

Development Contract

Schedule Part 1 (Investment Grade Audit)

Section 2 (Template Investment Grade Audit Report)

Colleges Energy Efficiency NDEE Project

January 2017

RevP1 - ITMC Stage Issue

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[COVER NOTE – This document, and its context in relevance to the Colleges Energy Efficiency (CEE) Non-Domestic Energy Efficiency Framework (NDEEF) Project, shall be read in conjunction with ‘CEE NDEEF Project ITMC Vol 3 - Development Contract SP1 S1 IGA Specification’ documentation]

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EXECUTIVE SUMMARY

[A Shortlisted Bidder will provide an executive summary of the process and findings of the IGA for each Authority]

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1 Introduction

[A Shortlisted Bidder will introduce the Project, Facilities, IGA process, aims, objectives and proposed outcomes.

A Shortlisted Bidder will further detail the Auditor's contact details and credentials]

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2 Facilities Details and Building Systems Summary

2.1 Facilities Building Information

[A Shortlisted Bidder will provide general Facilities information, provided at the Invitation to Mini Competition (ITMC) Proposals Stage, and assessed further in subsequent Shortlisted Bidder activities.

Static factors may be addressed here such as building size, occupancy, type, age, condition and operating hours]

2.2 Building Systems Information

[A Shortlisted Bidder will provide a summary of the current building systems in the Facilities forming the project, addressing, as a minimum, the below system criteria including current performance/condition].

2.2.1 Meter Reading Technology

[A Shortlisted Bidder will provide a summary of the existing Utilities metering equipment (automatic and manual) within the Facilities. Sub-metering systems may also be summarised, or included respectively under the following headings]

2.2.2 Building Fabric

[A Shortlisted Bidder will provide a summary of the Facilities existing building fabric make up (wall, window, floor etc. constructions and performance)]

2.2.3 Thermal

[A Shortlisted Bidder will provide a summary of the Facilities' existing thermal systems (heating, hot water provision, thermal fuel/Utilities connections etc.)]

2.2.4 Ventilation

[A Shortlisted Bidder will provide a summary of the Facilities' existing ventilation systems (mechanical and passive)]

2.2.5 Cooling and Air Conditioning

[A Shortlisted Bidder will provide a summary of the Facilities' existing cooling and air conditioning systems (centralised and local systems)]

2.2.6 Building Controls, Metering and Management Systems

[A Shortlisted Bidder will provide a summary of the Facilities' existing building controls, metering and sub-metering and management systems (existing BMS, central and local controls, metering systems (automatic and manual) etc.)]

2.2.7 Lighting and Lighting Controls

[A Shortlisted Bidder will provide a summary of the Facilities' existing lighting systems (existing luminaires, controls etc.)]

2.2.8 Electrical Equipment and Distribution

[A Shortlisted Bidder will provide a summary of the Facilities' existing electrical infrastructure systems and equipment (existing mains connections and sub-stations, transformers, meters, distribution, major equipment systems etc.)]

2.2.9 [Low to Zero Carbon Technologies]

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[Where relevant, a Shortlisted Bidder will provide a summary of any existing low to zero carbon technologies in the Facilities]

2.2.10 [Specialist Systems]

[Where relevant, a Shortlisted Bidder will provide a summary of any existing specialist systems in the Facilities]

2.2.11 Water and Waste Water Systems

[A Shortlisted Bidder will provide a summary of the Facilities' existing water and waste water systems (sanitary ware, controls etc.)].

2.2.12 [Other Building Systems]

[Where relevant, a Shortlisted Bidder will provide a summary of any other Facilities building systems].

2.3 Environmental Parameters

[A Shortlisted Bidder will provide the agreed relevant static Environmental Parameters of rooms/areas affected by proposed Energy Conservation Measures (ECMs)]

3 Data Verification and System Testing

3.1 Site Surveys, Testing and Interviews

[A Shortlisted Bidder will provide a summary of all site surveys, testing and interviews held during the Development Contract. Detailed records should be included in the appendices]

3.2 Outcome of site Surveys, testing and Interviews

[A Shortlisted Bidder will provide a summary of the outcome of site surveys, testing and interviews, split by building system/ECM. Agreed 'static factors' should be included where relevant, or included individually in each ECM Proposal detailed in chapter 6.

Agreed/finalised Major Legacy Equipment Asset and Condition Registers shall be included in the appendices]

3.3 Deemed Performance of ECMs

[A Shortlisted Bidder will identify the process and outcomes of agreeing 'deemed performance' values relevant to the Measurement and Verification requirements for each ECM.]

3.4 Known Authority Actions Affecting Data Verification

[A Shortlisted Bidder will identify any recent/future Authority actions which may affect performance proposals, such as Plant replacements, building modifications etc. undertaken by an Authority outwith the EnPC.

The effect on baseline performance of any recent/future works by the Authority outwith the EnPC shall be agreed between the Shortlisted Bidder, Authority and M&V Professional, and assumptions and agreements stated here.]

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4 Baseline Calculations

[A Shortlisted Bidder will detail the agreed baseline energy and water consumption performance of the Facilities. Detailed calculations and supporting data will be included in the appendices].

4.1 Utilities Consumption by Type

Table 4-1: Example Table of Energy Consumption by Site

Site	Total Annual Electricity Consumption (kWh)	Total Annual Gas Consumption (kWh)	Total Annual [Fuel X...] Consumption (kWh)
Building 1			
Building 2			
Building ...n			

Table 4-2: Facilities Baseline Energy Consumption

Utility	Annual Consumption (kWh)	% of total	Annual Utilities Cost	% of total	Annual CO ₂ Emissions (tCO ₂)
<i>Electricity</i>					
<i>Gas</i>					
<i>Fuel X ...</i>					
TOTAL					

Table 4-3: Agreed Average Unit Costs of Energy

Utility	Average Unit Cost (£/kWh)
<i>Electricity</i>	
<i>Gas</i>	
<i>Fuel X ...</i>	

Table 4-4: DECC Energy CO₂ Emissions Factors

Utility	Emission Conversion Factor (kg/CO ₂ per kWh)
<i>Electricity</i>	
<i>Gas</i>	
<i>Fuel X ...</i>	

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4.1.1 Utilities Consumption Profiling

[A Shortlisted Bidder will detail the monthly baseline performance of each Utility]

Table 4-5: Baseline Utilities Consumption by Month

Month	Electricity Consumption by Month (kWh)	Gas Consumption by Month (kWh)	Fuel X... Consumption by Month (kWh)
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			

4.2 Energy Consumption by Building System and End Use

[A Shortlisted Bidder will identify the end use energy consumption by major Plant/systems/Equipment]

Table 4-6: Breakdown of Baseline Electricity Consumption by End Use

Electricity	Annual energy consumption (kWh/year)	% of total Utility consumption	Annual CO ₂ Emissions (tonnes)	Annual cost (£)
<i>Internal Lighting</i>				
<i>External Lighting</i>				
<i>ICT Equipment</i>				
<i>Catering Equipment</i>				
<i>HVAC Plant</i>				
<i>HVAC Pumps</i>				
<i>Equipment</i>				
<i>Plug In Load</i>				

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Miscellaneous				
Total				

Table 4-7: Breakdown of Baseline Natural Gas Consumption by End Use

Gas	Annual energy consumption (kWh/year)	% of total Utility consumption	Annual CO ₂ Emissions (tonnes)	Annual cost (£)
Heating				
Domestic hot water (DHW)				
Catering equipment				
Total				

Table 4-8: Breakdown of Baseline Fuel X... Consumption by End Use

Gas	Annual energy consumption (kWh/year)	% of total Utility consumption	Annual CO ₂ Emissions (tonnes)	Annual cost (£)
Heating				
Domestic hot water (DHW)				
Catering equipment				
Total				

4.3 [Other Baseline Calculations / Data Analysis / Presentation]

[A Shortlisted Bidder will include other baseline calculations, data analysis and graphical representation of performance as appropriate]

5 Data Analysis and Benchmarking

5.1 Benchmarking

5.1.1 Energy Benchmarking

[A Shortlisted Bidder will detail relevant energy benchmarking, as agreed with the Authority]

5.2 [Other Data Analysis]

[A Shortlisted Bidder will detail other relevant data analysis, such as normalised energy performance indicators, degree day analysis and regression analysis to provide an understanding of the existing performance of the Facilities, and identify reasons for inclusion of the ECMs]

6 Proposed ECMS

6.1 Process in Determining Performance

6.1.1 ITMC Proposal ECMs

[A Shortlisted Bidder will provide a summary of the ECMs proposed in the ITMC Proposal, including proposed avoided energy costs, capital costs and pay back performance]

6.1.2 IGA Proposals

[A Shortlisted Bidder will introduce the IGA ECM proposals]

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6.2 Energy Conservation Measure _n

[A Shortlisted Bidder will detail each proposed ECM in detail, using the following headings for guidance.]

6.2.1 Short Description of Proposal

[A Shortlisted Bidder will provide a short description of the ECM proposal and building(s) where it shall be installed]

6.2.2 Existing Performance and Condition

[A Shortlisted Bidder will identify the existing performance and condition of the building systems and Legacy Equipment which the proposed ECM will replace, upgrade and/or interact with.

Reference to baseline performance, survey findings and Legacy Equipment asset registers will be relevant as an explanation as to why the proposed ECM is suitable]

6.2.3 Proposed Works

[A Shortlisted Bidder will provide details on the proposed works relevant to the ECM and how energy performance improvements will be realised through its implementation.

The proposal will detail all the proposed new Equipment/Plant, including the performance ratings of all proposed Equipment/Plant. The final specification of Plant shall meet, or improve upon, the performance criteria proposed when assessing the GECP in this IGA.

Interface with Legacy Equipment will be clearly detailed, with any adoption or refresh of Legacy Equipment identified. A delivery programme will also be identified.

Further detailed drawings, specifications and information may be included in chapter 8 of this template report, to the satisfaction of the Authority. Finalised detailed Works proposals shall be included in Section 4 (Contractor's Proposals) of Schedule Part 6 (Construction Requirements) prior to signing the EnPC]

6.2.4 Annual Guaranteed Energy Cost Performance Calculation

[A Shortlisted Bidder will provide detailed calculations of the avoided energy costs for the ECM, based on performance improvement against the baseline. Detailed calculations shall be included below or as appendices. The calculation shall follow the IGA specification requirements, including following the energy hierarchy in identifying interactive effects of the proposed ECMs to avoid 'double counting' of savings.

The below tables will summarise performance. The Shortlisted Bidder will also provide the relevant information respective of the ECM in the Template ECM Register, included in Section 3 of Schedule Part 1 (IGA Specification) of the Development Contract:

Table 6-1: ECM 1 – GECP Summary

ECM Proposal	Annual Avoided Energy			Other Avoided Costs			
				CRC Avoided Costs	Avoided Maintenance Costs	RHI ¹ Savings	FIT ² Savings
	kWh	CO ₂ (tonne)	(£)	£	£	£	£
ECM _n (Utility ₁)							

¹ It is noted, specific to this Colleges Energy Efficiency NDEEF project, that RHI savings are not anticipated to be eligible given the project funding is from a public grant.

² It is noted, specific to this Colleges Energy Efficiency NDEEF project, that FIT savings are not anticipated to be eligible given the project funding is from a public grant.

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performance)							
ECM _n (Utility ... _n performance)							

6.2.4.1 Monthly Savings Analysis

Table 6-2: Predicted Avoided Energy Associated with ECM 1 – For Monthly Energy Reporting Analysis

Month	Predicted Avoided Consumption Associated with ECM _n – For Monthly Energy Reporting Analysis (kWh)	
	Utility ₁	Utility ... _n
January		
February		
March		
April		
May		
June		
July		
August		
September		
October		
November		
December		

6.2.5 Automatic Meter Reading (AMR)

[A Shortlisted Bidder will detail the proposed AMR relevant to the ECM, identifying the Works associated with performance measurement, monitoring and records]

6.2.6 Commissioning and Completion Testing

[A Shortlisted Bidder will identify preliminary commissioning and completion testing proposals for the ECM.

The finalised detailed completion testing proposals shall be included in Schedule Part 10 (Outline Completion Testing Programme) prior to signing the EnPC]

6.2.7 Operation and Maintenance Proposals

[A Shortlisted Bidder will identify the proposed maintenance and operational activities in respect of the ECM, and associated cost/savings from such activities against existing activities.

A Shortlisted Bidder shall develop detailed Operation and Maintenance proposals for those Services they are to provide as part of the EnPC]

6.2.8 Measurement and Verification Approach

[A Shortlisted Bidder will summarise the proposed M&V approach for the ECM, in consultation with the M&V Professional.

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A Shortlisted Bidder may reference detailed M&V documentation in Schedule Part 3 (Measurement and Verification) where such detail is developed as part of the Development Contract contemporaneously]

6.2.9 Costs and Simple Payback

[A Shortlisted Bidder will detail the costs associated with the ECM.

Costs shall be inclusive of all design work, enabling works, materials, labour, completion testing and commissioning, initial training, management and overheads in installing the ECM. The proposed costs shall not be exceeded in final development of the proposals post completion of the Development Contract. The Authority reserves the right to review and comment on costs as part of their IGA and IGP review.

Operational costs and lifecycle replacement costs during the contract term will be separately identified.

Detailed costs may be included in the appendices. The below table will summarise costs and simple pay back:]

Table 6-3: Costs and simple Payback for ECM 1

ECM Proposal	Installation Costs	Avoided Costs	Simple Pay Back Period
	£	£	Years
ECM _n			

6.2.10 [Net Present Value (NPV) Assessment]

[A Shortlisted Bidder may provide an NPV assessment of the ECM]

6.2.11 Static Factors, Assumptions, Interactivity and Deemed Performance

[A Shortlisted Bidder will identify, as far as is practicable, static factors and assumptions used in calculating the avoided energy costs.

Reference to factors identified elsewhere in the IGA Report, such as Environmental Parameters, operating hours etc. may be made where relevant to avoid duplication]

6.2.11.1 Interactivity

[A Shortlisted Bidder will detail the interactivity of the ECM performance with other ECMs and demonstrate that interactive savings have been addressed in the calculations]

6.2.11.2 Deemed Performance

[A Shortlisted Bidder will identify the approach and agreement (between the Shortlisted Bidder, Authority and M&V Professional) to any performance criteria of the ECM avoided energy cost calculations which have been 'deemed' for the purposes of the M&V approach to the ECM]

6.2.12 Training

[A Shortlisted Bidder will identify the initial supporting training activities which will be provided to the Authority following installation and commencement]

6.2.13 Performance Summary

[A Shortlisted Bidder will summarise the performance of the ECM in a similar manner to the below table. The Shortlisted Bidder will also provide the relevant information respective of the ECM in the Template ECM Register, included in Section 3 of Schedule Part 1 (IGA Specification) of the Development Contract:]

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Table 6-4: ECM 1 Summary Performance Table

ECM Proposal	Annual Utilities savings			Cost	Simple Payback	Other Avoided Annual Costs	Revised Simple Payback Period
	kWh	CO ₂ (tonne)	£	£	Years	£	Years
ECM _n - Utility ₁							
ECM _n – Utility _{2...}							
ECM _n	Σ(Utility ₁ , Utility _{2...})	Σ(Utility ₁ , Utility _{2...})	Σ(Utility ₁ , Utility _{2...})	Σ(Utility ₁ , Utility _{2...})		Σ(Utility ₁ , Utility _{2...})	

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7 Consolidated ECM Performance

7.1 Summary of Performance

[A Shortlisted Bidder will summarise performance of the complete suite of ECMs proposed in a similar form to the summary tables below, identifying the finalised agreed total GECP, simple payback and NPV.

The Shortlisted Bidder will also provide the relevant information respective of the ECMs in the Template ECM Register, included in Section 3 of Schedule Part 1 (IGA Specification) of the Development Contract]

Table 7-1: Summarised Total ECM GECP, [NPV] and Simple Payback

ECM	Annual Electrical Energy Saving	Annual Avoided Electrical Energy Saving	Annual Gas Energy Saving	Annual Avoided Gas Energy Saving	Total Avoided Energy Cost	[Net Present Value]	Cost of the Works	Simple Payback
	(kWh)	(£)	(kWh)	(£)	(£)	(£)	(£)	(Years)
ECM ₁								
ECM ₂								
...								
ECM _n								
TOTAL								

[A Shortlisted Bidder will identify the total Guaranteed Energy Performance Cost (GECP) following collation of the above table.

A Shortlisted Bidder will also summarise performance of the complete suite of ECMs, taking in to consideration all avoided costs, not just energy costs, for the purposes of the Authority's Business Case.

The Shortlisted Bidder will also provide the relevant information respective of the ECM in the Template ECM Register, included in Section 3 of Schedule Part 1 (IGA Specification) of the Development Contract]

Table 7-2: Summarised Total ECM Performance including all Avoided Costs and Carbon Savings

ECM	Total Avoided Costs	Total Carbon Savings	Other Avoided Costs	Total Avoided Costs	Cost of the Works	Revised Simple Payback
	(£)	CO ₂ (tonne)	(£)	(£)	(£)	(Years)
ECM ₁						
ECM ₂						
...						
ECM _n						
TOTAL						

7.2 ITMC Proposal and IGA Comparison

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[A Shortlisted Bidder will detail performance of the complete suite of ECMs following the IGA against the ITMC Proposal – identifying that performance has not degraded]

7.3 [Monthly Performance Analysis]

[A Shortlisted Bidder will detail monthly predicted performance of the ECM proposals for each Utility against the baseline. A summary table similar to the below will be provided to identify monthly performance indicators for Monthly Service Reporting assessment]

Table 7-3: Monthly ECM Avoided Utility_n Performance against the Baseline

	Predicted Avoided Utility _n Consumption by ECM (kWh)				Total Avoided Utility _n Consumption	Baseline Utility _n Consumption	Predicted Utility _n Monthly Consumption Following ECM Implementation
Month	ECM ₁	ECM ₂	...	ECM _n	(kWh)	(kWh)	(kWh)
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							

8 Detailed Installation Works Proposal

[A Shortlisted Bidder will detail its approach to meeting the Authority's Requirements, statutory requirements and good practice guidance.

Works proposals will include identification of all enabling works, interface works and a proposed programme of Works. The Shortlisted Bidder shall further provide relevant Works specifications and drawings to satisfy the Authority that the Proposal shall not unduly affect the Authority's operations in the installation of the ECMs.

Finalised detailed Works proposals, including detailed drawings and specifications, shall be agreed in the development of Section 4 (Contractor's Proposals) of Schedule Part 6 (Construction Matters), Schedule Part 7 (Programme), Schedule Part 10 (Outline Completion Testing Requirements) and Schedule Part 11 (Equipment) prior to signing of the EnPC]

9 Risk Analysis

[A Shortlisted Bidder will provide a risk analysis of the proposed ECMs, considering risks associated with meeting performance and mitigating disruption to the Authority in the installation and operation of the Works. Mitigation measures to address the risks will further be provided.

The format and content of the risk analysis will be appropriate to the Authority's needs and respective Business Case requirements]

10 Appendices

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(A) Site Layout Drawings and Photos

[A Shortlisted Bidder will provide site layout drawings and photos of the site and Facilities. This provides the opportunity to identify the site at time of the IGA and EnPC commencement – enabling ease of comparison should there be need for a Change later in the EnPC.]

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(B) Major Legacy Equipment Asset Register

[A Shortlisted Bidder will provide a register of the major Legacy Equipment assets in the Facilities, similar in form to the simplified table provided below. Asset registers need only be relevant to Plant that will be affected by the proposed ECMs.

Plant Item	Reference	Location	Manufacturer	Model	Rating	Condition	Remaining Economic Life (Years)*	Comments

**Remaining Economic Life shall be determined in line with the guidance included in the latest publication of CIBSE Guide M – Maintenance Engineering and Management*

A Shortlisted Bidder will provide as much information as was reasonably practicable on the Legacy Equipment in order to satisfy all parties as to the Legacy Equipment ratings, conditions and useable life at the time of the EnPC. Tables will be split by building system type to enable Legacy Equipment specific information to be included i.e. refrigerant type for chillers:]

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(c) Site Surveys, Testing and Verification Activities

[A Shortlisted Bidder will provide detail of all the site surveys, testing, meter/system readings and interviews undertaken in collating and verifying energy performance.

This information will be presented in a schedule identifying the activities undertaken, with relevant details such as who undertook the activity, with whom, what date and what the outcome was.

Activities shall be split by building system / Plant analysed.

Records of tests identifying and proving 'static factors', such as internal temperatures will further be provided as evidence.]

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(D) Site Survey Photographic Evidence

[A Shortlisted Bidder will provide photographic evidence of site surveys, particularly in reference to condition surveys of Legacy Equipment – photographs will be referenced to the relevant Legacy Equipment Asset Register item included in Appendix B.]

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(E) Utilities Meter Readings

[A Shortlisted Bidder will provide the relevant meter reading logs which inform the baseline calculation for record purposes – i.e. the 3 consecutive years meter readings and associated mean average calculations]

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(F) Energy Consumption by Type Calculations

[A Shortlisted Bidder will provide the relevant methodology and supporting information used in the calculation of end use energy in the Facilities, including any benchmark assumptions made in the split of end use energy]

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(G) Energy Conservation Measure_n

[A Shortlisted Bidder will provide the detailed supporting calculations, modelling and information related to the performance, savings and works proposals associated with each ECM_n.

Reference should be made to relevant performance criteria of proposed Plant and Equipment. The final specification of Plant shall meet, or improve upon, the performance criteria proposed when assessing the GECP in this IGA.

A Shortlisted Bidder will further provide a detailed construction and prelims costs, based on the design works, proposed materials, labour, tools, fixtures, commissioning activities, training, performance monitoring and other costs/fees in determining the costs of the Works. The actual cost for the Works shall not exceed that proposed in the IGA, other than where agreed in writing with the Authority.

Operational and lifecycle costs, where relevant, shall further be detailed]