Deed of Novation, Variation and Extension

This Deed of Novation, Variation and Extension (**Deed**) is executed between:
Mornington Peninsula Shire Council (ABN 53 159 890 143) of 90 Besgrove Street, Rosebud, Victoria
(**Shire**)
Downer EDI Works Pty Ltd ACN 008 709 608
(**Contractor**)
Emoleum ABN 14 374 315 641, being a partnership between Emoleum Roads Group Pty Ltd (ACN 099 733 445) and Emoleum Road Services Pty Ltd (ACN 006 673 481)
(**Original Contractor**).

on 30th June 2021.

BACKGROUND

A. The Shire and the Original Contractor are parties to contract dated 30 June 2006 (Safer Local Roads contract no.1218) (**Contract**).
B. Following the acquisition of Original Contractor by the Contractor in 2006, the Original Contractor's rights and obligations under the Contract were assigned to the Contractor.
C. The parties wish to recognise the original assignment and perfect the Novation of the Contract from the Original Contractor to the Contractor.
D. The Contract commenced on 1 July 2006 and had an original expiry date of 30 June 2021.
E. Under clause 89.1 of the Contract, the Contractor was awarded an option to extend the term of the contract by 24 months from 1 July 2021 to 30 June 2023 (**Extension Option**).
F. On 30 April 2020, and in accordance with clause 89.4 of the Contract, the Contractor gave the Shire its "notice of intention" to exercise the Extension option. The "notice of intention" was accompanied by a fully priced and detailed offer for an Asset Management Services Refresh.
G.

Irrelevant & Sensitive

H. On 28 May 2021, the Contractor exercised the Extension Option under clause 89.7 by giving notice in writing to the Shire (**28 May Option**), a copy of which is attached to this Deed as Annexure 1.
I. Both parties have agreed to extend the term of the Contract by executing this Deed pursuant to clause 89.8 of the Contract.

OPERATING PROVISIONS

1. On and with effect from the execution of this Deed by the last party to do so (**Execution Date**):
   (a) the Shire consents to the novation of the Contract to the Contractor in accordance with clause 81.1 of the Contract; and
   (b) a reference in the Contract to the Original Contractor must be read as a reference to the Contractor in respect of all rights and obligations under the Contract, whether arising before or after the date of this Deed.

2. On and from the Execution Date:
   (a) the Contractor:
      (i) enjoys all of the Original Contractor's rights and benefits in connection with the Contract (whether arising before or after the Execution Date);
      (ii) assumes all of the Original Contractors obligations in connection with the Contract (whether arising before or after the Execution Date); and
      (iii) assumes all the Original Contractor's liability for claims under or in connection with the Contract (whether arising before or after the Execution Date),

      in each case, as if it were the original party to the Contract when the Contract was executed by the Original Contractor and the Shire.
   (b) the Shire:
      (i) accepts the Contractors assumption of the Original Contractor's obligations in accordance with clause 2(ii) and liability for claims in accordance with clause 2(iii); and
      (ii) irrevocably and unconditionally releases and discharges the Original Contractor from any and all obligations and liabilities or any claim it had or would have had, arising out of or in connection with the Contract.
3. The parties agree that:
   (a) only for the purpose of 28 May Option, clause 89.7 of the Contract be amended so that the deadline of 30 April 2021 is extended to 30 May 2021;
   (b) the Contract be extended in accordance with the terms and conditions of 28 May Option;
   (c) the Extended Contract Term (as defined in the Contract) will commence on 1 July 2021 and expire on 30 June 2023; and
   (d) the Annual Threshold will apply to both Contract Year 16 (1 July 2021 to 30 June 2022) and Contract Year 17 (1 July 2022 to 30 June 2023).
4. Any changes to this Deed must be agreed in writing by the parties.
5. This Deed is governed by Victorian law and the parties submit to the non-exclusive jurisdiction of the courts of Victoria.
6. This Deed may be executed in any number of counterparts. All counterparts taken together constitute one instrument.

SIGNING PAGE

Signed, sealed and delivered as a Deed

Executed by the **Mornington Peninsula Shire Council** by authority of its duly delegated officer:)

Personal Information

Signature of Witness

Caitlin Hancock

Name of Witness

Personal Information

Signature of Delegate

John Baker

Name of Delegate

Chief Executive officer

Position of Delegate

Executed by **Emoleum Roads Group Pty Ltd ACN 099 733 445** in accordance with section 127(1) of the *Corporations Act 2001* (Cth) by authority of its directors:)

.....

Signature of director

.....

Name of director (block letters)

.....

Signature of director/company secretary*

*delete whichever is not applicable

.....

Name of director/company secretary* (block letters)

*delete whichever is not applicable

Executed by **Emoleum Road Services Pty Ltd ACN 006 673 481** in accordance with section 127(1) of the Corporations Act 2001 (Cth) by authority of its directors:)

Signature of director

Name of director (block letters)

Signature of director/company secretary*

*delete whichever is not applicable

Name of director/company secretary* (block letters)

*delete whichever is not applicable

SIGNING PAGE

Signed, sealed and delivered as a Deed

Executed by the **Mornington Peninsula Shire Council** by authority of its duly delegated officer:)

Signature of Witness

Name of Witness

Signature of Delegate

Name of Delegate

Position of Delegate

Signed for and on behalf of **Emoleum Roads Group Pty Ltd ACN 099 733 445** by its duly constituted attorneys, who declare that they have not received any notice of the revocation of such power of attorney.)

DocuSigned by: Personal Information

Signature of Attorney

Robert Regan

Name of Attorney (block letters)

DocuSigned by: Personal Information

Signature of Attorney

Peter Lyons

Name of Attorney (block letters)

Signed for and on behalf of **Emoleum Road Services Pty Ltd ACN 006 673 481** by its duly constituted attorneys, who declare that they have not received any notice of the revocation of such power of attorney.)

DocuSigned by: Personal Information

Signature of Attorney

Robert Regan

Name of Attorney (block letters)

DocuSigned by: Personal Information

Signature of Attorney

Peter Lyons

Name of Attorney (block letters)

Signed for and on behalf of **Downer EDI Works Pty Ltd ACN 008 709 608** by its duly constituted attorneys, who declare that they have not received any notice of the revocation of such power of attorney.

)
)
)
)
)
)
)
)
)
)
)
)
)

DocuSigned by:
Personal Information

.....

Signature of Attorney

Robert Regan

.....

Name of Attorney (block letters)

DocuSigned by:
Personal Information

.....

Signature of Attorney

Peter Lyons

.....

Name of Attorney (block letters)

MORNINGTON PENINSULA Shire

Annexure 1 - 28 May Option

Downer EDI Works Pty LTD
ABN 66 008 709 608

10 Pound Road
Hastings VIC 3915

www.dmroads.com.au

28 May 2021

Jessica Wingad
Mornington Peninsula Shire Council
90 Besgrove Street,
Rosebud VIC 3939

RE: Notice of Intention to Exercise Extension Option

Dear Jessica

In line with Part 19 of Contract No. 1218 and with particular reference to Clause 89.7 DM Roads gives notice of its intention to exercise the Extension Option proposed to Mornington Peninsula Shire Council (the "Shire") in the form of a fully priced and detailed offer for an Asset Management Services Refresh on 30 April 2020 and subsequently endorsed by the Shire in the Minutes of Council Meeting held on 8 September 2020. A copy of this proposal, subsequent endorsement as mentioned above and DM Roads' definition of the amendment to the annual indexation is attached herewith in Appendix A.

Furthermore, we confirm our intention to execute an appropriate deed of variation and extension prepared by the Shire pursuant to Clause 89.8 of the Contract No. 1218 for the Extended Contract Term commencing on 1 July 2021 and continues until 30 June 2023.

We look forward to receiving your favourable response at your earliest convenience.

Please don't hesitate to contact the undersigned should you have any questions or need any further information on this matter.

Yours sincerely,

Personal Information

Chris Godsil
Service Manager - VIC
DM Roads

Appendix A

Description	Year 15	Year 15[1]	Year 16[2,3]	Year 17[2,3]
Commencing 01/07/2006	**Actual**	**Rebaselined**		
MANAGEMENT FUNCTIONS				
Customer Service				
Preparation & Maintenance of Integrated				
Inspections & Asset Reporting				
Management & Supervision of Contract including				
Condition Monitoring during Core Investment Period				
Condition Monitoring during Core Investment Period				
Conditioning Monitoring				
Sub-total				
OPERATIONAL FUNCTIONS				
Resealing Program Year 1				
Maintenance Activities as per SIMS				
Budget allowance for Resealing/Rehabilitation Works				
Accelerated Upgrading of Project Network		**I&S**		
Sub-Total				
Total Annual Service Management Charge				
Monthly Service Management Charge				
ANCIALLARY FUNCTIONS				
Working Capital Fee				
Linemarking				
Crushed Rock[4]				
Sub-Total				
Total Contract Service Charge				
Monthly Contract Service Charge				

Note 1: Rebaselined Indices against June 2005 benchmark for *Budget allowance for Resealing/Rehabilitation Works* using Labour 35% ABS 6345 T2 All sectors Vic; Bitumen 35% Vic Roads Average Bitumen Price Index; Materials 30% ABS 6427 T16 Road & Bridge Construction. For the purposes of applying annual indexation against in Years 16 and 17 only

Note 2: Year 16 and 17 total contract service charge subject to annual indexation against rebaselined Year 15 total contract service charge

Note 3: Replacement of ABS 6427 T11 Petroleum & Coal Products Index with the Average Bitumen Price of Class 170 bitumen from BP, Mobil and Shell from April to June of the current financial year as published on the VicRoads website

Note 4: The Crushed Rock budget is paid on volume placed and not as a monthly service charge. It is not subject to rise and fall, it is an indicative value only and is subject to change at Council's sole discretion.

Downer EDI Works Pty LTD
ABN 66 008 709 608

10 Pound Road
Hastings VIC 3915

www.dmroads.com.au

30 April 2020

Niall McDonagh
Mornington Peninsula Shire Council
90 Besgrove Street,
Rosebud VIC 3939

Dear Niall

In line with Part 19 of Contract 1218 and with particular reference to Clause 89.4 DM Roads gives notice of its intention to exercise the Extension Option until June 30, 2023 with a fully priced and detailed offer for an Asset Management Services Refresh.

Included within the notice is:

1. A proposed Monthly Service Charge payable during the extended contract term (Appendix 1)
2. A next generation Pavement Condition Index proposal (Appendix 2)
3. Requested benchmarking rates to demonstrate value for money (Appendix 3)

Working closely with Mornington Peninsula Shire over the last 14 years as your trusted partner we have tailored an extension option that we believe will enhance our Mornington Peninsula's future by delivering better community experiences through smarter solutions.

I have summarised the key attributes of DM Roads offer in the below table with full detail provided within the Appendices.

Key Attribute	**What this means for MPS**	**Key benefits for MPS**
Total Contract Service Charge to remain at current funding levels subject to annual indexation. Refer Appendix 1.	▪ [redacted] Accelerated Works Program (AWP) to be delivered during the extension period ▪ AWP to match funding differential of the original AWP repayment within the Total Contract Service Charge ▪ Sites to be identified and endorsed by SMT prior to commencement of the extension period. ▪ Investment is to be made outside of the Pavement Performance index. ▪ Lump Sum, Defined Scope, Fixed Price claimed in monthly instalments as per current contract.	✓ Retaining current funding [redacted] in the network. ✓ [redacted] investment into an accelerated works program with no increase in current funding levels required ✓ Contract payment model to remain as equal monthly instalments ✓ Business as usual approach to routine maintenance during the extension period

Key Attribute	What this means for MPS	Key benefits for MPS
A new Pavement Performance Measure to be set for the extension period. Refer Appendix 2.	▪ A new Pavement Performance Measure based on a distribution approach to maintaining a percentage of excellent, good, fair and poor pavements, with the aim to ensure that roads in poor condition are addressed. ▪ Current Pavement Condition Index (PCI) to be split into a Surface Conditions Index (SCI) and PCI ▪ Modelling to the current PCI will be completed as a benchmark to the new Pavement Performance Target. Deterioration rates will be applied to the new model and a program of works will be developed. ▪ Targets and Lump Sum Fixed Price to be defined and submitted for SMT endorsement by end of 2020. ▪ Lump Sum Fixed Price claimed in monthly instalments	✓ Risk remains wholly with DM Roads as per current contract ✓ New Pavement Performance Measure provides greater road user safety and reduced whole of life pavement costs. ✓ 15% of annual reseal budget to target roads in poor condition that would never be considered under the current model i.e. Canadian Bay car park ✓ Easier to understand Pavement Performance Measure for the community ✓ Evolution of the current Pavement Condition Index (PCI) to an outward looking customer focussed model ✓ Enhanced road hierarchy with larger importance on High Profile arterial roads and selection of car park treatments and site selection ✓ Council can take another industry leading contract model to market in 2023 with confidence that it will deliver value for money and an enriched community experience

Once you have had time to review and at your convenience I propose we schedule a meeting to explore our offer further. I look forward to speaking to you soon.

Yours sincerely,

Personal Information

Marcus Stephens
General Manager

Appendix 1

Proposed Monthly Service Charge
Version: v.1.0

Background

DM Roads proposes to adopt a Monthly Service Charge payable for years 16 and 17 using the current contract principles with the following amendments and improvements:

1. An Accelerated Works Program (AWP) over the 2 year extension period
2. Amendment to the annual indexation to reduce the risk profile for both Council and DM Roads

An Accelerated Works Program over the 2 year extension period

DM Roads proposes an AWP over the 2 year period to match the funding differential between Year 15 Total Contract Service Charge (including Working Capital Fee) and the Annual Service Management Charge excluding AWP. This proposed amendment maintains current Council funding levels, supports the current contract overhead and invests in sites that will realise significant community benefit. The Accelerated Works Program sites would be approved by the contract Service Management Team. Below are the key benefits of the AWP.

- ✓ **CIC** invested into an accelerated works program with no increase in current funding ired
- ✓ Site and treatment selection endorsed by the contract Service Management Team ensuring control of where the investment is made remains with Council whilst enhanced by DM Roads engineering input
- ✓ Works scoped and priced under a fixed price, defined scope, lump sum arrangement with benchmark rates for assessment transferring delivery risk to DM Roads

It is proposed that the AWP be scoped immediately with lump sum fixed prices submitted to SMT for endorsement at each site up to t **CIC** budget. It is proposed that delivery of the AWP projects start prior to commencement of the extension period once endorsed so the value of the improvement works can be realised by the community as soon as possible.

Amendment to the annual indexation to reduce risk profile for Council and DM Roads

DM Roads proposes to make the following amendments to the annual indexation.

- ✓ Replacement of ABS 6427 T11 Petroleum & Coal Products Index to with the Average Bitumen Price of Class 170 bitumen from BP, Mobil and Shell as published on the VicRoads website https://webapps.vicroads.vic.gov.au/VRNE/tenconin.nsf/webFreeForms/4B01451960BD9891CA257367001DFA9A?OpenDocument.
- ✓ The weighting for the Resealing/Rehabilitation to be amended to Labour 35% ABS 6345 T2 All sectors Vic; Bitumen 35% Average Bitumen Price of Class 170 bitumen; Materials 30% ABS 6427 T16 Road & Bridge Construction.

The Average Bitumen Price is more reflective of the fluctuation in Bitumen price and the weightings are more reflective of the cost breakdown of a resealed pavement. This will reduce the fluctuations in annual adjustments and the overall risk profile for both parties.

The Average Bitumen Price would require a reset benchmark adjustment at Year 15 for Years 16 and 17. This would be completed and submitted to the Service Management Team for approval once the Year 15 indices are released.

Monthly service charge payable

Table 1 below outlines the proposed monthly service charge payable for years 16 and 17. Adjustment would be made at the expiration of year 15 at the year 15 levels plus growth and indexation as per the current contract

Appendix 1

Proposed Monthly Service Charge
Version: v.1.0

Table 1 Schedule of Prices – Inflated Dollars Year 14

Description	Yr 15	Yr 16	Yr 17	Total (Yr 16 - 17 only)
Commencing 01/07/2006				
MANAGEMENT FUNCTIONS				
Customer Service				
Preparation & Maintenance of Integrated Management System				
Inspections & Asset Reporting				
Management & Supervision of Contract including Service Management Team support				
Condition Monitoring during Core Investment Period				
Condition Monitoring during Core Investment Period				
Conditioning Monitoring				
Sub-total				
OPERATIONAL FUNCTIONS				
Resealing Program Year 1			**I&S**	
Maintenance Activities as per SIMS				
Budget allowance for Resealing/Rehabilitation Works				
Accelerated Upgrading of Project Network				
Sub-Total				
Total Annual Service Management Charge				
Monthly Service Management Charge				
Working Capital Fee				
Total Contract Service Charge				
Monthly Contract Service Charge				

AWP to match funding differential betw een Year 15 Total Contract Service Charge (including Working Capital Fee) and Annual Service Management Charge excluding AWP

Appendix 1

Proposed Monthly Service Charge
Version: v.1.0

Next Generation PCI Proposal

Prepared For:

Mornington Peninsula Shire Council

30th of April 2020

Appendix 2

Next Generation PCI Proposal
Version: v.1.0

Document Preparation and Control	Document Review
Hui Chen	Ashley Oats
Document Approval	**Signature**
Chris Godsil	Personal Information

Document Version	Date
1.0 Final	30/04/2020

TABLE OF CONTENTS

LIST OF TABLES

1 INTRODUCTION

1.1 Background

The Mornington Peninsula Shire (MPS) has a sealed road network length of approximately 1,380km with a combined pavement and surface value of approximately $520m. The network is divided into 5 road categories:

- Category A – Arterial
- Category B – Collector Roads
- Category C1 – Local Collectors
- Category C2 – Local Access
- Category D – Limited Access, Service Roads and Car Parks

The existing Safer Local Roads (SLR) Contract Pavement Performance Measure is designed to measure the service providers performance against a set required condition standard to protect the community's significant investment in the network. The current PCI is calculated as a composite condition index made up of different condition parameters that aims to represent the overall health of the road network. Each road category above will have its own PCI calculated every three years and as part of the contract DM Roads is required to maintain the PCI level over each three year cycle.

The current SLR contract is now in its 14th year of a 15 year contract. MPS has requested DM Roads to propose any enhancements or amendments to the current PCI process for the proposed 2 year contract extension. This presents an immense opportunity to test and develop an industry leading contract model to take to market in 2023 with confidence that it will deliver value for money and an enriched community experience.

1.2 PCI Review Requirements

The existing contract review to prepare for the Next Generation road contract is to be undertaken based upon the following objectives and scope:

- Value for money
- Risk distribution
- Clarity of responsibilities
- Ease of management
- Ease of referral – customer service
- Management of asset data
- Market capability
- Quality of service
- Shire's reputation
- Consequence of contract termination

2 CURRENT PCI PROCESS

2.1 Calculation Methodology

The current Pavement Condition Index (PCI) for each road category is based on combination of the pavement conditions below:

Table 1: Pavement Condition

Condition	Measurement Method	Description
Roughness	Automated	Measures the Ride Quality of the road using the International Roughness Index (IRI m/km)
Rutting	Automated	Measures longitudinal pavement deformation in terms of rut depth (mm).
Texture	Automated	Measures the macrotexture of the surface which characterises the level between the aggregate and the binder to determine the ability for water to escape between the tyre and the surface. Measured in texture depth (mm)
Crocodile Cracking	Manual Visual	Interconnected or interlaced cracks forming a series of small polygons resembling a crocodile hide. Indicates pavement fatigue and structural failure. Measured as % area affected.
Lineal Cracking	Manual Visual	Line cracking which are mainly due to expansion and shrinkage of the pavement due to environmental wear. This indicates surface aging and leads to loss of waterproofing. Measured as % area affected.
Pavement Defects	Manual Visual	Localised rutting, shoving, depressions and deformation indicating pavement structural damage. Measured as % area affected.
Surface Defects	Manual Visual	Distresses such as delamination, potholes and temporary patching. Indicating end of surface life. Measured as % area affected.
Stripping	Manual Visual	Removal of the coarse aggregate of a seal leaving the binder exposed to tyre contact due to binder degradation. Leading to exposure of based material. Measured as % area affected
Flushing	Manual Visual	Immersion, partially or completely, of the aggregate into the bituminous binder that causes low texture depth and inadequate tyre-to-stone contact. Due to over application of binder or incorrect binder selection. Leading to safety issue. Measured as % of area affected

The PCI calculation methodology is as follows:

1. The above data is collected at 100m intervals for the whole network.
2. Each of the above condition parameters are then converted into condition indices between 0-100 so that they are measured on the same scale.
3. A PCI score is then calculated for each 100m segment within the network using a Weighted Average of the individual condition indices. Table below shows the condition weightings.

Each of the above condition parameters are then converted into condition indices between 0-100 so that they are measured on the same scale. The overall PCI is then calculated based on Weighted Average of the individual condition indices. Table below shows the condition weightings.

Table 2: Pavement Condition Weightings

Indices	Weightage Factor (WF) based on Categories						
	A		B		C1	C2	D
	A	AV	B	BV			
Condition Contribution (CC)	*CC =65 %*				*CC =75 %*		*CC = 80 %*
Roughness	30 %		30 %		25 %		
Rutting	15 %		15 %		15 %		
Surface Texture	30 %		30 %		30 %		
Flushing		30 %		30 %		25 %	25 %
Stripping						25 %	25 %
Cracking	25 %	25 %	25 %	25 %	30%	25 %	25 %
Pavement Defects		45 %		45 %		25 %	25 %
Surface Age Contribution (AC)	*AC =35 %*				*AC = 25%*		*AC =20 %*

4. The Length Weighted Average Overall PCI score for each Road Category is calculated (i.e. combination of 100m segment scores weighted based on its length)
5. The overall score will represent the current level of service of the road category.

2.2 Performance Targets and Compliance

The data shown in Table 1 was collected prior to the contract start and every 3 years subsequently and is used as:

- Compliance PCI score to measure whether PCI was maintained over the previous three year period
- Target PCI score used for the subsequent three year period

The reasons for two calculations are that the network changes over time hence a Compliance Score needs to be calculated based on the network three years ago and a Target Score is required for the new network. Network changes includes:

- Surface Type changes
- Growth and Shrinkage of the Network such as subdivisions (growth) or change of ownership to VicRoads (shrinkage)
- Road Category Changes – Category A road now a Category B road

2.3 Identified Opportunities

Table 3 lists a set of opportunities identified over the last 14 years by MPS and DM Roads to enhance the PCI process resulting in reduced whole of life costs and enriched community sentiment.

Table 3: Pavement Condition Weightings

Opportunity	Description
Transforming PCI into a tangible measure	The current PCI scores are hard to interpret and difficult to explain to the community. It is difficult to determine the condition of the road segment just from looking at the PCI score. While roads are not treated according to their PCI, they are treated based upon individual defects triggering treatments. The community cannot tell the difference in roads of similar PCI's, the PCI is not a number that can be related and compared across hierarchies. PCI's need to be standardised across hierarchies. For example, a PCI of 70 in a C2 road is not the same condition as a road of PCI 70 in an A road. A PCI of 80 in an A road would be good, the same 80 score in a C road would be excellent. The raising of PCI in C2 for example from 82 to 83 would cost a significant amount of money, yet the Community would not notice any change.
Enhanced Community Perception	Despite sound engineering performance of our network, the community perception continues to decline. Different road categories there are roads with varying levels of importance and sensitivity to the community. However, as they are measured under the same scale these road sections may not be treated leading to poor perception. Such as local access C2 roads that are near shopping centres or Arterial A roads that are tourist roads. Or limited Access D roads that contains both carparks and service roads which should have different levels of service.
Improved Video Image Assessment	Video image desktop analysis undertaken recently by ARRB has proven to be problematic. Results have highlighted the variation in ratings resulting from subjectivity, change of defect rating providers, variation in staff, and variation in image quality and technical changes to equipment. This is most profound when assessing stripping and flushing defects as these are very difficult to see from an image and lighting conditions has large effect.
Pavement Texture	Currently a single scale is used for measuring texture condition performance on both asphalt and spray seal which have very different finished surface textures and overall degradation performance.
Surface Age	The current PCI has a heavy reliance on surface age (35% for A and B roads and 25% for C roads and 20% for D roads). This weighting on surface age and requirement to achieve predefined PCI targets results in situations where a low profile 40 year old road with low traffic and in good condition receives a reseal. There is greater value for the community in investing in other higher profile and poorer conditioned pavements
Investing in Roads in Poor Condition	The current PCI process requires an average condition be maintained across each road hierarchy. Although the overall condition of the network is preserved, this allows poor road segments to remain untreated and to deteriorate.

3 NEW PROPOSED PCI PROCESS

The sections below details each component of the new proposed pavement performance measurement procedure and how they address the issues highlighted in the previous section.

3.1 Pavement and Surface Performance Levels

The current PCI measure represents the overall performance of the pavement which includes performance of both the pavement surface and structure. This results in a PCI that is less flexible and does not accurately reflect the actual performance.

It proposed that a separate Pavement Condition Index (PCI) and Surface Condition Index (SCI) be used as performance requirements, where:

- **Surface Condition Index (SCI)**: Aims to measure the ability of the surface to provide waterproofing to prevent accelerated deterioration due to water ingress and safe surface for vehicle travel.
- **Pavement Condition Index (PCI)**: measures overall structural performance of the pavement. This will assist in identifying sites that require heavier treatments to reduce whole of life cycle cost as the pavement may have already failed.

The separation of pavement and surface conditions ensures that each individual component of the road can be monitored for performance enabling better management and control, which in turn:

- Reduces cases where poor pavements with good surfaces are averaged out when using a single PCI
- Reduces the impact of surface age on overall PCI. While Surface age is still useful indicator of health of the surface it was previously weighted too highly which skewed the overall pavement preservation strategy
- Increase better treatment and site selection as value is actually gained from treatments.

3.2 Pavement Condition Data Collection

Table below shows the condition parameters proposed for the two separate condition indices.

Table 4: Condition Parameters for Surface and Pavement Condition Indices

Surface Condition Index (SCI)	Pavement Condition Index (PCI)
Texture Depth (mm) – AC Texture Depth (mm) – SS	Roughness
Surface Age – Asphalt and Spray Seal	Rutting
Environmental/Lineal Cracking	Crocodile Cracking
Surface Defects	Pavement Defects

The condition parameters were chosen based on the following:

- **Data availability** – All of the above parameters are currently being collected minimising change in data collection methodology and maintaining link to previous condition data.
- **More consistent data**: Flushing and stripping are removed due to very inconsistent data and diluted the overall PCI calculations. These types of defects would be covered by the measurement of texture depth across all road categories, including C2.
- **Inclusion of Surface defects and Lineal Cracking into the PCI**: While surface defects and lineal cracking data were previously collected, they were not included in the PCI. The inclusion provides incentive for work to be done that addresses Community perception issues (potholes and patching), includes lineal cracking as an individual defect (studies indicate 80% of local road cracking initiates through environmental factors – not load factors), should capture defect types prevalent in slurry surfaces that are not currently being captured or triggering treatments
- **Texture Depth**: Separate measurements for asphalt and spray seal surfaces

3.3 Treatment Based PCI Scoring

Similar to the previous PCI calculation method, it is proposed that each condition parameter is converted into individual indices on a scale of 0-100. As different parameters are measured differently this allows for them to be measured on the same scale. However, to improve transparency and improve community perception, condition thresholds aligned to treatment levels are added to provide clarity on what stage of life each road segment is in simply by looking at the PCI. Meaning that for each condition index the calculation values used to indicate the change in threshold (i.e. from Excellent to Good) will indicate that a treatment will be required.

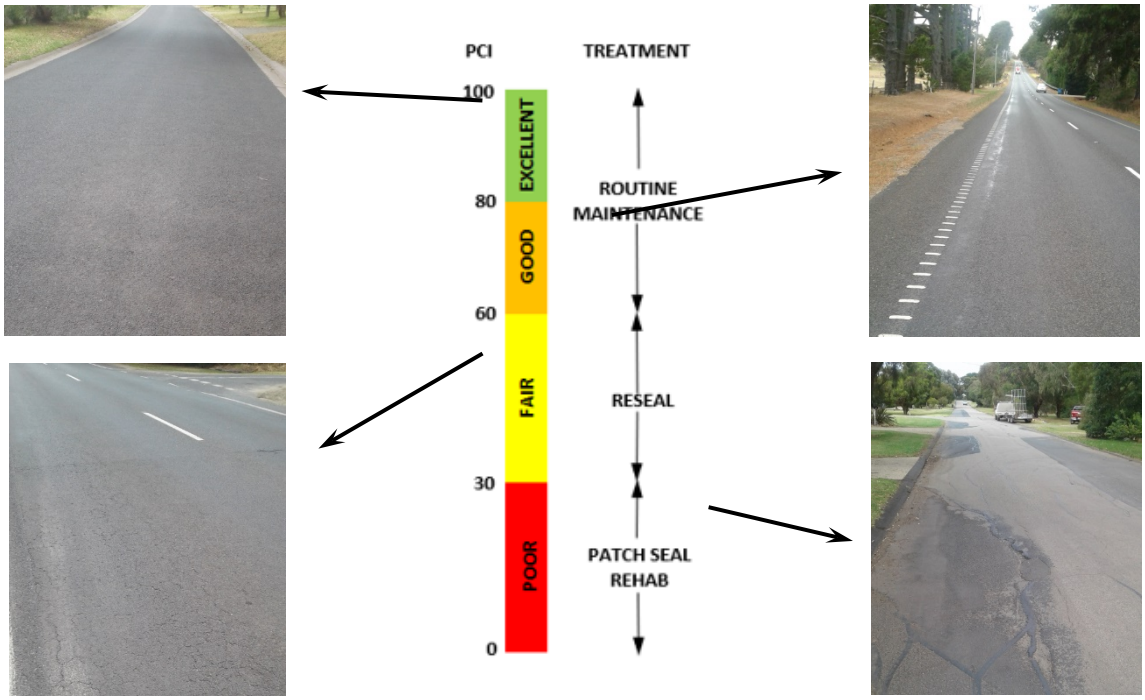

Figure 1: Treatment Based Condition

Table 5: Treatment Matrix Based on SCI and PCI

	Pavement (PCI)			
Surface (SCI)	**EXCELLENT**	**GOOD**	**FAIR**	**POOR**
EXCELLENT	Nil	Nil	Patch & Seal or Mill & AC	Rehabilitation
GOOD	Nil	Nil/Reseal	Patch & Seal or Mill & AC	Rehabilitation
FAIR	Reseal	Patch & Seal or Mill & AC	Patch & Seal or Mill & AC	Rehabilitation
POOR	Patch & Seal or Mill & AC	Patch & Seal or Mill & AC	Rehabilitation	Rehabilitation

3.4 Hierarchy Changes

To improve community perception, it is proposed that the following changes to road hierarchy be made:

- Introduction of high Profile A & B that roads are currently determined according to their ADT figures >5000 AADT and commercial and school bus route status. The finalisation of lengths remains subject to further analysis.
- Removal of carparks from Category D Roads and the PCI process - Pavement performance measures on car parks are hard to assess due to their specific individual requirements and treatment strategies. It is proposed that a separate annual budget to be set aside outside of the PCI process to address all car parks and those road segments that are extremely poor in condition but where there is no PCI benefit to renew them e.g. residential road servicing 6 properties that has severe roughness issues (not measured by PCI). It is proposed that a non-PCI driven treatment selection be made within the annual reseal budget.
- Consolidation of Category A and Category B roads into a Category A road covering arterial and collector roads.
- Consolidation of Category D roads (i.e. service lanes, right of ways, etc) into Category C2 roads.

This approach supports targeted treatment and site selection strategies for road segments that are highly sensitive to the Community.

Table 6: Proposed New PCI Hierarchies

EXISTING HIERARCHY	(km)	PROPOSED HIERARCHY	(km)
A – Local Arterial	217	H - High Profile Arterial and collector roads (>5,000adt)	77
B – Collector	145	A – Arterials and collectors	285
C1 – Local Collector (suitable for roughness capture)	246	C1 – Local Collector (suitable for roughness capture)	246
C2 – Local Access (not suitable for roughness capture)	714	C2 - Combined existing C2 and Local Limited Access D roads	728
D – Local Limited Access & Car Parks	32	Car Parks (**Propose to be removed from performance targets**)	18

3.5 Network Distribution Performance Targets

It is proposed that rather than requiring compliance with a specific target PCI number, we apply a distribution approach to PCI scores. Where performance is based on maintaining a percentage of the network within each PCI (surface, pavement) in categories of excellent, good, fair, poor with the aim to ensure that roads in poor condition are addressed.

Table 6 and Figure 2 below shows the current network distribution based on the Surface Condition Index described above. We can see that most of the network (55%) is in ‘Excellent’ condition requiring no treatment, while 4% is in poor requiring heavy treatment. Using a distribution based target setting methodology enables us to set targets to ensure the 4% of the ‘Poor’ roads are reduced. While a single average number could be maintained by addressing only the ‘Fair’ roads.

The numbers in the table below are based on draft numbers, the total quantum and sensitivity analysis has not yet been done to determine what the fair/achievable target will be based on the current level of funding for reseal and rehabilitation works under the current SLR contract. It is proposed to complete this modelling, define targets to be achieved and submit for Service Management Team endorsement by the end of 2020.

Table 7: Network Surface Condition Distribution

Category	Excellent	Good	Fair	Poor
H	58.41%	30.12%	9.97%	1.50%
A	54.98%	29.19%	12.33%	3.50%
C1	49.44%	31.07%	13.49%	6.00%
C2	58.14%	26.76%	11.16%	3.94%
Network	55.88%	28.27%	11.77%	4.09%

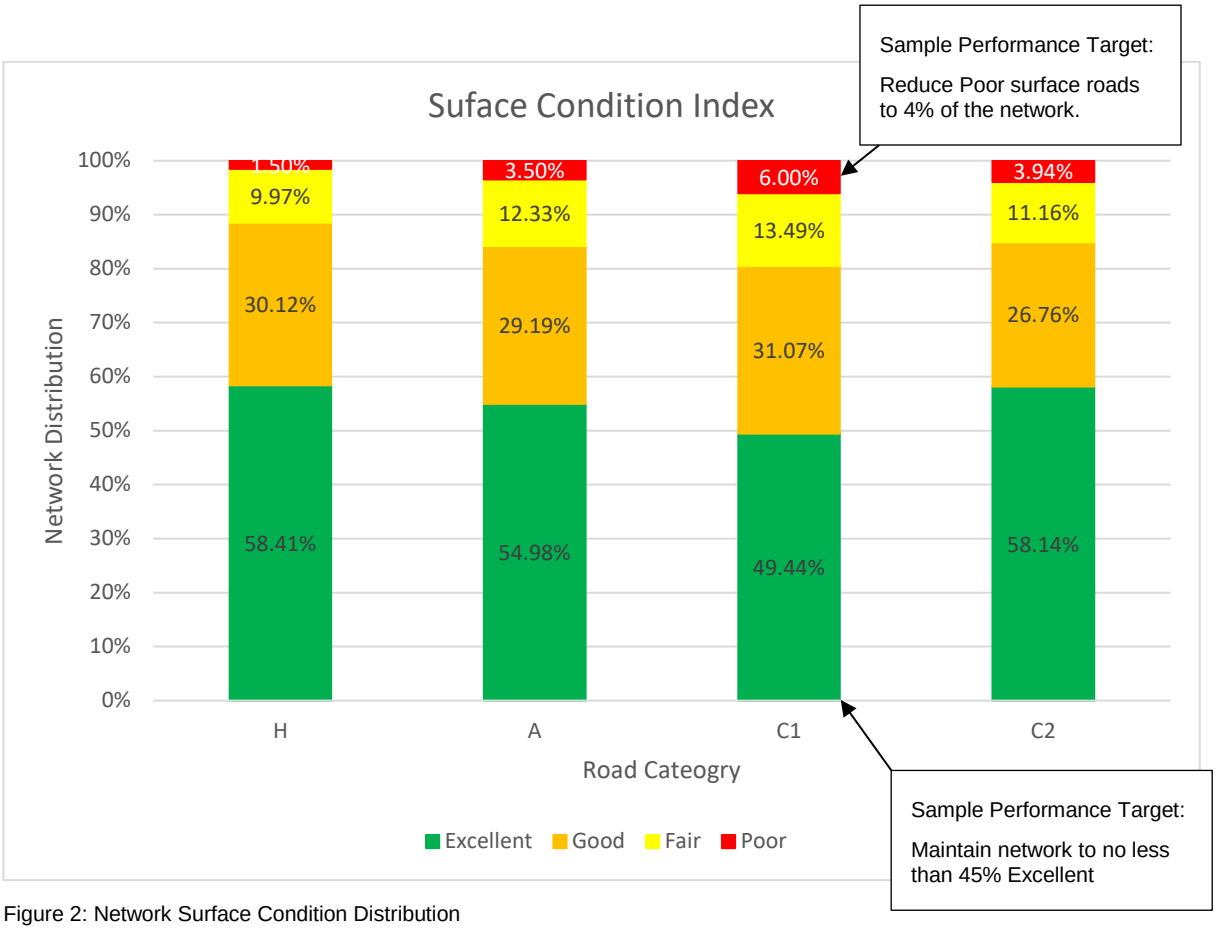

Figure 2: Network Surface Condition Distribution

This approach to target setting and performance measurement will be less reliant on achieving a single number, which will:

- minimise the effect of variability in the data collected or changes in technology, as a small error would not shift the number over the condition threshold boundaries.
- reduces the inappropriate treatments that can be applied simply to achieve a ‘number’, allowing for greater innovation and provides greater flexibility in investment and treatment strategies to be introduced (such as new products or treatments) without compromising the existing PCI process

3.6 Community Prioritisation

It is difficult to implement a community satisfaction based performance measure. However, using the above example Network Distribution Targets of reducing 6% Poor roads to 4%, it is possible to implement an agreed prioritisation methodology (by both DM Roads and MPS) to prioritise which 2% of Poor roads to address and improve customer satisfaction and remain transparent on our decision making.

A Multi-Criteria Analysis (MCA) scoring system can be used based on the following evaluation criteria divided into Customer Focus and Value Focus.

Table 8: MCA weighted criteria

Customer Focus	Value Focus
Political Importance – Roads that are freight routes, tourist routes may have higher political importance score	**Maintenance Effort** – Roads with repeat maintenance effort would be scored higher to address deteriorating roads and reduce whole of life costs
Customer Sensitivity – areas near shopping centres, community centres or high customer complaint volumes may have higher score	**Treatment Priority** – Fast deteriorating roads that maybe in the cusp of needing rehabilitation treatments within next 3 years if not addressed now.
Road Safety – addresses areas with higher accident rates or higher safety risk should the road deteriorate	**Road Use** – bus routes, high traffic volume roads maybe scored higher

DM Roads proposes a scoring approach on an arbitrary scale of 0-5, where, each criterion is scored against the same scale. The scoring system will be used for evaluating maintenance activities on different roads based on level of importance, where a score of 5 being the highest importance and 1 being the lowest.

Table 9: MCA scoring system

Criterion	Criteria Score				
	1	2	3	4	5
Maintenance Effort per block (Last 3 years)	0 visits	1 visit	5 visit	10 Visit	20 visits
Road Safety (Taken from accident statistics)	No safety concerns	Low safety Concerns	Moderate safety concerns	High safety concerns	Very High safety concerns
Road Use	<50 AADT	50 - 1000	1000 - 5000	1000-5000 And bus route	>5000
Political/Strategic importance (Defined by the Service Management Team)	Very Low importance	Low importance	Moderate importance	High importance	Very high importance (tourist routes)
Customer Sensitivity (Taken from Merit cases)	No prominence	Local priority – Low (Local schools etc)	Local priority – high (e.g. local shopping areas)	Regional priority (People within peninsula comes here)	Prominent Area (People from outside peninsula comes here)

A Weighted Aggregate Score based on the above factors will be used for ranking the proposed treatment sites. Where weightings for each criterion are used to reflect its relative importance in the making the final decision. Further investigation is required to establish the criteria measures and scoring to ensure it drives best for network and community outcomes. It is proposed to have this scoring system finalised and submitted for Service Management Team endorsement prior to contract extension commencement.

3.7 Network Changes

The current process used for handling network changes below needs to be retained when calculating both compliance and future targets:

- Surface Type changes
- Growth and Shrinkage of the Network such as subdivisions (growth) or change of ownership to VicRoads (shrinkage)
- Road Category Changes – Category A road now a Category B road

For example, a new subdivision that is added to the network in brand new condition does not contribute to achieving the compliance and vice versa it also should not artificially inflate the target requirements for the next performance cycle.

4 IMPLEMENTATION

4.1 Budget and Performance

DM Roads proposes that the that the next generation Pavement Performance Measure described above be adopted for the 2 year extension period. DM Roads will in addition complete pavement modelling based on the current contract PCI approach to provide a benchmark for the new model. This will form a baseline to measure the success of the enhanced PCI process and provide transparency that a level of investment is made into the network in line with the last 14 years.

This offer also proposes to establish a joint working group immediately to perform sensitivity analysis with regard to:

- Fine tuning the new SCI and PCI to reflect treatment requirements on road
- Determining levels of service and MCA scoring parameters
- Determining what is the achievable Network Distribution Targets for both SCI and PCI based on various funding levels such as historical budgets and +/-10% of historical budgets.
- Network coverage requirements to meet the Distribution Targets

As we are able to utilise previous data sets collected we will be able to finalise and agree on targets by the end of 2020 and provide a fixed price lump sum to deliver the program to the defined targets.

Treatment selection will be based on the above mentioned criteria and presented based on.

- SCI and PCI scores matrix to determine the appropriate level of treatment
- Site selection be based on the defined MCA process.
- Whole of life cycle implications to manage Network Distribution

4.2 PCI Bonus

As the above proposed changes are for the contract extension only no PCI Bonus has been proposed.

However, it is recommended that a similar approach to the previous iteration, a Performance Bonus should be implemented where the achieved Network Distribution exceeds the Target Distribution. Using the same example above, where a 2% reduction in Poor roads was the target while the actual reduction was 3% a 1% bonus should be carried over to the next target.

5 FURTHER CONSIDERATIONS

5.1 Automated Crack Detection

During previous discussions with the Council, the use of Automated Crack Detection (ACD) technology could be added to reduce the variability and subjectivity when collecting condition data. A trial was proposed to enable the comparison with existing crack defect data captured from visual images to be analysed to determine the accuracy and suitability of automated crack detection data for the future. However, there was two issues identified:

- Visual condition data would still need to be captured for pavement and surface defects via video image. In which case both datasets would still need to be collected. Automatic Crack Detection (ACD) would not remove the need for manual assessments.
- ACD only captures 1 lane width of data, hence, to cover the full carriageway width in line with current data collection would require multiple runs of the ACD which increases the cost. Based on previous quote an addition **CIC** n data collection costs to include ACD.

Appendix 3

Benchmarking Costs
Version: v.1.0

Item (supply only)	Typical Quantities	Large Projects Quantities
Bitumen (pre batched)		
Asphalt (hot) ex-bin		
Sand		
Blue Stone Gravel (FCR Class 3 20mm)		
Dromana Crushed (FCR Class 4 20mm)		
Dromana Aggregate (or similar)		
Speed Sign Large		
Speed Sign Small		
Post (with cross pile without concrete)		
Cement		
Concrete (kerb etc)		
Tactiles Sheet (at pedestrian and refuges) 600mmx300mm with adhesive		
Line marking paint, 100mm edge line, 3m line 9m gap,		
Reinforcing Steel F72		
Construct semi-mountable kerb type MP112		**I&S**
Side Entry Pit - Type 1 - Barrier Kerb MP201		
Standard Soakage Pit MP221 & MP222 0-1.5 metres deep 2-2.5 metres deep		
300mm dia. (class 2) rubber ring jointed.		
Asphalt Type N 7mm Rate per Tonne		
Crack Sealing Rate $ per LM (excluding traffic control)		
Single solid centreline		
Supply and Install "GIVE WAY" sign R1-2		
Supply and install 40Km/hr Size B 600 x 800 sign		
Supply Hillview Class 4 Brown 20mm FCR		

* Item does not form part of the current Safer Local Roads contract scope but can be delivered as required