

## **SECTION – D**

# **COMMUTED SUMS PAYMENTS FOR FUTURE MAINTENANCE IN RELATION TO ADOPTION AND TRANSFER OF INFRASTRUCTURE ASSETS**

**Issue Date: January 2014**

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## 1 Highways Suitable for Adoption

- 1.1 Local Authority's have increasing pressure on their budgets, which has resulted in the requirements for the commuted sums to cover the cost of maintaining additional highway facilitating a development and the "extra over" costs involved in maintaining new roads offered for adoption.
- 1.2 Commuted sums will generally be secured by way of section 38 and 278 agreements. The statutory authority for these payments is covered under section 38(6) and section 278(3) of the Highways Act 1980.
- 1.3 It is intended that developers use this guidance in the spirit in which it is meant and that innovation is not stifled as a result of financial contributions towards the future maintenance of innovative design, use of materials and landscaping.
- 1.4 The guidance provides a transparent and consistent approach towards seeking financial contribution as well as giving developers sufficient notification as to the requirements of the Council.
- 1.5 Commuted sum is a "one-off" payment of a capital sum to the Highway Authority, as a contribution towards future maintenance of the asset to be adopted or transferred.
- 1.6 Commuted sums will be required for the future maintenance of highways that fall into the following categories:-
- a) Alterations to the existing highway to form an access to a development that would not have been required should the development not take place. Usually roundabouts, traffic signal controlled junctions carried out under Section (278 (111)) or hybrid S38/278 Agreements.
  - b) New highway constructed, usually under Section 38(6) Agreements, any additional areas and features over and above that necessary for safe operational requirements.
  - c) Additional features to be adopted that require maintenance over and above that normally expected to access a development.
  - d) The use of approved alternative materials over and above the standard highway construction materials.
  - e) Utilisation of existing highway infrastructure by the proposed development.

The above items are now described in more detail.

- 1.7 Alterations to the existing highway; this will cover the future maintenance of the alterations and should cover the following:-
- a) Traffic signal controlled junctions; the cost of maintenance of traffic signal apparatus, additional carriageway and footway construction over and above areas of existing highway, additional street lighting requirements including illuminated signs and bollards, traffic signs and road markings, highway drainage, safety fencing, landscaping and any additional items that will require future maintenance.
  - b) Roundabouts; additional carriageway and footway construction over and above areas of existing highway, additional street lighting requirements including illuminated signs and bollards, traffic signs and road markings, highway drainage, safety fencing, landscaping and any additional items that will require future maintenance.
  - c) Junctions; additional carriageway construction over and above areas of existing highway for dedicated right turn lanes, additional street lighting requirements including illuminated signs and bollards, traffic signs and road markings, highway drainage, safety fencing, landscaping and any additional items that will require future maintenance.
- 1.8 New highway constructed; any additional area over and above that necessary for safe operational requirements, examples are: -
- a) Over sized turning areas above that required for accommodating a standard turning area.
  - b) Grassed areas to be adopted as highway verge, which could consist of vision splay, forward vision or soft margin strip.
  - c) Widened carriageway to provide on street parking facilities over and above the standard carriageway width.
  - d) Traffic calming facilities.
  - e) New trees/shrubs.
- 1.9 Additional features to be adopted that require maintenance over and above that normally expected for a development. These include items such as: -
- a) Bridges.
  - b) Retaining structures.
  - c) Traffic signals.
  - d) Controlled Pedestrian Crossings
  - e) Safety fencing.
  - f) Traffic calming

- g) Traffic Signs
- h) Additional Areas of Carriageway
- i) On Street Parking Laybys
- j) Road markings.
- k) Salt/grit bins.
- l) Street lighting.
- m) Bollards.
- n) Bus shelters.
- o) Highway Drainage:-
  - i. Culverted watercourses.
  - ii. Highway drainage attenuation.
  - iii. Flow control devices.
  - iv. Highway soakaways.
  - v. Sustainable Urban Drainage Systems (SUDS).
  - vi. Combined kerb drainage units.
  - vii. Drainage Gullies
- p) Landscaping.

It should be noted that this list is not exhaustive and other features may also attract commuted sums.

- 1.10 The use of approved alternative materials over and above the standard highway construction materials. Examples are: -
  - a) Alternative carriageway and footway construction.
  - b) Ornamental street-lighting where approved.
  - c) Ornamental pedestrian railings.
- 1.11 Standard highway construction definitions will typically include: -
  - a) Carriageway and footway construction in flexible asphalt concrete and block paving.
  - b) Standard street lighting columns and lanterns.
  - c) Pedestrian guardrails.
  - d) Pre-cast concrete kerbs, edgings and gullies.
  - e) Manhole covers, gully gratings, carrier drains and outlet structures.
- 1.12 The utilisation of existing highway infrastructure by the proposed development, an example being the discharge of highway or domestic surface water runoff into an existing highway drain or culvert.

- 1.13 The commuted sum is payable prior to the issue of the Final Certificate or adoption of the highway asset subject of the commuted sum.

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## 2 Highway Drainage Commuted Sums (Vetting and Connection Charges)

- 2.1 Commuted sums will be required for the extra over maintenance associated with SUDS, attenuation tanks, flow control mechanisms, soakaways and discharge of additional run-off into an existing highway drainage system.
- 2.2 Prior to an application for connection, the developer must first consider and discount other strategies in the following order:-
- a) Sustainable Drainage Systems (SuDS) Techniques (For more information refer to The SuDS Manual (CIRIA C697, 2007);
  - b) Discharge to a watercourse;
  - c) Discharge to public sewer
- 2.3 Where a developer intends to discharge run off from newly created highway into an existing highway drain, the developer will:-
- a) In addition to assessing integrity and capacity, determine that the highway drainage does not outfall to a DCWW combined sewer
  - b) Be responsible for determining the extent of the existing highway drainage network, (where records are not available) and assessing the capacity and integrity of the existing highway drainage to accommodate the net additional flow up to its discharge point.
  - c) Be required to pay the Council fees for the vetting and approving of the submitted documents and calculations relating to the drainage connection. The fee, which will be subject to periodic review is currently, (2014), £2,000, for the review in relation to residential, commercial and industrial developments and £375 for review in relation to single properties. Charges must be paid in advance of any review being made.
  - d) Pay the connection charge of £375 per connection. Payment must be received before any connection to the highway drainage system is made.
  - e) Be required to pay a commuted sum payment for the annual inspection and increased maintenance necessary as a result of the net increase in flow put into the system for a period of 30 years. This is based on the additional impermeable area to be drained and is currently, (2013), as follows: - (calculated by using the formula in Section 3).

Up to 500m <sup>2</sup>	£1.00/m <sup>2</sup> /yr
Over 500m <sup>2</sup>	£0.50/m <sup>2</sup> /yr

- f) Where measures are taken to restrict flow by means of attenuation tanks, flow control mechanisms, rainwater harvesting and other appropriate SUDS measures the commuted sums referred to in (c) above will be reduced as follows.

Up to 500m <sup>2</sup>	£0.30/m <sup>2</sup> /yr
Over 500m <sup>2</sup>	£0.15/m <sup>2</sup> /yr

- 2.4 Where a developer intends to connect attenuated highway drainage to a DCWW maintained surface water drain or a watercourse, the developer will: -

- a) Be responsible for assessing the size and design of the attenuation system and flow control mechanism, and to gain all necessary consents from the Lead Local Flood Authority (Rhondda Cynon Taf County Borough Council), DCWW or the Environment Agency.
- b) Pay commuted sums for the future maintenance of the attenuation and flow control mechanism:-
  - i) Attenuation tanks require more specialised equipment than that used on normal highway drainage maintenance to complete cleaning operations due to the high levels of silt and debris deposited in the system whilst water is held back. Refer to section 3 for calculating the commuted sums.
  - ii) Flow control devices require regular routine inspections to ensure they operate effectively, inspections would currently be required at 6 monthly intervals.

### **Attenuation Tanks**

- 2.5 Highway drainage attenuation tanks and soakaways may require vehicular access complete with turning facility to enable maintenance vehicles to enter and leave in a forward gear. The access and turning area shall be in permanent materials as approved by this Council. The developer must also pay a commuted sum for a period of 30 years for the future maintenance of the access, where such facility does not form part of the adopted highway.

### **Attenuation Ponds**

- 2.6 Maintenance requirements for attenuation ponds will generally be in accordance with the recommendations contained within CIRIA C697 'The SUDs Manual', as outlined in Table 1 below. The commuted sum required may be reviewed on a site by site basis to reflect any site specific maintenance requirements.



2.7 Lagoons / Ponds are to be designed to minimise the requirements for ongoing maintenance and to ensure that the pond does not cause nuisance to nearby properties. It is expected that off line ponds will be grassed utilising a slow growing grass mixture that will tolerate the prevailing conditions and will be cut at a frequency of 6 cuts per year. Planting of trees and shrubs will be such that falling leaves branches and root systems will not have an adverse impact on the pond.

Maintenance Schedule	Required Action	Frequency
Regular maintenance	Litter and debris removal	Monthly
	Grass cutting - access route	Monthly (during growing season), or as required
	Grass cutting - meadow grass in and around basin	Half yearly (spring - before bird nesting season and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlet and outlet	Annually (or as required)
	Flow Control Device – cleaning	Six Monthly or as manufacturers recommendations
Occasional maintenance	Re-seed areas of poor vegetation growth	Annually (or as required)
	Prune and trim trees and remove cuttings	2 years (or as required)
Remedial actions	Repair of erosion or other damage by re-seeding or re-turfing.	As required
	Repair/rehabilitation of outlet	As required
	Re-level uneven surfaces and reinstate design levels	As required
Monitoring	Inspect outlet for blockages and arrange clearance if required	Monthly/after large storms
	Inspect bank sides, structures, pipework etc for evidence of physical damage	Monthly/after large storms
	Inspect facility surface for silt accumulation and establish appropriate silt removal frequencies	Half yearly
	Check flow control device and arrange clearance/maintenance if required.	Monthly / After large storms

Table 1 - Maintenance requirements based on Table 16.2 CIRIA C697 'The SuDs Manual'

### Highway Soakaways

2.8 Where a developer intends to utilise SUDS and drain highway drainage to soakaways, the developer will be responsible for assessing the size and design of the soakaways together with ground permeability testing in accordance with BRE Digest 365 or alternative agreed method.

- 2.9 Highway soakaways require regular cleansing, and silt trap manholes cleansed on a regular basis. More specialised equipment is required to cleanse the soakaways due to the high levels of silt and debris deposited in the system whilst water is held back. Refer to section 3 for calculating the commuted sums.

### **Oil Interceptor/Separator**

- 2.10 In line with the Natural Resources Wales guidelines an oil interceptor/separator should be provided where there is a car park with spaces for 50 or more vehicles or in locations where oil/hydrocarbons are likely to be used or stored.
- 2.11 In some circumstances, gully pots may be adequate as long as they are suitable for the frequency of oil contamination and can be properly inspected and maintained.
- 2.12 It is advisable to provide oil interceptor in the delivery areas due to higher risk of oil spill from Lorries.
- 2.13 Oil interceptors/separators which are to be maintained by the Highway Authority would be subject of a commuted sum for the future maintenance.

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### 3 Method of Calculating Commuted Sums

The commuted sums required for extra maintenance liability will be calculated based on the current (2014) rates as detailed below.

The following formula has been used to calculate the maintenance obligation:-

$$\text{Commuted sum} = \sum M_p / (1+D/100)^T$$

where:  $M_p$  = Estimated periodic maintenance cost based on current rates.

$D$  = Periodic Discounted Rate (effective annual interest rate)(%)

$T$  = Time period before expenditure will be incurred or cyclical period (years)

Periodic Discounted Rate (D).

The discount rate (effective annual interest rate) is 2.2% which is calculated as follows: -

$$D = ((\text{LTNBR} / \text{RPIX}) - 1) \times 100$$

where LTNBR is the Long Term Neutral Base Rate (Currently 4.5% ie 1.045)

RPIX is the Retail Price Index excluding mortgage payments, taken as 2.25% i.e. 1.0225 for this example.

therefore  $D = ((1.045 / 1.0225) - 1) \times 100 = 2.2\%$

The RPIX rate is published by the office of National Statistics on a monthly basis and suitable figures for the calculation will be adopted as necessary to reflect any significant long term changes in the rate. Similarly the current rates may be amended to reflect any changes in costs.

#### Example Calculation

For a sum deposited in respect to a future maintenance activity, interest will be accrued up until the activity must be carried out, although over the same period inflation will tend to reduce the value of the deposit. This effect is taken into account by the use of the Periodic Discounted Rate which represents the effective interest rate.

The calculation is based on the conversion of future expenditure, (the cost of which is known at today's prices), being converted into a Net Present Value (NPV). This is the sum which if deposited today and invested at the periodic discounted rate would provide the sum required for the activity to be undertaken when it becomes due in 'T' years.

Considering the costs for a soakaway.

The commuted sum must include for the inspection, cleaning and desilting of the soakaway every 10 years.

The cost of undertaking the inspection, cleaning and desilting requires labour and hire of a vactor unit and the safe disposal of arisings. The cost has been determined to be £850 at current rates. The activity will be required in 10, 20 and 30 years time.

Using the formula

$$\text{NPV factor} = \sum 1 / (1 + D / 100)^T \quad \text{where D is the Periodic Discounted Rate calculated at 2.2\% as outlined above.}$$

$$\begin{aligned} \text{NPV factor} &= 1 / (1 + D / 100)^{10} + 1 / (1 + D / 100)^{20} + 1 / (1 + D / 100)^{30} \\ &= 1 / (1 + 2.2/100)^{10} + 1 / (1 + 2.2/100)^{20} + 1 / (1 + 2.2/100)^{30} \\ &= 0.80444 + 0.64712 + 0.52056 \\ &= 1.97211 \end{aligned}$$

$$\begin{aligned} \text{Commutated sum for inspection} &= \text{Current Cost} \times \text{NPV factor} \\ &= £850.00 \times 1.97211 \\ &= £1676.30 \end{aligned}$$

Commutated sums are rounded to the nearest pound therefore the commuted sum required would be £1676. For ease of manual calculation NPV factors for various periods are listed in Appendix A.

A typical commuted sum expenditure is shown in Appendix B.

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## 4 Highway Assets Subject of Commuted Sums.

The following list reflects highway assets which attract commuted sums and may change from time to time including the amount which is based on LTNRB and RPIX interest rates published by the Office of National Statistics.

The commuted sums are reviewed on a regular basis and updated accordingly.

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## Traffic Signals

Item No.	Description	Element	Quantity	Unit	Frequency	NPV Factor	Unit Cost @ 2014 Rates	Commuted Sum Element 30 yrs	Commuted Sum 30yrs	Comments
1	<b>Traffic Signals</b>	Posts	2	no	1 every 20 years	0.6471	£534.65	£691.96	£ 55,466	Calculate on a site specific basis to take account the exact number of posts and signal heads.
		Vehicle Signal Head (LED)	2	no	1 every 20 years	0.6471	£590.00	£763.60		
		Solar Cell	1	no	1 every 15 years	1.2421	£35.00	£43.47		
		Electricity usage Signal Heads	2	no	1 every 1 year	21.7926	£10.00	£435.85		
		Signal Controller	1	no	1 every 15 years	1.2421	£4,500.00	£5,589.28		
		MOVA Unit		item	1 every 15 years	1.2421	£4,338.41	£5,388.58		
		Outstation Monitoring Unit		item	1 every 15 years	1.2421	£3,200.00	£3,974.60		
		Electricity usage Controller		item	1 every 1 year	21.7926	£75.00	£1,634.45		
		Inspection/Test		item	1 every 1 year	21.7926	£150.00	£3,268.89		
		Maintenance (Siemens)		item	1 every 1 year	21.7926	£1,500.00	£32,688.90		
		Refresh Stop Lines/ Studs		item	1 every 10 years	1.9721	£500.00	£986.06		
2	<b>Pelican Crossing</b>	Posts	4	no	1 every 20 years	0.6471	£534.65	£1,383.92	£ 27,579	Calculate on a site specific basis to take account the exact number of posts and signal heads. (All new controlled pedestrian crossings within RCTCBC are to be Puffin type crossings)
		Vehicle Signal Heads	4	no	1 every 20 years	0.6471	£590.00	£1,527.19		
		Pedestrian Signal Heads	2	no	1 every 20 years	0.6471	£217.70	£281.75		
		Push Button Boxes	2	no	1 every 20 years	0.6471	£246.77	£319.38		
		MVDs	2	no	1 every 20 years	0.6471	£341.38	£441.82		
		Audible Units	2	no	1 every 20 years	0.6471	£41.93	£54.27		
		Tactile Cones	2	no	1 every 20 years	0.6471	£283.92	£367.46		
		Solar Cell	1	no	1 every 15 years	1.2421	£35.00	£43.47		
		Controller	1	no	1 every 15 years	1.2421	£2,500.00	£3,105.16		
		Inspection/Test		item	1 every 1 year	21.7926	£150.00	£3,268.89		
		Electricity		item	1 every 1 year	21.7926	£175.00	£3,813.71		
		Maintenance (Siemens)		item	1 every 1 year	21.7926	£550.00	£11,985.93		
		Refresh Stop Lines /Studs		item	1 every 10 years	1.9721	£500.00	£986.06		

## Traffic Signals continued

Item No.	Description	Element	Quantity	Unit	Frequency	NPV Factor	Unit Cost @ 2014 Rates	Commuted Sum Element 30 yrs	Commuted Sum 30yrs	Comments
3	Puffin Crossing	Posts	4	no	1 every 20 years	0.6471	£534.65	£1,383.92	£ 31,092	Calculate on a site specific basis to take account the exact number of posts and signal heads.
		Vehicle Signal Heads	4	no	1 every 20 years	0.6471	£590.00	£1,527.19		
		Puffin Red/Green Man Boxes	2	no	1 every 20 years	0.6471	£850.00	£1,100.10		
		MVDs	2	no	1 every 20 years	0.6471	£341.38	£441.82		
		Audible Units	2	no	1 every 20 years	0.6471	£41.93	£54.27		
		Tactile Cones	2	no	1 every 20 years	0.6471	£283.92	£367.46		
		On-crossing Detectors	2	no	1 every 15 years	1.2421	£469.68	£1,166.74		
		Kerbside Detectors	2	no	1 every 15 years	1.2421	£1,061.17	£2,636.08		
		Controller	1	no	1 every 15 years	1.2421	£2,500.00	£3,105.16		
		Solar Cell	1	no	1 every 15 years	1.2421	£35.00	£43.47		
		Inspection/ Test		item	1 every 1 year	21.7926	£150.00	£3,268.89		
		Refresh Stop Lines/ studs		item	1 every 10 years	1.9721	£100.00	£197.21		
		Electricity		item	1 every 1 year	21.7926	£175.00	£3,813.71		
Maintenance (Siemens)		item	1 every 1 year	21.7926	£550.00	£11,985.93				
4	Pedestrian Crossing (Zebra)	LED flasher unit	2	no	1 every 10 years	1.9721	£25.00	£98.61	£ 1,944	
		Globe	2	no	1 every 10 years	1.9721	£49.00	£193.27		
		Post	2	no	1 every 25 years	0.5804	£350.00	£406.28		
		Refresh Markings replace studs		item	1 every 15 years	1.2421	£500.00	£621.03		
		Inspection/Test		item	1 every 6 years	3.4374	£150.00	£515.61		
		Electricity		item	1 every 1 year	21.7926	£5.00	£108.96		

## Structures

Item No.	Description	Element	Quantity	Unit	Frequency	NPV Factor	Unit Cost @ 2014 Rates	Commuted Sum Element 120 yrs	Commuted Sum 120yrs	Comments
5	<b>Road Bridges (site by site basis)</b>	Inspection		item	1 every 2 years	20.82921	£200.00	£4,165.84	£ 74,980	Costs to be determined on an individual scheme basis. Figures given for guidance only.
		Bearings		item	1 every 60 years	0.34442	£25,000.00	£8,610.47		
		Expansion Joints		item	1 every 20 years	1.69913	£15,000.00	£25,486.96		
		Replacement		item	1 every 120 years	0.07343	£500,000.00	£36,716.60		
6	<b>Footbridges</b>	Inspection		item	1 every 2 years	20.82921	£200.00	£4,165.84	£ 11,509	Costs to be determined on an individual scheme basis. Figures given for guidance only.
		Replacement		item	1 every 120 years	0.07343	£100,000.00	£7,343.32		
7	<b>Retaining Structure / Wall</b>	Inspection		item	1 every 2 years	20.82921	£200.00	£4,165.84	£ 6,920	Costs to be determined on an individual scheme basis. Figures given for guidance only.
		Replacement		item	1 every 120 years	0.07343	£37,500.00	£2,753.75		



## Drainage

Item No.	Description	Element	Quantity	Unit	Frequency	NPV Factor	Unit Cost @ 2014 Rates	Commuted Sum Element	Commuted Sum 30yr	Comments
8	<b>Culverted Watercourse</b>	Inspection/desilting/cleaning	1	m	1 every 5 years	4.1700	£30.00	£125.10	£ 125	
9	<b>Combined Kerb Drainage Units</b>	Inspection / Cleansing/Desilting	1	m	1 every 5 years	4.1700	£30.00	£125.10	£ 125	
10	<b>Drainage Gully</b>	Inspection / Cleansing	1	no	1 every 1 year	21.7926	£5.00	£108.96	£ 109	
11	<b>Drainage Ditch</b>	Inspection/Desilting/Cleaning	1	m	1 every 5 years	4.1700	£30.00	£125.10	£ 129	
		Grass cutting	1	m <sup>2</sup>	1 every 2 years	10.7777	£0.40	£4.31		
12	<b>Soakaways</b>	Inspection/Desilting/Cleaning	1	m <sup>2</sup>	1 every 5 years	4.1700	£4.50	£18.77	£ 18,542	Maintenance rate is based on the Gross Impermeable Area draining to the soakaway
13	<b>Oil Separator</b>	Inspection/Desilting/Cleaning	1	item	1 every 1 year	21.7926	£850.00	£18,523.71	£ 18,524	

## Drainage continued

Item No.	Description	Element	Quantity	Unit	Frequency	NPV Factor	Unit Cost @ 2014 Rates	Commuted Sum Element	Commuted Sum 30yr	Comments
14	<b>Attenuation Tanks</b>	Inspection/Desilting/Cleaning		item	1 every 5 years	4.1700	£850.00	£3,544.50	£ 12,547	
		Structural inspection		item	1 every 10 years	1.9721	£1,500.00	£2,958.17		
		Flow Control Inspection		item	1 every 2 years	10.7777	£150.00	£1,616.66		
		Flow Control Maintenance		item	1 every 5 years	4.1700	£500.00	£2,085.00		
		Flow Control Replacement.		item	1 every 30 years	0.5206	£4,500.00	£2,342.53		
15	<b>Attenuation Ponds</b>	Inspection		item	2 every 1 year	43.5852	£150.00	£6,537.78	£ 52,106	Based on Guidance in CIRIA Report C697 Items may be omitted if not applicable. Include actual area for grass cutting. Note Large features may require commuted sums to be calculated over a 120 year period.
		Clear Inlet & Outlet		item	2 every 1 year	43.5852	£150.00	£6,537.78		
		Litterpicking	1	m <sup>2</sup>	6 every 1 year	130.7556	£0.01	£1.31		
		Grass cutting (Strim)	1	m <sup>2</sup>	6 every 1 year	130.7556	£0.06	£7.85		
		Replace/Maintain Fence	1	m	1 every 15 years	1.2421	£82.59	£102.58		
		Reinstate erosion		item	1 every 5 years	4.1700	£1,000.00	£4,170.00		
		Desilting Cleaning		item	1 every 5 years	4.1700	£2,000.00	£8,340.00		
		Clear dead vegetation		item	1 every 1 year	21.7926	£400.00	£8,717.04		
		Prune vegetation/trees/shrubs		item	1 every 3 years	7.1067	£500.00	£3,553.35		
		Inspect / Maintain Safety Equipment / Signage (where required)		item	2 every 1 year	43.5852	£50.00	£2,179.26		
		Structural Inspection / Report		item	1 every 15 years	1.2421	£800.00	£993.65		
		Flow Control Inspection		item	2 every 1 year	43.5852	£150.00	£6,537.78		
		Flow Control Maintenance		item	1 every 5 years	4.1700	£500.00	£2,085.00		
Flow Control Replacement.		item	1 every 30 years	0.5206	£4,500.00	£2,342.53				
16	<b>Flow Control Device</b>	Inspection		item	2 every 1 year	43.5852	£150.00	£6,537.78	£ 10,965	
		Cleaning / Adjustment / Repairs		item	1 every 5 years	4.1700	£500.00	£2,085.00		
		Replacement / Refurbishment		item	1 every 30 years	0.5206	£4,500.00	£2,342.53		

## Street Lighting and Signage

Item No.	Description	Element	Quantity	Unit	Frequency	NPV Factor	Unit Cost @ 2014 Rates	Commuted Sum Element	Commuted Sum 30yr	Comments
17	<b>Street Lighting Columns</b>	Electricity		item	1 every 1 year	21.7926	£40.00	£871.70	£ 1,053	
		Lamp replacement	1	no	1 every 4 years	4.2468	£40.00	£169.87		
		Inspection		item	1 every 10 years	1.9721	£6.00	£11.83		
18	<b>Illuminated Traffic Bollard</b>	Electricity		item	1 every 1 year	21.7926	£5.00	£108.96	£ 411	
		Lamp replacement	1	no	1 every 4 years	4.2468	£40.00	£169.87		
		Inspection		item	1 every 6 years	3.4374	£6.00	£20.62		
		Replacement Shell	1	no	1 every 15 years	1.2421	£90.00	£111.79		
19	<b>Retroreflective Bollard (non-illuminated) Bollard</b>	Reflective Shell Replacement	1	no	1 every 25 years	0.5804	£401.00	£232.74	£ 233	
20	<b>Illuminated Traffic Sign</b>	Electricity		item	1 every 1 year	21.7926	£5.00	£108.96	£ 610	
		Lamp replacement	1	no	1 every 4 years	4.2468	£40.00	£169.87		
		Inspection / Test		item	1 every 6 years	3.4374	£6.00	£20.62		
		Post & Plate Replacement		item	1 every 15 years	1.2421	£250.00	£310.52		
21	<b>Ornamental Columns</b>	Electricity		item	1 every 1 year	21.7926	£40.00	£871.70	£ 2,185	Figures are for guidance only. Actual costs to be based on the proposed column and lamp.
		Lamp replacement		item	1 every 4 years	4.2468	£55.00	£233.58		
		Inspection / Test		item	1 every 10 years	1.9721	£6.00	£11.83		
		Replacement Column		item	1 every 25 years	0.5804	£1,500.00	£870.60		
		Painting/maintenance		item	1 every 10 years	1.9721	£100.00	£197.21		
22	<b>Non-illuminated Single Post Sign</b>	Post & Plate Replacement		item	1 every 15 years	1.2421	£125.00	£155.26	£ 413	
		Inspection/Cleaning		item	1 every 6 years	3.4374	£75.00	£257.81		
23	<b>Non-illuminated Advance Direction Sign</b>	Post & Plate Replacement		item	1 every 15 years	1.2421	£175.00	£217.36	£ 475	
		Inspection/Cleaning		item	1 every 6 years	3.4374	£75.00	£257.81		

SECTION – D  
 COMMUTED SUMS PAYMENTS FOR FUTURE  
 MAINTENANCE IN RELATION TO ADOPTION  
 AND TRANSFER OF INFRASTRUCTURE ASSETS

## Miscellaneous Items

Item No.	Description	Element	Quantity	Unit	Frequency	NPV Factor	Unit Cost @ 2014 Rates	Commuted Sum Element	Commuted Sum 30yr	Comments
24	<b>Cantilever 3 Bay Bus Shelter</b>	Shelter		item	1 every 20 years	0.6471	£3,000.00	£1,941.35	£ 4,071	
		Maintenance		item	1 every 1 year	21.7926	£92.71	£2,020.39		
		Change Timetable		item	1 every 1 year	21.7926	£5.00	£108.96		
25	<b>Enclosed 3 Bay Bus Shelter</b>	Shelter		item	1 every 20 years	0.6471	£3,500.00	£2,264.91	£ 4,394	
		Maintenance		item	1 every 1 year	21.7926	£92.71	£2,020.39		
		Change Timetable		item	1 every 1 year	21.7926	£5.00	£108.96		
26	<b>Bus Stop Flagpole</b>	Pole, Flag & Timetable case		item	1 every 10 years	1.9721	£155.00	£305.68	£ 415	
		Change Timetable		item	1 every 1 year	21.7926	£5.00	£108.96		
27	<b>Bollard</b>	Bollard	1	no	1 every 15 years	1.2421	£200.00	£248.41	£ 248	
28	<b>Safety Barrier (Galvanised)</b>	Safety Barrier	1	m	1 every 15 years	1.2421	£250.00	£310.52	£ 311	
29	<b>Safety Barrier Endpost</b>	Replacement	1	No	1 every 25 years	0.5804	£3,500.00	£2,031.40	£ 2,031	
30	<b>Galvanised Pedestrian Guardrail</b>	Replacement	1	m	1 every 15 years	1.2421	£82.59	£102.58	£ 103	
31	<b>Grit Bin</b>	Bin		Item	1 every 15 years	1.2421	£400.00	£496.83	£ 1,586	
		Refill with Grit		item	1 every 1 year	21.7926	£50.00	£1,089.63		
32	<b>Carriageway as part of a Highway Agreement over and above that</b>	Plane & Re-surface	1	m <sup>2</sup>	1 every 15 years	1.2421	£10.96	£13.61	£ 14	
33	<b>Roadmarkings as part of a Highway Agreement over and above the</b>	Refresh Markings	1	m	1 every 10 years	1.9721	£2.50	£4.93		
		Refresh Markings	1	no	1 every 10 years	1.9721	£25.00	£49.30		
		Refresh Markings	1	no	1 every 10 years	1.9721	£5.00	£9.86		

## Miscellaneous Items continued

Item No.	Description	Element	Quantity	Unit	Frequency	NPV Factor	Unit Cost @ 2014 Rates	Commuted Sum Element	Commuted Sum 30yr	Comments
34	<b>Grass Cutting 'Highway Verge</b>	Strim cut grass, any size area Gradient >1 in 5	1	m <sup>2</sup>	6 every 1 year	130.7556	£0.06	£7.85	£ 8	
35	<b>Grass Cutting 'Highway Verge</b>	Mow cut grass, any size area Gradient <1 in 5	1	m <sup>2</sup>	6 every 1 year	130.7556	£0.03	£3.92	£ 4	
36	<b>Tree in Highway Land</b>	Prune tree		no	every year				£ -	Rate and frequency to be determined on a site by site basis
37	<b>Trim Hedges to Maintain Visibility Splay</b>	Flail cut hedgerow and dispose of arisings	1	m <sup>2</sup>	2 every 1 year	43.5852	£0.56	£24.41	£ 24	

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## APPENDIX A- NET PRESENT VALUE FACTORS

Formula used:

Net present value factor =  $\sum 1 / (1+D\%)^T$       Where 'D' = Periodic Discount Rate rate and 'T' = number of years forward

Commuted Sum =  $\sum$  Cost at Current Rate x NPV Factor

Long Term Neutral Bank Rate (LTNBR).....	=	4.5	%	Periodic Discount Rate (D)	=	2.20	%
Retail Price Index excluding Mortgage Interest Payments (RPIX).....	=	2.25	%	(1+D%)	=	1.0220	

**Table 1 : NPV Factors for - 30years**      Net Present Value factors for £1.00 expenditure at various intervals during 30 year period

Interval	Every Year	Every 2 Years	Every 3 Years	Every 4 years	Every 5 Years	Every 6 Years	Every 10 years	Every 15 years	Every 20 Years	Every 25 Years	Every 30 Years	Twice per year	Four Times per year	SixTimes per year	12 Times per year
NPV Factor $1/(1+D\%)^T$	21.79260	10.77774	7.10671	4.24683	4.17092	3.43740	1.97211	1.24206	0.64712	0.58040	0.52056	43.58520	87.17040	130.75560	261.51120

**Table 2 : NPV Factors for - 120years**      Net Present Value factors for £1.00 expenditure at various intervals during 120 year period

Interval	Every Year	Every 2 Years	Every 3 Years	Every 4 years	Every 5 Years	Every 6 Years	Every 10 years	Every 15 years	Every 20 Years	Every 25 Years	Every 30 Years	Every 60 Years	Every 120 Years	Two Times per year	Four Times per year
NPV Factor $1/(1+D\%)^T$	41.60823	20.82921	13.73452	10.18801	8.06077	6.64317	3.81133	2.40043	1.69913	1.22626	1.00605	0.34442	0.07343	166.43291	332.86582

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## APPENDIX B – EXAMPLE OF COMMUTED SUM EXPENDITURE

### Typical Commuted Sum Expenditure

As shown in the example calculation:-

Cyclical expenditure of £850 every 10 years

RPIX = 2.25% ( Effective inflation rate)

LTNBR = 4.50% ( Effective Interest Rate)

NPV factor = 1.97211 From Table 1 based on the above RPIX and LTNBR

Commuted sum for 30 years      £850.00 x 1.972      =      £1,676.30

To the nearest pound this would be £1676

### Effect of Inflation on Maintenance Cost (RPIX)

Years	Cost	Inflation Rate % (RPIX)	Increase in Maint. Cost	Cost of Maintenance
1	850.00	2.25	19.13	
2	869.13	2.25	19.56	
3	888.68	2.25	20.00	
4	908.68	2.25	20.45	
5	929.12	2.25	20.91	
6	950.03	2.25	21.38	
7	971.40	2.25	21.86	
8	993.26	2.25	22.35	
9	1015.61	2.25	22.85	
10	1038.46	2.25	23.37	1061.82
11	1061.82	2.25	23.89	
12	1085.71	2.25	24.43	
13	1110.14	2.25	24.98	
14	1135.12	2.25	25.54	
15	1160.66	2.25	26.11	
16	1186.78	2.25	26.70	
17	1213.48	2.25	27.30	
18	1240.78	2.25	27.92	
19	1268.70	2.25	28.55	
20	1297.24	2.25	29.19	1326.43
21	1326.43	2.25	29.84	
22	1356.28	2.25	30.52	
23	1386.79	2.25	31.20	
24	1418.00	2.25	31.90	
25	1449.90	2.25	32.62	
26	1482.52	2.25	33.36	
27	1515.88	2.25	34.11	
28	1549.99	2.25	34.87	
29	1584.86	2.25	35.66	
30	1620.52	2.25	36.46	1656.98

### Interest earned on Deposited Sum (LTNBR)

Years	Deposited Sum	Interest rate % (LTNBR)	Interest	Deposited Sum plus Interest	Expenditure	Deposited Sum + Interest - Expenditure
1	1676.00	4.5	75.42	1751.42		1751.42
2	1751.42	4.5	78.81	1830.23		1830.23
3	1830.23	4.5	82.36	1912.59		1912.59
4	1912.59	4.5	86.07	1998.66		1998.66
5	1998.66	4.5	89.94	2088.60		2088.60
6	2088.60	4.5	93.99	2182.59		2182.59
7	2182.59	4.5	98.22	2280.80		2280.80
8	2280.80	4.5	102.64	2383.44		2383.44
9	2383.44	4.5	107.25	2490.70		2490.70
10	2490.70	4.5	112.08	2602.78	1061.82	1540.95
11	1540.95	4.5	69.34	1610.30		1610.30
12	1610.30	4.5	72.46	1682.76		1682.76
13	1682.76	4.5	75.72	1758.48		1758.48
14	1758.48	4.5	79.13	1837.62		1837.62
15	1837.62	4.5	82.69	1920.31		1920.31
16	1920.31	4.5	86.41	2006.72		2006.72
17	2006.72	4.5	90.30	2097.03		2097.03
18	2097.03	4.5	94.37	2191.39		2191.39
19	2191.39	4.5	98.61	2290.00		2290.00
20	2290.00	4.5	103.05	2393.05	1326.43	1066.62
21	1066.62	4.5	48.00	1114.62		1114.62
22	1114.62	4.5	50.16	1164.78		1164.78
23	1164.78	4.5	52.41	1217.19		1217.19
24	1217.19	4.5	54.77	1271.97		1271.97
25	1271.97	4.5	57.24	1329.20		1329.20
26	1329.20	4.5	59.81	1389.02		1389.02
27	1389.02	4.5	62.51	1451.52		1451.52
28	1451.52	4.5	65.32	1516.84		1516.84
29	1516.84	4.5	68.26	1585.10		1585.10
30	1585.10	4.5	71.33	1656.43	1656.98	-0.55

The above tables show that the commuted sum invested and earning interest at the LTNBR will be sufficient to cover maintenance costs, which will increase annually at the RPIX rate, over a period of 30 years.

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