TRAFFORD COUNCIL

Report to:	**Executive 18th November 2013** **Council 22nd January 2014**
Report for:	**Decision**
Report of:	**Executive Member for Highways & Environment and the Corporate Director of Environment, Transport & Operations**

Report Title

Investment in Street Lighting

Summary

The Council's current revenue budget for street lighting is approximately £2.0m. This comprises £1.2m in energy consumption and £0.84m in maintenance.

A range of options have been explored with regard to how to manage the street lighting asset in the future and the proposal being put to the Executive offers the best way forward for future street lighting provision.

The proposal is to convert existing SOX/SON luminaires to LED over a two year period and also includes the transfer of the maintenance of all street lighting to a third party contractor.

It is also proposed to include a central management system, which will allow individual lights to be controlled, including the ability to dim.

It is forecast that the investment to convert to LED luminaires over a two year period coupled with a central management system and transfer of maintenance to a third party contractor will save the Council a minimum of between £7.0m and £9.0m over 20 years and will result in savings in the revenue budget of between £0.8m and £1.2m over the first four years.

Recommendation(s)

1. The Executive recommends the Council agrees
   a. that additional borrowing be approved, subject to a full procurement exercise in the sum stated in the report;
   b. the changes to the prudential indicators as detailed in the report.

2 Subject to the Council approving the recommendations above, the Executive approves the procurement of a contract to replace the existing SOX/SON luminaires with LED luminaires and other matters as detailed in the report. Following the procurement exercise a further report will be submitted to the Executive detailing the outcome of the procurement

exercise and to seek approval for the award of the contract.

Contact person for access to background papers and further information:

Peter Molyneux – Corporate Director of Environment, Transport and Operations (Extn 1555) and Ian Duncan – Director of Finance (Extn (4884)

Background Papers: None

Relationship to Policy Framework/Corporate Priorities	Low Council Tax and Value For Money
Financial	Capital Expenditure of £9.3m to be financed by borrowing. The scheme will achieve savings in energy and running costs sufficient to repay the borrowing costs and provide for additional savings to the revenue budget.
Legal Implications:	It will be necessary to enter into a legal agreement with the preferred partner.
Equality/Diversity Implications	None as a result of this report
Sustainability Implications	Significant reduction in carbon, energy and maintenance costs
Staffing/E-Government/Asset Management Implications	There is a potential impact on staff working in this area. If any work is transferred to a third party contractor, should it be deemed that there is a relevant transfer of an entity, then the Council will ensure that due process is followed in order to protect employment under the provisions of TUPE. We may need to provide supplementary resources for the tender process and review our existing structure.
Risk Management Implications	None as a result of this report. Should the procurement process not give the return on investment, or energy savings and technical equipment guarantees then the contract will not be awarded
Health and Safety Implications	Replacement lighting will protect communities and will increase the safety of pedestrians and road users

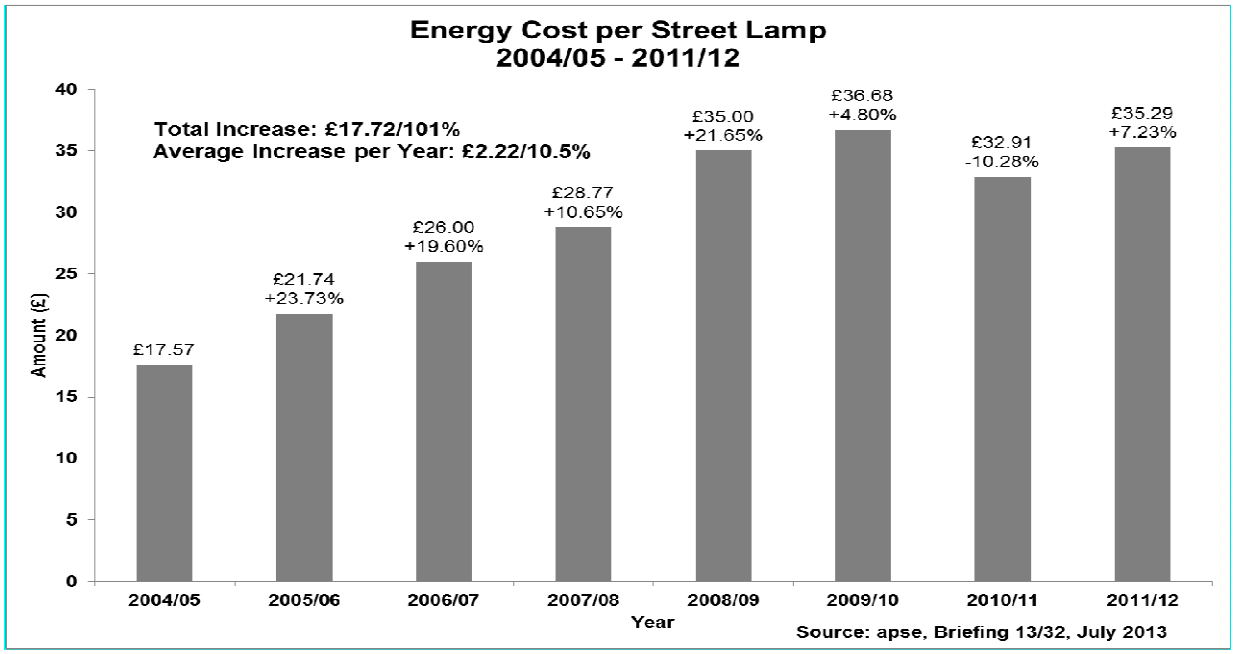
Background

1. The Council is responsible for the maintenance of 806km of highway infrastructure, including the provision of street lighting. At present, the stock is of mixed age, condition and specification and consists of approximately 27,127 luminaires, the majority of which are mounted on steel columns, but also includes approximately 1,000 cast iron, 4,030 concrete and 510 concrete sleeved columns. The lighting units are predominantly SON (High Pressure Sodium) or SOX (Low Pressure Sodium). SOX is a lighting source which is no longer promoted by the lighting industry, due to

the energy and cost required to maintain the lamps. Both of these have substantially higher energy usage than LED technology.

2. As further development takes place in the Borough there will be a corresponding increase in the number of street lighting columns that will need maintaining and in the energy costs and maintenance pressures on the Council's revenue budgets.

3. A substantial element of expenditure on street lighting is energy costs which have doubled in price since 2004/05 and are expected to continue to increase in future years. Recently confirmed prices for 2013/14 show a further 11% increase on the baseline numbers used in this report.

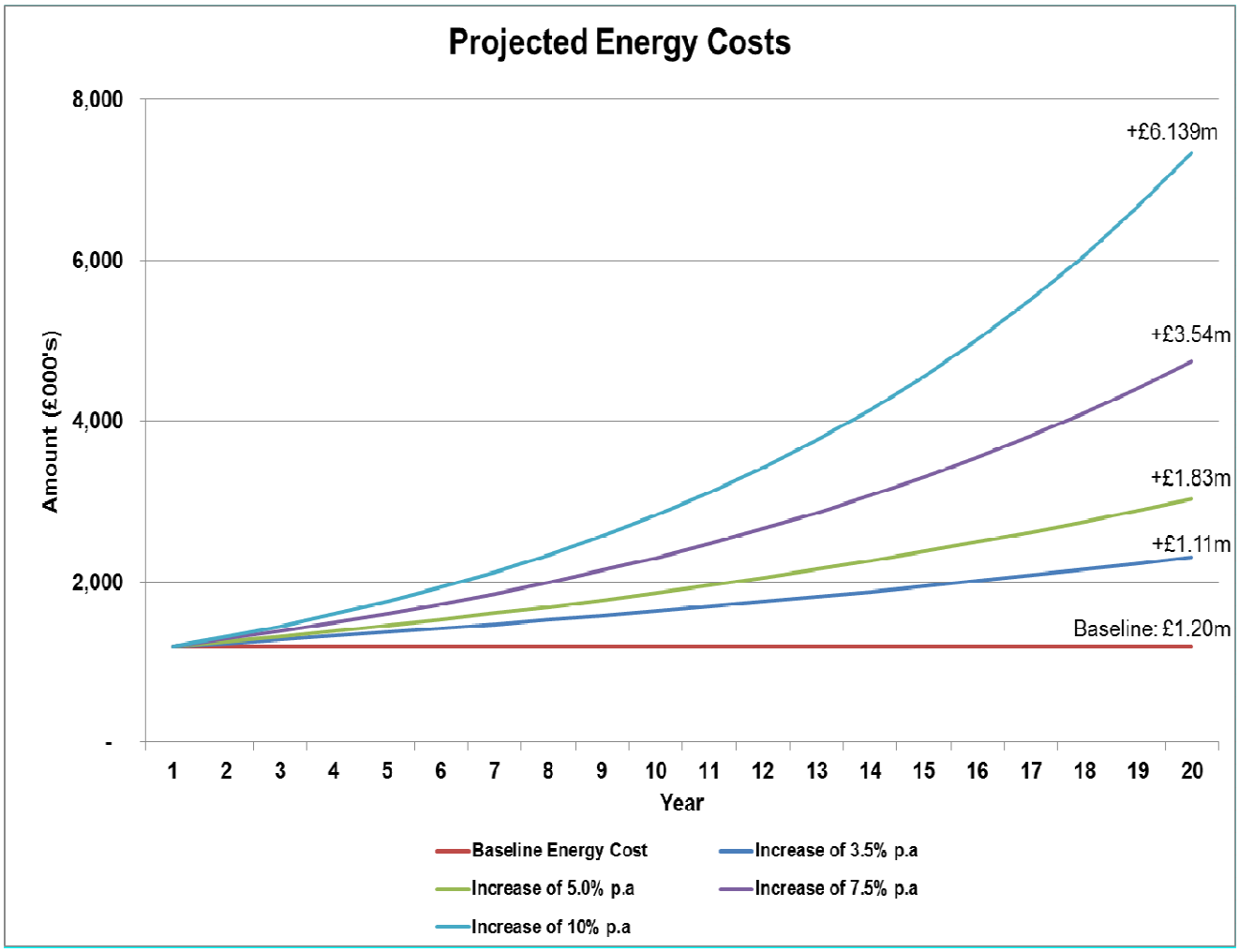


4. In 2012/13 revenue expenditure on street lighting was approximately £2.0m and is broken down below:-

- £838k Maintenance Spend (£745k Variable, £93k Fixed)
- £1,200k Energy costs;

These figures exclude any Carbon Reduction Commitment (CRC) tax and it is expected that the Council will fall below the qualification criteria in 2014. In addition a further £300k/yr is typically made available in the capital programme of which approximately £100k is luminaire renewal cost and £200k is column replacement.

The following chart provides an indication of the projected impact of rising energy costs over a 20 year period, for example a 5% annual increase will cost an additional £1.83m a year by year 20. A 10% annual increase will cost an additional £6.14m by year 20. It is clear from the chart below that the 'do nothing' option is not viable given the increase in energy costs against reducing revenue budgets.



5. Trafford has a commitment towards contributing to a Greater Manchester target of 48% reduction in carbon emissions by 2020. The street lighting service constitutes approximately 75% of the Council's electricity bill and contributes approximately 60% of Trafford's CO_2 emissions, excluding schools. If the proposal to introduce LEDs is agreed then it would reduce Trafford's CO_2 emissions, excluding schools by up to 40%.

6. The Council's energy reduction assumptions are based on the energy usage identified by Elexon for LEDs compared to the existing luminaires. Elexon are the independent body that assesses the energy usage of each type of luminaire used across the country. All energy suppliers use these figures to determine the cost of energy consumed per luminaire.

Options Considered

7. As part of the consideration of how to reduce our street lighting costs the Chief Executive, Director of Environment Transport and Operations, and Director of Finance met with Amey, one of the leading specialists in this area, to seek their advice on our options about how this might be best achieved. It is not unusual for councils when exploring new options for the delivery of savings, or new ways of working to have informal discussions with private sector colleagues. All the information shared with Amey was publicly available and will be shared with any future bidders for this initiative as part of the tender process e.g. financial information, street lighting stock

details etc. Following these initial discussions there has been no further communication with Amey on this matter. Therefore this does not compromise any procurement rules or prevent Amey from bidding in any future tender process if it is agreed to proceed.

8. In addition detailed research has been undertaken to identify alternative approaches being undertaken by other local authorities across the country. A number of options have been considered and in evaluating them consideration has been given to the capital cost of each option and the estimated consumption and maintenance savings each option would provide. The options included:-

    - Do Nothing
    - Retain existing luminaires and introduce a Central Management System (CMS) where possible (not all light sources will facilitate dimming lighting technology)
    - LED retrofit of SOX luminaires
    - Retain existing luminaires and update all control gear to allow lights to be turned off at a pre-determined time
    - Introduction of dimming of all SON luminaires
    - Replace all SOX luminaires with LED luminaires
    - Replacement of all SOX/SON luminaires with LED luminaires
    - Replacement of all SOX/SON luminaires with LED luminaires utilising a CMS

9. Some local authorities are looking at the option of a CMS only. However this is dependent upon their current luminaire type and the technology incorporated into the unit. If the lighting stock is of varied design age and mixed light sources, as in the case of Trafford Council where 95% of lanterns are not suitable, then a CMS system alone would not deliver a comprehensive and viable dimming lighting regime and for this reason no further evaluation of this option was undertaken.

10. A small number of authorities are trialling a SOX luminaire retrofit with LED solution, but this is not applicable in Trafford due to the age and condition of the SOX luminaire stock. For this reason no further evaluation of this option was undertaken.

11. The option to replace the control gear would allow for the luminaires to be switched off at a pre-determined time was also considered as this would generate a saving in energy costs for a lower level of capital investment than with the LED options. This is not a viable option at present as it is not likely to be acceptable to the public. Also it will not return the overall benefits that LED technology provides as life-cycle costs are higher due to the requirement for on-going lamp changes and the outage detection service limiting the scope for maintenance savings.

12. Cardiff Council is currently considering dimming approximately 50% of their stock by changing the ballasts in their existing SON luminaires. Dependent on the dimming regime this option would have the benefit of a reduction in energy consumption of approximately 30% based on a ‘midnight to dawn’ dimming regime for a relatively low capital outlay. Trafford has approximately 17,000 SON luminaires, but the majority (approximately 80%) of them are over 15 years old and as a result this option would not generate any significant maintenance savings as luminaires are likely to require replacement over the next 5 years.

13. A further option is to replace only SOX luminaires with LED luminaires and this is currently being undertaken in Bury. A replacement programme of all SOX luminaires would provide significant energy and maintenance savings, but these would only apply to approximately a third of the lighting stock and therefore not generate the level of savings that a whole scale LED replacement would generate.

14. The energy consumption and maintenance savings that can be realised using LED technology to replace all SOX and SON luminaires will allow the best net savings to be made on the revenue budget compared to the current position. For this reason LED programmes are currently being considered across AGMA, including Manchester, Bolton, Bury, Stockport, Tameside and Wigan. Wigan Council, for the last two years has made it a policy to specify only LED luminaires on all new lighting installations, and luminaire replacement as part of its maintenance activity. Salford is already underway with an LED replacement programme.

15. A further option is to combine the LED technology with a CMS, which under conditions where energy price inflation prevails and coupled with a dimming regime can provide the best value for money. The detailed financial implications of the options are shown in paragraph 35 and Appendix 3.

Proposal

16. The recommended approach is to replace the existing SOX/SON luminaires with LED luminaires coupled with a CMS system. The benefits of this option are listed in Paragraph 22. A two phased approach has been evaluated and concluded to derive the most benefit to deliver sustainable financial savings.

17. As part of the contract negotiations outputs and outcomes will be agreed with the preferred partner. This, together with the dimming regime, will form part of a new street lighting policy to be approved by the Council as part of the award of contract. The outcome will result in a considered and consistently applied street lighting policy for the Council to adopt.

18. The first phase of the contract will be for a third party contractor to replace the existing SOX/SON luminaires with LED luminaires over a two year period. A CMS system will be installed at the same time as the luminaire replacement. The second phase of the project will be for a third party contractor to maintain the street lighting network for a further 18 years at reduced cost than currently forecast. It is not proposed to include the maintenance of illuminated and non-illuminated signs as part of this proposal. The longer term aim would be to de-illuminate these signs to further reduce our energy costs, as part of a programme of de-clutter of signs on our roads, in line with Department for Transport advice.

Health Impacts

19. A further point for consideration is that some commentators think that there is a risk to health from LED lighting. The Council has consulted with the Director of Public Health and commissioned an independent health impact assessment by Dr Salim Vohra, Director, Institute of Occupational Medicine. An executive summary is included at

Appendix 1. This study concluded that ”the proposed LED Street Lighting Programme has overall no (neutral) or a minor positive health and wellbeing impact for the residents, workers and visitors of Trafford compared to the existing type of street lights being used.” A full copy of the health impact assessment is available upon request.

Scrutiny

20. The proposals have been the subject of a review by the Scrutiny Committee on 9 July 2013 who considered the proposals detailed above. A favourable response was received and this is included at Appendix 2. This updated report has also been shared with the Chairman of Scrutiny Committee (Topic Group B) who has been invited to submit any additional comments.

Independent assessment

21. The Council has also commissioned an independent assessment by Wilde Consulting Engineers (see Appendix 6) of the options considered in this report and the financial appraisals. This study concluded that ‘Trafford Council has carried out a balanced economic and financial assessment of the proposal to convert existing SOX/SON luminaires to LED units. The option of transferring the maintenance of all street lighting to a private sector operator has also been investigated. Based on the data provided by Trafford Council we confirm that due diligence has been carried out. The Council has developed a robust business case to convert to LED luminaires over a two year period coupled with a central management system and the transfer of maintenance to a private sector operator, to potentially save the Council between £7.0m and £9.0m over 20 years.’

Benefits

22. The benefits derived from this proposal include:

- Improving existing service standards whilst delivering long term budget savings;
- Replacing energy inefficient light sources;
- Approximately 61% - 70% reduction in energy consumption (56% without a CMS);
- A reduction in customer complaints due to lanterns not working (outages);
- Reduced maintenance regime due to remote monitoring of CMS (removing the need for night time inspections) and improved reliability and performance of LED luminaires;
- Significant contribution to reducing the Council’s carbon reduction targets;
- A 20+ year guarantee on LED luminaires, drivers, energy consumption savings and central management system;
- Environmental benefits through reduction in obtrusive and upward light;
- Enabling individual lights to be controlled centrally to respond to service and user needs and future budget pressures;
- Effective risk management to protect communities from safety issues associated with aged stock;
- The opportunity to retrofit LED technology to heritage areas, taking into account any conservation area implications

Dimming Regime

23. With the installation of a CMS it will be possible to dim lighting levels. Consultation has been undertaken with Greater Manchester Police who are supportive of the proposals and they will be an active partner in the development of the dimming policy. If there is intelligence or other operational reasons for a temporary amendment to the approved regime to prevent criminal activity or reduce a security risk, the Council will use the central management system to adjust the dimming of the relevant LEDs. One approach is for dimming to be implemented at the following times in the winter, which would achieve an additional 5% reduction in energy costs, i.e. approximately 61% in total:

Area	Full output -100%	25% light reduction
Residential	Dusk till midnight	Midnight till dawn
Traffic	Dusk till 20:00	20:00 till dawn

24. Clearly there are other options to improve on energy costs. The following is expected to achieve a further 9% reduction in costs, i.e. approximately 70% in total:

Area	Full output -100%	30% light reduction	50% light reduction
Residential	Dusk till 20:00	20:00 till midnight	Midnight till dawn
Traffic	Dusk till 20:00	20:00 till midnight	Midnight till dawn

25. The CMS also would give the option to the Council to act in a flexible way depending on the unpredictable movement of future energy costs.

Street Lighting Columns

26. Currently the Council typically spends £300k each year from the capital programme for the replacement of lighting columns and luminaires. If the LEDs are installed there will be no need to replace the luminaires for approximately 20 years, as part of the tender process the Council would require a guarantee from any successful bidder, which would allow all of the capital funding to be used for column replacement only.

27. Whilst the replacement of street lighting columns are a risk that the Council carries now it is prudent to include a sum within the appraisal to cover an accelerated programme of column replacements in the event some existing columns are not compatible with LED luminaires. Although it is not anticipated that there will be a need to carry out a significant column replacement programme, as a direct consequence of LED replacement, an allowance for 5% of columns to be replaced has been included at an estimated cost of £1.3m. Additional sample column condition surveys are currently being undertaken to identify the likelihood of further column replacement.

28. With regard to the issue of street lighting column replacement in Conservation Areas, Conservation Area Management Plans are currently being prepared and column replacement in conservation areas will be incorporated into an agreed street lighting policy.

Information Requirements

29. If the Council proceeds with this initiative it would be required to provide the following information to tenderers:

- Up to date inventory and energy consumption;
- A specification or performance to bid against (e.g. based on an equivalent white light LED solution for each light source);
- Dimming and switching regimes;
- List of columns in conservation areas and other environmentally sensitive areas. These may require separate treatment consideration (subject to the outcome of the forthcoming Conservation Area Management Plans consultation;
- List of non-standard columns/luminaires which must remain and cannot readily be upgraded to accommodate LED technology.
- Plans / strategy to replace columns during the works
- Depot – will space be available in our depot or will the partner need to find their own;
- Details of any group of workers who would be eligible to transfer under the provisions of TUPE.

30. If any work is transferred to a third party contractor, there is a potential impact on staff working in this area. Should it be deemed that there is a relevant transfer of an entity, then the Council will ensure that due process is followed in order to protect employment under the provisions of TUPE. The Council may need to provide supplementary resources for the tender process and review our existing structure.

Financial Evaluation

31. A number of options have been considered for delivering financial savings and these have been detailed in the report. A number of these were shortlisted for financial appraisal and Appendix 3 summarises these options. The options that deliver the greatest level of net savings to the Council which are to replace luminaires with:-

- LED technology only
- LED technology with a Central Management System(CMS)

32. **LED Technology** - It is estimated that it would cost £6.6m to convert all the SOX/SON street lights to LED, over a two year period. To pay for this level of investment would require the Council to undertake borrowing or for a third party to finance the investment and 'lease back' to the Council over a 15-20 year period. Given that the Council has access to very competitive borrowing rates this financial assessment is based on the Council carrying out prudential borrowing. Energy consumption savings

are estimated at 56% together with savings of 44% in annual maintenance costs, specifically bulk lamp change and luminaire replacement.

33. **LED Technology with CMS** - As mentioned a further option is to invest in a central management system which would allow individual lights to be dimmed. Depending on the dimming regime adopted then energy costs can reduce by a further 5-14% This would also reduce the need for a night scouting team as we would have real time information on outages. The additional capital cost of this enhancement is estimated at £1.4m.

34. It is expected that energy prices will be subjected to increases above the prevailing rate of inflation over the medium to long term. The increase for 2013/14 recently confirmed is 11%. The CMS flexibility provides a much more sophisticated range of switching options than a simple on or off and would provide the best overall return under the level 2 dimming regime, estimated to achieve an overall energy saving of 70%.

35. Both options have also been compared using differing assumptions on energy price inflation and this shows the option with the CMS functionality to have the best net present value (NPV) of the net savings under inflationary conditions.

NPV's (20 Yrs) and Payback		Inflation Level			
Energy price increases		0%	+5%	+7.5%	+10%
LED Only	**NPV`**	£6.702m	£13.987m	£19.982m	£28.487m
	Payback (Yrs)	8.9	7.7	7.2	6.8
LED and CMS (Energy Saving 61%)	**NPV**	£5.908m	£13.842m	£20.373m	£29.638m
	Payback (Yrs)	10.0	8.4	7.8	7.3
LED and CMS (Energy Saving 70%)	**NPV**	£7.442m	£16.548m	£24.041m	£34.673m
	Payback (Yrs)	9.1	7.8	7.3	6.8

36. Bidders will be asked to guarantee the reduction in energy consumption. The following table shows a positive NPV, even if consumption reductions are not delivered at the rates referred to in Paragraph 32):-

Variation in Energy Consumption	LED Only (NPV)	LED and CMS (61% Energy Saving) (NPV)
-5%	£5.992m	£5.388m
-10%	£5.282m	£4.868m
-20%	£3.861m	£3.827m

37. One of the perceived problems with this type of investment is the requirement to make a significant outlay upfront, which will hit the revenue budget, before cashable returns flow in the form of reduced energy costs. It is understood that potential suppliers may be willing to delay invoicing until energy savings are made. This would provide some cash flow benefit but there are other considerations:

    a) it is likely that the Council would have to accrue expenditure in the accounts to reflect the amount of work undertaken but not billed. If this is an operational asset then provision would have to be made in the following year's budget for the repayment of debt (the minimum revenue provision);

    b) the supplier will factor into his prices the financing costs of delayed invoicing / payment.

38. The Council should be able to mitigate these risks in two ways. The first is to be explicit in the next energy procurement exercise what changes are being made and how these are to be reflected in the tender process. The second is that normal treasury management operations should be able to minimise interest costs associated with the initial investment with LED. This can be done by utilising cash balances or taking a short term loan, until a permanent financing solution is entered into at the time energy savings come on stream.

39. Effect on the Revenue Budget: Assuming funds are borrowed over a 20 year period the impact on the budget is estimated to be:

Saving on Budget:	56% energy saving	61% energy saving	70% energy saving
Year 1	£168k	£163k	£190k
Year 2	£308k	£258k	£339k
Year 3	£289k	£200k	£308k
Year 4	£309k	£224k	£332k

(See Appendix 4 for detail).

The figures above take no account of energy price increases and will be reassessed during the procurement phase when actual capital costs are known and taking into account current energy prices. Therefore savings are likely to be greater than illustrated. For example, since 2004/05 prices have doubled and are projected to increase in future years. Also at this stage the figures exclude any CRC cost and savings. The figures are also based on the Council borrowing funds from the Public Works Loan Board. Further avenues continue to be explored, for example the Green Investment Bank and other European funding sources.

Prudential Indicators

40. These indicators are used to demonstrate the affordability and sustainability of the Council's decisions on capital investment. In February the Council approved the latest set of indicators reflecting the decisions taken as part of the last budget round. The proposals in this report have an impact on these indicators and therefore the Council is required to approve the revisions detailed in Appendix 5.

Risks

41. Some of the risks for this type of contract would include:

- Perceived risk to health from LED lighting - all new lighting design and product selection will be carried out in line with the new British Standard (BS5489-1:2013) and CIE115:2010. These documents identify the importance of only lighting for the needs of the area following assessment. In addition a health impact assessment has been independently commissioned by the Director of Public Health in Trafford (See Appendix 1).

- Equipment Failure - the selection of equipment will be carried out in line with the recommendations regarding minimum standards of performance, longevity, environmental qualities, and energy efficiency published by the Institute Institution of Lighting Professionals (ILP) plus other relevant bodies. It is proposed that this risk would be the contractors.

- Future Proofing - where possible and practical, equipment will be selected on the basis of having the facility to be upgraded.

- Pollution - luminaires and other associated equipment will be selected in line with the capability to minimise the effect on the environment. Products must achieve the minimum standards of light pollution (minimising sky glow etc.), and be compliant under The Waste Electronic and Electrical Equipment Regulations 2006 (WEEE) directive)

- Public perception of new light source - communication strategy to be developed to inform residents, businesses, etc., ahead of the project.

- Energy prices – How quickly energy suppliers reflect LED installations in their billing systems (See Para 38)

- Changes to Carbon Reduction Commitment – benefit not included in current calculations as it is expected that the Council will fall below the qualification

criteria in 2014.

- Ability to sell redundant lamps – benefit not included in current calculations. This will form part of the detailed contract negotiations and any income generated will be used to offset the Council's borrowing costs

Procurement Considerations

42. There are only two available procurement routes if the Council is to pursue a fully managed service:-

a) Procure directly in our own right. This would require a full OJEU process as this is likely to be considered as a service. This option would be time consuming due to regulated timeframes and therefore, if savings are to be realised in the next financial year, this may not be the most appropriate solution;

b) Procure through the Government Procurement Services' Traffic Management Technology framework. As this is already OJEU compliant, there would only be a mini-competition required amongst the providers already guaranteed a place on the framework. We would propose a specification and ask these providers to bid against it. This solution is relatively quick as the Council can prescribe its own reasonable timeframes.

Other Options

Other options have been considered as outlined in the report and in Appendix 3. The option of LED luminaires combined with a central management solution provides the best solution in terms of carbon reduction, maintenance and energy saving.

Consultation

Appropriate consultation will be undertaken with stakeholders as the scheme develops.

There is a potential impact on staff working in this area. If any maintenance work is to be transferred to a private sector provider, should it be deemed that there is a relevant transfer of an entity, then the Council will ensure that due process is followed in order to protect employment under the provisions of TUPE. We may need to provide supplementary resources for the tender process and review our existing structure.

Reasons for Recommendation

This recommendation has been developed following a review of street lighting. The proposal for the replacement of luminaires and central management system provides the best value for money and will achieve in delivering annual MTFP savings.

This is a key decision for the Executive

Finance Officer Clearance *……GB……*
Legal Officer Clearance *……JL……*

CORPORATE DIRECTOR'S SIGNATURE (*electronic)*……. ……

Health Impact Assessment Executive Summary

Introduction

ES.1 This Health Impact Assessment has been commissioned by Trafford Council.

ES.2 The overall aim of this report is to provide a fair and balanced assessment of the potential and likely positive and negative health and wellbeing impacts of implementing LED street lighting given the emerging nature of the research in this area.

ES.3 HIA is a key systematic approach to predicting the magnitude and significance of the possible health and wellbeing impacts, both positive and negative, of new plans and projects.

ES.4 The aim of HIA is to support and add value to the decision-making process by providing a systematic analysis of the potential impacts as well as recommending options, where appropriate, for enhancing the positive impacts, mitigating the negative ones and reducing health inequalities/inequities.

Scientific evidence on the health effects of LED street lighting

ES.5 The evidence review undertaken for this HIA has found no evidence that that LED street lighting specifically has any additional health and wellbeing effects beyond that found for artificial lighting in general.

ES.6 The majority of reviews are cautious in making wide ranging recommendations (only one does so) and where they do they apply to the whole range of artificial lighting that people are exposed to and all call for more research in this area. This is because the current evidence is weak and mostly associated with animal, in vitro and ecological/cross-sectional studies (where accurate levels of exposure and cause and effect relationships are difficult to identify).

ES.7 The research reviews identified in this evidence review all agree that artificial lighting can have some negative health and wellbeing impacts depending on the intensity, duration, pattern and characteristics of the light exposure alongside levels and types of exposure in the hours beforehand. This includes indoor lighting, light emitting devices such as computers as well as outdoor lighting.

ES.8 The main difference between LED lighting and other forms of artificial lighting is that it can produce light that is more in the blue part of the light spectrum, i.e. producing a

more whiter bluer light than incandescent, fluorescent or outdoor sodium or metal halide lighting which can be much yellower and can be more intense (given the size and shape of LEDs and the way the lighting system is constructed with reflectors and lenses to focus the light). Exposure to light in the blue part of the spectrum particularly single blue colour (monochromatic blue) light can have a greater effect on the circadian rhythm.

Findings of this HIA

ES.9 The proposed LED street lighting programme has overall no (neutral) or a minor positive health and wellbeing impact for the residents, workers and visitors of Trafford compared to the existing type of street lights being used.

ES.10 Though there is some research that shows a relationship between exposure to artificial lighting and physical and mental health and wellbeing effects, the research evidence is weak, and these are not likely to occur because of the LED Street Lighting Programme because of the type and intensity of the light likely to be emitted and the low duration and intermittent pattern of exposure to almost all Trafford residents, workers and visitors.

Measures to minimise the potential negative and maximise the potential positive health and wellbeing impacts

<u>Procurement of the LED lighting systems and its management</u>

ES.11 Ensure where, within the limits of commercial viability, some future-proofing is written into the procurement contract, such that during the life of the LED lighting systems and its management there is scope for both operational and failed LED lights to be replaced with ones that better meet the changing requirements of local residents needs and the local authority so that environmental and health and safety benefits, within existing/future financial and economic constraints, are maximised over the life of the programme.

ES.12 Ensure that there are contingency technologies or other appropriate measures written into the procurement contract to deal with glare from the new lighting system coming into local residents' homes.

ES.13 Check with other councils, particularly those in the Greater Manchester area, to ensure that the best LED lighting system is procured from a combined environmental, health and economic standpoint.

<u>Design aspects of the LED lighting and technology</u>

ES.14 The following set of measures are based on a single USA study so it may not be directly applicable to the UK context but do address many of the issues raised in the evidence review about mitigating the negative impacts of artificial lighting and LED lighting. Where possible:

- Light colour (Correlated Colour Temperature) should be white, preferably 3,500 Kelvin, but with an adjustable range from 2,800 to 5,000 Kelvin.
- The Colour Rendering Index should be greater than 80.
- The fixtures should be down-firing.
- The LED light source should not be visible to drivers, bicyclists or pedestrians unless they are directly under the fixture.
- The preferred lighting pattern on the ground should be overlapping ovals.
- Basic controls to allow dimming from 6 footcandles (65 lux) to 1.5 footcandles (16 lux) and adjusting colour temperature between 2,800 and 3,500 Kelvin.

ES.15 Aim to make the LED lighting system poles in keeping with the wider architectural environment and streetscape in residential areas.

ES.16 Aim to use existing street light locations on streets and heights of lighting fixtures/ And avoid changing the spacing between street lights or moving the location nearer to the boundary of householders properties.

Construction phase

ES.17 Ensure that any construction or setting up of the LED lighting is communicated beforehand and undertaken in a manner that reduces any potential disruption to local residents both in terms of access and, more importantly, night-time illumination.

ES.18 Develop a communication plan involving the use of local newspaper and radio, door-to-door leaflets, residents' associations, local community/ voluntary/ charity groups, etc. to ensure local residents' are aware of the construction/setting up and where they can complain and get issues remedied.

ES.19 Develop a construction/setting up management plan ensuring that sub-contractors are appropriately briefed about what they are doing and why this is being done as well as be briefed on how to ensure that they minimise any disruption to local residents and what to do and who to contact if there is likely to be unanticipated disruption e.g. that street lights could not be switched on, etc. so that the local

authority can take remedial action and inform local people about why the street lights are not on or access is disrupted.

ES.20 Have a clear and communicated (within the council and to key local organisational stakeholders as well as local residents through a variety of media) complaints and grievance procedure with a telephone number, email address and postal address as well as a designated person within the council who will take responsibility and has the authority and power to deal with and resolve local residents' complaints and concerns in a timely manner. A designated council member of staff is important even if the lighting programme is the responsibility of a private sector third party.

Operation phase

ES.21 Ensure that there is a clear and communicated set of procedures and processes in place within the council to deal with glare into local residents' homes from the new lighting system.

ES.22 Ensure that glare, light spillage or any other lighting system issues that affect residents in their homes (including gardens) are resolved within 2 weeks.

ES.23 Where dimming is considered ensure that:

- Develop a set of criteria that determines which locations are not dimmed in consultation with local residents and key public and private stakeholders such as emergency services and local businesses.
- There is initial and on-going, regular two-way dialogue and discussion between residents, residents groups and the council.
- Monitor key crime, safety and road traffic incident statistics.
- Consider switching lights back to normal brightness if there are significant complaints from local residents and alternative options are not able to address residents' complaints.

Monitoring and evaluation of health impacts

ES.24 Develop a monitoring and evaluation programme to monitor and evaluate the health and wellbeing impacts of the LED street programme by using a mix of the following indicators:

- Residents' complaints/concerns about disruption to access or lack of street lighting
- Residents' complaints/concerns about glare or other health and wellbeing related concerns

- Pedestrian, cyclist and motor vehicle driver complaints/concerns about glare or other new lighting system issue
- Residents' representative sample telephone survey – 6 months and 1 year from date of operation
- Complaints/concerns/complaints expressed by other local stakeholders e.g. environmental groups, health groups, residents' associations, business groups, voluntary groups, charities, etc.
- Complaints/concerns expressed by other local stakeholders e.g. environmental groups, health groups, residents' associations, business groups, voluntary groups, charities, etc.
- New research findings on LED street lighting and health and wellbeing published in a scientifically and/or governmentally recognised peer-reviewed scientific journal and/or undertaken by a recognised and respected individual/team of scientists.

Conclusion

ES.25 Overall, the proposed LED Street Lighting Programme has overall no (neutral) or a minor positive health and wellbeing impact for the residents, workers and visitors of Trafford compared to the existing type of street lights being used.

ES.26 Though there is some research that shows a relationship between exposure to artificial lighting and physical and mental health and wellbeing effects, the research evidence is weak, and these are not likely to occur because of the LED Street Lighting Programme because of the type and intensity of the light likely to be emitted and the low duration and intermittent pattern of exposure to almost all Trafford residents, workers and visitors.

The measures described in the Chapter 10 if appropriately considered and incorporated are likely to ensure that the majority of the negative health and wellbeing impacts of the LED Street Lighting Programme are mitigated and the positive health and wellbeing benefits enhanced.

Appendix 2

Democratic Services

Trafford Town Hall
Talbot Road
Stretford
M32 0TH

Telephone: 0161 912 1229
Fax: 0161 912 1277
Email: Helen.mitchell@trafford.gov.uk
Minicom: 0161 912 2012
When phoning ask for: Helen Mitchell

Our ref:
Your ref:
Date: 15 July 2013

Dear Councillor Mitchell,

Topic Group B: Review of Investment in Streetlighting

I wish to take this opportunity to thank you and your officers for their attendance at a meeting of the above Topic Group on 9 July 2013.

The Topic Group welcomed the opportunity to explore the issues raised in the draft reports which related to a significant investment in LED streetlighting across the Borough. We felt that the overall approach to the investment as an 'invest to save' initiative had been carefully prepared and it is with this in mind that we support, in principle, the proposals which are to be considered by the Executive in September 2013. Members welcomed the approach to phasing in the new stock over a two year period and the savings which the Council would realise if the investment was agreed by the Executive.

In their concluding remarks, Members wished to request that the Executive Member review the investment at appropriate intervals to ensure that the lighting stock continued to deliver optimal performance bearing in mind wider technological innovations. Further comments were also made in relation to the exploration of the residual costs of the lanterns as soon as practicable and that given the scale and significance of the contract, work be undertaken across the organisation to ensure a robust and flexible contract was in place to meet both current and potential future streetlighting requirements. Furthermore, Members noted the robustness of the Health Impact Assessment and the Borough-wide approach to the application of LED streetlighting. The Topic Group suggested that the Executive Member may wish to progress a communications and engagement strategy which, amongst other issues, focussed on the cost savings which would be achieved by the Council once LED streetlighting was implemented.

Once again, I wish to thank you and your officers for enabling the Topic Group to consider this report prior to its consideration by the Executive. We welcome the consideration of this

‘invest to save’ initiative as a means of updating and improving the streetlighting stock and realising savings for the Council in the longer term.

Yours sincerely,

Councillor John Reilly
Chairman of Scrutiny Topic Group B

Cc Peter Molyneux
Aidan Flynn
Iain Veitch
Graeme Bentley
Cllr Cordingley
Cllr Ross
Cllr Bowker
Cllr Lloyd
Cllr Adshead

Appendix 3

Summary of Options Considered

Option	Financial Implications	Implications	Rank
Do Nothing	Existing running costs of £2m a year and rising	The current revenue cost of street lighting is approximately £2m a year and is expected to rise in future years. Elements of the stock are of a mature age and are likely to require replacement in the short/medium term. Alternative light sources provide scope to significantly reduce future running costs.	**5**
Retain existing luminaires and update all control gear to allow lights to be turned off at a pre-determined time	Estimated revenue savings (energy and maintenance) of £340k p.a Estimated capital cost £0.3m NPV over a 20 year period £4.8m	This option would deliver a reasonable level of energy savings dependent on the "turn-off" time. Based on lights being switched off for 3 hours per night it is estimated approximately 27% in energy savings could be achieved, saving £0.3m p.a, and a small level of maintenance savings of £40k a year due to extending the useful life of the luminaire. The scheme would involve the replacement of the control gear (photocell) on all lamps at an estimated cost of £12/unit and have a low overall capital cost of £0.3m.This is not a viable option at present and is not expected to be publically acceptable, nor does it return the overall benefits that LED technology provides and life-cycle costs are higher due to the requirement for on-going lamp changes and the outage detection service limiting the scope for maintenance savings.	**4**
Introduction of dimming of all SON luminaires	Estimated revenue savings (energy and maintenance) of £238k p.a Estimated capital cost £4.3m NPV over a 20 year period £0.5m Adverse	There are currently 16,890 SON luminaires and it is estimated that based on a midnight – dawn dimming regime (50% reduction) that a 27% energy saving could be achieved on these luminaires. The stock of SON lamps in Trafford is of mixed age, with approximately 80% over 15 years old. It is estimated that these luminaires would need replacement over the next five years. (An average unit cost of £220 a unit has been assumed) The capital cost of this option is based on £80 ballast replacement plus replacement of luminaires on 80% of the SON stock. An assumption has been made that 5% of the ballast units will require replacement over the 20 year period.	**6**

<table>
<tr>
<td>Replace all SOX luminaires with LED luminaires</td>
<td>Estimated revenue savings (energy and maintenance) of £263k p.a

Estimated capital cost £3.0m, incl a contingency of £0.4m for replacement of columns

NPV over a 20 year period £1.1m</td>
<td>There are currently 8,658 SOX luminaires and it is estimated that by converting these to LED would reduce the energy costs on these lights by 59%, or £158k a year. Maintenance cost savings would also be achieved due to the savings in luminaire and lamp replacement costs, estimated at £105k a year.</td>
<td>3</td>
</tr>
<tr>
<td>Replacement of all SOX/SON luminaires with LED luminaires</td>
<td>Estimated revenue savings (energy and maintenance) of £1m p.a

Estimated capital cost £7.9m, incl a contingency of £1.3m for replacement of columns

<table>
<tr><th>Inflation</th><th>NPV over 20 years</th></tr>
<tr><td>0%</td><td>£6.7m</td></tr>
<tr><td>5%</td><td>£14.0m</td></tr>
<tr><td>7.5%</td><td>£20.0m</td></tr>
<tr><td>10%</td><td>£28.5m</td></tr>
</table>
</td>
<td>A whole scale replacement of all SOX/SON luminaires with LED luminaires, supported with a 20 year warranty, would generate a greater level of energy and maintenance savings. This option is estimated to deliver substantial energy and maintenance savings of £0.7m and £0.3m respectively per year. The initial capital cost is estimated at £6.6m and even allowing for some column replacement will deliver sustainable savings to the revenue budget over a 20 year period.</td>
<td>2</td>
</tr>
<tr>
<td>Replacement of all SOX/SON luminaires with LED luminaires utilising a central management system to allow dimming</td>
<td>Estimated revenue savings (energy and maintenance) of between £1m and £1.1m p.a

Estimated capital cost £9.3m, incl a contingency of £1.3m for replacement of columns

<table>
<tr><th colspan="3">NPV over 20 years</th></tr>
<tr><th>Inflation</th><th>Level 1 Dimming</th><th>Level 2 Dimming</th></tr>
<tr><td>0%</td><td>£5.9m</td><td>£7.4m</td></tr>
<tr><td>5%</td><td>£13.8m</td><td>£16.5m</td></tr>
<tr><td>7.5%</td><td>£20.4m</td><td>£24.0m</td></tr>
<tr><td>10%</td><td>£29.6m</td><td>£34.7m</td></tr>
</table>
</td>
<td>A CMS will allow lights to be dimmed therefore providing the potential for additional energy savings. There is the potential to make additional energy savings of 5% or 14%. The financial benefit of the CMS is achieved under the more extensive dimming regime where the additional energy savings are sufficient to cover the cost of the additional investment.</td>
<td>1</td>
</tr>
<tr>
<td colspan="4">Assumptions:-

1. All options appraised over 20 years once the asset becomes operational.</td>
</tr>
</table>

2. Baseline energy costs and maintenance use 2012/13 data
3. Maintenance cost savings for LED replacement option include saving on bulk lamp change and luminaire replacement equating to 44%. These estimated savings have been reduced to 41% with a central management system which includes an allowance for CMS maintenance costs.
4. Treasury discount rate of 3.5% applied to calculate net present value figures
5. No assumptions have been made in the modelling for any residual values

Projected Impact on the MTFP **Appendix 4**

	2013/14 (£000's)	Year 1 (£000's)	Year 2 (£000's)	Year 3 (£000's)	Year 4 (£000's)	Year 5 (£000's)	Year 6 (£000's)
Electricity	1,200	1,200	1,200	1,200	1,200	1,200	1,200
CRC							
Variable Maintenance	745	745	745	745	745	745	745
Fixed Maintenance	93	93	93	93	93	93	93
Total	2,038	2,038	2,038	2,038	2,038	2,038	2,038
Option - LED and CMS, 2 year construction							
Electricity (61% saving)		1,017	651	468	468	468	468
CRC							
Variable Maintenance		669	516	440	440	440	440
Fixed Maintenance		93	93	93	93	93	93
Sub-Total							
Savings "Pre-Finance" Costs		**-259**	**-778**	**-1,037**	**-1,037**	**-1,037**	**-1,037**
Finance Costs:-							
MRP		0	233	465	465	465	465
Interest Costs		96	289	386	386	386	386
Interest gain		0	-2	-14	-37	-56	-74
Net Saving - Impact on MTFP (*)	**0**	**-163**	**-258**	**-200**	**-224**	**-242**	**-261**
But with no borrowing in the short term							
Internal borrowing saving		-70	-129	-64			
%		1	2	3	4	4	4
Impact on MTFP - Internal Borrowing		**-233**	**-387**	**-265**	**-224**	**-242**	**-261**

(*) It is assumed that changes to the Carbon Reduction Commitment will mean Trafford is below the qualification threshold and will not have to buy allowances. This is dependent on the Government enacting its recent announcements.

Appendix 5

Prudential Indicators

	2013/14		2014/15		2015/16	
	Current	Updated	Current	Updated	Current	Updated
Capital Expenditure (£m)	39.8	39.8	27.0	31.7	11.2	15.8
The overall capital budget will increase by £4.7m in 2014/15 and £4.6m 2015/16 as a result of the proposed new investment						
Capital Financing Requirement (£m)	145.1	145.1	138.4	143.1	133.8	142.9
This reflects the Council's underlying borrowing requirement to support its current and historical capital expenditure.						
Financing Cost to Net Revenue Stream (%)	7.0	7.0	7.7	7.7	7.4	7.5
This indicator shows the trend in the cost of capital (borrowing and other long term obligation costs net of investment income) against the Council's net revenue stream. The increase reflects the additional debt repayment which can be more than met from the savings that the scheme will generate.						
Incremental Impact on Band D Council Tax (£)	13.66	13.66	0	0	0	0
There is no change in this indicator because the level of debt repayments the Council makes is greater than the level of this additional investment.						

Wilde Consulting Engineers

Civil and Structural Engineers

PROPOSED STREET LIGHTING INVESTMENT PROGRAMME
REVIEW OF REPORT TO TRAFFORD COUNCIL

30 October 2013

Ref : C398-151-R01 revA

Report Control Sheet

Version	Date	Status	Prepared By	Checked	Approved
A	30 October 2013	Issue to Trafford MBC	P Ormshaw	L Garner	S Tickle

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Any work subsequent to this report will be the subject of a separate contract. This covers any remedial work recommended in the report and requiring to be monitored or any extension to the inspection or any work allied to either.

Report by

P Ormshaw
Lighting Engineer

Checked by

L Garner CEng, MICE, CMIOSH
Director

Approved by

S Tickle CEng, MICE, CMIOSH
Director

29 October 2013

Contents

1. Purpose of this Review

To provide an independent review of a Trafford Council report entitled “Investment in Street Lighting”. The report is to the Executive 18th November 2013 and to the Council 22nd January 2014 for Decision.
The report was produced by the Executive Member for Highways & Environment and the Corporate Director of Environment Transport & Operations.
The report comprises a main body of 42 sections supported by six numbered appendices.

This independent review is itself to form appendix 6 of the report.

2. Executive Summary

Trafford Council has during the course of 2013 been considering a significant “invest to save“, initiative. The initiative focuses on re-evaluating the street lighting operation presently provided by the authority. As a result of this process, the above report has been made available to WCL with a request to provide an independent review of its content. All comments and potential recommendations offered in this independent review are based on the present content of the reports as they read. The financial case is based on the background work carried out by the authority to date and will be properly confirmed by seeking submissions to a tender having the scope, specifications and conditions to meet with the council’s street lighting policy requirements and the relevant national standards.

Trafford Council has carried out a balanced economic and financial assessment of the proposal to convert existing SOX/SON luminaires to LED units. The option of transferring the maintenance of all street lighting to a private sector operator has also been investigated. Based on the data provided by Trafford Council we confirm that due diligence has been carried out. The Council has developed a robust business case to convert to LED luminaires over a two year period coupled with a central management system and the transfer of maintenance to a private sector operator, to potentially save the Council between £7.0m and £9.0m over 20 years.

3. Content of This Report

This review report is organised to broadly reflect the format the investment report being reviewed. Comments are made on the technical aspects of the project and the expected outcomes on the basis of the information provided. Further comments are also made on the procurement and financial content of the document.

4. Overview

To the independent observer the report has a clear focus on the financial impact of the investment considered which is in line with objectives set out. Recent adverse publicity in the media however and questions raised locally by interested parties have identified the difficulties and issues encountered when embarking on such a project, or committing to a legally binding agreement with an outside organisation, without first laying out a proposed strategy and tendering a well-defined scope for delivering the project. The statements made in the report have been reviewed and found to be well reasoned and measured. The overall technical basis for a general move away from SON/SOX lighting to LED has been set out in paragraph 1 of the report (background).

We concur that a suitable tendering process and sustainable street lighting policy as outlined in section 17 should be progressed in order to confirm or disprove the anticipated long term cost savings. This should be in line with the overall lighting policy, the body of which might incorporate the following aim or similar; '*To make the roads safer for traffic and pedestrians during the hours of darkness and to reduce crime and the fear of crime by ensuring the roads and streets will be lit, and that where reasonable and practicable this be to a standard compliant with the recommendations of BS5489 2013.'.*

Preparation in this manner will ensure that the authority is making clear statements of its intention to comply with all statutory and other duties under the law.

The standard of lighting performance ultimately required for each area of the authority will need to be developed and included within the tendering / procurement process so that prospective future providers can supply accurate, comparable and representative tenders.

This aspect and several other informational requirements are addressed in section 29.

The scope of works will require setting out in some detail in order to allow the variety of conditions needing to be met to be properly reflected and priced for. i.e. some of the lighting stock may not readily accommodate simple lantern exchanges, also the spacing between some existing columns may be excessive in terms of providing road lighting to a recognised standard.

Elements within the tender should be provided for design time, expense and criteria to be included so that safety and compliance are clearly accounted for. These can be reinforced by referring to a '*complete and comprehensive service level agreement, including initial design / procurement / installation / future maintenance works*'.

5. Energy Price Predictions

The effect of future development in the borough will lead to a prospective growth in lighting stock along with resulting maintenance pressures. This factor is recognized within section 2. The general statements and graphical illustration within section 3 to 6 present a convincing view of the prospective effects of energy costs and other factors, which we would generally support. Recent energy price increases and fear of blackouts further support the recommendation to invest in a more energy efficient asset.

6. Energy Procurement

We have confirmed with Trafford that in line with the many authorities who are at the moment declaring energy on a ”passive” basis (a notional amount of time between dusk and dawn), they will be switching to “dynamic” metering. What this means is that any reduction in energy will also qualify for a reduction in CRC tax if that becomes liable. Authorities who remain trading passively may reduce their energy bill but would not qualify for a reduction in CRC tax. The lead time for changing from passive to dynamic is around six months.

7. Carbon Reduction

We have confirmed with Trafford that they have again reviewed their position regarding Carbon Reduction and all the indications are that they will not under present circumstances trigger CRC tax.

If at some point this situation does change such that maintaining the status quo (do nothing) would trigger this, then the effect would be to further strengthen the financial case in support of the proposed investment in LED’s and a CMS thus reducing/removing tax liability.

8. Technical Review

It is recognised in section 22 of the report that a CMS would negate the need for night time inspections and the potential costs for this activity. This saving will further offset the costs of installation and future maintenance, again reinforcing the business case.

CMS can also be used as a “virtual meter” if the system is approved by the host district network operator (DNO), and providing the DNO has the appropriate technology in order to handle the information.

We have confirmed with Trafford Council that the basis of costing the dimming regiemes has incorporated an average cost for the supply of electricity.

Within section 8 the bullet point list of proposed options for consideration set out. There are eight options in the bullet point list but only six of these are detailed in the table in appendix 3 (Summary of Options Considered). This is because the second and third items in the bullet point list were logically discounted within sections 9 and 10 respectively and no further evaluation was undertaken.

9. LED Luminaires and other associated equipment

Any concerns would seem to have been identified in benefits and risk sections. Reference to the appropriate bodies and process of selection would appear to satisfactorily meet the requirements regarding a duty of care. It is worth noting that during design stage luminaire variants should be selected in line with specific requirements in terms of colour appearance.

10. Benefits, Information Requirements and Risks

The benefits would seem to have been identified and clearly set out. Information requirements again are set out clearly, and applicable, although only in an overview format.

At tender stage there may be a need to be more specific information produced on points such as specification for instance.

The risk section is well set out and representative. It could justifiably also have included *'non-implementation of the proposed investment'* as a significant risk. This scenario is however also represented within the "Do Nothing" option. If the project is not implemented then Trafford Council will have a street lighting asset that incorporates ageing technology, where the annual energy consumption and maintenance costs will continue to increase in the foreseeable future.

11. Recommendations

1) Progress the necessary activities to support tender preparations for the proposed asset investment.

2) Agree a lighting policy for Trafford.

3) Agree scope of works in line with lighting policy and incorporating specifications, standards and statutory requirements.

4) Proceed to tender and obtain comparative competitive market proposals for the delivery and maintenance of the asset investment.

12. Conclusion

Trafford Council has carried out a balanced economic and financial assessment of the proposal to convert existing SOX/SON luminaires to LED units. The option of transferring the maintenance of all street lighting to a private sector operator has also been investigated. Based on the data provided by Trafford Council we confirm that due diligence has been carried out. The Council has developed a robust business case to convert to LED luminaires over a two year period coupled with a central management system and the transfer of maintenance to a private sector operator, to potentially save the Council between £7.0m and £9.0m over 20 years.