

# Highway Asset Management

## Inspection Strategy

**2010**



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## 1. INTRODUCTION

All the assets identified in the Redbridge Highway Asset Management Plan require maintenance and a strategy to deal with their wear and tear, it is therefore essential have in place an assessment and inspection regime. This document defines the types of inspections and surveys to be undertaken in respect of network safety, serviceability and sustainability. There are three types of inspection:

- Safety inspections
- Service inspections
- Condition surveys

This document specifically deals with the assessment and inspection strategy and criteria for the various asset maintenance types and categories set out in Table 1 below.

Table 1 – Maintenance Activities

Maintenance Type	Maintenance Category
<b>Reactive</b> – responding to emergencies, inspections or complaints	ALL ASSETS For safety reasons: - Sign and make safe or remove obstruction Provide initial temporary repair Provide permanent repair
<b>Routine</b> – scheduled cyclic work	Carriageways, footways and cycle routes – minor works and patching Drainage system – clean and repair Landscaped areas and trees – management Verges open spaces – grass cutting Fences and barriers – tensioning and repair Traffic signs and bollards – clean and repair Roadmarkings and studs – replacement Lighting installations – clean and repair Bridges and structures – cleansing and minor works
<b>Programmed</b> – planned schemes	Resurfacing Highway improvements Preventative maintenance Asset replacement or reconstruction
<b>Regulatory</b> – Inspecting and regulating the activities of others, Traffic Management Functions	Maintenance of highways register and definitive map Maintenance of national street gazetteer and associated street data Co-ordination of roads and street works (TM Responsibility) Charging schemes and permits for highway occupation (TM Responsibility) Management of Public Rights of Way Construction of vehicle crossings Adoption of new highways Other regulatory functions – encroachment, illegal signs, parking
<b>Emergencies</b>	Flooding High winds Extreme temperatures Major accidents and disasters

## 2. Redbridge Network Hierarchy

The hierarchies for carriageway, footway and cycle routes in Redbridge are historical based on those given in the Code of Practice for Highways Maintenance Management. However, as will be described later in this document, the local network hierarchy category can be changed to reflect local needs, this is key when developing the inspection regimes. Schools, hospital, shopping centre etc will influence the decision in setting the categories. The current hierarchies are shown in Tables 2 - 4.

Table 2 - Carriageway Network

Category	Hierarchy Description	Type of Road General Description	Detailed Description	Redbridge Network Lengths Km
1	Motorways	Motorway regulations apply	Fast moving traffic Limited access	N/A
2	Strategic Routes	Trunk roads and some principal roads	Fast moving traffic in excess of 40mph A – roads	N/A
3a	Main Distributor	Principal roads, major urban network and inter - primary link roads	A – roads	48.7km
3b	Secondary Distributor	Classified roads and unclassified urban bus routes	B and C roads High levels of pedestrian movement	17.9km
4a	Link Road	Roads linking between Main and Secondary Distributor Network with frontage access and junctions.	Residential or industrial interconnecting roads	460.9km
			<b>Total</b>	<b>532.3km</b>
4b	Local Access Road	Roads serving limited numbers of properties access only	Residential loop road or cul-de-sac	Incl. in 4a

Table 3 – Footway Network

Category Number	Category Name	Brief Description	Current Redbridge Network Lengths Km
1a	Prestige Walking Zone	Pedestrian only areas - shopping precinct	111.76
1	Primary Walking Route	Busy urban shopping areas and main pedestrian routes linking different modes of transport	
2	Secondary Walking Routes	Medium usage - feeding schools, locals shops, hospitals, industrial centres	
3	Link Footways	Linking local access footways through urban areas and busy rural footways	781.75
4	Local Access Footway	Footways associated with short estate roads low usage	
		<b>Total (exc independent footways)</b>	<b>893.51</b>

Table 4 – Cycle Network

<b>Category</b>	<b>Description</b>
A	Cycle lane - forming part of the carriageway commonly a 1.5 m strip adjacent to the nearside kerb
B	Cycle track - a route for cyclists not contiguous with the public footway or carriageway
C	Cycle trails - leisure routes through open space Not always the responsibility of the Highway Authority

### 3. Safety Inspections

A safety inspection regime must be achievable otherwise the whole system of maintenance management will be undermined. A safety inspection regime is typically comprised of the following elements:

- Frequency of inspection
- Items of inspection
- Degree of efficiency
- Nature of response

#### 3.1 Frequency of Inspections

Section 58 of the Highways Act 1980 affords a statutory defence to certain incidents. Essentially, if the Authority has in force a regular system of inspections, keeps records of those inspections, acts upon any reports of defects and generally attempts to fulfill its declared policy in relation to highway maintenance, it may be that, whatever the nature of the offending defect, it can avoid liability.

The frequency of inspections is based on the network hierarchy, Table 5 details the safety inspection frequency currently adopted by the Council and that proposed through the new HAMP process, which addresses the core policy objectives.

In general the recommendations of the Code of Practice have been adopted with the exception of both local access roads and local access footways, where we propose to double the frequency of inspections recommended by the Code of Practice.

Table 5 – Safety Inspection Frequency

Feature	Hierarchy Description	Category	Code of Practice Frequency	Redbridge Frequency
Roads/Carriageway	Strategic Routes	2	1 month	N/A
	Main Distributors	3a	1 month	1 month
	Secondary Distributors	3b	1 month	1 month
	Link Roads	4a	3 months	3 months
	Local Access	4b	1 year	6 months
Footways	Prestige Areas	1a	1 month	1 month
	Primary Walking Routes	1	1 month	1 month
	Secondary Walking Routes	2	3 months	3 months
	Link Footway	3	6 months	6 months
	Local Access Footway	4	1 year	6 months
Cycleway	Part of Carriageway	A	As for Road	As for Road
	Remote from Carriageway	B	6 months	6 months
	Cycle Trails	C	1 year	1 year

## 3.2 Inspection Items

The assets inspected include the following: -

- Carriageways
- Pedestrian crossings
- Footways
- Kerbing
- Ironwork
- Drainage
- Private forecourts
- Private attributes – pavement lights, coal plates, building access hatches
- Grass verges
- Road markings
- Signs
- Bollards
- Street lights – (Night scouting carried out separately by street lighting contractor.)
- Signals
- Safety fence and barriers
- Trees and vegetation
- Highways general – obstructions, poor reinstatements, enforcement issues

The typical defects to be found include: -

- Debris, spillage or contamination
- Displaced road studs lying in carriageway
- Overhead wires in a dangerous condition
- Vandalism, particularly if electrical hazard exposed
- Abrupt level differences
- Potholes, cracks or gaps
- Edge deterioration
- Loss of skidding resistance
- Missing or broken ironwork (gully lids, manholes etc.)
- Standing water, water discharging onto or overflowing across the highway
- Blocked drains or grips
- Damaged, defective displaced missing or misleading traffic signal or signs
- Damaged safety fence, parapet fencing, handrail or other barriers
- Sight lines obscured by trees, unauthorised signs and other features

### 3.3 Degree of Deficiency

The Code of Practice defines two categories of defects identified by safety inspections -

#### CAT 1 Defect

Those that require prompt attention because they represent an immediate or imminent hazard or because there is a risk of short-term structural deterioration.

Cat 1 defects should be corrected or made safe at the time of inspection if reasonably practicable. Making safe may constitute displaying warning signs, coning off or fencing off to protect the public from the defect. If it is not possible to correct or make safe the defect at the time of inspection then repairs of a temporary nature should be carried out within 24 hrs. Permanent repair should be carried out within 28 working days.

#### CAT 2 All other defects

Cat 2 defects should be repaired within planned programmes of work, with priority depending on the degree of deficiency, traffic and site characteristics. These priorities should be considered, together with access requirements, other works on the road network, traffic levels and the need to minimise traffic management in compiling the programmes of work.

### 3.4 Nature of Response

The repose times for remedial action are detailed in Table 6 below and are based on best practice and recommendation from the Code of Practice.

Table 6 - Response Times

Category	Priority	Response Time
1	1	2 hours
1	2	Next working day
2	3	3 working days
2	4	28 working days
2	5	To be programmed where funds permit



### 3.5 Risk Impact

It is proposed to introduce a risk assessment defect matrix, this will give the inspector more guidance in differentiating the defect and awarding it a priority.

Whether the defects should be dealt with as Cat 1 or 2 and what priority they are given will depend on a number of factors:

- The depth or the surface area of the defect
- The location relative to the user position, especially vulnerable users
- The location of the defect relative to highway features such as bends or junctions
- The nature and extent of interaction with other defects
- Weather condition – likely to freeze etc.

The weighting given to each defect will be subjective and on site judgement by the inspector. This will also need to be clarified with a series of workshops with inspectors. In Redbridge the current accepted intervention level is 20mm in footways and 40mm carriageways and cycleways, which would require particularly careful consideration. This investigatory level came about by case law in the late 1960's in which a Court of Appeal concluded that a difference in paving stone level of over 3/4 " or 20mm presented a hazard and again in 1980 a Court of Appeal case, Lawman v London Borough of Waltham Forest, a defect of 20mm was not thought sufficient to establish liability.

Typical defect examples and case studies are shown in Appendix A along with flow charts in assisting with the inspector's decision making.

The following table gives examples of investigatory levels, it is also felt that this will be developed further with the introduction of a risk register and following workshops.

**Table 7 – Investigatory Levels**

Item	Defect	Investigatory Level
Carriageway	Pothole /Spalling Crowning Depression Rutting Gap/Crack Sunken iron work Missing/Defective Anti Skid Pedestrian desire line/crossing	40mm depth 40mm 40mm (area 2m2) 40mm 40mm depth and 20mm wide 40mm level difference Yes 20mm
Footway	Trip/Pothole Rocking slab/blocks Open Joint Tree root damage Sunken iron work Defective coal plates/basement lights Bubbled mastic asphalt	20mm depth 20mm vertical movement 20mm wide 20mm trip 20mm level difference 20mm trip 20mm trip
Kerbing	Dislodged Missing/loose/rocking	50mm horizontal 20mm vertical Yes
Pedestrian Crossing	Trip/pothole Missing markings Damaged posts	20mm depth Yes Yes

### 3.6 Risk Assessment

The procedure for risk assessment is to evaluate the risk through assessing:

- The risk impact - the extent of damage likely to be caused if the risk occurs
- The risk probability - the likelihood of the risk actually happening

The matrix in Table 8 displays the correlation between risk impact and risk probability generating a score, which can then be related to a defect category and response time for the defect to be rectified, see Table 9.

Table 8 – Probability and Impact

		PROBABILITY				
		Very Low (1)	Low (2)	Medium (3)	High (4)	Very High (5)
IMPACT	Negligible (1)	1	2	3	4	5
	Low (2)	2	4	6	8	10
	Noticeable (3)	3	6	9	12	15
	High (4)	4	8	12	16	20
	Extreme (5)	5	10	15	20	25

Table 9 – Response

Risk Factor	Defect Category	Priority Response
25	1	1
15-20	1	2
8-12	2	3
5-6	2	4
1-4	2	5

### 3.7 Development of Risk Register

This will be developed over time and from workshops and primarily be in tabular form bringing together all the risks identified in the risk assessment procedure.

The register will incorporate the following elements:

- Risk description
- Extent of defect
- Assessment of impact
- Assessment of probability
- Risk factor
- Defect categorisation and response

## 4. Service Inspections

Service inspection regimes are comprised of similar elements to a safety inspection regime and can be developed in the same way, through a series of workshops and using a risk register. Service inspections are less frequent than safety inspections but can be done at the same time or separately. Their purpose is to look at network integrity such as poorly sited or confusing signs, street clutter and regulatory issues - such as illegal and unauthorized signs or contraventions on street parking regulations.

The service inspections will focus on ensuring the network meets the needs of the users and comprise more detailed specific inspections of particular highway elements to ensure they meet the levels of service defined in the HAMP. Details of service inspection requirements on typical highway assets are detailed in Chapter 9 of the Code of Practice for Highway Maintenance.

## 5. Condition Surveys and Planned Maintenance

### 5.1 Structural Condition Surveys

The most significant financial investment in highway maintenance will be in repairing, reconditioning and reconstructing carriageways and footways. As well as carrying out the routine safety inspection the Authority should have in place a pavement condition assessment regime.

Condition assessments support the identification of schemes or projects and prioritise the Authorities network. It will also support and assist the production of national Best Value Performance Indicators to enable authorities to benchmark and compare. It also enables authorities to determine levels of funding and assess the maintenance needs. Condition surveys identify the current condition of the network and from this condition both long-term and short-term maintenance funding decisions. Repeatable condition surveys allow trend analysis to be used to confirm the original decisions or allow for changes as a result of a changing network.

The types of surveys include:

- Course Visual Inspections (CVI)
- Detailed Visual Inspections (DVI)
- SCANNER Machine based Vehicle Survey
- Deflectograph
- Skid Resistance – SCRIM
- Skid Resistance – Grip Tester
- Ground Radar
- Falling Weight Deflectometer (FWD)

### 5.2 Planned Maintenance and Prioritising Schemes

Temporary safety repairs are carried out in accordance with Category 1 and 2 priorities. The repairs carried out have a limited service life and therefore a more sustainable solution to the deterioration of the highway network is achieved by means of a prioritised maintenance programme. Previous Borough Capital Highway Programmes have been developed and assessed using structural condition data determined by annual surveys carried out by consultants and in house staff. The priorities determined by the condition (worse first) concept. The problem with this system is that it does not address the needs of all users, does not address sustainability issues and was reliant on subjective judgement and local knowledge of officers.

### 5.3 Prioritisation Model

There are a number of key drivers identified in the HAMP for improving the way programmes of planned highway maintenance schemes are developed. A new prioritisation model has been produced, in partnership with councillors, officers and specialist consultants. The model is based on value engineering principals and takes into account key national asset management drivers in line with our local Council policies. This method of prioritisation will give the Authority a transparent and auditable decision making process for both carriageway and footway maintenance schemes and can be developed to incorporate other transportation projects.

#### 5.4 Process

An initial list of roads and footways to be considered for treatment will be obtained from the structural condition survey reports (UK Pavement Management System). The top 20 will then be fully weighted in accordance with the prioritisation model. The highest scoring carriageway and footway schemes will be recommended for treatment to the value of available funding.

#### 5.5 Programme Development

It is proposed to develop a detailed long-term plan by this method initially for periods of 3 years in detail but also taking into account professional judgement to ensure co-ordination of other work programmes, developments and work packaging to provide the most economical solution for the Council.