Appendix D

Traffic Impact Assessment

Hansen Bailey
ENVIRONMENTAL CONSULTANTS

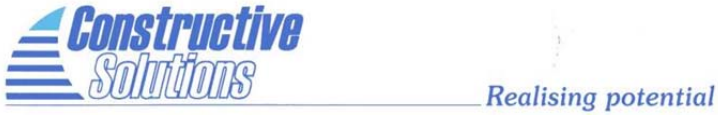
Idemitsu
Boggabri Coal Project

75W Modification – Traffic Assessment
Boggabri NSW

October 2013

Constructive Solutions
Realising potential

Report prepared by:



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1. Introduction

1.1 Project Background

Boggabri Coal Mine is located 15km north-east of the township of Boggabri in north-western New South Wales. Boggabri Coal Mine is an open cut coal mine that has been operating since 2006. Truck and shovel operations are undertaken to produce ROM coal product. Following processing, product coal is transported on a sealed private coal haul road to a rail loadout facility, where coal is dispatched for export via the Port of Newcastle.

The mine is managed by Boggabri Coal Pty Limited (BCPL), who engages contractors to undertake construction, mining, coal crushing and transportation activities.

In 2009, BCPL lodged a major Project application (the Project) under the now-repealed Part 3A of the *Environmental Planning and Assessment Act, 1979* (EP&A Act). In the Project application, BC sought to extend its mining operations for a further 21 years and increase production from the current production rate of 3.5 Million tonnes per annum (Mtpa) to 7Mtpa of Run of Mine coal from a total Project resource of 145Mt.

Construction activities of the Project include:-

- New coal handling and preparation plant (CHPP);
- 17km rail spur line;
- Rail bridges over the Namoi River and Kamilaroi Highway;
- Rail loadout facility located at the mine;
- Upgrade of the overburden and coal extraction haulage fleet (with an option for a dragline);
- Upgrade of electricity transmission lines; and
- Upgrades of other ancillary infrastructure.

The Project was determined by the NSW Planning Assessment Commission (PAC), under delegation by the Minister for Planning and Infrastructure. Project Approval 09_0182 (the Project Approval) was granted in July 2012.

1.2 Existing Project Approval Conditions

The Project Approval (PA 09_0182) includes several conditions that are directly related to traffic as follows:-

Schedule 3, Condition 58

The Proponent shall construct, operate and maintain the bridges over the Kamilaroi Highway for the Boggabri Rail Spur Line and the haul road bridge to the satisfaction of RMS [Roads and Maritime Services], and shall bear all costs associated with the construction and maintenance of these bridges.

Schedule 3, Condition 59

The Proponent shall meet the requirements of RMS in respect of road access from the Kamilaroi Highway for temporary construction traffic, road intersection upgrades and maintenance of RMS roads used in respect of the Project.

Schedule 3, Condition 60

The Proponent shall prepare and implement a Traffic Management Plan for the Project to the satisfaction of the Director-General. This plan must:

(a) be prepared in consultation with the RMS, Narrabri Council and Gunnedah Council;

(b) be submitted to the Director-General for approval within 6 months of the date of this approval;

(c) propose an appropriate program and schedule of works for any intersection upgrades to be undertaken or contributed to by the Proponent arising from conditions 58 and 59 of Schedule 3;

(d) include:

(i) a code of conduct for drivers of heavy vehicles;

(ii) nominated heavy vehicle access routes for construction and operational stages, including details on volumes and nature of heavy/over size and over / mass vehicles;

(iii) measures to minimise traffic impacts at school bus pick up and drop off times;

(iv) consideration of measures to minimise dust from unsealed roads that may be used for access to the mine site; and

(v) a monitoring program to audit vehicle movements against predictions in the EA.

1.3 The Modification

Since the receipt of Project Approval PA 09_0182, BC has undertaken detailed design studies for the infrastructure required to facilitate the Project. These studies have identified the need for amendments to the conceptual Project layout for which Project Approval was originally granted. A Modification is being sought under Section 75W of the EP&A Act to facilitate the changes described below:-

- Construction of permanent mine access from the Kamilaroi Highway;
- Temporary storage of processed mine overburden material at the existing Rock Quarry and the reuse of this material during the construction of the rail spur embankments; and
- Reuse of the existing Daisymede laydown compound.

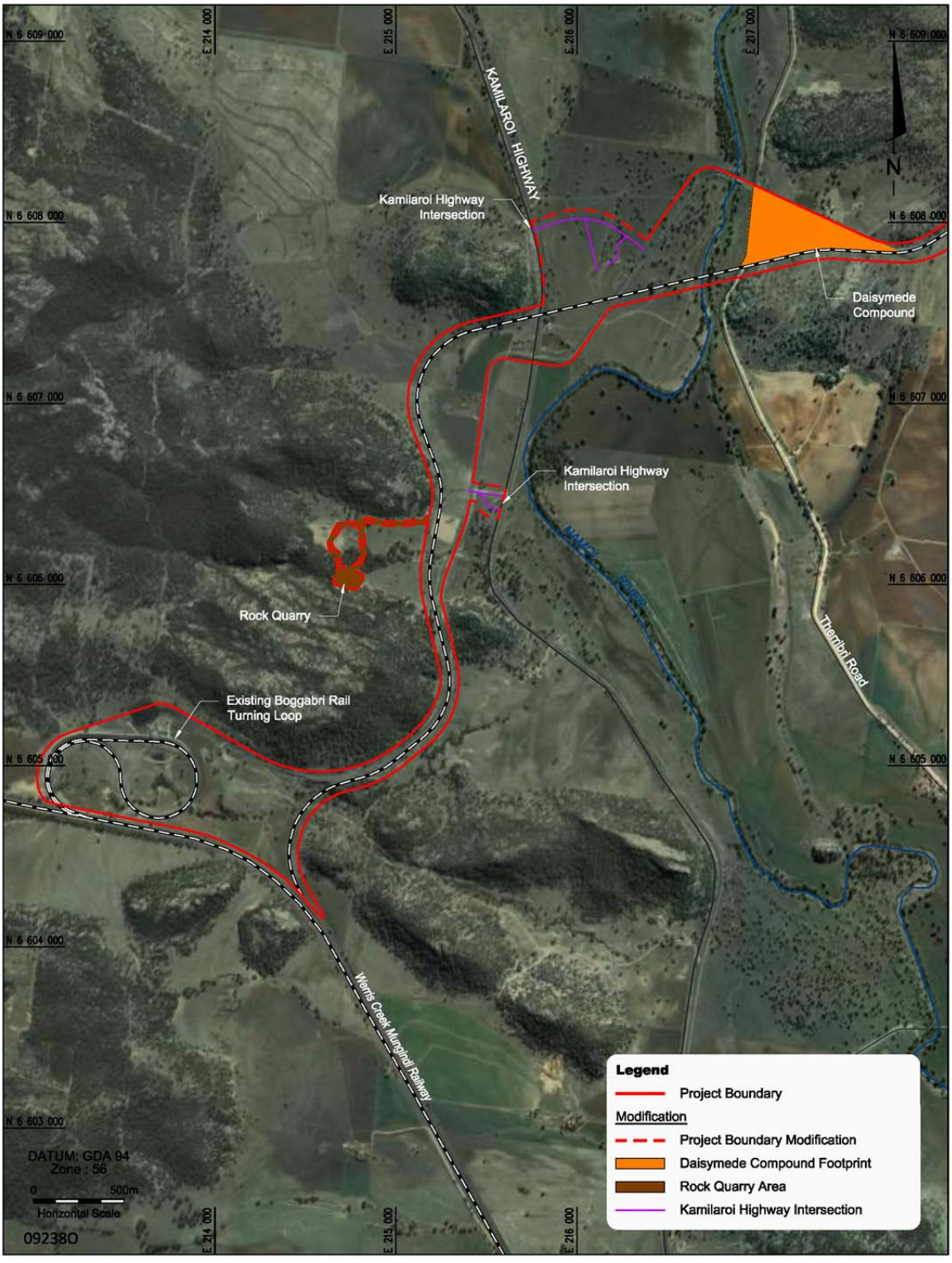


Figure 1 – Modification Overview (Hansen Bailey)

1.4 Scope of Report

This report has been prepared to accompany an Environmental Assessment (EA) for the proposed S75W Modification to the Project Approval prepared by Hansen Bailey.

This report includes assessment of the potential direct traffic-related impacts of the Modification, in accordance with the RMS's Guide to Traffic Generating Developments.

As such, the only modification considered to have an impact on the traffic arrangements on the public road network for this proposed modification is the revised site access. All other proposed modifications do not result in a change in the traffic arrangements as approved under PA 09_0182.

The storage of processed mine overburden at the Rock Quarry site will not involve the public road network.

This report will therefore concentrate on the impacts associated with the construction and associated use of the proposed new site accesses that will link Kamilaroi Highway to the existing Coal Haul Road.

The existing Coal Haul Road has not been included as part of this assessment, with the exception of the proposed rail crossings, as it is not a public road however the interfaces with the public road network at the Kamilaroi Highway and Therribri Road have been considered.

2. APPROVED TRAFFIC ARRANGEMENTS

Pursuant to the Director Generals Requirements, a Traffic Impact Assessment (TIA) was prepared by Parsons Brinkerhoff (2010) to accompany the original Project Environmental Assessment (Hansen Bailey, 2010).

The key assumptions/findings associated with the TIA relevant to this Modification are as follows:-

- Site access would primarily be via the Kamilaroi Highway, Manilla Road and Leard Forest Road (primary access route);
- Peak activity would likely be in Year 5 of the Project with operational employee numbers reaching 500 and construction employees totalling 150;
- The Year 5 peak employment/construction scenario was considered against the current arrangements (traffic numbers in 2009) and Year 5 if the Project were not to proceed;
- The associated intersections were modelled utilising SIDRA. No significant impacts were identified at the nominated intersections;
- An accompanying road safety audit of the primary access route identified the following safety issues:-
    - Significant pavement bleeding;
    - Loose gravel on the road surface;
    - Unprotected culverts;
    - Poor maintenance of the drainage facilities;
    - Pavement edge drop offs;
    - Surface fatigue cracking;
    - Poor road markings; and
    - Signage deficiencies.
- The increase in coal haulage along the Coal Haul Road would impact neither on the capacity or the safety of either Leard Forest Road or Therribri Road; and
- The Project was found not to have an impact on the school bus operation as the Project related traffic was not considered significant and the increases would occur at different times to the operation of the school bus service.

Several assumptions of the TIA have changed since the preparation of the original TIA, particularly related to the construction phase. The construction phase will now occur over a shorter period involving moderately higher overall traffic volumes. Also, the potential impacts on Project traffic on school bus operations have been further considered. Data collected for development of the TMP, since completion of the TIA, indicates Project traffic and school bus operating times may coincide at times. However, any impacts have been determined to be minimal and will be further minimised through measures such as those proposed in this modification.

3. PROPOSED MODIFICATION TRAFFIC ARRANGEMENTS

3.1 Proposed Kamilaroi Highway Site Access (Left in/Left out Intersections)

During the pre-construction design phase of the Project, it was apparent that an alternate access would be required to facilitate construction, particularly for the section of the approved rail spur to the west of the Kamilaroi Highway.

To facilitate access throughout the construction phase, RMS were consulted regarding the potential for the development of a new intersection with the Kamilaroi Highway to the south of the existing coal haul road overbridge. In principle support was obtained from RMS for the development of two intersections that allow for left in/left out only access from the highway whilst preventing right turn movements across the existing through lanes.

Once the rail spur approved under PA 09_0182 is commissioned, there will be no requirement for the haulage of coal from the mine infrastructure area to the existing rail loader via the Coal Haul Road. Thus, once the rail spur is commissioned, the proposed left in/ left out intersections from the Kamilaroi Highway will be used by a significant proportion of all operational traffic to access the mine site.

The proposed left in/left out intersections will require the construction of new pavement adjacent to the highway, development of new surfacing treatments and the installation of wire rope along the new centreline to prevent right turn manoeuvres into and out of the intersections.

Figures 2, 3 and 4 below show the location of the proposed intersections and the associated geometric designs.

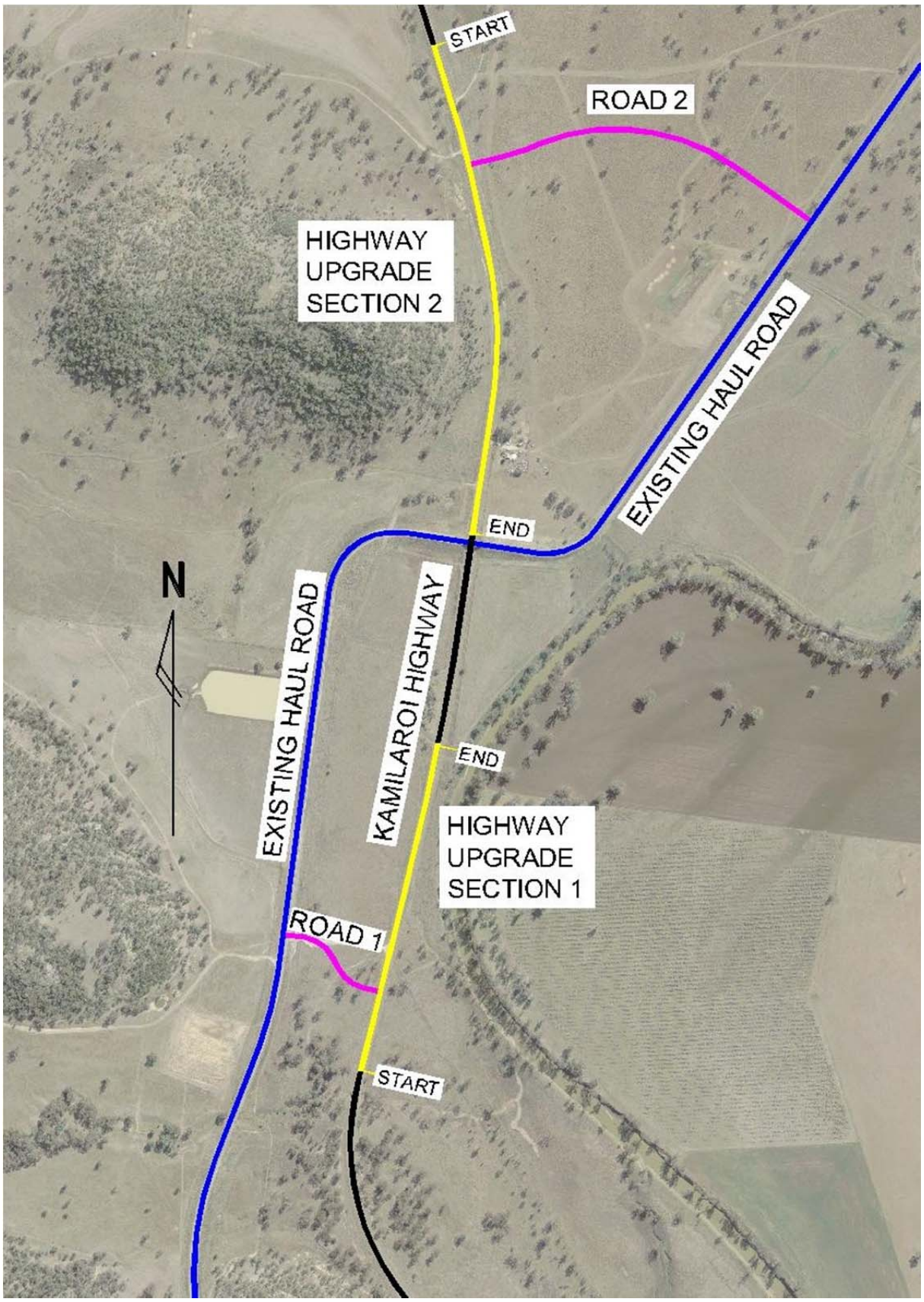


Figure 2 – Location of Left In/Left Out Intersections

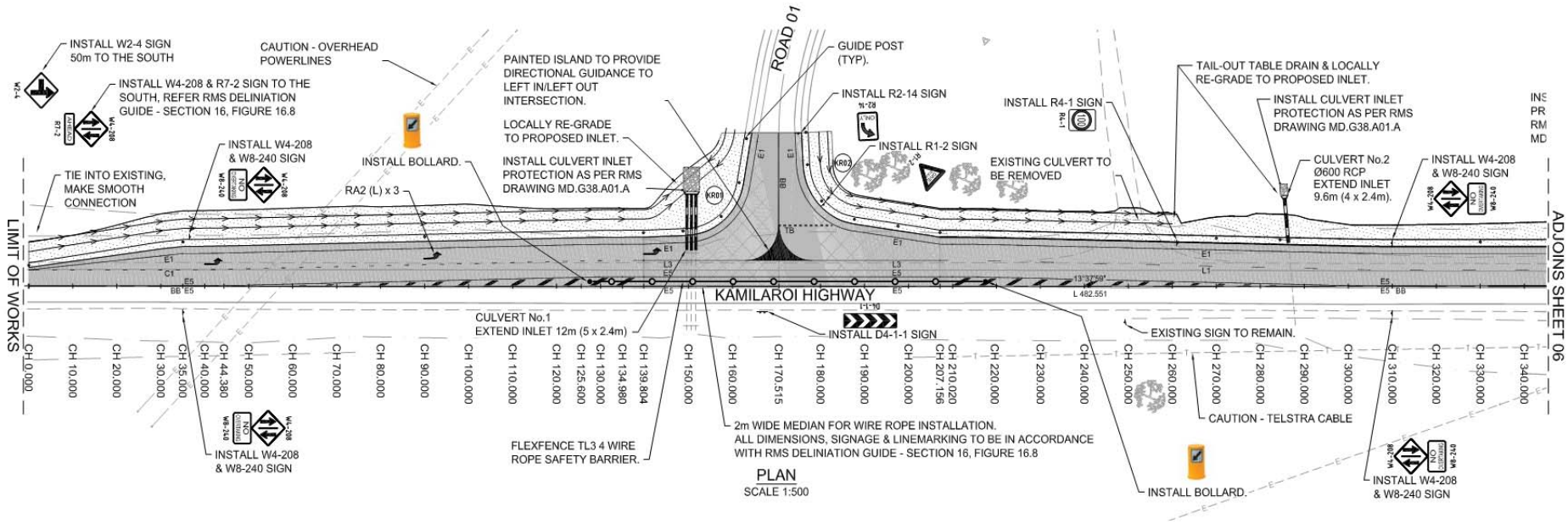


Figure 3 – Configuration of Southern Left In / Left Out Intersection

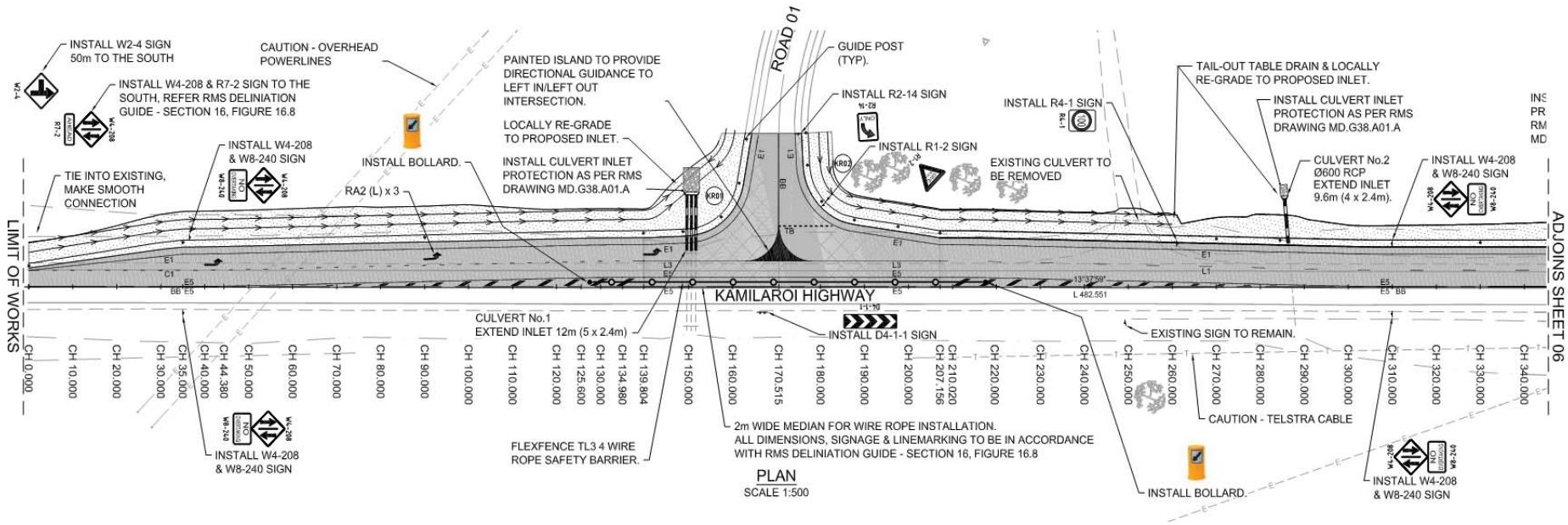


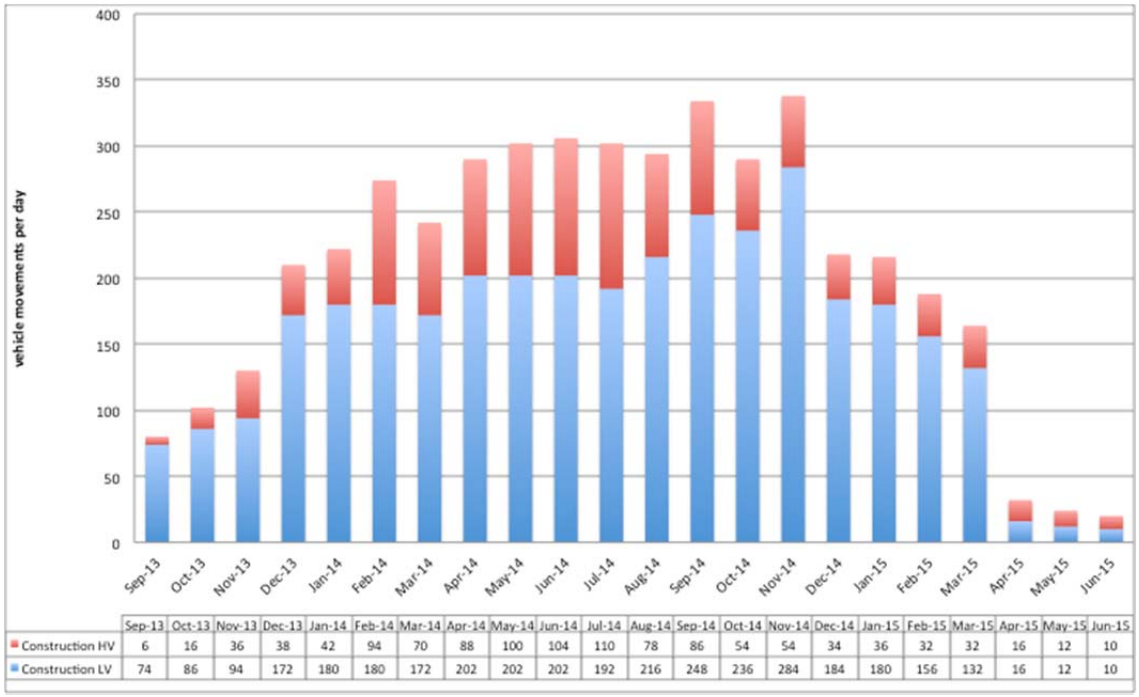
Figure 4 – Configuration of Northern Left In / Left Out Intersection

3.2 Construction Traffic

Updated estimates of construction traffic have been made pursuant of Schedule 3, Condition 60 of the Project Approval. The revised estimates of construction traffic are taken from Boggabri Coal's approved Traffic Management Plan.

The revised construction traffic estimates were developed utilising estimates provided by the primary contractors associated with the Project. These estimates have been used to generate traffic forecasts of total volumes and those resultant from opening of the proposed left in / left out intersections with Kamilaroi Highway and Coal Haul Road. Adjustments for minor traffic movements, such as along Therribri Road, have not been made.

Chart 1 below illustrates the total construction traffic volumes, additional to any background or current operational traffic. It can be assumed this represents the construction traffic would use both Manilla Road and Leard Forest Road without provision of the proposed left in / left out intersections.

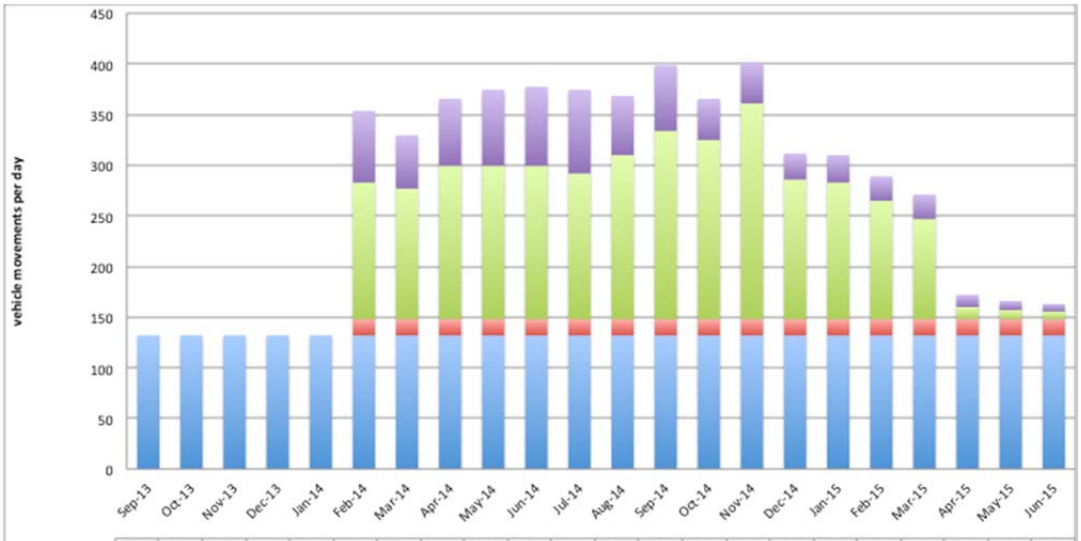


	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15
Construction HV	6	16	36	38	42	94	70	88	100	104	110	78	86	54	54	34	36	32	32	16	12	10
Construction LV	74	86	94	172	180	180	172	202	202	202	192	216	248	236	284	184	180	156	132	16	12	10

Chart 1 – Estimated Total Traffic Movements (VPD) Associated with Construction Phase

As illustrated in Chart 1 above, the estimated construction traffic movements will vary significantly, however for the core construction period spanning approximately 18 months (August 2013 – February 2015) an additional 150 to 340 movements per day are anticipated.

If the left in/left out intersections with the Kamilaroi Highway are approved, it is proposed that a significant proportion of all construction traffic will access the site during the construction phase from the Kamilaroi Highway intersections, then the Coal Haul Road. The forecast traffic volumes along the Coal Haul Road are illustrated in Chart 2 below.



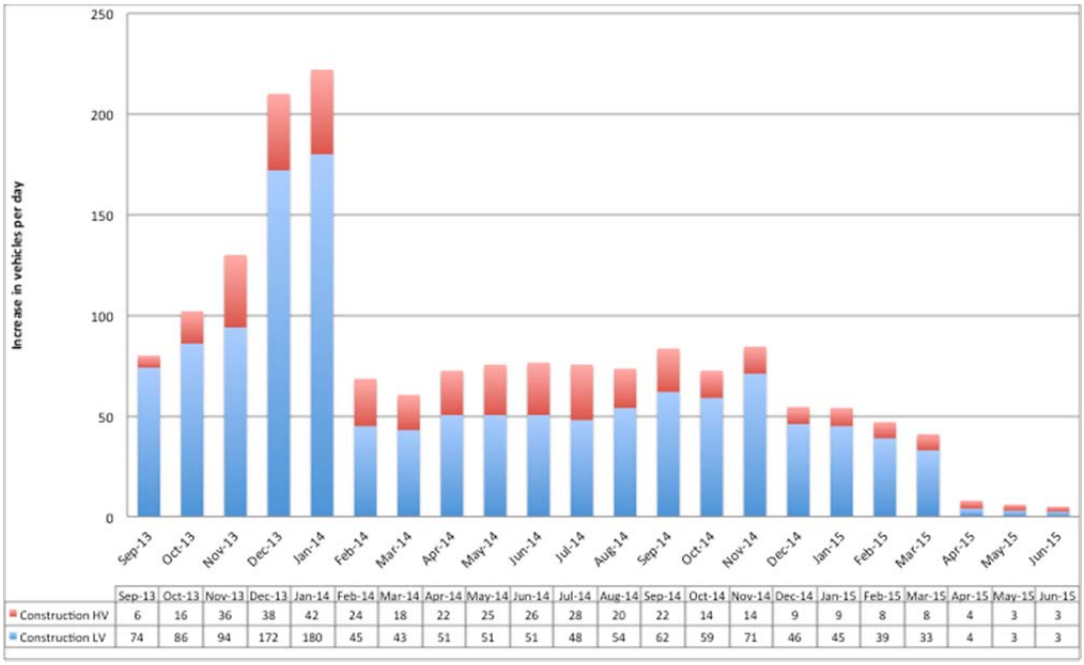
	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15
Construction HV						71	53	66	75	78	83	59	65	41	41	26	27	24	24	12	9	8
Construction LV						135	129	152	152	152	144	162	186	177	213	138	135	117	99	12	9	8
Operation HV						16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Coal Haulage	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132

Chart 2: Estimated Traffic Movements (VPD) on Coal Haul Road with Left In / Left Out Intersections during Construction Phase[1]

The alternative access to the Project site provided by the proposed intersections and the Coal Haul Road is anticipated to reduce heavy vehicle movements originally approved by between 30 and 80 movements per day along Manilla Road and Leard Forest Road.

Chart 3 below illustrates how the access route proposed by this Section 75W Modification would significantly reduce Project traffic impacts on both Manilla Road and Leard Forest Road, compared with the forecast volumes illustrated in Chart 1.

[1] Note: Tapering off of coal haulage has not been shown during the rail commissioning period although at some point during the commissioning period a complete switch will occur negating the need for coal haulage by road.



	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15
Construction HV	6	16	36	38	42	24	18	22	25	26	28	20	22	14	14	9	9	8	8	4	3	3
Construction LV	74	86	94	172	180	45	43	51	51	51	48	54	62	59	71	46	45	39	33	4	3	3

Chart 3: Estimated Construction Traffic Movements (VPD) on Manilla Road and Leard Forest Road before and after Left In / Left Out intersections constructed

It is anticipated that cumulative impacts associated with the construction activities of Whitehaven Coal at the Tarrawonga Coal Mine and the Maules Creek Coal Project will occur. An estimate of the overall increase has been made utilising the revised Project traffic estimates and the estimated traffic volumes presumed in the other respective TIA's. **Table 1** – Estimated Daily Traffic Volumes during Construction Period illustrates the likely cumulative Traffic Volumes during the Construction Period.

Table 1 – Estimated Daily Traffic Volumes during Construction Period

Description	Kamilaroi Highway	Manilla Road	Leard Forest Road	Therribri Road
Background	2,185	459	311	79
The Project	230*	165	165	0#
Maules Creek	157	157	157	0
Tarrawonga	16	37	0	0
TOTAL	**2,588**	**818**	**633**	**79**

Source: Boggabri Coal Traffic Management Plan (Rev. C)
* Split between northbound and southbound traffic not allocated.
# Therribri Road is not proposed to be utilised by BCP for construction with the exception of a short period of time to deliver some of the rail viaduct girders.

3.3 Operational Traffic

Operational traffic associated with the Modification has been assumed to be similar to the levels originally considered in the Project TIA (PB 2010) after the construction phase is complete. The assumptions made are shown in **Table 2** – Estimated Daily Operational Light Vehicle below.

Table 2 – Estimated Daily Operational Light Vehicle Traffic

Description	Number of Staff	% of Total Staff	Trip Generation rate per day	Vehicles per staff member	Total Vehicle trips per day
Professional, supervisory and office staff	49	14	1.8	0.83	73
Mining operations	194	55	1.8	0.83	290
Maintenance	81	23	1.8	0.83	121
Coal Preparation	29	8	1.8	0.83	43
Total	**353**	**100**			**527**

Operational heavy vehicle movements had not been estimated in the Project TIA (PB 2010). Based on current information presumed heavy vehicles are as shown in **Table 3** below.

Table 3 – Estimated Daily Operational Heavy Vehicle Traffic

Number of Deliveries	Heavy Vehicle Type	Load	Total Vehicle movements per day
3	b - double	Fuel	6
3	b - double	Ammonium Nitrate	6
2	Truck & Super Dog	Stemmings	4
5	Rigid trucks	Miscellaneous	10
13			**26**

Of the 13 estimated deliveries vehicles 8 will utilise the coal haul road as they exceed 42.5t GCM therefore cannot obtain access via the 'Iron Bridge' over the Namoi River. The 8 deliveries exceeding 42.5t will utilise the left in / left out intersections whilst the miscellaneous heavy vehicles will utilise the existing access until the rail spur is operational.

Following the construction of the approved rail spur, the proposed left in/left out intersections from the Kamilaroi Highway will be used by a significant proportion of all operational traffic to access the mine site. This would equate to approximately 550 vehicles per day utilising the intersections with the Kamilaroi Highway and the Coal Haul Road. This would also result in a near equivalent reduction in traffic movements on the relevant sections of Manilla Road and Leard Forest Road.

4. Assessment of Traffic Impacts

4.1 Construction of Left In/Left Out Intersections

The proposed intersections with the Kamilaroi Highway have been designed to enable widening for wire rope barriers, auxiliary left lanes and acceleration lanes on each side of the highway (refer Figures 3 and 4). It is anticipated that the construction duration for these intersections will be approximately 8 to 10 weeks, weather permitting.

RMS have previously advised that significant delays to through traffic along the Kamilaroi Highway will not be acceptable and that two lanes of traffic are to be maintained at a regulatory speed of no less than 80km/hr. This requirement is considered to be achievable provided that:-

- The existing road pavement is considered suitable and does not require any reconstruction; and
- The construction 'tie in' line is located near the fog line enabling suitable width for two lanes of through traffic during construction of the proposed access roads.

Short term construction activities for the proposed highway access roads that will require a reduction to one lane traffic include:

- Placement of an asphalt overlay;
- Bituminous sealing (as required); and
- Installation of the wire rope barriers.

Given the relatively small scale of the proposed works requiring a reduction to one lane traffic, it is anticipated that each activity will be undertaken in less than 2 days. As a result, the highway will be restricted to one lane of traffic for a total of 6 (non consecutive) days.

4.2 Vehicle Use of Coal Haul Road during Project Construction Phase

The use of the Coal Haul Road during the Project construction phase following construction of the proposed intersections with the Kamilaroi Highway is generally considered to be a positive approach to traffic management. However, this activity will result in a number of drivers utilising the Coal Haul Road that may be unfamiliar with current traffic arrangements, particularly those in relation to the existing intersections with Therribri Road and Leard Forest Road[2]. All vehicles utilising the Coal Haul Road will be pre-approved by BCP.

2 The Leard Forest Road intersection with the haul road will be operational until an alternative alignment to the east via Goonbri Road is established.

Introduction of additional heavy vehicles during the construction phase will require specific mitigation measures to ensure the drivers are familiar with the traffic arrangements on the coal haul road, particularly the associated intersections with public roads.

4.3 Operation of Left In/Left Out Intersections

The provision of auxiliary left lanes and acceleration lanes for the proposed intersections with the Kamilaroi Highway will result in improved traffic interaction in comparison with the existing Manilla Road intersection with the Kamilaroi Highway.

Given there are two intersections, left turn ingress and egress will be available for both northbound and southbound vehicles. Vehicles leaving the site shall be able to choose the correct intersection depending on their proposed direction of travel by utilising the section of the Coal Haul Road between the two intersections.

Merging and diverging traffic from the proposed access roads will be able to enter and exit the travel lanes of the Kamilaroi highway at speeds commensurate with that as determined in Austroads, 2010. Restricting vehicles from undertaking right turn movements from the highway, with the provision of wire rope barriers, when entering and exiting the mine site will also ensure that no slow moving vehicles cross the through lanes of the highway.

SIDRA analysis has not been undertaken for these proposed intersections, however it is considered that the effective capacity of these intersections will exceed the approved capacity required by the mine, even during shift changes which would result in concentrated vehicle movements over a short periods of time.

Public use of the haul road shall be discouraged by providing signage on both approaches stating that the site is a private road and is only to be utilised by vehicles authorised for mine entry.

4.4 Coal Haul Road and Therribri Road Intersections

The Coal Haul Road intersection with Therribri Road is operated under strict provisions governed by a Mine Vehicle Permit issued by RMS. At present, traffic on Therribri Road is required to give way to traffic on the Coal Haul Road. Existing boom gates prevent public vehicular access to the coal haul road from Therribri Road which are activated by vehicles on approach along the Coal Haul Road only.

The public road approaches include a range of control measures including advanced warning signage with ‘wig wag’ lighting for the period when haulage vehicles are within the vicinity of the intersection, transverse deceleration lines, other signage and holding lines.

Figure 4 shows the treatments replicated on both approaches on Therribri Road to the Coal Haul Road.

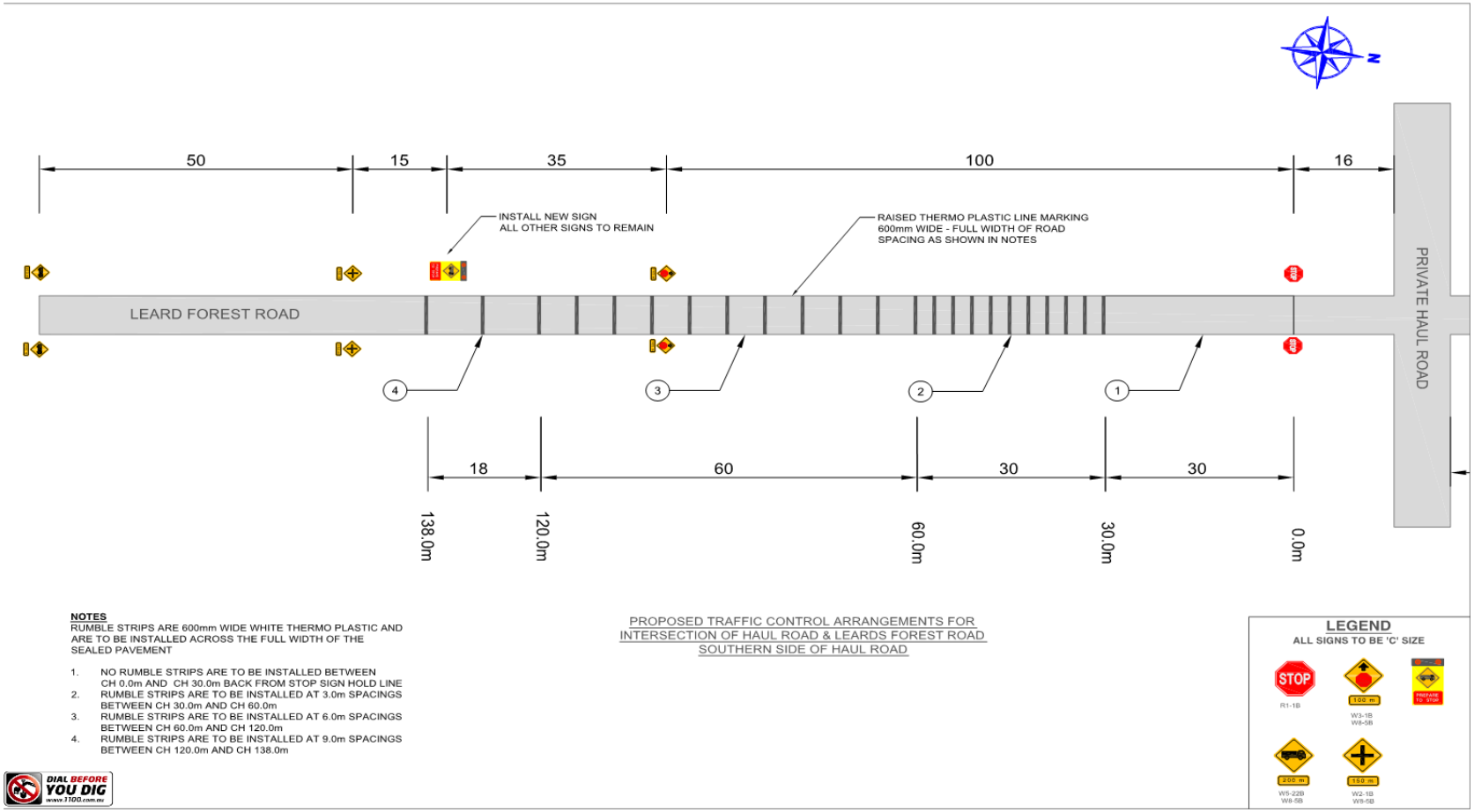


Figure 5 – Traffic Arrangements at Coal Haul Road Intersections

Given background traffic volumes for non-Project traffic of 79 vehicles per day on Therribri Road, it would be appropriate for operational traffic using Therribri Road following construction of the Kamilaroi Highway access intersections and approved rail spur to continue to give way to traffic on the Coal Haul Road.

Coal haulage vehicles are currently required to reduce speed to 20km/hr whilst travelling through the intersection. This requirement is primarily due to the significant braking distance of the coal haulage vehicles even at low speeds.

Once the rail spur is operational there will be no need for coal haulage vehicles to operate on the Coal Haul Road. Furthermore, it is envisaged that all vehicles utilising the Coal Haul Road to access the site from the Kamilaroi Highway will be 'road registered' vehicles. Given the change in traffic types, it is envisaged that an increased travel speed of 40km/hr through the intersection for vehicles accessing the mine is appropriate along with a maximum speed of 80km/hr.

To simplify interaction at the Therribri Road intersection, it is considered appropriate to prohibit any vehicles from turning onto or off the Coal Haul Road from this location.

4.5 Coal Haul Road and Rail Spur Interaction

After the completion of the rail spur there will be two at grade rail crossings with the coal haul road. This will require some localised roadworks to improve the respective road approaches. Controls at the rail crossings shall be determined in accordance with AS1742.7 – 2007 Manual of Uniform Traffic Control Devices and the Australian Level Crossing Assessment Model (ALCAM) where applicable.

4.6 Reduction in Manilla Road and Leard Forest Road Traffic

Once the left in/left out intersections with the Kamilaroi Highway are made available for use, there will be a significant reduction in traffic on both Manilla Road and Leard Forest Road. Initially this will only be pre-approved vehicles associated with the construction phase however in the longer term it will result in a reduction of approximately 550 vehicles per day (one way) representing the majority of the operational workforce traffic movements.

Given the increase in traffic volumes associated with other developments, primarily the Maules Creek Coal Project, reducing BCP traffic numbers will alleviate pressure on the following:-

1. Manilla Road & the Kamilaroi Highway Intersection;
2. Manilla Road including the 'Iron Bridge' and the intersection with Therribri Road; and
3. Leard Forest Road and the associated intersections along its length.

5. Recommendations

The proposed utilisation of the existing Coal Haul Road as the primary mine access for construction and then operations is considered as an improvement to the existing access provisions to the mine site, which is limited in its functionality for the reasons outlined in this report.

The following recommendations are made in relation to the construction of the left in/left out intersections with the Kamilaroi Highway, use of the Coal Haul Road as an access for heavy vehicles during the Project construction phase and subsequent use of the coal haul road as the primary access during the operational phase after the rail spur approved under PA 09_0182 is constructed.

Construction of Left In/Left Out Intersections

1. Construction of both intersections with the Kamilaroi Highway occur in accordance with the geometric design contained in Appendix A;
2. BCPL continue to liaise with and meet the requirements of the Works Authorisation Deed (WAD No. 12-2601-2985) issued by RMS;
3. Traffic delays for the Kamilaroi Highway through traffic be kept to an absolute minimum during construction; and
4. Works be undertaken by a suitably prequalified RMS contractor to ensure compliance with RMS requirements.

Vehicle Access During Construction Phase

5. That all light and heavy vehicles associated with the Project, that are pre-approved to do so, access the site via the Coal Haul Road once the left in/left out intersections with the Kamilaroi Highway are available;
6. That suitable measures are put in place by BCPL to ensure that drivers using the Coal Haul Road are aware of the local traffic arrangements, particularly at the intersections with Therribri Road and Leard Forest Road; and
7. That no construction employee private vehicles or any vehicles not pre-approved to do so access the Project site via the Coal Haul Road.

Primary Site Access via Left In/Left Out intersections and Coal Haul Road Following Commissioning of Rail Spur

8. Suitable arrangements be put in place by BCPL to identify the changed traffic conditions to all road users travelling on the Kamilaroi Highway (i.e. signage, etc.);
9. The intersections with the Kamilaroi Highway be reviewed once they are in use by Project operational traffic. This review to be undertaken in consultation with RMS to determine any required changes that may be required given the change in traffic types and traffic volumes;

10. Suitable inductions and training, with reference to a formal driver Code of Conduct, are provided by BCPL for all employees and contractors of the mine in relation to the changed traffic conditions and associated traffic arrangements for site access;

11. Suitable signage be installed on approaches to both intersections with the Kamilaroi Highway and Therribri Road advising road users that these roads are not approved for use by BC mine traffic; and

12. Existing CCTV at Therribri and Leard Forest Roads be maintained during the construction period. During operations, the Therribri Road CCTV will be maintained, as Leard Forest Road will be closed.

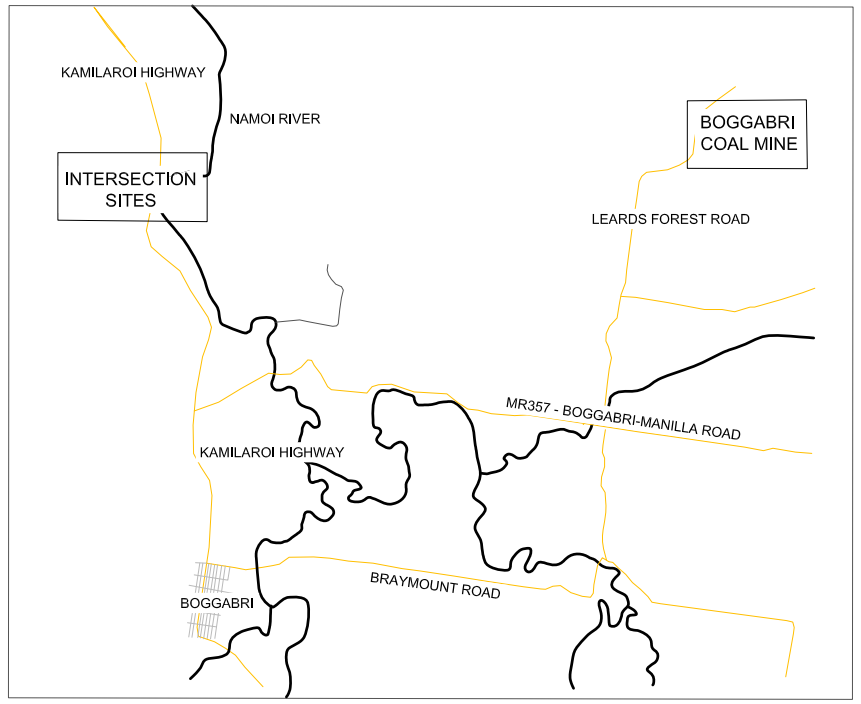
13. Road-registered vehicles travelling on the Coal Haul Road be restricted to 80km/hr and be required to reduce speed to a maximum of 40km/hr when travelling through any public road intersections.

Furthermore, it is recommended that the approved Traffic Management Plan (pursuant of Schedule 3, Condition 60 of PA 09_0182) be reviewed and revised as necessary to adequately address the recommendations of the associated changes in traffic impacts identified as part of this Modification and other requirements associated with the supplementary Project Approval.

APPENDIX A
Intersection Designs

BOGGABRI COAL PTY LTD
MINE EXPANSION PROJECT
DETAILED DESIGN
PROPOSED KAMILAROI HIGHWAY INTERSECTIONS

LOCALITY PLAN



CONSTRUCTIVE SOLUTIONS
"Approved for use."

"I certify that these plans meet the requirement of the brief."

..... Date .....
Director
Steve O'Rourke (SOR) M.B.A B.E

..... Date .....
Project Manager
Michael Bloem (MB) B.E. Civil

NORWEST Engineering & Planning

"I certify that these plans meet Austroads and RMS Standards where appropriate."

..... Date 22/02/2013
Designed by:
Michael Mowle (*MIEAust CPEng)*
Chartered Professional Engineer
NPER (Civil) No.1070385

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No.	DATE	REVISIONS	BY
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PROPOSED INTERSECTIONS - KAMILAROI HWY - BOGGABRI
COVER PAGE / LOCALITY PLAN

Drawing Number/Reference: NW1006-001-01			Rev. C
Designer J.N.S	Origin Of Levels SSM 2105		Date 13.06.2012
Surveyor	Height RL 237.493m		Sheet Size A1
Drafting J.N.S	Datum AHD		Sheet No. 01
Approved G.Hill	Scale AS SHOWN		Total 36

SHEET INDEX

DRAWING No.	DESCRIPTION
NW1006-001-01	COVER PAGE / LOCALITY PLAN
NW1006-001-02	SHEET INDEX
NW1006-001-03	GENERAL ARRANGEMENT
NW1006-001-04	TYPICAL SECTIONS AND NOTES
NW1006-001-05	LONGITUDINAL SECTION AND PLAN CH 0.00 TO CH 340.00
NW1006-001-06	LONGITUDINAL SECTION AND PLAN CH 340.00 TO CH 680.00
NW1006-001-07	LONGITUDINAL SECTION AND PLAN CH 680.00 TO CH 1020.00
NW1006-001-08	LONGITUDINAL SECTION AND PLAN CH 1020.00 TO CH 1360.00
NW1006-001-09	LONGITUDINAL SECTION AND PLAN CH 1360.00 TO CH 1700.00
NW1006-001-10	LONGITUDINAL SECTION AND PLAN CH 1700.00 TO CH 1930.00
NW1006-001-11	SOUTH INTERSECTION CROSS SECTIONS CH 0.00 TO CH 50.00
NW1006-001-12	SOUTH INTERSECTION CROSS SECTIONS CH 60.00 TO CH 125.60
NW1006-001-13	SOUTH INTERSECTION CROSS SECTIONS CH 130.00 TO CH 150.00
NW1006-001-14	SOUTH INTERSECTION CROSS SECTIONS CH 160.00 TO CH 220.00
NW1006-001-15	SOUTH INTERSECTION CROSS SECTIONS CH 230.00 TO CH 300.00
NW1006-001-16	SOUTH INTERSECTION CROSS SECTIONS CH 310.00 TO CH 380.00
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NW1006-001-25	NORTH INTERSECTION CROSS SECTIONS CH 13 25.39 TO CH 1360.00
NW1006-001-26	NORTH INTERSECTION CROSS SECTIONS CH 1 370.00 TO CH 1420.00
NW1006-001-27	NORTH INTERSECTION CROSS SECTIONS CH 1 430.00 TO CH 1480.00
NW1006-001-28	NORTH INTERSECTION CROSS SECTIONS CH 1 490.00 TO CH 1535.00
NW1006-001-29	NORTH INTERSECTION CROSS SECTIONS CH 1 540.00 TO CH 1580.00
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NW1006-001-33	NORTH INTERSECTION CROSS SECTIONS CH 17 75.00 TO CH 1820.00
NW1006-001-34	NORTH INTERSECTION CROSS SECTIONS CH 18 3.00 TO CH 1930.00
NW1006-001-35	SOUTHERN INTERSECTION PLAN AND KERB RETURNS
NW1006-001-36	NORTHERN INTERSECTION PLAN AND KERB RETURNS

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PROPOSED INTERSECTIONS - KAMILAROI HWY - BOGGABRI

SHEET INDEX

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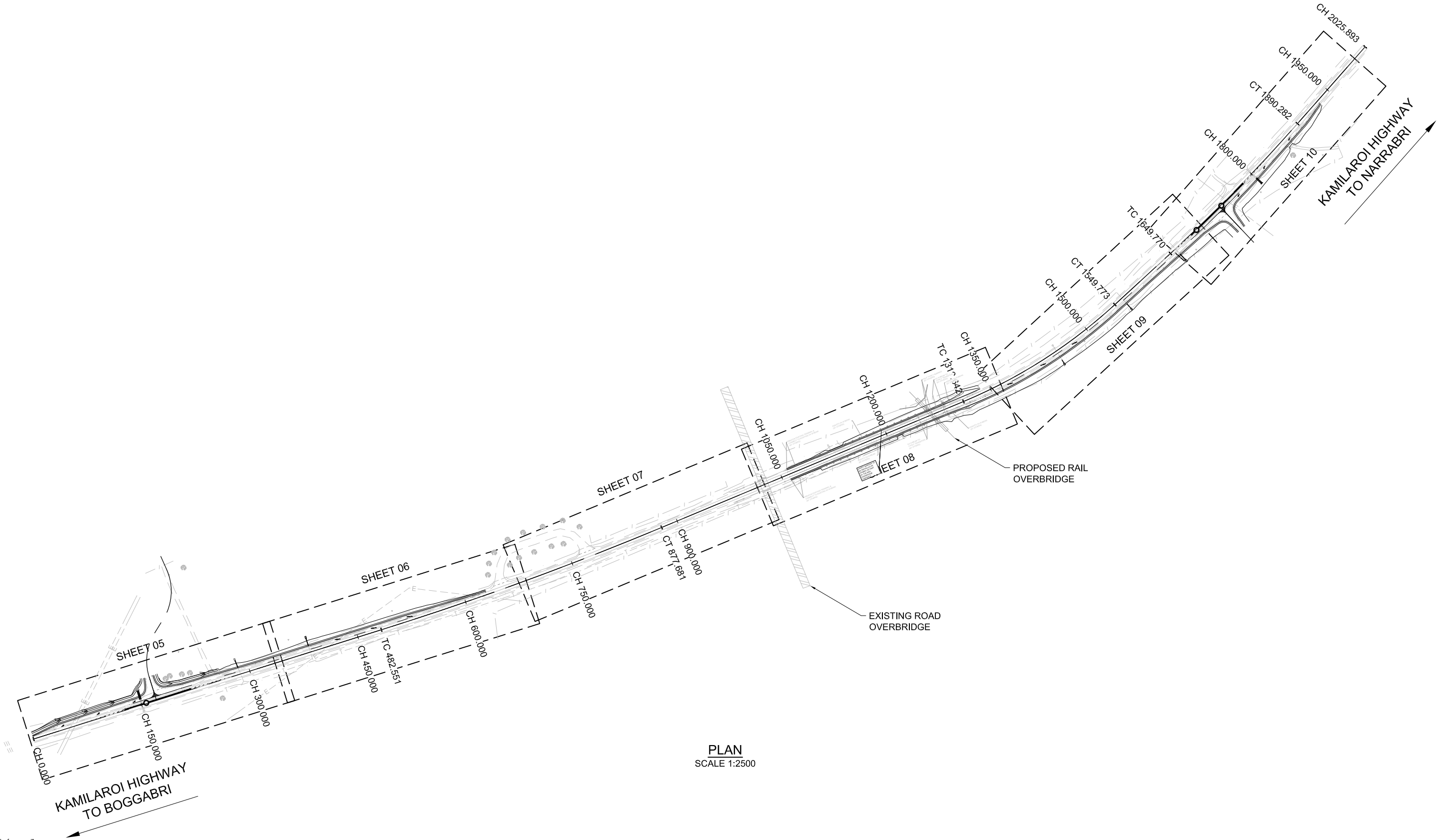
Approved G.Hill	Scale AS SHOWN		Total 36



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SCALE 1:2500

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Full Size 1:2500 ; Half Reduction 1:5000
SCALE (m)

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PROPOSED INTERSECTIONS - KAMILAROI HWY - BOGGABRI
GENERAL ARRANGEMENT

Drawing Number/Reference	NW1006-001-03		Rev. C
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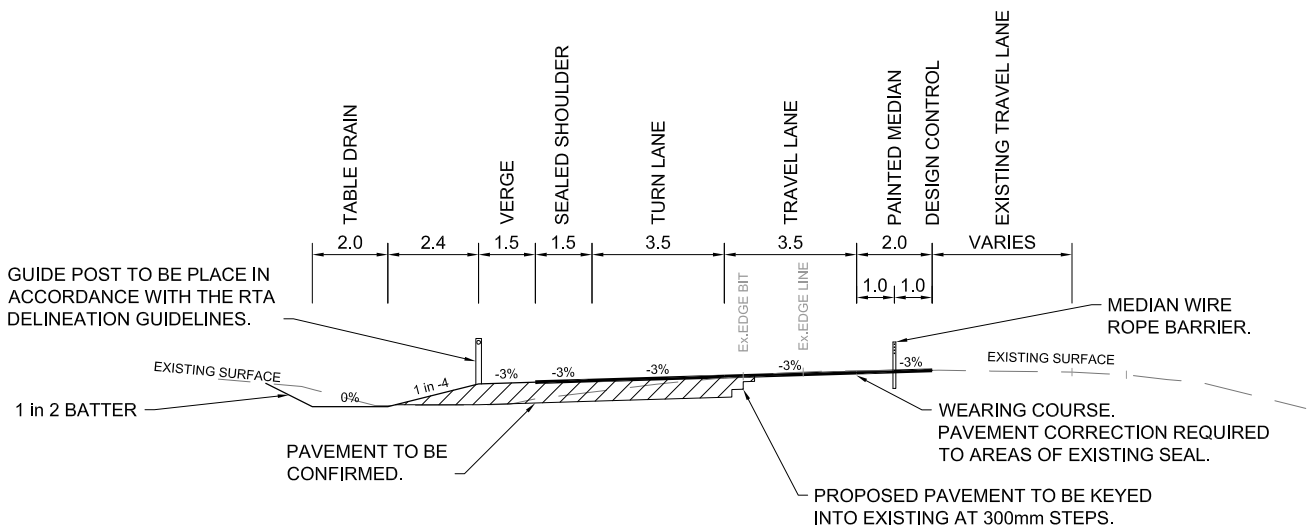
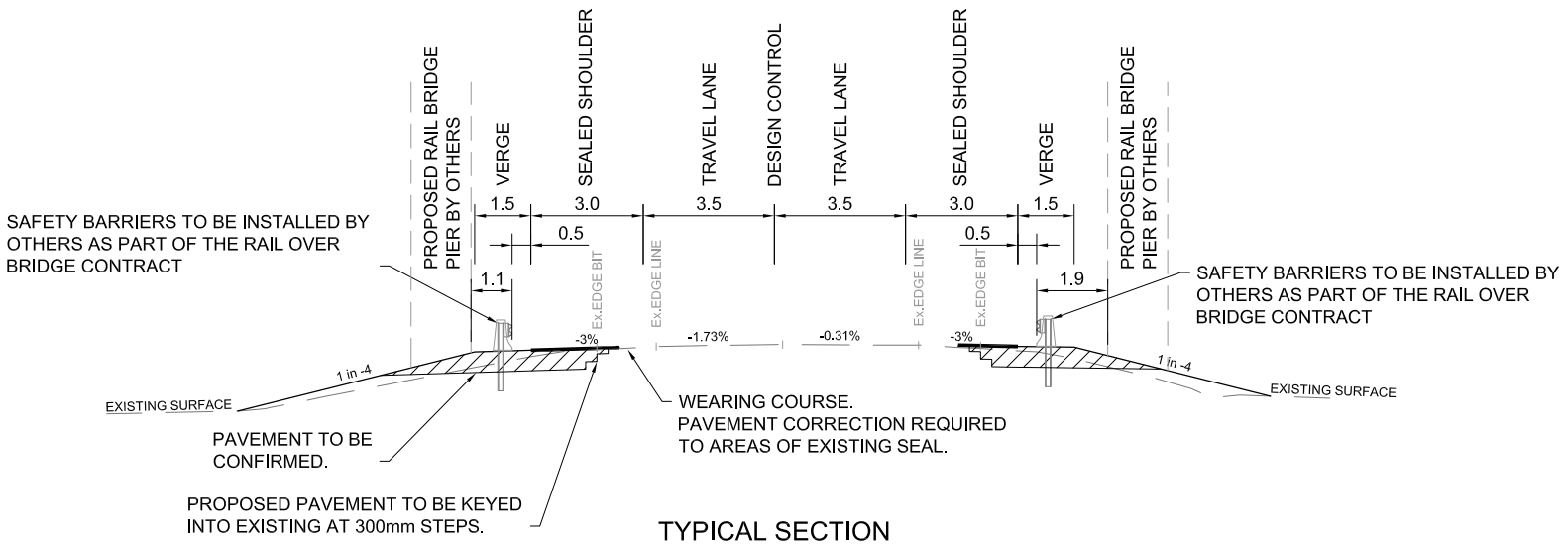
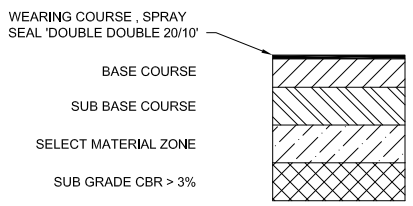
Surveyor		Height RL 237.493m	Sheet Size A1
Drafting	J.N.S	Datum AHD	Sheet No. 03
Approved	G.Hill	Scale AS SHOWN	Total 36



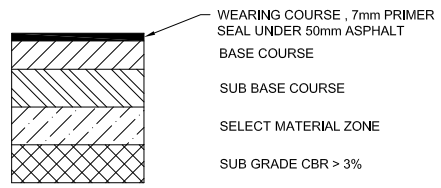
TYPICAL SECTION
INTERSECTION - ONE SIDED WIDENING
SCALE 1:100



TYPICAL SECTION
SHOULDER WIDENING FOR GUARD RAIL
SCALE 1:100



TYPE 1
PAVEMENT DETAIL
N.T.S.



TYPE 2 - AT INTERSECTION
PAVEMENT DETAIL
N.T.S.

NOTE:

PAVEMENT PROFILES ARE INDICATIVE ONLY AND ARE SUBJECT TO GEOTECHNICAL INVESTIGATIONS AND FORMAL PAVEMENT DESIGN.

CONSTRUCTION NOTES

1. ALL WORKS SHALL BE IN ACCORDANCE WITH RMS SPECIFICATIONS INCLUDED IN THE CONTRACT DOCUMENTATION.
2. THE CONTRACTOR SHALL LOCATE AND LEVEL ALL EXISTING SERVICES PRIOR TO COMMENCING CONSTRUCTION AND SHALL MAKE ALL NECESSARY ARRANGEMENTS WITH THE RELEVANT AUTHORITY TO RELOCATE OR ADJUST AS FOUND NECESSARY.
3. THE CONTRACTOR SHALL NOT ENTER UPON OR DO ANY WORK WITHIN ANY LAND WITHOUT PRIOR WRITTEN PERMISSION FROM THE LANDOWNER.
4. ALL NEW WORKS SHALL TRANSITION SMOOTHLY TO EXISTING CONDITIONS.
5. THE CONTRACTOR SHALL CLEAR THE SITE BY REMOVING ALL RUBBISH, FENCES, OUT HOUSES, CAR BODIES, DEBRIS ETC. THE CONTRACTOR SHALL NOT DISPOSE OF ANY DEBRIS BY BURNING.
6. REMOVAL OF UNSUITABLE MATERIAL IS SUBJECT TO THE APPROVAL OF THE SUPERINTENDENT.
7. SURPLUS EXCAVATED MATERIAL SHALL BE PLACED WHERE DIRECTED BY THE SUPERINTENDENT.
8. THE CONTRACTOR MUST ENSURE SUPERINTENDENT APPROVAL OF MATERIALS PRIOR TO DELIVERY TO SITE.
9. EROSION AND SEDIMENT CONTROL PLAN TO BE DEVELOPED AND IMPLEMENTED IN ACCORDANCE WITH RMS QA SPECIFICATION G38.
10. THE CONTRACTOR SHALL MAINTAIN ADEQUATE DUST CONTROL MEASURES THROUGHOUT THE DURATION OF THE PROJECT.
11. SERVICE CONDUITS SHALL BE LAID DURING SUBGRADE CONSTRUCTION AFTER THE RELEVANT AUTHORITIES HAVE DETERMINED POSITIONS. (IF REQUIRED)
12. FELLED TREES SHALL BE SALVAGED FOR REUSE AS WOOD CHIP FOR SITE REHABILITATION. NON-SALVAGEABLE MATERIAL SUCH AS STUMPS AND ROOTS SHALL BE DISPOSED OF OFF SITE.
13. THE CONTRACTOR SHALL MAINTAIN ALL SERVICES AND ALL WEATHER ACCESS AT ALL TIMES TO ADJOINING PROPERTIES.
14. THE CONTRACTOR SHALL DEVELOP A TRAFFIC MANAGEMENT PLAN IN ACCORDANCE RMS SPECIFICATION G10.
15. ALL NATURAL SURFACE DATA HAS BEEN DETERMINED BY TERRAIN MODELLING. THE CONTRACTOR IS TO VERIFY ACCURACY OF TERRAIN MODEL PRIOR TO CONSTRUCTION.
16. APPROVED CONSTRUCTION WORK THAT REQUIRES THE REMOVAL OF SITE WORKS MUST BE CARRIED OUT USING BENCH MARKS NOMINATED ONLY BY THE SUPERINTENDENT.
17. THE CONTRACTOR IS TO SUPPLY WORK-AS-EXECUTED ENGINEERING DRAWINGS AND CO-ORDINATES TO SUPERINTENDENT AT COMPLETION OF THE WORKS.
18. BITUMINOUS SEAL TO BE DESIGNED IN ACCORDANCE WITH RMS BITUMINOUS SEAL DESIGN GUIDE AND APPROVED BY SUPERINTENDENT AND RMS.

LINEMARKING AND ROAD SIDE FURNITURE:

1. ALL LINEMARKING TO BE IN ACCORDANCE WITH AS1742, RMS DELINEATION GUIDE AND RMS SPEC R141.
2. LINEMARKING SHOWN THUS:
   BB - DIVIDING/BARRIER LINE
   C1 - CONTINUITY LINE
   E1 - EDGE LINE
   E5 - OUTLINE OF PAINTED MEDIAN
   L1 - LANE LINE
   L3 - LANE LINE ON MULTI LANE ROAD
   TB - GIVE WAY LINE
3. RAISED PAVEMENT MARKERS TO BE PROVIDED FOR ALL LINEMARKING SHOWN IN ACCORDANCE WITH RMS DELINEATION GUIDE SECTION 15 AND RMS SPEC R142.
4. SIGN POSTING TO BE SUPPLIED & ERECTED IN ACCORDANCE WITH AS 1742 AND RMS SPECIFICATION R143.
6. LATERAL POSITION OF NEAREST EDGE OF SIGN SHALL BE AT LEAST 600mm CLEAR OF THE OUTSIDE EDGE OF ROAD SHOULDER AND BETWEEN 2m TO 5m FROM THE EDGE IF THE TRAVELED WAY.
7. THE BOTTOM OF THE SIGN SHALL BE A MINIMUM OF 1.5m ABOVE THE NEAREST EDGE OF TRAVELED WAY.
8. FOOTINGS SHALL COMPRISE 600mm DEEP, MINIMUM 300mm DIAMETER HOLE BACKFILLED WITH N15 CONCRETE. BOLT TO BE FIXED THROUGH BOTTOM OF POST TO PREVENT TWISTING.
9. GUIDEPOST TO BE PROVIDED AS PER PLAN LOCATIONS AND IN ACCORDANCE WITH RMS DELINEATION GUIDE SECTION 16 AND RMS SPEC R131 WITH ADDITIONAL 2 GUIDEPOSTS TO BE INSTALLED AT EACH CULVERT HEADWALL LOCATION AND DRIVEWAYS WHERE GUARD RAIL DOES NOT EXIST.
10. MEDIAN GUARDRAIL (Wire Rope Safety Barrier) TO BE IN ACCORDANCE WITH RMS DELINEATION GUIDE SECTION 16 (Figure 16.8) AND RMS SPEC R132.

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Full Size 1:100 ; Half Reduction 1:200
SCALE (m)

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PROPOSED INTERSECTIONS - KAMILAROI HWY - BOGGABRI

TYPICAL SECTIONS AND NOTES

Drawing Number/Reference: NW1006-001-04			Rev.: C
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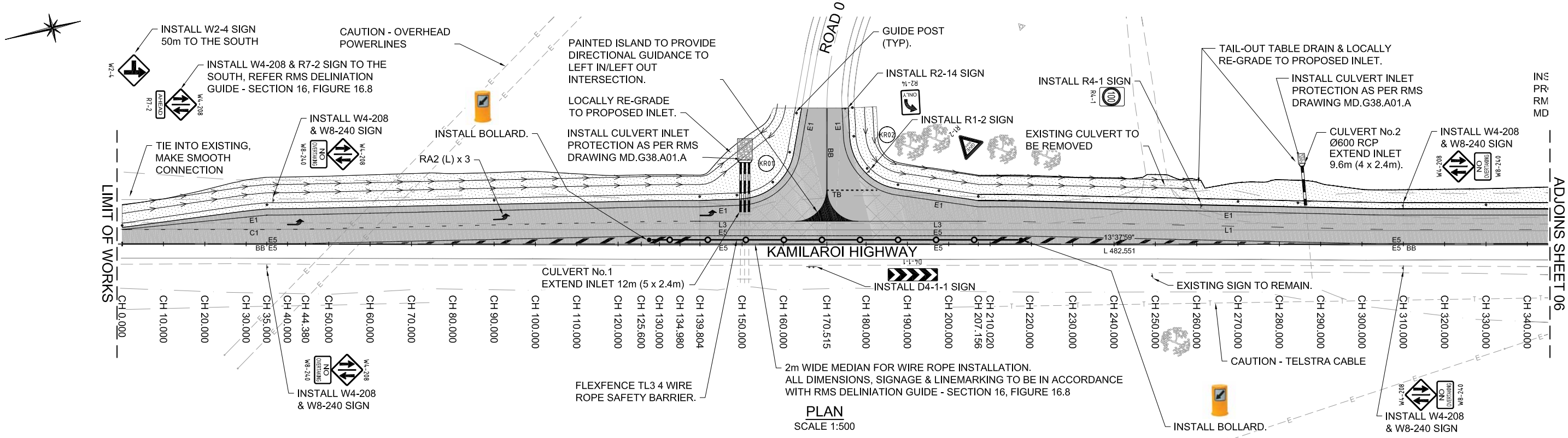
Surveyor:	Height: RL 237.493m		Sheet Size: A1
Drafting: J.N.S	Datum: AHD		Sheet No.: 04
Approved: G.Hill	Scale: AS SHOWN		Total: 36



PLAN
SCALE 1:500

CULVERT SCHEDULE

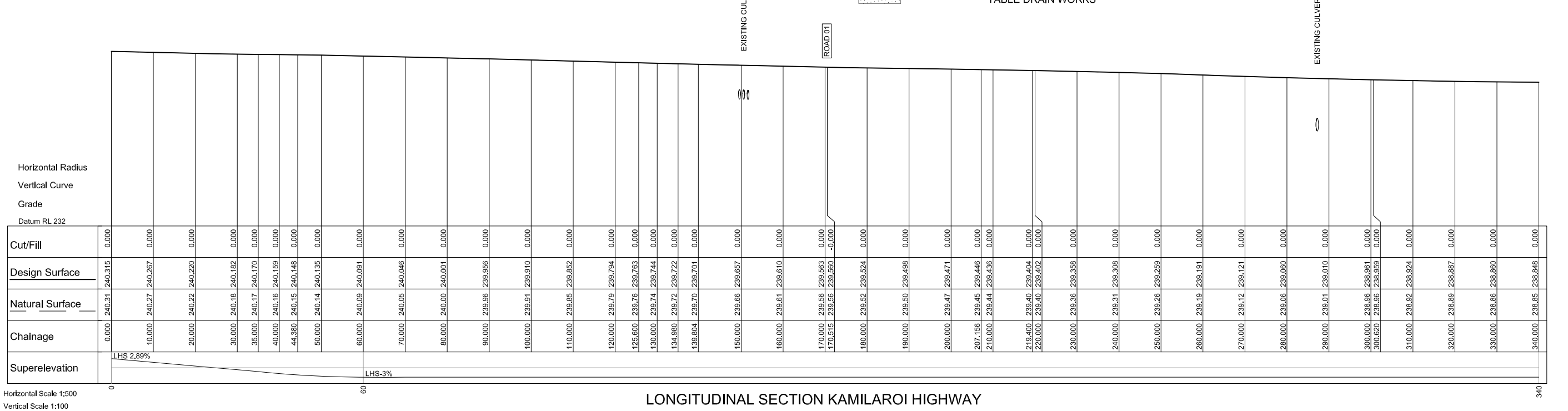
CULVERT No.	APPROX. CHAINAGE	DIAMETER (mm)	SLOPE (%)	CULVERT SIDE	NEW EASTING	NEW NORTHING	EXISTING INVERT LEVEL	NEW INVERT LEVEL	EXTENSION LENGTH	PIPE CLASS	RTA HEADWALL MODEL DRAWING
1	150	3 x 450	Existing 1.0	INLET	215548.051	6606396.810	238.11	238.23	12.0	4 RCP	MD.R11.A20.A.1
				OUTLET	-	-	237.94	-	-	-	
2	287	600	Existing 1.7	INLET	215580.682	6606527.633	236.68	236.84	9.6	4 RCP	MD.R11.A16.A.1
				OUTLET	-	-	236.35	-	-	-	
INSTALLATION, BEDDING AND FILLING / BACKFILLING AGAINST / OVER CONCRETE PIPE CULVERTS											MD.R11.A01.A.2

PAVEMENT LEGEND:

- TYPE 1 - SPRAY SEAL 'DOUBLE DOUBLE 20/10'
- TYPE 2 - 7mm PRIMER SEAL UNDER 50mm ASPHALT
- UNSEALED - VERGE, BATTER & TABLE DRAIN WORKS

MEDIAN GUARDRAIL SCHEDULE

START CHAINAGE	END CHAINAGE	LEADING TERMINAL	TRAILING TERMINAL	TYPE	REFERENCE DRAWINGS
128.3	216.7	FlexFence Standard Wire Rope Terminal	FlexFence Standard Wire Rope Terminal	FLEXFENCE TL3 4 Wire Rope	INGAL CIVIL PRODUCTS, "Flexfence Wire Rope Safety Barrier" Product Manual
NOMINAL 2.0m POST SPACING					



LONGITUDINAL SECTION KAMILAROI HIGHWAY

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Full Size 1:500 ; Half Reduction 1:1000 SCALE (m) 0 5 10 20 30

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PROPOSED INTERSECTIONS - KAMILAROI HWY - BOGGABRI

LONGITUDINAL SECTION AND PLAN
CH 0.00 TO CH 340.00

Drawing Number/Reference	NW1006-001-05		Rev. C
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Sheet Size	A1		
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Approved	G.Hill	Scale	AS SHOWN
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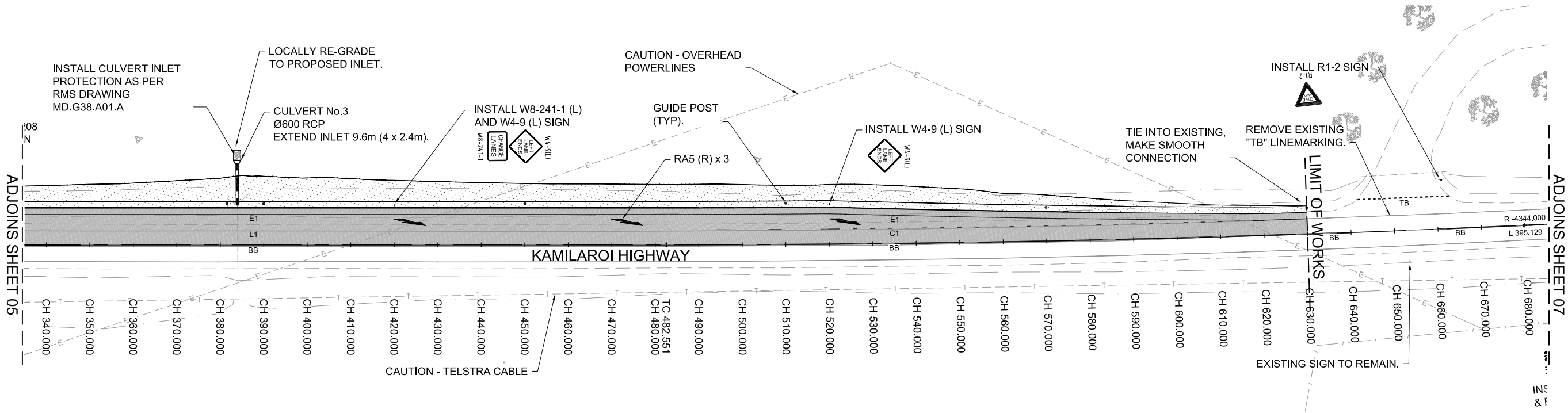

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CULVERT SCHEDULE

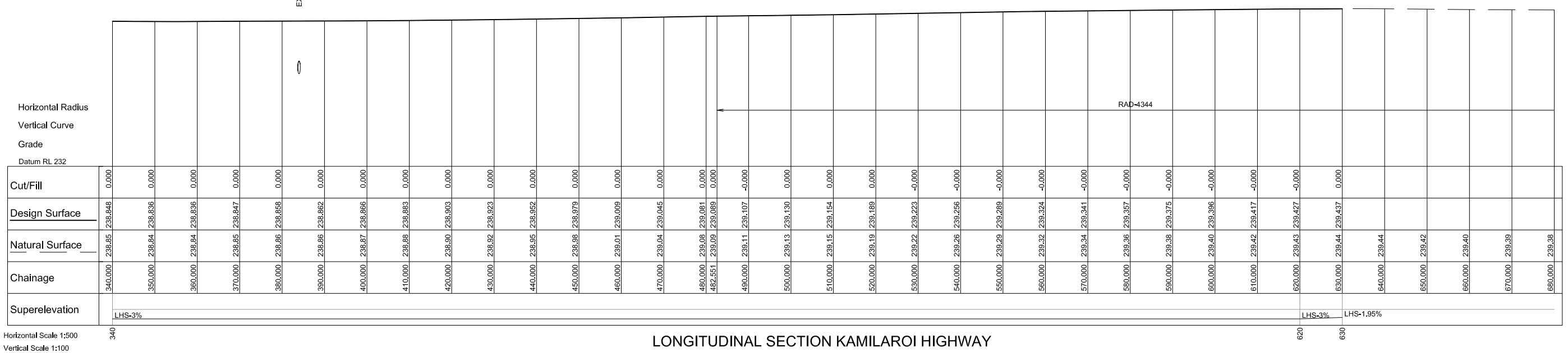
CULVERT No.	APPROX. CHAINAGE	DIAMETER (mm)	SLOPE (%)	CULVERT SIDE	NEW EASTING	NEW NORTHING	EXISTING INVERT LEVEL	NEW INVERT LEVEL	EXTENSION LENGTH	PIPE CLASS	RTA HEADWALL MODEL DRAWING
3	384	600	Existing 0.9	INLET	215604.016	6606623.184	236.45	236.53	9.6	4 RCP	MD.R11.A16.A.1
				OUTLET	-	-	236.27	-	-	-	
INSTALLATION, BEDDING AND FILLING / BACKFILLING AGAINST / OVER CONCRETE PIPE CULVERTS											MD.R11.A01.A.2

PAVEMENT LEGEND:

TYPE 1 - SPRAY SEAL 'DOUBLE DOUBLE 20/10'

TYPE 2 - 7mm PRIMER SEAL UNDER 50mm ASPHALT

UNSEALED - VERGE, BATTER & TABLE DRAIN WORKS



LONGITUDINAL SECTION KAMILAROI HIGHWAY

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Full Size 1:500 : Half Reduction 1:1000 SCALE (m) 0 5 10 20 30

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LONGITUDINAL SECTION AND PLAN
CH 340.00 TO CH 680.00

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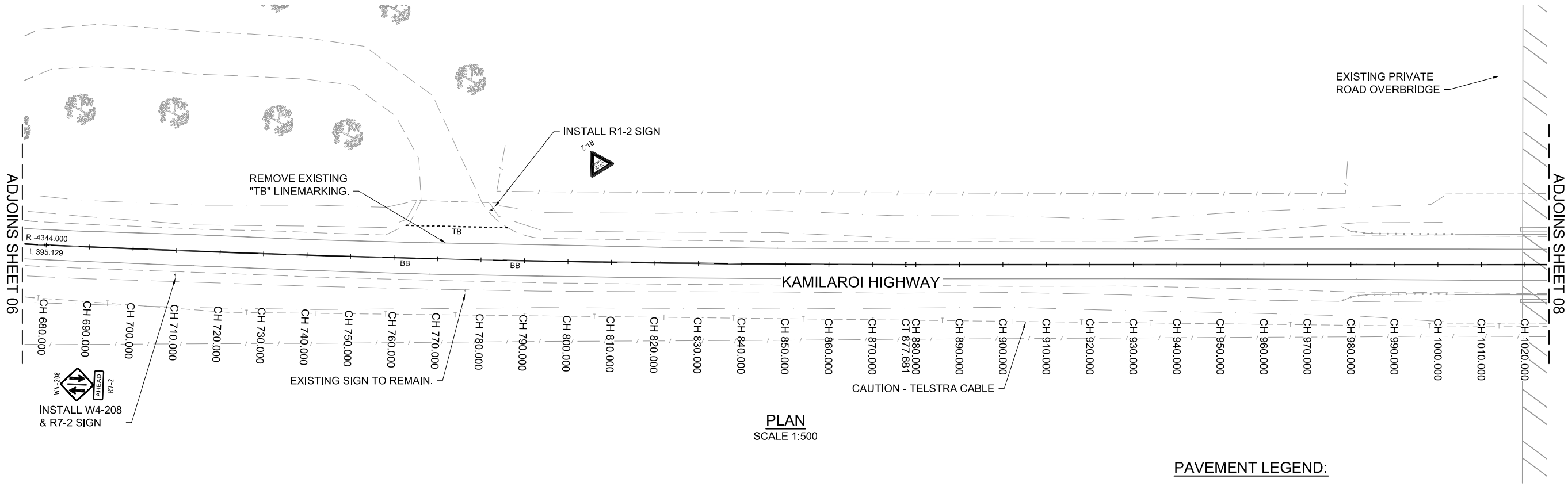

PLAN
SCALE 1:500

PAVEMENT LEGEND:

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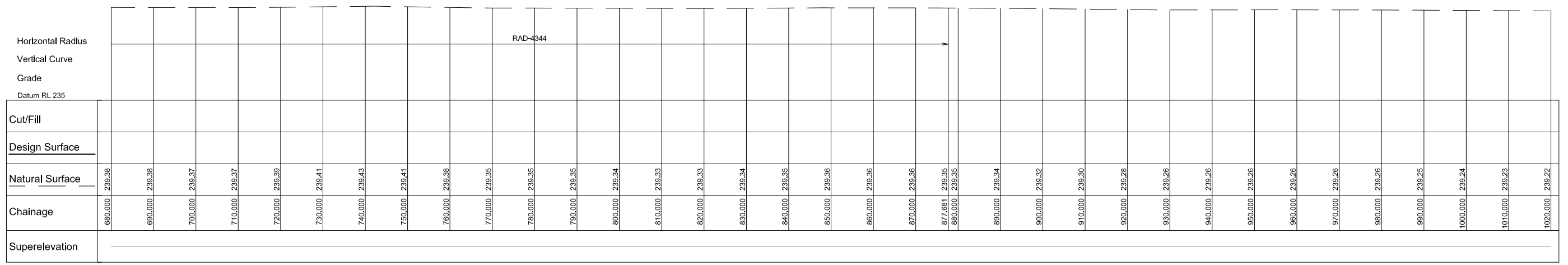
- TYPE 2 - 7mm PRIMER SEAL UNDER 50mm ASPHALT
- UNSEALED - VERGE, BATTER & TABLE DRAIN WORKS



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Vertical Scale 1:100

LONGITUDINAL SECTION KAMILAROI HIGHWAY

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Full Size 1:500 ; Half Reduction 1:1000 SCALE (m) 0 5 10 20 30

PRELIMINARY ISSUE
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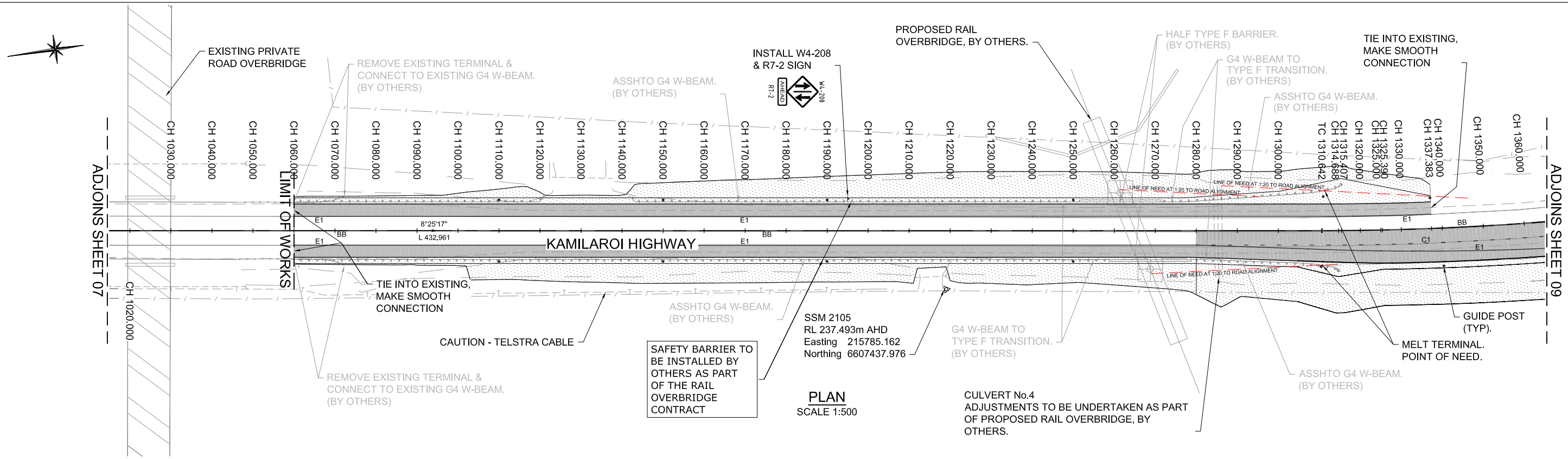
PROPOSED INTERSECTIONS - KAMILAROI HWY - BOGGABRI

LONGITUDINAL SECTION AND PLAN
CH 680.00 TO CH 1020.00

Drawing Number/Reference	NW1006-001-07		Rev. C
Designer J.N.S	Origin Of Levels SSM 2105	Date 13.06.2012	
Surveyor	Height RL 237.493m	Sheet Size A1	
Drafting J.N.S	Datum AHD	Sheet No. 07	
Approved G.Hill	Scale AS SHOWN	Total 36	



PLAN
SCALE 1:500

LHS GUARDRAIL SCHEDULE

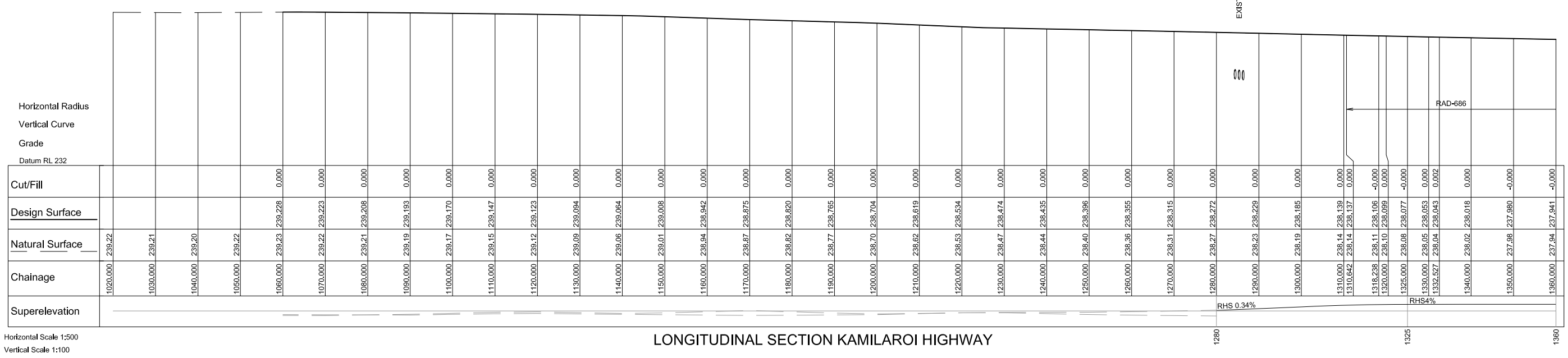
START CHAINAGE	END CHAINAGE	LENGTH (m)	TYPE	REFERENCE DRAWINGS
610.000	1245.4	635	G4 W-Beam Barrier	MD.R132.B01.A.2
1245.4	1251.4	6	G4 W-Beam to Type F Transition	MD.R132.H01.B
1251.4	1271.4	20	Half Type F Barrier	MD.R132.D07.B
1271.4	1277.4	6	G4 W-Beam to Type F Transition	MD.R132.H01.B
1277.4	1303.4	26	G4 W-Beam Barrier	MD.R132.B01.A.2
1303.4	1315.2	12	Melt Terminal	MD.R132.G01.B

RHS GUARDRAIL SCHEDULE

START CHAINAGE	END CHAINAGE	LENGTH (m)	TYPE	REFERENCE DRAWINGS
610.000	1252.8	643	G4 W-Beam Barrier	MD.R132.B01.A.2
1252.8	1258.8	6	G4 W-Beam to Type F Transition	MD.R132.H01.B
1258.8	1278.8	20	Half Type F Barrier	MD.R132.D07.B
1278.8	1284.8	6	G4 W-Beam to Type F Transition	MD.R132.H01.B
1284.8	1302.8	18	G4 W-Beam Barrier	MD.R132.B01.A.2
1302.8	1314.8	12	Melt Terminal	MD.R132.G01.B

PAVEMENT LEGEND:

- TYPE 1 - SPRAY SEAL 'DOUBLE DOUBLE 20/10'
- TYPE 2 - 7mm PRIMER SEAL UNDER 50mm ASPHALT
- UNSEALED - VERGE, BATTER & TABLE DRAIN WORKS



Horizontal Scale 1:500
Vertical Scale 1:100

LONGITUDINAL SECTION KAMILAROI HIGHWAY

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Full Size 1:100 : Half Reduction 1:200 SCALE (m) 0 1 2 4 6

Full Size 1:500 : Half Reduction 1:1000 SCALE (m) 0 5 10 20 30

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

Cad File: S:\DWGS\NW1006\NW1006-001 Detailed.dwg, Layout: 08, Plotted By: jamie, Date: 09/04/13 - 11:22,

No.	DATE	REVISIONS	BY
C	09.04.2013	AMENDMENTS AS PER RSA REPORT	G.Hill
B	18.03.2013	AMENDMENTS AS PER CSPL DESIGN CHECKLIST	G.Hill
A	13.06.2012	DETAILED DESIGN	G.Hill

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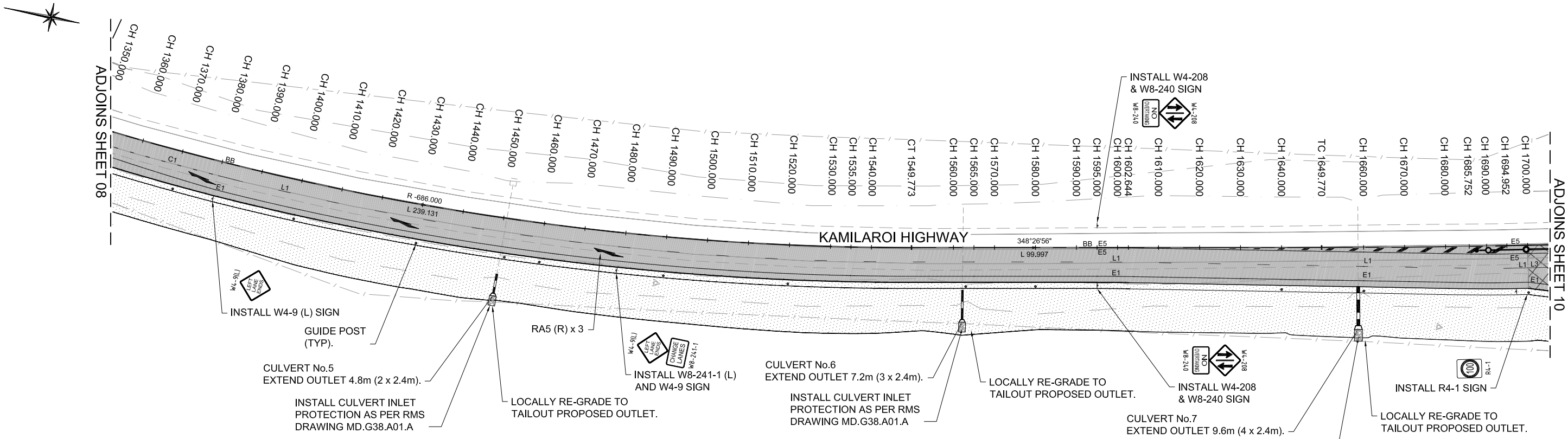
CLIENT: BOGGABRI COAL PTY LTD

PROPOSED INTERSECTIONS - KAMILAROI HWY - BOGGABRI

LONGITUDINAL SECTION AND PLAN
CH 1020.00 TO CH 1360.00

Drawing Number/Reference	NW1006-001-08
Rev.	C
Designer	J.N.S
Origin Of Levels	SSM 2105
Date	13.06.2012
Surveyor	
Height	RL 237.493m
Sheet Size	A1
Drafting	J.N.S
Datum	AHD
Sheet No.	08
Approved	G.Hill
Scale	AS SHOWN
Total	36



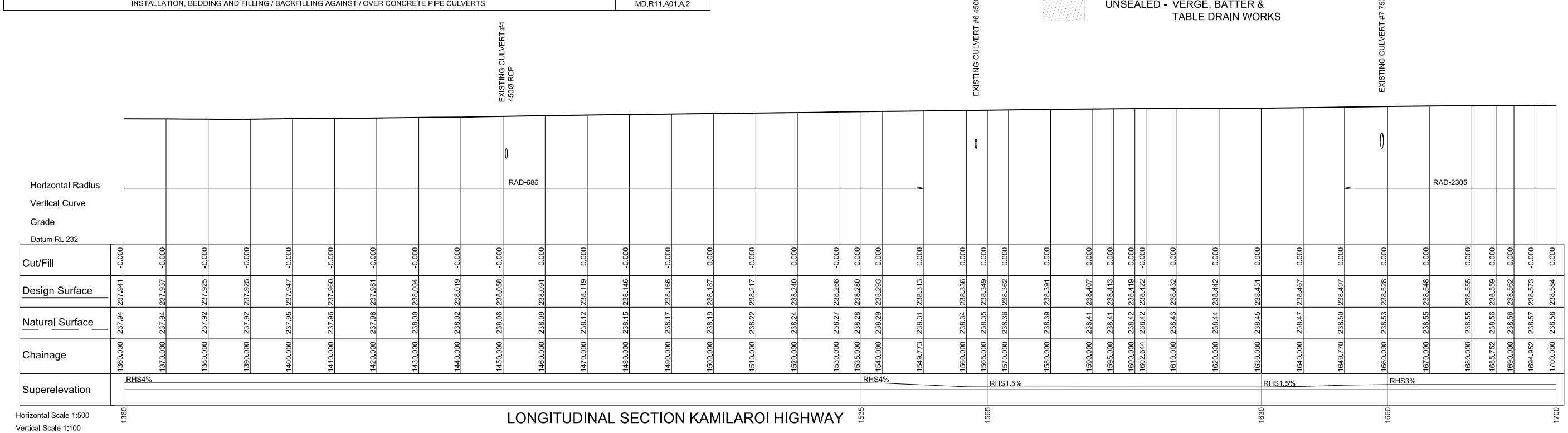
PLAN
SCALE 1:500

CULVERT SCHEDULE

CULVERT No.	APPROX. CHAINAGE	DIAMETER (mm)	SLOPE (%)	CULVERT SIDE	NEW EASTING	NEW NORTHING	EXISTING INVERT LEVEL	NEW INVERT LEVEL	EXTENSION LENGTH	PIPE CLASS	RTA HEADWALL MODEL DRAWING
5	1451	450	Existing 1.3	INLET	-	-	236.18	-	-	-	MD.R11.A16.A.1
				OUTLET	215809.335	6607670.853	235.89	235.83	4.8	4 RCP	
6	1562	450	Existing 1.8	INLET	-	-	236.70	-	-	-	MD.R11.A16.A.1
				OUTLET	215792.729	6607784.108	236.34	236.21	7.2	4 RCP	
7	1659	750	Existing 2.3	INLET	-	-	236.76	-	-	-	MD.R11.A16.A.1
				OUTLET	215774.835	6607879.071	236.31	236.09	9.6	4 RCP	
INSTALLATION, BEDDING AND FILLING / BACKFILLING AGAINST / OVER CONCRETE PIPE CULVERTS											MD.R11.A01.A.2

PAVEMENT LEGEND:

- TYPE 1 - SPRAY SEAL 'DOUBLE DOUBLE 20/10'
- TYPE 2 - 7mm PRIMER SEAL UNDER 50mm ASPHALT
- UNSEALED - VERGE, BATTER & TABLE DRAIN WORKS



Cut/Fill	Design Surface	Natural Surface	Chainage
-0.000	237.941	237.94	1360.000
-0.000	237.937	237.94	1370.000
-0.000	237.925	237.92	1380.000
-0.000	237.925	237.92	1390.000
-0.000	237.947	237.95	1400.000
-0.000	237.960	237.96	1410.000
-0.000	237.981	237.98	1420.000
-0.000	238.004	238.00	1430.000
-0.000	238.019	238.02	1440.000
-0.000	238.058	238.06	1450.000
0.000	238.091	238.09	1460.000
0.000	238.119	238.12	1470.000
-0.000	238.146	238.15	1480.000
-0.000	238.166	238.17	1490.000
0.000	238.187	238.19	1500.000
-0.000	238.217	238.22	1510.000
0.000	238.240	238.24	1520.000
-0.000	238.266	238.27	1530.000
0.000	238.280	238.28	1535.000
0.000	238.293	238.29	1540.000
0.000	238.313	238.31	1549.773
0.000	238.336	238.34	1560.000
0.000	238.349	238.35	1565.000
0.000	238.362	238.36	1570.000
0.000	238.391	238.39	1580.000
0.000	238.407	238.41	1590.000
0.000	238.413	238.41	1595.000
-0.000	238.419	238.42	1600.000
-0.000	238.422	238.42	1602.644
0.000	238.432	238.43	1610.000
0.000	238.442	238.44	1620.000
0.000	238.451	238.45	1630.000
0.000	238.467	238.47	1640.000
0.000	238.497	238.50	1649.770
0.000	238.528	238.53	1660.000
0.000	238.548	238.55	1670.000
0.000	238.555	238.55	1680.000
0.000	238.559	238.56	1685.752
0.000	238.562	238.56	1690.000
-0.000	238.573	238.57	1694.952
0.000	238.584	238.58	1700.000

Full Size 1:100 : Half Reduction 1:200 SCALE (m) 0 1 2 4 6

Full Size 1:500 : Half Reduction 1:1000 SCALE (m) 0 5 10 20 30

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No.	DATE	REVISIONS	BY
C	09.04.2013	AMENDMENTS AS PER RSA REPORT	G.Hill
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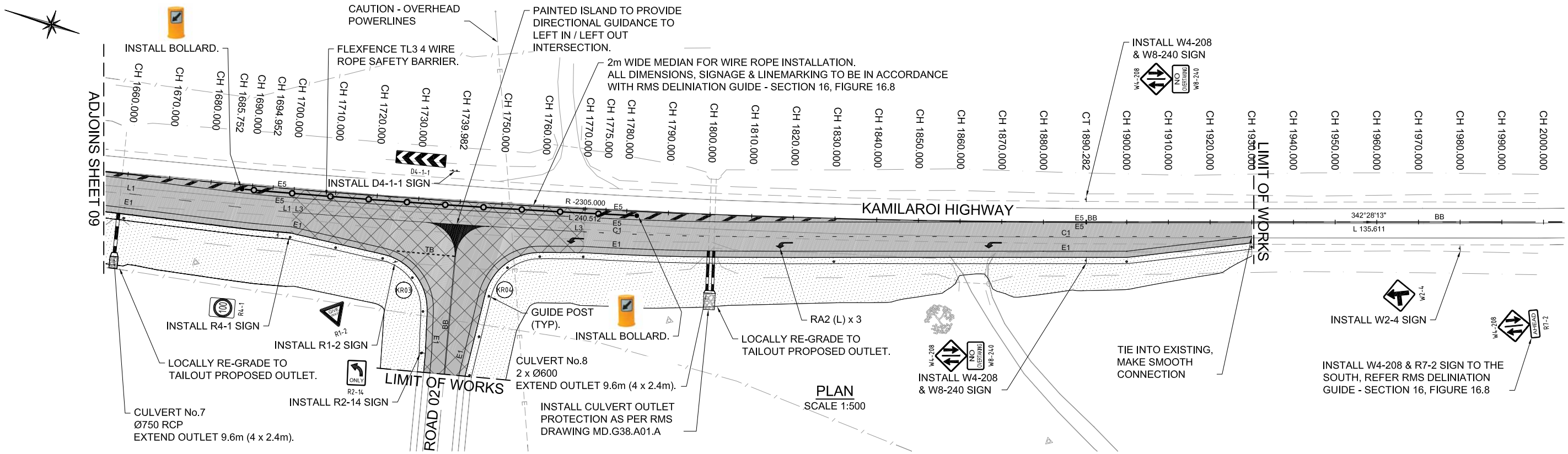
PROPOSED INTERSECTIONS - KAMILAROI HWY - BOGGABRI

LONGITUDINAL SECTION AND PLAN
CH 1360.00 TO CH 1700.00

Drawing Number/Reference	NW1006-001-09
Rev.	C
Designer	J.N.S
Origin Of Levels	SSM 2105
Date	13.06.2012
Surveyor	
Height	RL 237.493m
Sheet Size	A1
Drafting	J.N.S
Datum	AHD
Sheet No.	09
Approved	G.Hill
Scale	AS SHOWN
Total	36



CULVERT SCHEDULE

CULVERT No.	APPROX. CHAINAGE	DIAMETER (mm)	SLOPE (%)	CULVERT SIDE	NEW EASTING	NEW NORTHING	EXISTING INVERT LEVEL	NEW INVERT LEVEL	EXTENSION LENGTH	PIPE CLASS	RTA HEADWALL MODEL DRAWING
7	1659	750	Existing 2.3	INLET	-	-	236.76	-	-	-	MD.R11.A16.A.1
				OUTLET	215774.835	6607879.071	236.31	236.09	9.6	4 RCP	
8	1800	2 x 600	Existing 1.4	INLET	-	-	237.08	-	-	-	MD.R11.A18.A.1
				OUTLET	215740.517	6608017.985	236.84	236.70	9.6	4 RCP	
INSTALLATION, BEDDING AND FILLING / BACKFILLING AGAINST / OVER CONCRETE PIPE CULVERTS											MD.R11.A01.A.2

PAVEMENT LEGEND:

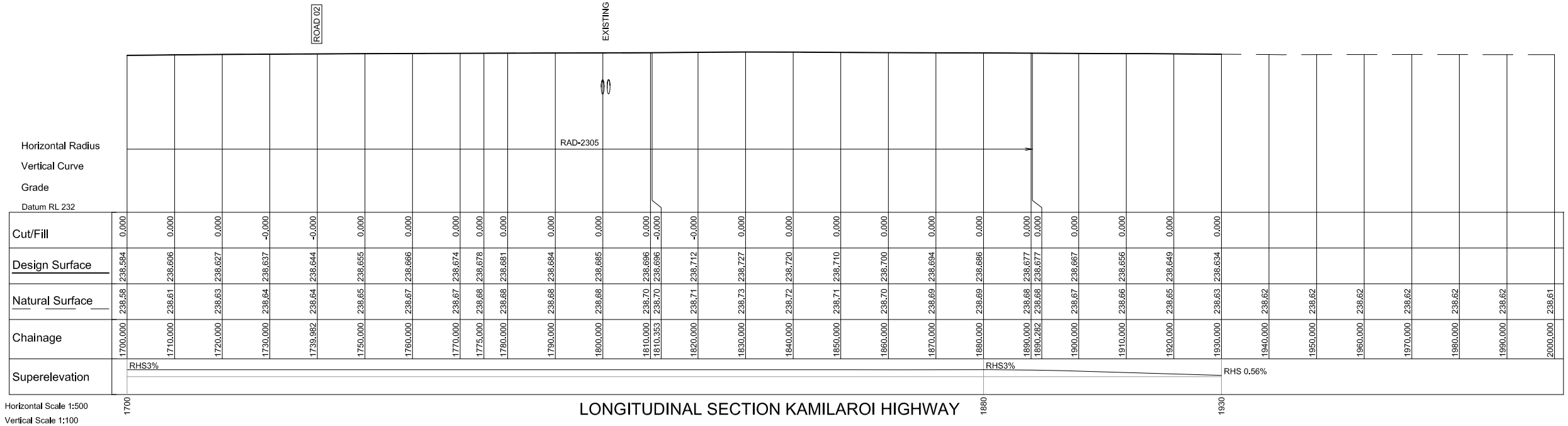
TYPE 1 - SPRAY SEAL 'DOUBLE DOUBLE 20/10'

TYPE 2 - 7mm PRIMER SEAL UNDER 50mm ASPHALT

UNSEALED - VERGE, BATTER & TABLE DRAIN WORKS

MEDIAN GUARDRAIL SCHEDULE

START CHAINAGE	END CHAINAGE	LEADING TERMINAL	TRAILING TERMINAL	TYPE	REFERENCE DRAWINGS
1688.3	1781.7	FlexFence Standard Wire Rope Terminal	FlexFence Standard Wire Rope Terminal	FLEXFENCE TL3 4 Wire Rope	INGAL CIVIL PRODUCTS. "Flexfence Wire Rope Safety Barrier" Product Manual
NOMINAL 2.0m POST SPACING					



Chainage	Cut/Fill	Design Surface	Natural Surface
1700.000	0.000	238.594	238.58
1710.000	0.000	238.606	238.61
1720.000	0.000	238.627	238.63
1730.000	-0.000	238.637	238.64
1739.982	-0.000	238.644	238.64
1750.000	0.000	238.655	238.65
1760.000	0.000	238.666	238.67
1770.000	0.000	238.674	238.67
1775.000	0.000	238.678	238.68
1780.000	0.000	238.681	238.68
1790.000	0.000	238.684	238.68
1800.000	0.000	238.685	238.68
1810.000	0.000	238.696	238.70
1810.353	-0.000	238.696	238.70
1820.000	-0.000	238.712	238.71
1830.000	0.000	238.727	238.73
1840.000	0.000	238.720	238.72
1850.000	0.000	238.710	238.71
1860.000	0.000	238.700	238.70
1870.000	0.000	238.694	238.69
1880.000	0.000	238.686	238.69
1890.000	0.000	238.677	238.68
1890.282	0.000	238.677	238.68
1900.000	0.000	238.667	238.67
1910.000	0.000	238.656	238.66
1920.000	0.000	238.649	238.65
1930.000	0.000	238.634	238.63
1940.000			238.62
1950.000			238.62
1960.000			238.62
1970.000			238.62
1980.000			238.62
1990.000			238.62
2000.000			238.61

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0 1 2 4 6 Full Size 1:100 : Half Reduction 1:200 SCALE (m)

0 5 10 20 30 Full Size 1:500 : Half Reduction 1:1000 SCALE (m)

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PROPOSED INTERSECTIONS - KAMILAROI HWY - BOGGABRI

LONGITUDINAL SECTION AND PLAN

CH 1700.00 TO CH 1930.00

Drawing Number/Reference	NW1006-001-10		Rev. C
Designer	J.N.S	Origin Of Levels SSM 2105	Date 13.06.2012
Surveyor		Height RL 237.493m	Sheet Size A1
Drafting	J.N.S	Datum AHD	Sheet No. 10
Approved	G.Hill	Scale AS SHOWN	Total 36