East Suffolk and North Essex NHS Foundation Trust

FULL BUSINESS CASE PROFORMA

(*Energy Saving Initiatives 2018-19*)

BC010

Document Control Information	
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SECTION A : EXECUTIVE SUMMARY

Case Title	Energy Saving Initiatives 2018-19
Case Lead	Tim Hewes – Energy & Sustainability Manager
Service/Specialty	Estates and Facilities

A1 : Brief Summary of Case	
It is proposed that £1,015,000.00 is borrowed from Salix at 0% interest, paid back over 5 years in 10 equal instalments. The money will be spent on upgrading lighting to more efficient LED type fittings at Colchester & Ipswich, replacement chillers at Colchester and modifying absorption pipework at Ipswich. These initiatives will collectively save more money than the outgoing finance payments offering the Trust a CIP whilst also being self-financing. Replacement lighting will provide a more welcoming environment whilst reducing costs, increasing life cycles and reducing maintenance costs. Chiller works will improve reliability of service, and reduce electricity demand whilst increasing the cooling capacity output.	
Necessary to mitigate patient safety risk	~~Yes~~ / No
Necessary to meet legal or regulatory requirement	~~Yes~~ / No

A2 : Financial Impact Assessment		
Income and Expenditure	**Annual Recurrent**	**Non-Recurrent**
Expenditure (-) : Capital Investment Required	£	(£1,015,000)
Expenditure (-) : Additional incremental costs	(£120,000)	£0
Savings (+) : Cost reductions	£ 330,000	£0
Income (+) : Additional to be delivered by investment	£0	£0
Surplus / (Deficit) of proposal	**£210,000**	**(£1,015,000)**

A3 : Other Impacts		
Activity : Additional to be delivered by investment	0	0
Workforce : Increase / (decrease) in wte	0	0

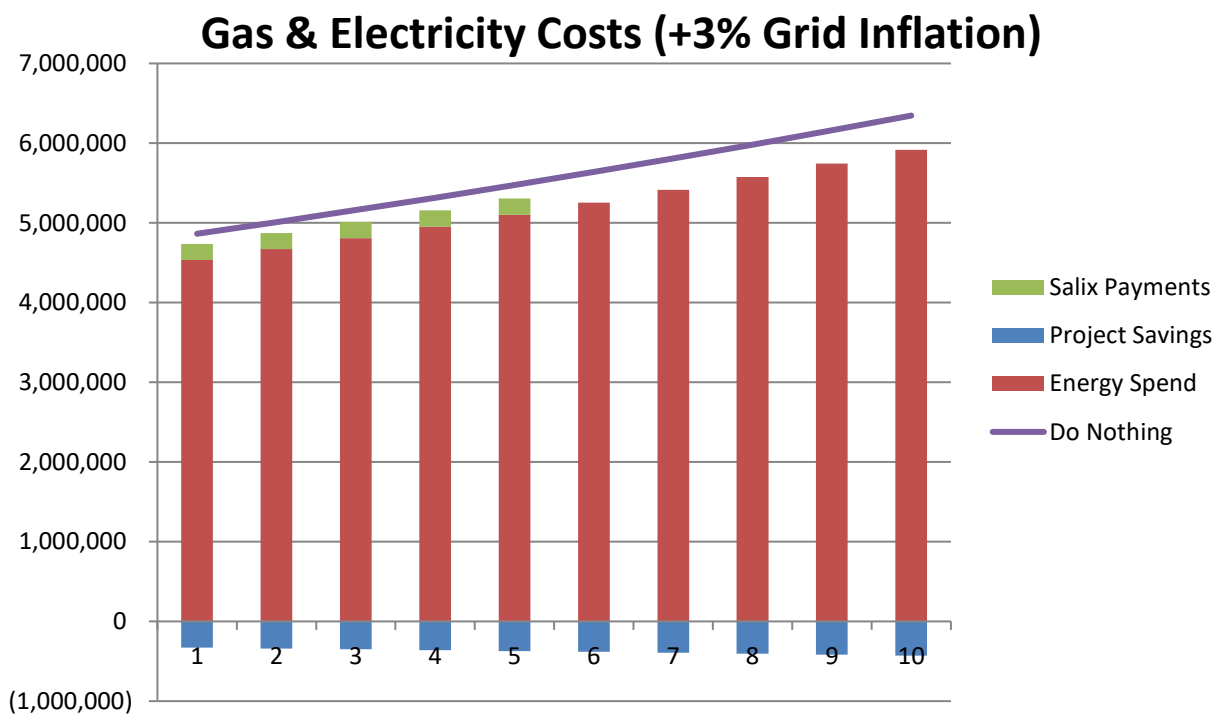
SECTION B : STRATEGIC CONTEXT

B1 : Current Service Provision

At both sites, existing lighting is provided by old inefficient fluorescent light fittings. In some areas the light diffusers have turned yellow from the years of exposure to the heat emitted from the lamps. Typical lamp life mans that maintenance operatives are regularly attending to fittings in order to replace or repair lamps.

The chillers at Colchester Hospital consist of ageing plant which are no longer able to cope with the seasonal high ambient conditions and therefore regularly suffer from faults or shutdown/cooldown periods to avoid failure.

The chillers at Ipswich are not to be replaced and are instead going to be used as resilience backup to the existing Absorption Chiller. As there is an onsite clinical waste incinerator which provides the site with steam at much lower than market rates. However, as this primarily used for heating and hot water, most of the steam is 'dumped' to atmosphere during the warmer weather.



B2 : Desired Future Position

1. LED Lighting Upgrades at Colchester Hospital
    - Colchester Hospital is well progressed with the roll out of LED light fittings across the site with some buildings already completed by the maintenance team and refurbished wards having been upgraded by capital projects.
    - LED lighting provides a greater light output whilst emitting less heat and consuming less energy than the existing fluorescent tubes.
    - LED fittings have a greater life expectancy than fluorescent fittings, therefore requiring less maintenance hours and allowing the team more time for preventative maintenance.
    - Improved lighting conditions benefit all patients, visitors and staff

2. LED Lighting Upgrades at Ipswich Hospital
    - Ipswich Hospital is further behind with the roll out of LED light fittings across the site with only some fittings having been replaced and only refurbished wards having been upgraded through capital projects.
    - LED lighting provides a greater light output whilst emitting less heat and consuming less energy than the existing fluorescent tubes.
    - LED fittings have a greater life expectancy than fluorescent fittings, therefore requiring less maintenance hours and allowing the team more time for preventative maintenance.
    - Improved lighting conditions benefit all patients, visitors and staff

3. Replacement Chillers for Main and Constable Buildings – Colchester Hospital
    - The existing chillers serving these buildings are between 10 and 15 years old, they are therefore nearing the end of their serviceable life. Although this would normally be considered a capital replacement scheme, the changes in chiller technology mean that the replacement chillers will offer a significant energy saving.
    - The existing chillers suffer from service outages and require regular intervention in order to keep the plant operational; replacing these chillers will remove this requirement.
    - The new chillers will be sized and controlled to deliver a steady flow temperature to the air handling units which in turn will provide improvements to the conditions within the theatres.

4. Absorption Chiller Utilisation – Ipswich Hospital
    - The existing steam driven absorption chiller at Ipswich Hospital is being underutilised due to historic service areas having been repurposed or removed from the cooling circuit. A pipework modification to link this chiller to another cooling circuit would enable the absorption chiller to run with a greater load and therefore offset the demand on the existing electric chillers and future additional chiller being installed as part of the capital project works.
    - Given the very low cost of steam from the incinerator, the absorption chiller runs at a significantly lower cost than the equivalent electric chiller.

B3 : Strategic Fit

Completion of these projects continues the Trust's commitment to reducing its demand on fossil fuels and overall carbon footprint whilst also reducing financial demands.

B4 : External Factors

All NHS bodies have a requirement to reduce their carbon footprint as outlined by the Sustainable Development Unit and NHSI. No penalties currently exist for not meeting the 2020 target but it is possible that enforcement or scrutiny may occur after this date if insufficient progress has been made.

The changes in Lighting and Chiller technology have progressed significantly since the incumbent plant was installed.

SECTION D : THE PREFERRED OPTION

D1 : Preferred Option

The above projects have been selected for their relatively quick return on investment which can also provide and demonstrate a funding mechanism for further projects. Whilst final project costing is still being finalised the projects will not be accepted for Salix funding if they do not meet the payback criteria.

The following table is based on the lighting infrastructure at Colchester which has then been used to estimate the benefits available at Ipswich.

Dextra	Lighting Drawin	Blo	Desc.	No. Ligh	Watts per fitti	Total k	Running Hou	Annual Running Co	New Watts per fitti	New Annual Running Co	Annual Savi	Supply Co	Installati	Payback
C476962/1	Yes		Main	1429	72	102.888	24	106353.2678	21.1	31167.41599	£75,185.85	£108,960.21	35725	23
C476958/2	Yes	34	Gainsborough	605	72	43.56	24	45027.1008	21.1	13195.44204	£31,831.66	£45,973.27	15125	23
	Yes	30-33	Constable	425	36	15.3	24	15815.304	21.1	9269.5254	£6,545.78	£33,214.60	10625	80.36862108
		14	PSU	150	60	9	24	9303.12	28.3	4387.9716	£4,915.15	£11,722.80	3750	37.7757872
C472573/1	Surveyed		Theatre 5-7	78	101.2307692	7.896	24	8161.93728	40.5	3265.39512	£4,896.54	£27,805.00	1950	72.92084666
C476964/2	Some	17-20	Elmstead (excluding Theatres)	110	54	5.94	24	6140.0592	21.1	2399.17128	£3,740.89	£8,326.94	2750	35.53254811
C472566/2	Surveyed		Constable Theatres 8-11 & 15	90	72	6.48	24	6698.2464	32.6	3032.81712	£3,665.43	£27,650.00	2250	98
C464730/5	Yes		SSU	117	See separate calc.			0		0	£3,226.58	£10,317.24	2925	49.24932281
C472572/1	Surveyed		Theatre 1-4	32	108	3.456	24	3572.39808	32.6	1078.334976	£2,494.06	£9,920.00	800	51.57848644
			Villa 1	97	72	6.984	10	3008.0088	21.1	881.51369	£2,126.50	£7,580.74	2425	56.46329843
C465328/8	Surveyed	4	Radiotherapy	276	36	9.936	12	5135.32224	21.1	3009.869424	£2,125.45	£120,213.60	6900	717.6650493
	Internal Survey		Villa 2	115	72	8.28	8	2852.9568	21.1	836.07484	£2,016.88	£8,987.48	2875	71
	Internal Survey		Villa 3	87	72	6.264	8	2158.32384	21.1	632.508792	£1,525.82	£6,799.22	2175	71
		V12	Old Boiler House	34	116	3.944	10	1698.6808	21.1	308.98418	£1,389.70	£2,657.17	850	30.28431918
C472567/1	Surveyed		Theatre 12	14	116	1.624	24	1678.69632	27	390.73104	£1,287.97	£4,140.00	350	41.83342582
		13	Boiler House (Energy Centre)	10	116	1.16	24	1199.0688	28.3	292.53144	£906.54	£781.52	250	13.65441795
			Contact Centre	17	128	2.176	10	937.2032	22.9	167.67151	£769.53	£1,328.58	425	27
			Villa 10	120	36	4.32	8	1488.4992	21.1	872.42592	£616.07	£9,378.24	3000	241.1058633
C472571/1	Surveyed		Theatre 14	19	72	1.368	24	1414.07424	41.7	818.984664	£595.09	£4,770.00	475	106
	No	40	Facilities Hub	13	36	0.468	24	483.76224	21.1	283.538424	£200.22	£1,015.98	325	80.36862108
C476961/1			Microbiology	55	36	1.98	10	852.786	28.3	670.38455	£182.40	£4,207.05	1375	367.2372122
		13	Service Yard Outbuildings	16	60	0.96	1	41.3472	28.3	19.502096	£21.85	£1,250.43	400	906.6188927
		29	Admin Block South	Don't Do.										
											£150,265.95	£457,000.08	£97,725.00	44.3
												£554,725.08		3.69 Years

This exercise has demonstrated that on average, for every £1 invested in lighting the Trust can save 30p on Electricity per annum.

The chiller projects have undergone a feasibility study by external consultants and have also proven to be viable projects.Delivery of these projects reducing financial pressures on the Trust without affecting patient services.

Financial Analysis

The capital investment required is £1,015,000 which is comprised as follows:

Initiative	**£**
LED Lighting - Colchester	554,750
LED Lighting - Ipswich	145,250
Chillers	260,000
Chiller Pipework	55,000
Total	**1,015,000**

The recurrent Energy savings generated from the investment are estimated to be £330,000 per year. Capital charges on the investment are approx. £120,000 per year, leaving a net revenue saving of **£210,000.**

In terms of the cash flow, the £1.m loan from Salix is repaid over years 1 to 6, and is offset by the revenue savings of £330,000. The cash flow analysis shows a net cash flow of £2.2m and positive net present value of £1.4m. The revenue analysis shows a net revenue saving of £2.1m

Appendix A details the impact on the Cash Flow and revenue costs over 10 years.

D2 : Risk Assessment
Risk: Initial capital release (pre initiation of the loan) – Action: Cash flow planning with capital accountant with continued updates on project progress and potential delays. Risk: Failure to secure funding – Action: Funding is secured and fully approved prior to commencing works, therefore avoiding financial risk to the Trust.

D3 : Consultation
Consultation has only taken place with the Estates team as chiller works will take place during cooler months, where the chillers would normally be taken out of operation due to the low ambient conditions. Lighting will be replaced in sequence with planned maintenance or in coordination with area managers once project timings are fully detailed.

D4 : Commissioning Support
The project will be fully supported and approved by Salix, which is a government backed organisation.

D5 : Accommodation Requirements
No changes required

D6 : Implementation
October 2018 – Complete tender documents (for chiller works) and confirm funding(£400k of £1m) *November 2018 – Place partial order for lighting and confirm project plan with department managers* *December 2018 – Receive payment from Salix for lighting delivered to site. Commence installation of lighting and place order for chiller works.* *March 2019 – Secure funding for remaining £600k* *End of March 2019 – Complete lighting upgrades, and chiller works. Receive remaining funding from Salix.* ***2018/19 – Neutral cash flow*** *April 2019 – Place order for remaining lighting project* *May 2019 – Continue lighting project and receive payment from Salix for light fittings* *June 2019 – Make first payment to Salix for initial £400k (£40k) – payments then continue every 6 months* *Nov 2019 – Complete Lighting project and receive payment from Salix* *Feb 2020 – Make first payment to Salix for second £600k (£60k) – payments then continue every 6 months*

D7 : Workforce
No change to existing services

SECTION E : NEW OR REPLACEMENT EQUIPMENT

E1 : Consultation	
For clinical equipment new to the Trust, has it been supported and approved by the Clinical Products Review Group (CPRG)?	~~Yes / No~~
For Medical Devices, have EBME and Decontamination Services been consulted?	~~Yes / No~~
For Medical Devices, have Infection Control been consulted?	~~**Yes / No**~~
For Medical Devices, has the investment been supported and approved by the Medical Equipment Management Group?	~~**Yes / No**~~

E2 : New or Replacement Equipment Details	
Equipment Description	Lighting – Dextra (ENEFT standard) Chillers – Either Daikin (Colchester standard), Mitsubishi or Carrier (Ipswich standard)
Expected Life of Equipment (Years)	**Lighting – 10 Years** **Chillers – 15 Years**

Existing equipment	All ceiling lights 2 x Daikin chillers on Main roof 2 x Daikin chillers next to Constable Building
Location (Hospital Site/Ward/Department)	Whole Site, Colchester & Ipswich
Year purchased/Age of equipment	10 to 40 years
Capital Asset Number/Book value ***(check with Finance)***	*n/a*
Disposal Options	All plant to be disposed will follow the relevant waste directives. It is considered that the plant does not have a resale value.

E3 : New or Replacement Equipment - *Other Considerations*	
Have the following been considered? If so, please state outcome.	
Staff workload implications or additional resource required?	Additional workload will be managed through reduced maintenance requirements and outsourced labour covered by the project funding. No additional resource is required once the project is complete.
Service Part requirement – budget implications; and costings?	No changes to budget or service requirements although less reactive maintenance will be required.
Transport implications – costs and staff resource?	No effect
Service Contract required – manufacturer's costs and frequency?	Covered by existing arrangements
Training – costs; resource implications and frequency?	No effect
Item tracking requirement – costs and feasibility?	No effect
Additional Test equipment; and calibration required?	No effect
IT/Software implications?	No effect
Disposal – special needs required and costs?	Covered by existing arrangements or covered by project costs.
Impact on staff resource re contract management?	Additional workload will be managed through reduced maintenance requirements and outsourced labour covered by the project funding. No additional resource is required once the project is complete.

SECTION F : DECLARATION *(to be completed in all cases by Divisional Associate Director)*		
Please read and tick the below declaration. Cases will not be processed unless all information is given.		
All necessary advice has been obtained from Estates & Facilities in completing this business case.	*Shaun Jackson, Head of Estates*	√
All necessary advice has been obtained from Finance in completing this business case.	*Dean Williams, Capital Accountant*	√
All necessary advice has been obtained from Business Informatics in completing this business case.	*n/a*	☐
All necessary advice has been obtained from ICT in completing this business case.	*n/a*	☐
All necessary advice has been obtained from Infection Control in completing this business case *(and has section E1 been completed?)*	*n/a*	☐
All necessary advice has been obtained from Trust Project Management function in completing this business case.	*n/a*	☐
All necessary advice has been obtained from EBME and Decontamination Services in completing this business case.	*n/a*	☐
For Equipment, Software etc containing Personal Data, has a Data Privacy Impact Assessment been undertaken for compliance with General Data Protection Regulations? ***(Mandatory requirement)***	*n/a*	☐
Has an Equality Impact Assessment been undertaken for compliance with the Equalities Act 2010?	*n/a*	☐
I confirm that users have been fully involved with the formulation of this business case and have accepted the proposals.		√
Any uncertainties and risk associated with the project will be managed within the Division's budget.		√
By submitting this form, I confirm that the information provided is true, complete and accurate.		√

Signature:		
Date:		

SECTION G : APPROVAL	
Is this business case approved?	Yes / No
Comments: Delete as appropriate The business case is approved up to a financial limit of £---,---. OR The business case has been recommended for "Approval in Principle" by the Investment Group within a financial limit of £---,--- to move to the next stage in the process. Additional Comments:	
Signature:	
Date:	

APPENDIX 1 : COSTS

	Yr 0 *2018/19* £	Yr 1 *2019/20* £	Yr 2 *2020/21* £	Yr 3 *2021/22* £	Yr 4 *2022/23* £	Yr 5 *2023/24* £	Yr 6 *2024/25* £	Yr 7 *2025/26* £	Yr 8 *2026/27* £	Yr 9 *2027/28* £	Yr 10 *2028/29* £	Total £
Cash Flow												
Capital Investment												0
LED Lighting - Colchester	(42,500)	(512,250)										(554,750)
LED Lighting - Ipswich	(42,500)	(102,750)										(145,250)
Chillers	(260,000)											(260,000)
Chiller Pipework	(55,000)											(55,000)
Salix Loan	400,000	615,000										1,015,000
Revenue Costs Savings												
LED Lighting - Colchester		80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	800,000
LED Lighting - Ipswich		100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	1,000,000
Chillers		60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	600,000
Chiller Pipework		90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	900,000
Loan repayment		(140,000)	(203,000)	(203,000)	(203,000)	(203,000)	(63,000)					(1,015,000)
Net Cash Flow	**0**	**190,000**	**127,000**	**127,000**	**127,000**	**127,000**	**267,000**	**330,000**	**330,000**	**330,000**	**330,000**	**2,285,000**
		1	2	3	4	5	6	7	8	9	10	
Discounted Cash Flow Factor (@8%)	1.00	0.93	0.86	0.79	0.74	0.68	0.63	0.58	0.54	0.50	0.46	
Net Present Value	**0**	**175,926**	**108,882**	**100,817**	**93,349**	**86,434**	**168,255**	**192,552**	**178,289**	**165,082**	**152,854**	**1,422,439**
Revenue Cost Impact												
												0
Revenue Costs Savings												
LED Lighting - Colchester		80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	800,000
LED Lighting - Ipswich		100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	1,000,000
Chillers		60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	600,000
Chiller Pipework		90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	900,000
												0
Capital Charges												0
Depreciation		(101,500)	(101,500)	(101,500)	(101,500)	(101,500)	(101,500)	(101,500)	(101,500)	(101,500)	(101,500)	(1,015,000)
Public Dividend Capital (3.5%)		(33,749)	(30,196)	(26,644)	(23,091)	(19,539)	(15,986)	(12,434)	(8,881)	(5,329)	(1,776)	(177,625)
Net Revenue Cost/Saving	**0**	**194,751**	**198,304**	**201,856**	**205,409**	**208,961**	**212,514**	**216,066**	**219,619**	**223,171**	**226,724**	**2,107,375**

Financial Summary – 10 years

Cash Flow	**£**
Capital Costs	(1,015,000)
External Funding	1,015,000
Revenue Savings	3,300,000
Loan Repayment	(1,015,000)
Net Cash flow	2,285,000
Net Present Value (NPV) at 8%	1,422,439
Revenue Cost Impact	
Revenue Savings	3,300,000
Capital Charges	(1,192,625)
Net Revenue Savings	2,107,375
Payback (Years)	4

APPENDIX 2 : OPTIONS BENEFITS APPRAISAL

1) Score the criteria identified in Appendix 3
2) Apply the weighting to each criteria
3) Obtain weighted scores for each option (Weighted score = Raw Score * Weight)
4) Apply the cost of each option to determine a cost per benefits point

Criteria	Weight	Option1		Option 2		Option 3		Option 4	
		Raw Score (0-5)	Weighted Score	Raw Score (0-5)	Weighted Score	Raw Score (0-5)	Weighted Score	Raw Score (0-5)	Weighted Score
Strategic Fit	**25**	4	100						
Patient Care	**25**	2	50						
Cost/Income Impact	**15**	5	75						
Risk Mitigation	**30**	2	60						
Ease of Delivery	**5**	3	15						
Total Benefits Weighted Score	**100**	16	300						
Recurring Revenue Cost (£000)	**n/a**		210						
Cost per Benefit Point (£/Pts)	**n/a**		£700						

APPENDIX 5 : POST- PROJECT EVALUATION – BENEFITS REALISATION REVIEW

Benefit *(from Section B2)*	**Type** *(Quantitative or Qualitative)*	**Metric**	**Baseline**	**Actual Benefit delivered** *(from Investment)*
Revenue cost savings	Quantitative	£	330,000	

Commentary on Benefits Delivery

Conclusion and Lessons Learnt