Appendix 3

Ardmore Park Quarry – Modification 3

Pavement Remaining Life Report Ardmore Park Quarry Product Delivery Route

prepared by

Pavement Management Services

(Total No. of pages including blank pages = 96)

September 2018

Note to Readers

It is noted that this report was prepared to assist in the negotiations for the Voluntary Planning Agreement (VPA). The contribution values in the VPA supersede those referred to on pages A3-1, A3-9, A3-13 and A3-14.

MULTIQUIP QUARRIES

PAVEMENT REMAINING LIFE REPORT: ARDMORE PARK QUARRY PRODUCT DELIVERY ROUTE

REPORT NO. R2017152

VER	REV	REVISION DESCRIPTION	VER. DATE	PREPARED BY	REVIEWED BY
1	0	Draft report for client review	3rd Aug 18	J. Erskine	
1	1	Inclusion of additional truck types	11th Sep 18	J. Erskine	
1	2	Revision of analysis to account for limit on annual tonnes hauled and combination of 4 Axle Dog & A Double truck scenario	24th Sep 18	J. Erskine	
1	3	Issued as Final	25th Sep 18	J. Erskine	

Winner	Winner	Winner	Finalist	Winner	Winner	Featured in
Gold Award Specialist Services	New or Improved Technique	NSW Eng Excellence Awards	National Eng. Excellence Awards	Most Innovative Product	Export award	Australian Technology Show Case

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EXECUTIVE SUMMARY

Pavement Management Services (PMS) was contracted by Multiquip to undertake a pavement structural evaluation and provide a remaining life assessment on the pavement of the Ardmore Park Quarry Transport Route from the South Marulan Road to the quarry entrance at Lumley Road. The route comprises Jerrara Road, Mountain Ash Road, Bungonia Bypass and Oallen Ford Road with the Bungonia Bypass not assessed between Mountain Ash Road and Oallen Ford Road.

To undertake the pavement investigation and prepare the remaining life report, Pavement Management Services undertook Falling Weight Deflectometer (FWD) testing on the existing pavement between 30th May and 20th June 2018. Based on the FWD testing, the values for deflection and curvature were determined and the remaining life for the various pavement sections assessed.

The findings of the structural and remaining life analysis found the three roads comprising the transport route exhibit a similar deflection response. Both Jerrara Road and Oallen Ford Road exhibit localised and for the most part isolated locations of remaining life less than 20 years, representing approximately 16% of the total transport route. The loaded lane of the transport route heading north owing to the higher design traffic volumes has the lower remaining life with an average of 17.1 to 17.5 years. This compares with to 19.3 to 19.4 for the unloaded lane considering the two quarry truck scenarios analysed.

The financial impact that the quarry trucks will have on the life of the pavement asset of the transport route when compared with the existing base load traffic was found to range from $857,376 (3 Axle Dog) to $1,143,168 (4 Axle Dog & A Double). This compares with Section 94 contributions based on material hauled over the same design period (20 years) which range from $7,520,000 (3 Axle Dog) to $10,646,064 (4 Axle Dog & A Double). The Section 94 contributions[1] range from 8.8 times (3 Axle Dog) to 9.3 times (4 Axle Dog & A Double) those determined from the increased consumption of the pavement asset.

This analysis is based on the pavement remaining in its current configuration of a spray sealed flexible unbound pavement that is subject to permanent deformation (rutting) being the primary mode in which these roads can be expected to fail. Should the road ever be surfaced with an asphalt wearing course the results indicate that asphalt fatigue would become the primary mode and with detrimental consequences.

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[1] See Note on page A3-ii

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1 INTRODUCTION

1.1 Introduction and Background

Pavement Management Services (PMS) was contracted by Multiquip to undertake a pavement structural evaluation and provide a remaining life assessment on the pavement of the Ardmore Park Quarry Transport Route from the South Marulan Road to the quarry entrance at Lumley Road. The route comprises Jerrara Road, Mountain Ash Road, Bungonia Bypass and Oallen Ford Road with the Bungonia Bypass not assessed between Mountain Ash Road and Oallen Ford Road.

To undertake the pavement investigation and prepare the remaining life report, Pavement Management Services undertook Falling Weight Deflectometer (FWD) testing on the existing pavement between 30th May and 20th June 2018. Based on the FWD testing, the values for deflection and curvature were determined and the remaining life for the various pavement sections assessed.

1.2 Objective

The objective of this report was to determine the current structural capacity and remaining life of existing central pavement of the transport route.

1.3 Scope of Work

The scope of work covered:

- FWD testing of Ardmore Park Quarry Transport Route excluding the Bungonia Bypass.
- Determine design traffic volumes for each road along the transport route comprising local traffic and additional quarry truck volumes considering both loaded and unloaded movements from the quarry.
- Assess the remaining life of the existing central pavement.

1.4 Location Details

The Ardmore Park Quarry Transport route extends from the South Marulan Road in the north to the Ardmore Park Quarry in the south totalling 19.82km. Only those road segments maintained by council have been considered in this analysis. Figure 1-1 following shows “in red” the transport route tested with the blue line representing the Bungonia Bypass not tested.

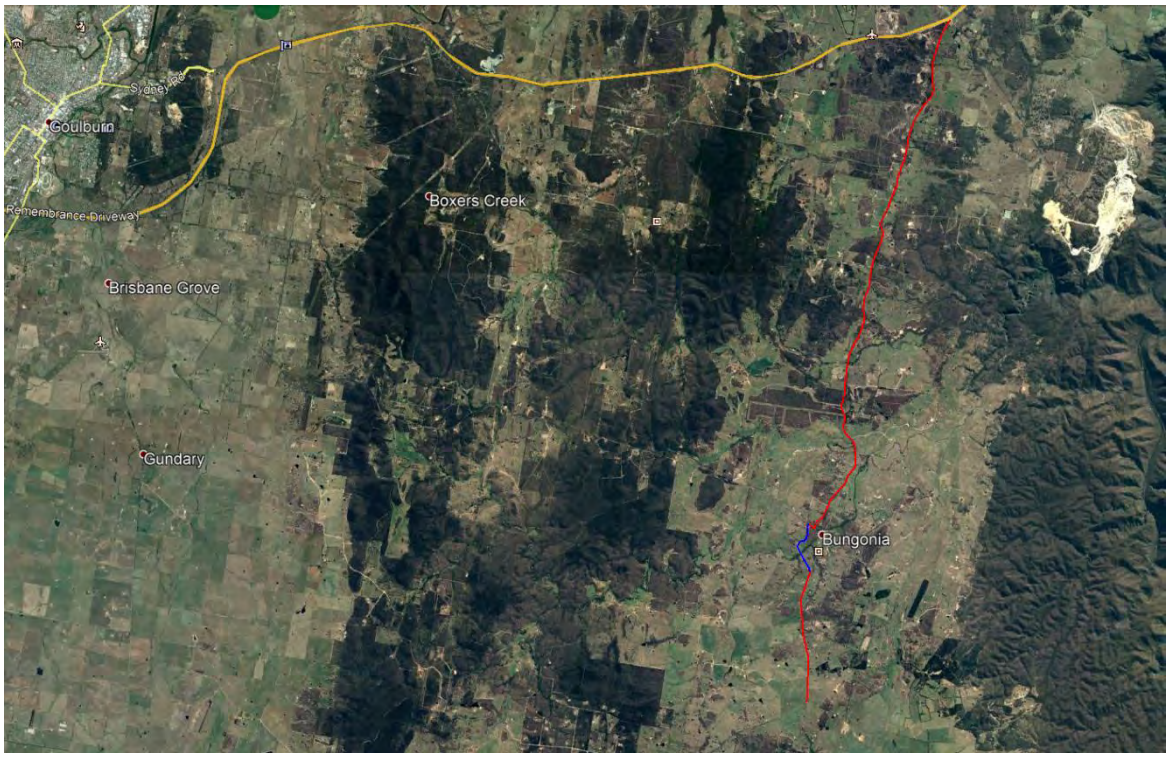

Figure 1-1 Ardmore Park Quarry Transport Route

Testing was performed along the length of each road between the extents described in Table 1-1 following. Each road surveyed was considered as a two lane rural road with one lane in each direction and testing was undertaken in the existing central pavement. For the purposes of this report the following lane naming convention has been used as illustrated in Figure 1-2 following.

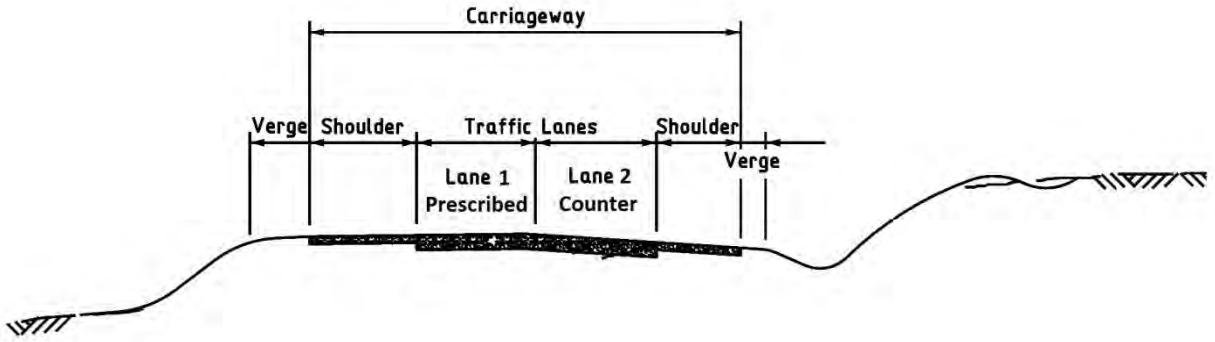

Figure 1-2 Testing Lane Naming Convention

Table 1-1: Section Locations

Road	Identifier	Start Location	End Location	Length (km)
Jerrara Road	1A1	South Marulan Road	Mountain Ash Road	14.600
	1A2	Mountain Ash Road	South Marulan Road	14.600
Mountain Ash Road	2A1	Jerrara Road	Bungonia Bypass	0.200
	2A2	Bungonia Bypass	Jerrara Road	0.200
Oallen Ford Road	3A1	Bungonia Bypass	Lumley Road (Quarry Entrance)	3.520
	3A2	Lumley Road (Quarry Entrance)	Bungonia Bypass	3.520

1.5 Referenced Documents

1. ASTM D4694 “Standard Test Method for Deflections with a Falling-Weight-Type Impulse Load Device” American Society for Testing Materials, Conshohocken, PA, 2002.

2. PMS-TP4-FWD “Falling Weight Deflectometer (FWD) Test Procedure” PMS, Sydney, 2000.

3. Austroads Pavement Design “Guide to Pavement Technology Part 5: Pavement Evaluation and Treatment Design”, Austroads, 2008.

4. Ref No: PBS – V110308 – VA3988 – Muscat Trailers / Multiquip Transport – v1, NHVR 2017.

5. Austroads Pavement Design “Guide to Pavement Technology Part 2: Pavement Structural Design”, Austroads, 2008.

2 METHOD AND ASSUMPTIONS

2.1 Test Methods of Survey

The FWD testing was conducted in accordance with ASTM D4694 [1] and PMS-TP4-FWD [2] 30th May and 20th June 2018 and measured the pavement condition at 100m intervals. This testing was staggered in the adjacent lane as shown in Figure 2-1 following. The FWD measured at each test point the peak applied load and peak deflections from 9 geophones, with spacing ranging from under the centre of the load to a distance of 1.5m from the load. The target load of the testing was 40kN or approximately 566kPa based on a 300mm diameter loading plate. The deflection and curvature readings were determined from the FWD testing, based on the Austroads Guide to Pavement Technology - Part 5 [3].

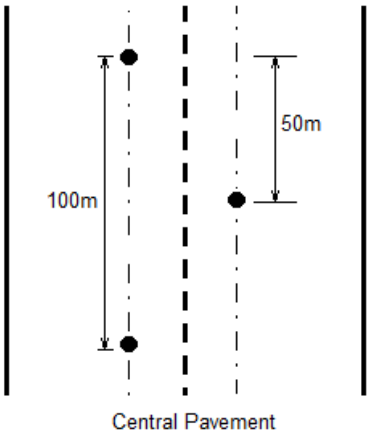

Figure 2-1 FWD Testing Pattern

2.1.1 Design Traffic Analysis

Road traffic includes a mixture of vehicles ranging from light to heavy vehicles and all vehicles contribute to the structural deterioration of the pavement though light vehicle have a much lower impact when compared to heavy vehicles. To design a pavement structure within a defined period of time, the traffic is considered one of the most important factors.

The design traffic of Oallen Ford Road and Mountain Ash Road was determined from 12 bin vehicle classification data as supplied by representatives of Multiquip adjusted to 1st July 2018 based on a historical growth rate of 2.5%. In addition, a daily count of light and heavy vehicles travelling along Jerrara Road was performed in December 2017. The distribution of heavy vehicles from the Oallen Ford classified count was used to distribute the heavy vehicles observed on Jerrara Road. A total of 25,000 truck movements per annum, comprising 12,500 loaded from the quarry travelling north and unloaded travelling south are understood allowed to use the transport route. Three different quarry trucks are proposed to use the transport route, 3-axle dog plus 4-axle dog plus and A double in combination [4] with configurations as shown in Figure 2-2 to Figure 2-4 following. The design traffic volumes of the loaded and unloaded quarry trucks have been determined from weighbridge dockets provided by representatives of Multiquip for each type of truck. All design traffic calculations are based on The Guide to Pavement Technology Part 2: Pavement Structural Design published by Austroads in 2008 [5]. A design period of 20 years has been adopted along with a long term growth rate of 2.5% equal to the historical growth.

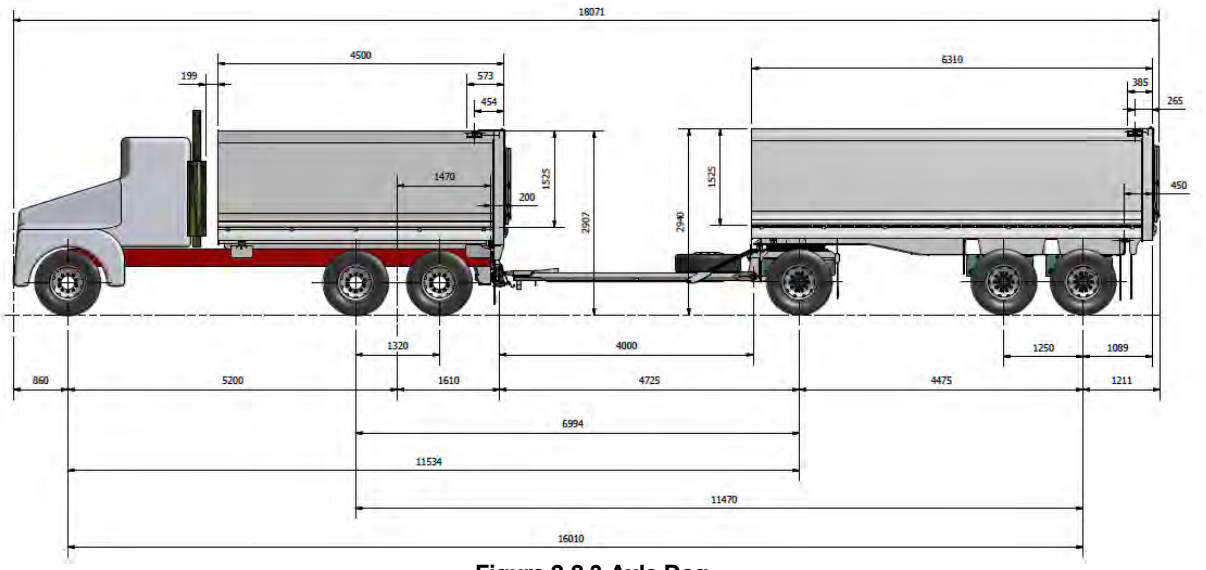

Figure 2-2 3-Axle Dog

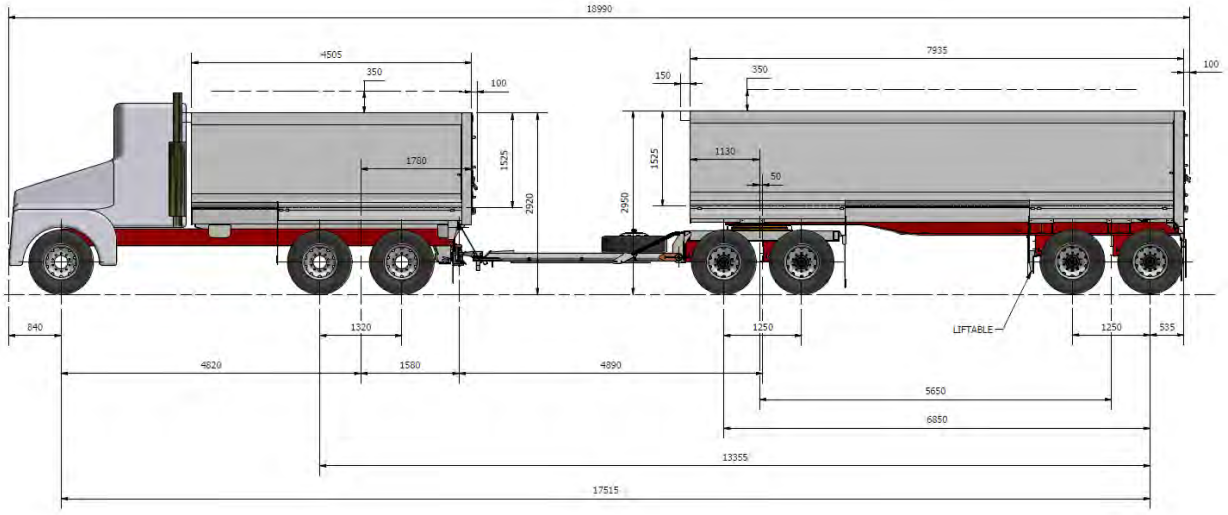

Figure 2-3 4-Axle Dog

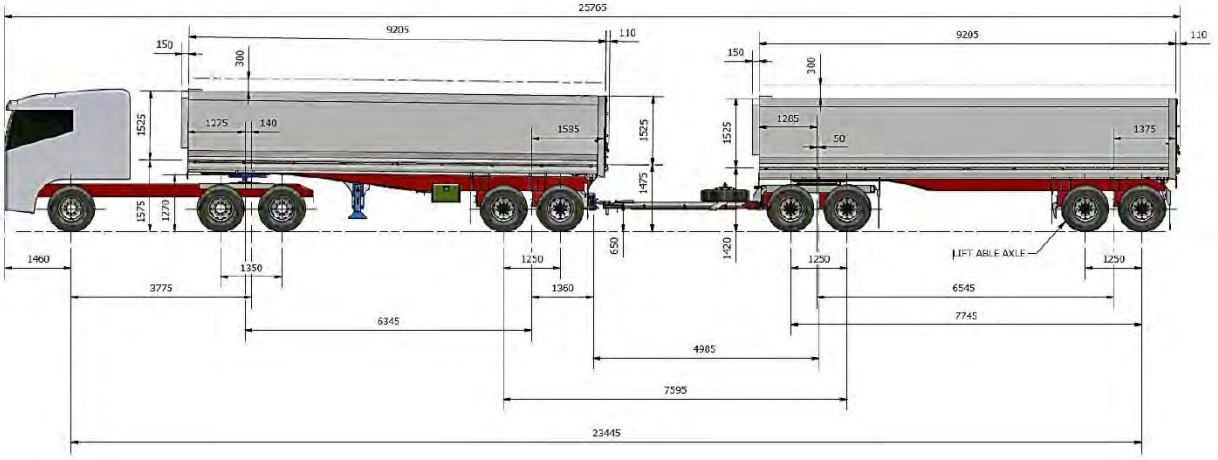

Figure 2-4 A Double

2.1.2 Remaining Life and Overlay Requirements based on Design Chart Method

The empirical design chart based approach was used in the determination of the structural life of the pavement; the normalised deflection and curvature readings were related to the structural life in accordance with Part 5 of the Austroads Guide to Pavement Technology [3]. The following assumptions were made in undertaking this analysis:

- The remaining life and overlay requirements assume that the pavement is flexible and does not comprise cemented materials.
- The pavement surface comprises a single or double coat seal with a thickness of approximately 25mm.
- A seasonal moisture factor of 1.0 has been used on the basis that there is no defined wet/dry season at the site. This was determined utilising Bureau of Meteorology historical rainfall data from Goulburn which showed generally consistent rainfall patterns throughout the year.

Any assessment of pavement remaining life on the basis of the empirical design chart method is subject to the inherent limitations of empirical based methods. The more fundamentally based mechanistic-empirical approach, utilising material characteristics such as layer modulus and environmental conditions provides a higher level of confidence in the assessment of remaining life, subject to the constraints of having accurate pavement profiles.

3 PAVEMENT CONDITION RESULTS

3.1 Structural Assessment

3.1.1 Design Traffic

Twenty year design traffic volumes were determined using the traffic count and daily observed data plus the quarry trucks for each road. Table 3-1 summarises the design traffic calculations for each direction at the two locations.

Table 3-1 Design Traffic

Identifier	Road	Direction	Source	3 Axle Dog		4 Axle Dog & A Double	
				Design Traffic (ESA's) (1)	Reference	Design Traffic (ESA's) (1)	Reference
1A1	Jerrara Road	Unloaded	Local	$5.36x10^5$	DT2017152-1	$5.36x10^5$	DT2017152-1
			Quarry	$1.54x10^5$	DT2017152-6	$1.13x10^5$	DT2017152-8
						$1.79x10^5$	DT2017152-10
			Total	**$6.90x10^5$**	N/A	**$8.28x10^5$**	N/A
1A2	Jerrara Road	Loaded	Local	$5.36x10^5$	DT2017152-1	$5.36x10^5$	DT2017152-1
			Quarry	$1.77x10^6$	DT2017152-5	$1.15x10^6$	DT2017152-7
						$1.46x10^6$	DT2017152-9
			Total	**$2.31x10^6$**	N/A	**$3.15x10^6$**	N/A
2A1	Mountain Ash Road	Unloaded	Local	$7.87x10^5$	DT2017152-2	$7.87x10^5$	DT2017152-2
			Quarry	$1.54x10^5$	DT2017152-6	$1.13x10^5$	DT2017152-8
						$1.79x10^5$	DT2017152-10
			Total	**$9.41x10^5$**	N/A	**$1.08x10^6$**	N/A
2A2	Mountain Ash Road	Loaded	Local	$7.87x10^5$	DT2017152-2	$7.87x10^5$	DT2017152-2
			Quarry	$1.77x10^6$	DT2017152-5	$1.15x10^6$	DT2017152-7
						$1.46x10^6$	DT2017152-9
			Total	**$2.56x10^6$**	N/A	**$3.40x10^6$**	N/A
3A1	Oallen Ford Road	Unloaded	Local	$3.26x10^5$	DT2017152-3	$3.26x10^5$	DT2017152-3
			Quarry	$1.54x10^5$	DT2017152-6	$1.13x10^5$	DT2017152-8
						$1.79x10^5$	DT2017152-10
			Total	**$4.80x10^5$**	N/A	**$6.18x10^5$**	N/A
3A2	Oallen Ford Road	Loaded	Local	$3.16x10^5$	DT2017152-4	$3.16x10^5$	DT2017152-4
			Quarry	$1.77x10^6$	DT2017152-5	$1.15x10^6$	DT2017152-7
						$1.46x10^6$	DT2017152-9
			Total	**$2.09x10^6$**	N/A	**$2.93x10^6$**	N/A

(1) Total Design Traffic is calculated as Local plus Quarry traffic

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Section 94 contributions[2] paid to council based on the payload of material transported from the quarry by each truck over the 20 year design period is summarised in Table 3-2.

Table 3-2 Section 94 Contributions

Truck	Payload (tonnes)	Section 94 (cents/tonne)	Annual Loaded Trips	20 Year Section 94 Contributions
3-Axle Dog	32	94	12,500	$7,520,000
4-Axle Dog[1]	39	94	6,292	$4,613,294
A Double[1]	51	94	6,292	$6,032,770

(1) Based on the 4-Axle Dog and A Double combination, total section 94 contributions equates to $10,646,064.

3.1.2 Deflection

The aim of this analysis is to determine the current structural capacity of each road segment so that any impact from the quarry trucks can be assessed. The deflection values refer to the amount of vertical displacement that occurs in the pavement under a loaded truck. Table 3-3 and Figure 3-1 following, show the statistical summary and the distribution of measured deflection results across each road segment.

Table 3-3 Deflection Results

Road	Identifier	Average	Standard Deviation	Upper 10th Percentile	Lower 10th Percentile	Minimum	Maximum
Jerrara Road	1A1	0.76	0.22	1.02	0.51	0.29	1.58
	1A2	0.76	0.29	1.09	0.42	0.09	2.09
Mountain Ash Road	2A1	0.66	0.21	0.77	0.54	0.51	0.80
	2A2	0.61	0.04	0.63	0.59	0.58	0.64
Oallen Ford Road	3A1	0.66	0.22	0.89	0.42	0.22	1.23
	3A2	0.68	0.25	0.98	0.37	0.12	1.20

These results show that in terms of average deflection, all roads generally exhibit a similar overall deflection response across the existing central pavement. What is also evident from the analysis is that there is a large range of deflection readings across each road as a whole with the deflections ranging from less than 0.5mm up to in excess of 1.5mm. The distribution of deflection values show approximately 15% of the tested locations have a deflection in excess of 1.0mm equivalent to a remaining life of less than 3 million axle repetitions. With the current loaded lane 20 year traffic volumes close to this volume, the results suggest that approximately 15% of the transport route is likely to have a remaining life of less than 20 years.

[2] See Note on page A3-ii

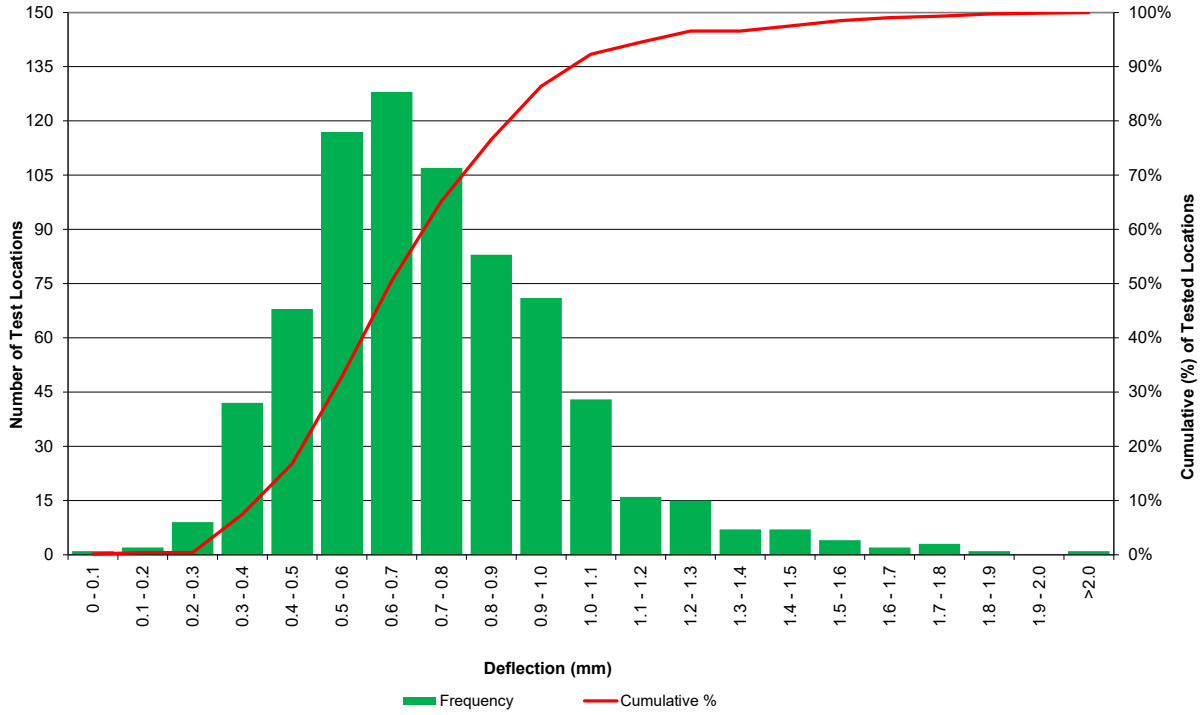

Figure 3-1 Distribution of Deflection

For comparison purposes, the following design deflections from Austroads [3] shown in Figure 3-2 are required to support the range of design traffic loadings.

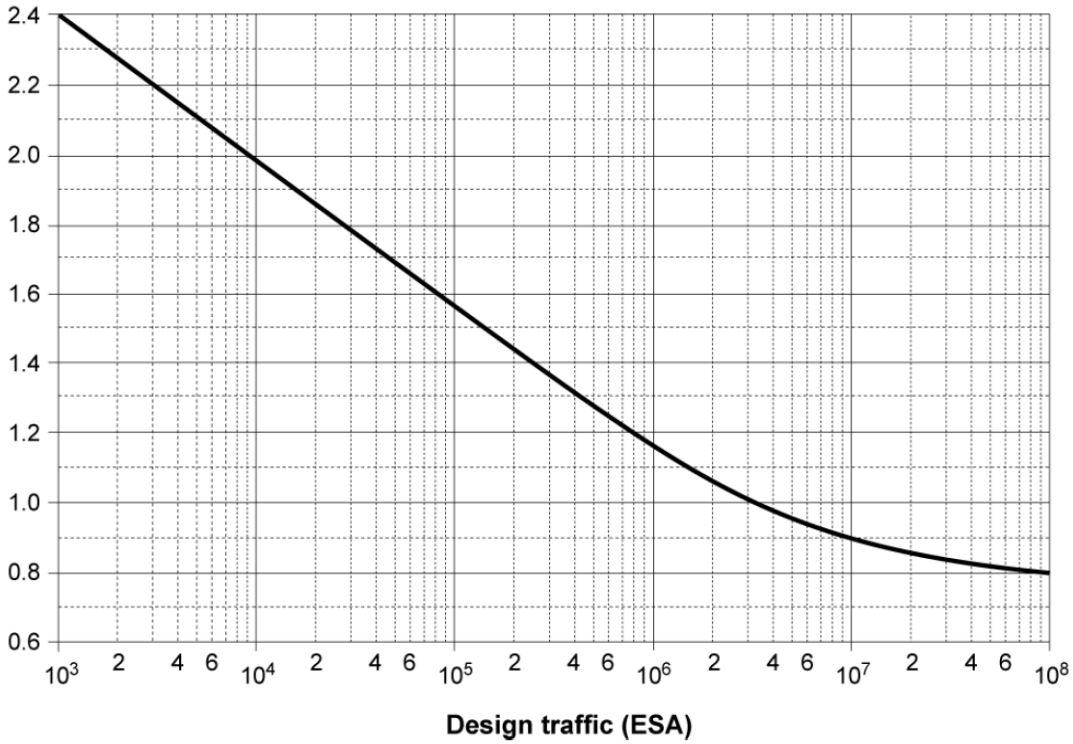

Figure 3-2 Design Deflections

Deflection results for each test location can be found in Appendix B.

3.1.3 Curvature

The aim of this analysis is to determine the current structural capacity of each road segment so that any impact from the quarry trucks can be assessed. The curvature measures the shape of the deflection bowl. The higher the curvature the more likely the pavement is to crack under traffic load. High values for curvature indicate a tendency of the surface to suffer fatigue cracking. As the site tested is a spray seal surfaced pavement, fatigue cracking is not typically the primary cause of pavement failure. Table 3-4 and Figure 3-3 following, show the statistical summary and the distribution of measured curvature results across each road segment.

Table 3-4 Curvature Results

Road	Identifier	Average	Standard Deviation	Upper 10th Percentile	Lower 10th Percentile	Minimum	Maximum
Jerrara Road	1A1	0.33	0.09	0.45	0.22	0.17	0.61
	1A2	0.30	0.11	0.45	0.19	0.03	0.62
Mountain Ash Road	2A1	0.26	0.04	0.28	0.24	0.23	0.29
	2A2	0.25	0.06	0.28	0.22	0.21	0.29
Oallen Ford Road	3A1	0.27	0.11	0.41	0.14	0.07	0.67
	3A2	0.24	0.10	0.37	0.15	0.05	0.52

These results show that in terms of curvature, all roads again have a similar overall response across the existing central pavement. It is important to note that as the transport route is a spray seal surfaced pavement fatigue which is assessed using curvature values is not applicable for this location. The distribution of curvature values show approximately 95% of the tested locations have a curvature in excess of 0.15mm equivalent to a remaining life of less than 3 million axle repetitions. This suggests that almost the entire length of the transport route is incapable of carrying significant traffic volumes should asphalt be used to surface the pavement in future due to the flexible nature of the pavement structure.

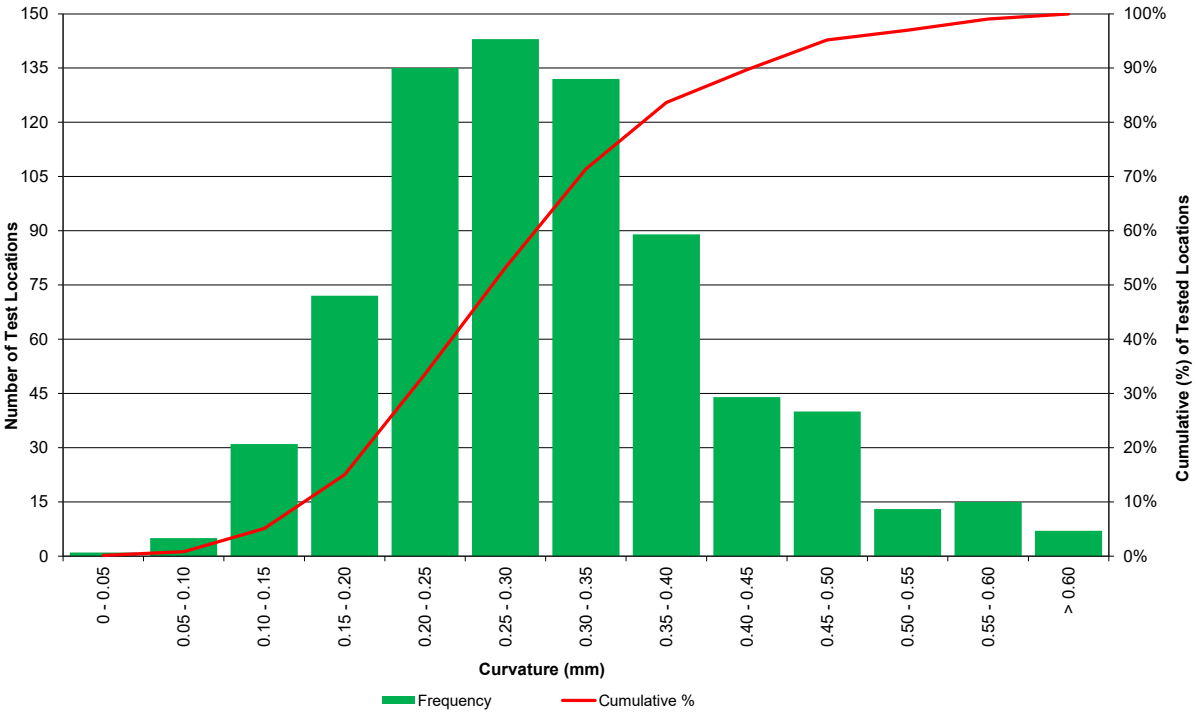

Figure 3-3 Distribution of Curvature

For comparison purposes the following values in Table 3-5 provides the design traffic life (in the fatigue mode) for various curvature functions.

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Table 3-5 Curvature/Design Traffic Loading Relationships

Curvature (mm)	Design Traffic Loading
< 0.11	More than 10 million ESA
0.11 – 0.18	1 million to 10 million ESA
0.18 – 0.32	100,000 to 1 million ESA
0.32 – 0.50	10,000 to 100,000 ESA
> 0.50	Less than 10,000 ESA

Curvature test results for each test location can be found in Appendix B.

3.1.4 Empirical Remaining Life (ESA's)

The remaining life of the pavement has been assessed using the Austroads empirically derived Design Chart Method using the peak deflection to assess the number of standard axle repetitions to failure in terms of permanent deformation. This in turn, based on the current and proposed quarry traffic volumes for each road has been used to determine the remaining life in terms of years.

Table 3-6 Remaining Life Results (Years)

Road	Identifier	Existing (No Quarry)		3 Axle Dog		4 Axle Dog & A Double		Tested Locations
		Average	< 10 yrs	Average	< 10 yrs	Average	< 10 yrs	
Jerrara Road	1A1	19.5	4	19.3	5	19.3	5	145
	1A2	18.9	8	17.2	19	16.7	25	145
Mountain Ash Road	2A1	20.0	0	20.0	20	20.0	0	2
	2A2	20.0	0	20.0	20	20.0	0	2
Oallen Ford Road	3A1	20.0	0	19.8	0	19.6	0	35
	3A2	20.0	0	18.5	3	18.2	3	35
Total		**19.4**	**12 (3.3%)**	**18.5**	**27 (7.4%)**	**18.2**	**33 (9.1%)**	**364**

The average remaining life of the unloaded lane was found to range from be 19.3 to 19.4 years and for the unloaded lane from 17.1 to 17.5 years based on the two quarry truck scenarios analysed. Overall considering both the loaded and unloaded lanes, the average remaining life for the transport route was 18.5 years for the 3 Axle Dog, 18.2 years for the 4 Axle Dog and A Double combination. Despite the 4 Axle Dog and A Double combination carrying 40% more material than the 3 Axle Dog from the same number of design life movements, the remaining life is reduced by only 0.3 years.

By examining the reduction in remaining life for the three truck configurations it is possible to determine an economic cost reflecting the increased consumption of the pavement asset associated with the quarry trucks using the local roads. Utilising a reconstruction unit rate of \$130/m^2 provided by representatives of Multiquip, a replacement cost for the 18.32km transport route, excluding the Bungonia Bypass, based on an 8m width is calculated as \$19,052,800 (130 x 8 x 18320). Determining the delta of the average remaining life between the existing traffic volumes without the quarry trucks and those with the addition of the quarry trucks, a value for the increased consumption of the pavement asset can be determined as follows:

$$Consumption = \frac{Remaining\ Life_{current} - Remaining\ Life_{quarry}}{20} \times Replacement\ Cost$$

The consumption of the pavement asset is summarised for the three truck configuration in Table 3-7 following and compared with the Section 94 contributions[3] paid.

Table 3-7 Consumption vs Contributions

	Current	3 Axle Dog	4 Axle Dog & A Double
Remaining Life	19.4	18.5	18.2
Consumption	N/A	$857,376	$1,143,168
Section 94 Contributions	N/A	$7,520,000	$10,646,064

What can be seen from this economic analysis is that the section 94 contributions are considerably greater, being almost 10 times that determined from the increased consumption of the pavement asset. While the quarry trucks will also contribute to an increased deterioration of the wearing surface which has not been considered in this analysis, this increase is not deemed to be significant. Furthermore the replacement cost that has been calculated is inclusive of the wearing surface and the unit rate adopted is understood to be conservative. As such any increased consumption of the wearing course is believed to be taken into account within the economic analysis undertaken.

The remaining life results for each road at each test location can be found in Appendix C.

[3] See Note on page A3-ii

4 CONCLUSIONS AND RECOMMENDATIONS

The findings of the structural and remaining life analysis found the three roads comprising the transport route exhibit a similar deflection response. Both Jerrara Road and Oallen Ford Road exhibit localised and for the most part isolated locations of remaining life less than 20 years, representing approximately 16% of the total transport route. The loaded lane of the transport route heading north owing to the higher design traffic volumes has the lower remaining life with an average of 17.1 to 17.5 years. This compares with to 19.3 to 19.4 for the unloaded lane considering the two quarry truck scenarios analysed.

The financial impact that the quarry trucks will have on the life of the pavement asset of the transport route when compared with the existing base load traffic was found to range from $857,376 (3 Axle Dog) to $1,143,168 (4 Axle Dog & A Double). This compares with Section 94 contributions based on material hauled over the same design period (20 years) which range from $7,520,000 (3 Axle Dog) to $10,646,064 (4 Axle Dog & A Double). The Section 94 contributions[4] range from 8.8 times (3 Axle Dog) to 9.3 times (4 Axle Dog & A Double) those determined from the increased consumption of the pavement asset.

This analysis is based on the pavement remaining in its current configuration of a spray sealed flexible unbound pavement that is subject to permanent deformation (rutting) being the primary mode in which these roads can be expected to fail. Should the road ever be surfaced with an asphalt wearing course the results indicate that asphalt fatigue would become the primary mode and with detrimental consequences.

[4] See Note on page A3-ii

APPENDIX A – DESIGN TRAFFIC VOLUMES

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Austroads Guide to Pavement Technology[1]

Design Traffic Calculation Sheet

Report Date: 2-Aug-18 **Client:** Multiquip
Project No.: 2017152
Location: Jerrara Road
Road Type: Rural
Method: Vehicle Classification Count
Traffic Load: Moderate to Heavy

Prepared By: James Erskine
Report No.: DT2017152-1
Direction: N/A
Carriageway: Single
Design Lane: Left Lane
Design Period: 20 years — 7.4.2
Projected Growth Rate: 2.5% — 7.4.5
Historical Growth Rate: 2.5%

Date Collected: from 1-Dec-17 to 7-Dec-17
Intended Date of Opening: 1-Jul-18 0.56 years to start of work

Average Daily Traffic Figures (Vehicles/Lane/Day)

Vehicle Class	Vehicles/ Lane/Day	SAST	SADT	TAST	TADT	TRDT	QADT	N_{HVAG}
1	0	0	0	0	0	0	0	0
2	311	0	0	0	0	0	0	0
3	34	34	34	0	0	0	0	68
4	5	5	0	0	5	0	0	10
5	2	4	0	0	2	0	0	6
6	5	5	10	0	0	0	0	15
7	1	1	1	0	1	0	0	3
8	2	2	0	0	4	0	0	6
9	1	1	0	0	1	1	0	3
10	1	1	0	0	2	1	0	4
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13 (Other)	0	0	0	0	0	0	0	0
Total	362	**53**	**45**	**0**	**15**	**2**	**0**	**115**
Proportion of Each Axle Group	**1.000**	**0.461**	**0.391**	**0.000**	**0.130**	**0.017**	**0.000**	

Total HV/Day 51
Total HV Axle Groups/Day 115
Calculated N_{HVAG} 2.25

Traffic Design Figures

Current AADT: 367 — 7.4.4
DF: 0.5 — 7.4.4
%HV: 14.1 — 7.4.4
LDF: 1 — 7.4.3
CGF: 25.5 — 7.4.5
Presumptive N_{HVAG}: N/A — 7.4.6

Traffic Load Distribution Calculations — 7.6.2

	Standard Axle Repetitions per Heavy Vehicle Axle Group[2]					Standard Axle Repetitions per ESA[2]		
Axle Group	**ESA/HVAG**	**ESA/HV**	**SAR5/HVAG**	**SAR7/HVAG**	**SAR12/HVAG**	**SAR5/ESA**	**SAR7/ESA**	**SAR12/ESA**
SAST	0.510	1.149	0.592	0.933	10.922	0.601	0.946	11.080
SADT	0.360	0.811	0.422	0.650	2.995	0.428	0.660	3.038
TAST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TADT	0.106	0.239	0.117	0.158	0.582	0.119	0.160	0.591
TRDT	0.010	0.023	0.011	0.013	0.036	0.011	0.013	0.036
QADT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	**0.986**	**2.223**	**1.142**	**1.753**	**14.535**	**1.158**	**1.779**	**14.746**

Table 7.8

Design Traffic Loading Calculations — 7.6.3

Design Traffic (ESA)			
	N_{DT}	5.44E+05	Equation 7.1
Overall Damage	DESA	5.36E+05	Equation 7.4
Design Standard Axle Repetitions (DSAR)			
Fatigue of asphalt	DSAR5	6.21E+05	Equation 7.5
Rutting and shape loss	DSAR7	9.53E+05	Equation 7.5
Fatigue of cemented materials	DSAR12	7.90E+06	Equation 7.5

1. These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G
2. Method of traffic collection determines whether results are calculated or presumptive values are used

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Austroads Guide to Pavement Technology[1]

Design Traffic Calculation Sheet

Report Date: 2-Aug-18 **Client:** Multiquip
Project No.: 2017152
Location: Mountain Ash Road (100m east of Jerrara Road)
Road Type: Rural
Method: Vehicle Classification Count
Traffic Load: Moderate to Heavy

Prepared By: James Erskine
Report No.: DT2017152-2
Direction: N/A
Carriageway: Single
Design Lane: Left Lane
Design Period: 20 years — 7.4.2
Projected Growth Rate: 2.5% — 7.4.5
Historical Growth Rate: 2.5%

Date Collected: from 3-Aug-17 to 24-Aug-17
Intended Date of Opening: 1-Jul-18 0.85 years to start of work

Average Daily Traffic Figures (Vehicles/Lane/Day)

Vehicle Class	Vehicles/ Lane/Day	SAST	SADT	TAST	TADT	TRDT	QADT	N_{HVAG}
1	484	0	0	0	0	0	0	0
2	46	0	0	0	0	0	0	0
3	58	58	58	0	0	0	0	116
4	4	4	0	0	4	0	0	8
5	2	4	0	0	2	0	0	6
6	4	4	8	0	0	0	0	12
7	4	4	4	0	4	0	0	12
8	1	1	0	0	2	0	0	3
9	2	2	0	0	2	2	0	6
10	1	1	0	0	2	1	0	4
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13 (Other)	0	0	0	0	0	0	0	0
Total	606	**78**	**70**	**0**	**16**	**3**	**0**	**167**
Proportion of Each Axle Group	**1.000**	**0.467**	**0.419**	**0.000**	**0.096**	**0.018**	**0.000**	

Total HV/Day 76
Total HV Axle Groups/Day 167
Calculated N_{HVAG} 2.20

Traffic Design Figures

Current AADT: 619 — 7.4.4
DF: 0.5 — 7.4.4
%HV: 12.5 — 7.4.4
LDF: 1 — 7.4.3
CGF: 25.5 — 7.4.5
Presumptive N_{HVAG}: N/A — 7.4.6

Traffic Load Distribution Calculations — 7.6.2

	Standard Axle Repetitions per Heavy Vehicle Axle Group[2]					Standard Axle Repetitions per ESA[2]		
Axle Group	**ESA/HVAG**	**ESA/HV**	**SAR5/HVAG**	**SAR7/HVAG**	**SAR12/HVAG**	**SAR5/ESA**	**SAR7/ESA**	**SAR12/ESA**
SAST	0.517	1.135	0.600	0.945	11.069	0.606	0.954	11.177
SADT	0.385	0.847	0.452	0.697	3.208	0.457	0.704	3.239
TAST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TADT	0.078	0.171	0.086	0.116	0.428	0.087	0.117	0.432
TRDT	0.010	0.023	0.011	0.013	0.037	0.011	0.013	0.037
QADT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	**0.990**	**2.176**	**1.149**	**1.771**	**14.741**	**1.160**	**1.788**	**14.885**

Table 7.8

Design Traffic Loading Calculations — 7.6.3

Design Traffic (ESA)			
	N_{DT}	7.95E+05	Equation 7.1
Overall Damage	DESA	7.87E+05	Equation 7.4
Design Standard Axle Repetitions (DSAR)			
Fatigue of asphalt	DSAR5	9.14E+05	Equation 7.5
Rutting and shape loss	DSAR7	1.41E+06	Equation 7.5
Fatigue of cemented materials	DSAR12	1.17E+07	Equation 7.5

1. These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G
2. Method of traffic collection determines whether results are calculated or presumptive values are used

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

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Pavement Management Services

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Austroads Guide to Pavement Technology[1]

Design Traffic Calculation Sheet

Report Date: 2-Aug-18 **Client:** Multiquip
Project No.: 2017152
Location: Oallen Ford Road (2km south of King Street/Lookdown Road)
Road Type: Rural
Method: Vehicle Classification Count
Traffic Load: Moderate to Heavy

Prepared By: James Erskine
Report No.: DT2017152-3
Direction: South
Carriageway: Single
Design Lane: Left Lane
Design Period: 20 years — 7.4.2
Projected Growth Rate: 2.5% — 7.4.5
Historical Growth Rate: 2.5%

Date Collected: from 10-May-13 to 17-May-13
Intended Date of Opening: 1-Jul-18 5.13 years to start of work

Average Daily Traffic Figures (Vehicles/Lane/Day)

Vehicle Class	Vehicles/ Lane/Day	SAST	SADT	TAST	TADT	TRDT	QADT	N_{HVAG}
1	155	0	0	0	0	0	0	0
2	15	0	0	0	0	0	0	0
3	9	9	9	0	0	0	0	18
4	2	2	0	0	2	0	0	4
5	1	2	0	0	1	0	0	3
6	1	1	2	0	0	0	0	3
7	0	0	0	0	0	0	0	0
8	1	1	0	0	2	0	0	3
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13 (Other)	0	0	0	0	0	0	0	0
Total	184	**15**	**11**	**0**	**5**	**0**	**0**	**31**
Proportion of Each Axle Group	**1.000**	**0.484**	**0.355**	**0.000**	**0.161**	**0.000**	**0.000**	

Total HV/Day 14
Total HV Axle Groups/Day 31
Calculated N_{HVAG} 2.21

Traffic Design Figures

Current AADT: 209 — 7.4.4
DF: 1 — 7.4.4
%HV: 7.6 — 7.4.4
LDF: 1 — 7.4.3
CGF: 25.5 — 7.4.5
Presumptive N_{HVAG}: N/A — 7.4.6

Traffic Load Distribution Calculations — 7.6.2

	Standard Axle Repetitions per Heavy Vehicle Axle Group[2]					Standard Axle Repetitions per ESA[2]		
Axle Group	**ESA/HVAG**	**ESA/HV**	**SAR5/HVAG**	**SAR7/HVAG**	**SAR12/HVAG**	**SAR5/ESA**	**SAR7/ESA**	**SAR12/ESA**
SAST	0.535	1.185	0.622	0.979	11.467	0.626	0.986	11.552
SADT	0.326	0.722	0.383	0.590	2.716	0.386	0.594	2.736
TAST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TADT	0.131	0.291	0.144	0.195	0.720	0.146	0.196	0.726
TRDT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
QADT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	**0.993**	**2.198**	**1.149**	**1.764**	**14.903**	**1.158**	**1.777**	**15.014**

Table 7.8

Design Traffic Loading Calculations — 7.6.3

Design Traffic (ESA)		
	N_{DT}	3.28E+05 — Equation 7.1
Overall Damage	DESA	3.26E+05 — Equation 7.4
Design Standard Axle Repetitions (DSAR)		
Fatigue of asphalt	DSAR5	3.77E+05 — Equation 7.5
Rutting and shape loss	DSAR7	5.79E+05 — Equation 7.5
Fatigue of cemented materials	DSAR12	4.89E+06 — Equation 7.5

1. These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G
2. Method of traffic collection determines whether results are calculated or presumptive values are used

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Austroads Guide to Pavement Technology[1]

Design Traffic Calculation Sheet

Report Date: 2-Aug-18 **Client:** Multiquip
Project No.: 2017152
Location: Oallen Ford Road (2km south of King Street/Lookdown Road)
Road Type: Rural
Method: Vehicle Classification Count
Traffic Load: Moderate to Heavy

Prepared By: James Erskine
Report No.: DT2017152-4
Direction: North
Carriageway: Single
Design Lane: Left Lane
Design Period: 20 years — 7.4.2
Projected Growth Rate: 2.5% — 7.4.5
Historical Growth Rate: 2.5%

Date Collected: from 10-May-13 to 17-May-13
Intended Date of Opening: 1-Jul-18 5.13 years to start of work

Average Daily Traffic Figures (Vehicles/Lane/Day)

Vehicle Class	Vehicles/ Lane/Day	SAST	SADT	TAST	TADT	TRDT	QADT	N_{HVAG}
1	158	0	0	0	0	0	0	0
2	13	0	0	0	0	0	0	0
3	11	11	11	0	0	0	0	22
4	1	1	0	0	1	0	0	2
5	0	0	0	0	0	0	0	0
6	1	1	2	0	0	0	0	3
7	0	0	0	0	0	0	0	0
8	1	1	0	0	2	0	0	3
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13 (Other)	0	0	0	0	0	0	0	0
Total	185	**14**	**13**	**0**	**3**	**0**	**0**	**30**
Proportion of Each Axle Group		**1.000**	**0.467**	**0.433**	**0.000**	**0.100**	**0.000**	**0.000**

Total HV/Day 14
Total HV Axle Groups/Day 30
Calculated N_{HVAG} 2.14

Traffic Design Figures

Current AADT: 210 — 7.4.4
DF: 1 — 7.4.4
%HV: 7.6 — 7.4.4
LDF: 1 — 7.4.3
CGF: 25.5 — 7.4.5
Presumptive N_{HVAG}: N/A — 7.4.6

Traffic Load Distribution Calculations — 7.6.2

	Standard Axle Repetitions per Heavy Vehicle Axle Group[2]					Standard Axle Repetitions per ESA[2]		
Axle Group	**ESA/HVAG**	**ESA/HV**	**SAR5/HVAG**	**SAR7/HVAG**	**SAR12/HVAG**	**SAR5/ESA**	**SAR7/ESA**	**SAR12/ESA**
SAST	0.516	1.106	0.600	0.944	11.059	0.602	0.948	11.105
SADT	0.398	0.854	0.468	0.720	3.316	0.470	0.723	3.330
TAST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TADT	0.081	0.174	0.090	0.121	0.447	0.090	0.121	0.448
TRDT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
QADT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	**0.996**	**2.134**	**1.157**	**1.785**	**14.822**	**1.162**	**1.793**	**14.883**

Table 7.8

Design Traffic Loading Calculations — 7.6.3

Design Traffic (ESA)			
	N_{DT}	3.17E+05	Equation 7.1
Overall Damage	DESA	3.16E+05	Equation 7.4
Design Standard Axle Repetitions (DSAR)			
Fatigue of asphalt	DSAR5	3.67E+05	Equation 7.5
Rutting and shape loss	DSAR7	5.67E+05	Equation 7.5
Fatigue of cemented materials	DSAR12	4.71E+06	Equation 7.5

1. These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G
2. Method of traffic collection determines whether results are calculated or presumptive values are used

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

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Pavement Management Services

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Austroads Guide to Pavement Technology[1]

Design Traffic Calculation Sheet

Report Date: 2-Aug-18 **Client:** Multiquip
Project No.: 2017152
Location: Multiquip Quarry Trucks (Loaded) - 3 Axle Dog
Road Type: Rural
Method: Weigh-In-Motion
Traffic Load: Moderate to Heavy

Prepared By: James Erskine
Report No.: DT2017152-5
Direction: N/A
Carriageway: Single
Design Lane: Left Lane
Design Period: 20 years — 7.4.2
Projected Growth Rate: 0.0% — 7.4.5
Historical Growth Rate: 0.0%

Date Collected: from 1-Jul-18 to 1-Jul-18
Intended Date of Opening: 1-Jul-18 0.00 years to start of work

Average Daily Traffic Figures (Vehicles/Lane/Day)

Vehicle Class	Vehicles/ Lane/Day	SAST	SADT	TAST	TADT	TRDT	QADT	N_{HVAG}
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13 (Other)	68	68	68	0	136	0	0	272
Total	68	**68**	**68**	**0**	**136**	**0**	**0**	**272**
Proportion of Each Axle Group	**1.000**	**0.250**	**0.250**	**0.000**	**0.500**	**0.000**	**0.000**	

Total HV/Day 68
Total HV Axle Groups/Day 272
Calculated N_{HVAG} 4.00

Traffic Design Figures

Current AADT: 68 — 7.4.4
DF: 0.5 — 7.4.4
%HV: 100.0 — 7.4.4
LDF: 1 — 7.4.3
CGF: 20.0 — 7.4.5
Presumptive N_{HVAG}: N/A — 7.4.6

Traffic Load Distribution Calculations — 7.6.2

	Standard Axle Repetitions per Heavy Vehicle Axle Group[2]					Standard Axle Repetitions per ESA[2]		
Axle Group	**ESA/HVAG**	**ESA/HV**	**SAR5/HVAG**	**SAR7/HVAG**	**SAR12/HVAG**	**SAR5/ESA**	**SAR7/ESA**	**SAR12/ESA**
SAST	0.381	1.525	0.424	0.523	0.887	0.237	0.293	0.497
SADT	0.371	1.484	0.410	0.499	0.817	0.229	0.279	0.457
TAST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TADT	1.034	4.137	1.240	1.784	4.425	0.694	0.998	2.477
TRDT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
QADT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	**1.787**	**7.146**	**2.074**	**2.806**	**6.130**	**1.161**	**1.571**	**3.431**

Table 7.8

Design Traffic Loading Calculations — 7.6.3

Design Traffic (ESA)		
	N_{DT}	9.93E+05 — Equation 7.1
Overall Damage	DESA	1.77E+06 — Equation 7.4
Design Standard Axle Repetitions (DSAR)		
Fatigue of asphalt	DSAR5	2.06E+06 — Equation 7.5
Rutting and shape loss	DSAR7	2.79E+06 — Equation 7.5
Fatigue of cemented materials	DSAR12	6.09E+06 — Equation 7.5

1. These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G
2. Method of traffic collection determines whether results are calculated or presumptive values are used

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Austroads Guide to Pavement Technology[1]

Design Traffic Calculation Sheet

Report Date: 11-Sep-18 **Client:** Multiquip
Project No.: 2017152
Location: Multiquip Quarry Trucks (Unloaded) - 3 Axle Dog
Road Type: Rural
Method: Weigh-In-Motion
Traffic Load: Moderate to Heavy

Prepared By: James Erskine
Report No.: DT2017152-6
Direction: N/A
Carriageway: Single
Design Lane: Left Lane
Design Period: 20 years (7.4.2)
Projected Growth Rate: 0.0% (7.4.5)
Historical Growth Rate: 0.0%

Date Collected: from 1-Jul-18 to 1-Jul-18
Intended Date of Opening: 1-Jul-18 0.00 years to start of work

Average Daily Traffic Figures (Vehicles/Lane/Day)

Vehicle Class	Vehicles/ Lane/Day	SAST	SADT	TAST	TADT	TRDT	QADT	N_{HVAG}
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13 (Other)	68	68	0	0	204	0	0	272
Total	68	**68**	**0**	**0**	**204**	**0**	**0**	**272**
Proportion of Each Axle Group	**1.000**	**0.250**	**0.000**	**0.000**	**0.750**	**0.000**	**0.000**	

Total HV/Day 68
Total HV Axle Groups/Day 272
Calculated N_{HVAG} 4.00

Traffic Design Figures

Current AADT: 68 (7.4.4)
DF: 0.5 (7.4.4)
%HV: 100.0 (7.4.4)
LDF: 1 (7.4.3)
CGF: 20.0 (7.4.5)
Presumptive N_{HVAG}: N/A (7.4.6)

Traffic Load Distribution Calculations (7.6.2)

	Standard Axle Repetitions per Heavy Vehicle Axle Group[2]					Standard Axle Repetitions per ESA[2]		
Axle Group	**ESA/HVAG**	**ESA/HV**	**SAR5/HVAG**	**SAR7/HVAG**	**SAR12/HVAG**	**SAR5/ESA**	**SAR7/ESA**	**SAR12/ESA**
SAST	0.146	0.582	0.127	0.097	0.049	0.822	0.627	0.319
SADT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TAST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TADT	0.009	0.036	0.003	0.001	0.000	0.022	0.003	0.000
TRDT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
QADT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	**0.155**	**0.619**	**0.131**	**0.098**	**0.049**	**0.844**	**0.631**	**0.319**

Table 7.8

Design Traffic Loading Calculations (7.6.3)

Design Traffic (ESA)			
	N_{DT}	9.93E+05	Equation 7.1
Overall Damage	DESA	1.54E+05	Equation 7.4
Design Standard Axle Repetitions (DSAR)			
Fatigue of asphalt	DSAR5	1.30E+05	Equation 7.5
Rutting and shape loss	DSAR7	9.69E+04	Equation 7.5
Fatigue of cemented materials	DSAR12	4.90E+04	Equation 7.5

1. These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G
2. Method of traffic collection determines whether results are calculated or presumptive values are used

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

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Pavement Management Services

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Austroads Guide to Pavement Technology[1]

Design Traffic Calculation Sheet

Report Date: 11-Sep-18 **Client:** Multiquip
Project No.: 2017152
Location: Multiquip Quarry Trucks (Loaded) - Current Approval
Road Type: Rural
Method: Weigh-In-Motion
Traffic Load: Moderate to Heavy

Prepared By: James Erskine
Report No.: DT2017152-7
Direction: N/A
Carriageway: Single
Design Lane: Left Lane
Design Period: 20 years — 7.4.2
Projected Growth Rate: 0.0% — 7.4.5
Historical Growth Rate: 0.0%

Date Collected: from 1-Jul-18 to 1-Jul-18
Intended Date of Opening: 1-Jul-18 0.00 years to start of work

Average Daily Traffic Figures (Vehicles/Lane/Day)

Vehicle Class	Vehicles/ Lane/Day	SAST	SADT	TAST	TADT	TRDT	QADT	N_{HVAG}
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13 (Other)	35	35	0	0	105	0	0	140
Total	35	**35**	**0**	**0**	**105**	**0**	**0**	**140**
Proportion of Each Axle Group	**1.000**	**0.250**	**0.000**	**0.000**	**0.750**	**0.000**	**0.000**	

Total HV/Day 35
Total HV Axle Groups/Day 140
Calculated N_{HVAG} 4.00

Traffic Design Figures

Current AADT: 35 — 7.4.4
DF: 0.5 — 7.4.4
%HV: 100.0 — 7.4.4
LDF: 1 — 7.4.3
CGF: 20.0 — 7.4.5
Presumptive N_{HVAG}: N/A — 7.4.6

Traffic Load Distribution Calculations — 7.6.2

	Standard Axle Repetitions per Heavy Vehicle Axle Group[2]					Standard Axle Repetitions per ESA[2]		
Axle Group	**ESA/HVAG**	**ESA/HV**	**SAR5/HVAG**	**SAR7/HVAG**	**SAR12/HVAG**	**SAR5/ESA**	**SAR7/ESA**	**SAR12/ESA**
SAST	0.499	1.996	0.593	0.838	1.989	0.264	0.373	0.885
SADT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TAST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TADT	1.748	6.992	2.160	3.297	9.493	0.961	1.467	4.225
TRDT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
QADT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	**2.247**	**8.988**	**2.753**	**4.135**	**11.482**	**1.225**	**1.840**	**5.110**

Table 7.8

Design Traffic Loading Calculations — 7.6.3

Design Traffic (ESA)		
	N_{DT}	5.11E+05 — Equation 7.1
Overall Damage	DESA	1.15E+06 — Equation 7.4
Design Standard Axle Repetitions (DSAR)		
Fatigue of asphalt	DSAR5	1.41E+06 — Equation 7.5
Rutting and shape loss	DSAR7	2.11E+06 — Equation 7.5
Fatigue of cemented materials	DSAR12	5.87E+06 — Equation 7.5

1. These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G
2. Method of traffic collection determines whether results are calculated or presumptive values are used

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Austroads Guide to Pavement Technology[1]

Design Traffic Calculation Sheet

Report Date: 2-Aug-18 **Client:** Multiquip
Project No.: 2017152
Location: Multiquip Quarry Trucks (Unloaded) - 4 Axle Dog
Road Type: Rural
Method: Weigh-In-Motion
Traffic Load: Moderate to Heavy

Prepared By: James Erskine
Report No.: DT2017152-8
Direction: N/A
Carriageway: Single
Design Lane: Left Lane
Design Period: 20 years (7.4.2)
Projected Growth Rate: 0.0% (7.4.5)
Historical Growth Rate: 0.0%

Date Collected: from 1-Jul-18 to 1-Jul-18
Intended Date of Opening: 1-Jul-18 0.00 years to start of work

Average Daily Traffic Figures (Vehicles/Lane/Day)

Vehicle Class	Vehicles/ Lane/Day	SAST	SADT	TAST	TADT	TRDT	QADT	N_{HVAG}
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13 (Other)	35	35	0	0	105	0	0	140
Total	35	**35**	**0**	**0**	**105**	**0**	**0**	**140**
Proportion of Each Axle Group	**1.000**	**0.250**	**0.000**	**0.000**	**0.750**	**0.000**	**0.000**	

Total HV/Day 35
Total HV Axle Groups/Day 140
Calculated N_{HVAG} 4.00

Traffic Design Figures

Current AADT: 35 (7.4.4)
DF: 0.5 (7.4.4)
%HV: 100.0 (7.4.4)
LDF: 1 (7.4.3)
CGF: 20.0 (7.4.5)
Presumptive N_{HVAG}: N/A (7.4.6)

Traffic Load Distribution Calculations (7.6.2)

	Standard Axle Repetitions per Heavy Vehicle Axle Group[2]					Standard Axle Repetitions per ESA[2]		
Axle Group	**ESA/HVAG**	**ESA/HV**	**SAR5/HVAG**	**SAR7/HVAG**	**SAR12/HVAG**	**SAR5/ESA**	**SAR7/ESA**	**SAR12/ESA**
SAST	0.211	0.844	0.202	0.186	0.150	0.915	0.841	0.680
SADT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TAST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TADT	0.010	0.040	0.004	0.001	0.000	0.017	0.003	0.000
TRDT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
QADT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	**0.221**	**0.884**	**0.206**	**0.186**	**0.150**	**0.932**	**0.843**	**0.680**

Table 7.8

Design Traffic Loading Calculations (7.6.3)

Design Traffic (ESA)		
	N_{DT}	5.11E+05 (Equation 7.1)
Overall Damage	DESA	1.13E+05 (Equation 7.4)
Design Standard Axle Repetitions (DSAR)		
Fatigue of asphalt	DSAR5	1.05E+05 (Equation 7.5)
Rutting and shape loss	DSAR7	9.52E+04 (Equation 7.5)
Fatigue of cemented materials	DSAR12	7.68E+04 (Equation 7.5)

1. These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G
2. Method of traffic collection determines whether results are calculated or presumptive values are used

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

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Pavement Management Services

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Austroads Guide to Pavement Technology[1]

Design Traffic Calculation Sheet

Report Date: 2-Aug-18 **Client:** Multiquip
Project No.: 2017152
Location: Multiquip Quarry Trucks (Loaded) - A Double
Road Type: Rural
Method: Weigh-In-Motion
Traffic Load: Moderate to Heavy

Prepared By: James Erskine
Report No.: DT2017152-9
Direction: N/A
Carriageway: Single
Design Lane: Left Lane
Design Period: 20 years — 7.4.2
Projected Growth Rate: 0.0% — 7.4.5
Historical Growth Rate: 0.0%

Date Collected: from 1-Jul-18 to 1-Jul-18
Intended Date of Opening: 1-Jul-18 0.00 years to start of work

Average Daily Traffic Figures (Vehicles/Lane/Day)

Vehicle Class	Vehicles/ Lane/Day	SAST	SADT	TAST	TADT	TRDT	QADT	N_{HVAG}
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13 (Other)	35	35	0	0	140	0	0	175
Total	35	**35**	**0**	**0**	**140**	**0**	**0**	**175**
Proportion of Each Axle Group	**1.000**	**0.200**	**0.000**	**0.000**	**0.800**	**0.000**	**0.000**	

Total HV/Day 35
Total HV Axle Groups/Day 175
Calculated N_{HVAG} 5.00

Traffic Design Figures

Current AADT: 35 — 7.4.4
DF: 0.5 — 7.4.4
%HV: 100.0 — 7.4.4
LDF: 1 — 7.4.3
CGF: 20.0 — 7.4.5
Presumptive N_{HVAG}: N/A — 7.4.6

Traffic Load Distribution Calculations — 7.6.2

	Standard Axle Repetitions per Heavy Vehicle Axle Group[2]					Standard Axle Repetitions per ESA[2]		
Axle Group	**ESA/HVAG**	**ESA/HV**	**SAR5/HVAG**	**SAR7/HVAG**	**SAR12/HVAG**	**SAR5/ESA**	**SAR7/ESA**	**SAR12/ESA**
SAST	0.420	2.100	0.506	0.733	1.852	0.221	0.321	0.811
SADT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TAST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TADT	1.864	9.322	2.304	3.517	10.126	1.008	1.539	4.433
TRDT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
QADT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	**2.284**	**11.422**	**2.809**	**4.249**	**11.978**	**1.230**	**1.860**	**5.243**

Table 7.8

Design Traffic Loading Calculations — 7.6.3

Design Traffic (ESA)			
	N_{DT}	6.39E+05	Equation 7.1
Overall Damage	DESA	1.46E+06	Equation 7.4
Design Standard Axle Repetitions (DSAR)			
Fatigue of asphalt	DSAR5	1.79E+06	Equation 7.5
Rutting and shape loss	DSAR7	2.71E+06	Equation 7.5
Fatigue of cemented materials	DSAR12	7.65E+06	Equation 7.5

1. These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G
2. Method of traffic collection determines whether results are calculated or presumptive values are used

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Austroads Guide to Pavement Technology[1]

Design Traffic Calculation Sheet

Report Date: 2-Aug-18 **Client:** Multiquip
Project No.: 2017152
Location: Multiquip Quarry Trucks (Unloaded) - A Double
Road Type: Rural
Method: Weigh-In-Motion
Traffic Load: Moderate to Heavy

Prepared By: James Erskine
Report No.: DT2017152-10
Direction: N/A
Carriageway: Single
Design Lane: Left Lane
Design Period: 20 years — 7.4.2
Projected Growth Rate: 0.0% — 7.4.5
Historical Growth Rate: 0.0%

Date Collected: from 1-Jul-18 to 1-Jul-18
Intended Date of Opening: 1-Jul-18 0.00 years to start of work

Average Daily Traffic Figures (Vehicles/Lane/Day)

Vehicle Class	Vehicles/ Lane/Day	SAST	SADT	TAST	TADT	TRDT	QADT	N_{HVAG}
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13 (Other)	35	35	0	0	140	0	0	175
Total	35	**35**	**0**	**0**	**140**	**0**	**0**	**175**
Proportion of Each Axle Group	**1.000**	**0.200**	**0.000**	**0.000**	**0.800**	**0.000**	**0.000**	

Total HV/Day 35
Total HV Axle Groups/Day 175
Calculated N_{HVAG} 5.00

Traffic Design Figures

Current AADT: 35 — 7.4.4
DF: 0.5 — 7.4.4
%HV: 100.0 — 7.4.4
LDF: 1 — 7.4.3
CGF: 20.0 — 7.4.5
Presumptive N_{HVAG}: N/A — 7.4.6

Traffic Load Distribution Calculations — 7.6.2

	Standard Axle Repetitions per Heavy Vehicle Axle Group[2]					Standard Axle Repetitions per ESA[2]			
Axle Group	**ESA/HVAG**	**ESA/HV**	**SAR5/HVAG**	**SAR7/HVAG**	**SAR12/HVAG**	**SAR5/ESA**	**SAR7/ESA**	**SAR12/ESA**	
SAST	0.269	1.347	0.290	0.337	0.489	1.036	1.202	1.745	
SADT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
TAST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
TADT	0.011	0.054	0.004	0.001	0.000	0.015	0.002	0.000	
TRDT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
QADT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Total	**0.280**	**1.401**	**0.294**	**0.338**	**0.489**	**1.051**	**1.205**	**1.745**	Table 7.8

Design Traffic Loading Calculations — 7.6.3

Design Traffic (ESA)			
	N_{DT}	6.39E+05	Equation 7.1
Overall Damage	DESA	1.79E+05	Equation 7.4
Design Standard Axle Repetitions (DSAR)			
Fatigue of asphalt	DSAR5	1.88E+05	Equation 7.5
Rutting and shape loss	DSAR7	2.16E+05	Equation 7.5
Fatigue of cemented materials	DSAR12	3.12E+05	Equation 7.5

1. These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G
2. Method of traffic collection determines whether results are calculated or presumptive values are used

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

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Pavement Management Services

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APPENDIX B – FWD DEFLECTION TEST RESULTS

Pavement Management Services

Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

FWD/HWD Structural Test Report - Deflection Results

Test Method: QT211
Testing Date: 31/05/2018
Operator: John Muir
Test Equipment: FWD-016

Target Load (kN): 40
Smoothing: No

Client: Multiquip Quarries
Job No: 2017152
Report No: DR2017152-3
Client Section ID: 1A1_IWP

Jerrara Road
from South Marulan Road to Mountain Ash Road

Road Id: 1
Lane: 1
Block: A

Station (km)	Lane	Wheel Path	Peak Load (kPa)	Measured Deflection Results (µm) Distance from Load (mm)									Normalised Deflection Results (µm) Distance from Load (mm)									Temperature (°C)		FWD		GDA94		Local Comment
				0	200	300	450	600	750	900	1200	1500	0	200	300	450	600	750	900	1200	1500	Air	Surface	Defl.	Curv.	Latitude	Longitude	
0.150	1	IWP	570	789	480	292	122	23	5	4	14	9	784	476	290	121	22	5	4	14	9	10.0	14.3	0.78	0.31	-34.7319766	149.9803367	ND
0.250	1	IWP	560	825	564	350	191	117	79	51	21	14	834	570	353	193	118	80	51	21	14	10.0	14.3	0.83	0.26	-34.7327550	149.9798367	
0.350	1	IWP	568	545	320	192	84	42	30	21	16	17	543	318	191	84	42	30	21	16	17	10.0	14.3	0.54	0.22	-34.7335400	149.9793483	ND
0.450	1	IWP	569	641	307	189	109	77	56	43	28	17	637	305	188	109	76	56	43	28	17	10.0	14.3	0.64	0.33	-34.7343733	149.9788850	
0.550	1	IWP	562	521	251	158	78	48	35	27	17	13	525	253	159	79	48	35	27	17	13	10.0	14.3	0.52	0.27	-34.7351866	149.9784083	
0.650	1	IWP	564	909	484	300	143	79	57	47	34	23	912	486	301	144	79	57	48	34	23	10.0	14.3	0.91	0.43	-34.7360617	149.9780217	
0.750	1	IWP	576	553	314	148	63	40	30	21	11	8	543	309	145	62	39	29	20	10	8	10.0	14.3	0.54	0.23	-34.7369050	149.9776917	
0.850	1	IWP	559	631	375	196	94	65	46	32	14	15	639	380	198	95	66	46	32	14	15	10.0	14.3	0.64	0.26	-34.7377733	149.9773617	ND
0.950	1	IWP	562	961	602	367	190	118	83	54	25	16	967	607	369	191	118	84	55	26	16	10.0	14.3	0.97	0.36	-34.7386467	149.9770250	
1.050	1	IWP	567	506	259	160	88	65	42	33	23	22	505	258	159	87	65	42	33	23	22	10.0	14.3	0.51	0.25	-34.7395217	149.9767033	
1.150	1	IWP	576	396	174	108	53	38	32	28	22	17	389	171	106	52	37	32	28	22	17	10.0	14.3	0.39	0.22	-34.7403933	149.9764483	
1.250	1	IWP	568	838	512	331	180	103	57	34	25	25	835	510	330	179	102	57	34	25	24	10.0	14.3	0.84	0.33	-34.7412867	149.9762783	
1.350	1	IWP	561	1036	663	425	234	122	60	33	19	12	1045	668	428	236	123	60	34	19	12	10.0	14.3	1.05	0.38	-34.7421483	149.9762334	
1.450	1	IWP	560	1024	539	310	155	90	61	47	29	18	1034	545	313	156	91	62	47	29	19	10.0	14.3	1.03	0.49	-34.7430533	149.9762484	
1.550	1	IWP	562	757	405	241	125	75	51	42	23	16	762	408	243	126	76	52	43	23	16	10.0	14.3	0.76	0.35	-34.7439950	149.9762650	
1.650	1	IWP	565	1052	598	382	191	112	83	71	49	35	1054	599	382	192	113	83	71	49	35	10.0	14.3	1.05	0.46	-34.7448850	149.9762917	
1.750	1	IWP	560	783	439	277	151	93	63	47	32	22	791	444	280	152	93	64	47	32	22	10.0	14.3	0.79	0.35	-34.7458033	149.9763184	
1.850	1	IWP	563	922	576	356	197	125	84	58	36	25	927	579	358	198	125	84	58	36	25	10.0	14.3	0.93	0.35	-34.7467167	149.9763383	
1.950	1	IWP	568	718	344	222	112	75	56	43	31	23	715	342	221	111	75	55	43	30	23	10.0	14.3	0.72	0.37	-34.7476100	149.9763533	New Pavement

Station (km)	Lane	Wheel Path	Peak Load (kPa)	Measured Deflection Results (µm) Distance from Load (mm)									Normalised Deflection Results (µm) Distance from Load (mm)									Temperature (°C)		FWD		GDA94		Local Comment
				0	200	300	450	600	750	900	1200	1500	0	200	300	450	600	750	900	1200	1500	Air	Surface	Defl.	Curv.	Latitude	Longitude	
2.050	1	IWP	569	873	443	333	185	119	79	54	35	26	868	441	331	184	118	79	54	35	26	10.0	14.3	0.87	0.43	-34.7485000	149.9761883	New Pavement
2.150	1	IWP	561	666	417	284	172	110	76	55	36	26	672	420	286	173	111	77	56	37	26	10.0	14.3	0.67	0.25	-34.7492817	149.9756933	
2.250	1	IWP	557	660	370	193	64	29	18	11	9	7	671	375	196	65	30	18	11	9	7	10.0	14.3	0.67	0.30	-34.7499566	149.9749783	
2.350	1	IWP	566	979	718	471	263	156	98	72	50	37	978	718	471	263	156	98	72	50	37	10.0	14.3	0.98	0.26	-34.7506467	149.9742350	
2.450	1	IWP	567	759	414	229	107	66	50	37	28	23	757	413	229	107	66	50	37	27	23	10.0	14.3	0.76	0.34	-34.7513433	149.9735117	
2.550	1	IWP	583	605	255	98	26	13	9	8	7	6	587	248	95	25	13	9	8	7	5	10.0	14.3	0.59	0.34	-34.7519833	149.9729717	
2.650	1	IWP	564	800	481	284	144	85	64	47	18	19	803	482	285	144	86	64	47	18	19	10.0	14.3	0.80	0.32	-34.7527517	149.9723817	ND
2.750	1	IWP	564	735	483	289	148	96	66	55	49	35	737	485	290	149	97	66	55	49	35	11.0	14.3	0.74	0.25	-34.7535334	149.9717733	
2.850	1	IWP	555	965	523	375	184	95	71	66	50	35	984	533	382	188	97	72	67	51	36	11.0	14.3	0.98	0.45	-34.7542517	149.9712400	
2.950	1	IWP	559	687	440	263	122	80	60	52	35	24	695	446	266	123	81	61	52	36	25	11.0	14.3	0.70	0.25	-34.7550700	149.9707417	New Pavement
3.050	1	IWP	560	815	447	270	109	64	50	42	30	19	824	452	273	110	65	51	42	31	19	11.0	14.3	0.82	0.37	-34.7559233	149.9703350	
3.150	1	IWP	567	1108	645	361	180	103	72	57	41	29	1106	644	360	179	103	72	57	41	29	11.0	14.3	1.11	0.46	-34.7567733	149.9699367	
3.250	1	IWP	565	785	456	291	191	131	97	76	54	42	786	457	292	191	132	97	76	54	42	11.0	14.3	0.79	0.33	-34.7576133	149.9695867	
3.350	1	IWP	565	649	324	218	122	75	52	41	33	28	650	324	218	122	75	52	41	33	28	11.0	14.3	0.65	0.33	-34.7585250	149.9692450	
3.450	1	IWP	566	678	432	320	198	141	103	84	54	41	677	432	320	198	141	103	84	54	41	11.0	14.3	0.68	0.25	-34.7593800	149.9690250	
3.550	1	IWP	556	933	400	227	131	90	67	54	44	34	950	407	231	134	91	68	55	45	35	11.0	14.3	0.95	0.54	-34.7602250	149.9688600	
3.650	1	IWP	569	851	472	319	192	126	85	58	25	19	846	469	318	191	125	85	58	25	19	11.0	14.3	0.85	0.38	-34.7611167	149.9687167	
3.750	1	IWP	560	872	452	271	125	53	29	21	10	6	881	457	274	126	54	29	22	10	6	11.0	14.3	0.88	0.42	-34.7620417	149.9685567	
3.850	1	IWP	579	379	161	79	41	22	15	12	8	7	370	157	77	40	22	15	11	8	6	11.0	14.3	0.37	0.21	-34.7629066	149.9683283	
3.950	1	IWP	560	566	282	156	86	67	50	39	35	24	572	285	158	86	68	51	39	35	25	11.0	14.3	0.57	0.29	-34.7637683	149.9680267	
4.050	1	IWP	561	831	466	300	167	91	64	49	29	17	838	470	303	168	91	65	50	29	17	11.0	14.3	0.84	0.37	-34.7646317	149.9676783	
4.150	1	IWP	563	363	178	132	74	49	30	21	19	17	365	178	132	74	49	30	21	19	17	11.0	14.3	0.36	0.19	-34.7654783	149.9672916	
4.250	1	IWP	566	927	476	246	149	98	64	46	23	18	927	476	246	149	98	64	45	23	18	11.0	14.3	0.93	0.45	-34.7663217	149.9669250	
4.350	1	IWP	552	725	408	213	120	83	60	45	32	26	743	418	219	123	85	62	46	33	26	11.0	14.3	0.74	0.33	-34.7671567	149.9665433	
4.450	1	IWP	564	1040	621	369	198	139	106	85	56	34	1044	623	370	198	139	106	86	57	34	11.0	14.3	1.04	0.42	-34.7680300	149.9661550	
4.550	1	IWP	554	630	371	217	116	64	38	25	10	6	644	379	222	119	66	39	25	11	6	11.0	14.3	0.64	0.26	-34.7688484	149.9658983	
4.650	1	IWP	564	416	221	149	95	67	42	24	12	6	417	222	150	95	68	42	24	12	6	11.0	14.3	0.42	0.20	-34.7697617	149.9658017	
4.750	1	IWP	569	414	243	155	70	42	25	18	14	8	412	242	154	69	41	25	18	14	8	11.0	14.3	0.41	0.17	-34.7706400	149.9656000	
4.850	1	IWP	564	661	392	234	122	63	30	32	32	17	663	393	235	123	63	30	32	32	17	11.0	14.3	0.66	0.27	-34.7714650	149.9651634	ND
4.950	1	IWP	566	955	472	345	180	130	101	79	52	37	955	472	345	180	130	100	78	52	37	11.0	14.3	0.96	0.48	-34.7722383	149.9647217	
5.050	1	IWP	567	1211	745	564	361	252	189	146	90	66	1209	744	562	360	252	189	146	90	65	11.0	14.3	1.21	0.47	-34.7731517	149.9642833	
5.150	1	IWP	559	941	451	282	168	114	86	66	47	34	952	456	285	170	116	87	67	47	34	11.0	14.3	0.95	0.50	-34.7739383	149.9639150	

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Station (km)	Lane	Wheel Path	Peak Load (kPa)	Measured Deflection Results (µm) Distance from Load (mm)									Normalised Deflection Results (µm) Distance from Load (mm)									Temperature (°C)		FWD		GDA94		Local Comment
				0	200	300	450	600	750	900	1200	1500	0	200	300	450	600	750	900	1200	1500	Air	Surface	Defl.	Curv.	Latitude	Longitude	
5.250	1	IWP	560	665	275	177	100	69	48	35	20	12	672	278	178	101	70	49	35	20	12	11.0	14.3	0.67	0.39	-34.7748067	149.9635867	
5.350	1	IWP	566	966	696	459	270	179	118	78	34	19	966	696	459	270	179	118	78	34	19	11.0	14.3	0.97	0.27	-34.7756417	149.9631884	
5.450	1	IWP	564	857	533	347	207	124	79	50	24	13	859	535	348	208	124	79	51	24	13	11.0	14.3	0.86	0.32	-34.7764267	149.9626933	
5.550	1	IWP	563	879	457	316	193	134	98	71	48	29	883	459	317	194	135	98	71	48	29	11.0	14.3	0.88	0.42	-34.7772400	149.9621983	
5.650	1	IWP	560	987	541	334	202	149	115	89	64	44	998	547	338	204	151	116	90	65	44	11.0	14.3	1.00	0.45	-34.7780583	149.9616950	
5.750	1	IWP	560	823	538	294	149	103	79	61	33	21	832	544	297	151	104	79	61	33	21	11.0	14.3	0.83	0.29	-34.7788467	149.9612000	
5.850	1	IWP	564	813	428	274	124	71	45	31	20	13	816	430	275	124	71	45	31	20	13	11.0	14.3	0.82	0.39	-34.7796750	149.9608833	
5.950	1	IWP	567	730	378	192	75	38	25	19	15	11	728	377	192	75	38	24	19	15	11	11.0	14.3	0.73	0.35	-34.7805784	149.9612283	
6.050	1	IWP	563	1170	567	399	234	164	122	96	67	52	1176	570	401	235	165	123	97	67	52	11.0	14.3	1.18	0.61	-34.7813517	149.9616233	
6.150	1	IWP	563	839	487	264	168	116	79	55	29	22	844	490	265	169	116	79	55	29	22	11.0	14.3	0.84	0.35	-34.7822517	149.9616467	
6.250	1	IWP	555	1035	626	399	193	96	79	65	48	35	1055	638	407	197	98	80	66	49	35	11.0	14.3	1.06	0.42	-34.7831266	149.9614033	
6.350	1	IWP	563	980	574	405	240	142	93	69	51	38	985	577	407	241	142	93	69	51	38	11.0	14.3	0.99	0.41	-34.7839767	149.9610550	
6.450	1	IWP	565	803	471	320	190	132	97	74	50	36	804	471	321	190	132	97	74	50	36	11.0	14.3	0.80	0.33	-34.7848033	149.9606300	
6.550	1	IWP	562	579	332	223	123	82	55	40	29	21	583	334	225	123	83	55	41	29	21	11.0	14.3	0.58	0.25	-34.7856033	149.9601950	
6.650	1	IWP	565	359	160	115	72	46	33	26	16	11	359	160	115	72	46	33	26	16	11	11.0	14.3	0.36	0.20	-34.7864433	149.9597516	
6.750	1	IWP	571	902	446	252	131	73	43	27	12	5	894	442	249	130	72	42	26	12	5	11.0	14.3	0.89	0.45	-34.7872616	149.9593633	
6.850	1	IWP	563	680	363	230	91	59	44	33	24	18	684	365	231	91	60	44	33	24	18	11.0	14.3	0.68	0.32	-34.7880884	149.9590200	
6.950	1	IWP	564	949	537	474	241	163	115	79	41	38	952	538	475	242	163	116	79	41	38	11.0	14.3	0.95	0.41	-34.7889584	149.9587133	
7.050	1	IWP	559	444	226	123	54	36	28	21	15	12	449	228	124	54	36	29	21	15	12	11.0	14.3	0.45	0.22	-34.7898617	149.9584450	
7.150	1	IWP	564	722	472	290	169	90	46	29	19	14	725	474	291	169	90	46	29	19	14	11.0	14.3	0.73	0.25	-34.7907183	149.9582250	
7.250	1	IWP	563	486	264	165	90	54	40	32	16	17	489	265	166	91	54	40	32	16	17	11.0	14.3	0.49	0.22	-34.7915817	149.9580584	ND
7.350	1	IWP	563	535	302	179	81	57	40	29	20	16	538	304	180	82	57	40	29	20	16	11.0	14.3	0.54	0.23	-34.7925067	149.9578466	
7.450	1	IWP	573	295	110	77	45	30	23	21	16	14	292	108	76	44	30	23	21	15	14	11.0	14.3	0.29	0.18	-34.7933817	149.9577784	
7.550	1	IWP	562	664	339	250	115	76	59	44	31	24	668	342	252	115	76	59	44	31	24	11.0	14.3	0.67	0.33	-34.7942883	149.9577967	
7.650	1	IWP	566	439	159	118	71	47	38	28	18	11	439	159	118	71	47	38	28	18	11	11.0	14.3	0.44	0.28	-34.7951267	149.9574317	
7.750	1	IWP	566	637	361	236	135	87	60	43	28	19	637	360	236	135	87	60	43	28	19	11.0	14.3	0.64	0.28	-34.7959183	149.9570117	
7.850	1	IWP	557	1024	604	342	175	112	78	51	31	27	1040	614	347	178	114	79	52	32	28	11.0	14.3	1.04	0.43	-34.7967650	149.9565650	
7.950	1	IWP	563	627	326	185	106	62	43	30	18	11	631	327	186	107	63	44	30	18	11	11.0	14.3	0.63	0.30	-34.7976334	149.9562784	
8.050	1	IWP	566	756	456	255	146	106	79	62	40	29	756	456	255	146	106	79	62	40	29	11.0	14.3	0.76	0.30	-34.7985450	149.9561100	
8.150	1	IWP	564	868	567	399	233	155	108	78	51	35	871	569	400	233	155	108	79	52	35	11.0	14.3	0.87	0.30	-34.7994167	149.9559500	
8.250	1	IWP	566	561	242	172	65	37	24	17	21	9	561	242	172	65	36	24	17	21	9	11.0	14.3	0.56	0.32	-34.8003200	149.9559450	ND
8.350	1	IWP	571	517	275	176	81	52	41	34	29	22	512	273	174	81	52	40	33	29	22	11.0	14.3	0.51	0.24	-34.8011717	149.9562017	

Station (km)	Lane	Wheel Path	Peak Load (kPa)	Measured Deflection Results (µm) Distance from Load (mm) 0	200	300	450	600	750	900	1200	1500	Normalised Deflection Results (µm) Distance from Load (mm) 0	200	300	450	600	750	900	1200	1500	Temperature (ºC) Air	Surface	FWD Defl.	Curv.	GDA94 Latitude	Longitude	Local Comment
8.450	1	IWP	560	607	273	169	84	46	29	25	22	13	614	276	171	84	47	30	26	22	13	11.0	14.3	0.61	0.34	-34.8020650	149.9562916	
8.550	1	IWP	567	701	456	314	178	118	88	72	50	36	700	455	314	178	118	88	72	50	36	11.0	14.3	0.70	0.24	-34.8029550	149.9560816	
8.650	1	IWP	570	668	427	297	153	100	76	61	46	36	663	424	295	152	99	75	61	46	36	11.0	14.3	0.66	0.24	-34.8038100	149.9558167	
8.750	1	IWP	566	693	416	251	127	83	55	45	39	29	692	416	251	127	83	55	44	38	29	11.0	14.3	0.69	0.28	-34.8046817	149.9554733	
8.850	1	IWP	563	738	422	267	151	81	59	49	39	29	741	424	268	152	82	60	50	39	30	11.0	14.3	0.74	0.32	-34.8055367	149.9550700	
8.950	1	IWP	566	1336	931	669	424	296	204	140	87	64	1336	931	669	424	295	204	140	87	64	11.0	14.3	1.34	0.41	-34.8063500	149.9546750	
9.050	1	IWP	566	765	461	343	156	94	62	44	38	26	765	461	343	156	94	62	44	38	26	11.0	14.3	0.77	0.30	-34.8071466	149.9541383	
9.150	1	IWP	564	807	529	337	198	132	93	70	51	38	810	531	338	199	132	93	70	51	39	11.0	14.3	0.81	0.28	-34.8078933	149.9535567	
9.250	1	IWP	562	706	436	280	151	95	68	50	31	31	711	439	282	152	95	68	51	31	31	11.0	14.3	0.71	0.27	-34.8086550	149.9530300	
9.350	1	IWP	558	614	375	221	112	74	56	41	27	25	622	381	224	113	75	56	41	28	25	11.0	14.3	0.62	0.24	-34.8094884	149.9525700	
9.450	1	IWP	560	773	436	257	125	76	58	42	31	28	781	441	259	126	77	58	43	31	28	11.0	14.3	0.78	0.34	-34.8103200	149.9521317	
9.550	1	IWP	563	638	313	169	90	53	37	28	21	14	641	315	170	91	53	37	28	21	14	11.0	14.3	0.64	0.33	-34.8112100	149.9517700	
9.650	1	IWP	566	1273	886	660	382	246	169	119	73	52	1273	885	660	382	246	169	119	73	52	11.0	14.3	1.27	0.39	-34.8120633	149.9515667	
9.750	1	IWP	567	1174	711	554	304	175	124	79	57	38	1172	710	553	304	175	124	79	57	38	11.0	14.3	1.17	0.46	-34.8129283	149.9513767	
9.850	1	IWP	569	457	244	170	94	72	55	48	37	26	455	242	169	94	72	55	48	36	26	11.0	14.3	0.45	0.21	-34.8138083	149.9511717	
9.950	1	IWP	574	784	446	304	175	117	84	65	44	31	773	440	300	173	116	83	64	43	31	11.0	14.3	0.77	0.33	-34.8147033	149.9510033	
10.050	1	IWP	561	628	330	233	129	84	59	45	29	20	633	333	235	130	84	59	45	30	20	11.0	14.3	0.63	0.30	-34.8156067	149.9508917	
10.150	1	IWP	567	699	384	291	189	131	91	69	50	38	697	383	290	188	130	91	69	50	38	11.0	14.3	0.70	0.31	-34.8165550	149.9508600	
10.250	1	IWP	562	539	287	183	92	54	35	27	19	14	542	289	184	93	54	35	27	19	14	11.0	14.3	0.54	0.25	-34.8174067	149.9507300	
10.350	1	IWP	562	478	218	135	82	65	57	43	29	23	481	219	136	82	66	57	44	29	24	11.0	14.3	0.48	0.26	-34.8182983	149.9505750	
10.450	1	IWP	564	451	228	144	75	50	37	29	22	14	453	229	145	75	50	37	29	22	14	11.0	14.3	0.45	0.22	-34.8191883	149.9505650	
10.550	1	IWP	560	906	552	338	182	105	69	51	32	25	915	557	342	184	106	70	52	32	25	11.0	14.3	0.92	0.36	-34.8200700	149.9505417	
10.650	1	IWP	563	720	464	323	164	92	64	50	36	27	723	466	324	165	93	65	51	36	27	11.0	14.3	0.72	0.26	-34.8209467	149.9502633	
10.750	1	IWP	566	519	277	177	98	59	42	30	21	15	519	276	177	97	59	42	30	21	15	11.0	14.1	0.52	0.24	-34.8217800	149.9499300	
10.850	1	IWP	567	839	387	208	89	50	34	27	20	12	838	387	207	89	49	34	27	20	12	11.0	14.1	0.84	0.45	-34.8226034	149.9496700	
10.950	1	IWP	562	529	299	188	103	68	52	42	29	22	533	301	189	104	68	52	42	30	22	11.0	14.1	0.53	0.23	-34.8235650	149.9496533	
11.050	1	IWP	558	803	483	294	155	93	63	45	32	20	814	489	298	157	95	64	46	33	20	11.0	14.1	0.81	0.32	-34.8244600	149.9500317	
11.150	1	IWP	566	504	269	209	70	43	43	27	25	24	504	269	209	69	43	43	27	25	24	11.0	14.1	0.50	0.24	-34.8252883	149.9504283	
11.250	1	IWP	564	637	318	311	119	100	86	41	33	45	639	319	312	119	101	86	41	33	45	11.0	14.1	0.64	0.32	-34.8261383	149.9505100	ND
11.350	1	IWP	566	527	305	456	127	86	67	52	39	35	526	305	456	127	86	66	51	39	35	11.0	14.1	0.53	0.22	-34.8271267	149.9503066	ND
11.450	1	IWP	563	712	429	286	152	106	78	58	45	32	716	431	287	153	106	79	58	45	32	11.0	14.1	0.72	0.28	-34.8279233	149.9501567	
11.550	1	IWP	560	781	418	286	125	77	54	42	28	20	790	422	289	126	78	55	43	28	21	11.0	14.1	0.79	0.37	-34.8288583	149.9502800	

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Station (km)	Lane	Wheel Path	Peak Load (kPa)	Measured Deflection Results (μm) Distance from Load (mm)									Normalised Deflection Results (μm) Distance from Load (mm)									Temperature (°C)		FWD		GDA94		Local Comment
				0	200	300	450	600	750	900	1200	1500	0	200	300	450	600	750	900	1200	1500	Air	Surface	Defl.	Curv.	Latitude	Longitude	
11.650	1	IWP	565	725	452	287	139	78	54	44	25	16	727	453	287	139	78	54	44	25	16	11.0	14.1	0.73	0.27	-34.8296550	149.9507550	
11.750	1	IWP	559	574	298	227	96	54	44	34	28	28	581	302	229	97	54	44	35	28	28	11.0	14.1	0.58	0.28	-34.8302917	149.9515000	
11.850	1	IWP	564	668	412	315	138	92	67	54	35	24	670	414	316	138	92	68	54	36	24	11.0	14.1	0.67	0.26	-34.8308650	149.9523050	
11.950	1	IWP	561	759	526	408	253	168	127	106	73	54	766	531	411	256	169	128	107	74	54	11.0	14.1	0.77	0.24	-34.8315767	149.9530100	
12.050	1	IWP	566	954	538	383	238	156	114	84	57	47	953	538	382	238	156	113	84	57	47	11.0	14.1	0.95	0.42	-34.8324367	149.9533616	
12.150	1	IWP	567	811	542	379	219	144	101	81	57	43	809	541	378	219	144	101	81	57	43	11.0	14.1	0.81	0.27	-34.8333366	149.9534634	
12.250	1	IWP	567	798	424	302	205	148	113	85	58	42	796	423	302	204	148	113	85	57	42	11.0	14.1	0.80	0.37	-34.8341967	149.9535600	
12.350	1	IWP	568	958	593	413	265	174	130	110	77	61	955	590	411	264	174	130	110	77	60	11.0	14.1	0.95	0.36	-34.8350817	149.9536350	
12.450	1	IWP	564	958	637	393	225	140	86	62	53	42	961	639	395	226	140	86	62	53	42	11.0	14.1	0.96	0.32	-34.8359967	149.9536734	
12.550	1	IWP	567	639	377	231	146	111	82	54	33	26	637	377	230	146	110	82	54	33	26	11.0	14.1	0.64	0.26	-34.8368950	149.9536917	
12.650	1	IWP	568	576	273	141	90	72	50	38	30	21	574	272	140	89	72	50	38	29	21	11.0	14.1	0.57	0.30	-34.8377567	149.9534133	
12.750	1	IWP	566	1329	783	508	288	200	143	109	77	56	1329	783	508	288	200	143	109	77	56	11.0	14.1	1.33	0.55	-34.8384366	149.9527583	
12.850	1	IWP	565	734	380	260	167	129	107	88	65	48	735	381	261	167	129	107	88	65	48	11.0	14.1	0.74	0.35	-34.8391050	149.9520067	
12.950	1	IWP	562	625	365	233	117	78	58	49	40	31	629	368	235	118	79	58	49	40	31	11.0	14.1	0.63	0.26	-34.8398666	149.9513850	
13.050	1	IWP	558	609	354	244	194	146	104	80	49	38	618	359	248	196	148	106	81	49	38	11.0	14.1	0.62	0.26	-34.8406800	149.9510567	
13.150	1	IWP	558	600	314	195	111	83	66	56	40	28	608	319	197	112	84	67	56	40	28	11.0	14.1	0.61	0.29	-34.8415000	149.9506016	
13.250	1	IWP	565	675	347	190	107	79	61	56	38	27	676	347	190	107	79	61	56	38	27	11.0	14.1	0.68	0.33	-34.8421917	149.9498900	
13.350	1	IWP	572	967	662	435	285	188	137	106	67	49	957	655	430	282	186	135	104	66	48	11.0	14.1	0.96	0.30	-34.8428317	149.9491734	
13.450	1	IWP	566	1282	698	264	147	143	142	129	81	55	1282	698	264	147	143	142	129	81	55	11.0	14.1	1.28	0.58	-34.8435483	149.9484166	
13.550	1	IWP	559	644	404	246	116	64	50	42	36	29	652	409	249	118	65	51	42	36	29	11.0	14.1	0.65	0.24	-34.8442183	149.9476950	
13.650	1	IWP	565	819	606	423	243	157	112	83	57	39	820	607	424	243	157	112	83	57	39	11.0	14.1	0.82	0.21	-34.8448850	149.9469833	
13.750	1	IWP	567	802	429	274	166	127	88	66	50	43	800	428	273	165	127	88	65	50	43	11.0	14.1	0.80	0.37	-34.8455950	149.9462967	
13.850	1	IWP	559	946	484	303	188	117	75	56	41	25	958	490	307	191	118	76	56	41	25	11.0	14.1	0.96	0.47	-34.8464200	149.9458684	
13.950	1	IWP	563	1568	989	649	408	250	174	134	86	58	1576	994	652	410	251	174	135	87	59	11.0	14.1	1.58	0.58	-34.8472600	149.9454533	
14.050	1	IWP	565	863	602	402	214	131	95	78	52	36	864	603	402	214	131	95	79	52	36	11.0	14.1	0.86	0.26	-34.8478683	149.9451300	
14.150	1	IWP	568	676	400	279	161	107	66	45	32	20	674	398	278	161	106	66	45	32	20	11.0	14.1	0.67	0.28	-34.8488583	149.9445600	
14.250	1	IWP	574	573	255	160	97	81	67	50	38	32	564	252	158	95	80	66	49	38	31	11.0	14.1	0.56	0.31	-34.8496616	149.9440383	
14.350	1	IWP	566	823	477	326	170	109	82	67	45	36	823	477	326	169	109	82	67	45	36	11.0	14.1	0.82	0.35	-34.8501850	149.9432083	
14.450	1	IWP	569	826	448	268	174	119	84	58	41	25	821	445	266	173	118	84	58	41	25	11.0	14.1	0.82	0.38	-34.8507783	149.9423484	
14.550	1	IWP	582	620	420	201	114	85	52	44	29	20	603	409	195	111	82	51	42	28	19	11.0	14.1	0.60	0.19	-34.8515733	149.9419200	

Average	10.8	14.2	0.76	0.33
Standard Deviation	0.4	0.1	0.22	0.09
10th Percentile			0.51	0.22
90th Percentile			1.02	0.45

Survey Notes

1 Acronyms:IWP - Inner Wheel Path of the tested lane, ND - Non Decreasing deflection bowl, RT - Retested owing to poor deflection bowl.

2 Lane 1 is in the prescribed direction whilst lane 2 is in the counter direction and all station values presented are increasing in the direction of lane 1 (prescribed lane).

3 Where negative curvature values occur as a result of Non-Decreasing deflection bowl data, they have been set to 0.00mm

4 IWP results were measured within the existing central pavement of the lane tested.

Prepared By:

James Erskine
Senior Pavement Engineer
25-Sep-18

Reviewed By:

James Erskine
Senior Pavement Engineer
25-Sep-18

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

FWD/HWD Structural Test Report - Deflection Results

Test Method: QT211
Testing Date: 1/06/2018
Operator: John Muir
Test Equipment: FWD-016
Target Load (kN): 40
Smoothing: No
Client: Multiquip Quarries
Job No: 2017152
Report No: DR2017152-3
Client Section ID: 1A2_IWP

Jerrara Road
from Mountain Ash Road to South Marulan Road

Road Id: 1
Lane: 2
Block: A

Station (km)	Lane	Wheel Path	Peak Load (kPa)	Measured Deflection Results (µm) Distance from Load (mm) 0	200	300	450	600	750	900	1200	1500	Normalised Deflection Results (µm) Distance from Load (mm) 0	200	300	450	600	750	900	1200	1500	Temperature (°C) Air	Surface	FWD Defl.	Curv.	GDA94 Latitude	Longitude	Local Comment
0.175	2	IWP	566	864	552	333	156	49	4	2	14	13	864	551	333	156	48	4	2	14	13	8.0	10.3	0.86	0.31	-34.7321166	149.9802134	ND
0.275	2	IWP	566	639	383	223	127	75	49	37	25	16	638	383	223	127	75	49	37	25	16	8.0	10.3	0.64	0.26	-34.7329217	149.9797084	
0.375	2	IWP	561	561	356	248	159	107	71	47	31	28	566	359	250	160	108	72	48	31	28	8.0	10.3	0.57	0.21	-34.7337517	149.9792133	
0.475	2	IWP	570	1097	732	403	206	138	104	75	48	27	1089	726	400	204	137	103	74	48	27	8.0	10.3	1.09	0.36	-34.7345317	149.9787667	
0.575	2	IWP	563	586	310	171	81	49	33	26	21	14	589	312	172	81	50	33	26	21	14	8.0	10.3	0.59	0.28	-34.7353816	149.9782900	
0.675	2	IWP	562	834	601	375	159	70	44	37	22	13	840	605	378	160	70	44	37	22	13	8.0	10.3	0.84	0.24	-34.7361350	149.9779566	
0.775	2	IWP	562	424	231	108	39	24	19	16	13	10	427	233	109	39	24	19	16	13	10	8.0	10.3	0.43	0.19	-34.7370733	149.9775950	
0.875	2	IWP	561	671	406	227	115	72	53	34	19	12	677	410	229	116	73	54	34	19	12	8.0	10.3	0.68	0.27	-34.7379300	149.9772517	
0.975	2	IWP	564	830	499	311	180	109	72	52	28	18	833	501	312	181	110	72	52	28	18	8.0	10.3	0.83	0.33	-34.7387634	149.9769567	
1.075	2	IWP	569	642	388	219	119	71	47	34	26	14	638	386	217	118	71	47	33	26	14	8.0	10.3	0.64	0.25	-34.7396500	149.9766367	
1.175	2	IWP	568	782	445	263	157	108	86	69	51	37	779	443	262	157	107	86	68	51	37	8.0	10.3	0.78	0.34	-34.7404883	149.9764067	
1.275	2	IWP	558	983	627	448	291	194	131	88	48	39	997	635	455	295	197	133	89	48	40	8.0	10.3	1.00	0.36	-34.7413800	149.9762450	
1.375	2	IWP	560	1074	622	393	176	85	45	36	29	27	1085	628	397	178	86	46	36	29	28	8.0	10.3	1.09	0.46	-34.7422583	149.9762117	
1.475	2	IWP	562	876	555	333	166	103	74	60	46	35	882	559	335	167	104	75	60	46	35	8.0	10.3	0.88	0.32	-34.7432117	149.9762267	
1.575	2	IWP	560	840	540	330	169	110	77	55	39	25	849	545	334	171	111	78	55	39	26	8.0	10.3	0.85	0.30	-34.7441350	149.9762400	
1.675	2	IWP	564	726	505	334	175	119	89	70	51	38	728	507	336	176	120	89	71	52	38	8.0	10.3	0.73	0.22	-34.7449583	149.9762733	
1.775	2	IWP	566	862	569	376	205	142	109	85	58	40	862	569	376	205	142	109	85	58	40	8.0	10.3	0.86	0.29	-34.7458883	149.9762884	
1.875	2	IWP	560	774	473	306	160	98	67	45	27	17	782	477	309	162	99	67	45	27	17	8.0	10.3	0.78	0.30	-34.7467634	149.9763150	
1.975	2	IWP	567	573	272	147	71	48	36	29	21	17	572	271	147	71	48	36	29	21	16	8.0	10.3	0.57	0.30	-34.7476450	149.9763267	

Station (km)	Lane	Wheel Path	Peak Load (kPa)	Measured Deflection Results (μm) Distance from Load (mm)									Normalised Deflection Results (μm) Distance from Load (mm)									Temperature (°C)		FWD		GDA94		Local Comment
				0	200	300	450	600	750	900	1200	1500	0	200	300	450	600	750	900	1200	1500	Air	Surface	Defl.	Curv.	Latitude	Longitude	
2.075	2	IWP	566	493	297	189	116	71	48	31	20	11	493	297	189	116	70	48	31	20	11	8.0	10.3	0.49	0.20	-34.7485817	149.9761333	
2.175	2	IWP	557	784	493	269	141	87	61	51	39	30	797	500	273	144	88	62	51	39	30	8.0	10.3	0.80	0.30	-34.7493284	149.9756184	
2.275	2	IWP	569	383	153	68	35	18	12	8	6	4	381	152	68	35	18	12	7	6	4	8.0	10.3	0.38	0.23	-34.7500183	149.9748866	
2.375	2	IWP	569	651	436	273	175	119	79	59	36	25	647	434	272	174	119	78	58	36	25	8.0	10.3	0.65	0.21	-34.7506800	149.9741433	
2.475	2	IWP	562	661	318	163	79	57	43	30	19	16	665	320	164	80	57	43	30	20	16	8.0	10.3	0.66	0.35	-34.7513600	149.9734716	
2.575	2	IWP	563	1083	512	262	108	66	45	33	22	13	1088	515	263	108	67	46	33	22	13	8.0	10.3	1.09	0.57	-34.7521734	149.9727967	
2.675	2	IWP	567	630	356	204	91	48	36	30	25	21	629	355	204	91	48	36	30	25	21	8.0	10.3	0.63	0.27	-34.7529450	149.9722317	
2.775	2	IWP	566	741	441	291	162	102	76	59	41	33	740	441	290	162	102	76	59	41	33	8.0	10.3	0.74	0.30	-34.7536883	149.9716433	
2.875	2	IWP	562	715	367	205	73	34	27	23	16	12	720	370	207	73	34	27	23	16	12	8.0	10.3	0.72	0.35	-34.7544733	149.9710667	
2.975	2	IWP	563	756	435	242	105	53	35	30	25	20	760	437	243	106	53	35	30	26	20	8.0	10.3	0.76	0.32	-34.7552633	149.9706167	
3.075	2	IWP	562	698	403	248	118	62	38	29	28	20	703	406	249	119	62	38	29	28	20	8.0	10.3	0.70	0.30	-34.7561167	149.9702117	
3.175	2	IWP	566	988	521	298	160	98	70	55	43	36	987	520	298	160	98	70	55	43	36	8.0	10.3	0.99	0.47	-34.7569167	149.9698584	
3.275	2	IWP	571	627	287	162	92	61	46	37	30	24	622	284	161	92	60	45	37	30	24	8.0	10.3	0.62	0.34	-34.7577800	149.9694883	
3.375	2	IWP	571	527	287	177	99	70	56	46	34	26	523	284	176	98	69	56	45	34	26	8.0	10.3	0.52	0.24	-34.7586217	149.9691733	New Pavement
3.475	2	IWP	571	1053	679	477	309	203	137	96	57	42	1043	673	472	307	201	135	95	56	42	8.0	10.3	1.04	0.37	-34.7595200	149.9689583	New Pavement
3.575	2	IWP	561	941	551	293	172	124	97	78	61	48	949	556	296	174	125	97	78	62	48	8.0	10.3	0.95	0.39	-34.7604266	149.9688084	
3.675	2	IWP	562	653	416	271	148	90	64	50	36	27	658	419	273	149	91	64	50	36	27	8.0	10.3	0.66	0.24	-34.7613250	149.9686500	
3.775	2	IWP	559	544	237	105	43	20	16	15	10	8	550	239	106	44	20	16	15	10	8	8.0	10.3	0.55	0.31	-34.7622017	149.9685033	
3.875	2	IWP	567	491	275	159	81	46	27	18	13	10	490	274	158	81	46	27	18	13	10	8.0	10.3	0.49	0.22	-34.7630833	149.9682517	
3.975	2	IWP	560	402	222	160	97	66	50	38	30	25	406	225	161	98	66	50	38	30	25	8.0	10.3	0.41	0.18	-34.7639016	149.9679500	
4.075	2	IWP	562	681	450	264	142	86	62	52	38	23	685	453	266	143	86	63	52	38	23	8.0	9.2	0.69	0.23	-34.7647584	149.9675884	
4.175	2	IWP	571	242	146	74	42	30	25	20	16	12	240	145	74	41	30	24	19	16	12	8.0	9.2	0.24	0.10	-34.7656000	149.9672300	
4.275	2	IWP	563	594	322	185	101	62	41	32	24	20	597	323	186	102	62	42	32	24	20	8.0	9.2	0.60	0.27	-34.7664283	149.9668450	
4.375	2	IWP	566	397	186	106	67	51	45	35	27	18	397	186	106	67	50	45	35	27	18	8.0	9.2	0.40	0.21	-34.7672784	149.9664600	
4.475	2	IWP	560	1017	653	396	250	164	117	87	49	32	1028	660	400	252	166	118	88	49	32	8.0	9.2	1.03	0.37	-34.7681267	149.9660933	
4.575	2	IWP	563	784	528	345	191	123	79	57	18	9	788	531	347	192	123	80	57	18	9	8.0	9.2	0.79	0.26	-34.7690150	149.9658450	
4.675	2	IWP	566	424	264	166	92	55	22	9	7	5	424	264	166	92	55	22	8	6	4	8.0	9.2	0.42	0.16	-34.7698833	149.9657617	
4.775	2	IWP	557	958	610	409	228	148	101	65	32	14	973	620	416	231	151	103	66	32	14	8.0	9.2	0.97	0.35	-34.7708150	149.9654966	
4.875	2	IWP	551	934	386	233	150	111	84	64	39	25	959	397	240	154	114	86	66	40	26	8.0	9.2	0.96	0.56	-34.7716084	149.9650533	
4.975	2	IWP	569	669	261	156	85	53	36	26	16	11	665	259	155	84	53	36	26	16	11	8.0	9.2	0.67	0.41	-34.7724500	149.9645933	
5.075	2	IWP	570	767	459	291	165	110	84	65	45	35	761	455	288	164	109	83	64	45	35	8.0	9.2	0.76	0.31	-34.7732867	149.9641950	
5.175	2	IWP	567	697	389	272	168	111	83	63	43	30	695	389	272	168	111	83	63	43	30	8.0	9.2	0.69	0.31	-34.7741383	149.9638083	

Station (km)	Lane	Wheel Path	Peak Load (kPa)	Measured Deflection Results (μm) Distance from Load (mm)									Normalised Deflection Results (μm) Distance from Load (mm)									Temperature (°C)		FWD		GDA94		Local Comment
				0	200	300	450	600	750	900	1200	1500	0	200	300	450	600	750	900	1200	1500	Air	Surface	Defl.	Curv.	Latitude	Longitude	
5.275	2	IWP	567	660	413	363	147	94	60	36	9	5	658	412	363	147	93	59	36	9	5	8.0	9.2	0.66	0.25	-34.7749850	149.9635050	
5.375	2	IWP	561	1018	650	327	211	98	47	31	22	14	1027	655	330	213	99	47	32	22	14	8.0	9.2	1.03	0.37	-34.7758266	149.9630433	
5.475	2	IWP	568	569	418	258	146	94	61	43	14	13	567	417	257	146	93	60	42	14	13	8.0	9.2	0.57	0.15	-34.7766217	149.9625584	
5.575	2	IWP	558	462	244	145	82	47	33	24	18	10	469	248	147	83	48	34	25	18	10	8.0	9.2	0.47	0.22	-34.7773834	149.9620767	
5.675	2	IWP	565	863	548	344	179	98	57	41	25	24	864	548	345	179	98	57	41	25	24	8.0	9.2	0.86	0.32	-34.7781783	149.9615733	
5.775	2	IWP	565	776	453	309	185	80	50	40	28	19	777	454	309	185	80	50	40	28	19	8.0	9.2	0.78	0.32	-34.7789467	149.9611150	
5.875	2	IWP	557	844	437	247	102	64	46	34	21	13	857	444	251	103	65	46	35	22	14	8.0	9.2	0.86	0.41	-34.7798400	149.9608833	
5.975	2	IWP	558	820	462	260	115	66	48	36	26	16	831	469	264	116	67	49	36	26	16	8.0	9.2	0.83	0.36	-34.7806900	149.9612684	
6.075	2	IWP	563	1337	790	372	257	162	104	76	48	33	1343	794	374	258	163	104	77	48	33	8.0	9.2	1.34	0.55	-34.7815267	149.9616283	
6.175	2	IWP	569	968	656	418	207	126	86	63	53	43	963	652	416	206	126	85	62	52	43	8.0	9.2	0.96	0.31	-34.7824050	149.9615917	
6.275	2	IWP	560	764	491	296	143	86	66	52	38	30	772	496	299	145	87	67	52	38	30	8.0	9.2	0.77	0.28	-34.7833017	149.9613133	
6.375	2	IWP	568	742	471	302	189	109	72	50	34	21	740	469	301	189	108	71	50	34	21	8.0	9.2	0.74	0.27	-34.7841216	149.9609584	
6.475	2	IWP	564	806	589	369	202	135	102	71	43	35	809	591	370	203	135	102	71	43	35	8.0	9.2	0.81	0.22	-34.7849667	149.9605150	
6.575	2	IWP	565	492	268	183	100	53	35	24	17	11	493	268	183	101	53	35	24	17	11	8.0	9.2	0.49	0.23	-34.7858117	149.9600550	
6.675	2	IWP	563	330	102	35	10	6	6	4	3	1	332	102	35	10	6	6	4	3	1	8.0	9.2	0.33	0.23	-34.7866217	149.9596400	
6.775	2	IWP	565	914	462	289	135	77	50	33	23	18	915	463	289	136	78	50	33	23	18	8.0	9.2	0.91	0.45	-34.7874700	149.9592433	
6.875	2	IWP	563	1088	642	395	232	144	93	63	38	24	1094	645	397	233	144	93	64	38	25	8.0	8.4	1.09	0.45	-34.7883400	149.9589000	
6.975	2	IWP	565	576	301	210	129	81	57	45	30	20	577	301	211	129	81	57	45	30	20	8.0	8.4	0.58	0.28	-34.7891834	149.9586133	
7.075	2	IWP	566	1375	927	622	319	171	98	58	34	24	1375	927	621	319	171	98	58	34	24	8.0	8.4	1.38	0.45	-34.7900650	149.9583567	
7.175	2	IWP	564	686	449	302	206	153	113	84	35	15	689	450	303	207	153	114	84	36	15	8.0	8.4	0.69	0.24	-34.7909267	149.9581767	
7.275	2	IWP	562	925	563	364	218	146	103	80	62	47	932	567	367	220	147	103	81	63	48	8.0	8.4	0.93	0.36	-34.7918083	149.9579767	
7.375	2	IWP	563	410	226	143	91	60	43	30	22	14	412	227	144	91	60	43	30	22	14	8.0	8.4	0.41	0.19	-34.7926716	149.9577916	
7.475	2	IWP	577	89	53	41	33	28	24	22	21	6	87	52	40	32	27	24	22	20	6	8.0	8.4	0.09	0.03	-34.7935534	149.9577766	
7.575	2	IWP	564	651	437	282	152	94	75	56	40	31	654	439	283	152	94	75	57	41	31	8.0	8.4	0.65	0.22	-34.7944833	149.9576916	
7.675	2	IWP	566	423	234	122	67	44	30	19	11	7	423	234	121	67	44	30	19	11	7	8.0	8.4	0.42	0.19	-34.7953400	149.9572884	
7.775	2	IWP	567	519	309	198	110	65	47	38	31	20	518	309	198	109	65	47	38	31	19	8.0	8.4	0.52	0.21	-34.7961217	149.9568800	
7.875	2	IWP	567	892	610	387	212	106	90	71	48	30	891	609	386	211	105	89	71	48	30	8.0	8.4	0.89	0.28	-34.7969467	149.9564550	
7.975	2	IWP	560	668	369	202	94	43	31	27	23	20	675	373	204	95	44	32	27	23	20	8.0	8.4	0.68	0.30	-34.7978500	149.9562167	
8.075	2	IWP	567	550	408	269	171	121	91	75	51	36	549	407	269	171	121	91	74	50	36	8.0	8.4	0.55	0.14	-34.7987250	149.9560450	
8.175	2	IWP	565	502	296	205	124	80	65	49	37	28	503	296	205	125	80	65	49	37	28	8.0	8.4	0.50	0.21	-34.7996650	149.9559083	
8.275	2	IWP	568	675	379	233	127	83	61	48	34	24	672	377	232	127	83	60	47	33	24	8.0	8.4	0.67	0.29	-34.8005533	149.9559683	
8.375	2	IWP	563	1561	1173	917	566	392	284	228	138	70	1569	1179	921	569	394	286	229	138	70	8.0	8.4	1.57	0.39	-34.8013900	149.9562133	

Station (km)	Lane	Wheel Path	Peak Load (kPa)	Measured Deflection Results (µm) Distance from Load (mm)									Normalised Deflection Results (µm) Distance from Load (mm)									Temperature (°C)		FWD		GDA94		Local Comment
				0	200	300	450	600	750	900	1200	1500	0	200	300	450	600	750	900	1200	1500	Air	Surface	Defl.	Curv.	Latitude	Longitude	
8.475	2	IWP	555	567	356	225	127	84	66	54	42	31	578	363	229	129	86	67	55	43	31	8.0	8.4	0.58	0.22	-34.8023033	149.9562433	
8.575	2	IWP	564	780	560	360	187	116	98	86	65	50	783	562	361	187	116	98	87	66	50	8.0	8.4	0.78	0.22	-34.8031800	149.9559883	
8.675	2	IWP	565	521	328	240	134	29	23	21	17	15	522	329	240	134	29	23	21	17	15	8.0	8.4	0.52	0.19	-34.8040117	149.9557133	
8.775	2	IWP	564	1230	919	712	465	318	209	149	89	63	1234	922	714	467	319	210	149	89	63	8.0	7.9	1.24	0.31	-34.8048700	149.9553717	
8.875	2	IWP	567	807	522	353	204	129	92	59	41	31	806	521	352	203	128	92	59	41	31	8.0	7.9	0.81	0.28	-34.8057250	149.9549517	
8.975	2	IWP	566	1191	612	385	226	146	111	95	67	50	1191	611	385	225	145	111	95	67	50	8.0	7.9	1.19	0.58	-34.8065566	149.9545400	
9.075	2	IWP	564	1011	590	353	188	114	75	54	40	32	1014	592	354	188	114	75	54	40	32	8.0	7.9	1.01	0.42	-34.8072967	149.9539950	
9.175	2	IWP	563	908	625	418	244	153	95	61	31	17	912	628	420	245	153	95	62	31	17	8.0	7.9	0.91	0.28	-34.8080667	149.9533983	
9.275	2	IWP	565	757	453	302	186	127	91	75	49	37	758	453	303	187	127	91	75	49	37	8.0	7.9	0.76	0.30	-34.8088483	149.9528967	
9.375	2	IWP	567	650	415	265	158	107	71	48	31	21	649	414	264	158	107	71	48	31	21	8.0	7.9	0.65	0.23	-34.8096733	149.9524483	
9.475	2	IWP	569	517	311	203	124	88	66	49	27	19	515	309	202	123	88	66	48	27	19	8.0	7.5	0.52	0.21	-34.8105400	149.9520267	
9.575	2	IWP	569	699	319	194	120	76	55	43	33	27	695	317	193	120	76	55	43	33	26	8.0	7.5	0.69	0.38	-34.8113850	149.9516816	
9.675	2	IWP	565	694	569	402	225	129	83	61	42	32	695	570	403	226	129	84	61	42	32	8.0	7.5	0.70	0.13	-34.8122700	149.9515100	
9.775	2	IWP	572	352	195	128	77	53	42	34	25	18	348	193	126	76	52	42	33	24	18	7.5	6.0	0.35	0.15	-34.8132117	149.9512733	
9.875	2	IWP	574	425	231	151	88	58	43	32	21	16	418	227	149	86	57	42	32	21	16	7.5	6.0	0.42	0.19	-34.8140650	149.9511066	
9.975	2	IWP	557	643	388	302	136	94	70	55	38	29	653	394	307	138	95	71	56	39	29	7.5	6.0	0.65	0.26	-34.8149650	149.9509333	
10.075	2	IWP	567	499	321	218	123	85	63	51	36	29	498	321	218	123	85	63	51	36	29	7.5	6.0	0.50	0.18	-34.8158717	149.9508517	
10.175	2	IWP	564	530	317	219	116	74	49	32	14	9	532	318	220	116	74	49	32	14	9	7.5	6.0	0.53	0.21	-34.8167650	149.9508317	
10.275	2	IWP	570	697	428	284	147	78	49	36	26	18	692	425	282	146	77	49	35	26	17	7.5	6.0	0.69	0.27	-34.8176383	149.9506367	
10.375	2	IWP	560	535	278	155	70	47	38	32	25	19	541	281	157	70	48	38	32	25	19	7.5	6.0	0.54	0.26	-34.8185550	149.9505367	
10.475	2	IWP	568	745	448	282	137	80	56	46	37	19	742	446	281	137	80	56	46	37	19	7.5	6.0	0.74	0.30	-34.8194400	149.9505367	
10.575	2	IWP	562	1021	645	405	192	90	48	34	22	15	1028	650	408	193	91	49	34	22	15	7.5	6.0	1.03	0.38	-34.8203350	149.9504500	
10.675	2	IWP	558	574	343	215	113	72	54	42	34	26	582	348	218	114	73	54	43	35	26	7.5	6.0	0.58	0.23	-34.8212016	149.9501350	
10.775	2	IWP	560	795	493	333	156	97	67	48	31	21	803	498	336	157	98	67	48	32	21	7.5	6.0	0.80	0.30	-34.8220633	149.9498083	
10.875	2	IWP	565	741	479	340	166	104	75	54	38	28	742	480	341	166	104	75	54	38	28	7.5	6.0	0.74	0.26	-34.8229517	149.9495867	
10.975	2	IWP	580	327	273	206	69	42	34	30	24	16	319	267	200	68	41	33	29	23	16	7.5	6.0	0.32	0.05	-34.8238600	149.9497017	
11.075	2	IWP	576	372	187	119	73	45	27	17	11	8	365	184	117	71	45	27	17	11	8	7.5	6.0	0.36	0.18	-34.8246533	149.9501083	
11.175	2	IWP	565	955	614	450	293	198	150	110	77	59	956	615	451	293	198	150	110	77	59	7.5	6.0	0.96	0.34	-34.8254533	149.9504383	
11.275	2	IWP	581	411	227	97	42	29	22	17	13	10	400	221	94	41	28	22	17	13	10	7.5	6.0	0.40	0.18	-34.8263700	149.9504583	
11.375	2	IWP	578	329	223	144	83	62	53	49	42	29	322	219	141	81	61	52	48	41	28	7.5	6.0	0.32	0.10	-34.8272767	149.9502450	
11.475	2	IWP	560	616	411	292	181	123	83	57	36	25	623	415	295	183	124	84	58	36	25	7.5	6.0	0.62	0.21	-34.8282084	149.9501217	
11.575	2	IWP	560	782	514	351	193	121	82	66	52	34	791	519	354	195	122	83	67	52	35	7.5	6.0	0.79	0.27	-34.8290517	149.9503317	

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Station (km)	Lane	Wheel Path	Peak Load (kPa)	Measured Deflection Results (µm) Distance from Load (mm)									Normalised Deflection Results (µm) Distance from Load (mm)									Temperature (°C)		FWD		GDA94		Local Comment
				0	200	300	450	600	750	900	1200	1500	0	200	300	450	600	750	900	1200	1500	Air	Surface	Defl.	Curv.	Latitude	Longitude	
11.675	2	IWP	564	633	408	247	141	92	63	48	37	26	635	409	248	141	92	63	48	38	26	7.5	6.0	0.64	0.23	-34.8298466	149.9509050	
11.775	2	IWP	564	476	287	185	102	70	51	41	30	20	478	287	185	102	70	51	41	30	20	7.5	6.0	0.48	0.19	-34.8304450	149.9516534	
11.875	2	IWP	562	753	390	243	128	95	82	62	41	34	758	392	245	129	96	83	63	41	34	7.5	6.0	0.76	0.37	-34.8310383	149.9524967	
11.975	2	IWP	567	1050	764	548	353	251	190	152	100	73	1048	763	547	352	251	189	152	100	73	7.5	6.0	1.05	0.29	-34.8317666	149.9530984	
12.075	2	IWP	570	1258	821	519	288	173	114	82	51	39	1249	815	515	286	171	113	82	51	39	7.5	6.0	1.25	0.43	-34.8326084	149.9533583	
12.175	2	IWP	569	727	473	309	183	123	89	68	48	35	723	470	308	182	123	88	68	47	35	7.5	6.0	0.72	0.25	-34.8335750	149.9534616	
12.275	2	IWP	567	747	515	356	218	149	111	84	61	44	746	514	355	218	148	110	83	61	44	7.5	6.0	0.75	0.23	-34.8344433	149.9535483	
12.375	2	IWP	566	1328	907	686	353	207	140	106	70	46	1328	907	686	352	207	140	106	70	46	7.5	6.0	1.33	0.42	-34.8353566	149.9536283	
12.475	2	IWP	578	636	411	232	96	57	44	36	18	16	623	402	227	94	56	43	35	18	16	7.5	6.0	0.62	0.22	-34.8362350	149.9536533	
12.575	2	IWP	568	698	412	243	129	87	65	50	27	21	695	411	242	128	87	65	49	27	21	7.5	6.0	0.70	0.28	-34.8371234	149.9536517	
12.675	2	IWP	569	752	452	265	165	135	111	91	68	51	748	450	264	164	134	110	90	67	51	7.5	6.0	0.75	0.30	-34.8379383	149.9532283	
12.775	2	IWP	564	1417	963	644	413	290	219	170	116	83	1421	966	646	414	291	219	170	117	83	7.5	6.0	1.42	0.46	-34.8386167	149.9525283	
12.875	2	IWP	565	1116	633	386	182	108	76	62	48	40	1118	634	386	183	108	76	62	48	40	7.5	6.0	1.12	0.48	-34.8393000	149.9517717	
12.975	2	IWP	564	1094	513	303	143	82	51	36	27	22	1098	515	304	143	82	51	36	27	22	7.5	6.0	1.10	0.58	-34.8400550	149.9512733	
13.075	2	IWP	568	904	490	353	220	153	119	94	66	57	901	488	351	219	153	118	94	65	57	7.5	6.0	0.90	0.41	-34.8409334	149.9509333	
13.175	2	IWP	573	875	445	286	150	95	75	57	46	35	864	439	282	149	94	74	56	45	34	6.2	5.0	0.86	0.42	-34.8416867	149.9503717	
13.275	2	IWP	584	595	338	262	120	80	64	53	39	34	576	328	254	116	77	62	51	38	33	6.2	5.0	0.58	0.25	-34.8423700	149.9496750	
13.375	2	IWP	586	624	384	246	124	73	66	60	47	33	602	371	238	120	71	64	58	45	32	6.2	5.0	0.60	0.23	-34.8430400	149.9489383	
13.475	2	IWP	564	1675	1058	712	391	240	163	126	95	75	1681	1061	714	392	241	163	126	96	75	6.2	5.0	1.68	0.62	-34.8437750	149.9481450	
13.575	2	IWP	564	1610	1133	820	485	278	154	126	82	54	1615	1137	823	486	279	155	126	82	55	6.2	5.0	1.61	0.48	-34.8444516	149.9474250	
13.675	2	IWP	601	541	387	269	149	98	66	46	30	20	510	365	253	140	92	62	43	29	19	6.2	5.0	0.51	0.14	-34.8451384	149.9466900	RT
13.775	2	IWP	578	967	507	316	164	105	76	60	49	37	947	496	309	161	103	74	58	48	36	6.2	5.0	0.95	0.45	-34.8458600	149.9461067	
13.875	2	IWP	565	2086	1505	1089	604	327	215	148	84	57	2089	1507	1091	604	328	215	148	85	57	6.2	5.0	2.09	0.58	-34.8466583	149.9457317	
13.975	2	IWP	561	1050	684	424	243	160	112	86	56	40	1059	690	427	245	162	113	87	57	40	6.2	5.0	1.06	0.37	-34.8475167	149.9452883	
14.075	2	IWP	571	953	558	354	188	126	93	74	53	43	945	553	351	186	125	92	73	53	43	6.2	5.0	0.95	0.39	-34.8483650	149.9448150	
14.175	2	IWP	588	626	314	198	113	71	47	36	27	19	603	302	191	109	68	45	34	26	18	6.2	5.0	0.60	0.30	-34.8491633	149.9443433	
14.275	2	IWP	568	951	487	290	126	75	50	52	31	31	947	485	289	125	75	50	51	31	31	6.2	5.0	0.95	0.46	-34.8498884	149.9437317	ND
14.375	2	IWP	596	600	382	225	135	94	69	49	30	20	569	363	213	128	89	66	47	28	19	6.2	5.0	0.57	0.21	-34.8503733	149.9428350	RT
14.475	2	IWP	591	878	593	394	208	130	96	66	40	28	841	568	377	199	124	92	64	38	27	6.2	5.0	0.84	0.27	-34.8510183	149.9421100	RT
14.575	2	IWP	620	634	318	186	127	88	62	39	28	23	579	290	169	116	81	56	35	26	21	6.2	5.0	0.58	0.29	-34.8518983	149.9418233	RT

Average				7.7	8.1	0.76	0.30
Standard Deviation				0.6	1.9	0.29	0.11
10th Percentile						0.42	0.19
90th Percentile						1.09	0.45

Survey Notes

1 Acronyms:IWP - Inner Wheel Path of the tested lane, ND - Non Decreasing deflection bowl, RT - Retested owing to poor deflection bowl.

2 Lane 1 is in the prescribed direction whilst lane 2 is in the counter direction and all station values presented are increasing in the direction of lane 1 (prescribed lane).

3 Where negative curvature values occur as a result of Non-Decreasing deflection bowl data, they have been set to 0.00mm

4 IWP results were measured within the existing central pavement of the lane tested.

Prepared By:

James Erskine
Senior Pavement Engineer
25-Sep-18

Reviewed By:

James Erskine
Senior Pavement Engineer
25-Sep-18

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

FWD/HWD Structural Test Report - Deflection Results

Test Method: QT211
Testing Date: 30/05/2018
Operator: John Muir
Test Equipment: FWD-016
Target Load (kN): 40
Smoothing: No
Client: Multiquip Quarries
Job No: 2017152
Report No: DR2017152-3
Client Section ID: 2A1_IWP

Mountain Ash Road
from Jerrara Road to Bungonia Bypass

Road Id: 2
Lane: 1
Block: A

Station (km)	Lane	Wheel Path	Peak Load (kPa)	Measured Deflection Results (µm) Distance from Load (mm) 0	200	300	450	600	750	900	1200	1500	Normalised Deflection Results (µm) Distance from Load (mm) 0	200	300	450	600	750	900	1200	1500	Temperature (°C) Air	Surface	FWD Defl.	Curv.	GDA94 Latitude	Longitude	Local Comment
14.650	1	IWP	568	800	509	330	182	112	75	54	34	27	797	507	329	182	112	75	54	34	27	13.0	14.8	0.80	0.29	-34.8520683	149.9411900	
14.750	1	IWP	569	518	285	190	107	70	48	34	21	16	515	284	189	106	70	47	34	21	16	13.0	14.8	0.51	0.23	-34.8515116	149.9404133	
Average																						13.0	14.8	0.66	0.26			
Standard Deviation																						0.0	0.0	0.21	0.04			
10th Percentile																								0.54	0.24			
90th Percentile																								0.77	0.28			

Survey Notes

1 Acronyms:IWP - Inner Wheel Path of the tested lane, ND - Non Decreasing deflection bowl, RT - Retested owing to poor deflection bowl.
2 Lane 1 is in the prescribed direction whilst lane 2 is in the counter direction and all station values presented are increasing in the direction of lane 1 (prescribed lane).
3 Where negative curvature values occur as a result of Non-Decreasing deflection bowl data, they have been set to 0.00mm
4 IWP results were measured within the existing central pavement of the lane tested.

Prepared By:
James Erskine
Senior Pavement Engineer
25-Sep-18

Reviewed By:
James Erskine
Senior Pavement Engineer
25-Sep-18

Pavement Management Services

Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

FWD/HWD Structural Test Report - Deflection Results

Test Method: QT211
Testing Date: 30/05/2018
Operator: John Muir
Test Equipment: FWD-016

Target Load (kN): 40
Smoothing: No

Client: Multiquip Quarries
Job No: 2017152
Report No: DR2017152-3
Client Section ID: 2A2_IWP

Mountain Ash Road
from Bungonia Bypass to Jerrara Road

Road Id: 2
Lane: 2
Block: A

Station (km)	Lane	Wheel Path	Peak Load (kPa)	Measured Deflection Results (µm) Distance from Load (mm) 0	200	300	450	600	750	900	1200	1500	Normalised Deflection Results (µm) Distance from Load (mm) 0	200	300	450	600	750	900	1200	1500	Temperature (°C) Air	Surface	FWD Defl.	Curv.	GDA94 Latitude	Longitude	Local Comment
14.675	2	IWP	561	633	422	313	165	100	67	49	35	23	639	425	316	166	100	68	49	35	24	13.0	14.8	0.64	0.21	-34.8519167	149.9410150	
14.775	2	IWP	577	592	291	173	87	56	41	33	25	19	580	285	169	85	55	41	33	24	18	13.0	14.8	0.58	0.29	-34.8513483	149.9402000	
Average																						13.0	14.8	0.61	0.25			
Standard Deviation																						0.0	0.0	0.04	0.06			
10th Percentile																								0.59	0.22			
90th Percentile																								0.63	0.28			

Survey Notes

1 Acronyms:IWP - Inner Wheel Path of the tested lane, ND - Non Decreasing deflection bowl, RT - Retested owing to poor deflection bowl.
2 Lane 1 is in the prescribed direction whilst lane 2 is in the counter direction and all station values presented are increasing in the direction of lane 1 (prescribed lane).
3 Where negative curvature values occur as a result of Non-Decreasing deflection bowl data, they have been set to 0.00mm
4 IWP results were measured within the existing central pavement of the lane tested.

Prepared By:
James Erskine
Senior Pavement Engineer
25-Sep-18

Reviewed By:
James Erskine
Senior Pavement Engineer
25-Sep-18

Pavement Management Services

Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

FWD/HWD Structural Test Report - Deflection Results

Test Method: QT211
Testing Date: 20/06/2018
Operator: John Muir
Test Equipment: FWD-016

Target Load (kN): 40
Smoothing: No

Client: Multiquip Quarries
Job No: 2017152
Report No: DR2017152-3
Client Section ID: 3A1_IWP

Oallen Ford Road
from Bungonia Bypass to Lumley Road (Quarry Entrance)

Road Id: 3
Lane: 1
Block: A

Station (km)	Lane	Wheel Path	Peak Load (kPa)	Measured Deflection Results (µm) Distance from Load (mm)									Normalised Deflection Results (µm) Distance from Load (mm)									Temperature (°C)		FWD		GDA94		Local Comment
				0	200	300	450	600	750	900	1200	1500	0	200	300	450	600	750	900	1200	1500	Air	Surface	Defl.	Curv.	Latitude	Longitude	
16.350	1	IWP	563	540	320	222	129	84	57	40	25	22	543	322	223	130	85	58	41	25	22	13.0	14.6	0.54	0.22	-34.8630577	149.9402662	
16.450	1	IWP	570	583	342	258	184	142	111	87	56	41	579	339	256	183	141	110	86	56	41	13.0	14.6	0.58	0.24	-34.8639081	149.9398992	
16.550	1	IWP	572	437	296	239	175	138	109	81	56	38	432	292	236	174	137	108	81	56	37	13.0	14.6	0.43	0.14	-34.8647619	149.9395532	
16.650	1	IWP	609	869	410	273	198	113	87	68	44	165	807	381	254	184	105	80	63	41	153	13.0	14.6	0.81	0.43	-34.8656365	149.9392035	ND, RT
16.750	1	IWP	580	877	588	402	240	195	122	76	24	0	856	573	392	234	190	119	74	23	0	13.0	14.6	0.86	0.28	-34.8664957	149.9388688	
16.850	1	IWP	577	626	358	224	120	71	51	35	28	24	614	351	219	117	69	50	34	27	24	13.0	14.6	0.61	0.26	-34.8673319	149.9385136	
16.950	1	IWP	570	702	422	262	152	85	63	47	34	27	697	419	260	151	84	62	46	34	27	13.0	14.6	0.70	0.28	-34.8681738	149.9381584	
17.050	1	IWP	572	378	258	171	112	75	54	39	21	17	374	255	169	111	74	53	39	21	16	13.0	14.6	0.37	0.12	-34.8690074	149.9378081	
17.150	1	IWP	566	436	217	139	81	52	36	25	22	15	436	217	139	81	52	36	25	22	15	13.0	14.6	0.44	0.22	-34.8699100	149.9377242	
17.250	1	IWP	576	611	373	230	119	75	57	46	32	23	600	367	226	117	73	56	45	31	23	13.0	14.6	0.60	0.23	-34.8708303	149.9377957	
17.350	1	IWP	571	221	150	83	24	24	21	16	34	17	219	149	82	23	24	20	16	34	17	13.0	14.6	0.22	0.07	-34.8717165	149.9378709	ND, RT
17.450	1	IWP	565	630	331	189	97	65	44	39	24	20	631	331	189	97	66	44	39	24	20	13.0	14.6	0.63	0.30	-34.8726402	149.9379466	New Pavement
17.550	1	IWP	571	619	450	281	118	63	42	33	23	18	614	446	279	117	62	41	33	23	18	13.0	14.6	0.61	0.17	-34.8735227	149.9380184	
17.650	1	IWP	584	625	345	193	83	62	47	89	20	9	605	334	187	81	60	46	87	19	9	13.0	14.6	0.60	0.27	-34.8744377	149.9380967	ID, New Pavemer
17.750	1	IWP	569	602	330	202	99	63	42	30	17	11	598	328	201	99	62	42	30	16	11	13.0	14.6	0.60	0.27	-34.8753222	149.9381615	
17.850	1	IWP	570	472	285	162	87	54	39	28	16	13	468	283	161	86	54	38	27	16	12	13.0	14.6	0.47	0.19	-34.8762079	149.9382355	
17.950	1	IWP	565	587	377	245	118	63	38	32	26	24	588	377	246	118	63	38	32	26	24	13.0	14.6	0.59	0.21	-34.8770898	149.9383112	
18.050	1	IWP	569	633	297	193	120	87	67	53	33	23	629	295	192	119	86	66	53	33	23	13.0	14.6	0.63	0.33	-34.8780256	149.9384525	
18.150	1	IWP	568	375	223	156	88	54	36	27	20	17	374	222	155	87	53	36	27	20	17	13.0	14.6	0.37	0.15	-34.8788927	149.9386758	

Station (km)	Lane	Wheel Path	Peak Load (kPa)	Measured Deflection Results (μm) Distance from Load (mm) 0	200	300	450	600	750	900	1200	1500	Normalised Deflection Results (μm) Distance from Load (mm) 0	200	300	450	600	750	900	1200	1500	Temperature (°C) Air	Surface	FWD Defl.	Curv.	GDA94 Latitude	Longitude	Local Comment
18.250	1	IWP	573	427	222	136	92	76	64	51	25	21	422	219	134	91	75	63	50	24	21	13.0	14.6	0.42	0.20	-34.8797309	149.9389122	
18.350	1	IWP	564	1155	711	412	189	118	85	69	49	38	1159	713	414	189	118	85	70	49	38	13.0	14.6	1.16	0.45	-34.8806122	149.9391574	
18.450	1	IWP	585	603	303	180	120	65	51	37	29	21	583	293	174	116	62	49	36	28	20	13.0	14.6	0.58	0.29	-34.8814672	149.9394215	
18.550	1	IWP	561	840	531	360	197	117	76	55	36	28	847	535	363	199	118	77	55	36	29	13.0	14.8	0.85	0.31	-34.8823593	149.9397002	
18.650	1	IWP	570	665	391	250	143	96	73	51	18	30	660	389	248	142	95	72	51	18	30	13.0	14.8	0.66	0.27	-34.8832442	149.9398822	ND
18.750	1	IWP	568	781	442	304	186	128	101	77	51	42	778	440	303	185	128	100	77	51	42	13.0	14.8	0.78	0.34	-34.8841313	149.9398646	
18.850	1	IWP	560	1070	716	531	324	213	151	111	71	54	1082	724	536	328	215	153	112	72	54	13.0	14.8	1.08	0.36	-34.8850419	149.9398202	
18.950	1	IWP	564	662	430	288	154	95	68	41	27	37	664	432	289	155	95	68	41	27	37	13.0	14.8	0.66	0.23	-34.8859488	149.9397890	ND, RT
19.050	1	IWP	569	808	362	223	124	86	69	57	38	32	803	360	221	124	86	68	57	38	31	13.0	14.8	0.80	0.44	-34.8868455	149.9397615	
19.150	1	IWP	565	1224	555	317	171	123	97	76	54	37	1226	555	318	172	123	97	76	54	37	13.0	14.8	1.23	0.67	-34.8877480	149.9397086	
19.250	1	IWP	575	535	293	208	127	82	61	48	37	32	526	288	205	125	81	60	47	37	32	13.0	14.8	0.53	0.24	-34.8886396	149.9396664	
19.350	1	IWP	569	675	437	341	246	192	146	111	72	53	671	435	339	244	191	145	110	72	53	13.0	14.8	0.67	0.24	-34.8895388	149.9396286	
19.450	1	IWP	572	736	424	239	141	96	76	57	41	37	728	419	236	140	95	75	57	40	36	13.0	14.8	0.73	0.31	-34.8904278	149.9395902	
19.550	1	IWP	565	673	359	254	154	95	66	50	33	24	674	360	254	154	95	66	50	33	24	13.0	14.8	0.67	0.31	-34.8913419	149.9395550	
19.650	1	IWP	559	902	517	340	203	147	109	86	54	38	913	523	344	205	148	110	87	55	38	13.0	14.8	0.91	0.39	-34.8922274	149.9395195	
19.750	1	IWP	576	556	413	306	211	161	121	94	66	48	546	406	301	207	158	119	92	65	47	13.0	14.8	0.55	0.14	-34.8931404	149.9394860	
Average																						13.0	14.7	0.66	0.27			
Standard Deviation																						0.0	0.1	0.22	0.11			
10th Percentile																								0.42	0.14			
90th Percentile																								0.89	0.41			

Survey Notes

1 Acronyms:IWP - Inner Wheel Path of the tested lane, ND - Non Decreasing deflection bowl, RT - Retested owing to poor deflection bowl.

2 Lane 1 is in the prescribed direction whilst lane 2 is in the counter direction and all station values presented are increasing in the direction of lane 1 (prescribed lane).

3 Where negative curvature values occur as a result of Non-Decreasing deflection bowl data, they have been set to 0.00mm

4 IWP results were measured within the existing central pavement of the lane tested.

Prepared By:

James Erskine
Senior Pavement Engineer
25-Sep-18

Reviewed By:

James Erskine
Senior Pavement Engineer
25-Sep-18

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

FWD/HWD Structural Test Report - Deflection Results

Test Method: QT211
Testing Date: 20/06/2018
Operator: John Muir
Test Equipment: FWD-016
Target Load (kN): 40
Smoothing: No
Client: Multiquip Quarries
Job No: 2017152
Report No: DR2017152-3
Client Section ID: 3A2_IWP

Oallen Ford Road
from Lumley Road (Quarry Entrance) to Bungonia Bypass

Road Id: 3
Lane: 2
Block: A

Station (km)	Lane	Wheel Path	Peak Load (kPa)	Measured Deflection Results (µm) Distance from Load (mm)									Normalised Deflection Results (µm) Distance from Load (mm)									Temperature (°C)		FWD		GDA94		Local Comment
				0	200	300	450	600	750	900	1200	1500	0	200	300	450	600	750	900	1200	1500	Air	Surface	Defl.	Curv.	Latitude	Longitude	
16.375	2	IWP	570	762	466	333	209	152	108	80	54	41	757	462	330	208	151	107	79	53	41	13.0	14.8	0.76	0.29	-34.8934510	149.9394398	
16.475	2	IWP	573	823	597	428	252	165	122	88	83	52	813	590	422	249	163	120	87	82	51	13.0	14.8	0.81	0.22	-34.8934510	149.9394398	
16.575	2	IWP	566	1164	707	521	348	230	159	106	70	54	1163	707	521	348	230	159	106	70	54	13.0	14.8	1.16	0.46	-34.8934510	149.9394398	
16.675	2	IWP	579	524	265	156	85	58	37	41	26	15	513	259	152	83	56	36	40	25	15	13.0	14.8	0.51	0.25	-34.8934510	149.9394398	ND, RT
16.775	2	IWP	568	872	608	395	240	146	92	58	43	51	869	605	393	239	146	92	57	43	51	13.0	14.8	0.87	0.26	-34.8934510	149.9394398	ND
16.875	2	IWP	564	726	533	312	165	96	71	59	47	39	729	535	313	166	96	71	59	47	39	13.0	14.8	0.73	0.19	-34.8934510	149.9394398	
16.975	2	IWP	565	706	525	358	211	144	120	96	56	39	707	525	358	212	144	120	96	56	39	13.0	14.8	0.71	0.18	-34.8934510	149.9394398	
17.075	2	IWP	565	423	261	171	98	58	40	29	19	14	424	262	171	98	58	40	29	19	14	13.0	14.8	0.42	0.16	-34.8934510	149.9394398	
17.175	2	IWP	564	791	470	308	173	104	64	40	23	18	793	471	309	173	105	64	40	23	18	13.0	14.8	0.79	0.32	-34.8934510	149.9394398	
17.275	2	IWP	576	236	130	91	56	40	31	26	19	14	232	128	90	55	39	30	26	19	14	13.0	14.8	0.23	0.10	-34.8934510	149.9394398	
17.375	2	IWP	577	118	71	48	30	24	19	15	10	11	116	69	47	29	23	18	15	10	11	13.0	14.8	0.12	0.05	-34.8934510	149.9394398	ND
17.475	2	IWP	564	875	723	513	307	218	122	48	27	24	877	725	514	308	219	123	48	27	24	13.0	14.8	0.88	0.15	-34.8934510	149.9394398	
17.575	2	IWP	559	634	428	229	95	52	40	40	22	16	642	433	231	96	53	41	40	22	16	13.0	14.8	0.64	0.21	-34.8934510	149.9394398	ND, RT
17.675	2	IWP	578	306	167	88	51	102	74	85	82	8	300	163	86	50	100	72	83	81	8	13.0	14.8	0.30	0.14	-34.8934510	149.9394398	ND, RT
17.775	2	IWP	565	709	411	229	95	50	35	26	19	15	710	412	230	96	50	35	26	19	15	13.0	14.8	0.71	0.30	-34.8934510	149.9394398	
17.875	2	IWP	563	591	287	168	93	63	40	34	24	17	594	288	169	94	63	40	35	24	17	13.0	14.8	0.59	0.30	-34.8934510	149.9394398	
17.975	2	IWP	562	625	456	275	145	88	61	47	34	27	629	459	277	146	89	62	48	34	27	13.0	14.8	0.63	0.17	-34.8934510	149.9394398	
18.075	2	IWP	567	762	505	378	228	146	97	60	43	30	760	504	377	228	146	96	60	43	30	13.0	14.8	0.76	0.26	-34.8934510	149.9394398	
18.175	2	IWP	573	368	187	129	76	45	27	22	21	15	364	184	127	75	45	26	22	21	15	13.0	14.8	0.36	0.18	-34.8934510	149.9394398	

Station (km)	Lane	Wheel Path	Peak Load (kPa)	Measured Deflection Results (μm) Distance from Load (mm) 0	200	300	450	600	750	900	1200	1500	Normalised Deflection Results (μm) Distance from Load (mm) 0	200	300	450	600	750	900	1200	1500	Temperature (°C) Air	Surface	FWD Defl.	Curv.	GDA94 Latitude	Longitude	Local Comment
18.275	2	IWP	566	649	389	208	108	76	57	42	30	16	649	389	208	107	76	57	42	30	16	13.0	14.8	0.65	0.26	-34.8934510	149.9394398	
18.375	2	IWP	575	569	404	238	106	56	33	22	14	9	560	398	234	105	55	32	22	14	9	13.0	14.8	0.56	0.16	-34.8934510	149.9394398	
18.475	2	IWP	565	1053	534	369	204	126	82	57	38	31	1055	534	370	204	126	82	57	38	31	13.0	14.8	1.06	0.52	-34.8934510	149.9394398	
18.575	2	IWP	577	477	319	215	132	89	72	53	44	29	467	312	210	129	88	71	52	43	29	13.0	14.8	0.47	0.15	-34.8934510	149.9394398	
18.675	2	IWP	562	953	497	298	152	96	73	57	40	30	959	501	300	153	97	73	58	40	30	13.0	14.8	0.96	0.46	-34.8934510	149.9394398	
18.775	2	IWP	569	1208	819	521	276	185	142	108	72	47	1202	814	518	274	184	141	107	72	47	13.0	14.8	1.20	0.39	-34.8934510	149.9394398	
18.875	2	IWP	578	462	223	161	115	89	73	61	45	37	452	218	158	113	87	71	59	44	37	13.0	14.8	0.45	0.23	-34.8934510	149.9394398	
18.975	2	IWP	572	824	496	328	192	137	102	83	61	51	815	491	324	190	135	101	82	60	51	13.0	14.8	0.82	0.32	-34.8934510	149.9394398	
19.075	2	IWP	570	795	642	364	219	153	122	98	71	57	789	637	361	218	152	121	97	71	57	13.0	14.8	0.79	0.15	-34.8934510	149.9394398	
19.175	2	IWP	567	779	578	394	231	148	99	79	34	29	777	577	393	230	147	98	79	34	29	13.0	14.8	0.78	0.20	-34.8934510	149.9394398	
19.275	2	IWP	568	1001	648	453	284	193	141	106	72	54	997	646	451	283	192	140	106	71	54	13.0	14.8	1.00	0.35	-34.8934510	149.9394398	
19.375	2	IWP	569	577	341	221	152	119	88	70	46	36	573	339	220	151	119	87	69	46	36	13.0	14.8	0.57	0.23	-34.8934510	149.9394398	
19.475	2	IWP	566	600	320	202	116	75	54	39	28	20	600	320	202	116	75	54	39	28	20	13.0	14.8	0.60	0.28	-34.8934510	149.9394398	
19.575	2	IWP	571	389	240	150	91	67	46	32	22	17	385	237	149	90	66	46	32	22	17	13.0	14.8	0.39	0.15	-34.8934510	149.9394398	
19.675	2	IWP	566	786	554	392	220	141	97	70	44	32	786	554	392	220	141	97	70	44	32	13.0	14.8	0.79	0.23	-34.8934510	149.9394398	
19.775	2	IWP	563	591	362	234	133	93	71	55	34	24	594	364	235	133	93	71	55	34	25	13.0	14.8	0.59	0.23	-34.8934510	149.9394398	
Average																						13.0	14.8	0.68	0.24			
Standard Deviation																						0.0	0.0	0.25	0.10			
10th Percentile																								0.37	0.15			
90th Percentile																								0.98	0.37			

Survey Notes

1 Acronyms:IWP - Inner Wheel Path of the tested lane, ND - Non Decreasing deflection bowl, RT - Retested owing to poor deflection bowl.

2 Lane 1 is in the prescribed direction whilst lane 2 is in the counter direction and all station values presented are increasing in the direction of lane 1 (prescribed lane).

3 Where negative curvature values occur as a result of Non-Decreasing deflection bowl data, they have been set to 0.00mm

4 IWP results were measured within the existing central pavement of the lane tested.

Prepared By:

James Erskine
Senior Pavement Engineer
25-Sep-18

Reviewed By:

James Erskine
Senior Pavement Engineer
25-Sep-18

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APPENDIX C – DESIGN CHART REMAINING LIFE RESULTS

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Remaining Life and Overlay Requirements - Design Charts Method [2,3]

Report Date: 24-Sep-18
Project No.: 2017152
Report No.: R2017152
Location: 1A1_IWP - Jerrara Road from South Marulan Road to Mountain Ash Road
Test Method: QT211
Analysis Method: FPMS-QP4-002
Tested By: John Muir
Testing Date: 31-May-18
Test Equipment: FWD-016

Client: Multiquip Quarries

Prepared By: James Erskine
Growth Rate: 2.5%
Design Period: 20
Design Traffic Intensity: 6.90E+05
Existing Pavement: Flexible without Cemented Materials
Overlay Type: Asphalt
Design Deflection: 1.20
WMAPT: 22
Overlay Adjustment Factor: 0.94
Seasonal Moisture Variation: 1.0

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Permanent Deformation Overlay (mm) Granular	Permanent Deformation Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
0.150	1	IWP	Seal	25	14.3	0.78	0.31	1.10	1.00	1.00	1.00	0.86	0.31	1.83E+07	20	0	0	N/A	N/A	N/A	
0.250	1	IWP	Seal	25	14.3	0.83	0.26	1.10	1.00	1.00	1.00	0.91	0.26	7.92E+06	20	0	0	N/A	N/A	N/A	
0.350	1	IWP	Seal	25	14.3	0.54	0.22	1.10	1.00	1.00	1.00	0.59	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
0.450	1	IWP	Seal	25	14.3	0.64	0.33	1.10	1.00	1.00	1.00	0.70	0.33	1.00E+08	20	0	0	N/A	N/A	N/A	
0.550	1	IWP	Seal	25	14.3	0.52	0.27	1.10	1.00	1.00	1.00	0.57	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
0.650	1	IWP	Seal	25	14.3	0.91	0.43	1.10	1.00	1.00	1.00	1.00	0.43	2.81E+06	20	0	0	N/A	N/A	N/A	
0.750	1	IWP	Seal	25	14.3	0.54	0.23	1.10	1.00	1.00	1.00	0.59	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
0.850	1	IWP	Seal	25	14.3	0.64	0.26	1.10	1.00	1.00	1.00	0.70	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
0.950	1	IWP	Seal	25	14.3	0.97	0.36	1.10	1.00	1.00	1.00	1.07	0.36	1.56E+06	20	0	0	N/A	N/A	N/A	
1.050	1	IWP	Seal	25	14.3	0.51	0.25	1.10	1.00	1.00	1.00	0.56	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
1.150	1	IWP	Seal	25	14.3	0.39	0.22	1.10	1.00	1.00	1.00	0.43	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
1.250	1	IWP	Seal	25	14.3	0.84	0.33	1.10	1.00	1.00	1.00	0.92	0.33	6.90E+06	20	0	0	N/A	N/A	N/A	
1.350	1	IWP	Seal	25	14.3	1.05	0.38	1.10	1.00	1.00	1.00	1.16	0.38	8.68E+05	20	0	0	N/A	N/A	N/A	
1.450	1	IWP	Seal	25	14.3	1.03	0.49	1.10	1.00	1.00	1.00	1.13	0.49	1.03E+06	20	0	0	N/A	N/A	N/A	
1.550	1	IWP	Seal	25	14.3	0.76	0.35	1.10	1.00	1.00	1.00	0.84	0.35	2.81E+07	20	0	0	N/A	N/A	N/A	
1.650	1	IWP	Seal	25	14.3	1.05	0.46	1.10	1.00	1.00	1.00	1.16	0.46	8.68E+05	20	0	0	N/A	N/A	N/A	
1.750	1	IWP	Seal	25	14.3	0.79	0.35	1.10	1.00	1.00	1.00	0.87	0.35	1.51E+07	20	0	0	N/A	N/A	N/A	
1.850	1	IWP	Seal	25	14.3	0.93	0.35	1.10	1.00	1.00	1.00	1.02	0.35	2.34E+06	20	0	0	N/A	N/A	N/A	

Station	Lane	Wheel	Surface			FWD Measured		DSF	CSF	Temperature Adjustment Factor		Adjusted		Permanent Deformation				Fatigue			Comment
(km)		Path	Type	Thickness (mm)	Temp (°C)	Deflection (mm)	Curvature (mm)			Deflection	Curvature	Deflection (mm)	Curvature (mm)	Remaining Life ESA's	Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Remaining Life ESA's[8]	Remaining Life Yrs[8]	Overlay (mm) Asphalt[8,9]	
1.950	1	IWP	Seal	25	14.3	0.72	0.37	1.10	1.00	1.00	1.00	0.79	0.37	1.00E+08	20	0	0	N/A	N/A	N/A	
2.050	1	IWP	Seal	25	14.3	0.87	0.43	1.10	1.00	1.00	1.00	0.96	0.43	4.23E+06	20	0	0	N/A	N/A	N/A	
2.150	1	IWP	Seal	25	14.3	0.67	0.25	1.10	1.00	1.00	1.00	0.74	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
2.250	1	IWP	Seal	25	14.3	0.67	0.30	1.10	1.00	1.00	1.00	0.74	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
2.350	1	IWP	Seal	25	14.3	0.98	0.26	1.10	1.00	1.00	1.00	1.08	0.26	1.45E+06	20	0	0	N/A	N/A	N/A	
2.450	1	IWP	Seal	25	14.3	0.76	0.34	1.10	1.00	1.00	1.00	0.84	0.34	2.81E+07	20	0	0	N/A	N/A	N/A	
2.550	1	IWP	Seal	25	14.3	0.59	0.34	1.10	1.00	1.00	1.00	0.65	0.34	1.00E+08	20	0	0	N/A	N/A	N/A	
2.650	1	IWP	Seal	25	14.3	0.80	0.32	1.10	1.00	1.00	1.00	0.88	0.32	1.26E+07	20	0	0	N/A	N/A	N/A	
2.750	1	IWP	Seal	25	14.3	0.74	0.25	1.10	1.00	1.00	1.00	0.81	0.25	6.37E+07	20	0	0	N/A	N/A	N/A	
2.850	1	IWP	Seal	25	14.3	0.98	0.45	1.10	1.00	1.00	1.00	1.08	0.45	1.45E+06	20	0	0	N/A	N/A	N/A	
2.950	1	IWP	Seal	25	14.3	0.70	0.25	1.10	1.00	1.00	1.00	0.77	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
3.050	1	IWP	Seal	25	14.3	0.82	0.37	1.10	1.00	1.00	1.00	0.90	0.37	9.17E+06	20	0	0	N/A	N/A	N/A	
3.150	1	IWP	Seal	25	14.3	1.11	0.46	1.10	1.00	1.00	1.00	1.22	0.46	6.25E+05	18	7	24	N/A	N/A	N/A	
3.250	1	IWP	Seal	25	14.3	0.79	0.33	1.10	1.00	1.00	1.00	0.87	0.33	1.51E+07	20	0	0	N/A	N/A	N/A	
3.350	1	IWP	Seal	25	14.3	0.65	0.33	1.10	1.00	1.00	1.00	0.72	0.33	1.00E+08	20	0	0	N/A	N/A	N/A	
3.450	1	IWP	Seal	25	14.3	0.68	0.25	1.10	1.00	1.00	1.00	0.75	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
3.550	1	IWP	Seal	25	14.3	0.95	0.54	1.10	1.00	1.00	1.00	1.04	0.54	1.97E+06	20	0	0	N/A	N/A	N/A	
3.650	1	IWP	Seal	25	14.3	0.85	0.38	1.10	1.00	1.00	1.00	0.94	0.38	5.34E+06	20	0	0	N/A	N/A	N/A	
3.750	1	IWP	Seal	25	14.3	0.88	0.42	1.10	1.00	1.00	1.00	0.97	0.42	3.79E+06	20	0	0	N/A	N/A	N/A	
3.850	1	IWP	Seal	25	14.3	0.37	0.21	1.10	1.00	1.00	1.00	0.41	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
3.950	1	IWP	Seal	25	14.3	0.57	0.29	1.10	1.00	1.00	1.00	0.63	0.29	1.00E+08	20	0	0	N/A	N/A	N/A	
4.050	1	IWP	Seal	25	14.3	0.84	0.37	1.10	1.00	1.00	1.00	0.92	0.37	6.90E+06	20	0	0	N/A	N/A	N/A	
4.150	1	IWP	Seal	25	14.3	0.36	0.19	1.10	1.00	1.00	1.00	0.40	0.19	1.00E+08	20	0	0	N/A	N/A	N/A	
4.250	1	IWP	Seal	25	14.3	0.93	0.45	1.10	1.00	1.00	1.00	1.02	0.45	2.34E+06	20	0	0	N/A	N/A	N/A	
4.350	1	IWP	Seal	25	14.3	0.74	0.33	1.10	1.00	1.00	1.00	0.81	0.33	6.37E+07	20	0	0	N/A	N/A	N/A	
4.450	1	IWP	Seal	25	14.3	1.04	0.42	1.10	1.00	1.00	1.00	1.14	0.42	9.68E+05	20	0	0	N/A	N/A	N/A	
4.550	1	IWP	Seal	25	14.3	0.64	0.26	1.10	1.00	1.00	1.00	0.70	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
4.650	1	IWP	Seal	25	14.3	0.42	0.20	1.10	1.00	1.00	1.00	0.46	0.20	1.00E+08	20	0	0	N/A	N/A	N/A	
4.750	1	IWP	Seal	25	14.3	0.41	0.17	1.10	1.00	1.00	1.00	0.45	0.17	1.00E+08	20	0	0	N/A	N/A	N/A	
4.850	1	IWP	Seal	25	14.3	0.66	0.27	1.10	1.00	1.00	1.00	0.73	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
4.950	1	IWP	Seal	25	14.3	0.96	0.48	1.10	1.00	1.00	1.00	1.06	0.48	1.68E+06	20	0	0	N/A	N/A	N/A	

Station (km)	Lane	Wheel Path	Surface			FWD Measured		DSF	CSF	Temperature Adjustment Factor		Adjusted		Permanent Deformation				Fatigue			Comment
			Type	Thickness (mm)	Temp (°C)	Deflection (mm)	Curvature (mm)			Deflection	Curvature	Deflection (mm)	Curvature (mm)	Remaining Life ESA's	Yrs	Overlay (mm) Granular	Asphalt[4]	Remaining Life ESA's[8]	Yrs[8]	Overlay (mm) Asphalt[8,9]	
5.050	1	IWP	Seal	25	14.3	1.21	0.47	1.10	1.00	1.00	1.00	1.33	0.47	3.43E+05	11	42	24	N/A	N/A	N/A	
5.150	1	IWP	Seal	25	14.3	0.95	0.50	1.10	1.00	1.00	1.00	1.04	0.50	1.97E+06	20	0	0	N/A	N/A	N/A	
5.250	1	IWP	Seal	25	14.3	0.67	0.39	1.10	1.00	1.00	1.00	0.74	0.39	1.00E+08	20	0	0	N/A	N/A	N/A	
5.350	1	IWP	Seal	25	14.3	0.97	0.27	1.10	1.00	1.00	1.00	1.07	0.27	1.56E+06	20	0	0	N/A	N/A	N/A	
5.450	1	IWP	Seal	25	14.3	0.86	0.32	1.10	1.00	1.00	1.00	0.95	0.32	4.74E+06	20	0	0	N/A	N/A	N/A	
5.550	1	IWP	Seal	25	14.3	0.88	0.42	1.10	1.00	1.00	1.00	0.97	0.42	3.79E+06	20	0	0	N/A	N/A	N/A	
5.650	1	IWP	Seal	25	14.3	1.00	0.45	1.10	1.00	1.00	1.00	1.10	0.45	1.25E+06	20	0	0	N/A	N/A	N/A	
5.750	1	IWP	Seal	25	14.3	0.83	0.29	1.10	1.00	1.00	1.00	0.91	0.29	7.92E+06	20	0	0	N/A	N/A	N/A	
5.850	1	IWP	Seal	25	14.3	0.82	0.39	1.10	1.00	1.00	1.00	0.90	0.39	9.17E+06	20	0	0	N/A	N/A	N/A	
5.950	1	IWP	Seal	25	14.3	0.73	0.35	1.10	1.00	1.00	1.00	0.80	0.35	1.00E+08	20	0	0	N/A	N/A	N/A	
6.050	1	IWP	Seal	25	14.3	1.18	0.61	1.10	1.00	1.00	1.00	1.30	0.61	4.04E+05	13	32	24	N/A	N/A	N/A	
6.150	1	IWP	Seal	25	14.3	0.84	0.35	1.10	1.00	1.00	1.00	0.92	0.35	6.90E+06	20	0	0	N/A	N/A	N/A	
6.250	1	IWP	Seal	25	14.3	1.06	0.42	1.10	1.00	1.00	1.00	1.17	0.42	8.22E+05	20	0	0	N/A	N/A	N/A	
6.350	1	IWP	Seal	25	14.3	0.99	0.41	1.10	1.00	1.00	1.00	1.09	0.41	1.34E+06	20	0	0	N/A	N/A	N/A	
6.450	1	IWP	Seal	25	14.3	0.80	0.33	1.10	1.00	1.00	1.00	0.88	0.33	1.26E+07	20	0	0	N/A	N/A	N/A	
6.550	1	IWP	Seal	25	14.3	0.58	0.25	1.10	1.00	1.00	1.00	0.64	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
6.650	1	IWP	Seal	25	14.3	0.36	0.20	1.10	1.00	1.00	1.00	0.40	0.20	1.00E+08	20	0	0	N/A	N/A	N/A	
6.750	1	IWP	Seal	25	14.3	0.89	0.45	1.10	1.00	1.00	1.00	0.98	0.45	3.42E+06	20	0	0	N/A	N/A	N/A	
6.850	1	IWP	Seal	25	14.3	0.68	0.32	1.10	1.00	1.00	1.00	0.75	0.32	1.00E+08	20	0	0	N/A	N/A	N/A	
6.950	1	IWP	Seal	25	14.3	0.95	0.41	1.10	1.00	1.00	1.00	1.04	0.41	1.97E+06	20	0	0	N/A	N/A	N/A	
7.050	1	IWP	Seal	25	14.3	0.45	0.22	1.10	1.00	1.00	1.00	0.50	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
7.150	1	IWP	Seal	25	14.3	0.73	0.25	1.10	1.00	1.00	1.00	0.80	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
7.250	1	IWP	Seal	25	14.3	0.49	0.22	1.10	1.00	1.00	1.00	0.54	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
7.350	1	IWP	Seal	25	14.3	0.54	0.23	1.10	1.00	1.00	1.00	0.59	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
7.450	1	IWP	Seal	25	14.3	0.29	0.18	1.10	1.00	1.00	1.00	0.32	0.18	1.00E+08	20	0	0	N/A	N/A	N/A	
7.550	1	IWP	Seal	25	14.3	0.67	0.33	1.10	1.00	1.00	1.00	0.74	0.33	1.00E+08	20	0	0	N/A	N/A	N/A	
7.650	1	IWP	Seal	25	14.3	0.44	0.28	1.10	1.00	1.00	1.00	0.48	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
7.750	1	IWP	Seal	25	14.3	0.64	0.28	1.10	1.00	1.00	1.00	0.70	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
7.850	1	IWP	Seal	25	14.3	1.04	0.43	1.10	1.00	1.00	1.00	1.14	0.43	9.68E+05	20	0	0	N/A	N/A	N/A	
7.950	1	IWP	Seal	25	14.3	0.63	0.30	1.10	1.00	1.00	1.00	0.69	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
8.050	1	IWP	Seal	25	14.3	0.76	0.30	1.10	1.00	1.00	1.00	0.84	0.30	2.81E+07	20	0	0	N/A	N/A	N/A	

Station (km)	Lane	Wheel Path	Surface			FWD Measured		DSF	CSF	Temperature Adjustment Factor		Adjusted		Permanent Deformation				Fatigue			Comment
			Type	Thickness (mm)	Temp (°C)	Deflection (mm)	Curvature (mm)			Deflection	Curvature	Deflection (mm)	Curvature (mm)	Remaining Life ESA's	Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Remaining Life ESA's[8]	Remaining Life Yrs[8]	Overlay (mm) Asphalt[8,9]	
8.150	1	IWP	Seal	25	14.3	0.87	0.30	1.10	1.00	1.00	1.00	0.96	0.30	4.23E+06	20	0	0	N/A	N/A	N/A	
8.250	1	IWP	Seal	25	14.3	0.56	0.32	1.10	1.00	1.00	1.00	0.62	0.32	1.00E+08	20	0	0	N/A	N/A	N/A	
8.350	1	IWP	Seal	25	14.3	0.51	0.24	1.10	1.00	1.00	1.00	0.56	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
8.450	1	IWP	Seal	25	14.3	0.61	0.34	1.10	1.00	1.00	1.00	0.67	0.34	1.00E+08	20	0	0	N/A	N/A	N/A	
8.550	1	IWP	Seal	25	14.3	0.70	0.24	1.10	1.00	1.00	1.00	0.77	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
8.650	1	IWP	Seal	25	14.3	0.66	0.24	1.10	1.00	1.00	1.00	0.73	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
8.750	1	IWP	Seal	25	14.3	0.69	0.28	1.10	1.00	1.00	1.00	0.76	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
8.850	1	IWP	Seal	25	14.3	0.74	0.32	1.10	1.00	1.00	1.00	0.81	0.32	6.37E+07	20	0	0	N/A	N/A	N/A	
8.950	1	IWP	Seal	25	14.3	1.34	0.41	1.10	1.00	1.00	1.00	1.47	0.41	1.60E+05	6	82	28	N/A	N/A	N/A	
9.050	1	IWP	Seal	25	14.3	0.77	0.30	1.10	1.00	1.00	1.00	0.85	0.30	2.24E+07	20	0	0	N/A	N/A	N/A	
9.150	1	IWP	Seal	25	14.3	0.81	0.28	1.10	1.00	1.00	1.00	0.89	0.28	1.07E+07	20	0	0	N/A	N/A	N/A	
9.250	1	IWP	Seal	25	14.3	0.71	0.27	1.10	1.00	1.00	1.00	0.78	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
9.350	1	IWP	Seal	25	14.3	0.62	0.24	1.10	1.00	1.00	1.00	0.68	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
9.450	1	IWP	Seal	25	14.3	0.78	0.34	1.10	1.00	1.00	1.00	0.86	0.34	1.83E+07	20	0	0	N/A	N/A	N/A	
9.550	1	IWP	Seal	25	14.3	0.64	0.33	1.10	1.00	1.00	1.00	0.70	0.33	1.00E+08	20	0	0	N/A	N/A	N/A	
9.650	1	IWP	Seal	25	14.3	1.27	0.39	1.10	1.00	1.00	1.00	1.40	0.39	2.34E+05	8	62	24	N/A	N/A	N/A	
9.750	1	IWP	Seal	25	14.3	1.17	0.46	1.10	1.00	1.00	1.00	1.29	0.46	4.27E+05	13	29	24	N/A	N/A	N/A	
9.850	1	IWP	Seal	25	14.3	0.45	0.21	1.10	1.00	1.00	1.00	0.50	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
9.950	1	IWP	Seal	25	14.3	0.77	0.33	1.10	1.00	1.00	1.00	0.85	0.33	2.24E+07	20	0	0	N/A	N/A	N/A	
10.050	1	IWP	Seal	25	14.3	0.63	0.30	1.10	1.00	1.00	1.00	0.69	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
10.150	1	IWP	Seal	25	14.3	0.70	0.31	1.10	1.00	1.00	1.00	0.77	0.31	1.00E+08	20	0	0	N/A	N/A	N/A	
10.250	1	IWP	Seal	25	14.3	0.54	0.25	1.10	1.00	1.00	1.00	0.59	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
10.350	1	IWP	Seal	25	14.3	0.48	0.26	1.10	1.00	1.00	1.00	0.53	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
10.450	1	IWP	Seal	25	14.3	0.45	0.22	1.10	1.00	1.00	1.00	0.50	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
10.550	1	IWP	Seal	25	14.3	0.92	0.36	1.10	1.00	1.00	1.00	1.01	0.36	2.56E+06	20	0	0	N/A	N/A	N/A	
10.650	1	IWP	Seal	25	14.3	0.72	0.26	1.10	1.00	1.00	1.00	0.79	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
10.750	1	IWP	Seal	25	14.1	0.52	0.24	1.10	1.00	1.00	1.00	0.57	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
10.850	1	IWP	Seal	25	14.1	0.84	0.45	1.10	1.00	1.00	1.00	0.92	0.45	6.90E+06	20	0	0	N/A	N/A	N/A	
10.950	1	IWP	Seal	25	14.1	0.53	0.23	1.10	1.00	1.00	1.00	0.58	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
11.050	1	IWP	Seal	25	14.1	0.81	0.32	1.10	1.00	1.00	1.00	0.89	0.32	1.07E+07	20	0	0	N/A	N/A	N/A	
11.150	1	IWP	Seal	25	14.1	0.50	0.24	1.10	1.00	1.00	1.00	0.55	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
11.250	1	IWP	Seal	25	14.1	0.64	0.32	1.10	1.00	1.00	1.00	0.70	0.32	1.00E+08	20	0	0	N/A	N/A	N/A	
11.350	1	IWP	Seal	25	14.1	0.53	0.22	1.10	1.00	1.00	1.00	0.58	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
11.450	1	IWP	Seal	25	14.1	0.72	0.28	1.10	1.00	1.00	1.00	0.79	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
11.550	1	IWP	Seal	25	14.1	0.79	0.37	1.10	1.00	1.00	1.00	0.87	0.37	1.51E+07	20	0	0	N/A	N/A	N/A	
11.650	1	IWP	Seal	25	14.1	0.73	0.27	1.10	1.00	1.00	1.00	0.80	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
11.750	1	IWP	Seal	25	14.1	0.58	0.28	1.10	1.00	1.00	1.00	0.64	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
11.850	1	IWP	Seal	25	14.1	0.67	0.26	1.10	1.00	1.00	1.00	0.74	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
11.950	1	IWP	Seal	25	14.1	0.77	0.24	1.10	1.00	1.00	1.00	0.85	0.24	2.24E+07	20	0	0	N/A	N/A	N/A	
12.050	1	IWP	Seal	25	14.1	0.95	0.42	1.10	1.00	1.00	1.00	1.04	0.42	1.97E+06	20	0	0	N/A	N/A	N/A	
12.150	1	IWP	Seal	25	14.1	0.81	0.27	1.10	1.00	1.00	1.00	0.89	0.27	1.07E+07	20	0	0	N/A	N/A	N/A	
12.250	1	IWP	Seal	25	14.1	0.80	0.37	1.10	1.00	1.00	1.00	0.88	0.37	1.26E+07	20	0	0	N/A	N/A	N/A	
12.350	1	IWP	Seal	25	14.1	0.95	0.36	1.10	1.00	1.00	1.00	1.04	0.36	1.97E+06	20	0	0	N/A	N/A	N/A	
12.450	1	IWP	Seal	25	14.1	0.96	0.32	1.10	1.00	1.00	1.00	1.06	0.32	1.68E+06	20	0	0	N/A	N/A	N/A	
12.550	1	IWP	Seal	25	14.1	0.64	0.26	1.10	1.00	1.00	1.00	0.70	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
12.650	1	IWP	Seal	25	14.1	0.57	0.30	1.10	1.00	1.00	1.00	0.63	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
12.750	1	IWP	Seal	25	14.1	1.33	0.55	1.10	1.00	1.00	1.00	1.46	0.55	1.69E+05	6	79	24	N/A	N/A	N/A	
12.850	1	IWP	Seal	25	14.1	0.74	0.35	1.10	1.00	1.00	1.00	0.81	0.35	6.37E+07	20	0	0	N/A	N/A	N/A	
12.950	1	IWP	Seal	25	14.1	0.63	0.26	1.10	1.00	1.00	1.00	0.69	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
13.050	1	IWP	Seal	25	14.1	0.62	0.26	1.10	1.00	1.00	1.00	0.68	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
13.150	1	IWP	Seal	25	14.1	0.61	0.29	1.10	1.00	1.00	1.00	0.67	0.29	1.00E+08	20	0	0	N/A	N/A	N/A	
13.250	1	IWP	Seal	25	14.1	0.68	0.33	1.10	1.00	1.00	1.00	0.75	0.33	1.00E+08	20	0	0	N/A	N/A	N/A	
13.350	1	IWP	Seal	25	14.1	0.96	0.30	1.10	1.00	1.00	1.00	1.06	0.30	1.68E+06	20	0	0	N/A	N/A	N/A	
13.450	1	IWP	Seal	25	14.1	1.28	0.58	1.10	1.00	1.00	1.00	1.41	0.58	2.22E+05	8	65	24	N/A	N/A	N/A	
13.550	1	IWP	Seal	25	14.1	0.65	0.24	1.10	1.00	1.00	1.00	0.72	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
13.650	1	IWP	Seal	25	14.1	0.82	0.21	1.10	1.00	1.00	1.00	0.90	0.21	9.17E+06	20	0	0	N/A	N/A	N/A	
13.750	1	IWP	Seal	25	14.1	0.80	0.37	1.10	1.00	1.00	1.00	0.88	0.37	1.26E+07	20	0	0	N/A	N/A	N/A	
13.850	1	IWP	Seal	25	14.1	0.96	0.47	1.10	1.00	1.00	1.00	1.06	0.47	1.68E+06	20	0	0	N/A	N/A	N/A	
13.950	1	IWP	Seal	25	14.1	1.58	0.58	1.10	1.00	1.00	1.00	1.74	0.58	3.66E+04	1	150	47	N/A	N/A	N/A	
14.050	1	IWP	Seal	25	14.1	0.86	0.26	1.10	1.00	1.00	1.00	0.95	0.26	4.74E+06	20	0	0	N/A	N/A	N/A	
14.150	1	IWP	Seal	25	14.1	0.67	0.28	1.10	1.00	1.00	1.00	0.74	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
14.250	1	IWP	Seal	25	14.1	0.56	0.31	1.10	1.00	1.00	1.00	0.62	0.31	1.00E+08	20	0	0	N/A	N/A	N/A	

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Permanent Deformation Overlay (mm) Granular	Permanent Deformation Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
14.350	1	IWP	Seal	25	14.1	0.82	0.35	1.10	1.00	1.00	1.00	0.90	0.35	9.17E+06	20	0	0	N/A	N/A	N/A	
14.450	1	IWP	Seal	25	14.1	0.82	0.38	1.10	1.00	1.00	1.00	0.90	0.38	9.17E+06	20	0	0	N/A	N/A	N/A	
14.550	1	IWP	Seal	25	14.1	0.60	0.19	1.10	1.00	1.00	1.00	0.66	0.19	1.00E+08	20	0	0	N/A	N/A	N/A	
Average				25	14.2	0.76	0.33					0.84	0.33	5.34E+07	19	4	2	N/A	N/A	N/A	
Standard Deviation				0	0.1	0.22	0.09					0.24	0.09	4.64E+07	3	18	7	N/A	N/A	N/A	
10th Percentile						0.51	0.22					0.56	0.22	1.12E+06	20	0	0	N/A	N/A	N/A	
90th Percentile						1.02	0.45					1.12	0.45	1.00E+08	20	0	0	N/A	N/A	N/A	

Survey Notes

1 These remaining life and overlay calculations follow the methodology of the Austroads Guide to Pavement Technology Part 5 Appendix E
2 The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue life
3 The remaining life and overlay requirements assume that the pavement is flexible and does not include any cemented materials, where this is not the case a mechanistic analysis should be undertaken
4 The asphalt overlay thickness to overcome permanent deformation is based on using asphalt with C320 binder, the use of other binders may result in a different thickness required
5 It is possible that a thinner asphalt overlay thickness may overcome fatigue however there would be a higher risk of premature distress in this case and as such it has not been considered
6 The overlay requirements indicate the thickness of additional material required to overcome any structural deficiencies of the pavement based on the pavement consisting of an asphalt wearing course and being subject to both permanent deformation and fatigue
7 The granular overlay requirements for design traffic volumes up to 1x10^8 ESA's can be derived using the Design Chart Method, while asphalt overlays are limited to a maximum design traffic volume of 1x10^7 ESA'
8 The asphalt fatigue remaining life is calculated considering a minimum 40mm of asphalt overlay
9 The thickness of the asphalt overlay considering fatigue is the minimum required considering the design traffic

Prepared By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Reviewed By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Remaining Life and Overlay Requirements - Design Charts Method [2,3]

Report Date: 24-Sep-18
Project No.: 2017152
Report No.: R2017152
Location: 1A2_IWP - Jerrara Road from Mountain Ash Road to South Marulan Road
Test Method: QT211
Analysis Method: FPMS-QP4-002
Tested By: John Muir
Testing Date: 01-Jun-18
Test Equipment: FWD-016

Client: Multiquip Quarries

Prepared By: James Erskine
Growth Rate: 2.5%
Design Period: 20
Design Traffic Intensity: 2.31E+06
Existing Pavement: Flexible without Cemented Materials
Overlay Type: Asphalt
Design Deflection: 1.02
WMAPT: 22
Overlay Adjustment Factor: 0.94
Seasonal Moisture Variation: 1.0

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
0.175	2	IWP	Seal	25	10.3	0.86	0.31	1.10	1.00	1.00	1.00	0.95	0.31	4.74E+06	20	0	0	N/A	N/A	N/A	
0.275	2	IWP	Seal	25	10.3	0.64	0.26	1.10	1.00	1.00	1.00	0.70	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
0.375	2	IWP	Seal	25	10.3	0.57	0.21	1.10	1.00	1.00	1.00	0.63	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
0.475	2	IWP	Seal	25	10.3	1.09	0.36	1.10	1.00	1.00	1.00	1.20	0.36	6.98E+05	7	66	24	N/A	N/A	N/A	
0.575	2	IWP	Seal	25	10.3	0.59	0.28	1.10	1.00	1.00	1.00	0.65	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
0.675	2	IWP	Seal	25	10.3	0.84	0.24	1.10	1.00	1.00	1.00	0.92	0.24	6.90E+06	20	0	0	N/A	N/A	N/A	
0.775	2	IWP	Seal	25	10.3	0.43	0.19	1.10	1.00	1.00	1.00	0.47	0.19	1.00E+08	20	0	0	N/A	N/A	N/A	
0.875	2	IWP	Seal	25	10.3	0.68	0.27	1.10	1.00	1.00	1.00	0.75	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
0.975	2	IWP	Seal	25	10.3	0.83	0.33	1.10	1.00	1.00	1.00	0.91	0.33	7.92E+06	20	0	0	N/A	N/A	N/A	
1.075	2	IWP	Seal	25	10.3	0.64	0.25	1.10	1.00	1.00	1.00	0.70	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
1.175	2	IWP	Seal	25	10.3	0.78	0.34	1.10	1.00	1.00	1.00	0.86	0.34	1.83E+07	20	0	0	N/A	N/A	N/A	
1.275	2	IWP	Seal	25	10.3	1.00	0.36	1.10	1.00	1.00	1.00	1.10	0.36	1.25E+06	12	31	24	N/A	N/A	N/A	
1.375	2	IWP	Seal	25	10.3	1.09	0.46	1.10	1.00	1.00	1.00	1.20	0.46	6.98E+05	7	66	24	N/A	N/A	N/A	
1.475	2	IWP	Seal	25	10.3	0.88	0.32	1.10	1.00	1.00	1.00	0.97	0.32	3.79E+06	20	0	0	N/A	N/A	N/A	
1.575	2	IWP	Seal	25	10.3	0.85	0.30	1.10	1.00	1.00	1.00	0.94	0.30	5.34E+06	20	0	0	N/A	N/A	N/A	
1.675	2	IWP	Seal	25	10.3	0.73	0.22	1.10	1.00	1.00	1.00	0.80	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
1.775	2	IWP	Seal	25	10.3	0.86	0.29	1.10	1.00	1.00	1.00	0.95	0.29	4.74E+06	20	0	0	N/A	N/A	N/A	
1.875	2	IWP	Seal	25	10.3	0.78	0.30	1.10	1.00	1.00	1.00	0.86	0.30	1.83E+07	20	0	0	N/A	N/A	N/A	

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Permanent Deformation Overlay (mm) Granular	Permanent Deformation Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
1.975	2	IWP	Seal	25	10.3	0.57	0.30	1.10	1.00	1.00	1.00	0.63	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
2.075	2	IWP	Seal	25	10.3	0.49	0.20	1.10	1.00	1.00	1.00	0.54	0.20	1.00E+08	20	0	0	N/A	N/A	N/A	
2.175	2	IWP	Seal	25	10.3	0.80	0.30	1.10	1.00	1.00	1.00	0.88	0.30	1.26E+07	20	0	0	N/A	N/A	N/A	
2.275	2	IWP	Seal	25	10.3	0.38	0.23	1.10	1.00	1.00	1.00	0.42	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
2.375	2	IWP	Seal	25	10.3	0.65	0.21	1.10	1.00	1.00	1.00	0.72	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
2.475	2	IWP	Seal	25	10.3	0.66	0.35	1.10	1.00	1.00	1.00	0.73	0.35	1.00E+08	20	0	0	N/A	N/A	N/A	
2.575	2	IWP	Seal	25	10.3	1.09	0.57	1.10	1.00	1.00	1.00	1.20	0.57	6.98E+05	7	66	24	N/A	N/A	N/A	
2.675	2	IWP	Seal	25	10.3	0.63	0.27	1.10	1.00	1.00	1.00	0.69	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
2.775	2	IWP	Seal	25	10.3	0.74	0.30	1.10	1.00	1.00	1.00	0.81	0.30	6.37E+07	20	0	0	N/A	N/A	N/A	
2.875	2	IWP	Seal	25	10.3	0.72	0.35	1.10	1.00	1.00	1.00	0.79	0.35	1.00E+08	20	0	0	N/A	N/A	N/A	
2.975	2	IWP	Seal	25	10.3	0.76	0.32	1.10	1.00	1.00	1.00	0.84	0.32	2.81E+07	20	0	0	N/A	N/A	N/A	
3.075	2	IWP	Seal	25	10.3	0.70	0.30	1.10	1.00	1.00	1.00	0.77	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
3.175	2	IWP	Seal	25	10.3	0.99	0.47	1.10	1.00	1.00	1.00	1.09	0.47	1.34E+06	13	27	24	N/A	N/A	N/A	
3.275	2	IWP	Seal	25	10.3	0.62	0.34	1.10	1.00	1.00	1.00	0.68	0.34	1.00E+08	20	0	0	N/A	N/A	N/A	
3.375	2	IWP	Seal	25	10.3	0.52	0.24	1.10	1.00	1.00	1.00	0.57	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
3.475	2	IWP	Seal	25	10.3	1.04	0.37	1.10	1.00	1.00	1.00	1.14	0.37	9.68E+05	10	45	24	N/A	N/A	N/A	
3.575	2	IWP	Seal	25	10.3	0.95	0.39	1.10	1.00	1.00	1.00	1.04	0.39	1.97E+06	18	8	24	N/A	N/A	N/A	
3.675	2	IWP	Seal	25	10.3	0.66	0.24	1.10	1.00	1.00	1.00	0.73	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
3.775	2	IWP	Seal	25	10.3	0.55	0.31	1.10	1.00	1.00	1.00	0.60	0.31	1.00E+08	20	0	0	N/A	N/A	N/A	
3.875	2	IWP	Seal	25	10.3	0.49	0.22	1.10	1.00	1.00	1.00	0.54	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
3.975	2	IWP	Seal	25	10.3	0.41	0.18	1.10	1.00	1.00	1.00	0.45	0.18	1.00E+08	20	0	0	N/A	N/A	N/A	
4.075	2	IWP	Seal	25	9.2	0.69	0.23	1.10	1.00	1.00	1.00	0.76	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
4.175	2	IWP	Seal	25	9.2	0.24	0.10	1.10	1.00	1.00	1.00	0.26	0.10	1.00E+08	20	0	0	N/A	N/A	N/A	
4.275	2	IWP	Seal	25	9.2	0.60	0.27	1.10	1.00	1.00	1.00	0.66	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
4.375	2	IWP	Seal	25	9.2	0.40	0.21	1.10	1.00	1.00	1.00	0.44	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
4.475	2	IWP	Seal	25	9.2	1.03	0.37	1.10	1.00	1.00	1.00	1.13	0.37	1.03E+06	10	41	24	N/A	N/A	N/A	
4.575	2	IWP	Seal	25	9.2	0.79	0.26	1.10	1.00	1.00	1.00	0.87	0.26	1.51E+07	20	0	0	N/A	N/A	N/A	
4.675	2	IWP	Seal	25	9.2	0.42	0.16	1.10	1.00	1.00	1.00	0.46	0.16	1.00E+08	20	0	0	N/A	N/A	N/A	
4.775	2	IWP	Seal	25	9.2	0.97	0.35	1.10	1.00	1.00	1.00	1.07	0.35	1.56E+06	14	19	24	N/A	N/A	N/A	
4.875	2	IWP	Seal	25	9.2	0.96	0.56	1.10	1.00	1.00	1.00	1.06	0.56	1.68E+06	15	16	24	N/A	N/A	N/A	
4.975	2	IWP	Seal	25	9.2	0.67	0.41	1.10	1.00	1.00	1.00	0.74	0.41	1.00E+08	20	0	0	N/A	N/A	N/A	

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
5.075	2	IWP	Seal	25	9.2	0.76	0.31	1.10	1.00	1.00	1.00	0.84	0.31	2.81E+07	20	0	0	N/A	N/A	N/A	
5.175	2	IWP	Seal	25	9.2	0.69	0.31	1.10	1.00	1.00	1.00	0.76	0.31	1.00E+08	20	0	0	N/A	N/A	N/A	
5.275	2	IWP	Seal	25	9.2	0.66	0.25	1.10	1.00	1.00	1.00	0.73	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
5.375	2	IWP	Seal	25	9.2	1.03	0.37	1.10	1.00	1.00	1.00	1.13	0.37	1.03E+06	10	41	24	N/A	N/A	N/A	
5.475	2	IWP	Seal	25	9.2	0.57	0.15	1.10	1.00	1.00	1.00	0.63	0.15	1.00E+08	20	0	0	N/A	N/A	N/A	
5.575	2	IWP	Seal	25	9.2	0.47	0.22	1.10	1.00	1.00	1.00	0.52	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
5.675	2	IWP	Seal	25	9.2	0.86	0.32	1.10	1.00	1.00	1.00	0.95	0.32	4.74E+06	20	0	0	N/A	N/A	N/A	
5.775	2	IWP	Seal	25	9.2	0.78	0.32	1.10	1.00	1.00	1.00	0.86	0.32	1.83E+07	20	0	0	N/A	N/A	N/A	
5.875	2	IWP	Seal	25	9.2	0.86	0.41	1.10	1.00	1.00	1.00	0.95	0.41	4.74E+06	20	0	0	N/A	N/A	N/A	
5.975	2	IWP	Seal	25	9.2	0.83	0.36	1.10	1.00	1.00	1.00	0.91	0.36	7.92E+06	20	0	0	N/A	N/A	N/A	
6.075	2	IWP	Seal	25	9.2	1.34	0.55	1.10	1.00	1.00	1.00	1.47	0.55	1.60E+05	2	148	52	N/A	N/A	N/A	
6.175	2	IWP	Seal	25	9.2	0.96	0.31	1.10	1.00	1.00	1.00	1.06	0.31	1.68E+06	15	16	24	N/A	N/A	N/A	
6.275	2	IWP	Seal	25	9.2	0.77	0.28	1.10	1.00	1.00	1.00	0.85	0.28	2.24E+07	20	0	0	N/A	N/A	N/A	
6.375	2	IWP	Seal	25	9.2	0.74	0.27	1.10	1.00	1.00	1.00	0.81	0.27	6.37E+07	20	0	0	N/A	N/A	N/A	
6.475	2	IWP	Seal	25	9.2	0.81	0.22	1.10	1.00	1.00	1.00	0.89	0.22	1.07E+07	20	0	0	N/A	N/A	N/A	
6.575	2	IWP	Seal	25	9.2	0.49	0.23	1.10	1.00	1.00	1.00	0.54	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
6.675	2	IWP	Seal	25	9.2	0.33	0.23	1.10	1.00	1.00	1.00	0.36	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
6.775	2	IWP	Seal	25	9.2	0.91	0.45	1.10	1.00	1.00	1.00	1.00	0.45	2.81E+06	20	0	0	N/A	N/A	N/A	
6.875	2	IWP	Seal	25	8.4	1.09	0.45	1.10	1.00	1.00	1.00	1.20	0.45	6.98E+05	7	66	24	N/A	N/A	N/A	
6.975	2	IWP	Seal	25	8.4	0.58	0.28	1.10	1.00	1.00	1.00	0.64	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
7.075	2	IWP	Seal	25	8.4	1.38	0.45	1.10	1.00	1.00	1.00	1.52	0.45	1.22E+05	1	161	52	N/A	N/A	N/A	
7.175	2	IWP	Seal	25	8.4	0.69	0.24	1.10	1.00	1.00	1.00	0.76	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
7.275	2	IWP	Seal	25	8.4	0.93	0.36	1.10	1.00	1.00	1.00	1.02	0.36	2.34E+06	20	0	24	N/A	N/A	N/A	
7.375	2	IWP	Seal	25	8.4	0.41	0.19	1.10	1.00	1.00	1.00	0.45	0.19	1.00E+08	20	0	0	N/A	N/A	N/A	
7.475	2	IWP	Seal	25	8.4	0.09	0.03	1.10	1.00	1.00	1.00	0.10	0.03	1.00E+08	20	0	0	N/A	N/A	N/A	
7.575	2	IWP	Seal	25	8.4	0.65	0.22	1.10	1.00	1.00	1.00	0.72	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
7.675	2	IWP	Seal	25	8.4	0.42	0.19	1.10	1.00	1.00	1.00	0.46	0.19	1.00E+08	20	0	0	N/A	N/A	N/A	
7.775	2	IWP	Seal	25	8.4	0.52	0.21	1.10	1.00	1.00	1.00	0.57	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
7.875	2	IWP	Seal	25	8.4	0.89	0.28	1.10	1.00	1.00	1.00	0.98	0.28	3.42E+06	20	0	0	N/A	N/A	N/A	
7.975	2	IWP	Seal	25	8.4	0.68	0.30	1.10	1.00	1.00	1.00	0.75	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
8.075	2	IWP	Seal	25	8.4	0.55	0.14	1.10	1.00	1.00	1.00	0.60	0.14	1.00E+08	20	0	0	N/A	N/A	N/A	

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Permanent Deformation Overlay (mm) Granular	Permanent Deformation Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
8.175	2	IWP	Seal	25	8.4	0.50	0.21	1.10	1.00	1.00	1.00	0.55	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
8.275	2	IWP	Seal	25	8.4	0.67	0.29	1.10	1.00	1.00	1.00	0.74	0.29	1.00E+08	20	0	0	N/A	N/A	N/A	
8.375	2	IWP	Seal	25	8.4	1.57	0.39	1.10	1.00	1.00	1.00	1.73	0.39	3.87E+04	0	213	70	N/A	N/A	N/A	
8.475	2	IWP	Seal	25	8.4	0.58	0.22	1.10	1.00	1.00	1.00	0.64	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
8.575	2	IWP	Seal	25	8.4	0.78	0.22	1.10	1.00	1.00	1.00	0.86	0.22	1.83E+07	20	0	0	N/A	N/A	N/A	
8.675	2	IWP	Seal	25	8.4	0.52	0.19	1.10	1.00	1.00	1.00	0.57	0.19	1.00E+08	20	0	0	N/A	N/A	N/A	
8.775	2	IWP	Seal	25	7.9	1.24	0.31	1.10	1.00	1.00	1.00	1.36	0.31	2.91E+05	3	116	38	N/A	N/A	N/A	
8.875	2	IWP	Seal	25	7.9	0.81	0.28	1.10	1.00	1.00	1.00	0.89	0.28	1.07E+07	20	0	0	N/A	N/A	N/A	
8.975	2	IWP	Seal	25	7.9	1.19	0.58	1.10	1.00	1.00	1.00	1.31	0.58	3.83E+05	4	101	33	N/A	N/A	N/A	
9.075	2	IWP	Seal	25	7.9	1.01	0.42	1.10	1.00	1.00	1.00	1.11	0.42	1.17E+06	11	34	24	N/A	N/A	N/A	
9.175	2	IWP	Seal	25	7.9	0.91	0.28	1.10	1.00	1.00	1.00	1.00	0.28	2.81E+06	20	0	0	N/A	N/A	N/A	
9.275	2	IWP	Seal	25	7.9	0.76	0.30	1.10	1.00	1.00	1.00	0.84	0.30	2.81E+07	20	0	0	N/A	N/A	N/A	
9.375	2	IWP	Seal	25	7.9	0.65	0.23	1.10	1.00	1.00	1.00	0.72	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
9.475	2	IWP	Seal	25	7.5	0.52	0.21	1.10	1.00	1.00	1.00	0.57	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
9.575	2	IWP	Seal	25	7.5	0.69	0.38	1.10	1.00	1.00	1.00	0.76	0.38	1.00E+08	20	0	0	N/A	N/A	N/A	
9.675	2	IWP	Seal	25	7.5	0.70	0.13	1.10	1.00	1.00	1.00	0.77	0.13	1.00E+08	20	0	0	N/A	N/A	N/A	
9.775	2	IWP	Seal	25	6.0	0.35	0.15	1.10	1.00	1.00	1.00	0.38	0.15	1.00E+08	20	0	0	N/A	N/A	N/A	
9.875	2	IWP	Seal	25	6.0	0.42	0.19	1.10	1.00	1.00	1.00	0.46	0.19	1.00E+08	20	0	0	N/A	N/A	N/A	
9.975	2	IWP	Seal	25	6.0	0.65	0.26	1.10	1.00	1.00	1.00	0.72	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
10.075	2	IWP	Seal	25	6.0	0.50	0.18	1.10	1.00	1.00	1.00	0.55	0.18	1.00E+08	20	0	0	N/A	N/A	N/A	
10.175	2	IWP	Seal	25	6.0	0.53	0.21	1.10	1.00	1.00	1.00	0.58	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
10.275	2	IWP	Seal	25	6.0	0.69	0.27	1.10	1.00	1.00	1.00	0.76	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
10.375	2	IWP	Seal	25	6.0	0.54	0.26	1.10	1.00	1.00	1.00	0.59	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
10.475	2	IWP	Seal	25	6.0	0.74	0.30	1.10	1.00	1.00	1.00	0.81	0.30	6.37E+07	20	0	0	N/A	N/A	N/A	
10.575	2	IWP	Seal	25	6.0	1.03	0.38	1.10	1.00	1.00	1.00	1.13	0.38	1.03E+06	10	41	24	N/A	N/A	N/A	
10.675	2	IWP	Seal	25	6.0	0.58	0.23	1.10	1.00	1.00	1.00	0.64	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
10.775	2	IWP	Seal	25	6.0	0.80	0.30	1.10	1.00	1.00	1.00	0.88	0.30	1.26E+07	20	0	0	N/A	N/A	N/A	
10.875	2	IWP	Seal	25	6.0	0.74	0.26	1.10	1.00	1.00	1.00	0.81	0.26	6.37E+07	20	0	0	N/A	N/A	N/A	
10.975	2	IWP	Seal	25	6.0	0.32	0.05	1.10	1.00	1.00	1.00	0.35	0.05	1.00E+08	20	0	0	N/A	N/A	N/A	
11.075	2	IWP	Seal	25	6.0	0.36	0.18	1.10	1.00	1.00	1.00	0.40	0.18	1.00E+08	20	0	0	N/A	N/A	N/A	
11.175	2	IWP	Seal	25	6.0	0.96	0.34	1.10	1.00	1.00	1.00	1.06	0.34	1.68E+06	15	16	24	N/A	N/A	N/A	

Station (km)	Lane	Wheel Path	Surface			FWD Measured		DSF	CSF	Temperature		Adjusted		Permanent Deformation				Fatigue			Comment
			Type	Thickness (mm)	Temp (°C)	Deflection (mm)	Curvature (mm)			Adjustment Factor Deflection	Adjustment Factor Curvature	Deflection (mm)	Curvature (mm)	Remaining Life ESA's	Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Remaining Life ESA's[8]	Remaining Life Yrs[8]	Overlay (mm) Asphalt[8,9]	
11.275	2	IWP	Seal	25	6.0	0.40	0.18	1.10	1.00	1.00	1.00	0.44	0.18	1.00E+08	20	0	0	N/A	N/A	N/A	
11.375	2	IWP	Seal	25	6.0	0.32	0.10	1.10	1.00	1.00	1.00	0.35	0.10	1.00E+08	20	0	0	N/A	N/A	N/A	
11.475	2	IWP	Seal	25	6.0	0.62	0.21	1.10	1.00	1.00	1.00	0.68	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
11.575	2	IWP	Seal	25	6.0	0.79	0.27	1.10	1.00	1.00	1.00	0.87	0.27	1.51E+07	20	0	0	N/A	N/A	N/A	
11.675	2	IWP	Seal	25	6.0	0.64	0.23	1.10	1.00	1.00	1.00	0.70	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
11.775	2	IWP	Seal	25	6.0	0.48	0.19	1.10	1.00	1.00	1.00	0.53	0.19	1.00E+08	20	0	0	N/A	N/A	N/A	
11.875	2	IWP	Seal	25	6.0	0.76	0.37	1.10	1.00	1.00	1.00	0.84	0.37	2.81E+07	20	0	0	N/A	N/A	N/A	
11.975	2	IWP	Seal	25	6.0	1.05	0.29	1.10	1.00	1.00	1.00	1.16	0.29	8.68E+05	9	52	24	N/A	N/A	N/A	
12.075	2	IWP	Seal	25	6.0	1.25	0.43	1.10	1.00	1.00	1.00	1.38	0.43	2.61E+05	3	122	42	N/A	N/A	N/A	
12.175	2	IWP	Seal	25	6.0	0.72	0.25	1.10	1.00	1.00	1.00	0.79	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
12.275	2	IWP	Seal	25	6.0	0.75	0.23	1.10	1.00	1.00	1.00	0.82	0.23	4.70E+07	20	0	0	N/A	N/A	N/A	
12.375	2	IWP	Seal	25	6.0	1.33	0.42	1.10	1.00	1.00	1.00	1.46	0.42	1.69E+05	2	145	47	N/A	N/A	N/A	
12.475	2	IWP	Seal	25	6.0	0.62	0.22	1.10	1.00	1.00	1.00	0.68	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
12.575	2	IWP	Seal	25	6.0	0.70	0.28	1.10	1.00	1.00	1.00	0.77	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
12.675	2	IWP	Seal	25	6.0	0.75	0.30	1.10	1.00	1.00	1.00	0.82	0.30	4.70E+07	20	0	0	N/A	N/A	N/A	
12.775	2	IWP	Seal	25	6.0	1.42	0.46	1.10	1.00	1.00	1.00	1.56	0.46	9.78E+04	1	172	56	N/A	N/A	N/A	
12.875	2	IWP	Seal	25	6.0	1.12	0.48	1.10	1.00	1.00	1.00	1.23	0.48	5.92E+05	6	76	28	N/A	N/A	N/A	
12.975	2	IWP	Seal	25	6.0	1.10	0.58	1.10	1.00	1.00	1.00	1.21	0.58	6.61E+05	7	69	24	N/A	N/A	N/A	
13.075	2	IWP	Seal	25	6.0	0.90	0.41	1.10	1.00	1.00	1.00	0.99	0.41	3.09E+06	20	0	0	N/A	N/A	N/A	
13.175	2	IWP	Seal	25	5.0	0.86	0.42	1.10	1.00	1.00	1.00	0.95	0.42	4.74E+06	20	0	0	N/A	N/A	N/A	
13.275	2	IWP	Seal	25	5.0	0.58	0.25	1.10	1.00	1.00	1.00	0.64	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
13.375	2	IWP	Seal	25	5.0	0.60	0.23	1.10	1.00	1.00	1.00	0.66	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
13.475	2	IWP	Seal	25	5.0	1.68	0.62	1.10	1.00	1.00	1.00	1.85	0.62	2.01E+04	0	241	75	N/A	N/A	N/A	
13.575	2	IWP	Seal	25	5.0	1.61	0.48	1.10	1.00	1.00	1.00	1.77	0.48	3.11E+04	0	223	75	N/A	N/A	N/A	
13.675	2	IWP	Seal	25	5.0	0.51	0.14	1.10	1.00	1.00	1.00	0.56	0.14	1.00E+08	20	0	0	N/A	N/A	N/A	
13.775	2	IWP	Seal	25	5.0	0.95	0.45	1.10	1.00	1.00	1.00	1.04	0.45	1.97E+06	18	8	24	N/A	N/A	N/A	
13.875	2	IWP	Seal	25	5.0	2.09	0.58	1.10	1.00	1.00	1.00	2.30	0.58	1.73E+03	0	329	108	N/A	N/A	N/A	
13.975	2	IWP	Seal	25	5.0	1.06	0.37	1.10	1.00	1.00	1.00	1.17	0.37	8.22E+05	8	55	24	N/A	N/A	N/A	
14.075	2	IWP	Seal	25	5.0	0.95	0.39	1.10	1.00	1.00	1.00	1.04	0.39	1.97E+06	18	8	24	N/A	N/A	N/A	
14.175	2	IWP	Seal	25	5.0	0.60	0.30	1.10	1.00	1.00	1.00	0.66	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
14.275	2	IWP	Seal	25	5.0	0.95	0.46	1.10	1.00	1.00	1.00	1.04	0.46	1.97E+06	18	8	24	N/A	N/A	N/A	

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
14.375	2	IWP	Seal	25	5.0	0.57	0.21	1.10	1.00	1.00	1.00	0.63	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
14.475	2	IWP	Seal	25	5.0	0.84	0.27	1.10	1.00	1.00	1.00	0.92	0.27	6.90E+06	20	0	0	N/A	N/A	N/A	
14.575	2	IWP	Seal	25	5.0	0.58	0.29	1.10	1.00	1.00	1.00	0.64	0.29	1.00E+08	20	0	0	N/A	N/A	N/A	
Average				25	8.1	0.76	0.30					0.84	0.30	5.61E+07	17	20	8	N/A	N/A	N/A	
Standard Deviation				0	1.9	0.29	0.11					0.32	0.11	4.64E+07	6	52	18	N/A	N/A	N/A	
10th Percentile						0.42	0.19					0.46	0.19	6.98E+05	7	0	0	N/A	N/A	N/A	
90th Percentile						1.09	0.45					1.20	0.45	1.00E+08	20	66	24	N/A	N/A	N/A	

Survey Notes

1 These remaining life and overlay calculations follow the methodology of the Austroads Guide to Pavement Technology Part 5 Appendix E
2 The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue life
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6 The overlay requirements indicate the thickness of additional material required to overcome any structural deficiencies of the pavement based on the pavement consisting of an asphalt wearing course and being subject to both permanent deformation and fatigue
7 The granular overlay requirements for design traffic volumes up to 1x10^8 ESA's can be derived using the Design Chart Method, while asphalt overlays are limited to a maximum design traffic volume of 1x10^7 ESA'
8 The asphalt fatigue remaining life is calculated considering a minimum 40mm of asphalt overlay
9 The thickness of the asphalt overlay considering fatigue is the minimum required considering the design traffic

Prepared By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Reviewed By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Remaining Life and Overlay Requirements - Design Charts Method [2,3]

Report Date: 24-Sep-18
Project No.: 2017152
Report No.: R2017152
Location: 2A1_IWP - Mountain Ash Road from Jerrara Road to Bungonia Bypass
Test Method: QT211
Analysis Method: FPMS-QP4-002
Tested By: John Muir
Testing Date: 30-May-18
Test Equipment: FWD-016

Client: Multiquip Quarries

Prepared By: James Erskine
Growth Rate: 2.5%
Design Period: 20
Design Traffic Intensity: 9.41E+05
Existing Pavement: Flexible without Cemented Materials
Overlay Type: Asphalt
Design Deflection: 1.15
WMAPT: 22
Overlay Adjustment Factor: 0.94
Seasonal Moisture Variation: 1.0

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
14.650	1	IWP	Seal	25	14.8	0.80	0.29	1.10	1.00	1.00	1.00	0.88	0.29	1.26E+07	20	0	0	N/A	N/A	N/A	
14.750	1	IWP	Seal	25	14.8	0.51	0.23	1.10	1.00	1.00	1.00	0.56	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
Average				25	14.8	0.66	0.26					0.72	0.26	5.63E+07	20	0	0	N/A	N/A	N/A	
Standard Deviation				0	0.0	0.21	0.04					0.23	0.04	6.18E+07	0	0	0	N/A	N/A	N/A	
10th Percentile						0.54	0.24					0.59	0.24	2.14E+07	20	0	0	N/A	N/A	N/A	
90th Percentile						0.77	0.28					0.85	0.28	9.13E+07	20	0	0	N/A	N/A	N/A	

Survey Notes

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8 The asphalt fatigue remaining life is calculated considering a minimum 40mm of asphalt overlay
9 The thickness of the asphalt overlay considering fatigue is the minimum required considering the design traffic

Prepared By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Reviewed By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Pavement Management Services
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Seven Hills, NSW 2147

Remaining Life and Overlay Requirements - Design Charts Method [2,3]

Report Date: 24-Sep-18
Project No.: 2017152
Report No.: R2017152
Location: 2A2_IWP - Mountain Ash Road from Bungonia Bypass to Jerrara Road
Test Method: QT211
Analysis Method: FPMS-QP4-002
Tested By: John Muir
Testing Date: 30-May-18
Test Equipment: FWD-016

Client: Multiquip Quarries

Prepared By: James Erskine
Growth Rate: 2.5%
Design Period: 20
Design Traffic Intensity: 2.56E+06
Existing Pavement: Flexible without Cemented Materials
Overlay Type: Asphalt
Design Deflection: 1.01
WMAPT: 22
Overlay Adjustment Factor: 0.94
Seasonal Moisture Variation: 1.0

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Permanent Deformation Overlay (mm) Granular	Permanent Deformation Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
14.675	2	IWP	Seal	25	14.8	0.64	0.21	1.10	1.00	1.00	1.00	0.70	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
14.775	2	IWP	Seal	25	14.8	0.58	0.29	1.10	1.00	1.00	1.00	0.64	0.29	1.00E+08	20	0	0	N/A	N/A	N/A	
Average				25	14.8	0.61	0.25					0.67	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
Standard Deviation				0	0.0	0.04	0.06					0.04	0.06	0.00E+00	0	0	0	N/A	N/A	N/A	
10th Percentile						0.59	0.22					0.65	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
90th Percentile						0.63	0.28					0.69	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	

Survey Notes

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2 The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue life
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James Erskine
Senior Pavement Engineer
24-Sep-18

Reviewed By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Remaining Life and Overlay Requirements - Design Charts Method [2,3]

Report Date: 24-Sep-18
Project No.: 2017152
Report No.: R2017152
Location: 3A1_IWP - Oallen Ford Road from Bungonia Bypass to Lumley Road (Quarry Entrance)
Test Method: QT211
Analysis Method: FPMS-QP4-002
Tested By: John Muir
Testing Date: 20-Jun-18
Test Equipment: FWD-016

Client: Multiquip Quarries

Prepared By: James Erskine
Growth Rate: 2.5%
Design Period: 20
Design Traffic Intensity: 4.80E+05
Existing Pavement: Flexible without Cemented Materials
Overlay Type: Asphalt
Design Deflection: 1.27
WMAPT: 22
Overlay Adjustment Factor: 0.94
Seasonal Moisture Variation: 1.0

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
16.350	1	IWP	Seal	25	14.6	0.54	0.22	1.10	1.00	1.00	1.00	0.59	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
16.450	1	IWP	Seal	25	14.6	0.58	0.24	1.10	1.00	1.00	1.00	0.64	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
16.550	1	IWP	Seal	25	14.6	0.43	0.14	1.10	1.00	1.00	1.00	0.47	0.14	1.00E+08	20	0	0	N/A	N/A	N/A	
16.650	1	IWP	Seal	25	14.6	0.81	0.43	1.10	1.00	1.00	1.00	0.89	0.43	1.07E+07	20	0	0	N/A	N/A	N/A	
16.750	1	IWP	Seal	25	14.6	0.86	0.28	1.10	1.00	1.00	1.00	0.95	0.28	4.74E+06	20	0	0	N/A	N/A	N/A	
16.850	1	IWP	Seal	25	14.6	0.61	0.26	1.10	1.00	1.00	1.00	0.67	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
16.950	1	IWP	Seal	25	14.6	0.70	0.28	1.10	1.00	1.00	1.00	0.77	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
17.050	1	IWP	Seal	25	14.6	0.37	0.12	1.10	1.00	1.00	1.00	0.41	0.12	1.00E+08	20	0	0	N/A	N/A	N/A	
17.150	1	IWP	Seal	25	14.6	0.44	0.22	1.10	1.00	1.00	1.00	0.48	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
17.250	1	IWP	Seal	25	14.6	0.60	0.23	1.10	1.00	1.00	1.00	0.66	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
17.350	1	IWP	Seal	25	14.6	0.22	0.07	1.10	1.00	1.00	1.00	0.24	0.07	1.00E+08	20	0	0	N/A	N/A	N/A	
17.450	1	IWP	Seal	25	14.6	0.63	0.30	1.10	1.00	1.00	1.00	0.69	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
17.550	1	IWP	Seal	25	14.6	0.61	0.17	1.10	1.00	1.00	1.00	0.67	0.17	1.00E+08	20	0	0	N/A	N/A	N/A	
17.650	1	IWP	Seal	25	14.6	0.60	0.27	1.10	1.00	1.00	1.00	0.66	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
17.750	1	IWP	Seal	25	14.6	0.60	0.27	1.10	1.00	1.00	1.00	0.66	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
17.850	1	IWP	Seal	25	14.6	0.47	0.19	1.10	1.00	1.00	1.00	0.52	0.19	1.00E+08	20	0	0	N/A	N/A	N/A	
17.950	1	IWP	Seal	25	14.6	0.59	0.21	1.10	1.00	1.00	1.00	0.65	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
18.050	1	IWP	Seal	25	14.6	0.63	0.33	1.10	1.00	1.00	1.00	0.69	0.33	1.00E+08	20	0	0	N/A	N/A	N/A	

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Permanent Deformation Overlay (mm) Granular	Permanent Deformation Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
18.150	1	IWP	Seal	25	14.6	0.37	0.15	1.10	1.00	1.00	1.00	0.41	0.15	1.00E+08	20	0	0	N/A	N/A	N/A	
18.250	1	IWP	Seal	25	14.6	0.42	0.20	1.10	1.00	1.00	1.00	0.46	0.20	1.00E+08	20	0	0	N/A	N/A	N/A	
18.350	1	IWP	Seal	25	14.6	1.16	0.45	1.10	1.00	1.00	1.00	1.28	0.45	4.51E+05	19	3	24	N/A	N/A	N/A	
18.450	1	IWP	Seal	25	14.6	0.58	0.29	1.10	1.00	1.00	1.00	0.64	0.29	1.00E+08	20	0	0	N/A	N/A	N/A	
18.550	1	IWP	Seal	25	14.8	0.85	0.31	1.10	1.00	1.00	1.00	0.94	0.31	5.34E+06	20	0	0	N/A	N/A	N/A	
18.650	1	IWP	Seal	25	14.8	0.66	0.27	1.10	1.00	1.00	1.00	0.73	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
18.750	1	IWP	Seal	25	14.8	0.78	0.34	1.10	1.00	1.00	1.00	0.86	0.34	1.83E+07	20	0	0	N/A	N/A	N/A	
18.850	1	IWP	Seal	25	14.8	1.08	0.36	1.10	1.00	1.00	1.00	1.19	0.36	7.37E+05	20	0	0	N/A	N/A	N/A	
18.950	1	IWP	Seal	25	14.8	0.66	0.23	1.10	1.00	1.00	1.00	0.73	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
19.050	1	IWP	Seal	25	14.8	0.80	0.44	1.10	1.00	1.00	1.00	0.88	0.44	1.26E+07	20	0	0	N/A	N/A	N/A	
19.150	1	IWP	Seal	25	14.8	1.23	0.67	1.10	1.00	1.00	1.00	1.35	0.67	3.08E+05	14	25	24	N/A	N/A	N/A	
19.250	1	IWP	Seal	25	14.8	0.53	0.24	1.10	1.00	1.00	1.00	0.58	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
19.350	1	IWP	Seal	25	14.8	0.67	0.24	1.10	1.00	1.00	1.00	0.74	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
19.450	1	IWP	Seal	25	14.8	0.73	0.31	1.10	1.00	1.00	1.00	0.80	0.31	1.00E+08	20	0	0	N/A	N/A	N/A	
19.550	1	IWP	Seal	25	14.8	0.67	0.31	1.10	1.00	1.00	1.00	0.74	0.31	1.00E+08	20	0	0	N/A	N/A	N/A	
19.650	1	IWP	Seal	25	14.8	0.91	0.39	1.10	1.00	1.00	1.00	1.00	0.39	2.81E+06	20	0	0	N/A	N/A	N/A	
19.750	1	IWP	Seal	25	14.8	0.55	0.14	1.10	1.00	1.00	1.00	0.60	0.14	1.00E+08	20	0	0	N/A	N/A	N/A	
Average				25	14.7	0.66	0.27					0.72	0.27	7.59E+07	20	1	1	N/A	N/A	N/A	
Standard Deviation				0	0.1	0.22	0.11					0.24	0.11	4.17E+07	1	4	6	N/A	N/A	N/A	
10th Percentile						0.42	0.14					0.46	0.14	3.58E+06	20	0	0	N/A	N/A	N/A	
90th Percentile						0.89	0.41					0.98	0.41	1.00E+08	20	0	0	N/A	N/A	N/A	

Survey Notes

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Prepared By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Reviewed By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Remaining Life and Overlay Requirements - Design Charts Method [2,3]

Report Date: 24-Sep-18
Project No.: 2017152
Report No.: R2017152
Location: 3A2_IWP - Oallen Ford Road from Lumley Road (Quarry Entrance) to Bungonia Bypass
Test Method: QT211
Analysis Method: FPMS-QP4-002
Tested By: John Muir
Testing Date: 20-Jun-18
Test Equipment: FWD-016

Client: Multiquip Quarries

Prepared By: James Erskine
Growth Rate: 2.5%
Design Period: 20
Design Traffic Intensity: 2.09E+06
Existing Pavement: Flexible without Cemented Materials
Overlay Type: Asphalt
Design Deflection: 1.03
WMAPT: 22
Overlay Adjustment Factor: 0.94
Seasonal Moisture Variation: 1.0

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
16.375	2	IWP	Seal	25	14.8	0.76	0.29	1.10	1.00	1.00	1.00	0.84	0.29	2.81E+07	20	0	0	N/A	N/A	N/A	
16.475	2	IWP	Seal	25	14.8	0.81	0.22	1.10	1.00	1.00	1.00	0.89	0.22	1.07E+07	20	0	0	N/A	N/A	N/A	
16.575	2	IWP	Seal	25	14.8	1.16	0.46	1.10	1.00	1.00	1.00	1.28	0.46	4.51E+05	5	88	28	N/A	N/A	N/A	
16.675	2	IWP	Seal	25	14.8	0.51	0.25	1.10	1.00	1.00	1.00	0.56	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
16.775	2	IWP	Seal	25	14.8	0.87	0.26	1.10	1.00	1.00	1.00	0.96	0.26	4.23E+06	20	0	0	N/A	N/A	N/A	
16.875	2	IWP	Seal	25	14.8	0.73	0.19	1.10	1.00	1.00	1.00	0.80	0.19	1.00E+08	20	0	0	N/A	N/A	N/A	
16.975	2	IWP	Seal	25	14.8	0.71	0.18	1.10	1.00	1.00	1.00	0.78	0.18	1.00E+08	20	0	0	N/A	N/A	N/A	
17.075	2	IWP	Seal	25	14.8	0.42	0.16	1.10	1.00	1.00	1.00	0.46	0.16	1.00E+08	20	0	0	N/A	N/A	N/A	
17.175	2	IWP	Seal	25	14.8	0.79	0.32	1.10	1.00	1.00	1.00	0.87	0.32	1.51E+07	20	0	0	N/A	N/A	N/A	
17.275	2	IWP	Seal	25	14.8	0.23	0.10	1.10	1.00	1.00	1.00	0.25	0.10	1.00E+08	20	0	0	N/A	N/A	N/A	
17.375	2	IWP	Seal	25	14.8	0.12	0.05	1.10	1.00	1.00	1.00	0.13	0.05	1.00E+08	20	0	0	N/A	N/A	N/A	
17.475	2	IWP	Seal	25	14.8	0.88	0.15	1.10	1.00	1.00	1.00	0.97	0.15	3.79E+06	20	0	0	N/A	N/A	N/A	
17.575	2	IWP	Seal	25	14.8	0.64	0.21	1.10	1.00	1.00	1.00	0.70	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
17.675	2	IWP	Seal	25	14.8	0.30	0.14	1.10	1.00	1.00	1.00	0.33	0.14	1.00E+08	20	0	0	N/A	N/A	N/A	
17.775	2	IWP	Seal	25	14.8	0.71	0.30	1.10	1.00	1.00	1.00	0.78	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
17.875	2	IWP	Seal	25	14.8	0.59	0.30	1.10	1.00	1.00	1.00	0.65	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
17.975	2	IWP	Seal	25	14.8	0.63	0.17	1.10	1.00	1.00	1.00	0.69	0.17	1.00E+08	20	0	0	N/A	N/A	N/A	
18.075	2	IWP	Seal	25	14.8	0.76	0.26	1.10	1.00	1.00	1.00	0.84	0.26	2.81E+07	20	0	0	N/A	N/A	N/A	

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
18.175	2	IWP	Seal	25	14.8	0.36	0.18	1.10	1.00	1.00	1.00	0.40	0.18	1.00E+08	20	0	0	N/A	N/A	N/A	
18.275	2	IWP	Seal	25	14.8	0.65	0.26	1.10	1.00	1.00	1.00	0.72	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
18.375	2	IWP	Seal	25	14.8	0.56	0.16	1.10	1.00	1.00	1.00	0.62	0.16	1.00E+08	20	0	0	N/A	N/A	N/A	
18.475	2	IWP	Seal	25	14.8	1.06	0.52	1.10	1.00	1.00	1.00	1.17	0.52	8.22E+05	9	51	24	N/A	N/A	N/A	
18.575	2	IWP	Seal	25	14.8	0.47	0.15	1.10	1.00	1.00	1.00	0.52	0.15	1.00E+08	20	0	0	N/A	N/A	N/A	
18.675	2	IWP	Seal	25	14.8	0.96	0.46	1.10	1.00	1.00	1.00	1.06	0.46	1.68E+06	17	12	24	N/A	N/A	N/A	
18.775	2	IWP	Seal	25	14.8	1.20	0.39	1.10	1.00	1.00	1.00	1.32	0.39	3.62E+05	4	100	33	N/A	N/A	N/A	
18.875	2	IWP	Seal	25	14.8	0.45	0.23	1.10	1.00	1.00	1.00	0.50	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
18.975	2	IWP	Seal	25	14.8	0.82	0.32	1.10	1.00	1.00	1.00	0.90	0.32	9.17E+06	20	0	0	N/A	N/A	N/A	
19.075	2	IWP	Seal	25	14.8	0.79	0.15	1.10	1.00	1.00	1.00	0.87	0.15	1.51E+07	20	0	0	N/A	N/A	N/A	
19.175	2	IWP	Seal	25	14.8	0.78	0.20	1.10	1.00	1.00	1.00	0.86	0.20	1.83E+07	20	0	0	N/A	N/A	N/A	
19.275	2	IWP	Seal	25	14.8	1.00	0.35	1.10	1.00	1.00	1.00	1.10	0.35	1.25E+06	13	27	24	N/A	N/A	N/A	
19.375	2	IWP	Seal	25	14.8	0.57	0.23	1.10	1.00	1.00	1.00	0.63	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
19.475	2	IWP	Seal	25	14.8	0.60	0.28	1.10	1.00	1.00	1.00	0.66	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
19.575	2	IWP	Seal	25	14.8	0.39	0.15	1.10	1.00	1.00	1.00	0.43	0.15	1.00E+08	20	0	0	N/A	N/A	N/A	
19.675	2	IWP	Seal	25	14.8	0.79	0.23	1.10	1.00	1.00	1.00	0.87	0.23	1.51E+07	20	0	0	N/A	N/A	N/A	
19.775	2	IWP	Seal	25	14.8	0.59	0.23	1.10	1.00	1.00	1.00	0.65	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
Average				25	14.8	0.68	0.24					0.74	0.24	6.15E+07	19	8	4	N/A	N/A	N/A	
Standard Deviation				0	0.0	0.25	0.10					0.27	0.10	4.55E+07	4	24	10	N/A	N/A	N/A	
10th Percentile						0.37	0.15					0.41	0.15	1.42E+06	15	0	0	N/A	N/A	N/A	
90th Percentile						0.98	0.37					1.08	0.37	1.00E+08	20	21	24	N/A	N/A	N/A	

Survey Notes

1 These remaining life and overlay calculations follow the methodology of the Austroads Guide to Pavement Technology Part 5 Appendix E
2 The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue life
3 The remaining life and overlay requirements assume that the pavement is flexible and does not include any cemented materials, where this is not the case a mechanistic analysis should be undertaken
4 The asphalt overlay thickness to overcome permanent deformation is based on using asphalt with C320 binder, the use of other binders may result in a different thickness required
5 It is possible that a thinner asphalt overlay thickness may overcome fatigue however there would be a higher risk of premature distress in this case and as such it has not been considered
6 The overlay requirements indicate the thickness of additional material required to overcome any structural deficiencies of the pavement based on the pavement consisting of an asphalt wearing course and being subject to both permanent deformation and fatigue
7 The granular overlay requirements for design traffic volumes up to 1x10^8 ESA's can be derived using the Design Chart Method, while asphalt overlays are limited to a maximum design traffic volume of 1x10^7 ESA'
8 The asphalt fatigue remaining life is calculated considering a minimum 40mm of asphalt overlay
9 The thickness of the asphalt overlay considering fatigue is the minimum required considering the design traffic

Prepared By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Reviewed By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Remaining Life and Overlay Requirements - Design Charts Method [2,3]

Report Date: 24-Sep-18
Project No.: 2017152
Report No.: R2017152
Location: 1A1_IWP - Jerrara Road from South Marulan Road to Mountain Ash Road
Test Method: QT211
Analysis Method: FPMS-QP4-002
Tested By: John Muir
Testing Date: 31-May-18
Test Equipment: FWD-016

Client: Multiquip Quarries

Prepared By: James Erskine
Growth Rate: 2.5%
Design Period: 20
Design Traffic Intensity: 8.28E+05
Existing Pavement: Flexible without Cemented Materials
Overlay Type: Asphalt
Design Deflection: 1.17
WMAPT: 22
Overlay Adjustment Factor: 0.94
Seasonal Moisture Variation: 1.0

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
0.150	1	IWP	Seal	25	14.3	0.78	0.31	1.10	1.00	1.00	1.00	0.86	0.31	1.83E+07	20	0	0	N/A	N/A	N/A	
0.250	1	IWP	Seal	25	14.3	0.83	0.26	1.10	1.00	1.00	1.00	0.91	0.26	7.92E+06	20	0	0	N/A	N/A	N/A	
0.350	1	IWP	Seal	25	14.3	0.54	0.22	1.10	1.00	1.00	1.00	0.59	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
0.450	1	IWP	Seal	25	14.3	0.64	0.33	1.10	1.00	1.00	1.00	0.70	0.33	1.00E+08	20	0	0	N/A	N/A	N/A	
0.550	1	IWP	Seal	25	14.3	0.52	0.27	1.10	1.00	1.00	1.00	0.57	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
0.650	1	IWP	Seal	25	14.3	0.91	0.43	1.10	1.00	1.00	1.00	1.00	0.43	2.81E+06	20	0	0	N/A	N/A	N/A	
0.750	1	IWP	Seal	25	14.3	0.54	0.23	1.10	1.00	1.00	1.00	0.59	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
0.850	1	IWP	Seal	25	14.3	0.64	0.26	1.10	1.00	1.00	1.00	0.70	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
0.950	1	IWP	Seal	25	14.3	0.97	0.36	1.10	1.00	1.00	1.00	1.07	0.36	1.56E+06	20	0	0	N/A	N/A	N/A	
1.050	1	IWP	Seal	25	14.3	0.51	0.25	1.10	1.00	1.00	1.00	0.56	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
1.150	1	IWP	Seal	25	14.3	0.39	0.22	1.10	1.00	1.00	1.00	0.43	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
1.250	1	IWP	Seal	25	14.3	0.84	0.33	1.10	1.00	1.00	1.00	0.92	0.33	6.90E+06	20	0	0	N/A	N/A	N/A	
1.350	1	IWP	Seal	25	14.3	1.05	0.38	1.10	1.00	1.00	1.00	1.16	0.38	8.68E+05	20	0	0	N/A	N/A	N/A	
1.450	1	IWP	Seal	25	14.3	1.03	0.49	1.10	1.00	1.00	1.00	1.13	0.49	1.03E+06	20	0	0	N/A	N/A	N/A	
1.550	1	IWP	Seal	25	14.3	0.76	0.35	1.10	1.00	1.00	1.00	0.84	0.35	2.81E+07	20	0	0	N/A	N/A	N/A	
1.650	1	IWP	Seal	25	14.3	1.05	0.46	1.10	1.00	1.00	1.00	1.16	0.46	8.68E+05	20	0	0	N/A	N/A	N/A	
1.750	1	IWP	Seal	25	14.3	0.79	0.35	1.10	1.00	1.00	1.00	0.87	0.35	1.51E+07	20	0	0	N/A	N/A	N/A	
1.850	1	IWP	Seal	25	14.3	0.93	0.35	1.10	1.00	1.00	1.00	1.02	0.35	2.34E+06	20	0	0	N/A	N/A	N/A	

Station	Lane	Wheel	Surface			FWD Measured		DSF	CSF	Temperature		Adjusted		Permanent Deformation				Fatigue			Comment
				Thickness	Temp	Deflection	Curvature			Adjustment Factor		Deflection	Curvature	Remaining Life		Overlay (mm)		Remaining Life		Overlay (mm)	
(km)		Path	Type	(mm)	(°C)	(mm)	(mm)			Deflection	Curvature	(mm)	(mm)	ESA's	Yrs	Granular	Asphalt[4]	ESA's[8]	Yrs[8]	Asphalt[8,9]	
1.950	1	IWP	Seal	25	14.3	0.72	0.37	1.10	1.00	1.00	1.00	0.79	0.37	1.00E+08	20	0	0	N/A	N/A	N/A	
2.050	1	IWP	Seal	25	14.3	0.87	0.43	1.10	1.00	1.00	1.00	0.96	0.43	4.23E+06	20	0	0	N/A	N/A	N/A	
2.150	1	IWP	Seal	25	14.3	0.67	0.25	1.10	1.00	1.00	1.00	0.74	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
2.250	1	IWP	Seal	25	14.3	0.67	0.30	1.10	1.00	1.00	1.00	0.74	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
2.350	1	IWP	Seal	25	14.3	0.98	0.26	1.10	1.00	1.00	1.00	1.08	0.26	1.45E+06	20	0	0	N/A	N/A	N/A	
2.450	1	IWP	Seal	25	14.3	0.76	0.34	1.10	1.00	1.00	1.00	0.84	0.34	2.81E+07	20	0	0	N/A	N/A	N/A	
2.550	1	IWP	Seal	25	14.3	0.59	0.34	1.10	1.00	1.00	1.00	0.65	0.34	1.00E+08	20	0	0	N/A	N/A	N/A	
2.650	1	IWP	Seal	25	14.3	0.80	0.32	1.10	1.00	1.00	1.00	0.88	0.32	1.26E+07	20	0	0	N/A	N/A	N/A	
2.750	1	IWP	Seal	25	14.3	0.74	0.25	1.10	1.00	1.00	1.00	0.81	0.25	6.37E+07	20	0	0	N/A	N/A	N/A	
2.850	1	IWP	Seal	25	14.3	0.98	0.45	1.10	1.00	1.00	1.00	1.08	0.45	1.45E+06	20	0	0	N/A	N/A	N/A	
2.950	1	IWP	Seal	25	14.3	0.70	0.25	1.10	1.00	1.00	1.00	0.77	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
3.050	1	IWP	Seal	25	14.3	0.82	0.37	1.10	1.00	1.00	1.00	0.90	0.37	9.17E+06	20	0	0	N/A	N/A	N/A	
3.150	1	IWP	Seal	25	14.3	1.11	0.46	1.10	1.00	1.00	1.00	1.22	0.46	6.25E+05	16	17	24	N/A	N/A	N/A	
3.250	1	IWP	Seal	25	14.3	0.79	0.33	1.10	1.00	1.00	1.00	0.87	0.33	1.51E+07	20	0	0	N/A	N/A	N/A	
3.350	1	IWP	Seal	25	14.3	0.65	0.33	1.10	1.00	1.00	1.00	0.72	0.33	1.00E+08	20	0	0	N/A	N/A	N/A	
3.450	1	IWP	Seal	25	14.3	0.68	0.25	1.10	1.00	1.00	1.00	0.75	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
3.550	1	IWP	Seal	25	14.3	0.95	0.54	1.10	1.00	1.00	1.00	1.04	0.54	1.97E+06	20	0	0	N/A	N/A	N/A	
3.650	1	IWP	Seal	25	14.3	0.85	0.38	1.10	1.00	1.00	1.00	0.94	0.38	5.34E+06	20	0	0	N/A	N/A	N/A	
3.750	1	IWP	Seal	25	14.3	0.88	0.42	1.10	1.00	1.00	1.00	0.97	0.42	3.79E+06	20	0	0	N/A	N/A	N/A	
3.850	1	IWP	Seal	25	14.3	0.37	0.21	1.10	1.00	1.00	1.00	0.41	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
3.950	1	IWP	Seal	25	14.3	0.57	0.29	1.10	1.00	1.00	1.00	0.63	0.29	1.00E+08	20	0	0	N/A	N/A	N/A	
4.050	1	IWP	Seal	25	14.3	0.84	0.37	1.10	1.00	1.00	1.00	0.92	0.37	6.90E+06	20	0	0	N/A	N/A	N/A	
4.150	1	IWP	Seal	25	14.3	0.36	0.19	1.10	1.00	1.00	1.00	0.40	0.19	1.00E+08	20	0	0	N/A	N/A	N/A	
4.250	1	IWP	Seal	25	14.3	0.93	0.45	1.10	1.00	1.00	1.00	1.02	0.45	2.34E+06	20	0	0	N/A	N/A	N/A	
4.350	1	IWP	Seal	25	14.3	0.74	0.33	1.10	1.00	1.00	1.00	0.81	0.33	6.37E+07	20	0	0	N/A	N/A	N/A	
4.450	1	IWP	Seal	25	14.3	1.04	0.42	1.10	1.00	1.00	1.00	1.14	0.42	9.68E+05	20	0	0	N/A	N/A	N/A	
4.550	1	IWP	Seal	25	14.3	0.64	0.26	1.10	1.00	1.00	1.00	0.70	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
4.650	1	IWP	Seal	25	14.3	0.42	0.20	1.10	1.00	1.00	1.00	0.46	0.20	1.00E+08	20	0	0	N/A	N/A	N/A	
4.750	1	IWP	Seal	25	14.3	0.41	0.17	1.10	1.00	1.00	1.00	0.45	0.17	1.00E+08	20	0	0	N/A	N/A	N/A	
4.850	1	IWP	Seal	25	14.3	0.66	0.27	1.10	1.00	1.00	1.00	0.73	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
4.950	1	IWP	Seal	25	14.3	0.96	0.48	1.10	1.00	1.00	1.00	1.06	0.48	1.68E+06	20	0	0	N/A	N/A	N/A	

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
5.050	1	IWP	Seal	25	14.3	1.21	0.47	1.10	1.00	1.00	1.00	1.33	0.47	3.43E+05	10	52	24	N/A	N/A	N/A	
5.150	1	IWP	Seal	25	14.3	0.95	0.50	1.10	1.00	1.00	1.00	1.04	0.50	1.97E+06	20	0	0	N/A	N/A	N/A	
5.250	1	IWP	Seal	25	14.3	0.67	0.39	1.10	1.00	1.00	1.00	0.74	0.39	1.00E+08	20	0	0	N/A	N/A	N/A	
5.350	1	IWP	Seal	25	14.3	0.97	0.27	1.10	1.00	1.00	1.00	1.07	0.27	1.56E+06	20	0	0	N/A	N/A	N/A	
5.450	1	IWP	Seal	25	14.3	0.86	0.32	1.10	1.00	1.00	1.00	0.95	0.32	4.74E+06	20	0	0	N/A	N/A	N/A	
5.550	1	IWP	Seal	25	14.3	0.88	0.42	1.10	1.00	1.00	1.00	0.97	0.42	3.79E+06	20	0	0	N/A	N/A	N/A	
5.650	1	IWP	Seal	25	14.3	1.00	0.45	1.10	1.00	1.00	1.00	1.10	0.45	1.25E+06	20	0	0	N/A	N/A	N/A	
5.750	1	IWP	Seal	25	14.3	0.83	0.29	1.10	1.00	1.00	1.00	0.91	0.29	7.92E+06	20	0	0	N/A	N/A	N/A	
5.850	1	IWP	Seal	25	14.3	0.82	0.39	1.10	1.00	1.00	1.00	0.90	0.39	9.17E+06	20	0	0	N/A	N/A	N/A	
5.950	1	IWP	Seal	25	14.3	0.73	0.35	1.10	1.00	1.00	1.00	0.80	0.35	1.00E+08	20	0	0	N/A	N/A	N/A	
6.050	1	IWP	Seal	25	14.3	1.18	0.61	1.10	1.00	1.00	1.00	1.30	0.61	4.04E+05	11	43	24	N/A	N/A	N/A	
6.150	1	IWP	Seal	25	14.3	0.84	0.35	1.10	1.00	1.00	1.00	0.92	0.35	6.90E+06	20	0	0	N/A	N/A	N/A	
6.250	1	IWP	Seal	25	14.3	1.06	0.42	1.10	1.00	1.00	1.00	1.17	0.42	8.22E+05	20	0	24	N/A	N/A	N/A	
6.350	1	IWP	Seal	25	14.3	0.99	0.41	1.10	1.00	1.00	1.00	1.09	0.41	1.34E+06	20	0	0	N/A	N/A	N/A	
6.450	1	IWP	Seal	25	14.3	0.80	0.33	1.10	1.00	1.00	1.00	0.88	0.33	1.26E+07	20	0	0	N/A	N/A	N/A	
6.550	1	IWP	Seal	25	14.3	0.58	0.25	1.10	1.00	1.00	1.00	0.64	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
6.650	1	IWP	Seal	25	14.3	0.36	0.20	1.10	1.00	1.00	1.00	0.40	0.20	1.00E+08	20	0	0	N/A	N/A	N/A	
6.750	1	IWP	Seal	25	14.3	0.89	0.45	1.10	1.00	1.00	1.00	0.98	0.45	3.42E+06	20	0	0	N/A	N/A	N/A	
6.850	1	IWP	Seal	25	14.3	0.68	0.32	1.10	1.00	1.00	1.00	0.75	0.32	1.00E+08	20	0	0	N/A	N/A	N/A	
6.950	1	IWP	Seal	25	14.3	0.95	0.41	1.10	1.00	1.00	1.00	1.04	0.41	1.97E+06	20	0	0	N/A	N/A	N/A	
7.050	1	IWP	Seal	25	14.3	0.45	0.22	1.10	1.00	1.00	1.00	0.50	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
7.150	1	IWP	Seal	25	14.3	0.73	0.25	1.10	1.00	1.00	1.00	0.80	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
7.250	1	IWP	Seal	25	14.3	0.49	0.22	1.10	1.00	1.00	1.00	0.54	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
7.350	1	IWP	Seal	25	14.3	0.54	0.23	1.10	1.00	1.00	1.00	0.59	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
7.450	1	IWP	Seal	25	14.3	0.29	0.18	1.10	1.00	1.00	1.00	0.32	0.18	1.00E+08	20	0	0	N/A	N/A	N/A	
7.550	1	IWP	Seal	25	14.3	0.67	0.33	1.10	1.00	1.00	1.00	0.74	0.33	1.00E+08	20	0	0	N/A	N/A	N/A	
7.650	1	IWP	Seal	25	14.3	0.44	0.28	1.10	1.00	1.00	1.00	0.48	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
7.750	1	IWP	Seal	25	14.3	0.64	0.28	1.10	1.00	1.00	1.00	0.70	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
7.850	1	IWP	Seal	25	14.3	1.04	0.43	1.10	1.00	1.00	1.00	1.14	0.43	9.68E+05	20	0	0	N/A	N/A	N/A	
7.950	1	IWP	Seal	25	14.3	0.63	0.30	1.10	1.00	1.00	1.00	0.69	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
8.050	1	IWP	Seal	25	14.3	0.76	0.30	1.10	1.00	1.00	1.00	0.84	0.30	2.81E+07	20	0	0	N/A	N/A	N/A	

Station	Lane	Wheel	Surface			FWD Measured		DSF	CSF	Temperature Adjustment Factor		Adjusted		Permanent Deformation				Fatigue			Comment
(km)		Path	Type	Thickness (mm)	Temp (°C)	Deflection (mm)	Curvature (mm)			Deflection	Curvature	Deflection (mm)	Curvature (mm)	Remaining Life ESA's	Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Remaining Life ESA's[8]	Remaining Life Yrs[8]	Overlay (mm) Asphalt[8,9]	
8.150	1	IWP	Seal	25	14.3	0.87	0.30	1.10	1.00	1.00	1.00	0.96	0.30	4.23E+06	20	0	0	N/A	N/A	N/A	
8.250	1	IWP	Seal	25	14.3	0.56	0.32	1.10	1.00	1.00	1.00	0.62	0.32	1.00E+08	20	0	0	N/A	N/A	N/A	
8.350	1	IWP	Seal	25	14.3	0.51	0.24	1.10	1.00	1.00	1.00	0.56	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
8.450	1	IWP	Seal	25	14.3	0.61	0.34	1.10	1.00	1.00	1.00	0.67	0.34	1.00E+08	20	0	0	N/A	N/A	N/A	
8.550	1	IWP	Seal	25	14.3	0.70	0.24	1.10	1.00	1.00	1.00	0.77	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
8.650	1	IWP	Seal	25	14.3	0.66	0.24	1.10	1.00	1.00	1.00	0.73	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
8.750	1	IWP	Seal	25	14.3	0.69	0.28	1.10	1.00	1.00	1.00	0.76	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
8.850	1	IWP	Seal	25	14.3	0.74	0.32	1.10	1.00	1.00	1.00	0.81	0.32	6.37E+07	20	0	0	N/A	N/A	N/A	
8.950	1	IWP	Seal	25	14.3	1.34	0.41	1.10	1.00	1.00	1.00	1.47	0.41	1.60E+05	5	92	28	N/A	N/A	N/A	
9.050	1	IWP	Seal	25	14.3	0.77	0.30	1.10	1.00	1.00	1.00	0.85	0.30	2.24E+07	20	0	0	N/A	N/A	N/A	
9.150	1	IWP	Seal	25	14.3	0.81	0.28	1.10	1.00	1.00	1.00	0.89	0.28	1.07E+07	20	0	0	N/A	N/A	N/A	
9.250	1	IWP	Seal	25	14.3	0.71	0.27	1.10	1.00	1.00	1.00	0.78	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
9.350	1	IWP	Seal	25	14.3	0.62	0.24	1.10	1.00	1.00	1.00	0.68	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
9.450	1	IWP	Seal	25	14.3	0.78	0.34	1.10	1.00	1.00	1.00	0.86	0.34	1.83E+07	20	0	0	N/A	N/A	N/A	
9.550	1	IWP	Seal	25	14.3	0.64	0.33	1.10	1.00	1.00	1.00	0.70	0.33	1.00E+08	20	0	0	N/A	N/A	N/A	
9.650	1	IWP	Seal	25	14.3	1.27	0.39	1.10	1.00	1.00	1.00	1.40	0.39	2.34E+05	7	73	24	N/A	N/A	N/A	
9.750	1	IWP	Seal	25	14.3	1.17	0.46	1.10	1.00	1.00	1.00	1.29	0.46	4.27E+05	12	39	24	N/A	N/A	N/A	
9.850	1	IWP	Seal	25	14.3	0.45	0.21	1.10	1.00	1.00	1.00	0.50	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
9.950	1	IWP	Seal	25	14.3	0.77	0.33	1.10	1.00	1.00	1.00	0.85	0.33	2.24E+07	20	0	0	N/A	N/A	N/A	
10.050	1	IWP	Seal	25	14.3	0.63	0.30	1.10	1.00	1.00	1.00	0.69	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
10.150	1	IWP	Seal	25	14.3	0.70	0.31	1.10	1.00	1.00	1.00	0.77	0.31	1.00E+08	20	0	0	N/A	N/A	N/A	
10.250	1	IWP	Seal	25	14.3	0.54	0.25	1.10	1.00	1.00	1.00	0.59	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
10.350	1	IWP	Seal	25	14.3	0.48	0.26	1.10	1.00	1.00	1.00	0.53	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
10.450	1	IWP	Seal	25	14.3	0.45	0.22	1.10	1.00	1.00	1.00	0.50	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
10.550	1	IWP	Seal	25	14.3	0.92	0.36	1.10	1.00	1.00	1.00	1.01	0.36	2.56E+06	20	0	0	N/A	N/A	N/A	
10.650	1	IWP	Seal	25	14.3	0.72	0.26	1.10	1.00	1.00	1.00	0.79	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
10.750	1	IWP	Seal	25	14.1	0.52	0.24	1.10	1.00	1.00	1.00	0.57	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
10.850	1	IWP	Seal	25	14.1	0.84	0.45	1.10	1.00	1.00	1.00	0.92	0.45	6.90E+06	20	0	0	N/A	N/A	N/A	
10.950	1	IWP	Seal	25	14.1	0.53	0.23	1.10	1.00	1.00	1.00	0.58	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
11.050	1	IWP	Seal	25	14.1	0.81	0.32	1.10	1.00	1.00	1.00	0.89	0.32	1.07E+07	20	0	0	N/A	N/A	N/A	
11.150	1	IWP	Seal	25	14.1	0.50	0.24	1.10	1.00	1.00	1.00	0.55	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
11.250	1	IWP	Seal	25	14.1	0.64	0.32	1.10	1.00	1.00	1.00	0.70	0.32	1.00E+08	20	0	0	N/A	N/A	N/A	
11.350	1	IWP	Seal	25	14.1	0.53	0.22	1.10	1.00	1.00	1.00	0.58	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
11.450	1	IWP	Seal	25	14.1	0.72	0.28	1.10	1.00	1.00	1.00	0.79	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
11.550	1	IWP	Seal	25	14.1	0.79	0.37	1.10	1.00	1.00	1.00	0.87	0.37	1.51E+07	20	0	0	N/A	N/A	N/A	
11.650	1	IWP	Seal	25	14.1	0.73	0.27	1.10	1.00	1.00	1.00	0.80	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
11.750	1	IWP	Seal	25	14.1	0.58	0.28	1.10	1.00	1.00	1.00	0.64	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
11.850	1	IWP	Seal	25	14.1	0.67	0.26	1.10	1.00	1.00	1.00	0.74	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
11.950	1	IWP	Seal	25	14.1	0.77	0.24	1.10	1.00	1.00	1.00	0.85	0.24	2.24E+07	20	0	0	N/A	N/A	N/A	
12.050	1	IWP	Seal	25	14.1	0.95	0.42	1.10	1.00	1.00	1.00	1.04	0.42	1.97E+06	20	0	0	N/A	N/A	N/A	
12.150	1	IWP	Seal	25	14.1	0.81	0.27	1.10	1.00	1.00	1.00	0.89	0.27	1.07E+07	20	0	0	N/A	N/A	N/A	
12.250	1	IWP	Seal	25	14.1	0.80	0.37	1.10	1.00	1.00	1.00	0.88	0.37	1.26E+07	20	0	0	N/A	N/A	N/A	
12.350	1	IWP	Seal	25	14.1	0.95	0.36	1.10	1.00	1.00	1.00	1.04	0.36	1.97E+06	20	0	0	N/A	N/A	N/A	
12.450	1	IWP	Seal	25	14.1	0.96	0.32	1.10	1.00	1.00	1.00	1.06	0.32	1.68E+06	20	0	0	N/A	N/A	N/A	
12.550	1	IWP	Seal	25	14.1	0.64	0.26	1.10	1.00	1.00	1.00	0.70	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
12.650	1	IWP	Seal	25	14.1	0.57	0.30	1.10	1.00	1.00	1.00	0.63	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
12.750	1	IWP	Seal	25	14.1	1.33	0.55	1.10	1.00	1.00	1.00	1.46	0.55	1.69E+05	5	89	28	N/A	N/A	N/A	
12.850	1	IWP	Seal	25	14.1	0.74	0.35	1.10	1.00	1.00	1.00	0.81	0.35	6.37E+07	20	0	0	N/A	N/A	N/A	
12.950	1	IWP	Seal	25	14.1	0.63	0.26	1.10	1.00	1.00	1.00	0.69	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
13.050	1	IWP	Seal	25	14.1	0.62	0.26	1.10	1.00	1.00	1.00	0.68	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
13.150	1	IWP	Seal	25	14.1	0.61	0.29	1.10	1.00	1.00	1.00	0.67	0.29	1.00E+08	20	0	0	N/A	N/A	N/A	
13.250	1	IWP	Seal	25	14.1	0.68	0.33	1.10	1.00	1.00	1.00	0.75	0.33	1.00E+08	20	0	0	N/A	N/A	N/A	
13.350	1	IWP	Seal	25	14.1	0.96	0.30	1.10	1.00	1.00	1.00	1.06	0.30	1.68E+06	20	0	0	N/A	N/A	N/A	
13.450	1	IWP	Seal	25	14.1	1.28	0.58	1.10	1.00	1.00	1.00	1.41	0.58	2.22E+05	6	75	24	N/A	N/A	N/A	
13.550	1	IWP	Seal	25	14.1	0.65	0.24	1.10	1.00	1.00	1.00	0.72	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
13.650	1	IWP	Seal	25	14.1	0.82	0.21	1.10	1.00	1.00	1.00	0.90	0.21	9.17E+06	20	0	0	N/A	N/A	N/A	
13.750	1	IWP	Seal	25	14.1	0.80	0.37	1.10	1.00	1.00	1.00	0.88	0.37	1.26E+07	20	0	0	N/A	N/A	N/A	
13.850	1	IWP	Seal	25	14.1	0.96	0.47	1.10	1.00	1.00	1.00	1.06	0.47	1.68E+06	20	0	0	N/A	N/A	N/A	
13.950	1	IWP	Seal	25	14.1	1.58	0.58	1.10	1.00	1.00	1.00	1.74	0.58	3.66E+04	1	160	52	N/A	N/A	N/A	
14.050	1	IWP	Seal	25	14.1	0.86	0.26	1.10	1.00	1.00	1.00	0.95	0.26	4.74E+06	20	0	0	N/A	N/A	N/A	
14.150	1	IWP	Seal	25	14.1	0.67	0.28	1.10	1.00	1.00	1.00	0.74	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
14.250	1	IWP	Seal	25	14.1	0.56	0.31	1.10	1.00	1.00	1.00	0.62	0.31	1.00E+08	20	0	0	N/A	N/A	N/A	

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
14.350	1	IWP	Seal	25	14.1	0.82	0.35	1.10	1.00	1.00	1.00	0.90	0.35	9.17E+06	20	0	0	N/A	N/A	N/A	
14.450	1	IWP	Seal	25	14.1	0.82	0.38	1.10	1.00	1.00	1.00	0.90	0.38	9.17E+06	20	0	0	N/A	N/A	N/A	
14.550	1	IWP	Seal	25	14.1	0.60	0.19	1.10	1.00	1.00	1.00	0.66	0.19	1.00E+08	20	0	0	N/A	N/A	N/A	
Average				25	14.2	0.76	0.33					0.84	0.33	5.34E+07	19	4	2	N/A	N/A	N/A	
Standard Deviation				0	0.1	0.22	0.09					0.24	0.09	4.64E+07	3	20	7	N/A	N/A	N/A	
10th Percentile						0.51	0.22					0.56	0.22	1.12E+06	20	0	0	N/A	N/A	N/A	
90th Percentile						1.02	0.45					1.12	0.45	1.00E+08	20	0	0	N/A	N/A	N/A	

Survey Notes

1 These remaining life and overlay calculations follow the methodology of the Austroads Guide to Pavement Technology Part 5 Appendix E
2 The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue life
3 The remaining life and overlay requirements assume that the pavement is flexible and does not include any cemented materials, where this is not the case a mechanistic analysis should be undertaken
4 The asphalt overlay thickness to overcome permanent deformation is based on using asphalt with C320 binder, the use of other binders may result in a different thickness required
5 It is possible that a thinner asphalt overlay thickness may overcome fatigue however there would be a higher risk of premature distress in this case and as such it has not been considered
6 The overlay requirements indicate the thickness of additional material required to overcome any structural deficiencies of the pavement based on the pavement consisting of an asphalt wearing course and being subject to both permanent deformation and fatigue
7 The granular overlay requirements for design traffic volumes up to 1x10^8 ESA's can be derived using the Design Chart Method, while asphalt overlays are limited to a maximum design traffic volume of 1x10^7 ESA'
8 The asphalt fatigue remaining life is calculated considering a minimum 40mm of asphalt overlay
9 The thickness of the asphalt overlay considering fatigue is the minimum required considering the design traffic

Prepared By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Reviewed By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Remaining Life and Overlay Requirements - Design Charts Method [2,3]

Report Date: 24-Sep-18
Project No.: 2017152
Report No.: R2017152
Location: 1A2_IWP - Jerrara Road from Mountain Ash Road to South Marulan Road
Test Method: QT211
Analysis Method: FPMS-QP4-002
Tested By: John Muir
Testing Date: 01-Jun-18
Test Equipment: FWD-016

Client: Multiquip Quarries

Prepared By: James Erskine
Growth Rate: 2.5%
Design Period: 20
Design Traffic Intensity: 3.15E+06
Existing Pavement: Flexible without Cemented Materials
Overlay Type: Asphalt
Design Deflection: 0.99
WMAPT: 22
Overlay Adjustment Factor: 0.94
Seasonal Moisture Variation: 1.0

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
0.175	2	IWP	Seal	25	10.3	0.86	0.31	1.10	1.00	1.00	1.00	0.95	0.31	4.74E+06	20	0	0	N/A	N/A	N/A	
0.275	2	IWP	Seal	25	10.3	0.64	0.26	1.10	1.00	1.00	1.00	0.70	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
0.375	2	IWP	Seal	25	10.3	0.57	0.21	1.10	1.00	1.00	1.00	0.63	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
0.475	2	IWP	Seal	25	10.3	1.09	0.36	1.10	1.00	1.00	1.00	1.20	0.36	6.98E+05	5	78	28	N/A	N/A	N/A	
0.575	2	IWP	Seal	25	10.3	0.59	0.28	1.10	1.00	1.00	1.00	0.65	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
0.675	2	IWP	Seal	25	10.3	0.84	0.24	1.10	1.00	1.00	1.00	0.92	0.24	6.90E+06	20	0	0	N/A	N/A	N/A	
0.775	2	IWP	Seal	25	10.3	0.43	0.19	1.10	1.00	1.00	1.00	0.47	0.19	1.00E+08	20	0	0	N/A	N/A	N/A	
0.875	2	IWP	Seal	25	10.3	0.68	0.27	1.10	1.00	1.00	1.00	0.75	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
0.975	2	IWP	Seal	25	10.3	0.83	0.33	1.10	1.00	1.00	1.00	0.91	0.33	7.92E+06	20	0	0	N/A	N/A	N/A	
1.075	2	IWP	Seal	25	10.3	0.64	0.25	1.10	1.00	1.00	1.00	0.70	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
1.175	2	IWP	Seal	25	10.3	0.78	0.34	1.10	1.00	1.00	1.00	0.86	0.34	1.83E+07	20	0	0	N/A	N/A	N/A	
1.275	2	IWP	Seal	25	10.3	1.00	0.36	1.10	1.00	1.00	1.00	1.10	0.36	1.25E+06	9	43	24	N/A	N/A	N/A	
1.375	2	IWP	Seal	25	10.3	1.09	0.46	1.10	1.00	1.00	1.00	1.20	0.46	6.98E+05	5	78	28	N/A	N/A	N/A	
1.475	2	IWP	Seal	25	10.3	0.88	0.32	1.10	1.00	1.00	1.00	0.97	0.32	3.79E+06	20	0	0	N/A	N/A	N/A	
1.575	2	IWP	Seal	25	10.3	0.85	0.30	1.10	1.00	1.00	1.00	0.94	0.30	5.34E+06	20	0	0	N/A	N/A	N/A	
1.675	2	IWP	Seal	25	10.3	0.73	0.22	1.10	1.00	1.00	1.00	0.80	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
1.775	2	IWP	Seal	25	10.3	0.86	0.29	1.10	1.00	1.00	1.00	0.95	0.29	4.74E+06	20	0	0	N/A	N/A	N/A	
1.875	2	IWP	Seal	25	10.3	0.78	0.30	1.10	1.00	1.00	1.00	0.86	0.30	1.83E+07	20	0	0	N/A	N/A	N/A	

Station	Lane	Wheel	Surface			FWD Measured		DSF	CSF	Temperature Adjustment Factor		Adjusted		Permanent Deformation				Fatigue			Comment
(km)		Path	Type	Thickness (mm)	Temp (°C)	Deflection (mm)	Curvature (mm)			Deflection	Curvature	Deflection (mm)	Curvature (mm)	Remaining Life ESA's	Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Remaining Life ESA's[8]	Remaining Life Yrs[8]	Overlay (mm) Asphalt[8,9]	
1.975	2	IWP	Seal	25	10.3	0.57	0.30	1.10	1.00	1.00	1.00	0.63	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
2.075	2	IWP	Seal	25	10.3	0.49	0.20	1.10	1.00	1.00	1.00	0.54	0.20	1.00E+08	20	0	0	N/A	N/A	N/A	
2.175	2	IWP	Seal	25	10.3	0.80	0.30	1.10	1.00	1.00	1.00	0.88	0.30	1.26E+07	20	0	0	N/A	N/A	N/A	
2.275	2	IWP	Seal	25	10.3	0.38	0.23	1.10	1.00	1.00	1.00	0.42	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
2.375	2	IWP	Seal	25	10.3	0.65	0.21	1.10	1.00	1.00	1.00	0.72	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
2.475	2	IWP	Seal	25	10.3	0.66	0.35	1.10	1.00	1.00	1.00	0.73	0.35	1.00E+08	20	0	0	N/A	N/A	N/A	
2.575	2	IWP	Seal	25	10.3	1.09	0.57	1.10	1.00	1.00	1.00	1.20	0.57	6.98E+05	5	78	28	N/A	N/A	N/A	
2.675	2	IWP	Seal	25	10.3	0.63	0.27	1.10	1.00	1.00	1.00	0.69	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
2.775	2	IWP	Seal	25	10.3	0.74	0.30	1.10	1.00	1.00	1.00	0.81	0.30	6.37E+07	20	0	0	N/A	N/A	N/A	
2.875	2	IWP	Seal	25	10.3	0.72	0.35	1.10	1.00	1.00	1.00	0.79	0.35	1.00E+08	20	0	0	N/A	N/A	N/A	
2.975	2	IWP	Seal	25	10.3	0.76	0.32	1.10	1.00	1.00	1.00	0.84	0.32	2.81E+07	20	0	0	N/A	N/A	N/A	
3.075	2	IWP	Seal	25	10.3	0.70	0.30	1.10	1.00	1.00	1.00	0.77	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
3.175	2	IWP	Seal	25	10.3	0.99	0.47	1.10	1.00	1.00	1.00	1.09	0.47	1.34E+06	10	39	24	N/A	N/A	N/A	
3.275	2	IWP	Seal	25	10.3	0.62	0.34	1.10	1.00	1.00	1.00	0.68	0.34	1.00E+08	20	0	0	N/A	N/A	N/A	
3.375	2	IWP	Seal	25	10.3	0.52	0.24	1.10	1.00	1.00	1.00	0.57	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
3.475	2	IWP	Seal	25	10.3	1.04	0.37	1.10	1.00	1.00	1.00	1.14	0.37	9.68E+05	7	57	24	N/A	N/A	N/A	
3.575	2	IWP	Seal	25	10.3	0.95	0.39	1.10	1.00	1.00	1.00	1.04	0.39	1.97E+06	14	20	24	N/A	N/A	N/A	
3.675	2	IWP	Seal	25	10.3	0.66	0.24	1.10	1.00	1.00	1.00	0.73	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
3.775	2	IWP	Seal	25	10.3	0.55	0.31	1.10	1.00	1.00	1.00	0.60	0.31	1.00E+08	20	0	0	N/A	N/A	N/A	
3.875	2	IWP	Seal	25	10.3	0.49	0.22	1.10	1.00	1.00	1.00	0.54	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
3.975	2	IWP	Seal	25	10.3	0.41	0.18	1.10	1.00	1.00	1.00	0.45	0.18	1.00E+08	20	0	0	N/A	N/A	N/A	
4.075	2	IWP	Seal	25	9.2	0.69	0.23	1.10	1.00	1.00	1.00	0.76	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
4.175	2	IWP	Seal	25	9.2	0.24	0.10	1.10	1.00	1.00	1.00	0.26	0.10	1.00E+08	20	0	0	N/A	N/A	N/A	
4.275	2	IWP	Seal	25	9.2	0.60	0.27	1.10	1.00	1.00	1.00	0.66	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
4.375	2	IWP	Seal	25	9.2	0.40	0.21	1.10	1.00	1.00	1.00	0.44	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
4.475	2	IWP	Seal	25	9.2	1.03	0.37	1.10	1.00	1.00	1.00	1.13	0.37	1.03E+06	8	53	24	N/A	N/A	N/A	
4.575	2	IWP	Seal	25	9.2	0.79	0.26	1.10	1.00	1.00	1.00	0.87	0.26	1.51E+07	20	0	0	N/A	N/A	N/A	
4.675	2	IWP	Seal	25	9.2	0.42	0.16	1.10	1.00	1.00	1.00	0.46	0.16	1.00E+08	20	0	0	N/A	N/A	N/A	
4.775	2	IWP	Seal	25	9.2	0.97	0.35	1.10	1.00	1.00	1.00	1.07	0.35	1.56E+06	11	31	24	N/A	N/A	N/A	
4.875	2	IWP	Seal	25	9.2	0.96	0.56	1.10	1.00	1.00	1.00	1.06	0.56	1.68E+06	12	28	24	N/A	N/A	N/A	
4.975	2	IWP	Seal	25	9.2	0.67	0.41	1.10	1.00	1.00	1.00	0.74	0.41	1.00E+08	20	0	0	N/A	N/A	N/A	

Station (km)	Lane	Wheel Path	Surface			FWD Measured		DSF	CSF	Temperature Adjustment Factor		Adjusted		Permanent Deformation				Fatigue			Comment
			Type	Thickness (mm)	Temp (°C)	Deflection (mm)	Curvature (mm)			Deflection	Curvature	Deflection (mm)	Curvature (mm)	Remaining Life ESA's	Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Remaining Life ESA's[8]	Remaining Life Yrs[8]	Overlay (mm) Asphalt[8,9]	
5.075	2	IWP	Seal	25	9.2	0.76	0.31	1.10	1.00	1.00	1.00	0.84	0.31	2.81E+07	20	0	0	N/A	N/A	N/A	
5.175	2	IWP	Seal	25	9.2	0.69	0.31	1.10	1.00	1.00	1.00	0.76	0.31	1.00E+08	20	0	0	N/A	N/A	N/A	
5.275	2	IWP	Seal	25	9.2	0.66	0.25	1.10	1.00	1.00	1.00	0.73	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
5.375	2	IWP	Seal	25	9.2	1.03	0.37	1.10	1.00	1.00	1.00	1.13	0.37	1.03E+06	8	53	24	N/A	N/A	N/A	
5.475	2	IWP	Seal	25	9.2	0.57	0.15	1.10	1.00	1.00	1.00	0.63	0.15	1.00E+08	20	0	0	N/A	N/A	N/A	
5.575	2	IWP	Seal	25	9.2	0.47	0.22	1.10	1.00	1.00	1.00	0.52	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
5.675	2	IWP	Seal	25	9.2	0.86	0.32	1.10	1.00	1.00	1.00	0.95	0.32	4.74E+06	20	0	0	N/A	N/A	N/A	
5.775	2	IWP	Seal	25	9.2	0.78	0.32	1.10	1.00	1.00	1.00	0.86	0.32	1.83E+07	20	0	0	N/A	N/A	N/A	
5.875	2	IWP	Seal	25	9.2	0.86	0.41	1.10	1.00	1.00	1.00	0.95	0.41	4.74E+06	20	0	0	N/A	N/A	N/A	
5.975	2	IWP	Seal	25	9.2	0.83	0.36	1.10	1.00	1.00	1.00	0.91	0.36	7.92E+06	20	0	0	N/A	N/A	N/A	
6.075	2	IWP	Seal	25	9.2	1.34	0.55	1.10	1.00	1.00	1.00	1.47	0.55	1.60E+05	1	160	52	N/A	N/A	N/A	
6.175	2	IWP	Seal	25	9.2	0.96	0.31	1.10	1.00	1.00	1.00	1.06	0.31	1.68E+06	12	28	24	N/A	N/A	N/A	
6.275	2	IWP	Seal	25	9.2	0.77	0.28	1.10	1.00	1.00	1.00	0.85	0.28	2.24E+07	20	0	0	N/A	N/A	N/A	
6.375	2	IWP	Seal	25	9.2	0.74	0.27	1.10	1.00	1.00	1.00	0.81	0.27	6.37E+07	20	0	0	N/A	N/A	N/A	
6.475	2	IWP	Seal	25	9.2	0.81	0.22	1.10	1.00	1.00	1.00	0.89	0.22	1.07E+07	20	0	0	N/A	N/A	N/A	
6.575	2	IWP	Seal	25	9.2	0.49	0.23	1.10	1.00	1.00	1.00	0.54	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
6.675	2	IWP	Seal	25	9.2	0.33	0.23	1.10	1.00	1.00	1.00	0.36	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
6.775	2	IWP	Seal	25	9.2	0.91	0.45	1.10	1.00	1.00	1.00	1.00	0.45	2.81E+06	18	4	24	N/A	N/A	N/A	
6.875	2	IWP	Seal	25	8.4	1.09	0.45	1.10	1.00	1.00	1.00	1.20	0.45	6.98E+05	5	78	28	N/A	N/A	N/A	
6.975	2	IWP	Seal	25	8.4	0.58	0.28	1.10	1.00	1.00	1.00	0.64	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
7.075	2	IWP	Seal	25	8.4	1.38	0.45	1.10	1.00	1.00	1.00	1.52	0.45	1.22E+05	1	173	56	N/A	N/A	N/A	
7.175	2	IWP	Seal	25	8.4	0.69	0.24	1.10	1.00	1.00	1.00	0.76	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
7.275	2	IWP	Seal	25	8.4	0.93	0.36	1.10	1.00	1.00	1.00	1.02	0.36	2.34E+06	16	12	24	N/A	N/A	N/A	
7.375	2	IWP	Seal	25	8.4	0.41	0.19	1.10	1.00	1.00	1.00	0.45	0.19	1.00E+08	20	0	0	N/A	N/A	N/A	
7.475	2	IWP	Seal	25	8.4	0.09	0.03	1.10	1.00	1.00	1.00	0.10	0.03	1.00E+08	20	0	0	N/A	N/A	N/A	
7.575	2	IWP	Seal	25	8.4	0.65	0.22	1.10	1.00	1.00	1.00	0.72	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
7.675	2	IWP	Seal	25	8.4	0.42	0.19	1.10	1.00	1.00	1.00	0.46	0.19	1.00E+08	20	0	0	N/A	N/A	N/A	
7.775	2	IWP	Seal	25	8.4	0.52	0.21	1.10	1.00	1.00	1.00	0.57	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
7.875	2	IWP	Seal	25	8.4	0.89	0.28	1.10	1.00	1.00	1.00	0.98	0.28	3.42E+06	20	0	0	N/A	N/A	N/A	
7.975	2	IWP	Seal	25	8.4	0.68	0.30	1.10	1.00	1.00	1.00	0.75	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
8.075	2	IWP	Seal	25	8.4	0.55	0.14	1.10	1.00	1.00	1.00	0.60	0.14	1.00E+08	20	0	0	N/A	N/A	N/A	

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Permanent Deformation Overlay (mm) Granular	Permanent Deformation Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
8.175	2	IWP	Seal	25	8.4	0.50	0.21	1.10	1.00	1.00	1.00	0.55	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
8.275	2	IWP	Seal	25	8.4	0.67	0.29	1.10	1.00	1.00	1.00	0.74	0.29	1.00E+08	20	0	0	N/A	N/A	N/A	
8.375	2	IWP	Seal	25	8.4	1.57	0.39	1.10	1.00	1.00	1.00	1.73	0.39	3.87E+04	0	226	75	N/A	N/A	N/A	
8.475	2	IWP	Seal	25	8.4	0.58	0.22	1.10	1.00	1.00	1.00	0.64	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
8.575	2	IWP	Seal	25	8.4	0.78	0.22	1.10	1.00	1.00	1.00	0.86	0.22	1.83E+07	20	0	0	N/A	N/A	N/A	
8.675	2	IWP	Seal	25	8.4	0.52	0.19	1.10	1.00	1.00	1.00	0.57	0.19	1.00E+08	20	0	0	N/A	N/A	N/A	
8.775	2	IWP	Seal	25	7.9	1.24	0.31	1.10	1.00	1.00	1.00	1.36	0.31	2.91E+05	2	128	42	N/A	N/A	N/A	
8.875	2	IWP	Seal	25	7.9	0.81	0.28	1.10	1.00	1.00	1.00	0.89	0.28	1.07E+07	20	0	0	N/A	N/A	N/A	
8.975	2	IWP	Seal	25	7.9	1.19	0.58	1.10	1.00	1.00	1.00	1.31	0.58	3.83E+05	3	113	38	N/A	N/A	N/A	
9.075	2	IWP	Seal	25	7.9	1.01	0.42	1.10	1.00	1.00	1.00	1.11	0.42	1.17E+06	9	46	24	N/A	N/A	N/A	
9.175	2	IWP	Seal	25	7.9	0.91	0.28	1.10	1.00	1.00	1.00	1.00	0.28	2.81E+06	18	4	24	N/A	N/A	N/A	
9.275	2	IWP	Seal	25	7.9	0.76	0.30	1.10	1.00	1.00	1.00	0.84	0.30	2.81E+07	20	0	0	N/A	N/A	N/A	
9.375	2	IWP	Seal	25	7.9	0.65	0.23	1.10	1.00	1.00	1.00	0.72	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
9.475	2	IWP	Seal	25	7.5	0.52	0.21	1.10	1.00	1.00	1.00	0.57	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
9.575	2	IWP	Seal	25	7.5	0.69	0.38	1.10	1.00	1.00	1.00	0.76	0.38	1.00E+08	20	0	0	N/A	N/A	N/A	
9.675	2	IWP	Seal	25	7.5	0.70	0.13	1.10	1.00	1.00	1.00	0.77	0.13	1.00E+08	20	0	0	N/A	N/A	N/A	
9.775	2	IWP	Seal	25	6.0	0.35	0.15	1.10	1.00	1.00	1.00	0.38	0.15	1.00E+08	20	0	0	N/A	N/A	N/A	
9.875	2	IWP	Seal	25	6.0	0.42	0.19	1.10	1.00	1.00	1.00	0.46	0.19	1.00E+08	20	0	0	N/A	N/A	N/A	
9.975	2	IWP	Seal	25	6.0	0.65	0.26	1.10	1.00	1.00	1.00	0.72	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
10.075	2	IWP	Seal	25	6.0	0.50	0.18	1.10	1.00	1.00	1.00	0.55	0.18	1.00E+08	20	0	0	N/A	N/A	N/A	
10.175	2	IWP	Seal	25	6.0	0.53	0.21	1.10	1.00	1.00	1.00	0.58	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
10.275	2	IWP	Seal	25	6.0	0.69	0.27	1.10	1.00	1.00	1.00	0.76	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
10.375	2	IWP	Seal	25	6.0	0.54	0.26	1.10	1.00	1.00	1.00	0.59	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
10.475	2	IWP	Seal	25	6.0	0.74	0.30	1.10	1.00	1.00	1.00	0.81	0.30	6.37E+07	20	0	0	N/A	N/A	N/A	
10.575	2	IWP	Seal	25	6.0	1.03	0.38	1.10	1.00	1.00	1.00	1.13	0.38	1.03E+06	8	53	24	N/A	N/A	N/A	
10.675	2	IWP	Seal	25	6.0	0.58	0.23	1.10	1.00	1.00	1.00	0.64	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
10.775	2	IWP	Seal	25	6.0	0.80	0.30	1.10	1.00	1.00	1.00	0.88	0.30	1.26E+07	20	0	0	N/A	N/A	N/A	
10.875	2	IWP	Seal	25	6.0	0.74	0.26	1.10	1.00	1.00	1.00	0.81	0.26	6.37E+07	20	0	0	N/A	N/A	N/A	
10.975	2	IWP	Seal	25	6.0	0.32	0.05	1.10	1.00	1.00	1.00	0.35	0.05	1.00E+08	20	0	0	N/A	N/A	N/A	
11.075	2	IWP	Seal	25	6.0	0.36	0.18	1.10	1.00	1.00	1.00	0.40	0.18	1.00E+08	20	0	0	N/A	N/A	N/A	
11.175	2	IWP	Seal	25	6.0	0.96	0.34	1.10	1.00	1.00	1.00	1.06	0.34	1.68E+06	12	28	24	N/A	N/A	N/A	

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Permanent Deformation Overlay (mm) Granular	Permanent Deformation Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
11.275	2	IWP	Seal	25	6.0	0.40	0.18	1.10	1.00	1.00	1.00	0.44	0.18	1.00E+08	20	0	0	N/A	N/A	N/A	
11.375	2	IWP	Seal	25	6.0	0.32	0.10	1.10	1.00	1.00	1.00	0.35	0.10	1.00E+08	20	0	0	N/A	N/A	N/A	
11.475	2	IWP	Seal	25	6.0	0.62	0.21	1.10	1.00	1.00	1.00	0.68	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
11.575	2	IWP	Seal	25	6.0	0.79	0.27	1.10	1.00	1.00	1.00	0.87	0.27	1.51E+07	20	0	0	N/A	N/A	N/A	
11.675	2	IWP	Seal	25	6.0	0.64	0.23	1.10	1.00	1.00	1.00	0.70	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
11.775	2	IWP	Seal	25	6.0	0.48	0.19	1.10	1.00	1.00	1.00	0.53	0.19	1.00E+08	20	0	0	N/A	N/A	N/A	
11.875	2	IWP	Seal	25	6.0	0.76	0.37	1.10	1.00	1.00	1.00	0.84	0.37	2.81E+07	20	0	0	N/A	N/A	N/A	
11.975	2	IWP	Seal	25	6.0	1.05	0.29	1.10	1.00	1.00	1.00	1.16	0.29	8.68E+05	7	64	24	N/A	N/A	N/A	
12.075	2	IWP	Seal	25	6.0	1.25	0.43	1.10	1.00	1.00	1.00	1.38	0.43	2.61E+05	2	134	47	N/A	N/A	N/A	
12.175	2	IWP	Seal	25	6.0	0.72	0.25	1.10	1.00	1.00	1.00	0.79	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
12.275	2	IWP	Seal	25	6.0	0.75	0.23	1.10	1.00	1.00	1.00	0.82	0.23	4.70E+07	20	0	0	N/A	N/A	N/A	
12.375	2	IWP	Seal	25	6.0	1.33	0.42	1.10	1.00	1.00	1.00	1.46	0.42	1.69E+05	1	157	52	N/A	N/A	N/A	
12.475	2	IWP	Seal	25	6.0	0.62	0.22	1.10	1.00	1.00	1.00	0.68	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
12.575	2	IWP	Seal	25	6.0	0.70	0.28	1.10	1.00	1.00	1.00	0.77	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
12.675	2	IWP	Seal	25	6.0	0.75	0.30	1.10	1.00	1.00	1.00	0.82	0.30	4.70E+07	20	0	0	N/A	N/A	N/A	
12.775	2	IWP	Seal	25	6.0	1.42	0.46	1.10	1.00	1.00	1.00	1.56	0.46	9.78E+04	1	184	61	N/A	N/A	N/A	
12.875	2	IWP	Seal	25	6.0	1.12	0.48	1.10	1.00	1.00	1.00	1.23	0.48	5.92E+05	5	88	28	N/A	N/A	N/A	
12.975	2	IWP	Seal	25	6.0	1.10	0.58	1.10	1.00	1.00	1.00	1.21	0.58	6.61E+05	5	81	28	N/A	N/A	N/A	
13.075	2	IWP	Seal	25	6.0	0.90	0.41	1.10	1.00	1.00	1.00	0.99	0.41	3.09E+06	20	0	24	N/A	N/A	N/A	
13.175	2	IWP	Seal	25	5.0	0.86	0.42	1.10	1.00	1.00	1.00	0.95	0.42	4.74E+06	20	0	0	N/A	N/A	N/A	
13.275	2	IWP	Seal	25	5.0	0.58	0.25	1.10	1.00	1.00	1.00	0.64	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
13.375	2	IWP	Seal	25	5.0	0.60	0.23	1.10	1.00	1.00	1.00	0.66	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
13.475	2	IWP	Seal	25	5.0	1.68	0.62	1.10	1.00	1.00	1.00	1.85	0.62	2.01E+04	0	253	85	N/A	N/A	N/A	
13.575	2	IWP	Seal	25	5.0	1.61	0.48	1.10	1.00	1.00	1.00	1.77	0.48	3.11E+04	0	235	75	N/A	N/A	N/A	
13.675	2	IWP	Seal	25	5.0	0.51	0.14	1.10	1.00	1.00	1.00	0.56	0.14	1.00E+08	20	0	0	N/A	N/A	N/A	
13.775	2	IWP	Seal	25	5.0	0.95	0.45	1.10	1.00	1.00	1.00	1.04	0.45	1.97E+06	14	20	24	N/A	N/A	N/A	
13.875	2	IWP	Seal	25	5.0	2.09	0.58	1.10	1.00	1.00	1.00	2.30	0.58	1.73E+03	0	341	113	N/A	N/A	N/A	
13.975	2	IWP	Seal	25	5.0	1.06	0.37	1.10	1.00	1.00	1.00	1.17	0.37	8.22E+05	6	67	24	N/A	N/A	N/A	
14.075	2	IWP	Seal	25	5.0	0.95	0.39	1.10	1.00	1.00	1.00	1.04	0.39	1.97E+06	14	20	24	N/A	N/A	N/A	
14.175	2	IWP	Seal	25	5.0	0.60	0.30	1.10	1.00	1.00	1.00	0.66	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
14.275	2	IWP	Seal	25	5.0	0.95	0.46	1.10	1.00	1.00	1.00	1.04	0.46	1.97E+06	14	20	24	N/A	N/A	N/A	

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (^{0}C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
14.375	2	IWP	Seal	25	5.0	0.57	0.21	1.10	1.00	1.00	1.00	0.63	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
14.475	2	IWP	Seal	25	5.0	0.84	0.27	1.10	1.00	1.00	1.00	0.92	0.27	6.90E+06	20	0	0	N/A	N/A	N/A	
14.575	2	IWP	Seal	25	5.0	0.58	0.29	1.10	1.00	1.00	1.00	0.64	0.29	1.00E+08	20	0	0	N/A	N/A	N/A	
Average				25	8.1	0.76	0.30					0.84	0.30	5.61E+07	17	23	9	N/A	N/A	N/A	
Standard Deviation				0	1.9	0.29	0.11					0.32	0.11	4.64E+07	6	55	19	N/A	N/A	N/A	
10th Percentile						0.42	0.19					0.46	0.19	6.98E+05	5	0	0	N/A	N/A	N/A	
90th Percentile						1.09	0.45					1.20	0.45	1.00E+08	20	78	28	N/A	N/A	N/A	

Survey Notes

1 These remaining life and overlay calculations follow the methodology of the Austroads Guide to Pavement Technology Part 5 Appendix E
2 The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue life
3 The remaining life and overlay requirements assume that the pavement is flexible and does not include any cemented materials, where this is not the case a mechanistic analysis should be undertaken
4 The asphalt overlay thickness to overcome permanent deformation is based on using asphalt with C320 binder, the use of other binders may result in a different thickness required
5 It is possible that a thinner asphalt overlay thickness may overcome fatigue however there would be a higher risk of premature distress in this case and as such it has not been considered
6 The overlay requirements indicate the thickness of additional material required to overcome any structural deficiencies of the pavement based on the pavement consisting of an asphalt wearing course and being subject to both permanent deformation and fatigue
7 The granular overlay requirements for design traffic volumes up to 1x10^8 ESA's can be derived using the Design Chart Method, while asphalt overlays are limited to a maximum design traffic volume of 1x10^7 ESA'
8 The asphalt fatigue remaining life is calculated considering a minimum 40mm of asphalt overlay
9 The thickness of the asphalt overlay considering fatigue is the minimum required considering the design traffic

Prepared By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Reviewed By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Remaining Life and Overlay Requirements - Design Charts Method [2,3]

Report Date: 24-Sep-18
Project No.: 2017152
Report No.: R2017152
Location: 2A1_IWP - Mountain Ash Road from Jerrara Road to Bungonia Bypass
Test Method: QT211
Analysis Method: FPMS-QP4-002
Tested By: John Muir
Testing Date: 30-May-18
Test Equipment: FWD-016

Client: Multiquip Quarries

Prepared By: James Erskine
Growth Rate: 2.5%
Design Period: 20
Design Traffic Intensity: 1.08E+06
Existing Pavement: Flexible without Cemented Materials
Overlay Type: Asphalt
Design Deflection: 1.12
WMAPT: 22
Overlay Adjustment Factor: 0.94
Seasonal Moisture Variation: 1.0

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
14.650	1	IWP	Seal	25	14.8	0.80	0.29	1.10	1.00	1.00	1.00	0.88	0.29	1.26E+07	20	0	0	N/A	N/A	N/A	
14.750	1	IWP	Seal	25	14.8	0.51	0.23	1.10	1.00	1.00	1.00	0.56	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
Average				25	14.8	0.66	0.26					0.72	0.26	5.63E+07	20	0	0	N/A	N/A	N/A	
Standard Deviation				0	0.0	0.21	0.04					0.23	0.04	6.18E+07	0	0	0	N/A	N/A	N/A	
10th Percentile						0.54	0.24					0.59	0.24	2.14E+07	20	0	0	N/A	N/A	N/A	
90th Percentile						0.77	0.28					0.85	0.28	9.13E+07	20	0	0	N/A	N/A	N/A	

Survey Notes

1 These remaining life and overlay calculations follow the methodology of the Austroads Guide to Pavement Technology Part 5 Appendix E
2 The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue life
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4 The asphalt overlay thickness to overcome permanent deformation is based on using asphalt with C320 binder, the use of other binders may result in a different thickness required
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6 The overlay requirements indicate the thickness of additional material required to overcome any structural deficiencies of the pavement based on the pavement consisting of an asphalt wearing course and being subject to both permanent deformation and fatigue
7 The granular overlay requirements for design traffic volumes up to 1x10^8 ESA's can be derived using the Design Chart Method, while asphalt overlays are limited to a maximum design traffic volume of 1x10^7 ESA'
8 The asphalt fatigue remaining life is calculated considering a minimum 40mm of asphalt overlay
9 The thickness of the asphalt overlay considering fatigue is the minimum required considering the design traffic

Prepared By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Reviewed By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Remaining Life and Overlay Requirements - Design Charts Method [2,3]

Report Date: 24-Sep-18
Project No.: 2017152
Report No.: R2017152
Location: 2A2_IWP - Mountain Ash Road from Bungonia Bypass to Jerrara Road
Test Method: QT211
Analysis Method: FPMS-QP4-002
Tested By: John Muir
Testing Date: 30-May-18
Test Equipment: FWD-016

Client: Multiquip Quarries

Prepared By: James Erskine
Growth Rate: 2.5%
Design Period: 20
Design Traffic Intensity: 3.40E+06
Existing Pavement: Flexible without Cemented Materials
Overlay Type: Asphalt
Design Deflection: 0.98
WMAPT: 22
Overlay Adjustment Factor: 0.94
Seasonal Moisture Variation: 1.0

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
14.675	2	IWP	Seal	25	14.8	0.64	0.21	1.10	1.00	1.00	1.00	0.70	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
14.775	2	IWP	Seal	25	14.8	0.58	0.29	1.10	1.00	1.00	1.00	0.64	0.29	1.00E+08	20	0	0	N/A	N/A	N/A	
Average				25	14.8	0.61	0.25					0.67	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
Standard Deviation				0	0.0	0.04	0.06					0.04	0.06	0.00E+00	0	0	0	N/A	N/A	N/A	
10th Percentile						0.59	0.22					0.65	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
90th Percentile						0.63	0.28					0.69	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	

Survey Notes

1 These remaining life and overlay calculations follow the methodology of the Austroads Guide to Pavement Technology Part 5 Appendix E
2 The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue life
3 The remaining life and overlay requirements assume that the pavement is flexible and does not include any cemented materials, where this is not the case a mechanistic analysis should be undertaken
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Prepared By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Reviewed By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Remaining Life and Overlay Requirements - Design Charts Method [2,3]

Report Date: 24-Sep-18
Project No.: 2017152
Report No.: R2017152
Location: 3A1_IWP - Oallen Ford Road from Bungonia Bypass to Lumley Road (Quarry Entrance)
Test Method: QT211
Analysis Method: FPMS-QP4-002
Tested By: John Muir
Testing Date: 20-Jun-18
Test Equipment: FWD-016

Client: Multiquip Quarries

Prepared By: James Erskine
Growth Rate: 2.5%
Design Period: 20
Design Traffic Intensity: 6.18E+05
Existing Pavement: Flexible without Cemented Materials
Overlay Type: Asphalt
Design Deflection: 1.22
WMAPT: 22
Overlay Adjustment Factor: 0.94
Seasonal Moisture Variation: 1.0

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
16.350	1	IWP	Seal	25	14.6	0.54	0.22	1.10	1.00	1.00	1.00	0.59	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
16.450	1	IWP	Seal	25	14.6	0.58	0.24	1.10	1.00	1.00	1.00	0.64	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
16.550	1	IWP	Seal	25	14.6	0.43	0.14	1.10	1.00	1.00	1.00	0.47	0.14	1.00E+08	20	0	0	N/A	N/A	N/A	
16.650	1	IWP	Seal	25	14.6	0.81	0.43	1.10	1.00	1.00	1.00	0.89	0.43	1.07E+07	20	0	0	N/A	N/A	N/A	
16.750	1	IWP	Seal	25	14.6	0.86	0.28	1.10	1.00	1.00	1.00	0.95	0.28	4.74E+06	20	0	0	N/A	N/A	N/A	
16.850	1	IWP	Seal	25	14.6	0.61	0.26	1.10	1.00	1.00	1.00	0.67	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
16.950	1	IWP	Seal	25	14.6	0.70	0.28	1.10	1.00	1.00	1.00	0.77	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
17.050	1	IWP	Seal	25	14.6	0.37	0.12	1.10	1.00	1.00	1.00	0.41	0.12	1.00E+08	20	0	0	N/A	N/A	N/A	
17.150	1	IWP	Seal	25	14.6	0.44	0.22	1.10	1.00	1.00	1.00	0.48	0.22	1.00E+08	20	0	0	N/A	N/A	N/A	
17.250	1	IWP	Seal	25	14.6	0.60	0.23	1.10	1.00	1.00	1.00	0.66	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
17.350	1	IWP	Seal	25	14.6	0.22	0.07	1.10	1.00	1.00	1.00	0.24	0.07	1.00E+08	20	0	0	N/A	N/A	N/A	
17.450	1	IWP	Seal	25	14.6	0.63	0.30	1.10	1.00	1.00	1.00	0.69	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
17.550	1	IWP	Seal	25	14.6	0.61	0.17	1.10	1.00	1.00	1.00	0.67	0.17	1.00E+08	20	0	0	N/A	N/A	N/A	
17.650	1	IWP	Seal	25	14.6	0.60	0.27	1.10	1.00	1.00	1.00	0.66	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
17.750	1	IWP	Seal	25	14.6	0.60	0.27	1.10	1.00	1.00	1.00	0.66	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
17.850	1	IWP	Seal	25	14.6	0.47	0.19	1.10	1.00	1.00	1.00	0.52	0.19	1.00E+08	20	0	0	N/A	N/A	N/A	
17.950	1	IWP	Seal	25	14.6	0.59	0.21	1.10	1.00	1.00	1.00	0.65	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
18.050	1	IWP	Seal	25	14.6	0.63	0.33	1.10	1.00	1.00	1.00	0.69	0.33	1.00E+08	20	0	0	N/A	N/A	N/A	

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Permanent Deformation Overlay (mm) Granular	Permanent Deformation Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
18.150	1	IWP	Seal	25	14.6	0.37	0.15	1.10	1.00	1.00	1.00	0.41	0.15	1.00E+08	20	0	0	N/A	N/A	N/A	
18.250	1	IWP	Seal	25	14.6	0.42	0.20	1.10	1.00	1.00	1.00	0.46	0.20	1.00E+08	20	0	0	N/A	N/A	N/A	
18.350	1	IWP	Seal	25	14.6	1.16	0.45	1.10	1.00	1.00	1.00	1.28	0.45	4.51E+05	15	19	24	N/A	N/A	N/A	
18.450	1	IWP	Seal	25	14.6	0.58	0.29	1.10	1.00	1.00	1.00	0.64	0.29	1.00E+08	20	0	0	N/A	N/A	N/A	
18.550	1	IWP	Seal	25	14.8	0.85	0.31	1.10	1.00	1.00	1.00	0.94	0.31	5.34E+06	20	0	0	N/A	N/A	N/A	
18.650	1	IWP	Seal	25	14.8	0.66	0.27	1.10	1.00	1.00	1.00	0.73	0.27	1.00E+08	20	0	0	N/A	N/A	N/A	
18.750	1	IWP	Seal	25	14.8	0.78	0.34	1.10	1.00	1.00	1.00	0.86	0.34	1.83E+07	20	0	0	N/A	N/A	N/A	
18.850	1	IWP	Seal	25	14.8	1.08	0.36	1.10	1.00	1.00	1.00	1.19	0.36	7.37E+05	20	0	0	N/A	N/A	N/A	
18.950	1	IWP	Seal	25	14.8	0.66	0.23	1.10	1.00	1.00	1.00	0.73	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
19.050	1	IWP	Seal	25	14.8	0.80	0.44	1.10	1.00	1.00	1.00	0.88	0.44	1.26E+07	20	0	0	N/A	N/A	N/A	
19.150	1	IWP	Seal	25	14.8	1.23	0.67	1.10	1.00	1.00	1.00	1.35	0.67	3.08E+05	11	41	24	N/A	N/A	N/A	
19.250	1	IWP	Seal	25	14.8	0.53	0.24	1.10	1.00	1.00	1.00	0.58	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
19.350	1	IWP	Seal	25	14.8	0.67	0.24	1.10	1.00	1.00	1.00	0.74	0.24	1.00E+08	20	0	0	N/A	N/A	N/A	
19.450	1	IWP	Seal	25	14.8	0.73	0.31	1.10	1.00	1.00	1.00	0.80	0.31	1.00E+08	20	0	0	N/A	N/A	N/A	
19.550	1	IWP	Seal	25	14.8	0.67	0.31	1.10	1.00	1.00	1.00	0.74	0.31	1.00E+08	20	0	0	N/A	N/A	N/A	
19.650	1	IWP	Seal	25	14.8	0.91	0.39	1.10	1.00	1.00	1.00	1.00	0.39	2.81E+06	20	0	0	N/A	N/A	N/A	
19.750	1	IWP	Seal	25	14.8	0.55	0.14	1.10	1.00	1.00	1.00	0.60	0.14	1.00E+08	20	0	0	N/A	N/A	N/A	
Average				25	14.7	0.66	0.27					0.72	0.27	7.59E+07	20	2	1	N/A	N/A	N/A	
Standard Deviation				0	0.1	0.22	0.11					0.24	0.11	4.17E+07	2	8	6	N/A	N/A	N/A	
10th Percentile						0.42	0.14					0.46	0.14	3.58E+06	20	0	0	N/A	N/A	N/A	
90th Percentile						0.89	0.41					0.98	0.41	1.00E+08	20	0	0	N/A	N/A	N/A	

Survey Notes

1 These remaining life and overlay calculations follow the methodology of the Austroads Guide to Pavement Technology Part 5 Appendix E
2 The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue life
3 The remaining life and overlay requirements assume that the pavement is flexible and does not include any cemented materials, where this is not the case a mechanistic analysis should be undertaken
4 The asphalt overlay thickness to overcome permanent deformation is based on using asphalt with C320 binder, the use of other binders may result in a different thickness required
5 It is possible that a thinner asphalt overlay thickness may overcome fatigue however there would be a higher risk of premature distress in this case and as such it has not been considered
6 The overlay requirements indicate the thickness of additional material required to overcome any structural deficiencies of the pavement based on the pavement consisting of an asphalt wearing course and being subject to both permanent deformation and fatigue
7 The granular overlay requirements for design traffic volumes up to 1x10^8 ESA's can be derived using the Design Chart Method, while asphalt overlays are limited to a maximum design traffic volume of 1x10^7 ESA'
8 The asphalt fatigue remaining life is calculated considering a minimum 40mm of asphalt overlay
9 The thickness of the asphalt overlay considering fatigue is the minimum required considering the design traffic

Prepared By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Reviewed By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Pavement Management Services
Unit 7b, 26 Powers Road
Seven Hills, NSW 2147

Remaining Life and Overlay Requirements - Design Charts Method [2,3]

Report Date: 24-Sep-18
Project No.: 2017152
Report No.: R2017152
Location: 3A2_IWP - Oallen Ford Road from Lumley Road (Quarry Entrance) to Bungonia Bypass
Test Method: QT211
Analysis Method: FPMS-QP4-002
Tested By: John Muir
Testing Date: 20-Jun-18
Test Equipment: FWD-016

Client: Multiquip Quarries

Prepared By: James Erskine
Growth Rate: 2.5%
Design Period: 20
Design Traffic Intensity: 2.93E+06
Existing Pavement: Flexible without Cemented Materials
Overlay Type: Asphalt
Design Deflection: 1.00
WMAPT: 22
Overlay Adjustment Factor: 0.94
Seasonal Moisture Variation: 1.0

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
16.375	2	IWP	Seal	25	14.8	0.76	0.29	1.10	1.00	1.00	1.00	0.84	0.29	2.81E+07	20	0	0	N/A	N/A	N/A	
16.475	2	IWP	Seal	25	14.8	0.81	0.22	1.10	1.00	1.00	1.00	0.89	0.22	1.07E+07	20	0	0	N/A	N/A	N/A	
16.575	2	IWP	Seal	25	14.8	1.16	0.46	1.10	1.00	1.00	1.00	1.28	0.46	4.51E+05	4	100	33	N/A	N/A	N/A	
16.675	2	IWP	Seal	25	14.8	0.51	0.25	1.10	1.00	1.00	1.00	0.56	0.25	1.00E+08	20	0	0	N/A	N/A	N/A	
16.775	2	IWP	Seal	25	14.8	0.87	0.26	1.10	1.00	1.00	1.00	0.96	0.26	4.23E+06	20	0	0	N/A	N/A	N/A	
16.875	2	IWP	Seal	25	14.8	0.73	0.19	1.10	1.00	1.00	1.00	0.80	0.19	1.00E+08	20	0	0	N/A	N/A	N/A	
16.975	2	IWP	Seal	25	14.8	0.71	0.18	1.10	1.00	1.00	1.00	0.78	0.18	1.00E+08	20	0	0	N/A	N/A	N/A	
17.075	2	IWP	Seal	25	14.8	0.42	0.16	1.10	1.00	1.00	1.00	0.46	0.16	1.00E+08	20	0	0	N/A	N/A	N/A	
17.175	2	IWP	Seal	25	14.8	0.79	0.32	1.10	1.00	1.00	1.00	0.87	0.32	1.51E+07	20	0	0	N/A	N/A	N/A	
17.275	2	IWP	Seal	25	14.8	0.23	0.10	1.10	1.00	1.00	1.00	0.25	0.10	1.00E+08	20	0	0	N/A	N/A	N/A	
17.375	2	IWP	Seal	25	14.8	0.12	0.05	1.10	1.00	1.00	1.00	0.13	0.05	1.00E+08	20	0	0	N/A	N/A	N/A	
17.475	2	IWP	Seal	25	14.8	0.88	0.15	1.10	1.00	1.00	1.00	0.97	0.15	3.79E+06	20	0	0	N/A	N/A	N/A	
17.575	2	IWP	Seal	25	14.8	0.64	0.21	1.10	1.00	1.00	1.00	0.70	0.21	1.00E+08	20	0	0	N/A	N/A	N/A	
17.675	2	IWP	Seal	25	14.8	0.30	0.14	1.10	1.00	1.00	1.00	0.33	0.14	1.00E+08	20	0	0	N/A	N/A	N/A	
17.775	2	IWP	Seal	25	14.8	0.71	0.30	1.10	1.00	1.00	1.00	0.78	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
17.875	2	IWP	Seal	25	14.8	0.59	0.30	1.10	1.00	1.00	1.00	0.65	0.30	1.00E+08	20	0	0	N/A	N/A	N/A	
17.975	2	IWP	Seal	25	14.8	0.63	0.17	1.10	1.00	1.00	1.00	0.69	0.17	1.00E+08	20	0	0	N/A	N/A	N/A	
18.075	2	IWP	Seal	25	14.8	0.76	0.26	1.10	1.00	1.00	1.00	0.84	0.26	2.81E+07	20	0	0	N/A	N/A	N/A	

Station (km)	Lane	Wheel Path	Surface Type	Surface Thickness (mm)	Surface Temp (°C)	FWD Measured Deflection (mm)	FWD Measured Curvature (mm)	DSF	CSF	Temperature Adjustment Factor Deflection	Temperature Adjustment Factor Curvature	Adjusted Deflection (mm)	Adjusted Curvature (mm)	Permanent Deformation Remaining Life ESA's	Permanent Deformation Remaining Life Yrs	Overlay (mm) Granular	Overlay (mm) Asphalt[4]	Fatigue Remaining Life ESA's[8]	Fatigue Remaining Life Yrs[8]	Fatigue Overlay (mm) Asphalt[8,9]	Comment
18.175	2	IWP	Seal	25	14.8	0.36	0.18	1.10	1.00	1.00	1.00	0.40	0.18	1.00E+08	20	0	0	N/A	N/A	N/A	
18.275	2	IWP	Seal	25	14.8	0.65	0.26	1.10	1.00	1.00	1.00	0.72	0.26	1.00E+08	20	0	0	N/A	N/A	N/A	
18.375	2	IWP	Seal	25	14.8	0.56	0.16	1.10	1.00	1.00	1.00	0.62	0.16	1.00E+08	20	0	0	N/A	N/A	N/A	
18.475	2	IWP	Seal	25	14.8	1.06	0.52	1.10	1.00	1.00	1.00	1.17	0.52	8.22E+05	7	63	24	N/A	N/A	N/A	
18.575	2	IWP	Seal	25	14.8	0.47	0.15	1.10	1.00	1.00	1.00	0.52	0.15	1.00E+08	20	0	0	N/A	N/A	N/A	
18.675	2	IWP	Seal	25	14.8	0.96	0.46	1.10	1.00	1.00	1.00	1.06	0.46	1.68E+06	13	24	24	N/A	N/A	N/A	
18.775	2	IWP	Seal	25	14.8	1.20	0.39	1.10	1.00	1.00	1.00	1.32	0.39	3.62E+05	3	112	38	N/A	N/A	N/A	
18.875	2	IWP	Seal	25	14.8	0.45	0.23	1.10	1.00	1.00	1.00	0.50	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
18.975	2	IWP	Seal	25	14.8	0.82	0.32	1.10	1.00	1.00	1.00	0.90	0.32	9.17E+06	20	0	0	N/A	N/A	N/A	
19.075	2	IWP	Seal	25	14.8	0.79	0.15	1.10	1.00	1.00	1.00	0.87	0.15	1.51E+07	20	0	0	N/A	N/A	N/A	
19.175	2	IWP	Seal	25	14.8	0.78	0.20	1.10	1.00	1.00	1.00	0.86	0.20	1.83E+07	20	0	0	N/A	N/A	N/A	
19.275	2	IWP	Seal	25	14.8	1.00	0.35	1.10	1.00	1.00	1.00	1.10	0.35	1.25E+06	10	39	24	N/A	N/A	N/A	
19.375	2	IWP	Seal	25	14.8	0.57	0.23	1.10	1.00	1.00	1.00	0.63	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
19.475	2	IWP	Seal	25	14.8	0.60	0.28	1.10	1.00	1.00	1.00	0.66	0.28	1.00E+08	20	0	0	N/A	N/A	N/A	
19.575	2	IWP	Seal	25	14.8	0.39	0.15	1.10	1.00	1.00	1.00	0.43	0.15	1.00E+08	20	0	0	N/A	N/A	N/A	
19.675	2	IWP	Seal	25	14.8	0.79	0.23	1.10	1.00	1.00	1.00	0.87	0.23	1.51E+07	20	0	0	N/A	N/A	N/A	
19.775	2	IWP	Seal	25	14.8	0.59	0.23	1.10	1.00	1.00	1.00	0.65	0.23	1.00E+08	20	0	0	N/A	N/A	N/A	
Average				25	14.8	0.68	0.24					0.74	0.24	6.15E+07	18	10	4	N/A	N/A	N/A	
Standard Deviation				0	0.0	0.25	0.10					0.27	0.10	4.55E+07	5	27	10	N/A	N/A	N/A	
10th Percentile						0.37	0.15					0.41	0.15	1.42E+06	11	0	0	N/A	N/A	N/A	
90th Percentile						0.98	0.37					1.08	0.37	1.00E+08	20	33	24	N/A	N/A	N/A	

Survey Notes

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Prepared By:

James Erskine
Senior Pavement Engineer
24-Sep-18

Reviewed By:

James Erskine
Senior Pavement Engineer
24-Sep-18

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