

## PLYMOUTH CITY COUNCIL

**Subject:** Award of Contract for the Provision of Low Energy Street Lighting  
Luminaires

**Committee:** Cabinet

**Date:** 29 April 2014

**Cabinet Member:** Councillor Coker

**CMT Member:** Anthony Payne (Strategic Director for Place)

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**Ref:** IRE/LESLP

**Key Decision:** Yes

**Part:** I

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### **Purpose of the report:**

On 12<sup>th</sup> February 2013, the Directors for Place and Corporate Services submitted a written report to Cabinet seeking approval for a £13.25 million capital investment as part of an energy and carbon saving programme. Included within this programme was a proposal to replace the authority's existing high pressure sodium street lamps with the more energy efficient light emitting diode (LED) luminaires.

Cabinet approved the proposals, which included the procurement of the new streetlighting luminaires, and the capital investment for the energy and carbon saving programme. The scope of the project includes all street lights on the highway and council owned land including parks and open spaces, a total of 28,857 street lighting luminaires.

This report details the outcome of the procurement process for the supply of low energy street lighting luminaires, and recommends the appointment of the successful tenderer to supply the new street lighting luminaires.

A separate private report is also submitted to the meeting containing commercially sensitive information.

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### **The Brilliant Co-operative Council Corporate Plan 2013/14 -2016/17:**

#### Pioneering Plymouth

The replacement of the city's existing street lighting luminaires represents a significant step in reducing the city's carbon footprint and leading in environmental and social responsibility.

#### Growing Plymouth

Providing a well-maintained street lighting asset signifies community investment and pride in the area whilst also playing a part in regeneration, by helping to revitalise the city's streetscape.

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**Implications for Medium Term Financial Plan and Resource Implications:  
Including finance, human, IT and land:**

The cost of purchasing and installing the new luminaries is £7.99m, funded from borrowing. Repayments will be met from the savings achieved within the Street Lighting revenue budget.

Using the data from the procurement exercise, the new low energy luminaires will provide a significant energy saving equating to an estimated £1.089m per annum (based on 2013/14 energy rates and current budget levels). In addition, further savings of approximately £0.108m are anticipated from reduced street lighting maintenance.

These savings are offset by the borrowing repayments of £0.845m per annum, where repayments have been aligned to the guaranteed life of the luminaries (12 years).

The net total saving for the first full year of operation is therefore estimated to be £0.352m against current budgeted levels. These savings will be utilised as part of the Place budget action plan, offsetting identified pressures.

The projected savings arising from the project represent a combination of both “cashable” reductions against existing budgets (above) and avoidance of current and future cost pressures. Taking into account predicted price increases, the estimated Net Present Value of this project is £10.3m over 12 years.

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**Other Implications: e.g. Child Poverty, Community Safety, Health and Safety and Risk Management:****Community Safety**

The majority of Plymouth’s existing street lights use high pressure sodium lamps (SON/T). Such lamps have been the first choice in street lighting for many years as they provide high levels of light in relation to the energy used. SON/T lamps have a low colour rendering which accounts for the distinctive yellow glow they produce.

The whiter coloured light from LED lighting has been shown to improve visibility for drivers, who are better able to detect roadside movement faster and at a greater distance. Consequently, it is hoped that night time road safety will be improved. Additionally, it has been found to be easier to distinguish objects, colour and people (particularly facial recognition) thus helping to reduce anxiety levels at night. As a result, it is anticipated that many people will feel safer where white light is used.

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**Equality and Diversity:**

Has an Equality Impact Assessment been undertaken? Yes

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**Recommendations and Reasons for recommended action:**

It is recommended that the contract for the provision of low energy street lighting luminaires is awarded to the most economically advantageous tenderer for each lot:

- Lot 1 Residential Luminaires
- Lot 2 Residential Decorative Luminaires
- Lot 3 Main Road Luminaires
- Lot 4 Main Road decorative Luminaires
- Lot 5 Area and Zebra Crossing Floodlights

Reason:

By installing the new low energy street lighting, the Authority will realise an estimated net revenue saving of £0.352m per annum. Furthermore, it is hoped that additional social benefits will be realised in terms of road safety and reducing the fear of crime.

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**Alternative options considered and rejected:**

Three options were considered:

OPTION ONE – do nothing, i.e. continued reliance on existing lighting technology.

By continuing to rely on existing street lighting technology, the Authority would forego net revenue saving of £0.352m per annum. In addition there would be no reputational benefit, no carbon reduction and less protection against ever increasing energy costs.

OPTION TWO – take other energy savings measures on the streetlighting

This option allowed for the installation of energy saving equipment in to the existing street lighting luminaires. This included dimming equipment and photoelectric cells with rationalised switching ratios. Whilst this option provided for reasonable energy savings, they were significantly lower than those provided for with LED equipment. Furthermore, as this option called for existing luminaires to be used, there would be a continued reliance on aging equipment. Furthermore, this option would not have had the benefits that the Authority would otherwise expect to gain from white light.

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**Published work / information:****Background papers:**

Title	Part I	Part II	Exemption Paragraph Number						
			1	2	3	4	5	6	7
Equality Impact Assessment	x								

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**Sign off:**

Fin	TC1415 003.24.04. 14	Leg	SC/20 087	Mon Off	20129/ DVS	HR		Assets		IT		Strat Proc	NA/SPU/357/ CP/0414
Originating SMT Member													
Has the Cabinet Member(s) agreed the content of the report? Yes / No													

## 1 Introduction

1.1 This report provides additional background and detail to the Low Energy Street Lighting project, which aims to replace nearly 29,000 of the city's existing street lights with the more energy efficient LED technology.

## 2 Background

2.1 On 12<sup>th</sup> February 2013, the Directors for Place and Corporate Services submitted a report to Cabinet seeking approval for a £13.25 million capital investment as part of an energy and carbon saving programme. This consisted of an £11.58m proposal to replace the authority's existing high pressure sodium street lamps with light emitting diode (LED) luminaires with the remainder allocated to Solar PV and Boiler replacement programmes.

2.2 Cabinet approved the proposals, which included both procurement of the new street lighting luminaires and the capital investment for the energy and carbon saving programme.

2.3 In addition to the energy and carbon savings, it is also anticipated that the low energy street lighting will provide the following social benefits arising from the 'white light' produced by the new luminaires:

- White light allows a wider spectrum of colours to be seen and facial features to be distinguished. As a result, it is anticipated that the new street lights will make people feel safer.
- White light has been shown to improve visibility for drivers, who are better able to detect roadside movement faster and at a greater distance, thus improving road safety.
- The street lights direct light downwards reducing light pollution into people's houses. It is hoped that light pollution can be reduced across the whole city.

2.4 Recognising the need to engage collaboratively with customers as 'community developers' in line with the Council's Framework for Co-operative Commissioning, a trial of approximately 100 LED street lights was undertaken across fourteen residential roads in West Park, Plymouth in February 2013. This helped to inform the proposed wider roll-out of the new technology.

2.5 Approximately three weeks after the installation of the new lights a feedback questionnaire was sent out to residents living in close proximity to the trial. Of the 702 properties surveyed, 233 provided feedback (33%), 230 by post, and 3 on-line. The responses are summarised in the following tables:

Response		Prefer new lights	Prefer new lamp colour	Feel safer (Crime)	Feel safer (Road Safety)	Further investment worthwhile
Strongly Agree	Positive	45%	44%	31%	30%	45%
Agree		24%	28%	27%	31%	28%
Not Sure	Neutral	11%	9%	17%	15%	9%
Disagree	Negative	6%	6%	12%	11%	6%
Strongly Disagree		13%	12%	12%	12%	12%

Response	Brightness level
Too Bright	8%
Just Right	66%
Not Bright Enough	26%

2.6 The average percentage for positive feedback across all statements (excluding brightness level) was 67%, whilst the average percentage for negative feedback across all statements (excluding brightness) was 20%. 66% of residents considered the level of brightness to be just right, whilst 8% felt the level was too bright.

2.7 With the above in mind, procurement of the luminaires began with the issue of the OJEU notice on 23<sup>rd</sup> October 2013. Thirty Pre-Qualification Questionnaires were received, of which five bidders were invited to tender. The outcome of the procurement is detailed in the Contract Award Report accompanying this paper.

### 3 Financial Model

3.1 The business case financial model for the project was predicated on an initial capital investment of £11.6m, funded by prudential borrowing, to deliver an estimated energy and maintenance cost saving/cost avoidance of £28m over 20 years. The financial model made numerous assumptions in respect of:

- energy unit rate increase over the 20 year period
- energy savings (Kilowatt Hours or KWH) provided by the new luminaires
- cost saving in maintenance
- cost of the new luminaires
- cost of the loan repayments over the 20 year period

3.2 The procurement has now given greater certainty in respect of the energy savings provided by the new luminaires, the potential cost saving in maintenance, and the cost of the new luminaires, thus enabling a more accurate assessment to be made of the overall cost of the project and the projected savings/cost avoidance over the life of the loan.

3.3 Based on the tendered prices, the estimated total cost of the project is £7.99m, which includes the costs of purchase, installation and project management. Also included is a 5% contingency for known risks, i.e. concrete street lighting columns which will need to be replaced prior to the installation of the new lighting, and a further 5% contingency to allow for the adaptation of certain designs of existing street lighting columns/provision of fittings to enable the new lighting units to be mounted.

3.4 The project costs also allow for the supply and installation of an iconic piece of illuminated public art, a 'solar tree', as a statement of the Council's intent in respect of its sustainable energy agenda and as a showpiece for the Low Energy Street Lighting Project. The location of the solar tree will need to be identified.

- 3.5 Using the data from the procurement exercise, the new low energy luminaires will provide a total estimated energy saving of 12,094 mega-watt hours per year. This equates to an energy saving of £1.089m based on current budgeted levels. The total avoided energy costs are estimated to be £1.263m per annum, the difference reflecting an estimated £0.174 pressure against future budgeted levels.
- 3.6 Given the level of prudential borrowing needed to fund the project is significantly lower than that estimated in the original business case, and that the energy differential is larger, the loan repayment period has been reduced to 12 years. This is in line with the guaranteed life of the Luminaires offered by the successful bidder.
- 3.7 Throughout the lifetime of the loan, it is estimated that the initial investment of £7.99m will deliver a net present value (NPV) of £10.3m. As the new luminaires are less prone to failures and will not require cyclical proactive lamp changing, this figure includes savings of £0.108m per annum projected from reduced street lighting maintenance over the same period.

#### **4 Additional Energy Saving Equipment**

- 4.1 In order to maximise energy savings, the tender specification required tenderers to provide for new photo electric cells (PECs) and automatic dimming equipment.
- 4.2 PECs are light operated switches. They switch street lights 'on' when the light level falls beneath a given value (usually at dusk), and switches them 'off' when it rises above another level (usually at dawn). The ratio between the two light levels is known as the switching ratio.
- 4.3 In Plymouth the switching ratio is typically set to 70:35. Guidance from the Institution of Lighting Engineers (ILE) estimates that if the switching levels were reduced to 35:18 a saving of 50 hours per lamp per annum could be achieved (approximately 1-2% energy saving). This reduction in operational hours of the lamp also reduces the chances of premature failure towards the end of a street light's life.
- 4.4 In simple terms, this means that the street lights will be on for less time each day, although the difference will be imperceptible. The reduction in energy through the use of the new PECs has been factored into the overall energy saving cited in section 3.5, above.
- 4.5 Dimming technology is available to reduce light output at different times of the night offering additional energy savings. The installation of automatic dimming equipment in the new luminaires will enable lighting levels to be gradually reduced to a pre-defined minimum at the dead of night and to increase towards dawn as streets become busier. Automatic dimming has been included only in the main road street lighting, as this provides for the greatest cost/benefit. Automatic dimming will not be used in residential street lights as it is not cost effective, i.e. the energy savings available are significantly reduced when the cost of the additional equipment is factored in.
- 4.6 The reduction in energy through the use of automatic dimming has not been factored into the overall energy saving cited in section 3.5, above, as the dimming profile, which dictates the additional energy saving, will need to be agreed with the successful tenderer after the award of contract.

#### **5 Project Implementation**

- 5.1 Subject to approval of the award of contract, and agreement with the successful supplier, the proposed starting date for the installation of the new luminaires is the 4<sup>th</sup> August 2014.

- 5.2 Installation will be undertaken by Plymouth City Council's street lighting contractor, Cartledge Ltd, over a period of eighteen months, a programme reflecting the agreed procured service approved by Cabinet on 10<sup>th</sup> December 2013. A detailed installation programme will be agreed between Plymouth City Council, Cartledge Ltd and the successful supplier following the award of contract, however, it is envisaged that the new luminaires will be installed on an area by area basis.

## **6 Equality Impact Assessment – Key Findings**

- 6.1 LED luminaires tend to give a more focussed cone of light than existing street lights. This may cause personal security concerns for some elderly residents as there may be darker areas between lighting columns, and less light overspill into private gardens. However, it is expected that, in general, greater security will be perceived by most people and that the whiter light should make it easier to recognise colours and objects, particularly for people with a visual impairment.
- 6.3 Officers will liaise with potentially affected groups, e.g. through NHS, Plymouth Guild, Thomas Pocklington Trust, throughout the rollout to monitor the effects of the new lighting. There will also be an ongoing liaison with the Devon and Cornwall Constabulary to monitor records of security incidents during hours of darkness.
- 6.4 It has been suggested that the higher content of blue in white LED lighting can have adverse effects on health, through the suppression of melatonin during hours of darkness.
- 6.5 However, studies have shown that this effect is produced by prolonged and intense exposure in an indoor environment. It has also been shown that melatonin suppression peaks at a colour temperature of 6500K and can also increase below 3000K; the specified colour temperature for the proposed lighting is 3500K-4500K, well outside the high-risk range.
- 6.6 No adverse impact on human rights has been identified.