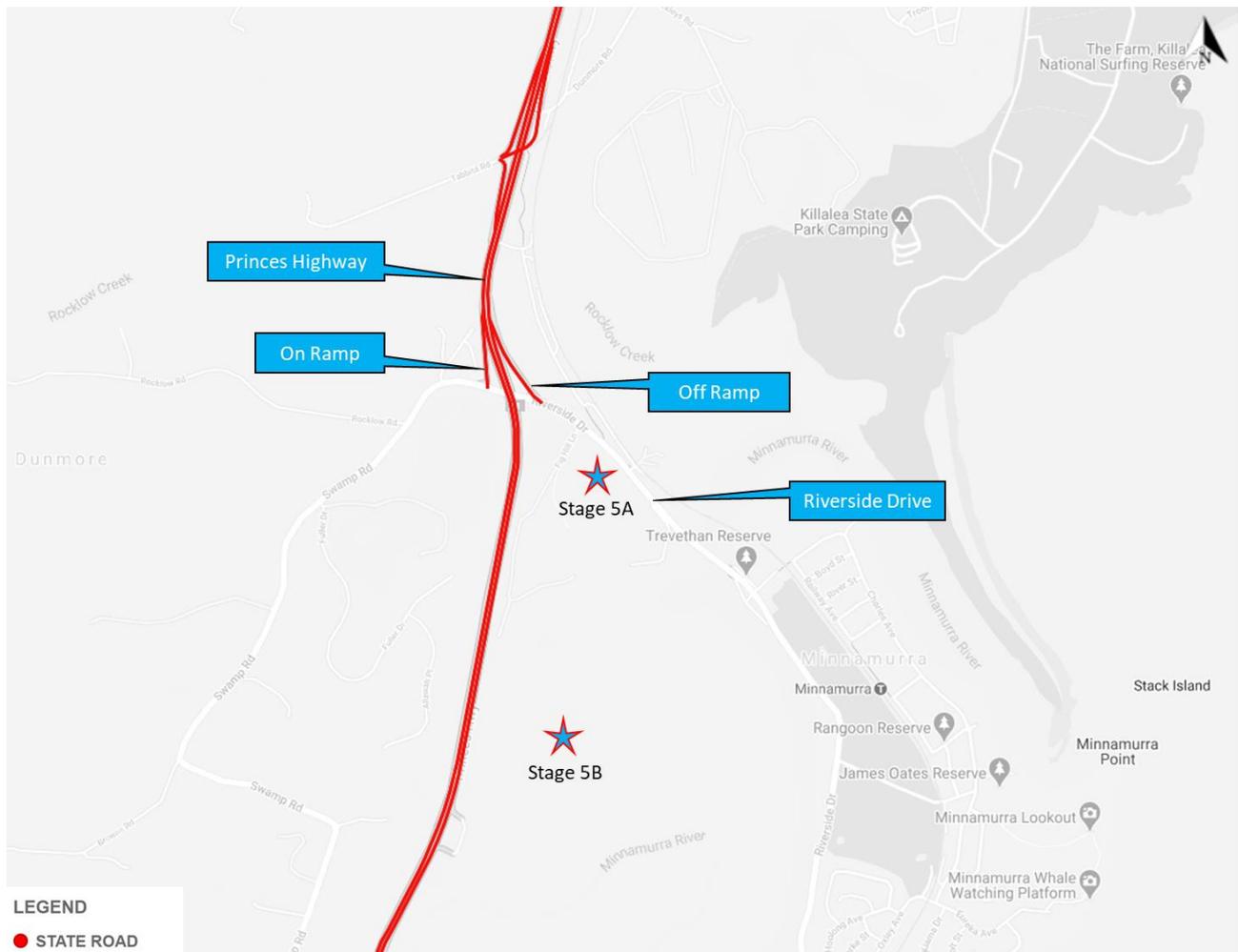
### 3 Existing conditions

#### 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).
- 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 e.g. EPA, DPIE etc. In total 10 car parking spaces will be provided next to the office.

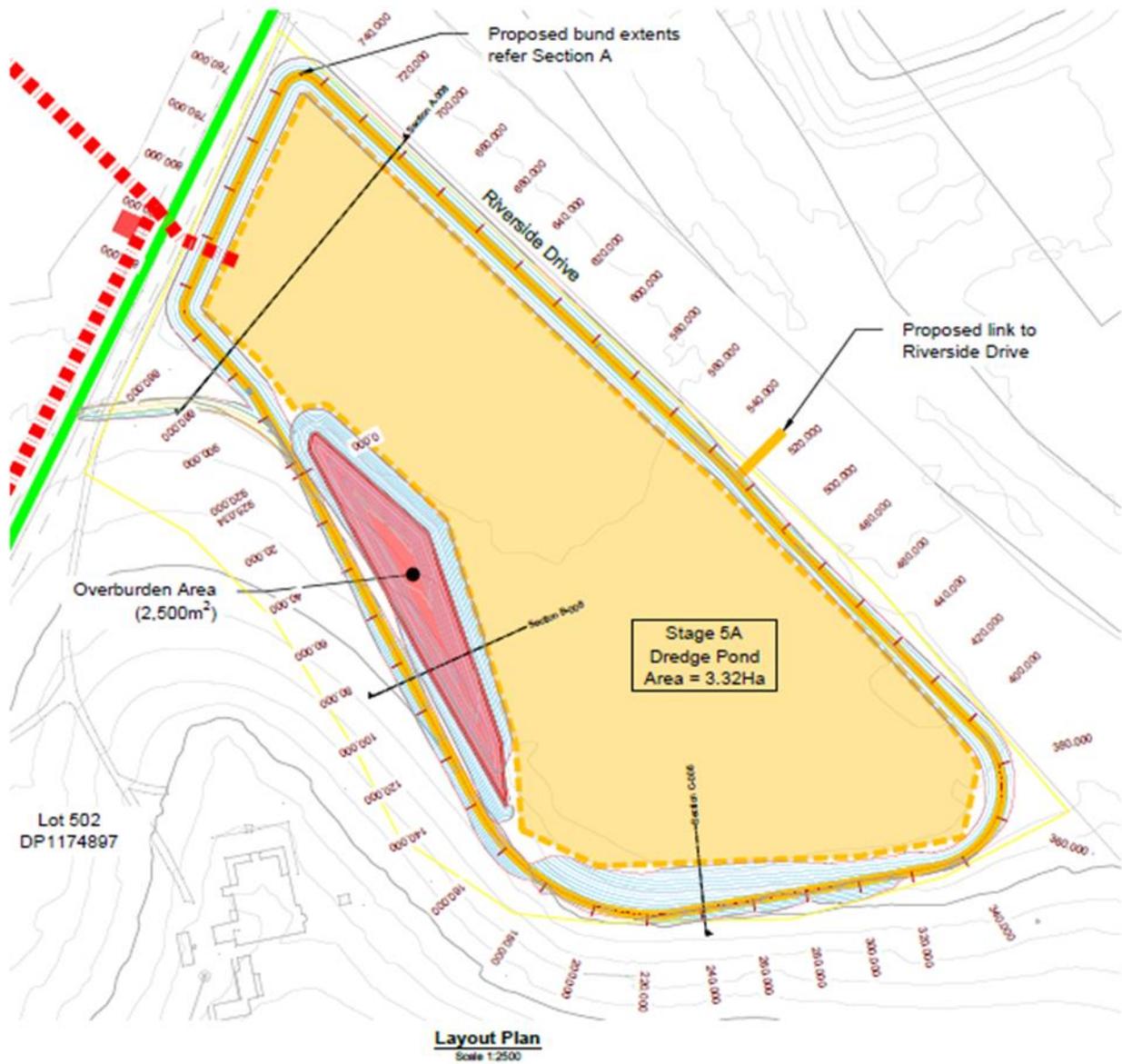


Figure 4.1 Site layout Stage 5A

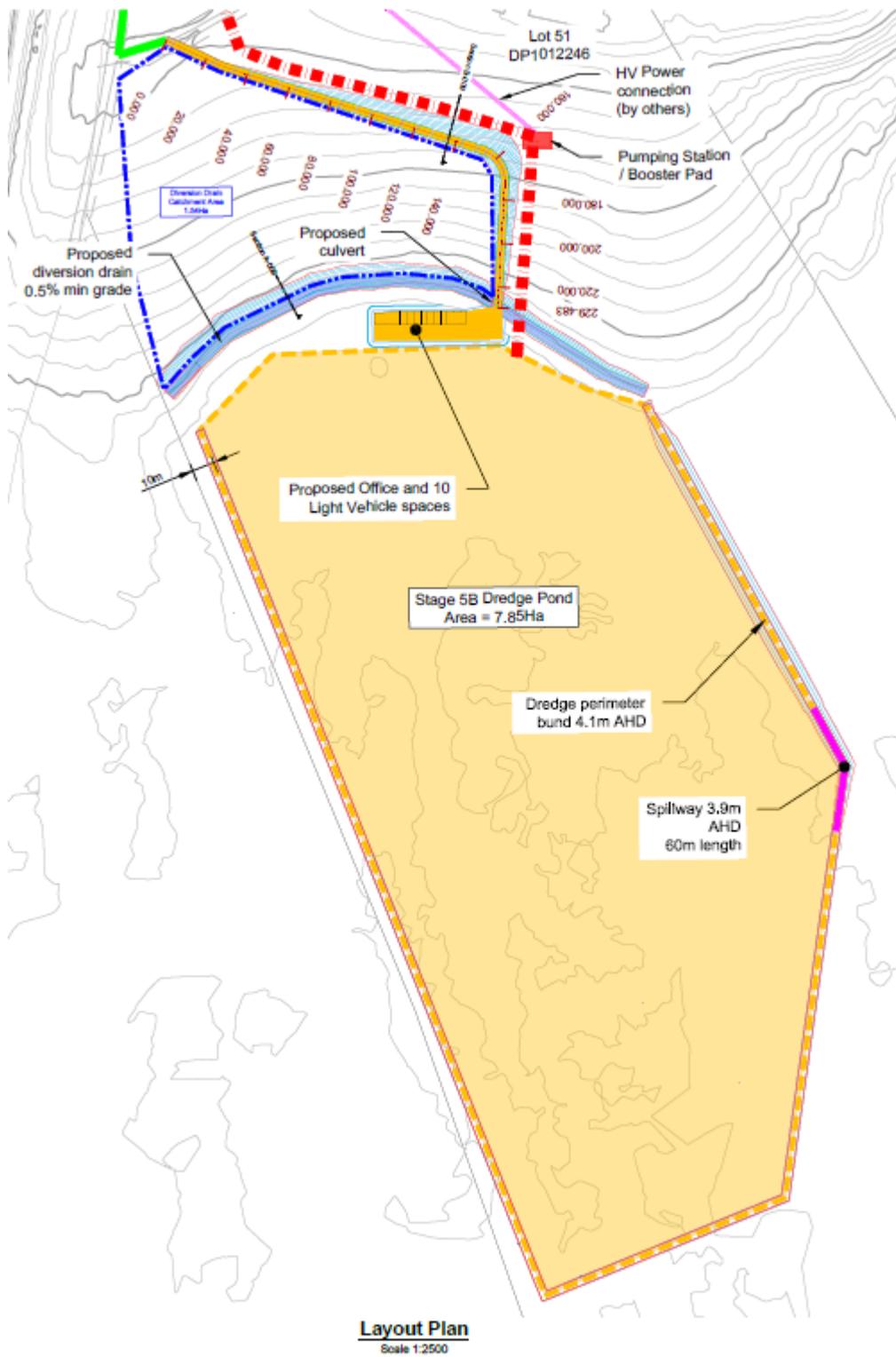


Figure 4.2 Site layout Stage 5B

### 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 1.7.2, 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

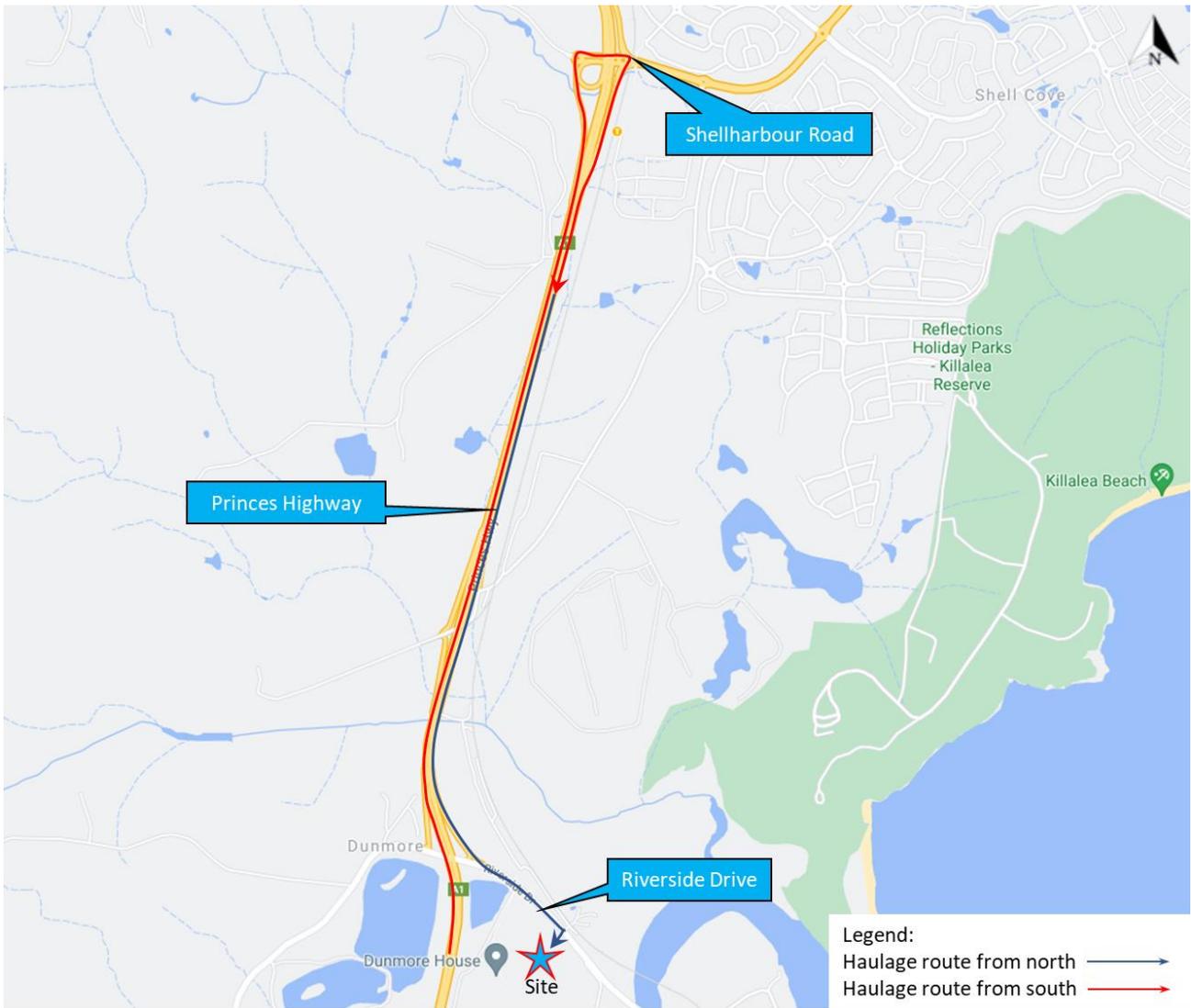
It is expected that majority of the trucks transporting VENM to Stage 5 areas will approach the site from north along Princes Highway in a southbound direction, use the Princes Highway off-ramp onto Riverside Drive, and then travel southbound along Riverside Drive before turning right into the site.

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

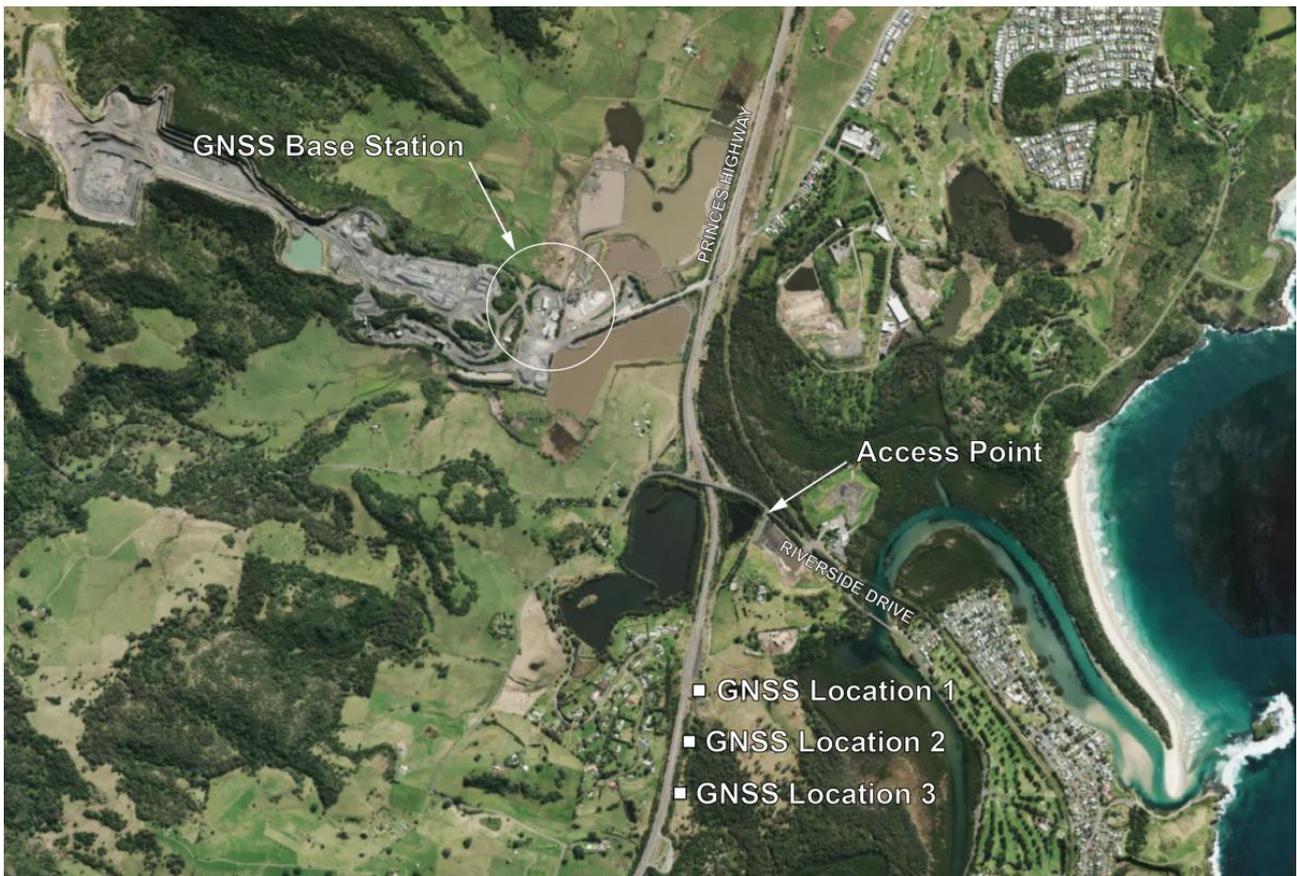
The heavy vehicle types accessing the site would vary between an 8.8-m long Medium Rigid Vehicle (MRV) and a 25m truck and trailer combination. The maximum size of vehicle accessing the site would be a 25m truck and trailer combination. Vehicles associated with construction activities are expected to 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. The monitoring device has been installed along the highway in January 2023 (Figure 4.4). The data collection will continue for total duration of the project. This means, the ground movement monitoring would cover both the existing situation (without Stage 5B) and whole duration after commencement of operation of Stage 5B.

The live data are regularly monitored by monthly basis. If there are any notable movement of the ground, the devices automatically send a signal to the base station. Since installation of the devices in January 2023, no signal/alert has been noted to date.

The annual report will be submitted to the relevant authorities, except any distinct signal of the ground movement. If it occurs, the authorities will be informed immediately.



**Figure 4.4** Location of the ground movement monitoring equipment

## 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
- 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.
- 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):

- feeling sleepy
- feeling physically or mentally tired, weary or drowsy
- feeling exhausted or lacking energy
- 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
- drivers to obey the operating hours outlined in Section 1.5.

## 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 Cleanliness

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.
- 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 wheel wash 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
- 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.

---

# Appendix A

Detailed design for site proposed access

---

# 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	C
EMM - C01	NOTES	C
EMM - C02	SURVEY AND SERVICES PLAN	C
EMM - C03	EROSION AND SEDIMENT CONTROL PLAN	C
EMM - C04	CONSTRUCTION PLAN	C
EMM - C05	LONGITUDINAL SECTIONS	C
EMM - C06	CROSS SECTION	C
EMM - C07	SIGNS AND LINEMARKING PLAN	C
EMM - C08	SWEPT PATHS PLAN	C

### CONSTRUCTION

REV	DATE	COMMENT	DRAWN	REVIEWED	REV	DATE	COMMENT	DRAWN	REVIEWED
C	17/3/23	FOR CONSTRUCTION	K.M.	C.J.					
B	22/8/21	FOR COMMENT	C.J.	C.J.					
A	17/6/21	FOR COMMENT	C.J.	C.J.					
-	12/5/21	FOR COMMENT	P.B.	C.J.					

**EMM**  
 creating opportunities  
 SYDNEY | Suite 01  
 Ground Floor  
 20 Chandos Street,  
 St Leonards NSW 2065  
 Phone # 02 9493 9500  
 www.emmconsulting.com.au

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: C

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 (DG820) COMPACTED TO 98% MAXIMUM MODIFIED DRY DENSITY (MMD) 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.
5. LATERAL SUPPORTS: PROVIDE LATERAL SUPPORT AT LEAST EQUAL TO THAT GIVEN BY THE STRUCTURE TO BE DEMOLISHED, USING SHORING.
6. VERTICAL SUPPORTS: PROVIDE SUPPORT WHERE NECESSARY USING PILING OR UNDERPINNING, OR BOTH.
7. PROVIDE DUST PROOF SCREENS, BULKHEADS AND COVERS TO PROTECT EXISTING FINISHES AND THE IMMEDIATE ENVIRONMENT FROM DUST AND DEBRIS.
8. DO NOT USE EXPLOSIVES.
9. 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 SMS 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 UNO.
4. PIPES SHALL GENERALLY BE LAID AT THE GRADES INDICATED ON THE DRAWINGS. MINIMUM COVER TO PIPES 300mm DIA. AND OVER GENERALLY SHALL BE 600mm IN CARPARK & ROADWAY AREAS UNO.
5. 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.
6. BACKFILL TRENCHES WITH APPROVED FILL COMPACTED IN 200MM LAYERS TO 98% OF STANDARD DENSITY.
7. ANY PIPES OVER 16% GRADE SHALL HAVE CONCRETE BULKHEADS AT ALL JOINTS PITS SHALL BE AS DETAILED WITH METAL GRATES AT LEVELS INDICATED. ALL PITS DEEPER THAN 1000mm TO HAVE CLIMB IRONS.
8. INSTALL TEMPORARY SEDIMENT BARRIERS TO INLET PITS, TO COUNCIL'S STANDARDS UNTIL SURROUNDING AREAS ARE PAVED OR GRASSED.
9. PIT LOCATIONS AND LEVELS MAY BE VARIED TO SUIT SITE CONDITIONS AFTER CONSULTING COUNCIL'S REPRESENTATIVE.
10. HAND-EXCAVATE STORMWATER PIPES IN VICINITY OF TREE ROOTS.
11. 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 DENOTES 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. RL 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:

Table with 6 columns: ELEMENT, STRENGTH GRADE (MPa), SLIP (mm), MAX. AGGREG. SIZE (mm), CAST IN FORMS AND NOT EXPOSED (mm), CAST IN FORMS AND EXPOSED (mm). Rows for 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 CHAMFFERS, 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 BY 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 DRIFLINE 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

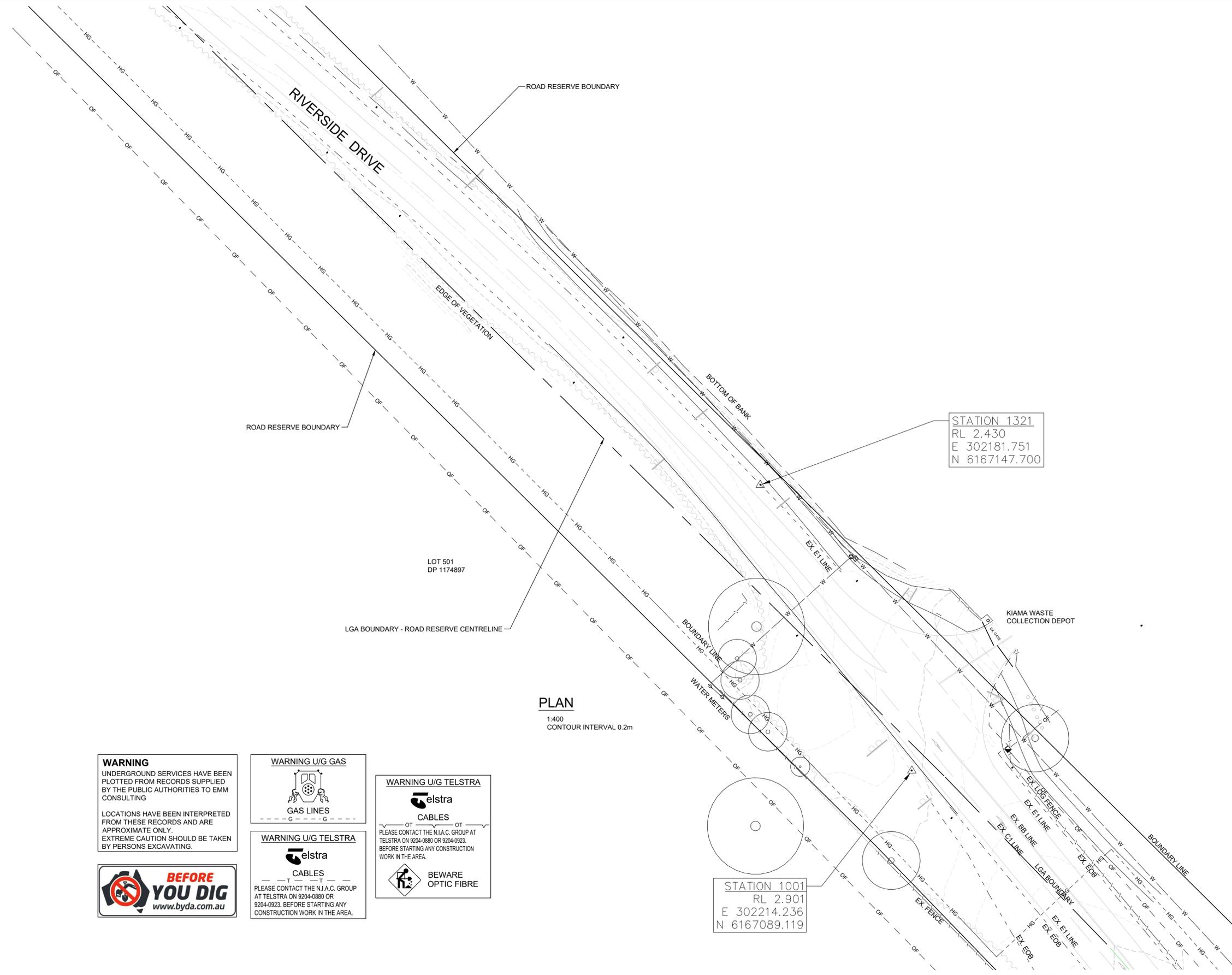
1. GENERAL MEASURES

- 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 REGRAIDDING 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 RPPM'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.

CONSTRUCTION DRAWING TITLE: BORAL, DUNMORE QUARRY RIVERSIDE DRIVE, DUNMORE. ACCESS WORKS. CLIENT: BORAL LTD. DRG. #: EMM - C01. PROJECT #: J210315. SCALE: AS SHOWN. REV: C. Includes EMM logo and revision table.



**PLAN**  
1:400  
CONTOUR INTERVAL 0.2m

STATION 1321  
RL 2.430  
E 302181.751  
N 6167147.700

STATION 1001  
RL 2.901  
E 302214.236  
N 6167089.119

**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.

**WARNING U/G GAS**  
GAS LINES

**WARNING U/G TELSTRA**  
CABLES  
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

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



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

**CONSTRUCTION**

SYDNEY | Suite 01  
Ground Floor  
20 Chandos Street,  
St Leonards NSW 2065  
Phone # 02 9493 9500  
www.emmconsulting.com.au

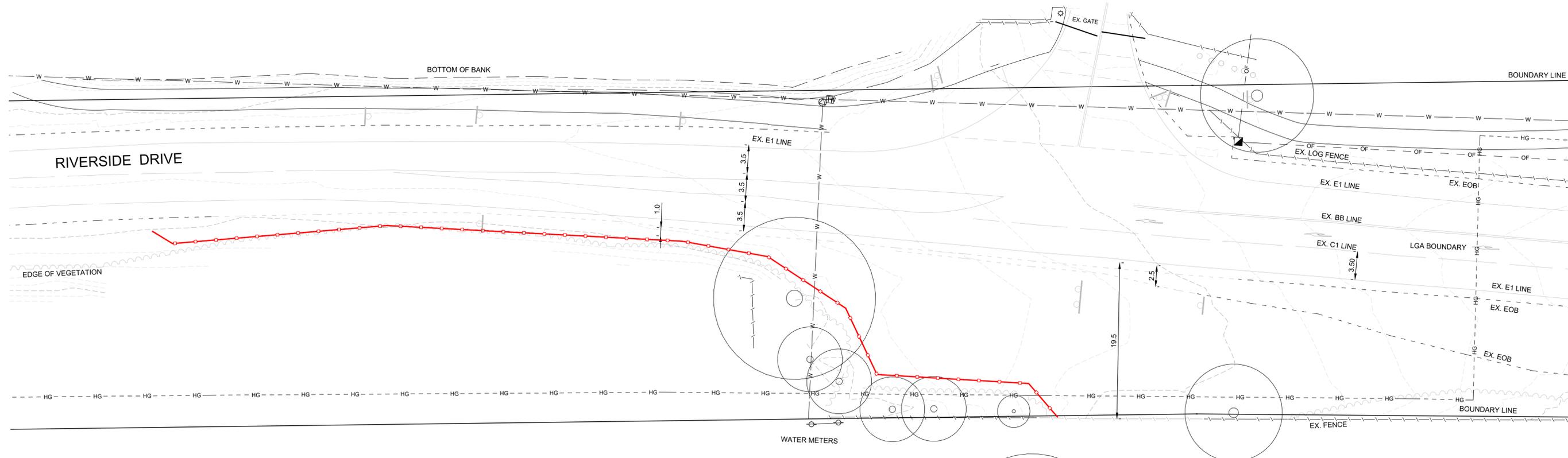
REV	DATE	COMMENT	DRAWN	REVIEWED	REV	DATE	COMMENT	DRAWN	REVIEWED
C	17/3/23	FOR CONSTRUCTION	K.M.	C.J.					
A	17/6/21	FOR COMMENT	C.J.	C.J.					
-	12/5/21	FOR COMMENT	P.B.	C.J.					



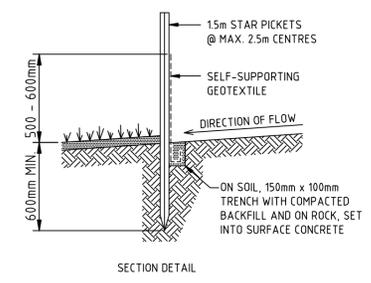
PROJECT:  
**BORAL, DUNMORE QUARRY  
RIVERSIDE DRIVE, DUNMORE.  
ACCESS WORKS**

DRAWING TITLE:  
**SURVEY & SERVICES PLAN**

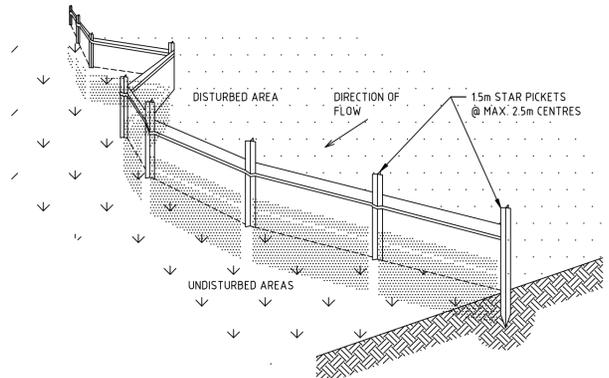
CLIENT: **BORAL LTD.**  
DRG. #: **EMM - C02**  
PROJECT #: **J210315**  
SCALE: **AS SHOWN**  
**REV: C**



**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.

**COMMENTS**

**LEGEND**

—○—○— SEDIMENT FENCE

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

**CONSTRUCTION**



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
C	17/3/23	FOR CONSTRUCTION	K.M.	C.J.					
-	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:  
**EROSION AND SEDIMENT CONTROL  
PLAN**

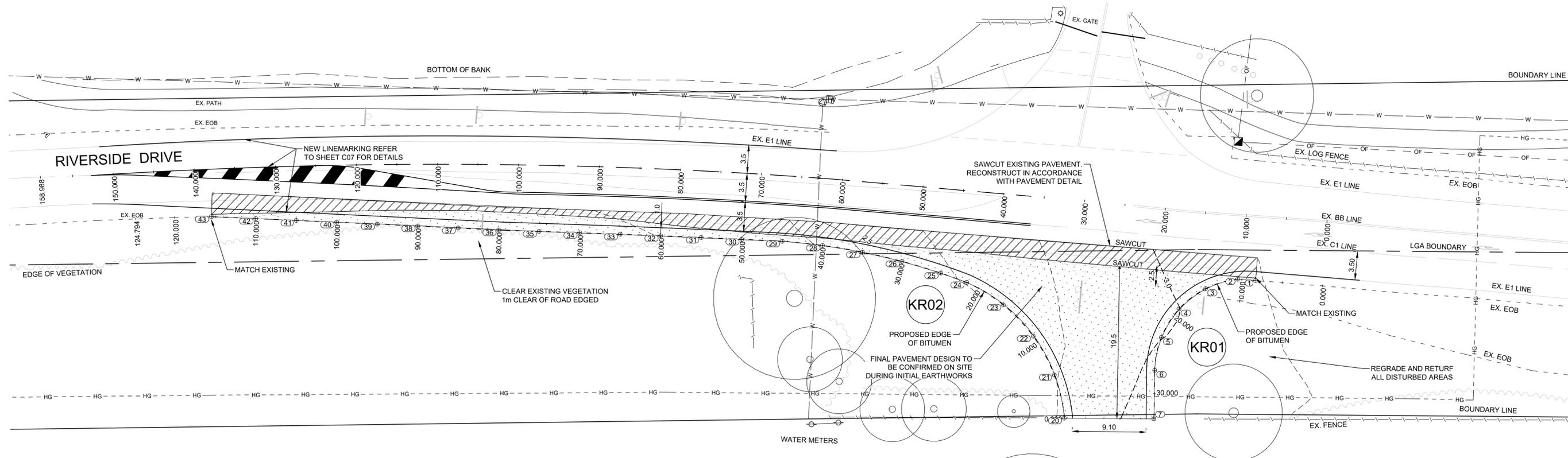
CLIENT: **BORAL LTD.**

DRG. #: **EMM - CO3**

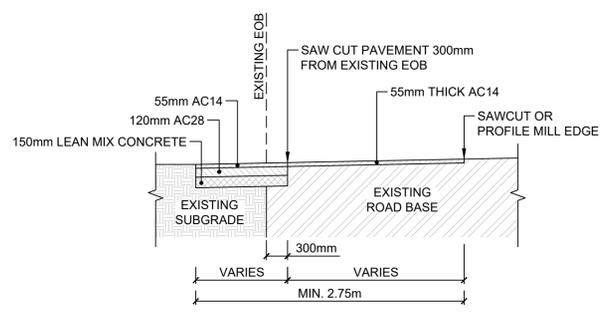
PROJECT #: **J210315**

SCALE: **AS SHOWN**

**REV: C**



PLAN  
SCALE 1:250



PAVEMENT DETAIL  
SCALE 1:50

**SETOUT TABLE - EDGE OF BITUMEN (KR01)**

POINT No.	EASTING	NORTHING	R.L.	DESCRIPTION
1	302223.686	6167080.144		MATCH
2	302222.227	6167081.817	3.144	TP
3	302218.569	6167083.733	3.061	MP
4	302214.471	6167084.233	3.006	MP
5	302210.460	6167083.253	3.000	MP
6	302207.054	6167080.920	3.034	TP
7	302202.801	6167076.710	3.088	MP

**SETOUT TABLE - EDGE OF BITUMEN (KR02)**

POINT No.	EASTING	NORTHING	R.L.	DESCRIPTION
20	302194.955	6167084.503	2.851	TP
21	302197.799	6167089.173	2.790	MP
22	302199.271	6167094.420	2.730	MP
23	302199.328	6167099.727	2.672	MP
24	302198.024	6167104.871	2.613	TP
25	302196.542	6167107.931	2.576	MP
26	302194.127	6167112.308	2.521	MP
27	302191.439	6167116.523	2.466	MP
28	302188.490	6167120.559	2.411	MP
29	302185.291	6167124.401	2.356	TP
30	302181.892	6167128.067	2.301	MP
31	302178.472	6167131.715	2.251	MP

**SETOUT TABLE - EDGE OF BITUMEN (KR02)**

POINT No.	EASTING	NORTHING	R.L.	DESCRIPTION
32	302175.042	6167135.354	2.206	MP
33	302171.604	6167138.983	2.168	MP
34	302168.155	6167142.604	2.135	MP
35	302164.698	6167146.216	2.109	MP
36	302161.239	6167149.826	2.089	MP
37	302157.842	6167153.495	2.076	MP
38	302154.440	6167157.159	2.068	MP
39	302151.033	6167160.819	2.064	MP
40	302147.622	6167164.475	2.062	MP
41	302144.206	6167168.126	2.063	MP
42	302140.786	6167171.773	2.067	MP
43	302137.036	6167175.760		MATCH

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
- DESIGN CONTOURS

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	⊞

- NOTES:
- The right turn bay lane has been designed based on and in accordance with Austroads guides to traffic engineering practice.
  - Design speed is 80km/h and lanes typically 3.5m wide.
  - The right turn bay provides for storage of 11 vehicles.
  - The right turn bay is 85m long including a 20m taper.
  - Final pavement design to be confirmed on site during initial earthworks.



CONSTRUCTION

REV	DATE	COMMENT	DRAWN	REVIEWED	REV	DATE	COMMENT	DRAWN	REVIEWED
C	17/3/23	FOR CONSTRUCTION	K.M.	C.J.					
-	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**

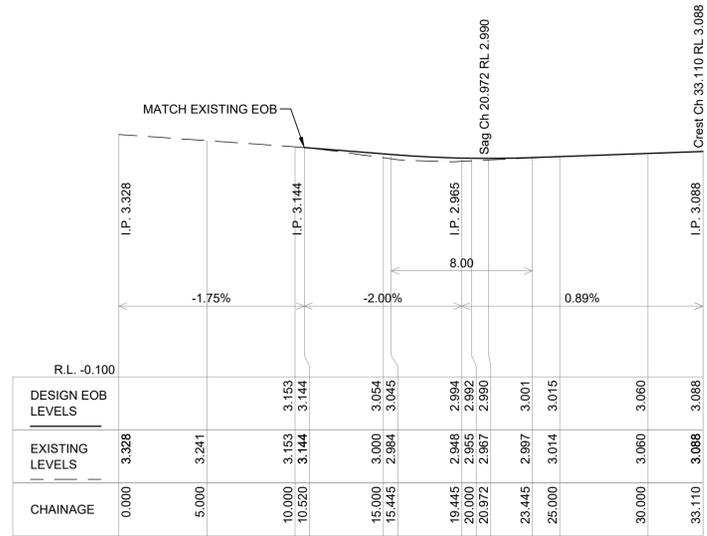
**REV: C**

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

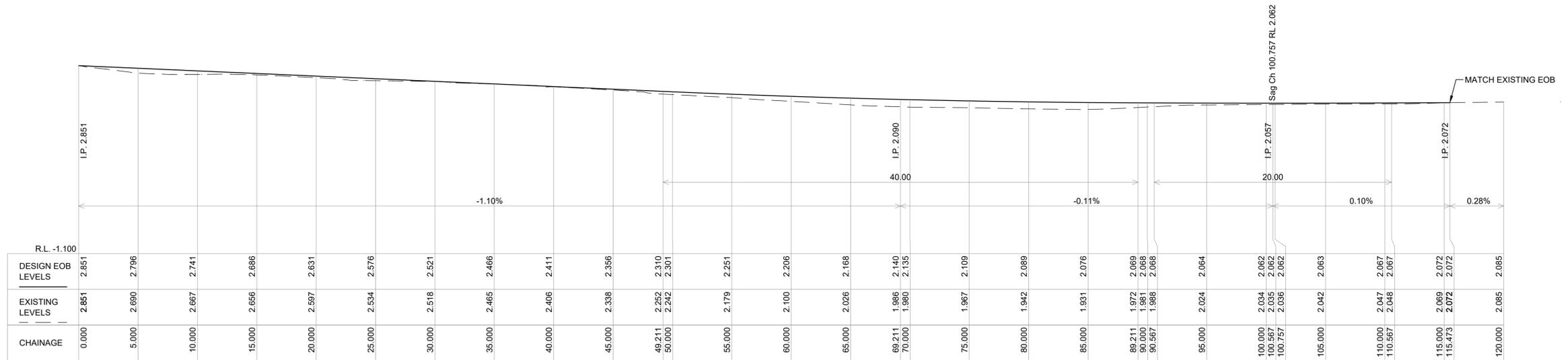
Phone # 02 9493 9500

www.emmconsulting.com.au





LONGITUDINAL SECTION - KR01  
 SCALES: HORIZONTAL 1:200 VERTICAL 1:50



LONGITUDINAL SECTION - KR02  
 SCALES: HORIZONTAL 1:200 VERTICAL 1:50

CONSTRUCTION

SYDNEY | Suite 01  
 Ground Floor  
 20 Chandos Street,  
 St Leonards NSW 2065  
 Phone # 02 9493 9500  
 www.emmconsulting.com.au

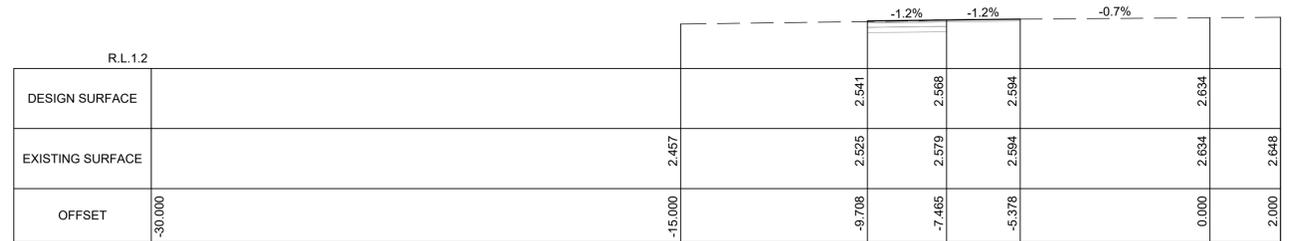
REV	DATE	COMMENT	DRAWN	REVIEWED	REV	DATE	COMMENT	DRAWN	REVIEWED
C	17/3/23	FOR CONSTRUCTION	K.M.	C.J.					
-	17/6/21	FOR COMMENT	C.J.	C.J.					
-	12/5/21	FOR COMMENT	P.B.	C.J.					

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

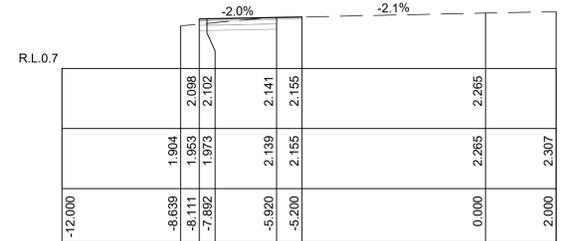
DRAWING TITLE:  
 LONGITUDINAL SECTIONS

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

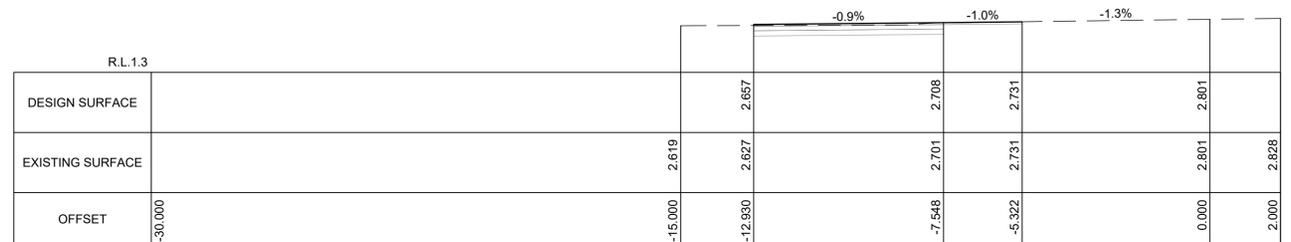
REV: C



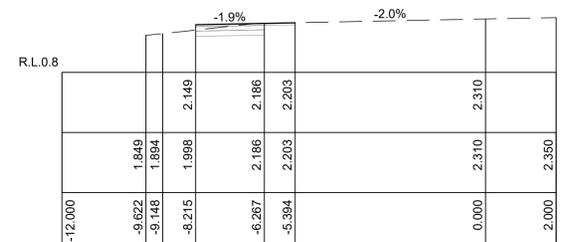
CH 50.00



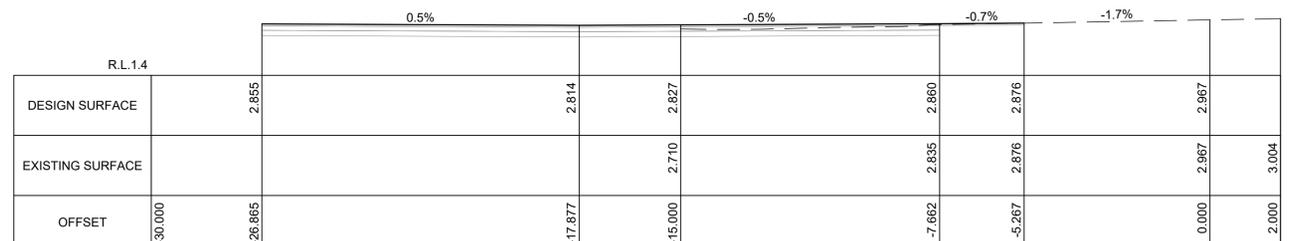
CH 100.00



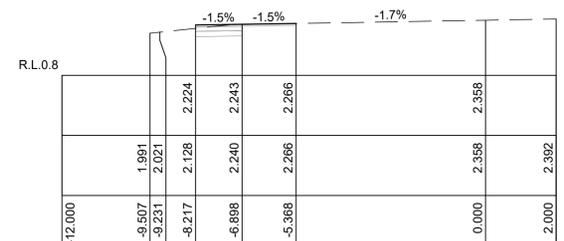
CH 40.00



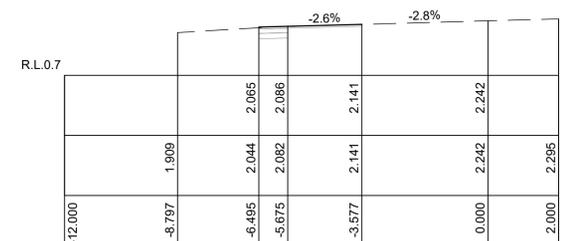
CH 90.00



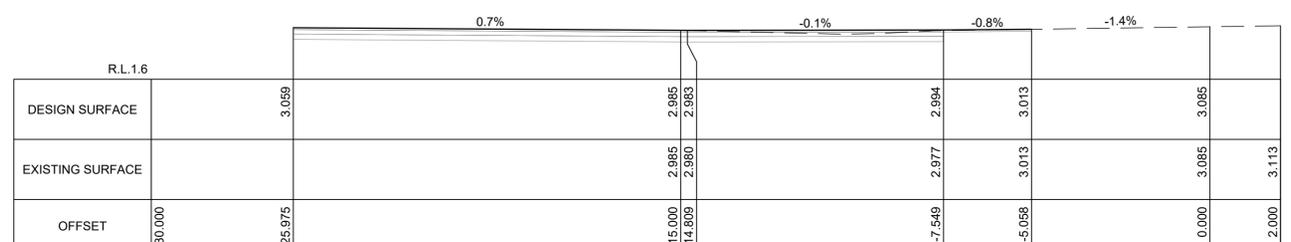
CH 30.00



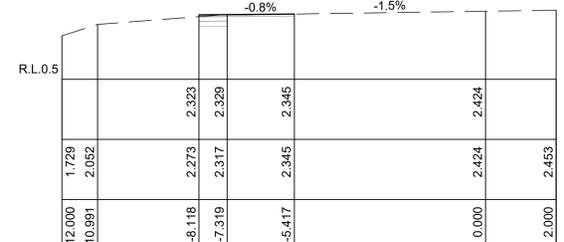
CH 80.00



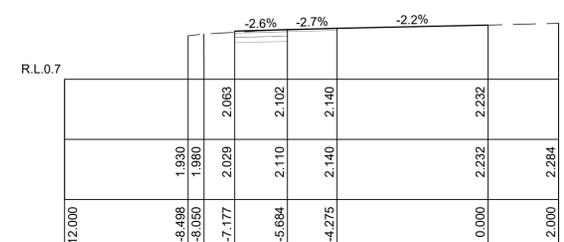
CH 130.00



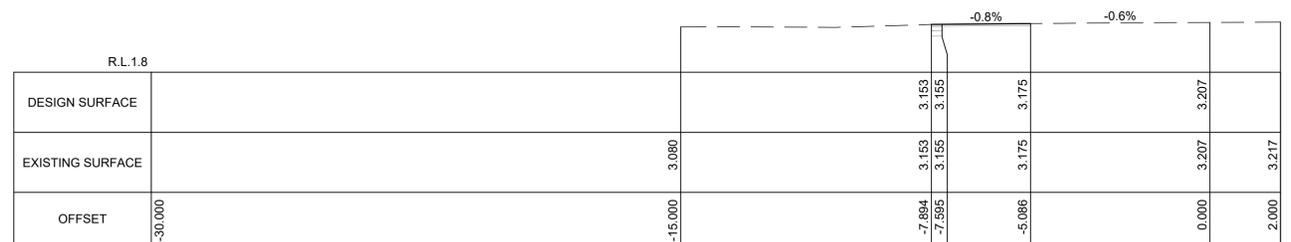
CH 20.00



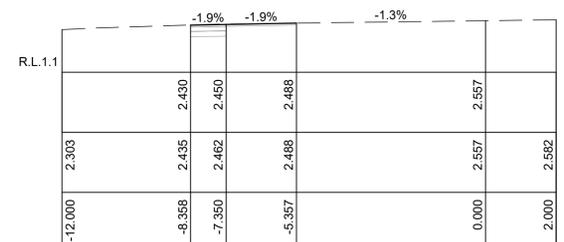
CH 70.00



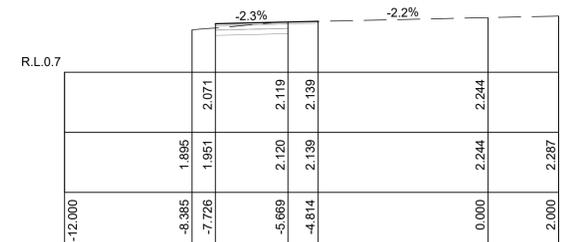
CH 120.00



CH 10.00



CH 60.00



CH 110.00

CONSTRUCTION

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
C	17/3/23	FOR CONSTRUCTION	K.M.	C.J.					
-	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: C**

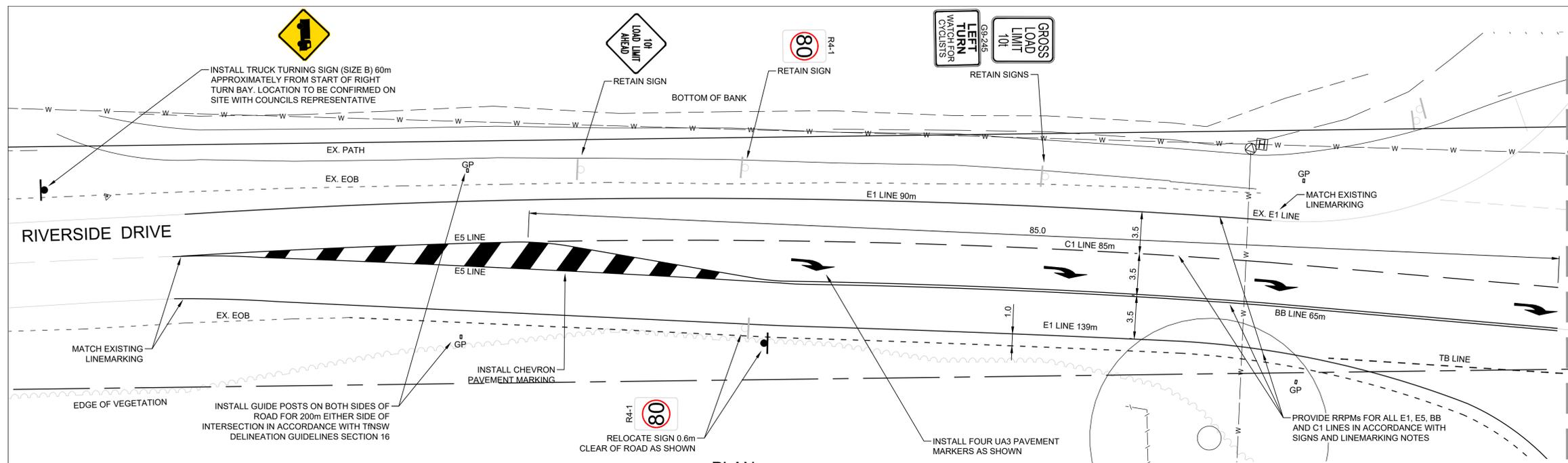
LEGEND

- PROPOSED SIGN
- EXISTING SIGN
- PROPOSED GUIDE POST - INSTALLED IN ACCORDANCE WITH TNSW DELINEATION GUIDELINES SECTION 16

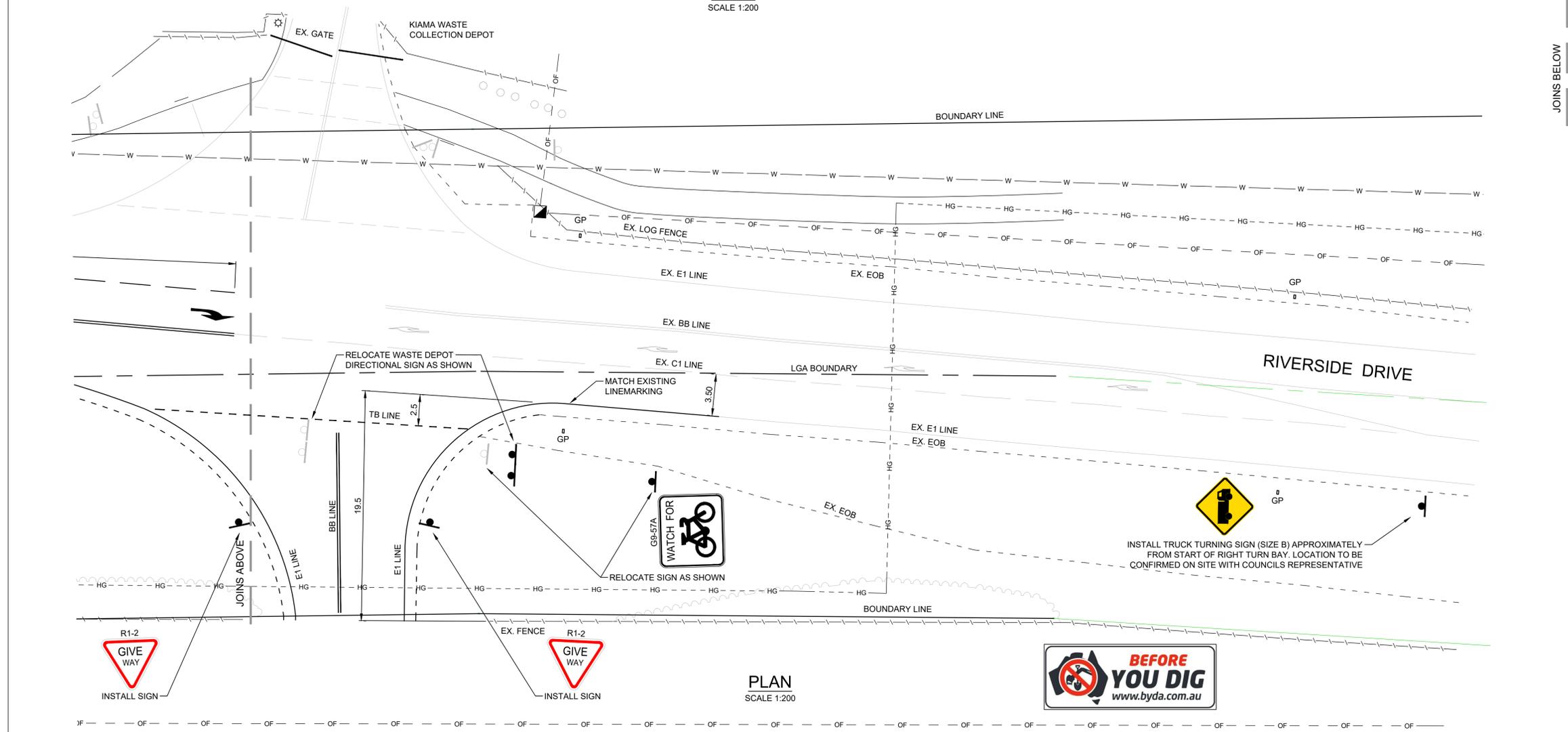
UTILITIES		TELSTRA PILLAR	
WATER MAIN	— W —	TELSTRA PILLAR	⊕
U/G TELSTRA	— T —	TELSTRA PIT	⊞
O/H TELSTRA	— OT —	HYDRANT	⊞
OPTICAL FIBRE	— OF —	STOP VALVE	⊞
GAS MAIN	— G —	POWER POLE	⊞
HP GAS MAIN U/G	— HG —	ELECTRICAL PILLAR	⊞
ELECTRICITY	— E —	POWER LIGHT POLE	⊞
O/H ELECTRICITY	— OH —	LIGHT POLE	⊞
SEWER	— 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 (RRPMs) 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 REMOVEABLE BLACK MASKING TAPE SERIES 715 OR EQUIVALENT).



PLAN  
SCALE 1:200



PLAN  
SCALE 1:200



CONSTRUCTION

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
C	17/3/23	FOR CONSTRUCTION	K.M.	C.J.					
B	22/08/21	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**

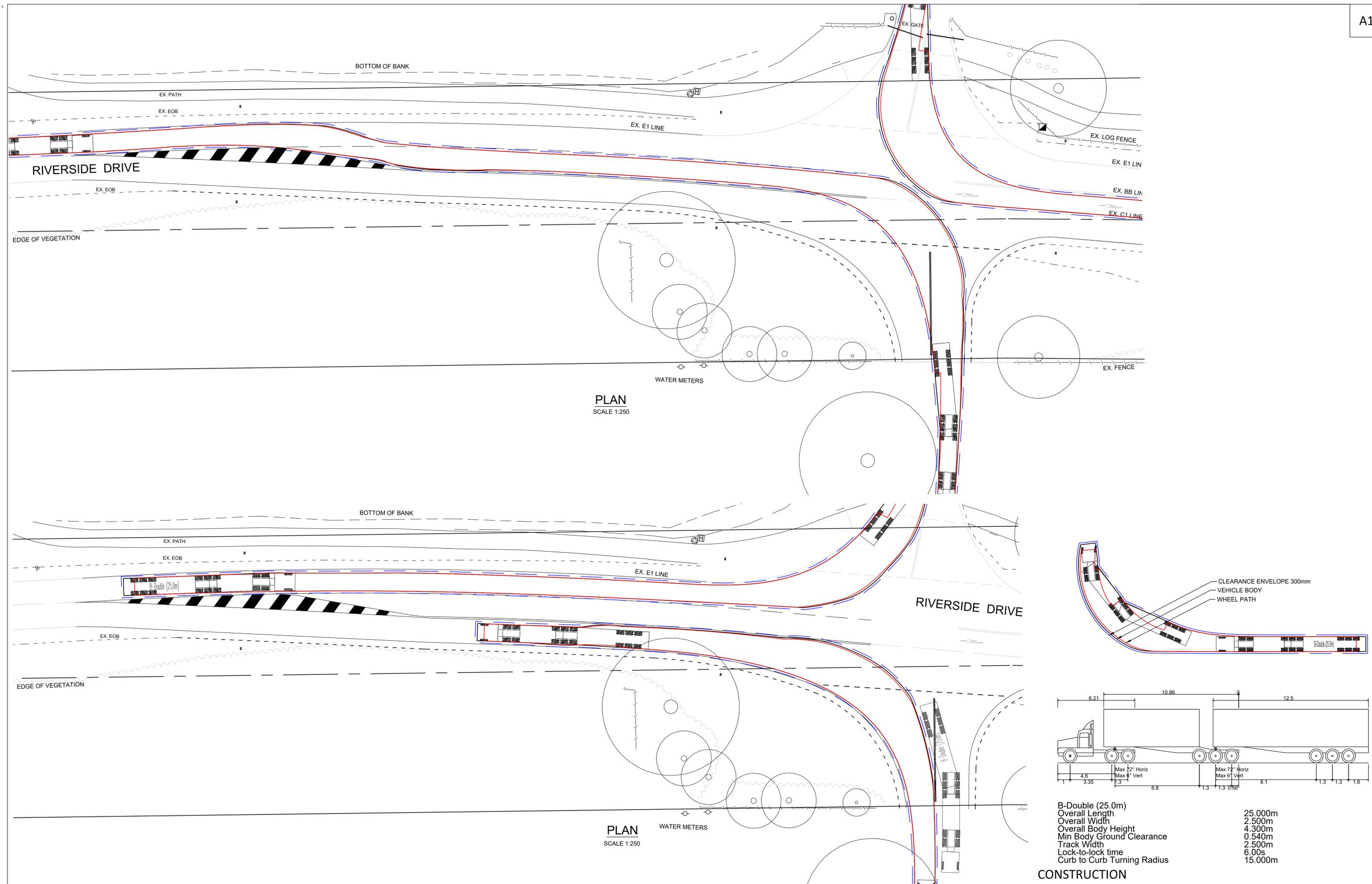
CLIENT: **BORAL LTD.**

DRG. #: **EMM - CO7**

PROJECT #: **J210315**

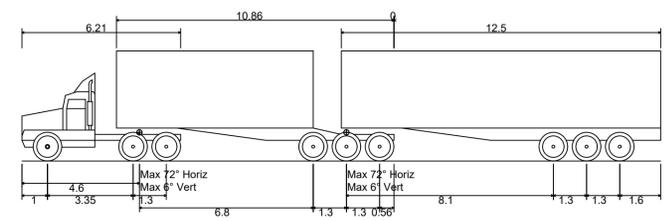
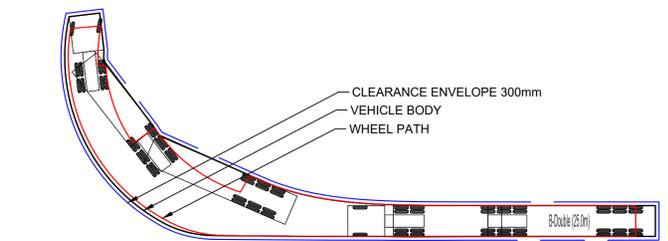
SCALE: **AS SHOWN**

**REV: C**



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

CONSTRUCTION

REV	DATE	COMMENT	DRAWN	REVIEWED	REV	DATE	COMMENT	DRAWN	REVIEWED
C	17/3/23	FOR CONSTRUCTION	K.M.	C.J.					
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: C

SYDNEY | Suite 01  
Ground Floor  
20 Chandos Street,  
St Leonards NSW 2065  
Phone # 02 9493 9500  
www.emmconsulting.com.au



---

# Appendix B

Correspondence from TfNSW, SCC and KMC

---

Department of Planning and Environment

Mr Matt Bray  
Stakeholder and Environment Advisor  
Boral  
38 Tabbitta Road  
Dunmore, New South Wales 2529  
25/07/2023

Dear Mr Bray,

**Dunmore Lakes Quarry (DA195-8-2004) Traffic Management Plan - Request for Additional Information**

I refer to your submission dated 10 July 2023, requesting approval of the Dunmore Lake Quarry Traffic Management Plan (rev 6, 05/07/2023), submitted to the Department of Planning and Environment (the department) as required under the conditions of consent for the Dunmore Lakes Quarry (DA195-8-2004).

After careful consideration, the Department is requesting that you provide additional information detailed in **Attachment A**

Please provide the information to the Department by Friday 4 August 2023. If you are unable to provide the requested information within this timeframe, or you have any questions, please contact Paul-James Caruana, who can be contacted on / at [paul-james.caruana@dpie.nsw.gov.au](mailto:paul-james.caruana@dpie.nsw.gov.au).

Yours sincerely

A handwritten signature in black ink, appearing to be "G. Allan".

Gabrielle Allan  
Team Leader  
Resource Assessments

## Attachment A

Condition	DPE Comments	Company Response	Further Action Required
<p>53A. Stage 5 Prior to any heavy vehicle access to the Stage 5 extraction areas, the Applicant must construct a channelised right turn intersection with appropriate line marking from Riverside Drive to the Stage 5A extraction area, to the satisfaction of the relevant road's authority and in accordance with the Austroads Guide to Road Design Part 4: Intersections and Crossings –General</p>	<p>The Department notes that the 2022 Annual Review indicates that extraction in the Stage 5 areas has commenced and that the new access from Riverside Drive has been constructed. Recommend updating relevant sections of the Plan to reflect this (e.g., section 1.7.1)</p>	<p>Refer to Section 1.7.1 which has been updated with further information.</p> <p>EMM has been advised that the secondary access has not been constructed yet as Boral is not receiving any VENM at Stage 5. However, this new access road is going to be started in the upcoming few weeks, but to date there is no access.</p>	<p>Please include a commitment that no heavy vehicles will access the Stage 5 extraction areas until the intersection is constructed, in accordance with conditions of consent 53A and 53B.</p>

3 July 2023

TfNSW reference: STH11/00218/30  
Your reference: DA195-8-2004-MOD2

Boral  
By Email: [Matt.Bray@boral.com.au](mailto:Matt.Bray@boral.com.au)

Attention: Matt Bray

**DA195-8-2004-MOD2 – Dunmore Lakes Sand Extraction Project Stage 5A and 5B extraction  
– Updated Traffic Management Plan**

Dear Matt

Transport for NSW (TfNSW) is responding to the updated Traffic Management Plan (TMP) for DA195-8-2004-MOD2 (prepared by EMM and dated April 2023) referred on 22 June 2023.

TfNSW has reviewed the information and provides comments in Attachment 1.

If you have any questions, please contact Steven Yuan, Development Services Case Officer, on 02 9983 2596 or email [development.south@transport.nsw.gov.au](mailto:development.south@transport.nsw.gov.au).

Yours faithfully



**Steven Yuan**  
Development Services Case Officer, Development Services

---

OFFICIAL

**DA195-8-2004-MOD2 – Dunmore Lakes Sand Extraction Project Stage 5A and 5B extraction  
– Updated Traffic Management Plan**

**Context**

TfNSW notes for this DA:

- The key state road is Princes Highway; and
- The proponent is seeking feedback from TfNSW on a revised Traffic Management Plan (TMP, see **Attachment 2**), prepared by EMM and dated April 2023, for Modification 2 of the Dunmore Lakes Sand Extraction Project. Modification 2 was sought to provide for two additional extraction areas, Stage 5A and Stage 5B, which will yield 234,000 tonnes and 1.12 million tonnes of sand respectively;
- The traffic generation and routes are consistent with the approved modification consent;
- The TMP has been prepared to satisfy Condition 56 (a)-(k); and
- The proposed modification includes the installation of inclinometers to detect notable ground movements. TfNSW is to be advised via email if notable ground movements occur.

**Additional comments**

Trigger value of inclinometers

- TfNSW will need to be advised of the trigger value and precise locations of the inclinometers when this information is available. Please advise TfNSW by contacting [development.south@transport.nsw.gov.au](mailto:development.south@transport.nsw.gov.au).

## Abdullah Uddin

---

**To:** Matt Bray  
**Subject:** RE: Traffic Management Plan Dunmore Sand and Soil - WAD Dunmore Lakes Sands Quarry, Construction of Pipeline TfNSW re: STH11 00218/30

**From:** Matt Bray <[Matt.Bray@boral.com.au](mailto:Matt.Bray@boral.com.au)>

**Sent:** Monday, July 3, 2023 3:52 PM

**To:** Steven Yuan <[Steven.Yuan2@transport.nsw.gov.au](mailto:Steven.Yuan2@transport.nsw.gov.au)>; Development South <[development.south@transport.nsw.gov.au](mailto:development.south@transport.nsw.gov.au)>

**Subject:** Re: Traffic Management Plan Dunmore Sand and Soil - WAD Dunmore Lakes Sands Quarry, Construction of Pipeline TfNSW re: STH11 00218/30

Good afternoon,

Thanks for your timely response to our updated Traffic Management Plan for Dunmore Lakes Quarry.

Read below the trigger values and GPS coordinates for the Inclinometers, as requested:

### TRIGGER VALUE

20mm of ground movement

LAT	LONG	
Site 01	-34.624338024	150.837374349
Site 02	-34.626076176	150.836726442
Site 03	-34.628441182	150.836280643

Don't hesitate to reach out if you have any further questions.

Kind regards

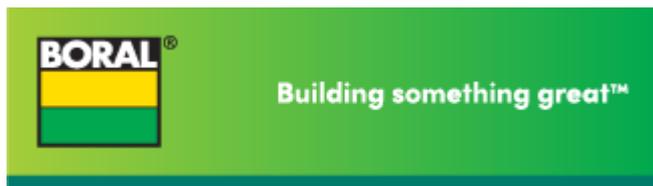
### MATT BRAY

Environmental and Stakeholder Advisor - Dunmore Operations

Telephone: 02 4237 8414

Mobile: 0401 892 239

Email: [Matt.Bray@boral.com.au](mailto:Matt.Bray@boral.com.au)



---

**From:** Steven Yuan <[Steven.Yuan2@transport.nsw.gov.au](mailto:Steven.Yuan2@transport.nsw.gov.au)>

**Sent:** Monday, July 3, 2023 9:59 AM

**To:** Matt Bray <[Matt.Bray@boral.com.au](mailto:Matt.Bray@boral.com.au)>

**Subject:** RE: Traffic Management Plan Dunmore Sand and Soil - WAD Dunmore Lakes Sands Quarry, Construction of Pipeline TfNSW re: STH11 00218/30

Hi Matt,

Please see the attached TfNSW response.

Regards,

Steven Yuan  
Development Case Officer  
Community and Place | South Region  
Regional and Outer Metropolitan  
**Transport for NSW**

T +61 2 9983 2596  
[steven.yuan2@transport.nsw.gov.au](mailto:steven.yuan2@transport.nsw.gov.au)  
Level 4, 90 Crown Street, Wollongong NSW 2500

---

OFFICIAL

**From:** Matt Bray <[Matt.Bray@boral.com.au](mailto:Matt.Bray@boral.com.au)>  
**Sent:** Wednesday, 28 June 2023 10:13 AM  
**To:** Steven Yuan <[Steven.Yuan2@transport.nsw.gov.au](mailto:Steven.Yuan2@transport.nsw.gov.au)>  
**Subject:** Re: Traffic Management Plan Dunmore Sand and Soil - WAD Dunmore Lakes Sands Quarry, Construction of Pipeline TfNSW re: STH11 00218/30

**CAUTION:** This email is sent from an external source. Do not click any links or open attachments unless you recognise the sender and know the content is safe.

Hi Steven,

I would be really grateful if this one could come back by the end of the week.

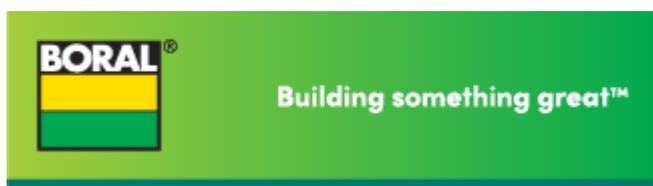
We would like to have the plan all fixed up, signed off by TfNSW and DPE and ready to go by the end of next week, if that's possible. It's holding up a pretty large project for us!

Thanks so much for the prompt response!

Kind regards

**MATT BRAY**  
Environmental and Stakeholder Advisor - Dunmore Operations

Telephone: 02 4237 8414  
Mobile: 0401 892 239  
Email: [Matt.Bray@boral.com.au](mailto:Matt.Bray@boral.com.au)



OFFICIAL

---

**From:** Steven Yuan <[Steven.Yuan2@transport.nsw.gov.au](mailto:Steven.Yuan2@transport.nsw.gov.au)>  
**Sent:** Monday, June 26, 2023 4:20 PM  
**To:** Matt Bray <[Matt.Bray@boral.com.au](mailto:Matt.Bray@boral.com.au)>  
**Subject:** RE: Traffic Management Plan Dunmore Sand and Soil - WAD Dunmore Lakes Sands Quarry, Construction of Pipeline TfNSW re: STH11 00218/30

Hi Matt,

I will aim to provide you with our advice by the end of the week or early next week.

How urgent is this? Is there a specific deadline? This matter will be a priority.

Regards,

Steven Yuan  
Development Case Officer  
Community and Place | South Region  
Regional and Outer Metropolitan  
**Transport for NSW**

T +61 2 9983 2596  
[steven.yuan2@transport.nsw.gov.au](mailto:steven.yuan2@transport.nsw.gov.au)  
Level 4, 90 Crown Street, Wollongong NSW 2500

---

OFFICIAL

**From:** Development South <[development.south@transport.nsw.gov.au](mailto:development.south@transport.nsw.gov.au)>  
**Sent:** Monday, 26 June 2023 2:22 PM  
**To:** Steven Yuan <[Steven.Yuan2@transport.nsw.gov.au](mailto:Steven.Yuan2@transport.nsw.gov.au)>  
**Subject:** FW: Traffic Management Plan Dunmore Sand and Soil - WAD Dunmore Lakes Sands Quarry, Construction of Pipeline TfNSW re: STH11 00218/30

FYI. Can you provide an update?

---

OFFICIAL

**From:** Matt Bray <[Matt.Bray@boral.com.au](mailto:Matt.Bray@boral.com.au)>  
**Sent:** Monday, 26 June 2023 1:22 PM  
**To:** Development South <[development.south@transport.nsw.gov.au](mailto:development.south@transport.nsw.gov.au)>  
**Cc:** Simon Mahy <[Simon.Mahy2@transport.nsw.gov.au](mailto:Simon.Mahy2@transport.nsw.gov.au)>; Abdullah Uddin <[auddin@emmconsulting.com.au](mailto:auddin@emmconsulting.com.au)>  
**Subject:** Re: Traffic Management Plan Dunmore Sand and Soil - WAD Dunmore Lakes Sands Quarry, Construction of Pipeline TfNSW re: STH11 00218/30

**CAUTION:** This email is sent from an external source. Do not click any links or open attachments unless you recognise the sender and know the content is safe.

Afternoon Steven and team,

I was just checking in on what the time frame is looking like for this one?

We need to submit this urgently to DPE, so if there is anything I can do to help fast track the process, please let me know.

Thanks!

Kind regards,

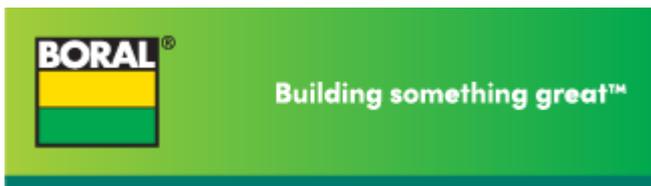
**MATT BRAY**

Environmental and Stakeholder Advisor - Dunmore Operations

Telephone: 02 4237 8414

Mobile: 0401 892 239

Email: [Matt.Bray@boral.com.au](mailto:Matt.Bray@boral.com.au)



OFFICIAL

---

**From:** Development South <[development.south@transport.nsw.gov.au](mailto:development.south@transport.nsw.gov.au)>

**Sent:** Thursday, June 22, 2023 2:14 PM

**To:** Matt Bray <[Matt.Bray@boral.com.au](mailto:Matt.Bray@boral.com.au)>

**Cc:** Simon Mahy <[Simon.Mahy2@transport.nsw.gov.au](mailto:Simon.Mahy2@transport.nsw.gov.au)>; Abdullah Uddin <[auddin@emmconsulting.com.au](mailto:auddin@emmconsulting.com.au)>

**Subject:** re: Traffic Management Plan Dunmore Sand and Soil - WAD Dunmore Lakes Sands Quarry, Construction of Pipeline TfNSW re: STH11 00218/30

Transport for NSW (TfNSW previously RMS) has received your referral below.

The development assessment officer assigned to this matter is Steven Yuan who can be reached on 02 9983 2596. We will endeavour to respond within 21 days of your referral.

Please ensure any future correspondence is sent to [development.south@transport.nsw.gov.au](mailto:development.south@transport.nsw.gov.au).

---

OFFICIAL

**From:** Matt Bray <[Matt.Bray@boral.com.au](mailto:Matt.Bray@boral.com.au)>

**Sent:** Friday, 9 June 2023 1:06 PM

**To:** Simon Mahy <[Simon.Mahy2@transport.nsw.gov.au](mailto:Simon.Mahy2@transport.nsw.gov.au)>

**Cc:** Abdullah Uddin <[auddin@emmconsulting.com.au](mailto:auddin@emmconsulting.com.au)>

**Subject:** Re: Traffic Management Plan Dunmore Sand and Soil - WAD Dunmore Lakes Sands Quarry, Construction of Pipeline STH11 00218

**CAUTION:** This email is sent from an external source. Do not click any links or open attachments unless you recognise the sender and know the content is safe.

Afternoon Simon!

We are progressing our development to Stage 5B, which means that we will have trucks entering the site, which is at 79 Fig Hill Lane, Dunmore. There was a requirement that we install inclinometers along the

roadside to ensure that no ground movement occurs that might compromise the Princes Highway. We have installed these and added a blurb into the updated TMP.

We have passed the new plan onto DPE, who have included in the RFI that consultation with TfNSW take place prior to approval. For this consultation, I've attached the new report (two versions - a completed version and a version with the changes highlighted) for your review. If you could have comments back to me within two weeks, that would be greatly appreciated!

Please note, I am aware we don't have trigger values for the inclinometers in this current report but these will be included in the updated report we send to DPE.

If you need any further information, don't hesitate to touch base with me - happy to discuss or provide further details.

Kind regards,

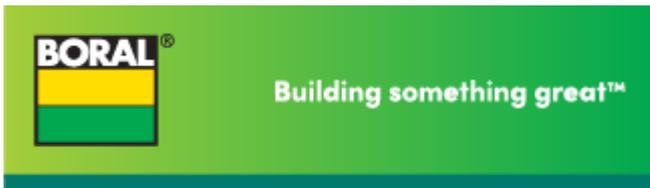
**MATT BRAY**

Environmental and Stakeholder Advisor - Dunmore Operations

Telephone: 02 4237 8414

Mobile: 0401 892 239

Email: [Matt.Bray@boral.com.au](mailto:Matt.Bray@boral.com.au)



OFFICIAL

---

**From:** Simon Mahy <[Simon.Mahy2@transport.nsw.gov.au](mailto:Simon.Mahy2@transport.nsw.gov.au)>

**Sent:** Thursday, June 8, 2023 4:04 PM

**To:** Matt Bray <[Matt.Bray@boral.com.au](mailto:Matt.Bray@boral.com.au)>

**Subject:** RE: Traffic Management Plan Dunmore Sand and Soil - WAD Dunmore Lakes Sands Quarry, Construction of Pipeline STH11 00218

Hi Matt,

Daniel has forwarded this on to me as I'm the Project officer looking after the above WAD project for TfNSW, from what I understand this WAD Dunmore Lakes Sands Quarry, Construction of Pipeline STH11/00218 has already achieved Project Completion so just wondering why a Traffic management plan needs to be reviewed by us. Is this in relation to new works or is it in relation to the completed project?

Kind regards,

**Simon Mahy**

Project Officer

Developer Works

Regional and Outer Metropolitan

**Transport for NSW**

**M: 0407221457**

Level 4, 90 Crown Street Wollongong NSW 2500

---

**From:** Daniel Bojkovic <[daniel.bojkovic@transport.nsw.gov.au](mailto:daniel.bojkovic@transport.nsw.gov.au)>  
**Sent:** Wednesday, 7 June 2023 2:18 PM  
**To:** Simon Mahy <[Simon.Mahy2@transport.nsw.gov.au](mailto:Simon.Mahy2@transport.nsw.gov.au)>  
**Subject:** FW: Traffic Management Plan Dunmore Sand and Soil - WAD Dunmore Lakes Sands Quarry, Construction of Pipeline STH11 00218

Hi Simon,

I received this email from most likely a consultant assisting Boral's Dunmore Sands Site. It is in regards to the TMP for the works.

Are you the project officer looking after this WAD?

Regards,

Daniel Bojkovic  
Project Engineer  
Regional & Freight  
Regional and Outer Metropolitan  
Transport for NSW

M 0447 541 579  
Level 4 Crown Street Wollongong NSW 2500

---

**From:** Matt Bray <[Matt.Bray@boral.com.au](mailto:Matt.Bray@boral.com.au)>  
**Sent:** Monday, 5 June 2023 10:23 AM  
**To:** Daniel Bojkovic <[daniel.bojkovic@transport.nsw.gov.au](mailto:daniel.bojkovic@transport.nsw.gov.au)>  
**Subject:** Traffic Management Plan Dunmore Sand and Soil

You don't often get email from [matt.bray@boral.com.au](mailto:matt.bray@boral.com.au). [Learn why this is important](#)

**CAUTION:** This email is sent from an external source. Do not click any links or open attachments unless you recognise the sender and know the content is safe.

Hey Daniel,

I see you reviewed a previous version of the Dunmore Lakes Sand Project Traffic Management Plan.

I was wondering if you could review a new version we have collated?

If not, could you let me know who I could pass this one on to?

Thanks!

Kind regards,

**MATT BRAY**  
Environmental and Stakeholder Advisor - Dunmore Operations

Telephone: 02 4237 8414

Mobile: 0401 892 239

Email: [Matt.Bray@boral.com.au](mailto:Matt.Bray@boral.com.au)



OFFICIAL

This email is intended only for the addressee and may contain confidential information. If you receive this email in error please delete it and any attachments and notify the sender immediately by reply email. Transport for NSW takes all care to ensure that attachments are free from viruses or other defects. Transport for NSW assume no liability for any loss, damage or other consequences which may arise from opening or using an attachment.

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

OFFICIAL

This email is intended only for the addressee and may contain confidential information. If you receive this email in error please delete it and any attachments and notify the sender immediately by reply email. Transport for NSW takes all care to ensure that attachments are free from viruses or other defects. Transport for NSW assume no liability for any loss, damage or other consequences which may arise from opening or using an attachment.

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

This email is intended only for the addressee and may contain confidential information. If you receive this email in error please delete it and any attachments and notify the sender immediately by reply email. Transport for NSW takes all care to ensure that attachments are free from viruses or other defects. Transport for NSW assume no liability for any loss, damage or other consequences which may arise from opening or using an attachment.

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

This email is intended only for the addressee and may contain confidential information. If you receive this email in error please delete it and any attachments and notify the sender immediately by reply email. Transport for NSW takes all care to ensure that attachments are free from viruses or other defects. Transport for NSW assume no liability for any loss, damage or other consequences which may arise from opening or using an attachment.

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

Message protected by MailGuard: e-mail anti-virus, anti-spam and content filtering.

<https://www.mailguard.com.au/mg>

## 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

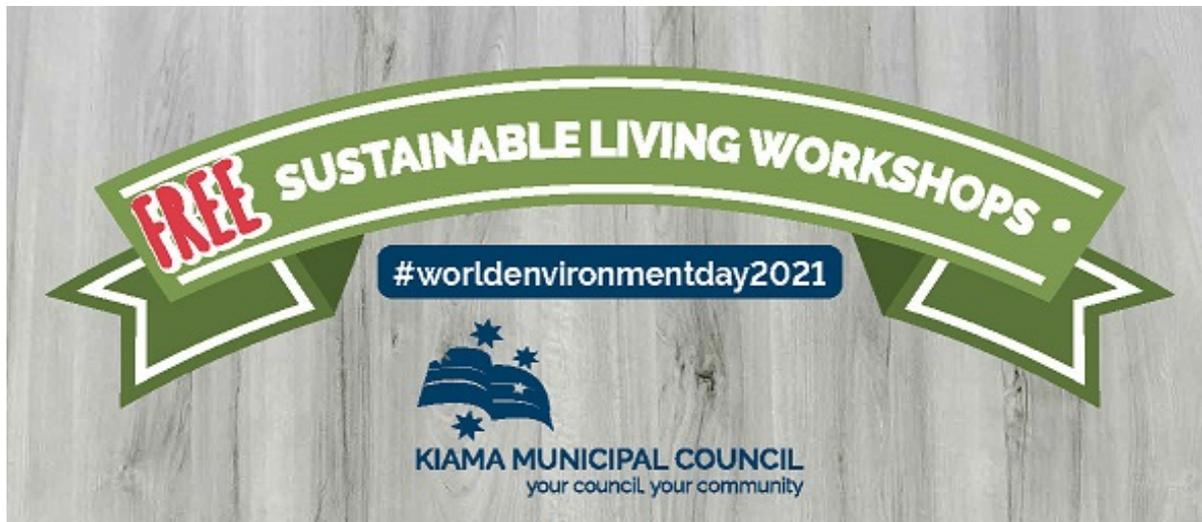
As per previous advice (attached) I have no issue with the concept provided. However please lodge a Road Occupancy Permit application and I will provide you with detailed comments on the design (if required) prior to our approval of the access works to be completed and the associated TMP

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](http://www.kiama.nsw.gov.au)



**RESPECT • INNOVATION • INTEGRITY • TEAMWORK • EXCELLENCE**

### PRIVACY & CONFIDENTIALITY NOTICE

This transmission or any part of it is intended for the named recipient/s only. It may be confidential, privileged and/or subject to copyright. If you are not the intended recipient, any use, disclosure or copying of this e-mail or its attachments is unauthorised. If you have received this e-mail in error, please notify Kiama Council immediately by return e-mail or by a reverse charge telephone call to +61 2 4232 0444 and erase all copies of the message and attachments. No liability is assumed by Kiama Council for expressions of opinion in this communication which are other than the official opinion of Kiama Council and a communication of other than official opinion is not to be regarded as a communication from Kiama Council. While all care has been taken, Kiama Council disclaims all liability for loss or damage to person or property arising from this message being infected by computer virus or other contamination.

---

**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 2<sup>nd</sup> or Friday the 4<sup>th</sup>, 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](mailto:cjones@emmconsulting.com.au).

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](http://www.boral.com.au)



## 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

CAUTION: This email originated outside of the Organisation.

---

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 condition 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



Boral Land & Property Group

PO Box 6041

North Ryde NSW 2113

[www.boral.com.au](http://www.boral.com.au)

 View my profile on LinkedIn  Follow us

## 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

CAUTION: This email originated outside of the Organisation.

---

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



Boral Land & Property Group

PO Box 6041

North Ryde NSW 2113

[www.boral.com.au](http://www.boral.com.au)



---

**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 documents 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



**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](http://www.shellharbour.nsw.gov.au)



COLLABORATION

ACCOUNTABILITY

INTEGRITY

RESPECT

SUSTAINABILITY

**From:** Adnan Voloder <[adnan.voloder@boral.com.au](mailto:adnan.voloder@boral.com.au)>

**Sent:** Friday, 18 June 2021 9:22 AM

**To:** Matthew Apolo <[Matthew.Apolo@shellharbour.nsw.gov.au](mailto:Matthew.Apolo@shellharbour.nsw.gov.au)>

**Cc:** Grant Meredith <[Grant.Meredith@shellharbour.nsw.gov.au](mailto:Grant.Meredith@shellharbour.nsw.gov.au)>; Wayne Wilson <[Wayne.Wilson@shellharbour.nsw.gov.au](mailto:Wayne.Wilson@shellharbour.nsw.gov.au)>; Kate Jackson <[Kate.Jackson@boral.com.au](mailto: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



Boral Land & Property Group

PO Box 6041

North Ryde NSW 2113

[www.boral.com.au](http://www.boral.com.au)

[View my profile on LinkedIn](#) Follow us

## 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](http://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



Boral Land & Property Group

PO Box 6041

North Ryde NSW 2113

[www.boral.com.au](http://www.boral.com.au)



---

**From:** Matthew Apolo <[Matthew.Apolo@shellharbour.nsw.gov.au](mailto:Matthew.Apolo@shellharbour.nsw.gov.au)>

**Sent:** Thursday, 10 June 2021 8:55 PM

**To:** Adnan Voloder <[adnan.voloder@boral.com.au](mailto:adnan.voloder@boral.com.au)>

**Cc:** Grant Meredith <[Grant.Meredith@shellharbour.nsw.gov.au](mailto:Grant.Meredith@shellharbour.nsw.gov.au)>; Wayne Wilson <[Wayne.Wilson@shellharbour.nsw.gov.au](mailto: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 be 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](http://www.shellharbour.nsw.gov.au)



COLLABORATION	ACCOUNTABILITY	INTEGRITY	RESPECT	SUSTAINABILITY
---------------	----------------	-----------	---------	----------------

Be part of shaping Shellharbour's future by co-creating a vision and goals for the City! Click on the graphic to find out how.

**From:** Adnan Voloder <[adnan.voloder@boral.com.au](mailto:adnan.voloder@boral.com.au)>  
**Date:** 10 June 2021 at 1:12:55 pm AEST  
**To:** Grant Meredith <[Grant.Meredith@shellharbour.nsw.gov.au](mailto:Grant.Meredith@shellharbour.nsw.gov.au)>  
**Cc:** Information Management <[council@shellharbour.nsw.gov.au](mailto: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](http://www.boral.com.au)



---

**From:** Grant Meredith <[Grant.Meredith@shellharbour.nsw.gov.au](mailto:Grant.Meredith@shellharbour.nsw.gov.au)>  
**Sent:** Wednesday, 2 June 2021 6:50 AM

**To:** Adnan Voloder <[adnan.voloder@boral.com.au](mailto: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



**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](http://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](mailto: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](http://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](mailto:grant.meredith@shellharbour.nsw.gov.au))

<[grant.meredith@shellharbour.nsw.gov.au](mailto:grant.meredith@shellharbour.nsw.gov.au)>; [council@shellharbour.nsw.gov.au](mailto:council@shellharbour.nsw.gov.au)

([council@shellharbour.nsw.gov.au](mailto:council@shellharbour.nsw.gov.au)) <[council@shellharbour.nsw.gov.au](mailto:council@shellharbour.nsw.gov.au)>

**Cc:** Ben Williams <[Ben.Williams@boral.com.au](mailto:Ben.Williams@boral.com.au)>; Baqir Husain

<[bhusain@emmconsulting.com.au](mailto: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 condition 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>

Boral Land & Property Group

PO Box 6041

North Ryde NSW 2113

[www.boral.com.au](http://www.boral.com.au)

<image005.png>

<image004.png>



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

CAUTION: This email originated outside of the Organisation.

---

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



**Transport  
for NSW**

---

**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

CAUTION: This email is sent from an external source. Do not click any links or open attachments unless you recognise the sender and know the content is safe.

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



Boral Land & Property Group

PO Box 6041

North Ryde NSW 2113

[www.boral.com.au](http://www.boral.com.au)



---

**From:** Daniel Bojkovic <[daniel.bojkovic@transport.nsw.gov.au](mailto:daniel.bojkovic@transport.nsw.gov.au)>

**Sent:** Wednesday, 2 June 2021 3:10 PM

**To:** Adnan Voloder <[adnan.voloder@boral.com.au](mailto:adnan.voloder@boral.com.au)>

**Cc:** Ben Williams <[Ben.Williams@boral.com.au](mailto:Ben.Williams@boral.com.au)>; Baqir Husain <[bhusain@emmconsulting.com.au](mailto: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](mailto:daniel.bojkovic@transport.nsw.gov.au)>  
**Cc:** Ben Williams <[Ben.Williams@boral.com.au](mailto:Ben.Williams@boral.com.au)>; Baqir Husain <[bhusain@emmconsulting.com.au](mailto:bhusain@emmconsulting.com.au)>  
**Subject:** Traffic Management Plan - Condition 56 of consent DA 195-8-2004

**CAUTION:** This email is sent from an external source. Do not click any links or open attachments unless you recognise the sender and know the content is safe.

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 condition 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



Boral Land & Property Group

PO Box 6041

North Ryde NSW 2113

[www.boral.com.au](http://www.boral.com.au)



This email is intended only for the addressee and may contain confidential information. If you receive this email in error please delete it and any attachments and notify the sender immediately by reply email. Transport for NSW takes all care to ensure that attachments are free from viruses or other defects. Transport for NSW assume no liability for any loss, damage or other consequences which may arise from opening or using an attachment.

---

# Appendix C

## Dilapidation report

---



# Pre-Operation 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

Revision: F

Date Issued: 12/04/2023



## Table of Contents

1.0	Introduction .....	3
2.0	Visual Assessment .....	4
3.0	Falling Weight Deflectometer Testing .....	7
4.0	Traffic Loading Analysis .....	9
5.0	Pavement Structure Impact Analysis .....	10
6.0	Conclusions and Recommendations .....	11

## Attachments

Appendix A – 2021 FWD. Reports

Appendix B – 2023 FWD. Reports

Appendix C – 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.
D19537-PDR001	E	03/04/2023	S Baseri		Updated the report based on FWD testing and site inspection carried out in March 2023.
D19537-PDR001	F	12/04/2023	S Baseri		Updated formatting and added clarification regarding limitations of the analysis.

## Referenced Documents

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

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

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

Roads and Maritime Supplement to Austrroads 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 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 long. The pavement condition has not been assessed further to the west as it is a bridge over Princes Highway. The section of pavement under investigation is highlighted in Figure 1.1.

An initial investigation was carried out in 2021. At the request of EMM, Durkin carried out another set of FWD testing and visual examination in March 2023 as the original investigation needs to be updated.

This report aims to investigate the existing pavement condition through visual assessment and Falling Weight Deflectometer (FWD) testing. Durkin was informed that additional heavy vehicle movements would occur during stage 5 of the Dunmore Lakes Sand Project. Durkin will carry out a post-dilapidation assessment within 1-month from the completion of the Project. This report intends 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.



Figure 1.1 – Scope of Works (Overview)

## 2.0 Visual Assessment

The original visual inspection was conducted on 6<sup>th</sup> of May 2021 during the day in wet weather (Figure 2.0.1 and Figure 2.0.2). A follow up visual inspection was carried out on 26<sup>th</sup> of March 2023.

The existing pavement has some defects throughout the section under investigation. The most common pavement defects are shown below.



Figure 2.0.1 – Pavement Defects Encountered During the visual inspection on 6th May 2021



Figure 2.0.2 – Pavement Defects Encountered During the visual inspection on 6th May 2021

Based on the recent visual inspection, the existing pavement conditions appear to be fairly similar to 2021. However, it must be noted that widening and propagation of longitudinal cracks were observed during the 2023 site inspection. Some longitudinal cracks near Princess Highway off-ramp do not appear to be related to vehicular loading and are likely due to slope instability. Durkin recommends a geotechnical investigation and slope stability assessment by Transport for NSW (TfNSW) along the embankment near Princess highway off-ramp. Typical pavement defects encountered on 26th March 2023 are shown in Figures 2.0.3 and Figure 2.0.4.



Figure 2.0.3 – Pavement Defects Encountered During the visual inspection on 26<sup>th</sup> March 2023



Figure 2.0.4 – Pavement Defects Encountered During the visual inspection on 26<sup>th</sup> March 2023

### 3.0 Falling Weight Deflectometer Testing

Falling Weight Deflectometer (FWD) testing was carried out on 3rd May 2021 during a 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 the Eastbound travel lane was tested as an additional run at the same intervals.

Testing was conducted with a 40kN load per Austroads Guide to Pavement Technology Part 5 (AGPT05-19). 50kN data was also collected 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. Seasonal Correction Factor of 1.0 was used for this analysis based on Table 9.1 of AGPT05-19. Temperature Correction factor is assumed to be 1.0 as the thickness of the existing asphalt is unknown. Deflection Standardisation Factor of 1.1 has been used for a 40kN FWD test as per Table 9.2 of AGPT02-19.

FWD testing was repeated at the exact locations following the same pattern on 20th March 2023. Deflection data obtained during the 2021 investigation are shown using dotted lines, and the recent data obtained during the 2023 investigation are shown using solid lines (Figures 3.0.1 to 3.0.3).

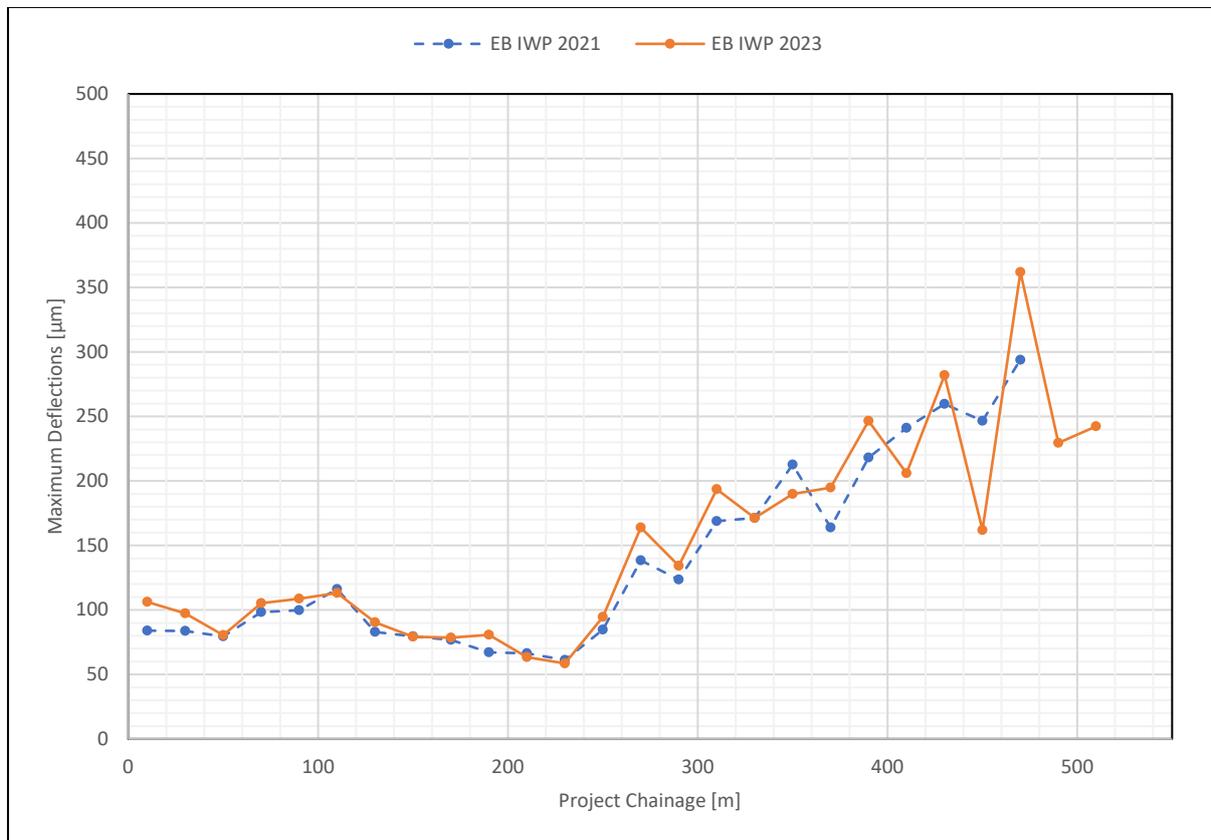


Figure 3.0.1 – Variation in Corrected Maximum Deflections (EB IWP 2021 vs. EB IWP 2023)

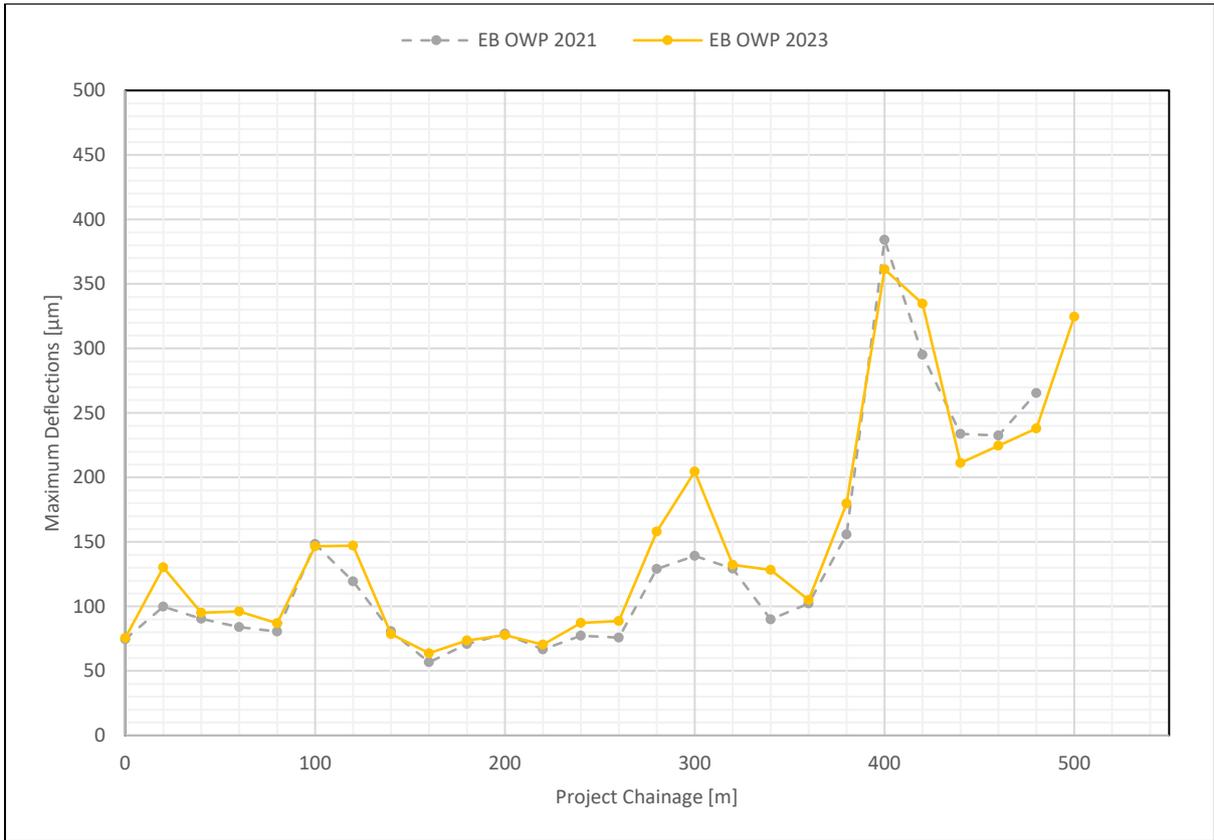


Figure 3.0.2 – Variation in Corrected Maximum Deflections (EB OWP 2021 vs. EB OWP 2023)

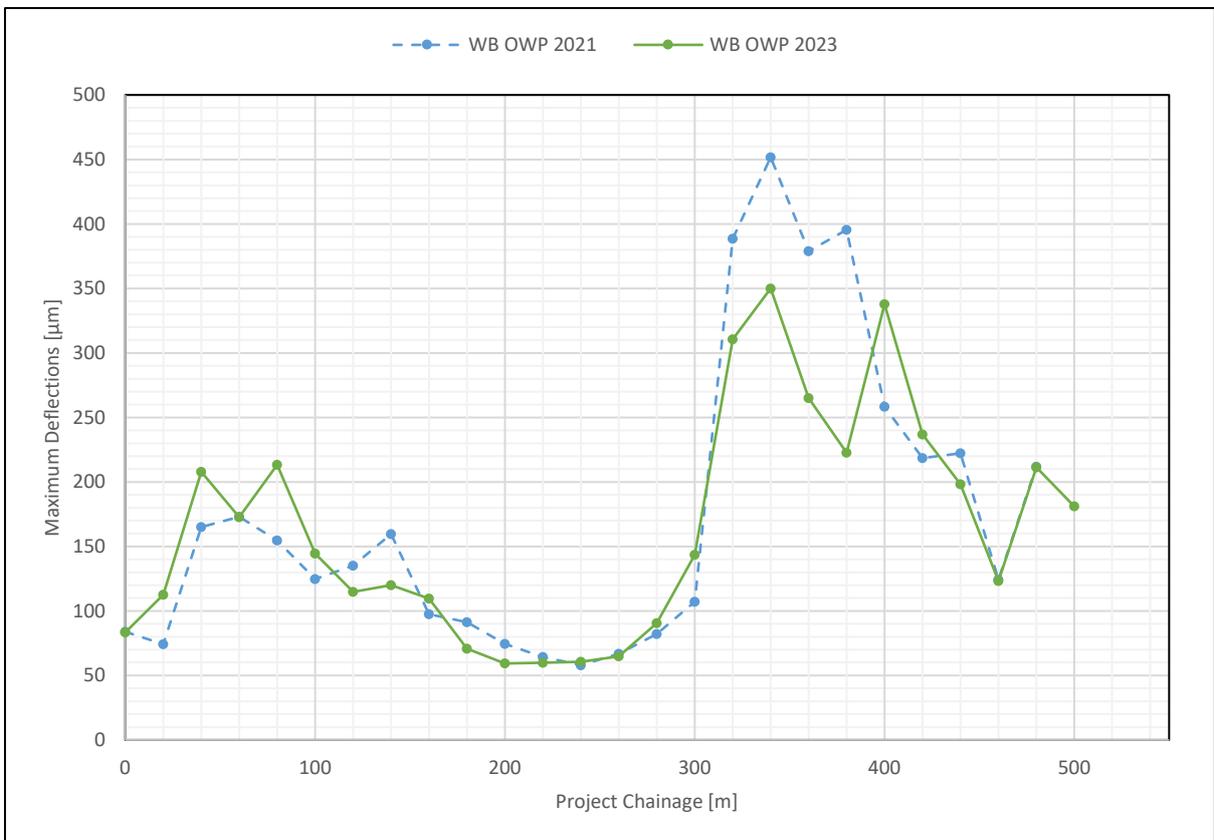


Figure 3.0.3 – Variation in Corrected Maximum Deflections (WB OWP 2021 vs. WB OWP 2023)

It must be noted that the pavement structure is unknown at this stage, and a detailed analysis cannot be carried out. Deflection data can be used for comparative analysis only.

As seen in Figure 3.0.1 to Figure 3.0.3, the maximum deflections are generally consistent between the wheel paths along the length of the scope. The deflection data indicates a good structural condition for a Full Depth Asphalt pavement 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 the presumed full-depth asphalt pavement to a granular pavement, the deflections from chainage 300 onwards indicate good structural condition.

It must be noted that slight variations in maximum deflections are anticipated. Deflections depend on various site conditions such as pavement temperature and moisture condition of the pavement at the time of testing.

#### 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 ( $N_{DT}$ )	$0.576 \times 10^6$
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)	$0.615 \times 10^6$

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)	$0.025 \times 10^6$
Additional traffic loading per year ( $N_{DT}$ )	$0.023 \times 10^6$
Additional traffic loading over 3-years (ESA)	$0.074 \times 10^6$
Additional traffic loading over 3-years ( $N_{DT}$ )	$0.069 \times 10^6$

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; however, to be able to carry out a comparative analysis, 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 the above-mentioned pavement structure based on the low FWD deflections and the longitudinal cracking defects noted on site.

The subgrade CBR is unknown, but we have assumed a 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 conducted 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)	$6.0 \times 10^6$	$6.0 \times 10^6$
Additional Traffic Loading (ESA)	-	$7.4 \times 10^4$
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 five 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 Limitations of the Analysis

It must be noted that the pavement structure is unknown at this stage, and a detailed analysis cannot be carried out. Durkin recommends a borehole investigation to determine the pavement structure at various road sections. Detailed estimation of the pavement's remaining life can be undertaken if the existing pavement structure data is available. The observations, comments and some design parameters in sections 3, 4, and 5 of this report are based on assumptions and estimations and cannot be relied upon without further borehole investigation.

Deflection data and CIRCLY analysis can be used for comparative analysis only.

## 7.0 Conclusions and Recommendations

Based on the visual assessment, FWD investigation, and the presumed pavement structure, the existing pavement is in good structural condition.

The section from chainage 0 to 300 is not expected to be heavily 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, and a different pavement structure is anticipated.

The additional traffic loading on the pavement due to the development is estimated to be  $7.4 \times 10^4$  ESA. This represents the equivalent of approximately five 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.

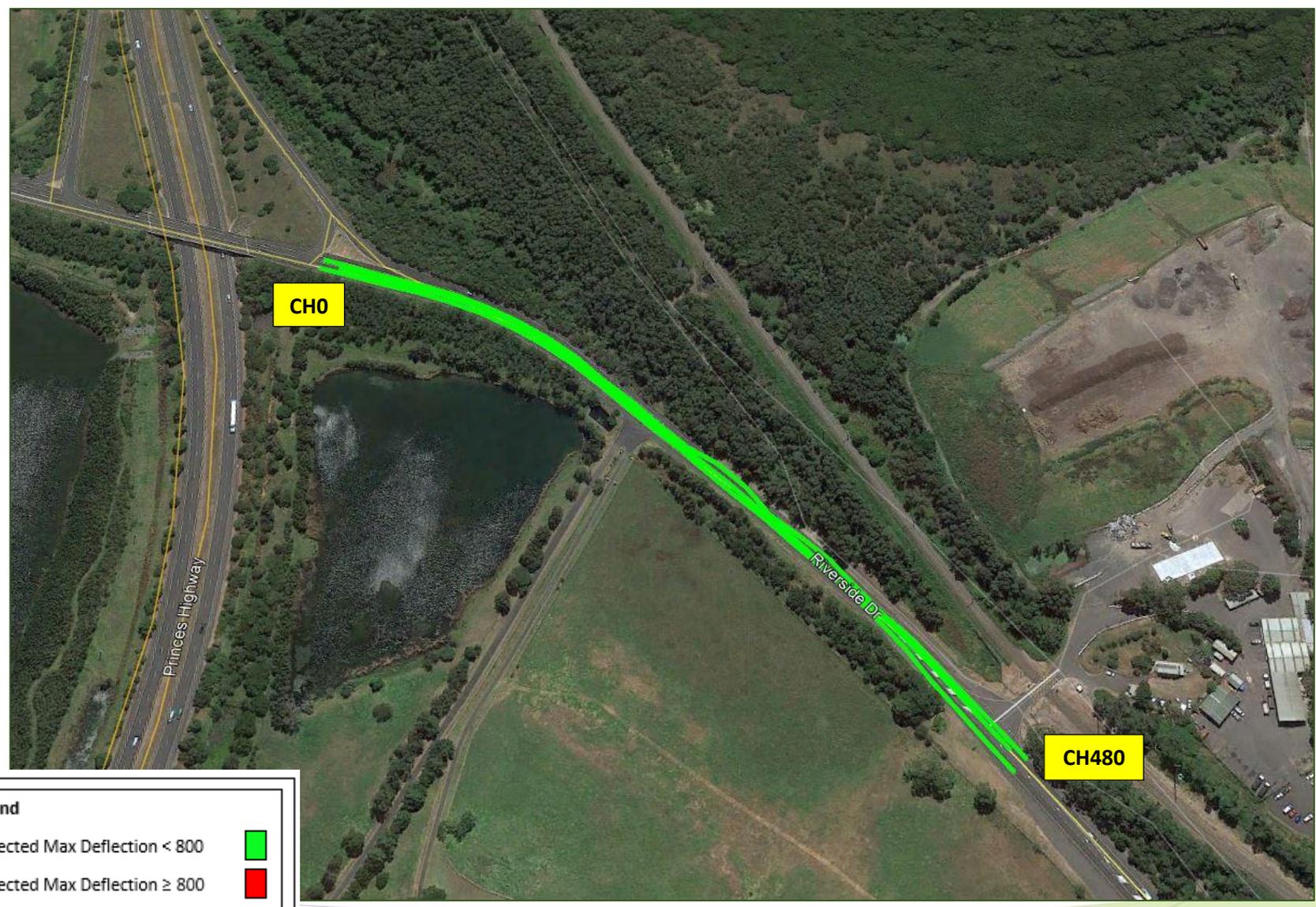
Durkin will carry a post-dilapidation assessment within 1-month from the completion of the project as per Condition 53B (c) and the finding of the pre and post dilapidation will be compared to determine the net pavement impact on Riverside Drive.



## **APPENDIX A**

### **2021 FWD Report**

# RIVERSIDE DRIVE, DUNMORE



**Legend**

Corrected Max Deflection < 800	
Corrected Max Deflection ≥ 800	

# FWD/HWD Report



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

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

**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]													Normalised Deflection Results [µm]										Temperature [°C]		FWD/HWD [mm]			Pavement Condition
			Lat	Long		Offset from Load [mm]													Offset from Load [mm]										Surface	Air	D <sub>max</sub>			
						0	200	300	450	600	750	900	1200	1500	0	200	300	450	600	750	900	1200	1500	D <sub>MAX</sub>	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:**

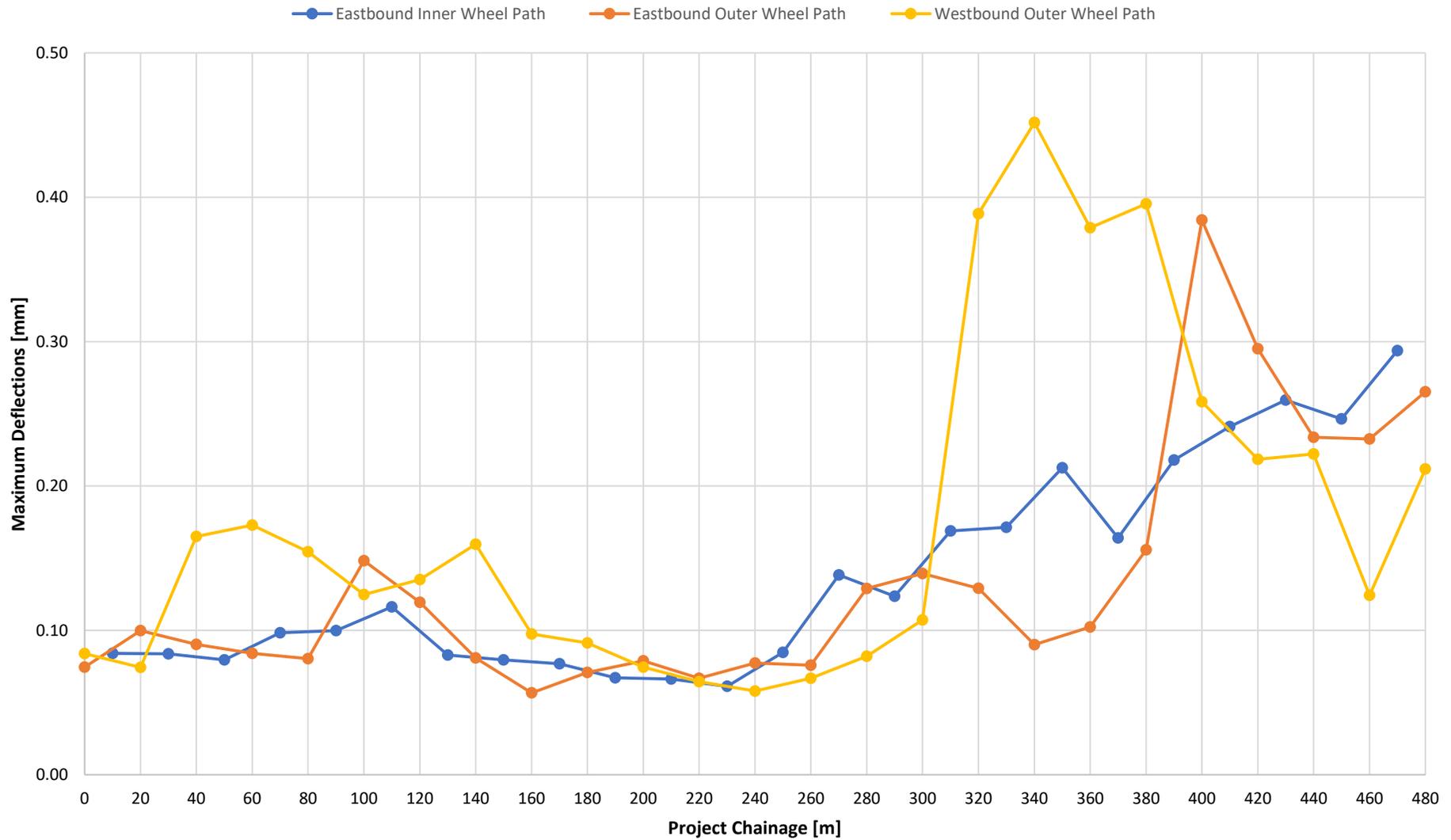
COL - Centre of Lane, IWP - Inner Wheelpath, OWP - Outer Wheelpath, NB - North Bound, SB - South Bound, EB - East Bound, WB - West Bound, PL - Left Parking Lane, PR - Right Parking Lane, TL - Left Traffic Lane, TR - Right Traffic Lane, OS - Outer Shoulder, IS - Inner Shoulder, FL - Fast Lane, SL - Slow 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





## **APPENDIX B**

### **2023 FWD Report**

# FWD/HWD Report



**Job Number:** D22412      **Report Number:** D22412-FWD001  
**Project Name:** Dunmore Lake Sand Project - Riverside Drive, Dunmore  
**Date Tested:** 20/03/2023      **Client:** EMM Consulting  
**Time Tested:** 09:17-11:25      **Contact:** Abdullah Uddin  
**Target Load:** 40kN / 566kPa      **GPS Model / Datum:** BX982 / GDA

**Filters Applied:** None  
**Operator:** J. Priestly  
**Test Equipment:** HWD-175

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

Chainage	Lane	Wheel Path	GPS Location		Peak Load [kPa]	FWD Deflection Results [µm]										Normalised Deflection Results [µm]						Temperature [°C]		FWD/HWD [µm]				Remaining Life [Years]	Pavement Condition			
			Lat	Long		Offset from Load [mm]										Offset from Load [mm]						Surface	Air	Corrected								
						0	200	300	450	600	750	900	###	###	0	200	300	450	600	750	900			###	###	D <sub>MAX</sub>	d			BLI	CF	
0	EB	OWP	-34.61652	150.83874	554	67	63	59	55	51	46	43	35	27	69	64	60	56	52	47	44	36	27	22.6	21.3	69	76	8	4	-	-	CM
20	EB	OWP	-34.61657	150.83895	557	117	108	104	95	88	81	75	63	45	118	109	105	96	89	82	76	64	46	23.0	21.3	118	130	13	9	-	-	CM
40	EB	OWP	-34.61662	150.83916	553	85	76	73	69	65	61	56	45	37	87	78	75	71	66	62	57	46	37	23.0	21.3	87	95	12	8	-	-	CM
60	EB	OWP	-34.61666	150.83937	544	84	76	72	68	63	58	55	46	37	88	79	75	70	66	61	57	47	39	22.8	21.3	88	96	12	9	-	-	CM
80	EB	OWP	-34.61672	150.83958	551	77	69	66	63	59	54	50	41	35	79	70	68	64	61	55	51	42	36	22.6	21.4	79	87	11	9	-	-	CM
100	EB	OWP	-34.61679	150.83979	572	135	127	120	119	109	101	93	80	67	133	126	118	118	108	100	92	80	67	22.1	21.4	133	147	15	8	-	-	CM
120	EB	OWP	-34.61687	150.83999	550	130	120	116	112	105	97	90	77	64	134	124	119	116	108	100	93	79	66	22.1	21.5	134	147	15	10	-	-	CM
140	EB	OWP	-34.61696	150.84018	562	71	63	60	57	53	49	44	37	31	72	64	60	57	53	49	45	38	31	22.3	21.5	72	79	11	8	-	-	CM
160	EB	OWP	-34.61706	150.84036	557	57	49	47	46	43	39	36	30	27	58	50	48	47	44	39	36	30	27	22.5	21.5	58	64	10	8	-	-	CM
180	EB	OWP	-34.61718	150.84053	553	65	52	45	44	41	39	35	30	26	67	53	46	45	42	40	36	31	26	22.1	21.5	67	74	20	14	-	-	
200	EB	OWP	-34.61730	150.84069	543	68	59	56	51	47	42	40	31	27	71	61	58	53	49	44	42	33	28	21.7	21.5	71	78	12	9	-	-	
220	EB	OWP	-34.61742	150.84086	553	63	55	53	50	48	45	42	38	32	64	57	55	51	49	46	43	38	33	22.3	21.4	64	70	9	7	-	-	
240	EB	OWP	-34.61753	150.84102	551	77	68	66	61	58	55	52	46	39	79	70	67	63	60	57	53	47	40	22.1	21.5	79	87	12	9	-	-	
260	EB	OWP	-34.61765	150.84119	551	79	66	60	55	49	44	41	36	27	81	68	62	56	51	45	42	36	28	22.1	21.5	81	89	19	13	-	-	
280	EB	OWP	-34.61778	150.84135	548	139	106	92	78	65	55	48	40	34	144	110	95	80	67	57	50	41	35	22.1	21.4	144	158	49	34	-	-	
300	EB	OWP	-34.61789	150.84153	548	180	139	115	92	78	66	58	46	37	186	143	118	95	81	68	60	48	39	22.1	21.4	186	205	67	43	-	-	
320	EB	OWP	-34.61801	150.84169	551	117	92	79	67	58	52	48	40	33	120	94	81	69	60	53	49	41	34	22.0	21.4	120	132	39	26	-	-	
340	EB	OWP	-34.61813	150.84185	550	113	88	76	65	60	53	51	43	40	117	91	78	67	62	54	52	44	41	21.6	21.3	117	128	38	26	-	-	
360	EB	OWP	-34.61826	150.84201	552	93	82	77	69	62	58	53	47	41	95	84	78	71	63	59	54	48	42	22.6	21.3	95	105	17	12	-	-	
380	EB	OWP	-34.61839	150.84216	568	164	143	126	108	89	74	64	50	40	163	142	126	107	88	74	64	50	40	22.7	21.2	163	180	38	21	-	-	
400	EB	OWP	-34.61851	150.84232	602	349	263	203	140	100	76	66	54	44	329	247	191	132	94	72	62	51	41	22.6	21.2	329	361	138	82	-	-	
420	EB	OWP	-34.61865	150.84246	588	316	239	191	139	107	87	75	60	48	304	230	183	134	103	83	72	58	46	22.2	21.0	304	335	121	74	-	-	DD

440	EB	OWP	-34.61879	150.84261	578	196	158	135	102	82	66	57	44	36	192	155	132	100	81	65	56	43	35	21.7	21.0	192	211	60	37	-	-	DD
460	EB	OWP	-34.61893	150.84275	585	211	173	147	117	96	78	66	50	37	204	167	142	113	93	75	64	48	36	21.8	20.9	204	225	63	37	-	-	DD
480	EB	OWP	-34.61907	150.84289	546	209	178	157	137	117	98	87	63	52	216	185	163	142	121	101	90	66	53	21.8	20.8	216	238	53	31	-	-	DD
500	EB	OWP	-34.61921	150.84303	562	293	241	208	167	134	105	87	60	43	295	243	209	168	135	106	88	61	43	21.7	20.8	295	325	86	52	-	-	DD
10	EB	IWP	-34.61655	150.83885	563	96	85	81	76	71	66	61	51	41	97	85	81	77	71	66	61	51	41	23.3	20.1	97	106	15	11	-	-	CM,CT
30	EB	IWP	-34.61660	150.83906	556	87	79	76	73	68	64	58	49	40	89	80	77	74	69	65	59	49	40	23.5	20.2	89	97	12	9	-	-	CM
50	EB	IWP	-34.61665	150.83927	554	72	65	62	59	56	52	48	40	31	73	66	64	61	57	53	49	41	32	23.5	20.2	73	81	10	7	-	-	CM
70	EB	IWP	-34.61671	150.83948	557	94	86	82	79	74	69	65	55	47	96	88	84	80	75	70	66	56	48	23.5	20.2	96	105	12	8	-	-	CM
90	EB	IWP	-34.61677	150.83969	548	96	82	83	73	68	64	61	53	42	99	85	86	75	70	66	63	54	43	23.0	20.3	99	109	13	14	-	-	CM
110	EB	IWP	-34.61684	150.83989	557	101	93	88	85	78	71	66	57	47	103	94	90	86	79	72	67	58	48	23.0	20.3	103	113	13	9	-	-	CM
130	EB	IWP	-34.61693	150.84008	550	80	75	73	70	65	61	55	47	41	82	77	75	72	66	62	56	48	42	22.9	20.4	82	90	7	5	-	-	CM
150	EB	IWP	-34.61703	150.84026	562	72	62	59	56	53	48	45	37	31	72	62	59	56	53	49	45	37	31	22.5	20.4	72	79	13	10	-	-	CM
170	EB	IWP	-34.61714	150.84044	567	72	60	57	55	51	46	42	36	30	71	60	57	55	51	46	42	36	30	22.6	20.5	71	79	14	12	-	-	CM
190	EB	IWP	-34.61725	150.84061	573	74	70	66	64	61	55	52	44	35	73	69	66	63	60	54	52	44	34	22.1	20.4	73	81	8	5	-	-	
210	EB	IWP	-34.61737	150.84077	557	57	50	48	45	42	39	37	31	26	58	51	49	46	43	40	37	32	26	22.6	20.3	58	63	9	7	-	-	
230	EB	IWP	-34.61749	150.84094	569	54	48	45	45	43	39	38	34	28	53	48	45	45	43	38	38	34	27	22.6	20.3	53	59	8	6	-	-	
250	EB	IWP	-34.61760	150.84111	563	86	78	74	71	67	61	56	49	40	86	78	74	71	67	61	56	49	40	22.3	20.2	86	95	12	8	-	-	
270	EB	IWP	-34.61772	150.84128	562	148	121	112	97	87	78	71	57	46	149	122	112	97	88	78	71	58	47	22.1	20.1	149	164	36	27	-	-	
290	EB	IWP	-34.61784	150.84145	564	122	100	88	78	67	59	52	41	36	122	101	89	78	68	59	52	41	36	22.0	20.1	122	134	33	21	-	-	
310	EB	IWP	-34.61796	150.84160	557	173	141	122	98	81	66	57	46	39	176	143	124	99	82	67	58	47	40	22.0	20.0	176	194	52	33	-	-	
330	EB	IWP	-34.61809	150.84176	565	156	130	112	91	78	67	58	48	39	156	130	112	91	78	67	58	48	39	22.5	20.0	156	171	43	26	-	-	
350	EB	IWP	-34.61821	150.84193	556	170	142	123	102	84	70	61	47	40	173	145	125	104	86	71	62	47	40	22.6	19.9	173	190	48	28	-	-	
370	EB	IWP	-34.61833	150.84208	557	174	139	117	93	73	61	52	42	36	177	142	119	95	74	62	53	42	37	22.9	20.0	177	195	58	35	-	-	
390	EB	IWP	-34.61847	150.84223	592	235	180	142	106	82	68	57	47	40	224	172	136	101	79	65	55	45	38	22.9	20.0	224	247	89	53	-	-	
410	EB	IWP	-34.61860	150.84238	576	191	153	132	107	89	71	61	45	36	187	150	130	105	87	69	60	44	35	22.9	20.0	187	206	58	37	-	-	
430	EB	IWP	-34.61873	150.84252	584	265	212	174	134	107	85	67	48	40	256	205	169	130	104	83	65	46	39	22.8	20.0	256	282	87	51	-	-	
450	EB	IWP	-34.61887	150.84267	577	150	131	119	103	88	75	66	51	41	147	129	116	101	87	74	65	50	40	22.5	20.0	147	162	31	18	-	-	
470	EB	IWP	-34.61901	150.84280	584	340	244	198	152	125	102	87	65	51	329	236	192	148	121	99	84	63	50	22.1	20.0	329	362	138	93	-	-	
490	EB	IWP	-34.61915	150.84294	570	210	175	153	124	101	84	71	54	41	209	173	152	124	101	84	70	54	41	21.9	20.0	209	229	56	35	-	-	
510	EB	IWP	-34.61929	150.84308	579	225	187	161	125	98	76	60	42	32	220	183	157	122	96	74	58	41	32	22.3	20.0	220	242	63	37	-	-	
0	WB	OWP	-34.61656	150.83873	586	79	72	69	66	61	55	50	42	34	76	69	67	63	59	53	49	40	33	22.2	20.3	76	83	9	6	-	-	DD
20	WB	OWP	-34.61660	150.83894	578	105	102	98	92	85	78	72	59	47	102	99	96	90	84	76	70	58	46	23.3	20.3	102	113	6	3	-	-	DD
40	WB	OWP	-34.61665	150.83915	574	192	183	179	174	167	156	148	122	98	189	180	177	172	164	154	146	121	97	22.8	20.2	189	208	12	9	-	-	DD
60	WB	OWP	-34.61670	150.83937	567	157	148	142	135	127	116	108	92	76	157	148	142	135	127	116	108	92	76	23.3	20.2	157	173	16	9	-	-	
80	WB	OWP	-34.61676	150.83957	569	195	182	177	169	159	147	137	117	97	194	181	176	168	158	147	137	116	97	22.9	20.1	194	213	18	13	-	-	
100	WB	OWP	-34.61683	150.83978	568	132	122	119	115	108	100	93	79	66	131	121	119	115	108	99	92	79	66	23.1	20.0	131	145	13	10	-	-	
120	WB	OWP	-34.61691	150.83997	571	105	93	94	85	84	78	73	61	45	104	92	93	84	83	77	72	61	45	23.3	20.0	104	115	12	12	-	-	

140	WB	OWP	-34.61700	150.84016	567	109	101	99	94	89	81	75	64	53	109	101	99	94	88	81	75	63	53	22.7	19.9	109	120	10	8	-	-	CR
160	WB	OWP	-34.61711	150.84033	545	96	86	83	79	73	67	62	52	41	100	89	86	82	76	69	64	53	43	22.6	19.8	100	110	14	10	-	-	CR
180	WB	OWP	-34.61722	150.84051	542	62	52	50	48	44	41	37	31	25	64	54	52	50	46	43	38	32	26	22.3	19.8	64	71	12	10	-	-	
200	WB	OWP	-34.61733	150.84067	548	52	48	44	41	38	35	33	27	23	54	49	45	43	40	36	34	28	23	22.1	19.8	54	59	9	4	-	-	
220	WB	OWP	-34.61745	150.84084	550	53	46	44	42	39	34	31	27	22	55	48	45	43	40	35	32	27	23	22.6	19.8	55	60	10	7	-	-	
240	WB	OWP	-34.61756	150.84101	556	54	48	45	43	39	36	34	29	24	55	49	46	44	40	37	34	29	24	22.2	19.7	55	61	9	7	-	-	
260	WB	OWP	-34.61768	150.84118	551	57	51	50	47	44	41	39	36	32	59	53	51	48	45	42	40	37	33	22.1	19.8	59	65	8	6	-	-	
280	WB	OWP	-34.61779	150.84134	555	81	78	73	70	66	61	58	50	42	82	79	75	71	67	62	59	51	43	22.0	19.9	82	91	7	3	-	-	
300	WB	OWP	-34.61791	150.84152	547	126	121	114	106	97	90	81	69	55	131	125	118	109	101	93	84	72	57	22.0	19.9	131	144	13	6	-	-	
320	WB	OWP	-34.61804	150.84167	554	276	233	200	160	130	104	88	65	51	282	238	204	163	132	106	90	67	52	22.2	20.0	282	311	78	45	-	-	
340	WB	OWP	-34.61816	150.84183	569	320	259	218	171	132	105	85	64	52	318	257	217	170	132	104	85	63	52	22.2	20.0	318	350	102	61	-	-	CM
360	WB	OWP	-34.61829	150.84198	553	235	191	164	132	107	88	75	58	47	241	195	168	135	110	90	77	60	48	22.3	19.9	241	265	73	46	-	-	CM
380	WB	OWP	-34.61842	150.84213	566	203	159	140	120	102	87	77	61	50	203	159	140	120	102	87	77	61	50	22.0	19.8	203	223	62	44	-	-	CM
400	WB	OWP	-34.61856	150.84228	574	311	266	237	200	168	138	116	81	59	307	262	233	198	166	136	114	80	58	22.4	19.7	307	338	74	45	-	-	CM
420	WB	OWP	-34.61870	150.84241	562	214	187	174	154	137	119	106	82	62	215	188	175	155	138	119	107	83	63	22.0	19.6	215	237	40	27	-	-	CM
440	WB	OWP	-34.61884	150.84255	566	180	165	150	132	115	98	86	65	50	180	165	150	132	115	98	86	65	50	22.0	19.6	180	198	30	16	-	-	CM
460	WB	OWP	-34.61898	150.84269	570	113	95	89	80	73	67	61	53	40	112	94	88	79	73	66	61	53	40	22.1	19.7	112	123	24	18	-	-	CM
480	WB	OWP	-34.61912	150.84283	556	189	166	151	130	111	94	80	60	44	192	169	154	132	113	96	82	61	45	21.9	19.7	192	211	38	23	-	-	CM
500	WB	OWP	-34.61926	150.84297	553	161	140	129	110	94	79	65	47	34	165	143	132	112	96	81	66	48	35	21.8	19.7	165	181	33	21	-	-	CM

<b>Average</b>	22.4	20.4	141.3	155.4	33.5	21.5
<b>Standard Deviation</b>	0.5	0.6	75.1	82.7	31.5	19.2
<b>CV</b>	0.02	0.03	0.53	0.53	0.94	0.89

<b>Seasonal Correction Factor</b>	<b>Temperature Deflection Correction Factor</b>	<b>Deflection Standardisation Factor</b>	<b>20-Year Design Traffic</b>
1.0	1.00	1.1	-

<b>Characteristic Deflection [µm]</b>	239.70
<b>Corrected Characteristic Deflection [µm]</b>	263.67
<b>Design Deflection [µm]</b>	-

This applies only to granular pavements with thin bituminous surfacing [AGPT05-19]

**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, TU - Turning Lane, OS - Outer Shoulder, IS - Inner Shoulder, FL - Fast Lane, SL - Slow Lane, SI - Slip 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, SD - Delamination

Chainage 0 is taken from West end (-34.6165162574392, 150.8387406576)

Base Layer Index (BLI) =  $D_0 - D_{300}$

Curvature Function (CF) =  $D_0 - D_{200}$

Characteristic Deflection (CD) for a homogeneous sub-section of pavement is defined as value exceeded by only 10% of the measured values [AGPT05-19]

The units interpreted from the deflection bowl data are appropriate for granular pavements with thin bituminous surfacing. On pavements with different pavement structure modulus back calculation should be used to interpret pavement layer conditions.

Subgrade CBR is estimated based on Equation 13 in 'Enhancing the Prediction of Subgrade Stiffness Modulus and CBR using FWD for Flexible Pavements' [Chai et al. 2017]. Value has been capped at CBR of 25%.

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

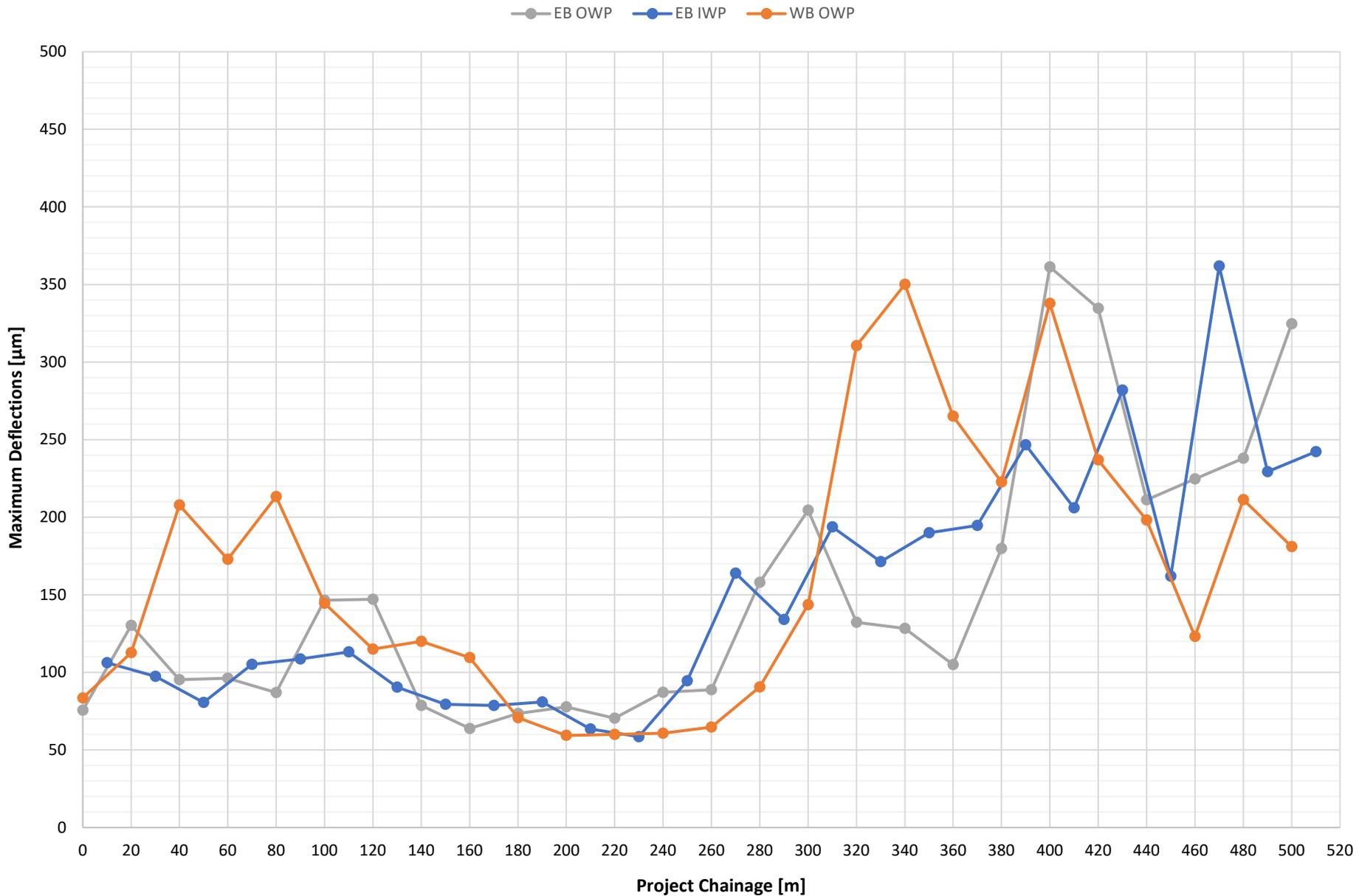
Report By:

  
Alenae Sarmiento  
Pavement Data Officer

Reviewed by:

  
Sahand Baseri  
Pavements Manager

### Variation in Corrected Maximum Deflections





## **APPENDIX C**

### **CIRCLY Analysis**

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

---

# Appendix D

DPE endorsement of Abdullah Uddin

---



Mr Ben Williams  
Dunmore Environmental Coordinator  
Boral Resources (NSW) Pty Ltd  
38 Tabbitta Road  
Dumore, NSW, 2529

25/05/2021

Dear Mr Williams

**Dunmore Lakes Quarry (DA195-8-2004)  
Endorsement of Traffic Consultant**

I refer to your request (DA195-8-2004-PA-19) for the Planning Secretary's approval of suitably qualified person to prepare the Traffic Management Plan for the Dunmore Lakes Quarry (DA195-8-2004).

The Department has reviewed the nomination and information you have provided and is satisfied that the expert is suitably qualified and experienced. Consequently, I can advise that the Planning Secretary approves the appointment of Abdullah Uddin of EMM Consulting to prepare the Traffic Management Plan.

If you wish to discuss the matter further, please contact Nagindar Singh on 8289 6873.

Yours sincerely

A handwritten signature in black ink, appearing to read 'M Sprott'.

Matthew Sprott  
Director  
Resource Assessments (Coal & Quarries)

as nominee of the Planning Secretary

## **Australia**

### **SYDNEY**

Ground floor, 20 Chandos Street  
St Leonards NSW 2065  
T 02 9493 9500

### **NEWCASTLE**

Level 3, 175 Scott Street  
Newcastle NSW 2300  
T 02 4907 4800

### **BRISBANE**

Level 1, 87 Wickham Terrace  
Spring Hill QLD 4000  
T 07 3648 1200

### **CANBERRA**

Level 2, Suite 2.04  
15 London Circuit  
Canberra City ACT 2601

### **ADELAIDE**

Level 4, 74 Pirie Street  
Adelaide SA 5000  
T 08 8232 2253

### **MELBOURNE**

188 Normanby Road  
Southbank VIC 3006

### **PERTH**

Level 9, Suite 9.02  
109 St Georges Terrace  
Perth WA 6831

## **Canada**

### **TORONTO**

2345 Yonge Street, Suite 300  
Toronto ON M4P 2E5

### **VANCOUVER**

60 W 6th Ave Suite 200  
Vancouver BC V5Y 1K1



[linkedin.com/company/emm-consulting-pty-limited](https://www.linkedin.com/company/emm-consulting-pty-limited)



[emmconsulting.com.au](http://emmconsulting.com.au)