



# LIFECYCLE PLAN: STREET LIGHTING

**Version 0.2**

**February 2012**

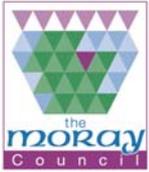
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0.2	February 2012			Final Draft



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*ROADS ASSET MANAGEMENT PLAN*  
*STREET LIGHTING LIFECYCLE PLAN*

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## 1 Summary of Current Status (February 2012)

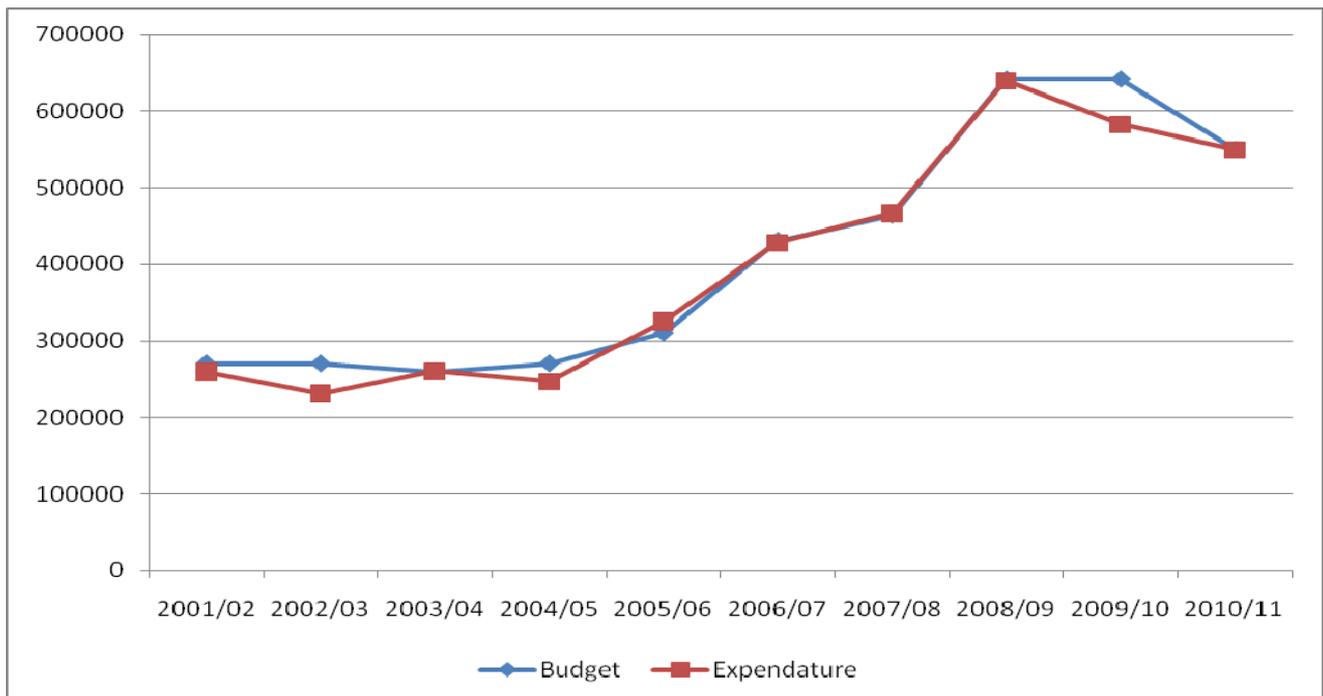
### 1.1 Current Issues

The Council is responsible for some 17097 lighting columns as well as 1020 illuminated signs and bollards. With the design life for older columns currently 30 years, the Council has calculated that 17.1% are in excess of 30 years old. (A number of older installations (pre 1975) have assumed dates as their actual dates are uncertain.)

It is also estimated that 5611 streetlights and 367 illuminated signs are currently supplied by 5<sup>th</sup> core electricity cables directly from electricity supplier circuits which are now life expired and although safe, are in need of replacement.

Despite a programme of column replacement for those over 30 years old, more columns are being added to the network than can be replaced.

Spiralling energy costs have been a factor over the last few years and costs are predicted to increase even more over the next few years.





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## **1.2 Current Asset Management Strategies**

The following strategies are currently in place;

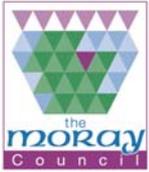
- Budgets

**Capital Column Replacement** – the first few years of the Council's 2012 – 2022 capital plan allocates typically £465k for replacing old or defective columns (£528k in 2009/10)

**Capital Lighting Improvement Works** – the first few years of the Council's 2012 – 2022 capital plan allocates typically £200k for lantern replacement and other energy saving enhancements. (£220k in 2009/10)

**Revenue Lighting Maintenance** – typically £185k has been available from revenue budgets for fault repairs, emergency responses and electrical inspection testing.

- The Council are now specifying the installation of aluminium alloy lighting columns which, due to their longer life span (50yr design life), are considered to give best whole life cost although they require a higher initial investment. Whilst the Council will be influenced by whole life costs, this is not always the case with developers who often base their judgement on capital costs.
- In addition the Council are specifying the installation of long life low energy lamps which, once again reduce the costs associated with the asset over its life despite a higher initial investment.
- Over the recent years the Council have been designing for lower light levels with often increased column spacing and more efficient lanterns to reduce energy consumption.



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## 2 The Asset

### 2.1 Inventory

The Street Lighting asset within Moray Council is comprised of 17097 streetlights and 1010 illuminated signs & bollards of various types and materials as detailed in tables 1 & 2 below.

<b>Table 2.1 Moray Council Streetlight Inventory (at January 2012)</b>	
<b>Column Type</b>	<b>Number</b>
Galvanised Steel	12334
Stainless Steel	1
Concrete	2
Aluminium	690
Cast Iron	11
Wooden Pole	152
Mild Steel	3399
Steel	13
Wall Bracket/Attachments	505
<b>Total</b>	<b>17097</b>

<b>Table 2.2 Moray Council Illuminated Signs &amp; Bollards Inventory (at January 2012)</b>	
<b>Illumination Type</b>	<b>Number</b>
Illuminated Signs	640
Illuminated Bollards	370
<b>Total</b>	<b>1010</b>



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## **2.2 Asset Register**

Details of the majority of Moray Council's roads assets are stored within the Asset Management System. The street lighting assets are held in a street lighting module within the system. The database holds details of:

- Column number
- Unique Asset Number
- Location Description
- Street Name
- Area
- Electricity Supplier
- Mounting Height
- Mounted Fitting
- Column Material
- Lamp Type
- Lamp Control Gear Type
- Date Installation
- Lantern Manufacturer
- Switching Device
- Switching Regime
- Ownership
- OS Grid Reference
- Service Owner

The database also contains details of illuminated signs and bollards. The attribute information held for these assets includes;

- Sign Number
- Sign Description
- Electricity Supplier
- Location Description
- Street Name
- Unique Asset Number
- Area
- Internally or Externally illuminated
- Lamp Type
- Lamp Control Gear Type
- Lantern Manufacturer
- Type of illuminated bollard
- Switching Device
- Switching Regime
- Unique Asset Number
- Ownership
- OS Grid Reference
- Service Owner

All individual units are digitised within the asset management system.

The National Street Gazetteer is an integral part of the asset management system. The system also has its own built in GIS mapping facility.

## **2.3 Asset Growth**

It has been estimated that the asset has grown over the last 5 years by approximately 5.1%. Generally, any lighting schemes which were installed prior to the mid 1980's do not comply with current standards, BS5489:2003 & EN13201-4, for lighting installations and this is reflected in the fact that typical lighting scheme improvements see more columns installed than removed from site. Growth has also occurred as a result of the adoption of street lighting within private developments.

It has been estimated that this additional growth will continue in the short term due to ongoing housing and industrial developments in Moray. However it is expected that this growth pattern will be affected by the difficult economic situation.

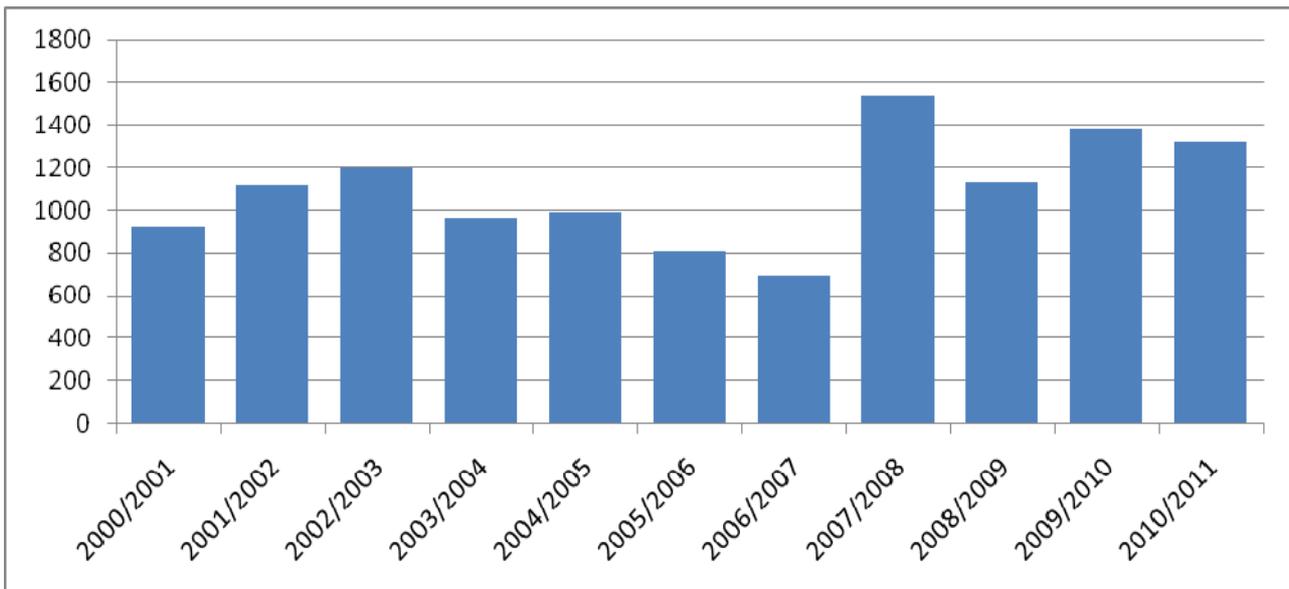


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### 3 Service Expectations

#### 3.1 Customer Perceptions

A formal customer enquiry reporting system, through the asset management system Customer Care module, is currently in place for the public to call and report all faults/enquiries. Where relating to street lighting, these are then transferred automatically into the lighting module of asset management system.



Customer Requests Logged in CSS

Once into the lighting module of asset management system, staff identify the defect category, allocate a budget code and prioritise using some of the following recorded information:

- Date of report
- Person Compiling Report
- Method of Contact
- Name, address and contact details of the person making the enquiry
- Location of concern
- Service area affected
- Subject of enquiry
- Description of enquiry
- Classification / class of enquiry

The system is updated at regular intervals, by the responsible officer, with all subsequent actions undertaken until the enquiry is finally closed out.

Enquiries within the system can be made in relation to any of the above and reports can be produced to enable the information to be used for asset management purposes, such as the budget spent, energy use, fault repairs by category, performance indicators, etc.



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### **3.2 Council Goals and Objectives;**

The current Single Outcome Agreement has as one of its top ten priorities; “Roads/Transport – Addressing the transport infrastructure and encouraging sustainable travel”.

This follows through into the updated Local Transport Strategy (2010) which has a number of relevant objectives including “Maintain and improve the existing transport infrastructure to enable an effective and reliable transport network”

### **3.3 Use**

There are 1541km of adopted roads in Moray, of which approximately 400km are lit. In addition there are also some remote footpaths, remote cycle tracks and private roads that are lit.

Designed lighting levels can vary depending on the usage and level of amenity. Light level will normally conform to the appropriate standards.

### **3.4 Safety Considerations**

The street lighting section maintains a record of all incidents that cause damage to the asset and where possible, damage caused by third parties is recharged. Where this is not possible a records of the damage and repair costs are kept within the asset management system for reference.

The street lighting asset supports road and community safety. Leading criminologists have stated that well designed and maintained street lighting is reckoned to be up to six times more effective than CCTV in crime reduction.

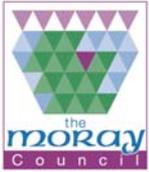
A recent Institution of Lighting Professionals (ILP) report has put forward recommendations as to special lighting requirements for pedestrian crossings which have been informally adopted as practice within the authority.

### **3.5 Utility Activity**

Utility activity can have a major effect on the maintenance and management of the street lighting asset. Particularly buried cables can be damaged and, in some cases, the damage to the street lighting apparatus goes unreported and is only found when lighting problems occur.

Where statutory undertakers have caused damage to street lighting assets it is the Council’s practice to endeavour to reclaim the costs of repair or replacement from the responsible party.

Co-ordination of utility and authority works is undertaken through the Scottish Roads Works Register (SRWR). Performance is monitored by the Scottish Road Works Commissioner, who has the power to issue fines up to £50,000.



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The coordination of major utility projects, often looking ahead to future financial years, are undertaken at Local RAUC level where utility companies and the road authority can table their future programmes of work to enable open discussion and exploration of the opportunity for any joint working, early progression of utility work in advance of major roads maintenance projects, or, the delay of major roads projects until after utility work is completed. The frequency of these local RAUC meetings has unfortunately been allowed to slip in recent years and an improvement on frequency of meetings should be achieved as a priority

The street lighting section gets a number of “plant information requests” from other parties through the Scottish Road Works Register.

### **3.6 3<sup>rd</sup> Party Claims**

There have been no incidents of third party claims specifically against the Council’s street lighting asset within the last 10 years.

### **3.7 Environmental Considerations**

The environmental requirements for new installations can be found within BS5489. Additionally, the disposal of electrical apparatus are governed by the Waste Electrical and Electronic Equipment Regulations 2006, which directs that all such equipment shall be disposed of through an Authorised Treatment Facility (ATF). Lighting equipment is included in the above regulations.

### **3.8 Network Availability Considerations**

The Council have identified a relatively small number of traffic sensitive streets and footways where working time restrictions are prescribed. These can affect the cost of carrying out works on the asset. Congestion is generally not a major issue however certain parts of both the Trunk and Local road network in Elgin experience congestion at certain times.

### **3.9 Amenity Value Considerations**

Moray Council do not at present have a formal policy in regard to construction or material standards for differing amenity areas. There is informal recognition that town centre conservation areas should be of a higher standard than other areas, and this is recognised by designers being sympathetic in their approach in all areas and follow best practice.

There has been some attempt to improve consistency between these design specifications in recognition that they often impact heavily on the maintenance requirements and costs.

Decorative, seasonal lighting in Elgin is erected and taken down by the Council’s Housing DLO. Other towns and villages purchase, maintain and erect their own seasonal lighting, which is generally fixed to brackets and plugged in to pre-installed power sockets. The initial installation is checked by the Street Lighting Section, thereafter the responsibility for inspection, testing and maintenance lies with the Community.

The cost of the energy associated with the lights is recharged to the community.



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**4 Management Practices:**

**4.1 Policies**

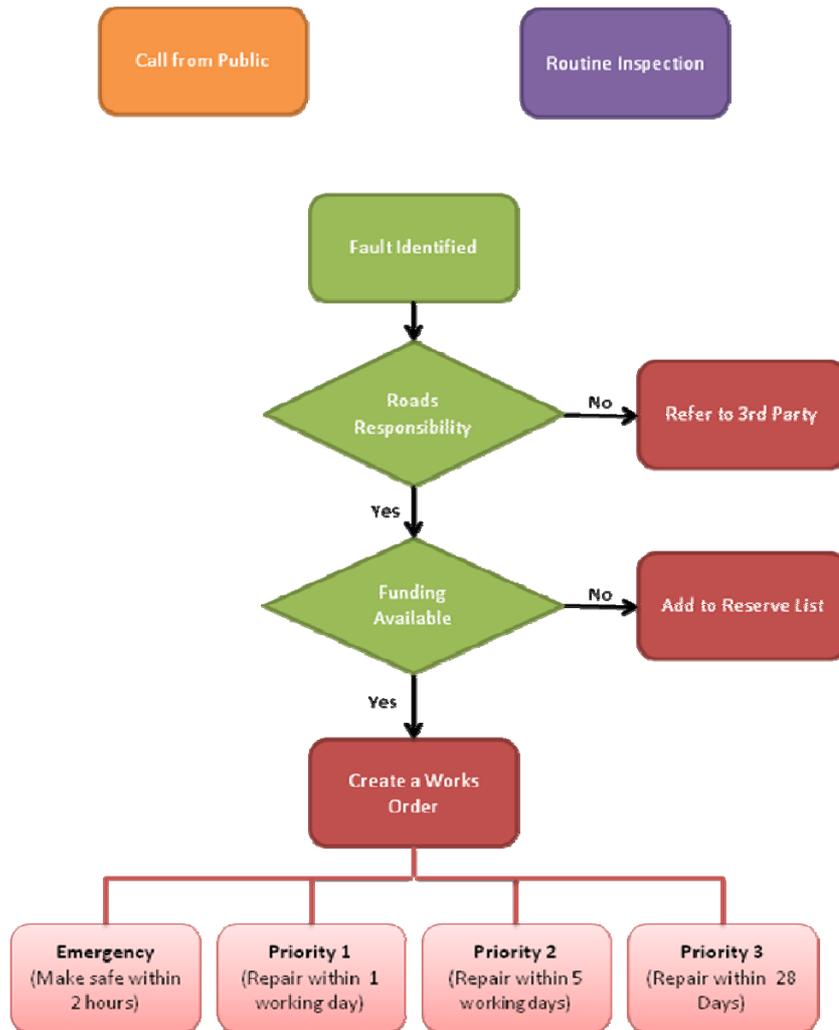
The management of the lighting asset is currently governed by the Code of Practice for Highway Lighting Management (Well-lit Highways) 2004, as well as the Direct Services Business System (Quality System) which includes inspection and repair procedures for street lighting assets. Inspection Regime

<b>Table 4.1 Street Lighting Safety &amp; Condition Inspection Regime</b>			
<b>Inspection Type</b>	<b>Frequency</b>	<b>Record Keeping</b>	<b>Code of Practice</b>
Night time inspections	All units are inspected typically in August / September, November / December and February / March. Inspections are split into 4 areas – all done within a week.	Recorded electronically on hand-held device and transferred into asset management system.	
Visual Inspections	Currently only done on an ad-hoc basis or as part of the electrical testing inspection. (See below)	See below	To be agreed
Electrical testing of Asset	Undertaken every 6 years. Incorporates a visual inspection.	Recorded on site in hard copy format and then transferred to the asset management system.	To be decided following risk assessment exercise (Maximum intervals of six years)



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Reactive Inspections are undertaken when a defect or issues are reported by the public or from another source, e.g. the police. Reactive inspections are recorded against the note of the report and the defects categorised and repaired for example as below.



**Inspection Regime for Street Lighting**

- Anything deemed emergency to be responded to within 2 hours.
- High priority – 24h
- Standard defects – 5 working days
- Non-urgent – 28 days

The public are able to notify the council of lighting defects by the following means

- Website
- Email
- Phone
- Personal contact at council office
- Via their local councillor



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## **4.2 Condition Assessment**

The only condition assessments undertaken are the visual and electrical inspections as detailed in table 4.1 above.

### Data Uses

The information collected from the inspections is used:

- To inform the reserve list of desirable works
- To allocate the lighting budget
- To priorities maintenance and capital schemes
- To aid in responding to customer complaints

### Data Interpretation

The council utilise a street lighting management module within the asset management system. All information collected from the inspections is entered into this system and at this time some reports can be run. Some training needs have been identified to allow the team to write other reports.

### Data Standards

All columns, pillars, etc are recorded within the asset management system. Cabling is currently being captured and will be added in due course.

Night inspections are recorded electronically, while other inspection reports are still recorded on paper.

At this time data is recorded on paper and then transferred to the management system resulting in double handling of the information, reducing efficiency and accuracy. Handheld devices are being introduced which, combined with GPS, will deliver service efficiencies and improve the accuracy of data.



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**4.3 Construction/Asset Acquisition**

<b>Table 4.2 - Creation/Acquisition/Upgrading Activities</b>	
<b>Activity</b>	<b>Explanation</b>
<b>Creation</b>	Where a new street lighting asset is required, or where existing substandard street lighting needs replacing, scheme designs will normally be undertaken by the street lighting section.
<b>Acquisition</b>	Acquisition of street lighting is normally associated with the taking up of maintenance responsibilities following adoption of new developments. This is normally managed by the development control team using the Roads Construction Consent (RCC) process. In all cases the street lighting section is asked to either approve or design the street lighting prior to construction consent being granted. In addition all electrical installations must have electrical test certificates provided to the authority prior to their final adoption. Files are created for all new developments at the design stage and records of un-adopted apparatus can also be stored within the asset management system
<b>Upgrading</b>	Street lighting may be upgraded to meet the current design standards, where the existing asset does not meet the requirements.

At present the whole life cost of new works are not assessed and the ongoing maintenance liability is not included within the design calculations or added to the service plan. This can lead to the addition of new assets that have overly onerous ongoing maintenance requirements.

There is currently a lack of clarity over certain standards used for RCC adoption and there is no clear procedure during the adoption period. The current RCC design standards are out of date and need to be reviewed, particularly following the introduction of Designing Streets.<sup>IA1</sup>

All newly acquired assets are entered into the asset management system so that they can be included on the inspection programme.

**4.4 Routine Maintenance**

All routine reactive works relating to lighting outages have a target reaction time of 5 working days. Emergency works involving electrical or structural faults are usually attended on the same day with a specified reaction time of 2 hours.

**4.5 Operational/Cyclic Maintenance**

At present (over the past 3-4 years) operational/cyclic maintenance such as painting, cleaning, bulk lamp replacement has been stopped due to budget constraints.



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#### **4.6 Planned Maintenance: Renewals**

Planned street lighting maintenance activities are restricted to the replacement of faulty or defective equipment as identified from the structural inspections or when defects are spotted during other works.

A risk assessment is first undertaken and a prioritisation procedure (see below) is used to create a programme of replacements when funding allows.

The following points are used when prioritising.

- **Column Condition** – 1 good to 4 bad (> 75% external rust, cracks or splits)
- **Column Age** – 1 = <15 to 5 = 30+
- **Column Type** – Cohens/ Stewarts & Lloyds/ Concrete
- **Cable condition** – poor electrical results
- **Existing Lamp Type** – Sox, Mercury Vapour, Son
- **Maintenance Problems** – previously recorded visits
- **Complaints Received** – Councillors, Public, Police
- **Environment** – amenity area, amount of traffic/pedestrian traffic
- **Spacing** – does not meet present standards

No assessment of the opportunities for preventative maintenance associated with the street lighting asset has been made.

Preventative maintenance is defined as maintenance that is economically preventative i.e. the application of the preventative measure prevents large future costs having to be incurred to achieve the same outcome. It is important to make this distinction as most maintenance treatments can be considered to be preventative from an engineering perspective as they may prevent the defect that is being repaired from growing.

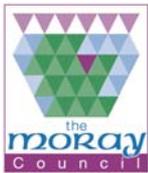
#### **4.7 Disposal**

The disposal of street lighting assets, where they are not replaced, is relatively rare. However there have been a few occasions where the enforced redundancy of a length of footway or carriageway due to the introduction of a new route, for example, has resulted in the enforced redundancy of some lighting apparatus.

At present the Council has no formal procedure for determining when a lighting asset is no longer required.

Where assets are removed, even when being replaced, they are subject to the W.E.E.E. regulations regarding the disposal of electrical equipment, lamps are disposed of to a third party who ensures their correct disposal.

Lamps and lanterns are recycled under W.E.E.E regulations. Metalwork is also recycled but to a scrap yard.



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**5 Investment:**

**5.1 Historical Investment;**

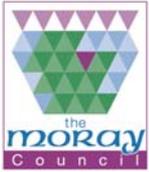
<b>Budget Heading</b>	<b>05/06</b>	<b>06/07</b>	<b>07/08</b>	<b>08/09</b>	<b>09/10</b>	<b>10/11</b>
Reactive maintenance	182	182	197	193	197	197
Cyclical maintenance (electrical testing & Inspection)	118	76	61	62	62	62
<b>Total Revenue (Exc. Energy costs)</b>	<b>300</b>	<b>258</b>	<b>258</b>	<b>255</b>	<b>259</b>	<b>259</b>

<b>Budget Heading</b>	<b>05/06</b>	<b>06/07</b>	<b>07/08</b>	<b>08/09</b>	<b>09/10</b>	<b>10/11</b>
Column Replacement	210	240	420	500	525	510
Lighting Improvements	150	170	185	220	240	220
Hydro network alterations	20	20	22	26	10	0
<b>Total Capital</b>	<b>380</b>	<b>430</b>	<b>627</b>	<b>746</b>	<b>775</b>	<b>730</b>

<b>Budget Heading</b>	<b>05/06</b>	<b>06/07</b>	<b>07/08</b>	<b>08/09</b>	<b>09/10</b>	<b>10/11</b>
Street Lighting	340	431	464	642	642	550
Traffic Signs & Bollards	9	11	13	19	19	16

The significant reduction in electricity costs was due to the Scottish Procurement Directive leading to a new contract for procurement of electricity with a lower unit price in financial year 2009/10, followed by a switch from an unmetered tariff to a half-hourly metering system in financial year 2010/11.

Replacement of high wattage lamps with lower power have reduced electrical load, but savings have usually been negated by increases in energy cost.



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The total number of faults attended by year is reported in table 5.4 below

<b>Table 5.4 Number of Street Lighting Faults Attended</b>			
<b>Year</b>	<b>Number of Faults</b>	<b>Total Reactive Maintenance Costs</b>	<b>Average Cost per Attendance</b>
2006/07	3997	182000	45.53
2007/08	2312	197000	85.21
2008/09	2799	193000	68.95
2009/10	3503	197000	56.24
2010/11	3523	197000	55.92

Prior to 2007 the regular inspections picked up around 74% of the faults with the remainder being reported by the public. In 2007/08 and 2008/09 the evening inspections were suspended and consequently the number of faults detected significantly reduced. The average maintenance cost per unit rose during this period due to the sporadic reporting of faults.

Limited evening inspections restarted in 2009 and resulted in an increase in the number of faults recorded and an associated drop in the average maintenance cost per unit due to a more efficient repair programme.

**5.2 Forecasting Financial Needs**

The Council do not have a formalised process for establishing the ongoing, long term, budgetary requirements for the maintenance and management of the street lighting asset however some work has been undertaken within the street lighting team to assess a forward need based on the age profile of the columns within the area. This exercise has identified that over 2915 columns have exceeded their nominal 30 year lifespan and may require replacement within the near future, the cost of this work is estimated to be in excess of £7 Million. Based on the Council's 2012 – 2022 capital plan, it has been estimated that within the next 5 years an additional 598 columns will also exceed their expected service lives and will require additional monitoring or replacement (inflation has not been taken into account).

Revenue budget will need to increase in line with additional assets being incorporated from developments, etc.

Energy costs are unpredictable but are likely to rise significantly. For example, the Scottish DNO have published their proposed pass through charges for 2012/13 which show significant rises in DUoS which will see increase in total electricity costs of 18.9% for councils in Scottish Powers area and 56.5% increases for those Councils in Scottish & Southern Energy area.



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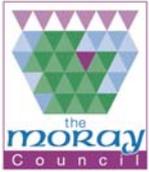
### **5.3 Valuation**

An exercise to calculate the value of the street lighting asset has been done as part of the SCOTS asset management project.

The Gross Replacement Cost (GRC) for the Street Lighting asset has been calculated as £61.8M. This is based on the actual lighting inventory and estimated unit replacement costs as of 2010. This figure represents the cost of replacing the asset with new.

The Depreciated Replacement Cost (DRC) is £37.3M. This figure represents the value of the street lighting asset in its current condition.

The Annualised Depreciation is £1.37M.



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**6 Forward Works Programme;**

**6.1 Existing Programmes;**

The street lighting section produces a list annually, in late winter/spring, of desirable lighting replacement works. The list is derived from faulty or defective equipment as identified from inspections or when defects are spotted during other works or from requests from elected members, the public or the police. There are always more schemes than there is budget, so there is a roll over of projects into future years (reserve list).

In January 2012, the Council approved a Capital plan for 2012 – 2022 as follows.

<b>Table 6.1 Street Lighting Capital Plan 2012 - 2022 (£000's)</b>											
	<b>2012/13</b>	<b>2013/14</b>	<b>2014/15</b>	<b>2015/16</b>	<b>2016/17</b>	<b>2017/18</b>	<b>2018/19</b>	<b>2019/20</b>	<b>2020/21</b>	<b>2021/22</b>	<b>Total</b>
<b>Replacement columns and lights.</b>	145	200	200	200	200	300	300	300	300	300	2445
<b>Replacement of life-expired columns</b>	420	465	465	465	465	600	600	600	600	600	5280

**6.2 Programme Coordination**

Work programmes are coordinated across the sections responsible for the individual asset groups, and also with other network activities such as utility works through the SRWR. Dialogue between teams prior to finalising the annual programme allows scheme timings to be aligned to ensure coordination. In particular street lighting schemes timing are adjusted to fit footway programmes. Customer feedback has resulted in a holistic approach to schemes with street lighting, footways and carriageways all being renewed in a single programme where this is deemed best value.

**6.3 Option Appraisal;**

The identification of different options are at present restricted to that of assets being included on the replacement programme or not and a priority rating based on risk to determine when works are undertaken. (See 4.5 above)

A full option appraisal needs to be developed as one of the improvement actions.

Different products, materials together with design criteria are continually reviewed to ensure best practice and improve efficiency.



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## **7 Risk**

### **7.1 Risk identification**

Details of the major risks associated with this asset group are included within the RAMP Risk Register which is still under development. These consider risks relating to H&S, finance, reputation, environmental, etc and are based on the corporate Moray Council risk management guidelines.

### **7.2 Risk Evaluation and Control**

The evaluation and control of risk follows the guidelines produced by Moray Council. Details of these guidelines are given in the RAMP document.



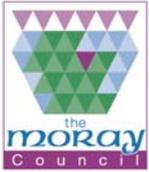
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**8 Works Delivery and Procurement**

- Reactive maintenance work is carried out by the in-house contractor with the works being paid for using a schedule of rates.
- Planned lighting replacement works are carried out by the in-house contractor. This work is measured and paid using a Bill of Quantities.
- Scottish & Southern Energy is employed to undertake disconnection and connection activities associated with their electrical service.

At present the cost of the internal works undertaken by Moray Council is benchmarked against other Councils through SCOTS and APSE in order to ensure that they provide best value to the local community.

Moray Council procures lighting materials through the Scotland Excel National Street Lighting materials contract.



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**9 Performance Measurement:**

**9.1 Performance Measurement**

The performance of the street lighting maintenance is measured and maintained against a set of Performance Indicators. (PI's). Information is held in the Council's Covalent system.

**9.2 Performance Indicators: National**

Those SPIs that are relevant to the street lighting asset are:

	<b>2005/06</b>	<b>2006/07</b>	<b>2007/08</b>	<b>2008/09</b>	<b>2009/10</b>	<b>2010/11</b>
Performance Indicator						
Total number of street light repairs to be completed	4143	3997	2312	2799	3503	3523
Number of street light repairs completed within 7 days	4023	3890	2084	2678	3162	3253
Percentage of all street light repairs completed within 7 days	97.1%	97.32%	90.1%	95.68%	90.3%	91.83%
Total number of street lighting columns	16245	16505	16679	16746	16833	16962
Number of street lighting columns over 30 years old	2337	2363	2432	2663	2817	2915
Proportion of street lighting columns over 30 years old	14.39%	14.32%	14.58%	15.90%	16.73%	17.08%

The performance indicators are reported to the Council's Audit & Performance Committee on a quarterly basis.

**10 Future Strategies**

- Continually seeking means of ensuring street lighting is reliable, energy efficient and cost effective.
- Continuing to increase focus on energy reduction strategies such as increased use of more efficient, lower wattage white lights and the specification of electronic control gear. Trialling dimming systems and LED lighting solutions, these to be assessed for inclusion in future strategies.



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**11 Service Improvement Actions**

<b>Improvement Actions – Street Lighting</b>			
<b>No.</b>	<b>Action</b>	<b>Proposed Implementation date</b>	<b>Responsibility</b>
<a href="#"><u>IA1</u></a>	Formalise the RCC adoption process.	Take forward (as other assets)	Transportation
<a href="#"><u>IA2</u></a>	Formalise the prioritisation process for column replacement.	Take forward in line with national RAMP development.	?