Local Road Dilapidation Report City of Canterbury

Project Name: WestConnex New M5

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Document Approval

Rev.	Date	Prepared by	Reviewed by	Recommended by	Approved by	Remarks
00	09/05/16	Haris Chandrasiri	Tim Cunningham		T Orpen	
Signature:						

Details of Revision Amendments

Document Control

The Project Director is responsible for ensuring that this Report is reviewed and approved. The Construction Manager (Project Wide) is responsible for updating this Report to reflect changes to the Project, legal and other requirements, as required.

Amendments

Any revisions or amendments must be approved by the Project Director before being distributed or implemented.

Revision Details

Revision	Details
00	Prepared for internal review

Contents

1. Introduction

The CPB Contractors, Dragados and Samsung Joint Venture (CDS-JV) has been selected to deliver the New M5 from St Peters to Beverly Hills.

Condition B59 of the Minister's Condition of Approval (MCoA) requires CDS-JV to determine the access route(s) for heavy and oversized vehicles associated with the construction of the New M5 and site establishment works and prepare a Local Road Dilapidation Report for those local roads within the control of the relevant councils that would be utilised.

In addition, Clause 4.3 of Exhibit A of the SWTC requires CDS-JV to undertake ground and infrastructure condition surveys of all existing infrastructure (including local roads) within 50 meters of the Project Site and Temporary Areas and within a surface corridor which, when viewed in plan, has boundaries set a minimum of 50 meters beyond all excavations.

This is the dilapidation report of the local roads within the control of City of Canterbury.

2. Dilapidation survey of Local Roads within the control of City of Canterbury

Local Roads within the control of City of Canterbury Council that require dilapidation survey falls in to two groups;

1. Group 1- Local roads that will be utilised for heavy and oversized vehicles associated with the construction of the New M5 (**Condition B59 of MCoA)**

2. Group 2- Local roads within 50m of the construction works but are not utilised for construction traffic (**Clause 4.3 of Exhibit A of the SWTC)**

2.1 Group 1- Local Roads that will be utilised for heavy and oversized vehicles

Table 1 below shows the increase in traffic volumes on the local roads that will be utilised for heavy and oversized vehicles associated with the construction of the WestConnex New M5.

Street	From	To	Length (m)	Direction	** Traffic volumes and performance 2016 with construction traffic			
					Heavy Vehicles			
					AM Peak Hour		PM Peak Hour	
					Total	% increase	Total	% increase
Moorefield Road	King Georges Rd	Kingsgrove Rd	2300	East bound	61	22%	32	45%
				West bound	56	25%	33	44%
Kingsgrove Road	Moorefield Rd	Stoney Creek Rd	2200	East bound	90	14%	53	23%
				West bound	89	14%	69	17%
*Garema Cct	Full length		1030	East bound				
				West bound				
*Wirega Av	Garema CCT	Moorefields Rd	300	North bound				
				South bound				
Hommer St	Kingsgrove Rd	Bexley Rd	1000	East bound	TBC	TBC	TBC	TBC
				West bound	TBC	TBC	TBC	TBC

* Roads in Local Areas to be maintained by the Project Company

** New M5 EIS Vol 202B App G Traffic and Transport Part 02

Table 1

As per the Condition B59 of Minister's Condition of Approval the Local Road Dilapidation Report must assess the current condition of the road and describe mechanism to restore any damage that may result due to its use by traffic and transport related to the construction of the WestConnex New M5.

Local Road Dilapidation survey was undertaken by Australian Road Research Board (ARRB) and dilapidation survey results and the assessment of the current condition of the local roads is described in the report Pre-construction Road Condition Report WestConnex New M5 Main Works Project by ARRB (Attachment 1).

Mechanisms to restore any damage that may result due to its use by traffic and transport related to the construction of the project

Garema Circuit and Wirega Avenue will be maintained by the Project Company during the Project Company's Work as required by 'Appendix C.6 Local Road Maintenance during Project Company's Work'. Any damage that may result due to construction traffic will be restored during the local road maintenance by the Project Company.

It is estimated that heavy vehicle traffic volumes on Moorefield Road and Kingsgrove Road are likely to increase between 14% and 45% due to construction traffic (Table 1).

Current and predicted heavy vehicle traffic volumes on Hommer Street are presently not available. An updated report with will be issued when this data is available.

A post-construction dilapidation report will be prepared within 4 weeks of the completion of construction to assess any damage to these roads that may have occurred as a result of the construction traffic. This report will be compared with the pre-construction dilapidation reports and any damage that may have resulted due to construction traffic and transport related to the construction of the project will be restored as per 'Clause 3.2 Pavement Repairs of SWTC Appendix C.6 Local Road Maintenance during Project Company's Work (Attachment 2).

2.2 Group 2 - Local roads within 50m of the construction works but are not utilised for construction traffic

Table 2 below shows the local roads within 50m of the construction works but that will not be utilised for project construction traffic. Assessment of the current condition of the local roads is described in the report Pre-construction Road Condition Report WestConnex New M5 Main Works Project by ARRB (Attachment 1).

A post-construction dilapidation report will be prepared within 4 weeks of the completion of construction. The post-construction dilapidation report will be compared with the pre-construction dilapidation report and any changes in the road condition will be recorded. Any damage that may have resulted due to construction of the Project Company's Work will be assessed and repairs undertaken based on the geotechnical instrumentation and monitoring data, primarily vertical and horizontal ground movement data, in conjunction with the dilapidations reports.

Street	From	To	Street length (m)	Suburb
Rosebank Av	End of Rosebank roads	100m length	100	Beverly Hills
Armitree St	End of Armitree St	100m length	100	Kingsgrove
Glamis St	End of Glamis St	100m length	100	Kingsgrove
Karingal St	M5 noise wall	40m length	40	Kingsgrove
Poole St	Bexley Rd	Flatrock Rd	65	Kingsgrove
Jones Av	Flatrock Rd	To end of the road	70	Kingsgrove

Table 2

Attachment 1 – Pre-construction Road Condition Report for WestConnex New M5 Main Works Project

Pre-Construction Road Condition Report for WestConnex New M5 Main Works Project – City of Canterbury

for CDS JV

SUMMARY

ARRB was commissioned by CDS JV (CPB Contractors Pty Limited, Dragados Australia Pty Ltd, and Samsung C&T Corporation Joint Venture) to survey and assess the current condition of the nominated roads associated with the construction of the WestConnex New M5 Main Works project.

A surface condition survey of the road network was conducted by ARRB in April 2016 to collect condition distresses including rutting, roughness, texture and cracking information.

The scope of the main report includes:

- collection and processing of pavement condition data into various data categories including roughness (IRI m/km), rut depth (mm), texture depth (mm) and cracking (% area).
- preparation of a report evaluating the overall condition of each road by direction and lane for each of the road authorities involved in the study area.

The study area involves several road authorities and the road conditions are reported in the below road groups for each organisation where applicable.

- Group 1 – Local roads that will be utilised for heavy and oversized vehicles
- Group 2 - Local roads within 50m of the construction works but are not utilised for construction traffic
- Group 3 - Non-haulage maintenance roads
- RMS- Arterial roads within 50m buffer zone

Condition assessments presented are based on current industry practices for the purpose of dilapidation rather than a customised local condition assessment. It should be noted that the condition statement could vary depending on the definition. See Section 1.3 for details.

This report is an extraction from the main report of the sections relevant for City of Canterbury.

City of Canterbury

Condition assessments (based on current industry standards) are represented based on the average condition of road sections owned by City of Canterbury.

Group 1 roads:

	IRI group	Rut group	Texture group	Cracking group
GAREMA CCT-CLOCKWISE_C_1	Good	Fair	Fair	Very good
GAREMA CCT-CLOCKWISE_P_1	Good	Good	Fair	Very good
HOMMER ST_C_1	Good	Good	Poor	Very good
HOMMER ST_P_1	Fair	Good	Poor	Very good
KINGSGROVE ROAD_C_1	Fair	Fair	Poor	Good
KINGSGROVE ROAD_C_2	Fair	Good	Poor	Very good
KINGSGROVE ROAD_P_1	Fair	Fair	Poor	Very good
KINGSGROVE ROAD_P_2	Poor	Fair	Poor	Very good
MOOREFIELD ROAD_C_1	Fair	Good	Poor	Very good
MOOREFIELD ROAD_P_1	Good	Fair	Poor	Very good
WIREGA AV_C_1	Fair	Fair	Poor	Very good
WIREGA AV_P_1	Good	Good	Poor	Very good

Group 2 roads:

	IRI group	Rut group	Texture group	Cracking group
ARMITREE ST_C_1	Very poor	Fair	Poor	Good
ARMITREE ST_P_1	Good	Good	Poor	Very good
GLAMIS ST_C_1	Very poor	Good	Poor	Very good
GLAMIS ST_P_1	Fair	Good	Poor	Good
JONES AV_P_1	Fair	Good	Fair	Very good
KARINGAL ST_C_1	Good	Very good	Poor	Very good
KARINGAL ST_P_1	Very good	Very good	Poor	Very good
POOLE ST_C_1	Poor	Good	Poor	Very good
POOLE ST_P_1	Poor	Very good	Poor	Very good
ROSEBANK AV_C_1	Good	Fair	Fair	Very good
ROSEBANK AV_P_1	Good	Fair	Poor	Very good

CONTENTS

1 INTRODUCTION

1.1 General

ARRB was commissioned by CDS JV (CPB Contractors Pty Limited, Dragados Australia Pty Ltd, and Samsung C&T Corporation Joint Venture) to survey and assess the current condition of the nominated roads associated with the construction of the WestConnex New M5 Main Works project.

Pavement surface condition survey of the road network was undertaken by ARRB in April 2016 to collect surface condition distresses including rutting, roughness, cracking and texture depth. The survey scope included a series of roads managed by several organisations and the pre and post construction condition report is presented for these roads.

The study area involves several road authorities. The road condition is reported in separate road groups for each organisation where applicable.

- Group 1 – Local roads that will be utilised for heavy and oversized vehicles
- Group 2 - Local roads within 50m of the construction works but are not utilised for construction traffic
- Group 3 - Non-haulage maintenance roads
- RMS- Arterial roads within 50m buffer zone

The report summarises the current surface condition of the affected road sections by lane.

The following sections address road conditions for City of Canterbury.

1.2 Condition Survey

ARRB used Hawkeye 2000 survey vehicle to capture surface condition data of the road pavement network including:

- rut depth (inner, outer and lane)
- roughness (IRI, NAASRA)
- surface texture including sand patch texture depth (SPTD) and sensor measured texture depth (SMTD) for outer and between wheel paths.
- Surface condition including cracking data and other surface defects.

Source: ARRB Group Ltd Figure

Figure 1.1: Network survey vehicle (NSV)

1.3 Assumptions for levels of services

To help communicate between engineers and management teams, condition data is further grouped into "Very Good", "Good", "Fair", "Poor", and "Very poor" based on current industry practices, see Table 1.1.

Table 1.1: Current industry Level of services

Class name	Very Good	Good	Fair	Poor	Very poor
Rut depth (mm) range	0–2.5	2.5–5	5–10	10–15	>15
Roughness (IRI) range	0–1.5	1.5–3.0	3.0–4.2	4.2–5.33	>5.33
Texture range (mm)	>1.2	1.2–0.8	0.8–0.4	0.4–0.2	0.2–0
Cracking (%) range	0–5	5-10	10-15	15-20	>20

1.4 Scope

The scope of the report is as follows:

- collection and processing of pavement condition data including roughness (IRI m/km), rut depth (mm), cracking (%) and texture depth (mm)
- preparation of a report evaluating the current condition of the road and describe outstanding defects in terms of rutting, roughness, texture depth and cracking

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Table 2.1 and Table 2.2 show the average condition of IRI, rutting, texture depth and cracking for the nominated roads of reporting for the CC (City of Canterbury) for Group 1 and Group 2 road respectively. Table 2.3 and Table 2.4 present the worst condition on each of the selected road sections. Below is the definition of Group 1 and Group 2:

- Group 1 – Local roads that will be utilised for heavy and oversized vehicles
- Group 2 - Local roads within 50m of the construction works but are not utilised for construction traffic

Table 2.1: Average road network condition- CC-Group 1 road

	IRI (m/km)	Rut (mm)	Texture depth (mm)	Cracking (%)
GAREMA CCT-CLOCKWISE_C_1	2.80	5.10	0.47	4.06
GAREMA CCT-CLOCKWISE_P_1	2.77	4.66	0.44	2.85
HOMMER ST_C_1	2.92	2.90	0.31	3.76
HOMMER ST_P_1	3.22	2.96	0.30	3.33
KINGSGROVE ROAD_C_1	3.40	5.05	0.34	8.04
KINGSGROVE ROAD_C_2	4.03	4.26	0.36	2.17
KINGSGROVE ROAD_P_1	3.43	5.00	0.35	2.45
KINGSGROVE ROAD_P_2	4.20	5.26	0.37	0.00
MOOREFIELD ROAD_C_1	3.25	4.95	0.30	2.94
MOOREFIELD ROAD_P_1	2.85	5.07	0.31	4.42
WIREGA AV_C_1	3.29	5.65	0.24	0.13
WIREGA AV_P_1	2.27	4.53	0.24	1.25

Table 2.2: Average road network condition- CC-Group 2 road

	IRI (m/km)	Rut (mm)	Texture depth (mm)	Cracking (%)
ARMITREE ST_C_1	5.44	5.22	0.30	6.06
ARMITREE ST_P_1	2.02	3.54	0.28	3.53
GLAMIS ST_C_1	6.15	4.44	0.39	0.44
GLAMIS ST_P_1	3.95	2.54	0.39	7.09
JONES AV_P_1	3.25	4.82	0.71	0.00
KARINGAL ST_C_1	1.91	1.63	0.32	0.25
KARINGAL ST_P_1	1.50	0.96	0.31	2.71
POOLE ST_C_1	4.78	4.23	0.35	3.55
POOLE ST_P_1	5.19	1.75	0.41	2.00
ROSEBANK AV_C_1	1.51	5.66	0.43	0.06
ROSEBANK AV_P_1	2.28	6.68	0.36	3.56

Table 2.3: Worst condition on the network- CC-Group 1 road

	IRI (m/km)	Rut (mm)	Texture depth (mm)	Cracking (%)
GAREMA CCT-CLOCKWISE_C_1	4.85	6.25	0.40	11.23
GAREMA CCT-CLOCKWISE_P_1	5.81	6.38	0.37	11.55
HOMMER ST_C_1	4.19	3.62	0.28	10.60
HOMMER ST_P_1	4.35	4.33	0.27	9.53
KINGSGROVE ROAD_C_1	5.98	8.35	0.25	22.90
KINGSGROVE ROAD_C_2	7.87	8.78	0.27	9.30
KINGSGROVE ROAD_P_1	6.12	9.75	0.26	10.55
KINGSGROVE ROAD_P_2	7.05	9.97	0.27	0.00
MOOREFIELD ROAD_C_1	5.38	7.64	0.25	16.90
MOOREFIELD ROAD_P_1	4.71	7.11	0.26	13.10
WIREGA AV_C_1	4.03	6.02	0.23	0.38
WIREGA AV_P_1	2.81	6.06	0.22	1.88

Table 2.4: Worst condition on the network- CC-Group 2 road

	IRI (m/km)	Rut (mm)	Texture depth (mm)	Cracking (%)
ARMITREE ST_C_1	8.56	6.35	0.27	10.00
ARMITREE ST_P_1	2.88	3.92	0.24	5.68
GLAMIS ST_C_1	9.35	4.73	0.36	0.88
GLAMIS ST_P_1	4.36	2.98	0.35	8.30
JONES AV_P_1	3.25	4.82	0.71	0.00
KARINGAL ST_C_1	1.91	1.63	0.32	0.25
KARINGAL ST_P_1	1.50	0.96	0.31	2.71
POOLE ST_C_1	4.78	4.23	0.35	3.55
POOLE ST_P_1	5.19	1.75	0.41	2.00
ROSEBANK AV_C_1	3.02	6.55	0.41	0.13
ROSEBANK AV_P_1	2.91	8.47	0.34	4.50

According to the definition shown above (Section 1.3), the following condition statement is made for each of the surveyed roads. It should be noted that the condition statement could vary depending on the definition. The following condition categories are for the purpose of the pre and post construction comparison rather than a customised local condition assessment.

Table 2.5: Categories of condition- CC-Group 1 road

	IRI group	Rut group	Texture group	Cracking group
GAREMA CCT-CLOCKWISE_C_1	Good	Fair	Fair	Very good
GAREMA CCT-CLOCKWISE_P_1	Good	Good	Fair	Very good
HOMMER ST_C_1	Good	Good	Poor	Very good
HOMMER ST_P_1	Fair	Good	Poor	Very good
KINGSGROVE ROAD_C_1	Fair	Fair	Poor	Good
KINGSGROVE ROAD_C_2	Fair	Good	Poor	Very good

KINGSGROVE ROAD_P_1	Fair	Fair	Poor	Very good
KINGSGROVE ROAD_P_2	Poor	Fair	Poor	Very good
MOOREFIELD ROAD_C_1	Fair	Good	Poor	Very good
MOOREFIELD ROAD_P_1	Good	Fair	Poor	Very good
WIREGA AV_C_1	Fair	Fair	Poor	Very good
WIREGA AV_P_1	Good	Good	Poor	Very good

Table 2.6: Categories of condition- CC-Group 2 road

	IRI group	Rut group	Texture group	Cracking group
ARMITREE ST_C_1	Very poor	Fair	Poor	Good
ARMITREE ST_P_1	Good	Good	Poor	Very good
GLAMIS ST_C_1	Very poor	Good	Poor	Very good
GLAMIS ST_P_1	Fair	Good	Poor	Good
JONES AV_P_1	Fair	Good	Fair	Very good
KARINGAL ST_C_1	Good	Very good	Poor	Very good
KARINGAL ST_P_1	Very good	Very good	Poor	Very good
POOLE ST_C_1	Poor	Good	Poor	Very good
POOLE ST_P_1	Poor	Very good	Poor	Very good
ROSEBANK AV_C_1	Good	Fair	Fair	Very good
ROSEBANK AV_P_1	Good	Fair	Poor	Very good

Each of the individual physical parameter (rut depth, roughness, texture depth and cracking) is described separately in the following sections.

2.1 Rut Depth

A rut is a pavement defect in the form of a longitudinal depression of the surface, usually in a wheel path (Austroads 2006b).

Rutting is considered as one of the most critical parameters on bituminous pavements in urban environments, as it reflects the deformation of the pavement. Rutting also has implications for road safety due to the potential for water ponding and subsequent loss of skid resistance.

The deformation (rutting), of the asphalt may be functional or structural distress, depending on the pavement's base. Signalised intersections with asphalt pavements are particularly prone to rutting under heavy traffic.

For the current project, rutting data is collected using a 13-point laser system, which measures a 2-metre transverse profile across the lane. A full transverse profile is measured every 20 mm of longitudinal travel and the processing software allows both lane and wheel path rutting to be measured using the string line and straight edge model.

Figure 2.1 and Figure 2.2 present the average rutting of each road direction/lane for Group 1 and 2 road sections. The majority of the sections in Group 1 present rut depth of about 5mm, which is 'good' generally. Group 2 roads show similar condition except Karingal Street which is in 'very good' condition.

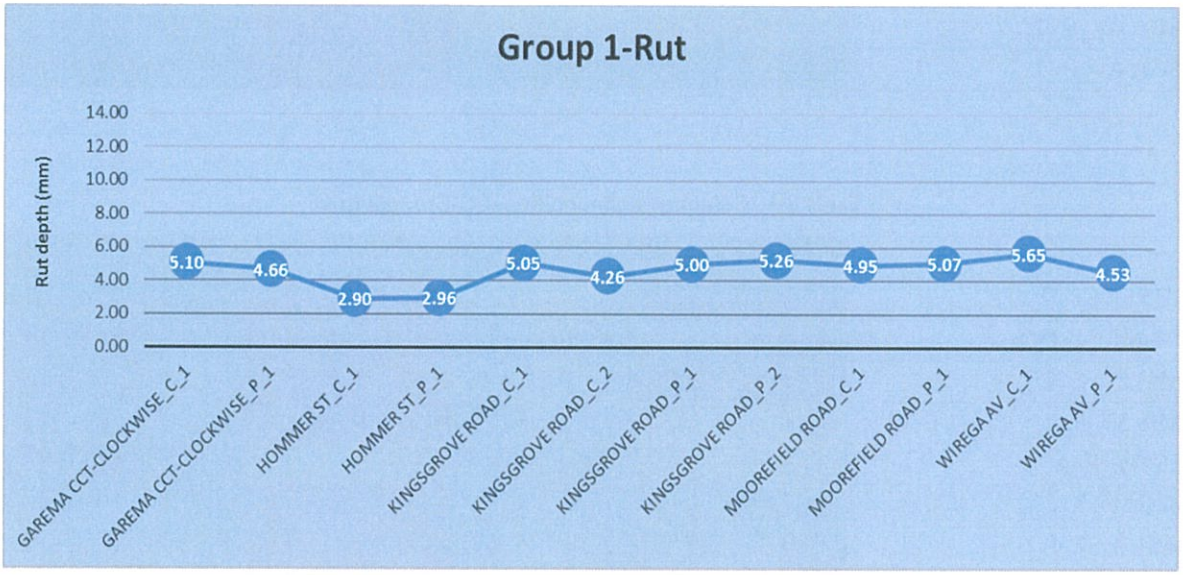

Figure 2.1: Rutting condition- CC-Group 1 road

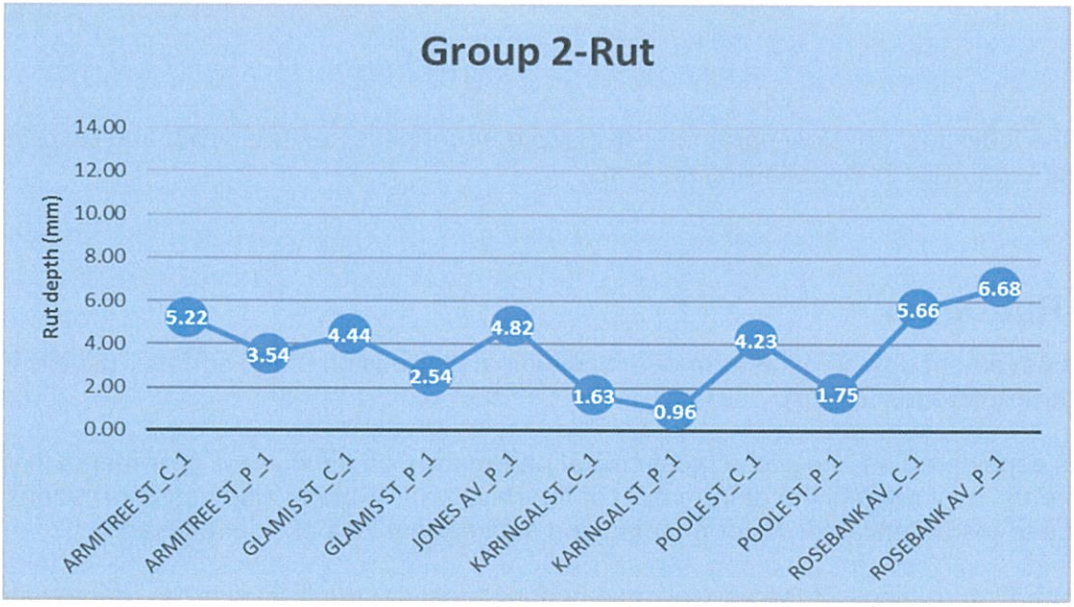

Figure 2.2: Rutting condition- CC-Group 2 road

2.2 Roughness

Roughness is considered as an important indicator of driver comfort and its change is accepted as an indicator of condition deterioration. Roughness data is presented as the International Roughness Index (IRI), the average of the left and right wheel path values for the surveyed lanes.

Austroads has endorsed the International Roughness Index (IRI) as the reporting unit for road roughness in Australasia (Austroads 2006a).

Figure 2.3 and Figure 2.4 show the average roughness condition of each survey section per direction per lane for Group 1 and Group 2 road. Most roads in Group 1 present roughness value of less than 3 IRI with Kingsgrove Road showing slightly higher roughness. Armitree Street and Glamis Street in counter direction show high roughness value of nearly 6 IRI. Both directions of Poole Street present 'poor' roughness condition according to the definition (Section 1.3). Other roads in Group 2 show good roughness condition (mostly around 2 IRI).

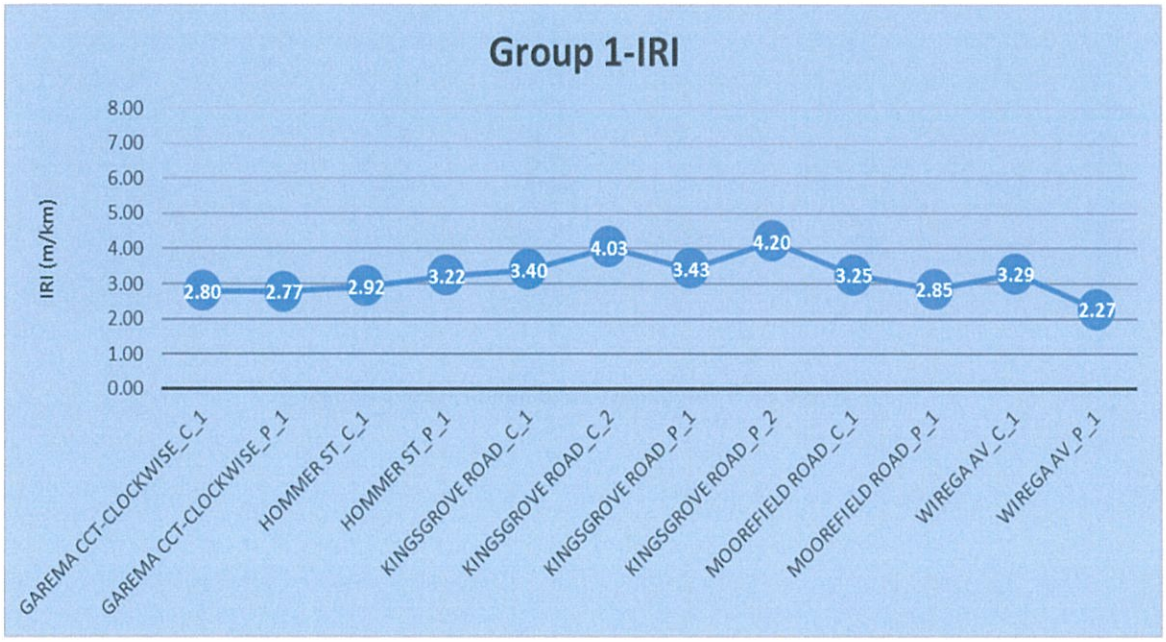

Figure 2.3: Roughness condition-CC-Group 1 road

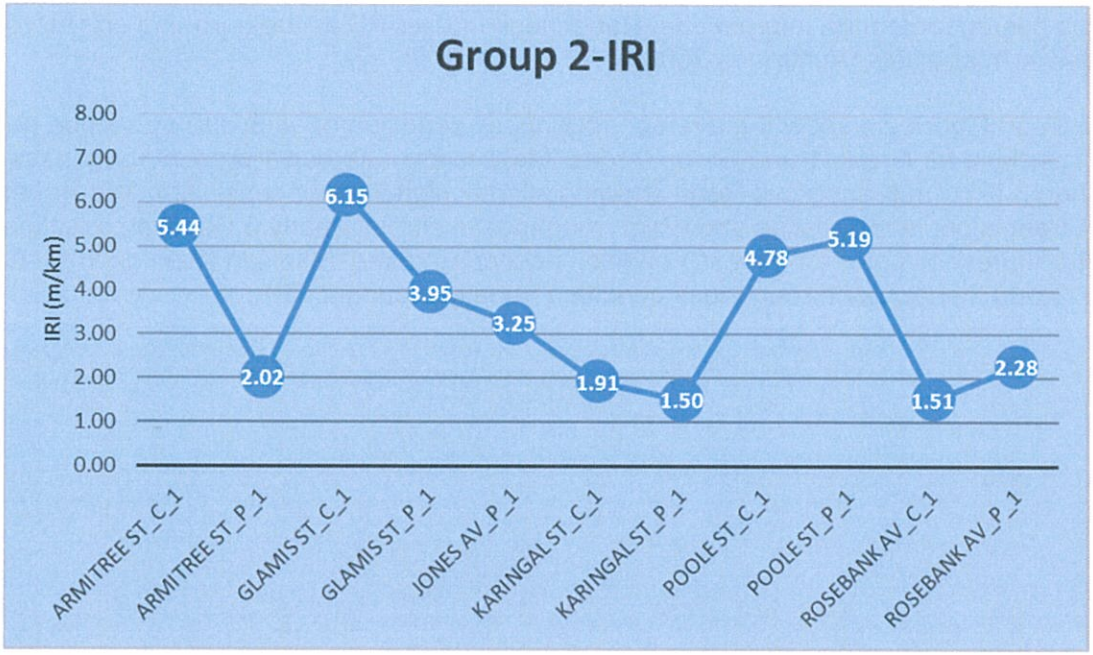

Figure 2.4: Roughness condition-CC-Group 2 road

2.3 Texture Depth

Texture depth refers to the amplitude of deviations from the surface plane of the road and is influenced by the size, shape and spacing of the aggregate of the surfacing material.

Texture is an important contributor to safety, as adequate texture depth is required to maintain skid resistance, particularly under wet conditions. On bituminous surfaces, it may indicate the loss of texture or appearance of bitumen on the surface. Both the outer (where trafficking is greatest) and inner wheel paths (where trafficking is minimal) were measured. It should be noted that a comparison of both could indicate texture loss, which should be monitored against future measurements to determine the rate and extent of deterioration. In the analysis, texture was taken from the survey data as the minimum of SMTD (mm) of the left wheel path and right wheel path.

As indicated in Figure 2.5 and Figure 2.6 , most roads in Group 1 present texture depth of less than 0.4mm while Wirega Avenue has less than 0.25mm texture depth. Similar texture condition is found in Group 2 road.

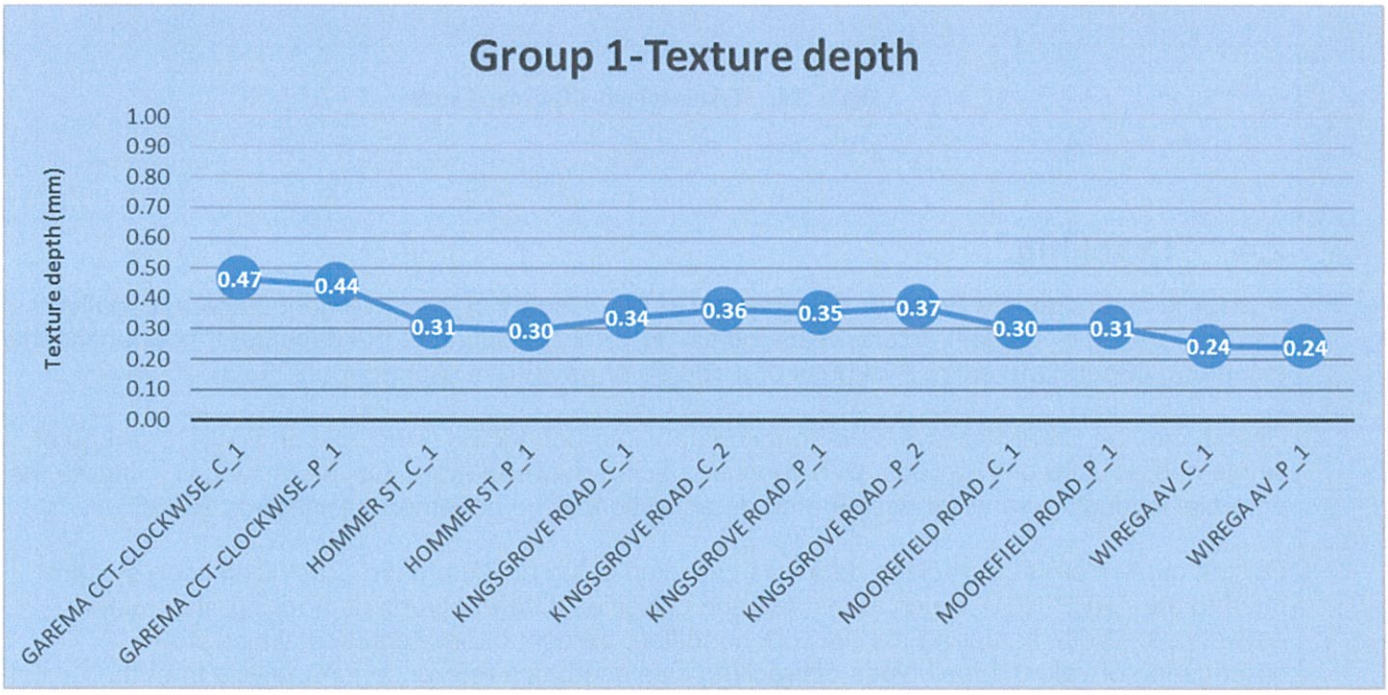

Figure 2.5: Texture depth- CC-Group 1 road

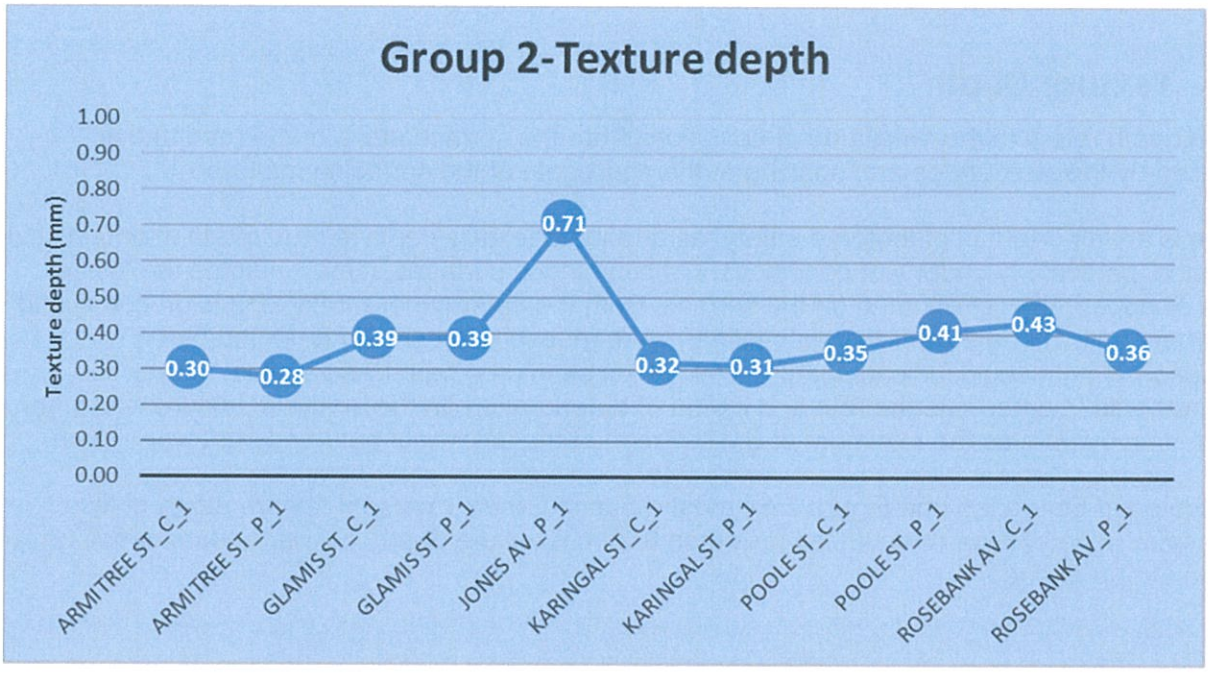

Figure 2.6: Texture depth- CC-Group 2 road

2.4 Cracking

A crack is an unplanned break or discontinuity in the integrity of the pavement surface, usually a narrow opening or partial fracture, often indicating vertical splitting of the pavement, not necessarily extending through the entire thickness of a course or pavement (Austroads 2006C).

Cracks may be linear (transverse or longitudinal), interconnected (crocodile or block), or irregular, single and isolated or in groups, with varying spacing between them. Once cracking is initiated, the potential is much greater for accelerated deterioration of the pavement (Austroads 2006C).

For the current project, cracking data was collected using an Automatic Crack Detection system fitted to the ARRB NSV, which measures and classifies different types of cracking, their extent, severity etc. While analysing the network condition, percent of area cracked, which is an aggregation of values for all types of cracking was used as a reference for analysis from the surveyed data.

Figure 2.7 and Figure 2.8 show the average cracking condition for both Group 1 and Group 2. Garema CCT both directions present larger than 10% localised cracking. Kingsgrove Road counter direction lane 1 is showing severe cracking of 22% cracked area. Moorefield Road is also heavily cracked with larger than 13% of localised cracked area.

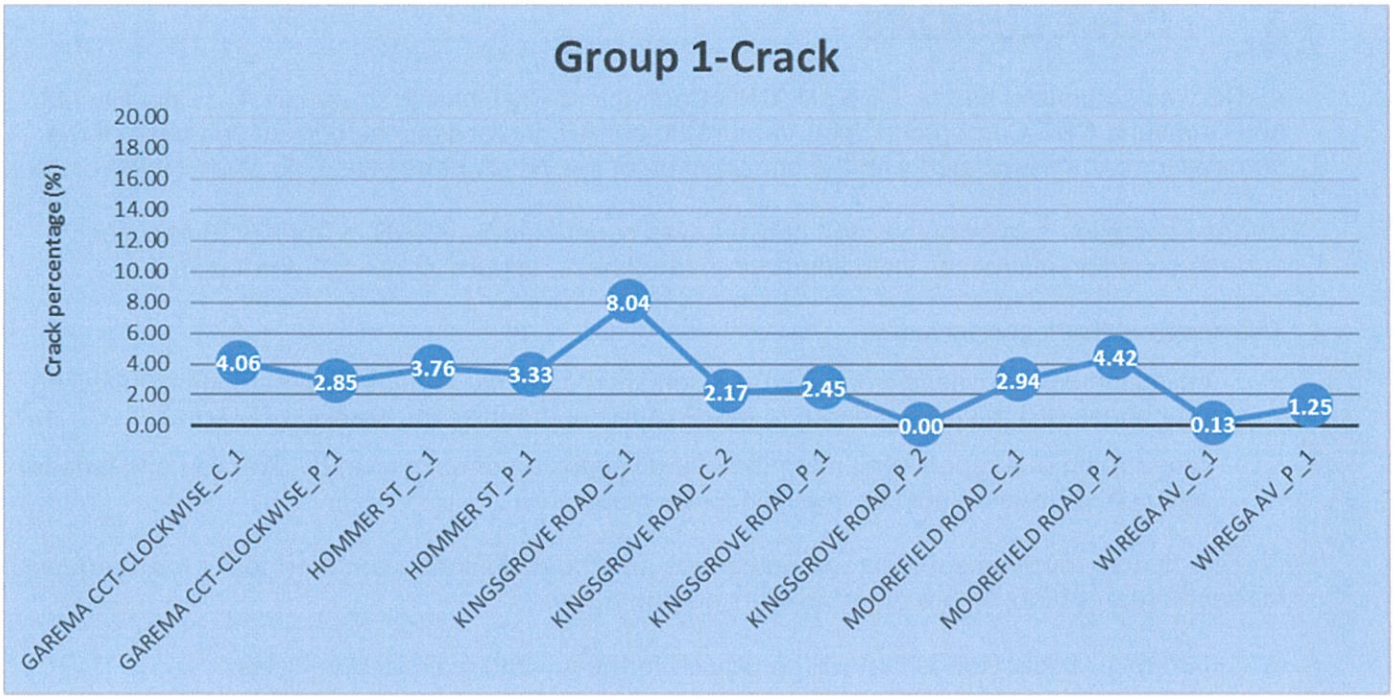

Figure 2.7: Cracking condition-CC-Group 1 road

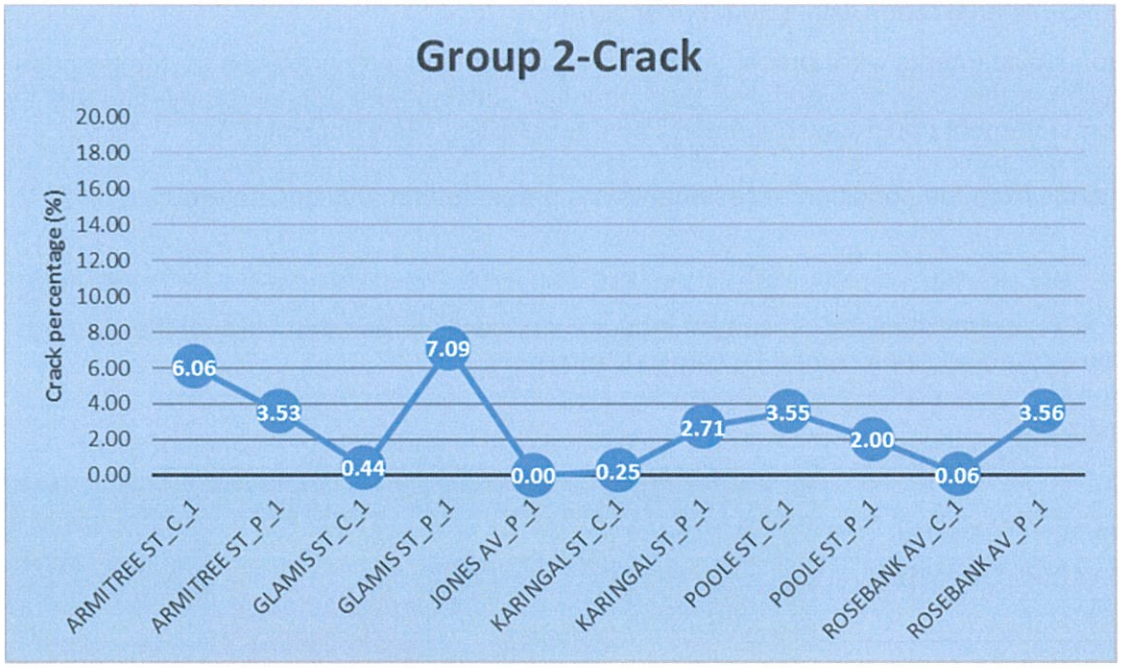

Figure 2.8: Cracking condition-CC-Group 2 road

3 CONCLUSIONS

ARRB was commissioned by CDS JV (CPB Contractors Pty Limited, Dragados Australia Pty Ltd, and Samsung C&T Corporation Joint Venture) to survey and assess the current condition of the nominated roads associated with the construction of the WestConnex New M5 Main Works project.

Surface condition survey of the road network was conducted by ARRB in April 2016 to collect surface condition distresses including rutting, roughness, texture, cracking information.

The scope of the report includes:

- collection and processing of pavement condition data into various data categories including roughness (IRI m/km), rut depth (mm), texture depth (mm) and cracking (% area).
- preparation of a report evaluating the overall condition of each road by direction and lane for each of the road authorities involved in the study area.

The study area involves several road authorities and the conditions were reported in road groups for each organisation, where applicable, as per the below.

- Group 1 - Local Roads that will be utilised for heavy and oversized vehicles
- Group 2 - Local roads within 50m of the construction works but are not utilised for construction traffic
- Group 3 - Non-haulage maintenance roads
- RMS- Arterial roads within 50m buffer zone

Condition assessments were presented based on current industry practices for the purpose of dilapidation, rather than a customised local condition assessment. Please be mindful that the condition statement could vary depending on the definition. See Section 1.3.

The findings from the condition assessments are presented for City of Canterbury.

Condition assessment based on current industry standards, presented utilising the average condition of road sections owned by City of Canterbury.

Group 1 road:

	IRI group	Rut group	Texture group	Cracking group
GAREMA CCT-CLOCKWISE_C_1	Good	Fair	Fair	Very good
GAREMA CCT-CLOCKWISE_P_1	Good	Good	Fair	Very good
HOMMER ST_C_1	Good	Good	Poor	Very good
HOMMER ST_P_1	Fair	Good	Poor	Very good
KINGSGROVE ROAD_C_1	Fair	Fair	Poor	Good
KINGSGROVE ROAD_C_2	Fair	Good	Poor	Very good
KINGSGROVE ROAD_P_1	Fair	Fair	Poor	Very good
KINGSGROVE ROAD_P_2	Poor	Fair	Poor	Very good
MOOREFIELD ROAD_C_1	Fair	Good	Poor	Very good
MOOREFIELD ROAD_P_1	Good	Fair	Poor	Very good

WIREGA AV_C_1	Fair	Fair	Poor	Very good
WIREGA AV_P_1	Good	Good	Poor	Very good

Group 2 road:

	IRI group	Rut group	Texture group	Cracking group
ARMITREE ST_C_1	Very poor	Fair	Poor	Good
ARMITREE ST_P_1	Good	Good	Poor	Very good
GLAMIS ST_C_1	Very poor	Good	Poor	Very good
GLAMIS ST_P_1	Fair	Good	Poor	Good
JONES AV_P_1	Fair	Good	Fair	Very good
KARINGAL ST_C_1	Good	Very good	Poor	Very good
KARINGAL ST_P_1	Very good	Very good	Poor	Very good
POOLE ST_C_1	Poor	Good	Poor	Very good
POOLE ST_P_1	Poor	Very good	Poor	Very good
ROSEBANK AV_C_1	Good	Fair	Fair	Very good
ROSEBANK AV_P_1	Good	Fair	Poor	Very good

4 SURVEY RESULTS

Surface condition survey processed data results are supplied to CDS JV separately in electronic format. The file names and contents are as follows (Table 4.1):

Table 4.1: Files with survey results

File Name	Content
PSS16084 - NSV_MS_WestConnex Laser Data	Roughness, rut depth and Texture depth data
PSS16084 - NSV_MS_WestConnex Visual Assessment	Cracking and other surface defects data

REFERENCES

Austroads 2006a, *Guide to Asset Management Part 5B: Roughness*, AGAM05B/07, Austroads, Sydney, NSW.

Austroads 2006b, *Guide to Asset Management Part 5C: Rutting*, AGAM05C/07, Austroads, Sydney, NSW

Austroads 2006C, *Guide to Asset Management Part 5C: Cracking*, AGAM05E/07, Austroads, Sydney, NSW.

Attachment 2 - Clause 3.2 Pavement Repairs of SWTC Appendix C.6 Local Road Maintenance during Project Company's Work

3.2 Pavement Repairs

Element	Requirement
1.Safe conditions	Repair to ensure road remains open to traffic providing safe conditions under the prevailing weather conditions, traffic volume, and speed zone.
2.Integrity of materials	All repairs, unless otherwise specified, shall comprise materials that are compatible with, or of better quality than the existing pavement. Asphalt may be used to alleviate stepping at joint.
3.Unsound material	For permanent repairs, the Project Company must remove enough of the underlying unsound material to ensure sound repair is achieved.
4.Compaction	Compaction shall achieve a uniformly dense, free from segregation and well bonded repair sufficient to ensure that it is not displaced, shoved, deformed, or picked up by traffic.
5.Ride quality	The deviation both within the repair and between the existing pavement and the repair when measured with a 1.5 m straight edge shall not be greater than 10 mm with a maximum surface level difference of 5 mm at the perimeter of the repair
6.Surface Finish	The surface shall provide a uniform water resistance layer to protect the pavement layers from surface infiltration of moisture. The skid resistance of the surface shall not be lower than that apparent immediately in front of and beyond the work area. Where surfacing aggregate is used it shall remain proud of the binder so that: ▪ binder is not picked up by the tyres of traffic, and ▪ the surface repair shall have no exposed bituminous material.
7.Lateral drainage	Ensure completed repair does not adversely affect lateral drainage across shoulder.

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Element	Requirement
8.Excess material	Excavated material and debris shall not be left on the roadside or placed so as to impede surface drainage. Excess material shall be swept from the traffic lanes and bicycle lanes and disposed of legally and responsibly at the Project Company's expense.
9.Avoid damage to existing surface	Repair material and binding agents used shall not cause damage to the integrity of the existing bituminous surfacing.