Portsmouth CITY COUNCIL

Highways PFI
Tertiary Road Network

Vision, Strategy & Methodology

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1. Introduction

1.1 The purpose of this document is to set out a robust methodology for maintaining the Portsmouth PFI Tertiary Road Network. It takes into account the Council's existing Vision, Asset Management Strategies, Policies and Plans.

1.2 The tertiary road network or unclassified local network is defined as local roads intended for local traffic. The vast majority (60%) of roads in the UK fall within this category.

1.3 The document sets out the decision process for selecting roads for treatment, and how best to treat those roads to ensure that they are repaired on a whole life cost basis making maximum use of the financial resources available.

2. Background

2.1 Portsmouth City Council ("PCC" or "the Council") entered into a private finance initiative highways management contract (the Contract) with Ensign Highways Ltd ("the Service Provider") on the 30 July 2004. The Contract, which was the first of its kind for highway maintenance in the UK, extends over a period of 25 years and PCC setup a Highways PFI team to manage the Contract.

2.2. The Highways Maintenance Contract obliges the Service Company to carry out maintenance and Life Cycle replacement for Carriageways on the Primary and Secondary Network; however it only includes maintenance for the Tertiary Network.

2.3 The Tertiary Network (TRN) in Portsmouth constitutes approximately 294 km, 64% of the adopted Portsmouth Road Network, and it is divided in 1798 Road Section Lengths. Although there is residential housing in the PRN and SRN networks, the vast majority of the Portsmouth residents live in a TRN road.

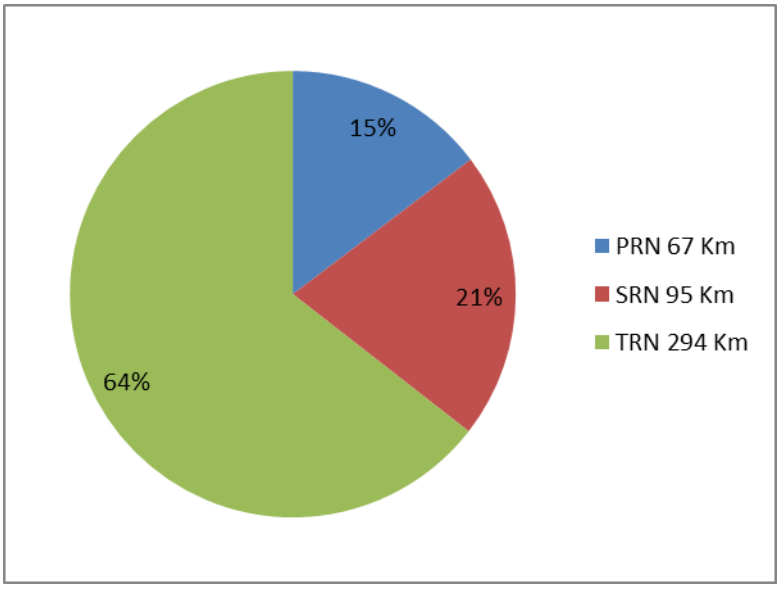

Figure 1: Percentages of each network hierarchy by km

2.4 The contract required the Service Provider to upgrade the network, including the TRN network in an initial 5 years Core Investment Period (CIP) as specified below.

2.5 To date the TRN condition was assessed through the annual Coarse Visual Survey (CVI).CVI is intended to be a coarse, rapid survey, usually carried out from a slow-moving vehicle, that allows a large part of a highways authority's road network to be assessed each year.

2.6 At the end of CIP, 100% of the TRN was surveyed and the Core Investment Period (CIP) was certified based on the TRN NCI at 6.64 which was above the minimum threshold of 3.02 (as defined below). In order to achieve this certification, a total of 47km of the TRN were treated in the initial 5 years CIP.

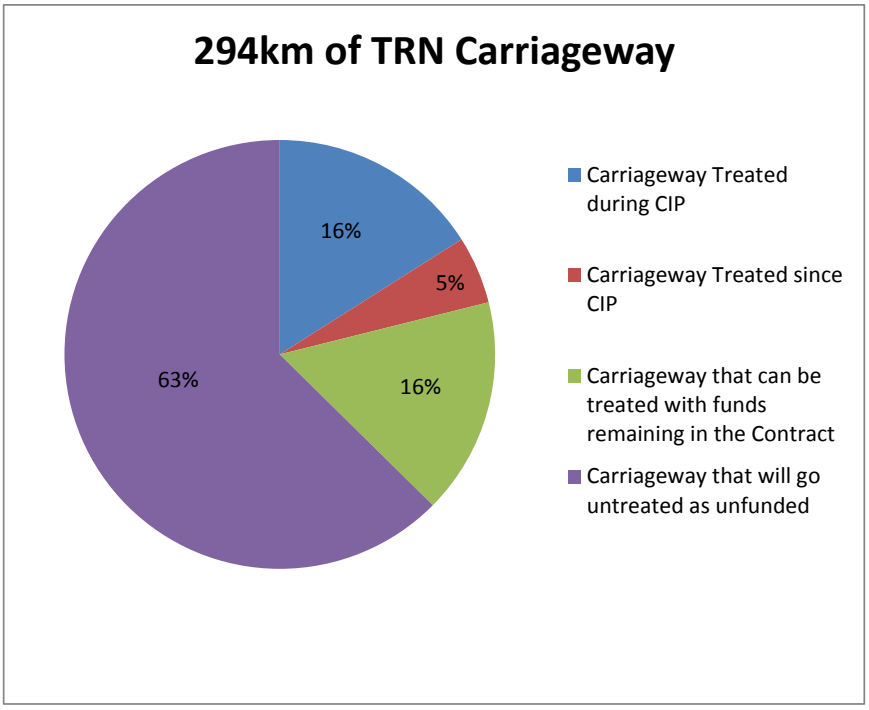

Figure 2 - Projected maximum carriageway treatment over the Contract duration

2.7 After CIP, the only Contractual requirements placed on the Service Company for the TRN are:

- *At the end of the CIP, and for the remainder of the Contract Period, no Road Section Length shall exhibit, greater than 30% (by area) of Patching*
- *Footways in Tertiary Network shall be maintained to the required FCI threshold in accordance with Part 1 Schedule 4, paras 22 to 27;*

2.8 The Contract also specifies that the Service Company has to deposit £200,000 (indexed) from year 6 to 20 into the TRN fund and to use the fund to pay for works on Tertiary Network following the 7th contract year (Clause 10.22). The fund is very limited, and it is only a 10% of Southampton budget of £2m for example. It is worth noting that the TRN fund is only for renewal as maintenance is included in the PFI contract.

2.9 From this the City Council has to work with the Service Company to use best endeavours to maintain the TRN to the highest possible standard within the budget provided.

2.10 From the TRN fund account, the Council are Contractually obligated to:

(a) only use the TRN Fund to pay for works to be performed by Service Co. on the carriageway of the Tertiary Network;

(b) subject to (c) below, use best endeavours to specify and pay for (from the TRN) such works to a value of £500,000 Indexed in any three year period following the seventh Contract Year until the fund is spent, and

(c) in so doing, have reasonable regard to representations from Service Co. about the works which should be paid for from the Tertiary Network Fund, which representations may include suggestions for works which will assist in the discharge of Service Co.'s obligation under Clause 10.22.7.

2.11 The main contractual requirement for TRN CIP upgrade is set out in Schedule 4 Part 1 of the Contract as follows:

- *The Tertiary Network shall be maintained at or above a Network NCI of 3.02 as defined in Schedule 4 Pt 2 [Service Performance Measurement Methodology] (i.e. at or above the existing network level) by the end, or before the end, of the Core Investment Period such that no Road Section Length within the Tertiary Network shall be in failed condition (i.e. a section NCI of 1.6 or less).*

2.12 This means that for maintenance purposes, defects like pot holes that reach an intervention point set out in the Contract, the Service Company has the responsibility to fix, however they are not required to resurface the entire road.

2.13 The TRN condition is assessed through the annual Coarse Visual Survey (CVI). At the end of CIP, 100% of the TRN was surveyed and the Core Investment Period (CIP) was certified based on the TRN NCI at 6.64 which was above the minimum threshold of 3.02 (as defined above). In order to achieve this certification, a total of 47km of the TRN were treated in the initial 5 years of CIP. (See Appendix 1, Roads treated during CIP)

2.14 After CIP, the contract only requirements for the TRN are:

- *At the end of the CIP, and for the remainder of the Contract Period, no Road Section Length shall exhibit, greater than 30% (by area) of Patching*

- *Footways in Tertiary Network shall be maintained to the required FCI threshold in accordance with Part 1 Schedule 4, paras 22 to 27;*

2.15 Following the CIP, the TRN is assessed through the CVI on a 4 year basis (25% of the network is assessed per year). Additionally, Ensign carries out an externally contracted visual survey of all assets, including carriageway, which form the basis of the SIC score. The survey assesses the carriageway every 20m and assigns a value from 1 (as new) to 4 (no safety defects but might need renewing). Further information can be found in table 3 below.

2.16 The Contract also specifies that the Service Company has to deposit £200,000 (indexed) from year 6 to 20 into the TRN fund and to use the fund to pay for works on Tertiary Network following the 7th contract year (Clause 10.22).

2.17 Service Co. will deposit £200 000 (Indexed) on the 1st October of the sixth Contract Near, and each Contract Year thereafter up to and including the twentieth Contract Year, in an interest bearing designated account in the name of Portsmouth City Council (PCC).

2.18 Since the fund was created, PCC has refurbished approximately 15km of the TRN utilising £1m of the fund, on a variety of schemes and technical proposals. This equates to an average of 6 roads per year. (around 3Km a year)

2.19 The table below summarises the TRN NCI, the CIP investment and investment following the CIP:

Year/Period	CIP	2011	2012	2013	2014	2015
NCI	6.64		5.94	5.34*	4.04	5.28
£ investment	£13.35 m	£159,836	£350,850	£200,671	£0	£291,654

Table 1 . Investment during and after CIP

2.20 There is currently £1.1m in the Tertiary Network fund bank account and an additional £2.1m still left in the Contract. Which, given the expenditure to date means that approximately a further 48km of road can still be treated. (around 5km per year average)

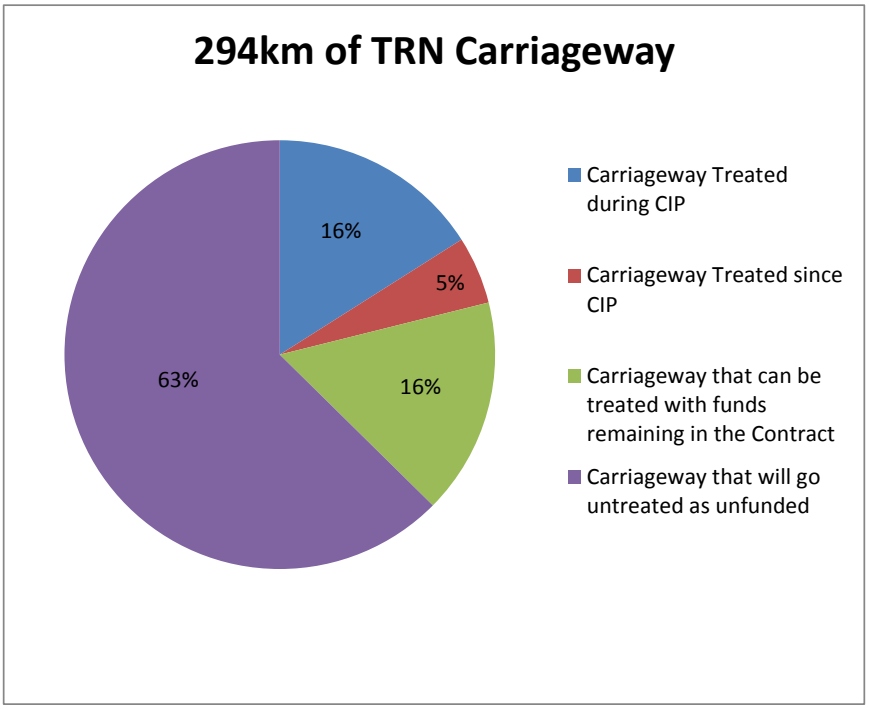

Figure 3 - Projected maximum carriageway treatment over the Contract duration

2.12 The graph above demonstrates that by the end of the Contract the Council will only be able to treat 37% of the overall TRN. Therefore, it is essential that the Council has a robust methodology not only for selecting the Roads that require treatment but also to ensure that the treatment applied provides a value for money. This ensures that the areas treated are critical road structures and not due to aesthetics issues.

In summary, during the 25 years of the contract only around 37% of the TRN will be treated.

3. Vision

3.1 To develop a strategy that allows the Council to provide a structurally sound, safe, resilient and reliable TRN network that is maintained regularly to protect its users and that contributes to local economic growth and aids to develop strong road links that also attracts housing developments.

3.2 The TRN also needs to support the stated Council overall Vision statements, support regional LTP programmes and the overall Council Highways Asset Management Plan, ensuring it delivers:

- A network that provides high quality, affordable and accessible services for all.
- A network that contributes to Portsmouth City Council corporate vision statement to become “The premier waterfront city with an unrivalled maritime heritage – a great place to live, work & visit.”

4. Strategy

1. To ensure that a robust selection process is used so that those Roads that support the Councils' wider strategic goals are treated as a priority.

2. To use a methodology that allows the Council to accurately assess the condition of the TRN which in turn allows the Council to treat those roads that are in the poorest condition ensuring strategic locations such as schools, hospital, nursing homes, etc are factored in within the decision process.

3. To adopt a consistant investment plan to ensure the appropriate validation and technically sound treatments are applied to the Tertiary Network.

4. To ensure that Best Value is achieved through procuring the Tertairy works in the most beneficial terms to the Council so that the finite amount of money available can treat the maximum amount of Roads within the confines of the Highways Maintenance Contract.

5. To maximise the Services provided by the Service Company under the Highways Maintenance Contract to ensure that the Council only procures works that are not already covered by the Service Payment.

6. To devise a forward looking Tertiary Network Plan by creating a three year indicative programme of works, allowing the Council to where able merge these works with others on the Network.

5. Methodology

5.1 The methodology used so far for the selection of these schemes did not seem to have a clear strategy and a proven industry approach to ensure the funds were spent wisely targeting the poorest condition road section length and obtaining best value for the PCC.

5.2 During this review of the methodology, it was discovered that the main drivers used by PCC to date for the selection of schemes were not appropriately defined and inconsistently applied. Furthermore, the data used had been unreliable. The use of this strategy meant that some areas of the network were not attended or treated as a priority creating concerns from the residents which in turn became residents' complaints. This prompted a rethink of the process and a new methodology has been developed jointly by PCC and Ensign's technical groups.

5.3 The proposed new methodology is based on Industry Best Practice and follows guidance documents produced by the UK Roads Liaison Group and the Highways Maintenance Efficiency Program (HMEP).

5.4 It ensures a systematic analysis of the data available which is summarised in the diagram below:

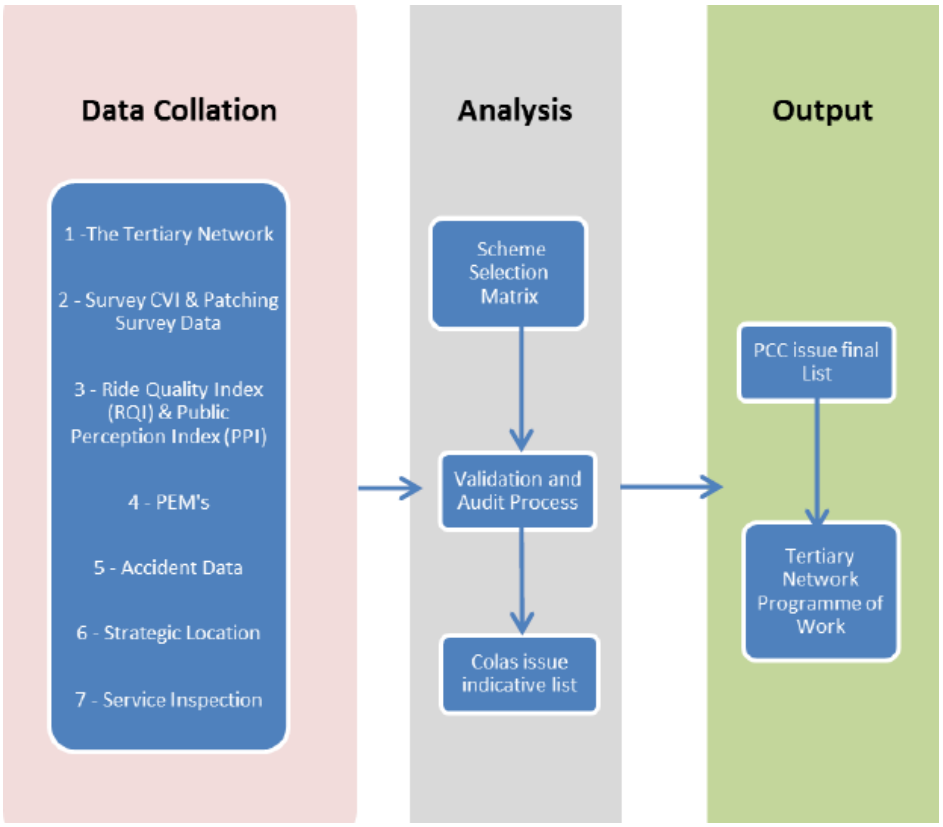

Figure 4 - Process diagram

5.5 The process is summarised in three disctinct stages, the first is the collection of relevant technical data that allows the Council to fully understand the condition of the Highways Network. This uses a mixture of Industry standard technical surveys, local knowledge and collected data.

5.1 Data Collation

5.1.1 The data used for the proposed new methodology comes from various sources;

a) Surface Condition Index (SCI) obtained as part of the Network Condition Index (NCI) process. This score is based on a Coarse Visual Inspection (CVI) carried out on 25% of the network every year;
b) Service Inspections Condition (SIC), based on a 100% TRN walked survey and undertaken by John Reed Surveyors;
c) Reactive Maintenance Data; analyses defect locations and category of defects (by asset and treatment)
d) Public Enquiries Management System (PEM's): Public concerns on the carriageway condition;
e) Accident records: Skid related accidents derived from Police records;
f) Strategic Routes and Amenities: Identifying the location of schools, hospital, emergency services and residential homes on tertiary network and giving priority;
g) Safety Inspections condition, comments and recommendations;
h) Road sections of concern to PCC,

5.1.2 These data sources have been designed to conform with good industry practice and also take into account public feedback, local knowledge of a non-engineering manner, such as location and the number of issues that have been reported in these locations.

5.2 Analysis

The second stage is analysing this data. In order to do this we need to introduce trigger points for intervention which are detailed below:

5.2.1 **Analysis** of the data collected.

The triggers are based on 4 main data:

1. Surface Condition Index – SCI; collected as part of NCI surveys. Based on Coarse Visual Inspection

SCI data

Condition	Years Remaining	SCI
Excellent	>10	10
Good	>8 - <=10	8
Reasonable	>6 - <=8	6.6
Fair	>5 - <=6	4.8
Poor	>2 - <=5	3.6
Critical	>0 - <=2	2.4
Failed	0	1.6

Table 2 - SCI Condition distribution

Based on this parameter, a 5% distribution was obtained based on the actual condition which meant that every RSL under the value of 1.93 was added to the list of sites for site investigation. The figure below shows how this is calculated:

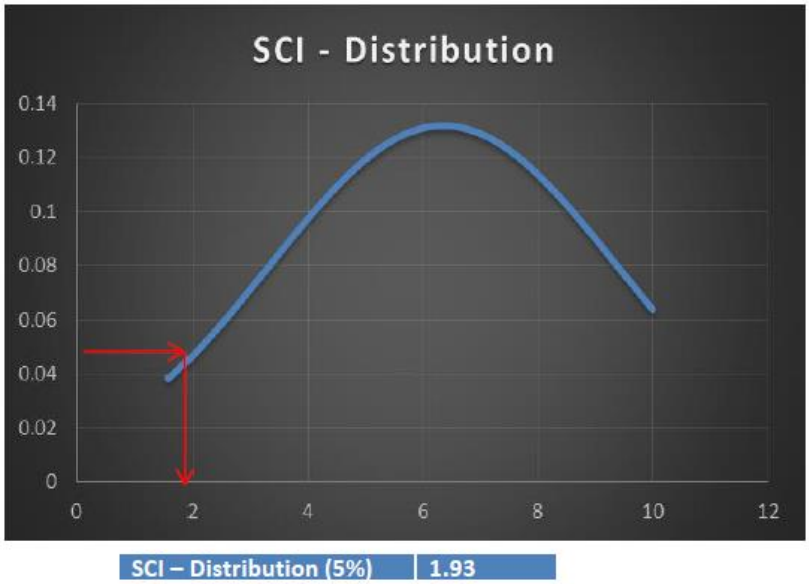

Figure 5 - SCI distribution curve

2. Service Inspection Condition (SIC) : Visual Survey data is collected as part of the Ensign/Colas Asset Maintenance Strategy.

SIC data – is a length weighted average of the 20m subsection

Condition	SIC
New or As New	1
Good	2
Condition showing signs of aging	3
No safety defects but may need renewing	4

Table 3 - SIC Condition distribution

As per the SCI above, a 5% distribution was obtained based on the actual condition which meant that every RSL over the value of 3.25 was added to the list of sites for site investigation. The figure below shows how this is calculated:

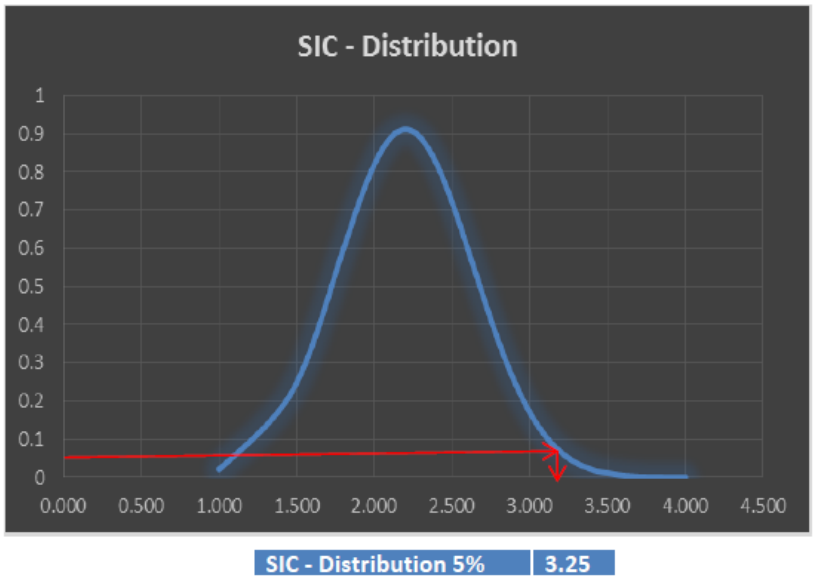

Figure 6 - SIC distribution curve

3. Reactive maintenance data; based on the number of defects recorded in any particular Road Section Length
4. Safety Inspectors recommendations.

5.2.2 Following this 4 triggers of data analysis, the generated list is then prioritised based on the following data:

1. Public Enquiries Management System (PEM's): Public concerns on the carriageway condition;
2. Accident records: Skid related accidents derived from Police records;
3. Strategic locations (SL): (Schools, hospital, emergency services and residential homes) Priority 1 assigned to sections on SL and Priority 2 assigned to sections not on SL;
4. Road sections of concerned to PCC.

5.2.3 Utilising a statistical approach based on the four main triggers above and for each of the parameters a list is generated, where a 5% distribution has been added to create a first indicative list.

5.2.4 The list of sections generated by this distribution is then categorised by Strategic Location.

5.2.5 Site validation by in depth visual inspections is then carried out by Ensign/Colas and PCC.

5.2.6 A provisional list of sites to treat from the validation survey is then generated. This list is then assessed by PCC engineers.

This year the list generated 306 sites. A breakdown per ward is presented below:

Wards	High priority	Medium priority	Low priority	Grand Total
Charles Dickens	3	18	19	40
Paulsgrove		5	32	37
St Jude	1	19	9	29
Cosham	1	12	12	25
St Thomas	2	12	9	23
Milton	1	10	10	21
Hilsea		9	12	21
Drayton & Farlington		4	17	21
Eastney & Craneswater	2	5	13	20
Baffins	1	6	12	19
Fratton	3	4	7	14
Copnor	4	2	7	13
Central Southsea	4	4	4	12
Nelson	1	6	4	11
Grand Total	23	116	167	306

Table 4 - Tertiary Road Network 201 -Wards Summary and Priority Ratings

5.2.7 Finally a Joint Ensign and PCC Workshop to finalise potential schemes is held.

5.3 Output Stage

5.3.1 The Last Stage is the Output stage, this is where PCC confirms final scheme selection for the TRN network.

5.3.2 The 3 year Works Programme is developed. This includes a 12 month detailed schedule and a further 2 year indicative programme. The selection process can be found in Appendix 4.

6. Treatment Selection Methodology

In order to define the treatment selection methodology we have to firstly classify the roads based on their existing road structure, these are as follows:

I. Fully flexible Road, where the road base and the surface course are composed by flexible materials (commonly known as tarmac).

II. Flexible Composite Roads, where the road base is pavement quality concrete and the overlying surface course is between 30mm/50mm of tarmac.

III. Concrete roads, where the road base and the surface is concrete. (with time, some of this roads have been treated with a very thin micro asphalt surface 0-15mm to protect them from the ingress of water).

Based on the road structure, the main treatment types are:

Type	Treatment Type	Description	Purpose
A	**Crack Sealing/ Overbanding**	Sealing the cracks from the ingress of water with a bituminous emulsion	To protect from the ingress of water and freeze and thaw effects
B	**Surface Dressing**	Covering the carriageway with stone chips embedded in bitumen.	To seal the surface, improve skidding resistance and restore visual/ride quality mainly in Rural areas.
C	**MicroAsphalt**	Covering the carriageway with a veneer of cold laid surfacing material.	To seal the surface, improve skidding resistance and restore visual/ride quality mainly in Urban areas.
D	**Resurfacing (Inlay)**	Removal of surface course and replacing the carriageway with a minimum thickness of 30mm of dense hot laid surfacing material.	To replace a failed surface which is not suitable for Micro suirfacing or Surface dressing. Resurfacing restores ride quality, skidding resistance and can reduce noise.
E	**Resurfacing (Overlay)**	Covering the carriageway with a minimum thickness of 30mm of dense hot laid surfacing material.	To replace a failed surface which is not suitable for Micro suirfacing or Surface dressing. Resurfacing restores ride quality, skidding resistance and can reduce noise.
F	**Strenghthening**	Removal of surface course and base/binder course to a minimum of 70mm depth and replacing the materials with a new road structure.	To replace a failed road structure

Table 5 - Treatment Matrix

7. Treatment Selection Methodology

7.1 The process for selecting the appropriate treatment for each selected TRN scheme will be based on the two main factors:

- Road structure
- Structural condition

As summarised on the table 4 below, the first step would be to determine the road structure.

7.2 Once the road structure has been determined, we would then analyse the data available and the site validation notes to ascertain whether the road is structurally sound or not. Based on the this, the treatment options would be selected from Table 5 above.

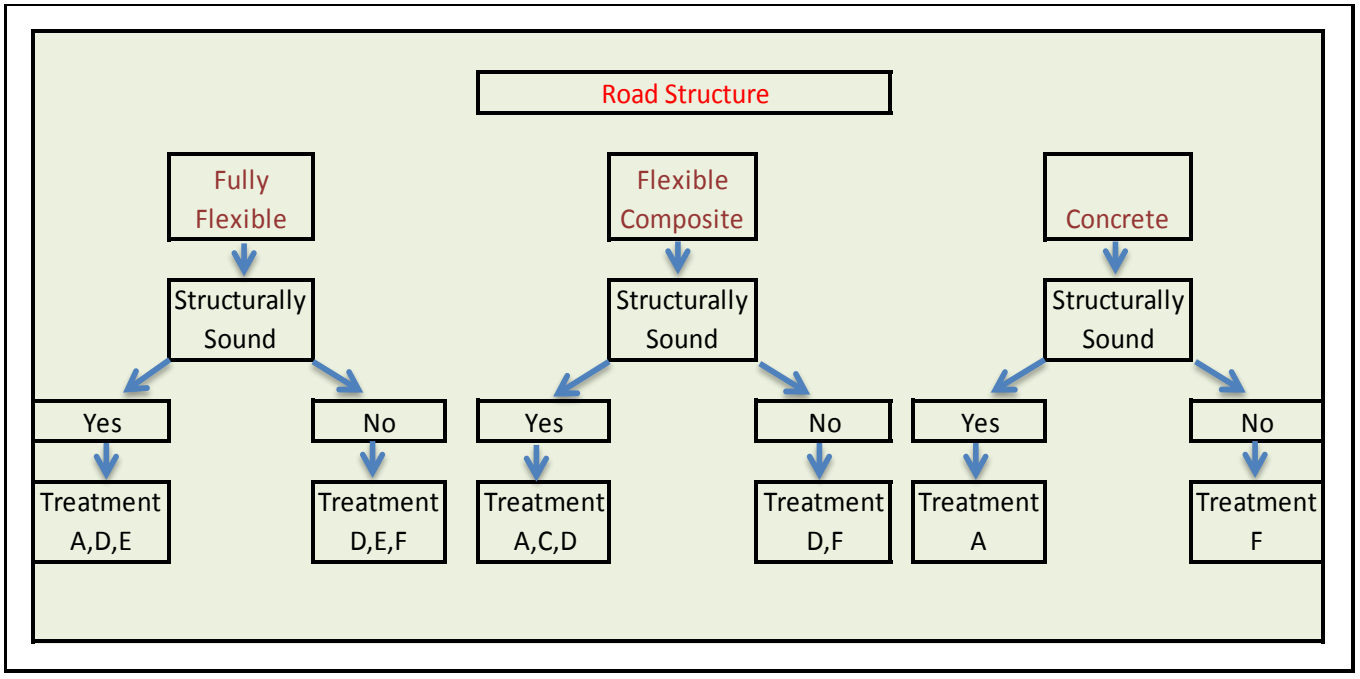

Table 6 - Treatment Selection Matrix

7.3 Due to the limited funding available and the misconstrued perception that concrete roads need treatment when the surface cover deteriorates, it is our intention to only treat concrete roads when their structure is deteriorated and failing and not due to aesthetically unpleasing issues.

7.4 Concrete Roads constitutes 2% of the tertiary network as detailed below

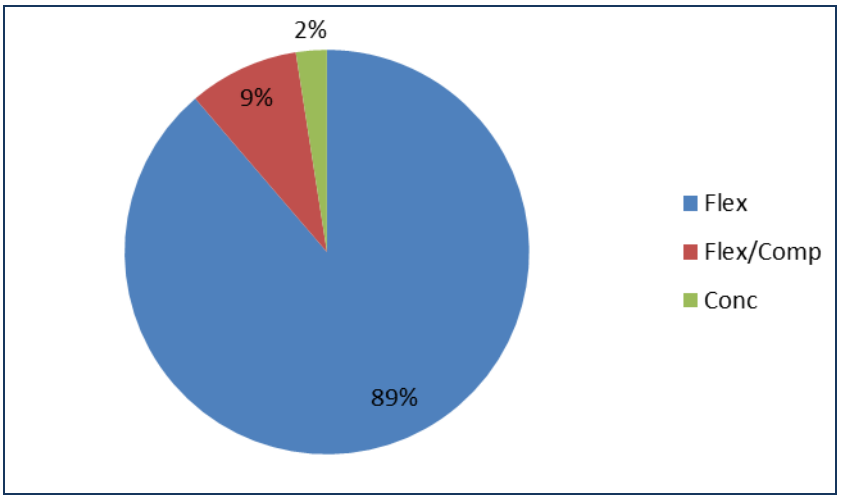

Figure 7: Percentages distribution of Tertiary Network based on Surface Type

7.5 The definition of a carriageway pothole under the Highways PFI contract and when it becomes a safety concern is a depth of defect of 40mm. Concrete roads have a Surface cover of normally 6-10mm and therefore a pothhole occurring does not constitute a safety concern.

7.6 The concrete roads will be regularly serviced using overbanding methods to ensure the surface continues to be waterproofed and prevent the deterioration caused by freeze and thaw.

8. Appendices

Appendix 1: Tertiary Network Schemes Selection Process, Tertiary Road Network Report, Contract Year 12, Ensign/Colas, 21 July 2016.

Appendix 2: Tertiary Road Network Report, Contract Year 12, Ensign/Colas, 21 July 2016. Process of Scheme Selection (Tertiary Road Network), Ensign/Colas, July 2016.

Appendix 3: Tertiary Road Network Fund Report, Contract Year 12, Ensign/Colas, 21 July 2016.

Appendix 4: Tertiary Road Network , Programme of Works following Selection Process,Contract Year 13 , PCC, August 2016

References

Hampshire County Council - Guidance Document on Surfacing Options for Highways, 2010.