ENERGY STUDY REPORT

for the

TRANSFORMATION PROGRAMME
'INVEST-TO-SAVE'

for

STATES OF JERSEY
PROPERTY HOLDINGS

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Date: January 2012
File Ref: J2110907/2A/02/ESRep

STATES OF JERSEY PROPERTY HOLDINGS
TRANSFORMATION PROGRAMME 'INVEST-TO-SAVE'

ENERGY STUDY REPORT

C O N T E N T S

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Checked By:	R M SPINNEY	**Date:**	05/01/2012
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EXECUTIVE SUMMARY

Background

The States of Jersey are committed to increasing the efficiency of service operations and reducing the environmental impact of its day to day activities in delivering its services. In 2010, the States spent almost 5% more on energy than in 2009, largely driven by rising prices in the cost of fuel over the period, thus putting significant pressures on budgets.

Spend analysis on energy and water has identified the potential for significant improvements and efficiency gains. These will not only result in immediate cashable efficiencies, but will also assist the States in achieving an improved performance on sustainability and environmental objectives also.

In April 2011, the States launched 'ECO ACTIVE States', an awareness and action campaign designed to ensure all States Departments achieve ECO ACTIVE accreditation by 2014, but further sustained efficiencies will be realised through investment in energy saving technology across the estate. To this end, the States are seeking to identify the optimum programme of investment that will both sustain the immediate gains made through raising awareness of energy-efficiency, and deliver further gains through use of appropriate technology.

This report has been produced in order to provide support to the Energy Project for Property Holdings (JPH) in identifying and validating the costs and savings associated with all invest-to-save projects within Estate, with a view to identifying projects that will achieve the targeted savings with minimum investment and risk to help to reduce and better manage their energy and water consumption in the future.

Summary of Buildings Surveyed as Part of This Study

Schools

Site	Type	No. Students	Measured Floor Area/m²	Advised Area/m²	Year First Built
d'Auvergne	Primary	339	3088	2945	2003
First Tower	Primary	360	2453	2990	1901
Grands Vaux	Primary	133	2195	2351	2003
Janvrin	Primary	336	2503	2929	1950
JCG Prep	Primary	375	2697	4810	1899
La Moye	Primary	324	2255	2236	1901
Les Landes	Primary	165	1651	1534	1901
Plat Douet	Primary	321	2495	2584	1966
Rogue Bouillon	Primary	355	4713	5692	1952
Samares	Primary	214	2747	3718	1997
St Clements	Primary	177	3090	2069	2006
St Johns	Primary	166	1631	1634	1901
St Lawrence	Primary	175	1373	1273	1911
St Mary	Primary	166	1248	1278	1901
St Peter's	Primary	184	1936	1083	1862
St Saviours	Primary	183	1986	1791	1897
D'Hautree	Special Needs	17	990	686	1965
Mont a l'Abbe	Special Needs	76	2998	2733	1997
Hautlieu	Secondary	676	9793	10124	2003
Highlands	CofFE	975	19196	14178	1880
JCG	Secondary	716	9628	12905	1899
Le Rocquier	Secondary	891	11281	4609	2006
Les Quennevais	Secondary	777	7395	7368	1964

EXECUTIVE SUMMARY - contd

Summary of Buildings Surveyed as Part of This Study - contd

Administrative

Site	No. Floors	No. Staff	Measured Floor Area/m²	Advised Area/m²	Year First Built
Police HQ	2	50	1610	6,671	1835
States Building	6	95	4844	5,001	1866
Morier House	6	125	4520	4,158	1997
Maritime House	4	83	2160	2,331	1999
South Hill	3	103	2031	2,600	1997
Jubilee Wharf	5	89	1315	1,359	1961
Philip Le Feuvre Hse	6	125	4100	2,528	2001
Cyril Le Marquand	10	270	3519	5229	1976
Liberty Wharf Ph1	5	51	769	756	2007
Howard Davis Fm	2	43	1250	1130	1810
Fire Station	3	31	2712	574	1977

Sports

Site	Type	Measured Floor Area/m²	Advised Area/m²	Year First Built
Fort Regent	Sports	14514	18298	1806
Langford	Sports Hall	2644	2724	2003
Les Quennevais	Playing Fields		1629	1970
Les Quennevais	Sports Centre	4146	1629	1970
Oakfield	Sports Hall	1275	1484	2003
Springfield	Stadium	2491	3389	1996

Prison

Measured Floor Area/m²	Advised Area/m²	Year Opened	Capacity
19196	6964	1970	184

EXECUTIVE SUMMARY - contd

Findings and Recommendations

The following summarises the major findings of the analysis undertaken as part of the project schedule in Appendix A, with the priorities for individual projects assessed using the model in Section 2.0.

Priority 1 – Low Investment with Medium to High Savings Potential

- Investment: £298,000; Annual Savings: £86,000; Payback; 3.5 years (Pessimistic)

Primary, Secondary and Special Needs Schools	Lagging of pipeline components	Installation of additional lighting controls	Replace Spotlights w/LED	Change Heating Type (Oil for elec. radiant)	Install Cistermisers	Training of operatives	Improve time control on ePoU water heaters	Install Tamperproof Thermostats	Install Heated Door Curtain	Address abnormalities in electrical demand profile	Replace/Repair Windows	Replace Boiler
JCG Prep			X				X					
St Mary's Primary			X				X					
First Tower Primary	X				X		X					
Janvrin Primary	X	X				X	X					
Rouge Bouillon Primary	X	X	X				X			X		
Samares Primary	X						X					
St Lawrence Primary	X		X			X	X					
St Peter's Primary	X						X					
St John's Primary			X					X				
St Saviour's Primary							X					
La Moye Primary							X					
Grands Vaux Primary		X	X			X	X					
d'Auvergne Primary							X			X		
Les Landes Primary		X	X				X					
St Clement's Primary		X				X	X					
Plat Douet Primary			X				X					
Highlands College of FE	X		X	X								X
Le Roqcuier Secondary	X	X									X	
Jersey College for Girls						X						
Hautlieu Secondary		X										
Les Quennevais Secondary		X							X			
d'Hautree House Special Needs		X	X									
Mont a l'Abbe Special Needs		X	X									

EXECUTIVE SUMMARY - contd

Findings and Recommendations - contd

Priority 1 – Low Investment with Medium to High Savings Potential - contd

- Investment: £298,000; Annual Savings: £86,000; Payback; 3.5 years (Pessimistic)

Administration, Sports and Other Facilities	Lagging of pipeline components	Installation of additional lighting controls	Power Factor Correction	Replace Floodlights	Disconnect steam humidifiers	Training of operatives	Improve time control on ePoU water heaters	Bring forward transformer installation	Improve AC Control	Address abnormalities in electrical demand profile	Time Control on Servery Hotplates	Improve heating control/zoning	Review Heating (Greenhouse)	Install Door Closers
Jubilee Wharf		X					X							
Howard Davis Farm		X												
Morier House					X									
Cyril le Marquand					X	X								
Liberty Wharf							X							
States Building						X								
South Hill		X								X				
Maritime House		X					X							
Fire Station		X												
Springfield Stadium									X					
Oakfield Sports Centre						X			X	X				
Langford Sports Centre	X	X				X								X
Fort Regent		X	X											
Les Quennevais Sports		X												
La Moye Prison	X			X				X			X	X	X	
Police HQ		X												

Priority 2 – Medium Investment with Medium to High Savings Potential

- Investment: £999,000; Annual Savings: £118,000; Payback; 8.5 years (Pessimistic)

Primary, Secondary and Special Needs Schools	Repair Windows	Replace Immersion heater w/instantaneous	Add Cavity Insulation	Replace Boilers	Installation of additional lighting controls	Install TRVs to all rads
St Mary's Primary				X		
Janvrin Primary			X			
Rouge Bouillon Primary	X			X		
St Lawrence Primary					X	
Plat Douet Primary		X				
Highlands College of FE				X		X

EXECUTIVE SUMMARY - contd

Findings and Recommendations - contd

Priority 2 – Medium Investment with Medium to High Savings Potential - contd

- Investment: £999,000; Annual Savings: £118,000; Payback; 8.5 years (Pessimistic)

Administration, Sports and Other Facilities	Repair Windows	Installation of additional lighting controls	Install CHP Unit	Add Cavity Insulation	Power Factor Correction	Replace Boilers
Morier House		X				
Cyril le Marquand		X				
Howard Davis Farm						X
States Building		X		X		
South Hill	X					
Philip le Feuvre		X				
Fire Station						X
Springfield Stadium					X	
La Moye Prison			X			X
Police						X

Priority 3 – High Investment but High Savings Potential

- Investment: £139,000; Annual Savings: £12,000; Payback; 11.5 years (Pessimistic)

Primary, Secondary and Special Needs Schools	Installation of additional lighting controls	Replace Boilers
First Tower Primary		X
La Moye Primary	X	
JCG Prep	X	
Samares Primary	X	
d'Hautree House		X

EXECUTIVE SUMMARY - contd

Findings and Recommendations - contd

Priority 3 – High Investment but High Savings Potential - contd

- Investment: £139,000; Annual Savings: £12,000; Payback; 11.5 years (Pessimistic)

Administration, Sports and Other Facilities	Power Factor Correction	Provide Add'l Pipeline Insulation
Cyril le Marquand	X	
Fort Regent	X	
La Moye Prison		X

Priority 4 – All Projects with low Savings Potential and High Investment Projects with Medium Savings Potential

- Investment: £923,000; Annual Savings: £31,000; Payback; 29.8 years (Pessimistic)

Primary, Secondary and Special Needs Schools	Improve Roof Insulation	Replace/Repair Windows	Draught Proofing	Add Cavity Insulation	Replace/Improve AC Plant Control	Install PIR/door contact switches in cupboards	Install Push Button Taps/Flow Restrictors	Replace Existing WCs with Low Flush	Zoning of Heating System
First Tower Primary			X	X			X		
La Moye Primary		X							
JCG Prep								X	X
St Mary's Primary	X			X				X	
Grands Vaux Primary	X								
Janvrin Primary		X							
St Lawrence Primary			X					X	
St Peter's Primary			X			X			
d'Auvergne Primary						X		X	
Rouge Bouillon Primary								X	
St John's Primary								X	
Plat Douet Primary								X	
JCG		X							
Les Quennevais					X				
d'Hautree House								X	

Findings and Recommendations - contd

Priority 4 – All Projects with low Savings Potential and High Investment Projects with Medium Savings Potential - contd

- Investment: £923,000; Annual Savings: £31,000; Payback; 29.8 years (Pessimistic)

Administration, Sports and Other Facilities	Improve Roof Insulation	Add Cavity Insulation	Replace/Improve AC Plant Control	Install Solar Thermal Collectors
South Hill		X	X	
Fire Station	X	X		
Les Quennevais Playing Fields				X
La Moye Prison				X

Projects Not Financially Viable

- Investment: £4,221,000; Annual Savings: £69,000; Payback; 61.3 years (Pessimistic)

Primary, Secondary and Special Needs Schools	Install BMS	Replace Windows	Review Ductwork	Change HWS to ePoU	Power Factor Correction	Replace Windows	Improve Roof Insulation
JCG Prep					X		
St Mary's Primary					X		
First Tower Primary							X
Janvrin Primary							X
Rouge Bouillon Primary				X			
St Saviour's Primary		X					X
Les Landes Primary		X					
Highlands College of FE	X					X	
Hautlieu Secondary			X				
d'Hautree House Special Needs		X					

Findings and Recommendations - contd

Projects Not Financially Viable - contd

Administration, Sports and Other Facilities	Install BMS	Insulate Plate Heat Exchangers	Change HWS to ePoU	Power Factor Correction	Improve Roof Insulation	Replace Chillers	Provide PV	Replace Windows	Change Heating Type
Howard Davis Farm	X		X					X	
Morier House						X			
Cyril le Marquand								X	
States Building					X				
South Hill					X	X			
Fire Station								X	X
Oakfield Sports Centre				X					
Langford Sports Centre				X					
La Moye Prison		X					X		

Further Findings

During the survey phase, a number of other findings came to light that are worthy of consideration for future projects and operational procedures.

The first of these relates to the current use of energy saving controls in buildings, particularly with regards to lighting. In many instances, the controls have been disabled due to unreliability or being unfit for the application. It is recommended that the States' in-house designers are tasked to investigate the reasons for this and develop a brief for future designs and retro-fitted systems, based on what has been proven to work in specific environments; and then where future energy saving measures are implemented, these are monitored for effectiveness.

Additionally, it is noted the schools generally perform a lot better than the offices surveyed. This is put down to "ownership" of the building by on-site staff, i.e. in the school caretakers, who work to manage and reduce the energy consumption of their premises. For most of the office buildings, there is no equivalent person on-site who considers the day-to-day running costs.

Health and Safety Concerns

During the surveys, a number of issues arose, which, whilst not directly within the remit of this study, were considered health and safety risks and should be addressed as a matter of urgency. These include:

Les Quennevais Secondary School

There have been further recent additions to the school which has created issues with fire escape and ventilation as follows:

- Opening windows from the IT suite leading directly onto a fire escape corridor
- Internally occupied spaces with inadequate means of ventilation

EXECUTIVE SUMMARY - contd

Health and Safety Concerns - contd

Rouge Bouillon Primary School

Here, two boilers have had the flue removed that carried exhaust gases up to second floor roof level. This has been replaced by an exhaust that vents to ground level directly under the overhang of the roof of the phase one building. The vent is also directly below a roof terrace accessible by the children (see photo in section 3.1.9). This raises safety concerns where exhaust fumes are being vented adjacent to occupied spaces and opening windows.

1.0 TERMS OF REFERENCE

The States of Jersey is presently undertaking a comprehensive spending review ('CSR'), to evaluate all of its present and future public-service provision and expenditure. Part of CSR is looking at realising gains through more efficient procurement across Departments ('the Transformation Programme').

The Transformation Programme is divided into several categories, one of which is FM and Infrastructure. Within this Category, one of the areas of focus is achieving a 10% reduction in the consumption of energy and water between 2011 and 2013 ('the Energy Project').

The Energy Project is concentrating on three main areas:

- Awareness/behavioural change ('hearts and minds')
- Sustainable procurement
- Management of demand

This last area will require investment in technology by all Departments to sustain the savings made through behavioural change; therefore, the scope of this study is to:

- Review the initial long list of potential invest-to-save opportunities across the estate
- Validate the content and phasing of invest-to-save projects identified
- Grade all identified projects to identify quickest pay-back on investment with less risk to States' Departments
- Optimise the phasing to obtain maximum benefit from economies-of-scale within project procurement
- Produce the basis for a Business Case to identify how the future savings identified will be achieved

The Estate properties covered by this report are as follows:

- 16 Primary Schools
- 2 Special Needs Schools
- 4 Secondary Schools and 1 College of Further Education
- 6 Sports and Leisure Facilities
- 9 Administrative Buildings
- Fire Station
- Police HQ
- La Moye Prison

2.0 APPROACH

Our approach to this commission was a staged process as follows:

a) Validate the Dashboard Information by review of the existing building fabric, plant performance, controls and occupancy in order to assess end energy usage.
b) Schedule all significant energy consuming plant.
c) Compare the actual consumption with published benchmark data for the relevant building type to identify areas of excessive consumption.
d) Where available, review half-hourly electrical data to determine abnormal usage patterns, Power Factors and implications of tariff changes.
e) Consider the costs and savings potential of each of the relevant projects from the initiatives list using discounted cash flow techniques.

Within the remit of a commission such as this, it is only possible to do initial broad brush budget estimates for the projects under consideration; and therefore we recommend that a pessimistic view of payback is taken, where:

- Cost allowances are 20% higher than the budget
- Savings potential is 20% less than the actual prediction

Using the above adjustments, an attenuated payback is calculated which assumes:

- A project life of 10 years
- That over the 10 year period, interest and inflation rates will be similar; and fuel costs will rise at 5% above this rate

Table 2.1 Factors to Apply to Simple Payback for NPV calculation

Fuel Inflation = Discount Rate +/-	10 Year Actual	10 Year Pessimistic	5 Year Actual	5 Year Pessimistic
-13%	54%	36%	35%	18%
-5%	77%	51%	43%	26%
0%	100%	67%	50%	33%
5%	132%	88%	58%	44%
10%	175%	116%	67%	58%

Using the above recommendations, the "pessimistic" net present value (NPV) of any savings would equate to around 90% of the simple cash payback for a 10 year life; or 45% for a 5 year life.

This demonstrates that for the bulk of the projects under consideration, which should easily last 10 years, simple payback is considered to be a reasonable indication of financial viability.

The priorities shown in Table 2.2 have been developed on the basis that the lower the investment level, the quicker the project should be able to be instigated and therefore the sooner the benefits will be realised.

Table 2.2 Priority Ranking Model

Savings Potential	Investment Level: Low	Med	High
High	1	2	3
Med	1	2	4
Low	4	4	4

With relevance to this project, research has also been studied to determine if supplies of fuel reserves should be a factor to consider in the life time of the projects considered. With regard to the future availability of oil and gas, proven reserves worldwide have more than doubled since 1980.

2.0 APPROACH - contd

At 2009 global rates of oil demand (84 Mb/d), 1,354 billion barrels is enough for a little over 44 years; and at global gas consumption rates of about 75 TCF per year, the proven natural gas reserves of over 6,000 TCF will last around 40 years, thus there will be both oil and gas available long after the end of the useful life of the proposed plant, so the availability of the fuel source need not be a factor in the decision making process.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED

3.1 PRIMARY SCHOOLS

3.1.1 d'Auvergne Primary

d'Auvergne is one of the most modern primary schools on the estate, built in 2003. The school is over two floors and is thought to be of insulated cavity wall construction. The fabric of the building is in very good condition and the windows are all double glazed, open and shut properly and are draft proof. The roof is insulated with slate tiles.

The HWS is supplied by point of use heaters situated under the sinks, of which there are 11. Three gas boilers supply the underfloor heating. This is effective but has been reported as slow to react to changes to both outside and room temperature adjustments. The heating can be controlled via a BMS and zoned to be adjustable for each room. In addition there are two small supply and extract AHUs servicing the medical room and toilets with heating. There are 6 air conditioning units servicing the library/IT suite which are manually operated and on a timer, however the timer is not functioning properly so they are often left turned off.

The school lighting is well controlled by the caretaker in corridors and halls etc and lights are not switched on where there is adequate natural lighting or where they are not needed. However all switching is manual so lights can easily be left on all day and overnight, at weekends and during holidays. A particular issue is that every classroom has a storage cupboard where the lights are left on all day with little use of the cupboard.

This school consumes approximately 55% of the energy of a best practice facility of this type which is very good.

Recommended energy survey initiatives to analyse:

- Improved lighting control, e.g. PIR/timed off/door contact switches (in cupboards) and PIR as appropriate
- Time clocks on water heaters

3.1.2 First Tower Primary School

The original part of this school dates from 1901 and makes up approximately a fifth of the overall ground floor plan. In 1992 the first extension was built (which included a nursery); and then in 1996 a second extension was added. Most of the site is single storey, but the latest extension is two storey in part. The original school has classrooms with high ceilings (approximately 4 metres to ceiling tiles) and it is reported there is another 2 metre void above this which leads to excessive heat loss in the winter.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED

3.1 PRIMARY SCHOOLS - contd

3.1.2 First Tower Primary School - contd

The school is mostly double glazed, but there are some cracks between the windows and frames in the 1996 section – these are often taped up to stop the draught. Additionally, old draughty single glazed, wooden doors remain.

The heating plant consists of a total of 4 boilers. The one located in the nursery is of poor condition and supplies only the nursery (see picture). Another is located in the original building, is also of poor condition and supplies the original building and the first extension excluding the nursery. The final two are located in the original building also, but are much newer and in better condition; these supply the newest extension only. Despite this plant being in use it is reported that there are often complaints of the rooms being too cold and up to ten eletric portable heaters are also used. The hot water system is entirely electric and consists of 12 point of use hot water heaters and 2 immersion heaters, both of which are located in the nursery and supply this area only.

All lighting in the building is manually switched, the majority of which is low energy.

The school performs to 70% of best practice costs overall and electrically.

Recommended energy survey initiatives to analyse:

- Replace boilers
- Address draughty doors and windows
- Improve cavity insulation
- Insulate boiler room components

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.1 PRIMARY SCHOOLS - contd

3.1.3 Grands Vaux Primary School

This is a 2-storey school built in 2003. As such the building is thought to be of insulated cavity construction and is double glazed throughout. The roof is tiled and insulated. The suspended ceiling on the first floor is of a hollow waffle tile construction which allows considerable air flow to the large void above (approximately 8 ft high). Whether this has been done for aesthetic or acoustic performance is not known, but better insulation of this ceiling would reduce heating demand for the entire first floor.

The hot water system is entirely electric and consists of 10 point of use heaters for classrooms and a 50 litre immersion heater for the toilets. These are all thought to be on continuously. The central heating is supplied by two gas fired boilers and distributed under floor with control in the boiler room by a TREND BMS. The system seems in good condition, but the new caretaker has had little information on how to use the system, so training would be beneficial to allow effective zoning and time control.

Nearly all the lighting in the school is low energy and suited to the purpose. There are a small number, approximately 20, of low voltage spotlights used mainly for display lighting, however many of these have blown and not been replaced or not switched on as they are not needed. There are no time controls or PIR sensors in the school; it is up to the cleaners to switch all the lights off in the evening.

The school performs to 50% of best practice for overall costs and 65% for electrical costs.

Recommended energy survey initiatives to analyse:

- Address issues with heat loss through first floor suspended ceiling
- Install PIR sensors where suitable, namely corridors and toilets
- Replace spotlights

3.1.4 Janvrin Primary School

Janvrin School is a single storey property constructed with uninsulated cavity walls and is constructed in three parts. The school is divided by a road, and the half of the school to the west of this road is original. The building to the east of this road was refurbished in 1999 and to the far east of this is the nursery which was built in 2004. The entire school underwent a glazing renovation to replace single with double glazing, however this project was not completed and approximately 20% of the glazing is the original single. The roof is thought to be uninsulated.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.1 PRIMARY SCHOOLS - contd

3.1.4 Janvrin Primary School - contd

The central heating is fed both by oil and electric. The oil central heating consists of two boilers which feed radiators in the refurbished area of the school and another boiler for the underfloor heating in the nursery. The remaining area (approximately half) is heated by night storage heaters. Some are original and are now obsolete so are being replaced with newer models, as and when they break down. It has been suggested that the storage heaters be replaced with a wet heating system, which the current boilers would be sufficient to run, but it was deemed financially unviable. The hot water in the classrooms is provided by point of use water heaters and three immersion heaters provide the hot water for the toilets.

The lighting in the school is all fluorescent tubing and mostly manual switches. There are some PIR sensors but they are reported to malfunction and leave the lights on constantly. There is a single AC unit that runs constantly in the server room.

The school performs to 55% best practice for electrical consumption costs but 80% overall.

Recommended energy survey initiatives to analyse:

- Complete double glazing project
- Improve cavity wall insulation
- Improve Roof Insulation
- Address lighting control issues
- Insulate boiler room components

3.1.5 JCG Prep School

JCG Prep was built in 1996 over two storeys. Approximately half of the lower ground floor is built in to the landscape, with the other half exposed to the air. The entire ground floor is exposed. The walls are thought to be of insulated cavity construction and generally in good condition. Generally the building is double glazed, but there are a few small (approx. 30cm square) windows which are single glazed.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.1 PRIMARY SCHOOLS - contd

3.1.5 JCG Prep School - contd

The heating and hot water systems are simply engineered, with the central heating provided by two oil fired boilers feeding radiators fitted with TRVs. The boilers were replaced in 2009 so are in excellent condition. Whilst there is BMS control for the heating, we have been informed that it cannot be zoned, so when it is required only for limited usage of the school, e.g. when the hall only is used in evenings, the whole property must be heated. The hot water system heated is provided electrically throughout the school. There are 5 no. 25L immersion heaters which provide hot water for the toilets and a further 21 small point of use heaters for classrooms and shared preparation areas.

The lighting is the property is generally fluorescent with few PIR sensors. Some sensors, such as in classrooms, have been replaced with switches as the sensors were deemed unfit for purpose. The lighting is controlled by the BMS and switches off throughout the building at 5:30pm. In addition to fluorescent lighting, there are approximately 40 no. 25 Watt spotlights in the entrance foyer which are on throughout the school day. There are a further 25 no. spots in the IT suite which are rarely used as there is also fluorescent lighting.

The Power Factor fluctuates around 0.90 so is worth investigating.

The school performs to 90% of best practice overall costs and 60% of costs electrically.

Recommended energy survey initiatives to analyse:

- Replace spotlights
- Zone heating system via 2-port valves
- Time control for HWS
- Power Factor Correction

3.1.6 La Moye Primary School

This school consists of two parts, the original school which was built in 1901, and the new extension built in 2004. The 1901 section is a listed, granite, two storey building containing the entrance to the school, two classrooms and five small administrative/store rooms. The bulk of the school is the extension, which makes up 85% of the ground floor area and is also two storeys.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.1 PRIMARY SCHOOLS - contd

3.1.6 La Moye Primary School - contd

The old section is granite walled and the new is cavity wall with insulation. The former has some double and single glazing, the latter is entirely double glazed. There are considerably large amounts of glazing on the new section, where numerous windows are poorly fitting, leaving large gaps when closed (see picture). The old building has a tiled roof and the new is flat.

The heating and hot water systems are simply engineered, with an external boiler house serving both the old and new sections of the school with two 7 year old oil fired boilers in good condition. The hot water system is supplemented with two electric immersion heaters in good condition as well as 10 no. point of use hot water heaters for sinks in classrooms.

Cooling is provided by standalone air conditioning units in most of the classrooms of the new build.

The school costs 50% of best practice overall and 40% electrically.

Recommended energy survey initiatives to analyse:

- Improve lighting control – master off switch and lighting on when not needed/rooms not in use
- Replace single glazed and ill-fitting windows and address the cause

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.1 PRIMARY SCHOOLS - contd

3.1.7 Les Landes Primary School - contd

Les Landes School consists of sections, the original school which was built in 1954 and phase two of the school built in 1995. The original school is single storey and now makes up a relatively small part of the overall school (approximately a third of the ground floor area containing three classrooms, toilets and the hall). Phase two is now the main part of the school and has a small first floor with two store rooms and the staff room. The original school is believed to be made from uninsulated cavity walls and the new school from insulated cavity walls. The new school is double glazed and it is in good condition. The original school however is single glazed and with poorly fitting openings, allowing uncontrolled draughts. Additionally the original school has wooden external doors which are poor fitting and draughty. These windows and doors are often taped round in winter to stop the draught.

The heating and hot water systems are fairly simple, with the hot water being supplied entirely by point of use electric heaters. The heating is supplied by two oil fired boilers, distributed underfloor in the new section and by radiators in the original. There are also forced convection heaters in the hall.

The majority of the lighting in the school is fluorescent, which is entirely manually switched. In addition there are 19 spotlights fitted with incandescent bulbs, though to be 40 Watt.

The school performs to 60% of best practice total costs and 33% electrical costs.

Recommended energy survey initiatives to analyse:

- Replace single glazed windows
- Address door and windows leakage
- Replace spotlights

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.1 PRIMARY SCHOOLS - contd

3.1.8 Plat Douet Primary School

Plat Doeut consists of two phases, the original part of the building was built in 1966 and the extension was built in 2003, which approximately doubled the floor area. The walls of the original building were refurbished in 1998 at which point they were insulated. The extension has insulated cavity walls. The roof has been renewed in the summer of 2011 due to leaking. The windows are all double glazed and in good conditions. Most frames are PVC, some metal frames remain in the original building.

The heating is provided entirely by two oil fired boilers feeding LST radiators in the original building and a separate loop provides underfloor heating to the extension. There are 12 point of use hot water heaters in classrooms and staffrooms. Additionally, a total of 4 immersion heaters provide hot water to the toilets and kitchen. There is also a large (341 litre, 6kW) immersion heater which currently only supplies the showers. These are very infrequently used and only by teachers when they have cycled to work etc, however the water is heated every day. It has been proposed that this tank could replace some or all of the point of use heaters but no action has been taken. We would, however, recommend it to be replaced by an instantaneous heater for the shower.

The majority of the lighting in the school is fluorescent and in good condition in the extension. In the original school the diffusers are discoloured and would benefit from being replaced. Additionally there are approximately 16 75W PAR lights in the new and old building, with a further 5 no. 50W fittings. There are some PIRs fitted, such as in the corridors of the new building and toilets. Some have been overridden with switches due to faulty sensors.

The school's current energy costs are 50% of good practice overall and 40% of good practice for electrical costs.

Recommended energy survey initiatives to analyse:

- Replace shower HWS supply with instantaneous heating
- Rectify lighting control faults
- Replace spotlights

3.1 PRIMARY SCHOOLS - contd

3.1.9 Rouge Bouillon Primary School

Rouge Bouillon is one of the largest primary schools on the Island and consists of two phases; the latter of which dates from 1952. The original phase is thought to date from the first decade of the 20th century, but was gutted by fire in 1991. The building was subsequently rebuilt over the following 6 years. The rebuilt phase consists of two storeys and a basement containing a car park and boiler room and the '52 phase is three storeys. The walls of both phases are thought to be partially insulated. The school is double glazed throughout and some of the windows are poor fitting, requiring new hinges. These have been priced at £300 per window and nine windows have been suggested as most urgently needing attention.

There are two boiler rooms, one in the basement under the first phase and another in a plantroom attached to the second phase. Each boiler room has two oil fired boilers which are 20 years old and in poor condition. These boilers provide heating throughout the school feeding radiators fitted with TRVs. In the phase two boiler room, there are also 2 no. 250 litre oil fired water heaters in poor condition which need replacing (potentially with point of use). The phase one boilers provide hot water via an immersion tank in the roof void. In addition, there are 11 point of use hot water heaters.

It has been noted during a site visit that the phase two boilers have had the flue removed that carried exhaust gases up to second floor roof level. This has been replaced by an exhaust that vents to ground level directly under the overhang of the roof of the phase one building. The vent is also directly below a roof terrace accessible by the children (see photo). This raises safety concerns where exhaust fumes are being vented adjacent to occupied spaces and opening windows; and we believe may not comply with Building Regulations.

3.1.9 **Rouge Bouillon Primary School** - contd

The school has a single AHU located in the roof void that provides fresh air and extract for 6 classrooms in the phase I building. This is also used to serve some of the toilets, but faults with the system controls led to extractors being fitted.

The majority of the lighting is fluorescent which is manually controlled. In addition are 25 runs of 6 no. 75 W spotlights for display lighting, which are on throughout the school day.

The daily energy usage shows that consumption steadily reduces off as expected at 3pm, but then increases from 7pm to 9:30pm, before dropping to the night time load. This has been attributed to the contract cleaners who are employed in the school between 8 and 10pm, as well as the in house cleaners that work until 6pm.

This school costs 75% of good practice overall and 65% of electrical costs.

Recommended energy survey initiatives to analyse:

- Replace boilers
- Address ill-fitting windows
- Replace spotlights
- Address daily electric consumption abnormalities
- Insulate boiler room components

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.1 PRIMARY SCHOOLS - contd

3.1.10 Samares Primary School

This school was built in 1997, situated in a fairly exposed location on the south east coast of the Island. The school consists of two floors and is constructed of insulated cavity walls. The windows are double glazed throughout, and in good condition on the ground floor as they were replaced mid-2011. The first floor windows are also scheduled to be replaced spring/summer 2012.

The heating is provided entirely by two oil fired boilers, which also supply hot water to approximately a quarter of the school when fired. Otherwise, the hot water is supplied by two large immersion heaters and 4 point of use heaters. There have been reports of issues with these heaters breaking down or leaking, so some have been replaced.

The lighting in the school is fluorescent throughout and the majority are on manual switches, PIR sensors only being utilised in the toilets. It is reported that corridor light are often left on overnight and at weekends.

Costs of this school are approximately 55% of good practice overall and 50% for electric.

Recommended energy survey initiatives to analyse:

- Improve lighting controls – manual master off switch
- Time control for HWS
- Insulate boiler room components

3.1.11 St Clement's Primary School

St Clement's is built over two storeys and entirely replaced the old school upon completion in 2006. The walls are of cavity construction and thought to be insulated, all glazing is double and the building has a tiled roof which is believed to be insulated. The roof is reported to leak, particularly above the Hall, Hearing Impaired rooms and classrooms for years 4 and 6. Appropriate brise soleil has been fitted to the W and WSW elevation; and there is one lift in good condition.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.1 PRIMARY SCHOOLS - contd

3.1.11 St Clement's Primary School - contd

All the plant at the school is in good condition, being only five years old. The central heating is run off two gas fired boilers and distributed entirely under floor. The BMS is located in the boiler room and the heating control has 6 zones over the two floors. The hot water system consists of 16 point of use electric heaters in classrooms, toilets and staff rooms, which are left on 24/7. The school has seven air handling units which have had little use due to control problems, but we understand this is in the process of being rectified. In addition, there are five air conditioning units in the IT room and another five in the Library. These are not on timers and can only be operated manually in the room. There is an additional AC unit in the server room that is on continuously.

All lighting in the school is low energy, but all manually switched with no PIR sensors or timers.

The school performs to approximately half best practice with regards to both total cost and electrical cost.

Recommended energy survey initiatives to analyse:

- Automatic lighting control
- Time control for HWS

3.1.12 St John Primary School

St John is a single storey school, the majority of which dates from 2000. A small part of the school (approximately a fifth by floor area) is the original building dating from 1901, which was extensively restored when the rest of the school was built. The walls of the new building are thought to be of insulated cavity construction and the walls of the original section solid construction. The tiled roof is insulated and there is double glazing throughout in good condition.

The heating plant consists of two oil fired boilers that supply underfloor heating in the new build and radiators in the original. The heating is controlled by thermostats in each room which are not tamperproof. The hot water is provided by two 140 litre cylinders heated when the boilers are firing, and supplemented by two immersion heaters during the summer. Additionally there are four point of use heaters serving classrooms.

3.1.12 St John Primary School - contd

There is one AC unit in the server room which is constantly on. In addition, there are five AC units serving the IT suite, but these are rarely on. It has been reported that PCs are often left on overnight and during holidays.

The majority of the lighting in the school is fluorescent with approximately 20 no. 75 Watt spotlights for display lighting. All lighting in the school is manually controlled. There is also very good natural lighting in the corridor areas of the school.

The school currently costs 60% of best practice overall and 55% of best practice electrically.

Recommended energy survey initiatives to analyse:

- Replace spotlights
- Box in immersion heater in server room
- Improve central heating control

3.1.13 St Lawrence Primary School

The original part of St Lawrence dates from early 1900s and now has an extra two phases; the nursery built in 1992 and the new school which makes up most of the property, built in 2000. The earlier phases were extensively renovated in 2000 to incorporate insulation in the walls and roof space, as was installed in the new building. The majority of the glazing is double wooden framed; however, some of the nursery is uPVC double glazed. The glazing in the hall leaves gaps of approximately 25mm due to the hinges being damaged – work is currently underway to correct this. The doors are also wooden, however some are single glazed. This is because the double glazing cracked, and the doors were replaced with single glazing, ostensibly due to the cost. The work was carried out 2009-2010, and the new doors are poorly fitting allowing drafts – the doors to the staffroom have a 20mm gap where they meet (see photo).

The plant is in two sections, with a plantroom for the original and new school, and a plantroom for the nursery. The plant for the original/new school consists of two oil fired boilers which feed under floor heating.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.1 PRIMARY SCHOOLS - contd

3.1.13 St Lawrence Primary School - contd

There are complaints of poor controllability as the south side of the school gets too hot (to the point teachers open doors, windows) and the north side too cold. The plant has BMS control by way of a small TREND VDU, but is equipped for use with a PC, though this hasn't been supplied. This would allow easier use of the system and more effective zoning.

The hot water is supplied by separate oil fired hot water heater and supplemented by eight under sink point of use heaters set on timers. The nursery has its own oil fired boiler which supplies hot water and heating through radiators. This boiler is 20 years old and in poor condition.

The majority of the lighting in the school is modern fluorescent. Most of this was originally on PIR sensors, but these have been disabled as they kept malfunctioning and leaving lights on constantly. The replacement sensors were costed at £170 for the part only, so were deemed not financially viable. As such the lighting in the school is now entirely manually switched. There are also 13 no. 240 Volt incandescent spotlights, all 60 Watt.

There is no air handling in the building but there are AC units for each of the two server rooms.

This school performs to 75% best practise for overall costs and 85% for electrical costs.

Recommended energy survey initiatives to analyse:

- Address leakage through windows and doors
- Address lighting control issues
- Replace spotlights
- Insulate boiler room components

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.1 PRIMARY SCHOOLS - contd

3.1.14 St Mary's Primary School

The oldest part of St Mary's school dates from 1901 and the building has been extended over the last century. What is now the main block of the school was built in the 1970s, and there are small buildings coming off this which were built in 1926 and 1990. All phases of the school are single storey. Due to the large time span the property was built over there is incongruity between different parts of the building fabric and fittings and there are sporadic records relating to this. The walls of the 1970's and 1990's phases are thought to be cavity walls, the rest solid and none insulated. The windows are double glazed throughout and in fair condition but quite old; and generally metal framed.

The central heating and hot water for the toilets and changing rooms are run off a single oil fired boiler which is thirty years old and near the end of its life. The heating is distributed by natural convection radiators in corridors and forced convection radiators in classrooms. The hot water system is supplemented with 4 electric point of use hot water heaters.

The majority of lighting is fluorescent and in need of replacement due to old, discoloured and cracked diffusers. In addition, there is considerable halogen spotlighting in the school, approximately 30 no. 25 Watt low voltage spots in common areas. There are also a further 24 over two classrooms used for display lighting. All lighting is manually controlled.

The school performs to 65% of best practice costs overall and 75% of best practice for electrical costs.

Recommended energy survey initiatives to analyse:

- Replace boiler
- Replace lighting and include automatic controls
- Replace spotlights
- Improve cavity insulation

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.1 PRIMARY SCHOOLS - contd

3.1.15 St Peter's Primary School

This school is made up of two phases, the first is the oldest primary in this survey, dating from 1862 and account for approximately 15% of the ground floor area. The second phase is the newest primary to be surveyed and was finished in 2009. The fabric of the new section is in good condition as would be expected for its age, built from insualted cavity walls, double glazed throughout and with an insulated, tiled roof. The original section in generally in good condition too, as in 2010 the roof was renovated to include insulation and the windows here replaced with double glazing in wooden frames in 2011. The external doors of the old section are all wooden to comply with heritage regulations. These are obviously more draughty than modern designs but are required to be fitted. One of these doors though is a particularly bad fitment as it has been replaced and a 5mm gap has been left between the door and frame for the whole perimeter – this can be seen in the picture as the light enters through the gap. Reportedly this is due to the original frame not being allowed to be modified to fit the new door. It has also been reported that the doors of the reception and nursery classes are left open, onto the playground, for most of the school day.

The heating throughout the second phase is provided by two gas fired boilers and distributed under floor which can be controlled by the BMS in the boiler room. The heating and cooling in the original section is provided by Daikin air source heat pumps units recessed in the ceiling, but due to the high ceiling level (3.3m) the warm air doesn't reach the level of the pupils. Hot water is provided by 15 point of use heaters in classrooms and a small immersion heater situated in the ceiling void at the entrance to the new school which provides hot water for the staff toilets.

There are 12 extract and supply AHUs with heat recovery fitted in the new section of the school serving the classrooms and toilets.

The lighting is fluorescent throughout the property and controlled manually. Each classrooms has a store cupboard with a light, which are prone to be left on all day so would benefit from time lag or door switches.

This school costs 45% of best practice overall and 40% electrically.

Recommended energy survey initiatives to analyse:

- Address draughty wooden doors
- Insulate boiler room components
- Resolve Daikin unit heating issues

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.1 PRIMARY SCHOOLS - contd

3.1.16 St Saviour's Primary School

The oldest part of the school dates from 1898 with new sections added in 1983 and 1993. As such the school is a combination of insulated and non-insulated solid and cavity wall construction. The windows also vary, with single glazed, wooden sash windows in the 1898 building and double glazing elsewhere. The roof of the old building is also not insulated, but the new building is.

The heating is provided by two oil fired boilers feeding radiators. The boilers were replaced 5 years ago so are in good condition. The heating is split between the newer and older sections of the building to allow better control, along with TRVs. The hot water is entirely electric, with most of the classrooms having a point of use heater and four immersion heaters for toilets, etc. There is also a 1000 litre calorifier and immersion heater, but this is never used.

Nearly all of the lighting in the school is fluorescent, some of which could do with replacing in corridors due to old, discoloured diffusers. There are also 25 spotlights around the school, all 50 Watt and 240 Volt. The lighting is manual throughout.

The school performs at approximately 55% of good practice costs overall and electrically.

Recommended energy survey initiatives to analyse:

- Address lighting control – PIRs in toilets and time lag in cupboard
- Consider insulation improvements
- Replace single glazing if possible
- Isolate unused calorifier

3.2 SECONDARY SCHOOLS AND CofFE

3.2.1 Highlands College of Further Education

Highlands College is a large campus comprising around 19,000m² of buildings of widely varying types, ages and usage ranging from the prestigious Turner Block built in the 1890's to a group of pre-fabricated buildings erected around 5 years ago, although most of the campus dates from the 1970's and 80's. There is no significant record documentation and controls are very basic, with no site wide BMS and even oil tank levels need to be manually read.

Teaching Blocks Generally
The main teaching blocks are Camden, Turner, the University Centre, Media and Exam, School of Art and Information Technology. These blocks, with the exception of the School of Art, are in a reasonable state of repair. All buildings are predominantly naturally ventilated and with the exception of the IT block, only a small proportion of the accommodation has mechanical cooling.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.2 SECONDARY SCHOOLS AND CofFE - contd

3.2.1 Highlands College of Further Education - contd

Camden
The heating for both Camden and Turner blocks is fed from dedicated 20 year old oil fired boilers in the Education Department Offices (ESC Building) via buried external mains. All hot water is electrically generated, mostly at point of use. Camden building has had little investment in energy saving, with low levels of insulation and some single glazing.

Turner

Turner is the oldest building on the campus, dating from the 1890's. The heating for Turner blocks is as for Camden. All hot water is electrically generated, mostly at point of use. The Turner building has just completed a major refurbishment, although it is understood that little money was spent on additional insulation, or other energy saving measures such as the installation of Thermostatic Radiator Valves which is a real missed opportunity.

University Centre
The University centre is one of the newest buildings on the site; dating from the mid 1990's, and appears to be well designed and constructed, with reasonably efficient oil fired boiler plant and electric hot water generation via a mix of central calorifier and point of use generators. There is a distinct lack of any form of automatic control.

Technology Centre
The Technology Centre is of a mix of teaching and carpentry workshop space, fed by a 30 year old boiler with electric point of use water heaters. The teaching block is of traditional blockwork construction with some single glazing.

Art and Media
The Art and Media blocks are of concrete frame construction fed by 10 year old gas fired boilers and point of use water heaters. There are large glazing areas and metal and glass infill panels. Whilst the Media block has had the infill panels and single glazing replaced with double glazed and insulated units, with the exception of one unit (which had failed), the Art School retains its original panel and glazing system. There are also complaints of under heating in the Media Centre in the areas heated by ceiling panels.

Information Technology
The information and Technology department is a single storey temporary building constructed around 3 years ago, fully electrically heated and cooled via local heat pumps with electric point of use hot water.

Nightingale (Canteen, etc)
The Nightingale block is of traditional construction with an oil boiler less than 10 years old and all electric point of use water heaters.

Workshop Blocks Generally
These buildings are generally of steel portal frame construction with a crinkly tin envelope with double glazed windows and comprise of industrial areas on the ground floor, with classrooms on a mezzanine level above. The workshop areas of these buildings are generally only heated to around 15°C and there are only very simple time controls on these buildings, although they do appear to be well managed.

Stephenson Block (Vehicle Workshops)
Stephenson Block is heated by a fairly new oil boiler with high level wall mounted fan coil units and hot water is via local point of use electric heaters. The users complain that the heating is ineffective due to the high leakage through the vehicle access doors and recently electric radiant heaters have been added to supplement the fan heaters which have made a marked improvement to the internal winter environment. We concur with the view that the fan coil heating is not fit for a building with such a high infiltration rate and recommend replacing these with direct electric radiant heating.

Brunel Block (Mechanical Engineering and Plumbing)
This building and the heating systems within Brunel are very similar to Stephenson, although as the access doors are smaller and open less, the problems experienced with low internal temperatures do not appear to be an issue here.

3.2 SECONDARY SCHOOLS AND CofFE - contd

3.2.1 Highlands College of Further Education - contd

Nash Building (Trowel Trades)

Nash Building is very similar to Stephenson, although the heating system is Electric Radiant and therefore the problems experienced with low internal temperatures do not appear to be an issue here. One difference is that the windows are single glazed, however due to the low temperatures, replacement of the windows is unlikely to be financially viable.

Recommendations:

- Replace Camden and Turner Boilers
- Replace Camden Windows
- Replace Art School Panels and Glazing
- Lighting Controls Generally
- BMS – Site Wide
- Improve lagging on heating
- Replace Stephenson heating
- Add TRV's Turner
- Replace Boiler – Building Technology

3.2.2 Jersey College for Girls

The Jersey College for Girls caters for around 750 students between the ages of 11 and 18 and the site is built round the original old College House dating from 1880, although the vast majority of the estate dates from the late 1990's and includes:

- JADAT (Art, Design and Technology)
- College Hall and Dining
- Cheshire Wing (Music and Languages)
- Roberts Building (Maths, History, Geography, etc)
- Barton Science Building

The walls are thought to be of well insulated cavity construction and generally in good condition. The building is fully double glazed, but there are issues with ill-fitting and leaky opening panes.

The new Stevenson Drama block has been excluded from this survey, as it has only recently been completed and therefore was not consuming energy in 2010 (the base line for our energy consumption benchmarking exercise).

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.2 SECONDARY SCHOOLS AND CofFE - contd

3.2.2 Jersey College for Girls - contd

The heating for the site is all derived from the three 352kW oil fired boilers in college house which date from 1998 and appear to provide just a single constant temperature circuit feeding the heater batteries in the Air Handling Units; with a single variable temperature circuit feeding the emitters in all blocks. Most of the buildings are fully naturally ventilated, although the Main Hall, Drama and Music Rooms are fully mechanically ventilated.

Problems with low temperatures are reported in Barton Block, Roberts Block and Cheshire Wing which appear to be caused by a combination of:

1. Leaky Doors and Glazing – In Roberts and Cheshire Wing, particularly on the upper floors where the glazing is around 4m high and many classrooms have portable electric heaters to supplement the boiler fed radiators.
2. Poor Design and Control – Barton is heated by Ceiling mounted radiant panels, the output of which are far more sensitive to temperature difference than conventional radiators, thus the single variable temperature circuit is not really appropriate.
3. Poor Siting of Radiators – These are frequently located on the corridor wall, rather than the external wall where the majority of the heat loss occurs.

The lighting is generally fluorescent; and there is an automatic lighting control system installed in teaching areas, although at the time of the survey, most of the teaching staff appear to have switched the lighting to manual mode, leading to lights being left on when the classrooms are not in use.

The whole site is controlled by a Trend BMS system, although there are no as-fitted drawings or OandM manuals and none of the staff appear confident enough to use the control system. A brief review of the BMS indicated that it is currently in a very poor state of commission with:

- Many of the time schedules not set
- No apparent interface between heating and cooling systems
- Many heating temperatures set to 25°C

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.2 SECONDARY SCHOOLS AND CofFE - contd

3.2.2 Jersey College for Girls - contd

With the exception of JDAT which has gas fired HWS generators and the main kitchen which is fed from indirect cylinders from the main boilers, all the Domestic Hot water is generated by electric water heaters.

There are a total of 5 lifts on site, all of which are less than 15 years old.

Recommended energy survey initiatives to analyse:

- Replace Ill-fitting Windows
- Review the design and commissioning of the heating system to see if the control can be improved
- Address heating and lighting control issues by staff training on the BMS and Lighting Control System

3.2.3 Le Rocquier School

Le Rocquier School consists of a single block, constructed in 2006, catering for around 900 11–16 year old students.

The building footprint follows a cruciform layout, with 2 No. 3 storey wings, 1 No. 2 Storey; and one single storey wing. The walls are a combination of aluminium clad, painted render and cedar boarded and are believed to be well insulated and generally in good condition. The building is also fully double glazed, with Brize Soliel to reduce unwanted solar gain, but due to the size of the opening panes of windows, the hinges have failed or worn over time resulting in many windows not closing properly.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.2 SECONDARY SCHOOLS AND CofFE - contd

3.2.3 Le Rocquier School - contd

The heating for the site is all derived from a combination of three 125kW LPG boilers running at 50°C which feed the under floor heating; Daikin heat pumps and electric heater batteries in duct work. The under floor heating is not able to cope with step changes in load caused by classes starting and this leads to over-heating in some areas. In addition, there is no lagging on heating system pipeline components, resulting in excessive heat loss.

Mechanical ventilation consists of supply and extract systems with heat recovery serving the Drama rooms and internal rooms; and extract systems from the main kitchen, toilets and deep plan classrooms. Main hall ventilation consists of 4 No. roof extract fans, with make-up air provided by mid-level louvres with integral motorised dampers, synchronised with the fans.

There are around 20 cooling units installed in the IT rooms, GNVQ rooms and the learning resources rooms. These are R407c units with inverter drives to reduce energy consumption, although these units are not believed to link to the BMS.

Hot water for the kitchen is provided by two LPG fired water heaters rated to provide 6,000 Litres of hot water in 2 hours. In toilets and elsewhere where domestic hot water is required, point of use electric water heaters are used.

The lighting is generally fluorescent with high frequency control gear; and is PIR controlled in toilet areas; and external lighting is photo-cell controlled. Corridor areas are fitted with key switches, so only authorised personnel can activate the lighting, although these appear to be left on continuously during school occupation regardless of natural light available.

The whole site is controlled by a Trend BMS system, which appears to be well understood by the users and has 2 main control panels, i.e:

- MCCP1 – 2nd Floor main plantroom – controlling boilers, hall ventilation and Drama AHU
- MCCP2 – 2nd Floor kitchen plantroom – controlling kitchen ventilation and HWS

The school energy consumption appears to be in line with best practice, which is how a facility of this age would be expected to perform. The only operational problem reported (which is more of a Health & Safety issue, rather than an energy issue) was Pigeon droppings in the vicinity of the fresh air intakes.

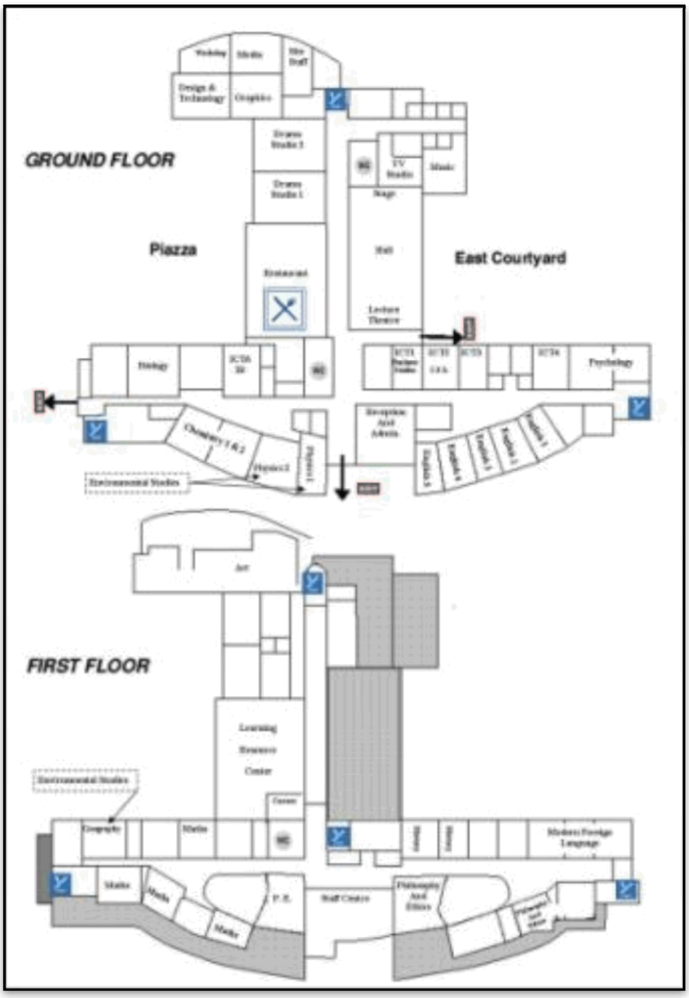
Recommended energy survey initiatives to analyse:

- Replace Window Hinges where panes not closing
- Lag Heating pipeline components
- Daylight sensors for corridor lighting

3.2 SECONDARY SCHOOLS AND CofFE - contd

3.2.4 Hautlieu School

Hautlieu School consists of a single 2 storey block, constructed in 2003, catering for around 700 11–18 year old students.



The building footprint is an inverted "T" and the walls which are mainly painted render are believed to be well insulated and in good condition. The building is also fully double glazed.
The heating for the building is provided by electrically heated fresh air supplied using a Termodeck fabric thermal storage system. The Termodeck solution is a full fresh air system which uses the thermal mass of the hollow concrete ceiling slabs which the air passes through to absorb fluctuations in room loads to produce a stable internal environment. Air Handling Units are arranged as follows:

- Classrooms South – AHU 1 – 3
- Resource Centre – AHU 4
- Study/Dining – AHU 5
- Main Hall – AHU 6
- Music and Media – AHU 7
- Performing Arts – AHU 9
- Art and Technology – AHU10

The biggest issues with the design of the heating system at Hautlieu are:

- There is no discrimination between the internal rooms which need constant fresh air and external rooms which can have the ventilation turned off for significant periods of the year.
- All the air heating is electric resulting in very high energy costs, despite reasonably low energy consumption relative to benchmarks.
- Some of the rooms have sloping and high ceilings resulting in the heat not reaching the occupied zone and complaints of low temperature from users, particularly in the Arts room.

The school caretaker has control over the operation of the ventilation plant and in order to reduce energy consumption, he tends to leave the plant turned off outside of the heating season, which results in internal spaces suffering from very stale air conditions.

Gas is provided to the kitchen and science block and all domestic hot water is provided by point of use electric water heaters.

The lighting is generally fluorescent; and is daylight sensor controlled near windows; and external lighting is time and photo-cell controlled. Corridor areas are fitted with central switching to allow the caretaker to activate the lighting from a single location.

The caretaker reported issues with the lighting controls and lighting being left on overnight, particularly in common areas.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.2 SECONDARY SCHOOLS AND CofFE - contd

3.2.4 Hautlieu School - contd

The whole site is controlled by a Trend BMS, which appears to be well understood by the users, although there are some issues with the monitoring and metering.

Recommended energy survey initiatives to analyse:

- Review ductwork distribution to see whether the system can be modified to allow the ventilation of internal areas to run independently of the areas with the potential for natural ventilation
- Review the heating and air supply to the areas currently under-heated
- Change the lighting control of the common areas to use key switches to restrict who can activate them
- Address the operational issues with the lighting control system
- Address the control and reporting issues with the BMS

3.2.5 Les Quennevais

Les Quennevais School and Community Centre was officially opened in 1966, built to accommodate up to 500 pupils. Over the years the number of pupils and adult users has increased; and between 1993 and 1996, a complete refurbishment programme was undertaken which involved a complete re-cladding. ***There have been further recent additions to the school which has created issues with fire escape and ventilation which whilst not directly within the remit of this study, constitute significant health and safety risks and we believe should be addressed as a matter of urgency. These include:***

- ***Opening windows from the IT suite leading directly onto a fire escape corridor***
- ***Internally occupied spaces with inadequate means of ventilation***

The school consists of a large ground floor with two multi-storey elements rising to 3 and 4 floors respectively. The school currently has 800 pupils and a large community of adults attending evening classes. The walls are predominantly curtain walling with relatively high levels of glazing, which leads to overheating issues for significant periods of the year.

The heating is predominantly via electric night storage heaters running on the E7 tariff, most of which were replaced as part of the 1996 refurbishment, although there are a small number of much older emitters; and some direct resistance "Dimplex" type emitters. There are complaints of inadequate heating in some areas, particularly the art room and in the recent extension which is heated by direct electric under floor heating. Here parts have already failed; due it is believed to poor installation resulting in cables buried in the floor being damaged by furniture.

3.2 SECONDARY SCHOOLS AND CofFE - contd

3.2.5 Les Quennevais - contd

The design of the main school pupil entrances mean that during the heating season, every time a large number of pupils enter or leave the building, there is a very high exchange of air through the double automatic opening doors; which cools down the core of the school and wastes significant quantities of energy. A fan heater has been installed to try and address this problem, but it is totally inadequate for the task in hand.

There is some local mechanical ventilation to the classrooms in the tower block to help control summer temperatures. Other areas on the ground floor including the IT classrooms, Home Economics and laboratories have split air conditioning units, but as these are internal classrooms with no adequate means of natural ventilation they should also have mechanical fresh air ventilation systems. Furthermore, the AC units are on local control only and whilst they appear to be well managed, there is a risk of them being left on when not required.

There is LPG on site, which feeds the kitchen hot water and cooking equipment but all other hot water is electric point of use.

The lighting is generally fluorescent; and fittings are PIR controlled in toilet areas.

Recommended energy survey initiatives to analyse:

- ***Provide mechanical ventilation to the IT suite***
- ***Ensure adequate fire integrity of escape corridor adjacent to IT suite***
- ***Provide all internally occupied spaces with adequate means of ventilation***
- Replace old and unserviceable storage heaters
- Relay under floor heating to extension, or install alternative
- Install daylight and movement sensors for corridor lighting
- Provide a heated door curtain to main entrance doors
- Improve control of AC units to interlock with heating and provide central switching

3.3 SPECIAL NEEDS SCHOOLS

3.3.1 d'Hautree House

d'Hautree House is a special needs school built in 1965. As it is a specialist school it currently has only 17 students. The main building is converted residential accommodation that is listed so has had limited scope for modernisation. In addition to the main building, there is an extension to the ground floor which makes up approximately half the ground floor area. The original building is solid granite construction and not insulated. The extension is thought to be uninsulated cavity walled. The building is single glazed throughout which is in fair condition. The tiled roof of the main building is insulated.

3.3 SPECIAL NEEDS SCHOOLS - contd

3.3.1 d'Hautree House - contd

The central heating is run off one oil fired boiler which is 18 years old and in poor condition, which feeds LST radiators. Electric mains heaters are also often used in winter to supplement the heating. The hot water is supplied by a separate oil fired heater. In addition, there is a point of use hot water heater in the kitchen.

The majority of the lighting in the building is fluorescent, with approximately ten 30W spotlights recessed in the kitchen's suspended ceiling. There are also spotlights in the main, double height entrance hall fitted with low energy bulbs. These are not an ideal solution as the hall is used for meetings and the spots do not provide sufficient light. The building has few light sensors; most that were fitted have been replaced with switches due to malfunction.

The daily load drops off at about 4pm as would be expected, however it stays at approximately 1.5 to 2 times the night time load until 10-11pm, which is much later than expected.

Recommended energy survey initiatives to analyse:

- Double glaze
- Replace boilers
- Replace spotlights
- Automatic lighting controls
- Address abnormalities in daily load profile

3.3.2 Mont a l'Abbe Primary

This special needs school was built in two phases of approximately equal size, the first in 1994 and the second finished in 2010. The property is thought to be of insulated cavity wall construction and has good double glazing throughout. The roof is tiled and insulated and the fabric of the building overall is in good condition.

The plant is divided between the two phases of the building. In phase one, there are three oil fired boilers which provide central heating and hot water. The central heating feeds radiators fitted with TRVs and the hot water provided by calorifiers. There is one AHU serving the hall and one AC unit for the server room.

The second phase has heating provided by two gas fired boilers and distributed under floor. This is controllable by the BMS. The HWS is provided by a gas fired water heater. The pool is heated by a combination of 2 small gas fired boilers and the solar thermal collectors on the roof, via a hot water tank fitted with calorifier. The newer phase also has a further five AHUs.

The majority of the lighting in the school is fluorescent, some of which could do with updating in the first phase of the school due to discoloured diffusers. There are also approximately 15 small spotlights in the entrance and the adjacent corridor, assumed to be approximately 30 Watt. All the lighting in the school is manually controlled.

The total school energy consumption costs are 76% of best practice and the electrical only (non-thermal) costs 108% of best practice.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.3 SPECIAL NEEDS SCHOOLS - contd

3.3.2 Mont a l'Abbe Primary - contd

Recommended energy survey initiatives to analyse:

- Replacement of spotlights and old light fittings
- Improved lighting controls – PIR sensors

3.4 ADMINISTRATIVE BUILDINGS

3.4.1 South Hill

South Hill is currently used for Transport and Technical Services Department. The original office was built in 1961 with some areas of the First and Second Floors being added at later dates in 1980's and 1990's. The original Building has very little (if any) cavity or roof insulation; however, the new thermal elements of the building were insulated to meet the requirements current at the time of construction.

The building is heated via a combination of fan convectors and radiators fed from the oil fired boilers and direct electric heating. The radiators are fitted with TRVs. The boilers and pumps look to be in a good condition and all systems are controlled via a BMS located in the boiler room. Some of the heating pipework outside the plantroom, as well as pipework components in the plantroom, were not insulated.

The majority of the Second Floor and also some of the offices at First and Ground Floor are provided with air conditioning split systems to provide cooling during summer months.

The users have complained that the building gets very hot in summer and very cold in winter and this is most likely due to the very poor double glazed, metal framed draughty windows.

As an addition to the main building, there are 5 no. porta-cabins, 2 of which are used as stores. 3 no. of the cabins are used as offices and are heated via electric heater and/or electric heat pump units.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.4 ADMINISTRATIVE BUILDINGS - contd

3.4.1 South Hill - contd

Domestic hot water is generated via local electric water heaters.

Lighting in the building is manually controlled with halogen spotlights fitted in reception area and within offices to light the books/documents shelves.

It has been noted that the boiler extract fan used for the combustion appears to run continuously even when the boilers are not operational

We have been advised that the dashboard data for the electrical energy consumption covers only the electrical supply to the first and ground floor. All other electrical supplies serving the second floor and porta-cabins are not metered and therefore the dashboard data is not available for these areas. The energy calculations have been based on the ground and the first floor area including the original second floor area.

South Hill performs to 135% of overall best practice costs and 95% of electrical best practice cost.

Recommended energy survey initiatives to analyse:

- Replacement of draughty double glazed windows
- Additional cavity and roof insulation
- Improved control of the air conditioning equipment
- Improved lighting control by daylight sensing and PIR controls
- Replacement of some of the old AC units with new
- Address abnormalities in electrical demand profile

3.4 ADMINISTRATIVE BUILDINGS - contd

3.4.2 Morier House

Morier House is the administration building for States Greffe, which provides an independent administrative support service to the States Assembly. Morrier House is a 5-storey office block dating from 1997, with dry storage/filing in the basement.

The basement wall and floors are waterproofed and constructed of reinforced concrete.

The roof consists of a structural slab covered with high performance roof membrane and insulation to give a U-value of 0.25W/m^{2}K.

The ground floor windows are timber framed double glazed units; and all upper floor windows are bronze anodised aluminium framed double glazed windows.

The external walls consist of 100mm thick block work with 80mm cavity and 50mm insulation.

The whole building is fully air conditioned.

Offices and occupied areas are generally heated via local independently controlled ceiling mounted fan coil units.

All the toilets and ancillary areas, including staircases, are heated via radiators fitted with TRV's. The basement is heated via fresh air delivered to the entire basement area at 2Ach per hour.

All of the above are served via LPHW pipework fed from 2 no oil fired boilers (215 kW each).

The fan coil system provides the cooling during the summer via chilled water pipework fed from 3 no. chillers located at Roof Level. In addition some rooms are provided with separate air conditioning units.

The server room located within the basement is also provided with 2 no. air conditioning split systems to maintain the required air temperature.

All heating, cooling and air conditioning plants are controlled via a BMS.

All occupied areas are provided with a fresh air supply via 2 no. Air Handling Units. Both units are fitted with electric steam humidifiers; and have plate heat exchangers to recover the energy from the exhaust air to preheat the fresh air. The fresh air is also heated via LPHW frost and main heating coils or cooled via a chilled water cooling coil. In addition the air is also humidified via 2 no. electric steam humidifiers.

Toilets and kitchenettes are provided with the separate extract ventilation system.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.4 ADMINISTRATIVE BUILDINGS - contd

3.4.2 Morier House - contd

The light fittings appear to be of energy efficient type with some areas with halogen spotlights. Lighting within the building is mainly manually controlled.

HWS is generated locally via local electric water heaters.

The building is connected to 23 Hill Street; and both buildings are fed from the same heating boilers.

Morier House performs to 45% and 50% of best practice for overall and electrical costs respectively.

Recommended energy survey initiatives to analyse:

- Installation of Daylight sensing and PIR lighting controls
- Replacement of the existing Air conditioning plant
- Consider the disconnection of the electric steam humidifiers

3.4.3 Jubilee Wharf

Jubilee Wharf is a 5 storey office block built in 2001 and is currently occupied by Housing and Enterprise Departments.

The building's exterior, including walls and windows, looks to be in good condition, with glazed entrance door normally closed and opened by the receptionists on request.

The lighting within the reception area and other areas of the building is of the energy efficient type however only few areas are provided with PIR for lighting control. Most of the lights are manually controlled on; however, we have been advised that these are controlled via time clock to automatically switch them off.

The heating or cooling to all of the offices is provided via concealed ceiling mounted air conditioning units. These are all fed from the external heat pump units located on the roof. Each floor has dedicated external heat pump with individual controls. The units are in good conditions but with rust at the bases.

Each internal space is fitted with a controller and temperature sensor to control the space temperature. We have been advised that the units are all automatically switched on and off via a centralised controller, located within one of the risers.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.4 ADMINISTRATIVE BUILDINGS - contd

3.4.3 Jubilee Wharf - contd

In addition, each space is provided with fresh air ventilation via ceiling mounted Daikin heat recovery ventilation units (74% efficient).

The ancillary areas are heated via local electric heaters fitted with timers and thermostats.

The lights are mainly manually controlled and it is recommended that some of the areas, e.g. WCs, should be fitted with PIR sensors. Some of the offices have a great amount of the daylight and therefore the daylight sensing could save some lighting energy.

The hot water is generated via local electric water heaters.

Jubilee Wharf performs to 44% of best practice costs both for overall consumption and for electrical only.

Recommended energy survey initiatives to analyse:

- Installation of automatic lighting controls
- Installation of time clock to all of the electric water heaters

3.4.4 Howard Davis Farm

Howard Davis Farm is currently used by Department of Environment. Originally the building was a farm built in 1869 and is a listed building. The building does not seem to have wall or roof insulation; and the windows are single glazed sash windows (with the exception of a couple that have been replaced). Predominantly, works have been carried out to renew and draught proof the existing windows rather than replacing them, but the old windows are very draughty and the whole building would benefit from secondary glazing or new double glazed windows.

The heating is provided mainly via radiators and local fan convectors; all fed from the oil fired boilers. The boilers and the primary pumps are very old and the paperwork found within the boiler room indicates that these are 26 years old. Domestic hot water is also generated via an oil fired boiler which looks to be of a similar age to the heating boiler. The main primary pumps are also very old and ready to be replaced with new.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.4 ADMINISTRATIVE BUILDINGS - contd

3.4.4 Howard Davis Farm - contd

The lighting in some areas of the building looks very old, possibly 30-40 years, and the existing inefficient lamps should be replaced with new energy efficient light fittings. All lights are manually controlled only and some areas could benefit from daylight and PIR automatic controls.

In addition to the main Building, there is also a single storey building, built back in the 1970's. We have been advised that the walls and roof have most likely not been insulated; however, the building has good quality double glazed PVC windows. The standalone building is heated via local electric heaters fitted with thermostats and timers.

As part of the development, there is greenhouse which is also heated during cold weather via a standalone external oil fired boiler with separate oil tank.

The greenhouse is also fitted with high sodium lighting to provide the required condition for the tested plants, although these are also used only when necessary.

Howard Davis Farm is one of the worst performing administrative buildings and costs are 145% of typical overall cost (265% of best practice) and 345% of typical electrically (570% of best practice). This means there should be good scope for making savings.

Recommended energy survey initiatives to analyse:

- Replacement of single glazed windows or provision of secondary glazing
- Replacement of the existing heating boilers
- Replacement of the existing hot water boiler with local electric water heaters
- Replacement of the existing primary heating pumps
- Replacement of the heating controls
- Replacement of the existing old light fittings with energy efficient light fittings
- Installation of automatic lighting controls

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.4 ADMINISTRATIVE BUILDINGS - contd

3.4.5 Liberty Wharf Phase I

Liberty wharf is a 5 -storey office building occupied by the Tourism Department, complete with Tourist Information Office located at the Ground Floor. The building was built in 2007 and its external facade is a curtain wall construction with full height double glazed windows.

Heating and cooling to all of the offices is provided via ceiling mounted AC units with the heat pump units located at the roof Level (one per floor). The units are controlled via local controllers only, without a centralised controller. Some of the open plan offices have been fitted with more than one controller to provide individual control of each of the units serving that area.

The ancillary areas are heated via local electric heaters, all fitted with timers and thermostats.

The windows cannot be opened and the fresh air is provided to all occupied spaces via one concealed ceiling mounted VES supply unit complete with electric heater battery.

The hot water is generated via local electric water heaters.

The majority of the offices are fitted with daylight sensors as well as PIR sensors; however, some of them have been removed on the request of the user.

Liberty Wharf performs fairly well compared to benchmarks, costing 120% of best practice overall and 115% of best practice electrically. However, due to the age of the building, it should be expected to perform better.

Recommended energy survey initiatives to analyse:

- Installation of the time clock to all of the electric water heaters

3.4.6 States Building

The States Building is a listed building built in 1866 and comprises of The Royal Court and States Chamber. The building underwent a major refurbishment around 20 years ago; although it is believed that the building has very little, if any, cavity or roof insulation, but is double glazed. The building is heated via a variety of old cast iron radiators, low level heating pipes, air displacement units and concealed ceiling mounted heat pump units (Versatemp) which provide energy efficient heating or cooling to the space. Each space is provided with a local controller and temperature sensor in order to provide independent room control.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.4 ADMINISTRATIVE BUILDINGS - contd

3.4.6 States Building - contd

The main source of heating is from two Hamworthy oil fired boilers which also serve the domestic hot water calorifier.

The fresh air is provided via 3 no ventilation units; all complete with cooling and heating coils. The heating coils are fed from the boilers and the cooling coil is served via external Daikin chillers located at the Roof of the building.

This is a very complex system and the maintenance staff/building user would benefit from a better understanding of the system and the controls associated within the building.

The lights are mainly manually controlled and it is recommended that some of the areas, e.g. WCs, should be fitted with PIR sensors. Some of the offices have a great amount of daylight and, therefore, could benefit from automatic daylight sensing control.

The benchmarking exercise indicates the building costs 65% of best practice overall and 90% of best practice electrically.

Recommended energy survey initiatives to analyse:

- Additional cavity and roof insulation
- Installation of automatic lighting controls
- Staff training to provide them with better understanding of control of installed heating and air conditioning systems

3.4.7 Cyril le Marquand

Cyril Le Marquand is a States Administration Building for Finance and Economics Committee and Income Tax Department. It is a 10 -storey building built in 1977. The windows are mainly single glazed metal frame units which are very draughty. Some windows have been replaced with double glazed windows to reduce the draughts.

Heating to the building is provided via a combination of radiators, perimeter convectors and ceiling mounted fan coil units all fed from oil fired boilers at 560kW each. The boilers look to be in good conditions with efficiency of 88% according to the documents found within the plantroom.

Part of the 9th floor is heated via local electric heaters; all complete with time clocks and thermostats.

The fan coil units are also served via chilled water to provide cooling during summer months. Chilled water is generated via an external air cooled 128kW chiller.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.4 ADMINISTRATIVE BUILDINGS - contd

3.4.7 Cyril le Marquand - contd

The low level perimeter convectors keep the space very warm and it is impossible to control them which wastes energy and provides an uncomfortable environment for the staff.

The hot water is generated via a 1200 litres calorifier, fed from the boilers. A separate dedicated electric boiler serves the calorifier during the summer months.

There is also a fresh air supply serving ground and mezzanine floors. This is a supply unit with mixing box, heater battery, cooling coil and an electric steam humidifier, which is not necessary.

During the survey the condition within the building was unacceptably hot in a few areas. There are other areas; First Floor Open Plan Office and Third Floor Office, of the building, which are also provided with dedicated fresh air supplies.

Most of the windows were open during the survey and people were using oscillating fans as the temperature was exceeding 24°C even with the local thermostats turned down.

The Power Factor ranges from 0.79 to 0.9 over one year so is worthy of investigation.

The lights are a combination of manually controlled, daylight sensing and PIR sensing. Some areas are fitted with halogen spotlights which cannot be even switched off so are switch on for 24 hours/day. The building has very big windows and would benefit from automatic daylight sensors.

Cyril le Marquand performs slightly below typical for overall costs, at 82%, and above typical electrically a 110%. Due to the high running costs of £180,000, there is a big savings potential in bringing consumption as close to best practice as possible.

Recommended energy survey initiatives to analyse:

- Replacement of single glazed windows
- Revision to the existing heating system or provision for new heating system and/or controls
- Automatic lighting controls and light fittings replacement
- Disconnection of the humidifiers
- Staff training and employing a dedicated building facility manager.
- Power Factor Correction

3.4.8 Maritime House

Maritime House is an administration office for the Customs and Immigration Service. The building was built in 1997. The lighting within the reception area and other areas of the building is of the energy efficient type however only few areas are provided with PIRs for lighting control. Most of the lights are manually controlled and apparently some of them stay on even when the building is not occupied.

The heating and cooling to all of the offices is provided via concealed ceiling mounted ducted air conditioning units.

Each internal space is fitted with a controller and temperature sensor to control the space temperature.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.4 ADMINISTRATIVE BUILDINGS - contd

3.4.8 Maritime House - contd

These are all fed from the external heat pump units located within roof top plantroom. Each floor has dedicated external heat pumps with centralised controls located within the dedicated riser. The external units look old and are rusting. The ancillary areas are heated via local electric heaters fitted with timers and thermostats.

The hot water is generated via local electric water heaters.

In addition, each space is provided with the fresh air ventilation via ceiling mounted Daikin heat recovery ventilation units (74% efficient).

The lights are mainly manually controlled and it is recommended that some of the areas, e.g. WCs, should be fitted with PIR sensors. Some of the offices have a great amount of the daylight and therefore the automatic daylight sensing controls could be beneficial.

Maritime House performs poorly where cost is concerned with an overall cost of over double that of the typical benchmark for this type of building. This may be due in part to being entirely electric; however there will be the opportunity for savings by improving control and reducing waste.

Recommended energy survey initiatives to analyse:

- Installation of automatic lighting controls
- Installation of the time clock to all of the electric water heaters
- Replacement of the Heat pump system due to its age and condition

3.4.9 Philip le Feuvre House

Philip Le Feuvre House is an office block in La Motte Street which houses the Employment Social Security Department. The building is a five storey office block originally built in 1977 with an additional courtyard extension built in 2003. In 2007 Philip Le Feuvre House was refurbished and connected to the adjacent Huguenot House to increase the available space.

Currently both buildings share an open plan reception, cashier and training areas. The whole building is heated via ceiling concealed heat pump units with the external condensing units mounted on various parts of the roof.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.4 ADMINISTRATIVE BUILDINGS - contd

3.4.9 Philip le Feuvre House - contd

All ancillary areas are heated via local electric heaters. Also the Ground Floor area is provided with perimeter electric heaters only used when the outside temperature is very low.

There are 3 No. AHU's providing fresh air to all occupied areas. One AHU serving Ground Floor, a second AHU serving Pensions Department and the third unit serving the remainder of the building.

The Domestic Hot Water for the Ground Floor is generated via 145 litre Heatrae Sadia electric water heater. The hot water pipework serving the WHB is also trace heated to maintain the hot water temperature.

The hot water to other areas is provided via local 10 or 15 litre electric heaters.

There is also a 170 litre Megaflow electric heater to generate hot water to serve the First Floor Kitchen, although currently the kitchen facilities are not in use.

The majority of the lights are controlled via PIR sensors.

Philip le Feuvre house is another office building that is entirely electric and; similarly to Maritime House, performs at just over double good practice, so there is clearly scope here for making savings.

Recommended energy survey initiatives to analyse:

- Replacement of the supply AHUs with new incorporating thermal heat recovery
  Replacement of the chillers and condensers with new
- Automatic lighting controls

3.4.10 Fire Station

The Fire Station is situated within a 3 storey building, with the original part; and a new extension built back in 1977. The building is of block construction with slightly pitched roof and single glazed windows. It is also believed that there is no wall cavity insulation; and the rooms cool down very quickly once the heating has been turned off.

The Ground Floor is mainly garage space for Fire Engines and a workshop with storage space and a Control Room.

All of the offices, sleeping area and staff Canteen are located on the First Floor. More offices and a server room are located on the Second Floor.

The Ground Floor garage space is heated via high level unit heaters fed from the oil fired boilers.

3.4 ADMINISTRATIVE BUILDINGS - contd

3.4.10 Fire Station - contd

The majority of the offices are heated via local air source heat pumps which also provide the cooling during summer. Each unit is provided with independent local controller. The remaining building is heated via radiators fed from the oil fired boiler. All radiators are fitted with TRVs.

The hot water serving the kitchen, showers and WHBs is generated via dedicated oil fired water heater located within the Boiler Room. We could not establish the age of the boilers as they are located below the floor level. The lighting within the building is via compact fluorescent or T5 type lamps and all are manually controlled.

The fire station performs well and costs just under best practice for both total energy and electrical alone.

Recommended energy survey initiatives to analyse:

- Replacement of the single glazed windows with double glazed windows
- Cavity and roof insulation
- Improved lighting control by daylight sensing and PIR controls
- Replacement of the heating boilers, pumps and controls
- Replace garage and workshop heating with electric radiant

3.4.11 Police Station – Overview

There are four separate premises currently utilised for States police duties and administration, all in the same Rouge Bouillon area. The Police Headquarters and Rouge Bouillon Station are located on the same compound, on opposite sides of the main car park. The Summerland building and Broadcasting House are two other nearby buildings, but on the other side of the main road. Only parts of these two buildings are occupied by the police force.
The only property for which dashboard data exists is the Headquarters Building itself, so this will be benchmarked as other administrative buildings have been. The other buildings have been surveyed however; and the findings documented below.

With the exception of the Rouge Bouillon Station extension, all buildings have been built for purposes other than a police station. Each building has been acquired to accommodate the expanding police force over the years and the common theme for all is that they are all in poor condition.
Plans are being prepared for a new purpose built police station, which would affect the decision making and the expenditure to maintain/improve the existing buildings.

The occupancy numbers could not be accurately determined. However, it was advised that maybe 130 could be accommodated across all four buildings, Monday to Friday and many during shift patterns. It was further estimated that 60 could be on the sites over the weekend. Regardless of numbers, all of the buildings have some areas that are manned 24 hours per day.

3.4.11.1 Police Station Headquarters

This building was originally constructed for use as a school. The year of construction has not been determined, but it is believed to be circa 1965. The majority, but not all windows have been replaced as double glazed, uPVC framed. The services infrastructure within the building are out dated and beyond design life.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.4 ADMINISTRATIVE BUILDINGS - contd

3.4.11.1 Police Station Headquarters - contd

Photo 2.1 Police Station Headquarters (right hand side of compound)

Heating is provided via the central LTHW system, with the boiler room located in the basement. There is currently a single oil fired boiler rated at 186 kW, which is in a poor but functional condition. The second defective boiler of the same capacity has been removed. Refer to photo. It has been reported that a new No2 boiler has been instructed so that standby exists if boiler No1 develops a fault.

There are radiators of differing types throughout the building; some have TRVs, while others in areas such as corridors do not.

A number of zones have heating or cooling provided by split type AC units. All operate with R22 refrigerant and the majority of condensers were seen to be in good condition.

There is little in the way of mechanical ventilation. Some localized extract fans were observed that serve the changing rooms and washrooms. All perimeter offices were dependant on openable windows for natural ventilation, which is detrimental to any heating efficiency in the building. Refer to photo above.

Some internal offices and rooms with specialized police duties have mechanical fresh air and extract. These are all manual on/off switching.

The lighting was provided by many different types of luminaires and were all switched locally. All rooms switched on/off manually, leaving potential for lights on while rooms are unoccupied. Many areas are in 24-hour use (shifts), so lights continuously switched on. No PIR occupancy sensors were observed and no low energy LED type lighting was installed.

Cold water services throughout the building are believed to be mains fed and no storage tanks reported. It has been advised that water pressure noticeably drops during times of peak demand.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.4 ADMINISTRATIVE BUILDINGS - contd

3.4.11.1 Police Station Headquarters - contd

The wash hand basins in the washrooms and changing rooms have percussion operated taps to minimise water wastage.

Hot water services are provided by the plate heat exchanger and 500L buffer tank located in the basement boiler room. The plate heat exchanger is connected to the LTHW heating system and single oil fired boiler and is in good condition.

- One old, but functional, oil fired boilers installed and second defective one removed
- General M&E Services within the building are old and nearing their design life end
- 16No condenser units observed
- Wall mounted radiators installed with TRVs, some without
- Perimeter zones have natural ventilation via openable windows; undesirable during heating season
- Many areas are operational 24 hours per day and lighting is on for the duration; all areas have manual on/off light switching regardless of room being occupied

Recommended energy survey initiatives to analyse:

- Recommendations depend on whether the police continue to use this building; investment may not be wise, bearing in mind the tired building, obsolete M&E Services and if the Police are relocating to new premises
- If investment were instructed, then LED lighting and PIR occupancy sensors would be recommended

3.4.11.2 Rouge Bouillon Station

Part of the building is listed status and is of the same structure that accommodates the Jersey Fire Brigade. The main structure was originally built as a military arsenal in 1910. The newer extension that is now the public enquiry office and custody cells, was built in 1970 and purpose built for police use.

Heating for the building is provided by a LTHW system with a central ground floor boiler room. There are two oil fired boilers each with output rated at 115kW. Refer to photo below. The oil is supplied from the internal steel storage tank.

Ventilation was generally seen to be via opening windows in perimeter zones, which is detrimental to efficient heating. No central AHUs or large fans were identified. Small, local extract fans are installed in places such as washrooms and interview rooms. The interview room fans are reversible and reportedly incorporate electric heater batteries.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.4 ADMINISTRATIVE BUILDINGS - contd

3.4.11.2 Rouge Bouillon Station - contd

Some internal rooms had heating/cooling provided by split unit type AC units.

Condensers seen to be in good condition, but suspect that they operate with R22 refrigerant.

The lighting throughout was not of uniform type and were all switched locally. All rooms switched on/off manually, leaving potential for lights on while rooms are unoccupied. Many areas are in 24 hour use, so lights continuously switched on. No PIR occupancy sensors were observed and no low energy LED type luminaires were installed.

- Two extremely old, but functional, oil fired boilers are installed
- General M&E Services within the building are old and nearing their design life end
- Wall mounted radiators installed with TRVs
- Perimeter zones have natural ventilation via openable windows; undesirable during heating season
- Many areas are operational 24 hours per day and lighting is on for the duration. Many types of luminaire. All areas have manual on/off light switching regardless of room being occupied.

Recommended energy survey initiatives to analyse:

- Recommendations depend on whether the police continue to use this building; investment may not be wise, bearing in mind the tired building, obsolete M&E Services and if the Police are relocating to new premises
- If investment were instructed, then LED lighting and PIR occupancy sensors would be recommended

3.4.11.3 Broadcasting House

The building is believed to have been built in 1982 and comprises of ground floor and three floors above. It is poorly constructed thermally, with minimum insulation and has single glazed metal framed windows. Refer to photo below.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.4 ADMINISTRATIVE BUILDINGS - contd

3.4.11.3 Broadcasting House - contd

No central heating or ventilation plant serves this building. The ground and first floors have no heating except localised electrical heaters, switched by occupants as required. The second and third floors are served by a number of split type DX units with 4 way blow cassettes. The condenser units (8) are located on the roof of the nearby Summerland building. It is reported that some of these do not function correctly and require technical inspection. These are believed to operate with R22 refrigerant.

General ventilation throughout is by natural ventilation and openable windows. The toilets located on each floor in central core have extract fans operated by the light switch in the on position.

Hot water services are through the "point of use" electric water heaters, located in each washroom.

Cold water services are supplied by gravity from the roof located water storage tank.

A number of different luminaire types were identified, which were all switched on/off manually. No PIR occupancy sensors were installed and no low energy LED type luminaires were installed.

- General M&E Services within the building are old and nearing their design life end.
- Wall mounted electric heater installed, manual on/off
- Perimeter zones have natural ventilation via openable windows; undesirable during heating season
- Many areas are operational 24 hours per day and lighting is on for the duration; all areas have manual on/off light switching regardless of room being occupied

Recommended energy survey initiatives to analyse:

- Recommendations depend on whether the police continue to use this building; investment may not be wise, bearing in mind the tired building, obsolete M&E Services and if the Police are relocating to new premises

3.4.11.4 Summerland

This building was initially built for use as a fabric factory. It is poorly insulated and has metal framed, single glazed windows. It has been reported that M&E Services were improved as part of a refurbishment in 2003/04. The intended refurbishment was to be for a temporary Police tenancy and believed to be around 4 to 5 years. This has now extended beyond. In general the building and M&E Services are past their intended design life.

There is a ground floor boiler room close to the main entrance, with a single oil fired boiler rated at 186kW. The boiler provides LTHW, distributed to the pre-heat and main heater batteries of the VES AHU located on the first floor. This VES AHU is the only air handling plant in the building and handles 2.6 m³/s and fan motor rated at 4kW.

3.0 **GENERAL OVERVIEW OF PROPERTIES SURVEYED** - contd

3.4 **ADMINISTRATIVE BUILDINGS** - contd

3.4.11.4 **Summerland** - contd

Office/admin spaces are heated/ cooled by Mitsubishi VRF systems with 4 way blow cassettes. The installation is in good condition except that the condenser units located on the roof have suffered with coil corrosion, likely due to saline atmospheric conditions. Refer to photo.

There are two extract fans located in the AHU room, each estimated to handle approximately 1.7 m³/s. The motor rating could not be determined.

Cold water services are all mains fed and hot water services are all provided by point of use heaters.

A number of different luminaire types were identified, which were all switched on/off manually. No PIR occupancy sensors installed. No low energy LED type installed.

- The building was refurbished with a short term police tenancy in mind
- The building and general M&E Services are in poor condition
- A variety of luminaires are installed throughout; no low energy or PIRs installed
- Five AC condenser unit identified plus three VRF condensers
- A single oil fired boiler in ground floor boiler room

Recommended energy survey initiatives to analyse:

- Recommendations depend on whether the police continue to use this building; investment may not be wise, bearing in mind the tired building, obsolete M&E Services and if the Police are soon relocating to new premises

3.5 **SPORTS AND LEISURE**

3.5.1 **Oakfield**

Oakfield Sports Centre was built in 2005 and is currently used as a sports facility by the State's Education, Sports and Culture. As the Building is of fairly recent construction, it assures that the thermal elements of the building complied with the Jersey Building Bye-Laws at that time (1997 Byelaws), which set relatively high standards. The architecture has been developed to minimise solar gain, such as overhanging eaves and brise soleil that provides shading to the glazing. This sports centre comprises of the ground and first floor level and it does not have a swimming pool.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.5 SPORTS AND LEISURE - contd

3.5.1 Oakfield - contd

Discussions with the department staff indicate an active policy towards minimising energy consumption with the introduction of new energy saving initiatives.

It has been advised, by the Sports Centre staff, that the daily occupancy numbers average approximately 325. Pupils from nearby schools use the facilities between 9am and 6pm. The centre is also used by community groups during some early mornings, evenings and weekend mornings, by arrangement only.

Heating for the building is provided by 3 No. gas fired condensing boilers, each with an output of 135kW.

LTHW circuits from the boilers serve the under-floor heating in the sports hall and changing areas on the ground floor. LTHW heater batteries are incorporated into the AHUs serving the changing rooms and the first floor fitness room and dance studio. The AHUs also incorporate heat recovery.

Radiators, fitted with TRVs are installed in the ground floor lobby and first floor landing.
The heating plant is located within the dedicated plantroom accessed from the west side of the building. The plantroom M&E installation is well laid out, tidy and all equipment was seen to be in good condition. Metal clad thermal insulation is installed throughout the plantroom. Thermal jackets are installed around valves to further reduce system heat losses as seen on photo.

Air conditioning units have been installed in the fitness room and dance studio located on the first floor. The AHU and heater battery in each of the two rooms are interlocked with the AC units so that simultaneous heating and cooling cannot occur. The on/off operation of the AC units is manual and therefore presents the potential to be left switched on while the rooms are unoccupied. The eight condenser units are located within a secure enclosure at the east façade.

The domestic hot water is pre-heated through two solar collectors with the main hot water heating is through two indirect water storage calorifiers connected to the LTHW via plate heat exchangers.

The BMS has a front end user PC located in the lower level plantroom. Unfortunately, the BMS is not networked, so all recorded operating data must be transferred by manual means (i.e. handwritten). All equipment is believed to be monitored by the BMS. However, it is uncertain whether the aforementioned AC units are monitored.

Some areas such as the sports hall, lobby and fitness room have had the light fittings recently replaced with LED type. PIR occupancy sensors are installed in most areas thereby minimising the risk of lighting being left on during unoccupied periods.

Recommended energy survey initiatives to analyse:

- The BMS being network connected
- The on/off function of the AC units installed in the fitness room and dance studio to be reviewed to check for BMS monitoring and also ensure that operation only during occupied periods, e.g. manual on with timed 1 hr off

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.5 SPORTS AND LEISURE - contd

3.5.2 Langford Sports Centre

Langford Sports Centre, located at Mont Millais, St Saviour was built in 2003 and is currently used as sports facilities by the State's Education, Sports and Culture. The Building's fairly recent construction assures that the thermal elements of the building complied with the Jersey Building Bye-Laws at that time (1997 Byelaws), which set relatively high standards. This sports centre comprises of the lower ground floor and ground floor. It also has a swimming pool.

It has been advised by Sports Centre staff that the daily occupancy numbers can be to a maximum of 1500. Pupils from the two nearby schools use the facilities between 9am and 6pm. The centre is also used by community/sports groups during some early mornings, evenings and weekend mornings, by arrangement only.

Heating for the building is provided by 2 No Clyde oil fired boilers, each with an output of 295kW. LTHW circuits from the boilers serve the under-floor heating in the sports hall and changing areas. LTHW heater batteries are incorporated into the AHUs serving the changing rooms and fitness suite.

The pool AHU also incorporates heat recovery; however, it is reported to not be functional and requires attention.

Radiators fitted with TRVs are installed in various common areas such as foyer, lobby and corridors.

The plantroom installation was of clean appearance. The only observation that could be improved upon is the lack of thermal insulation around the heating valves, flanges and ancillary fittings. This is recommended for all installations, as seen at Oakfield Sports Centre; refer to photo.

A pool cover has been installed that is rolled out over the pool surface every night. This offers the benefit of reduced pool water heat loss, lower air humidity, thereby enabling the AHUs to operate with a night setback capability and reduced pool pump circulation. Uncertainty exists with site staff whether the existing AHU and pool plant are set up to operate at a variable capacity during night setback. Further investigation is recommended.

During the survey, the entrance door to the North foyer was routinely left open by visitors entering or leaving the premises. This contributes to heat loss even under normal circumstances. However, this was compounded by the reception/public window being open and the pool hall door to the reception being open. The pool hall has a comparatively high air temperature (28°C) and a positive air pressure. This had the effect of causing a wind tunnel through the reception window, through the open entrance door to atmosphere. This is extremely undesirable in terms of unnecessary heat loss. Refer to photo.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.5 SPORTS AND LEISURE - contd

3.5.2 Langford Sports Centre - contd

It was reported by staff that the gymnasium under-floor heating was ineffectual, perhaps due to the floor covering thickness. As a result of this, natural ventilation louvers had been blocked off at low level to reduce drafts and improve occupant comfort.

Some areas such as; pool hall, lobby and changing rooms have had the light fittings recently replaced with LED type. Switching on/off of lighting in main areas such as pool hall, sports hall and gymnasium is from a bank of switches behind the reception desk. This presents the potential for lights to be switched on during unoccupied times.

The main hot water heating is via the LTHW and through plate heat exchangers with no apparent storage.

Recommended energy survey initiatives to analyse:

- The BMS would be better monitored if connected network connected
- PIR occupancy sensors within the sports hall, gymnasium
- Fit a door closer/automatic control to all exterior entrance doors, consider an additional lobby and exterior doors at North Foyer to reduce "wind tunnel" from pool hall via reception, keep pool hall/ reception door closed
- Investigate the pool hall AHU operation and reinstate/replace the heat recovery
- Install thermal insulation jackets around plantroom valves

3.5.3 Les Quennevais Sports Centre

Les Quennevais Sports Centre, located at St Brelade, was built in 1994 and is currently used as a sports facility by the State's Education, Sports and Culture department. The evaluation of the Building's thermal envelope is considered to be in line with the Building Regulations current at that time. This sports centre comprises of the ground and first floor. It also has two swimming pools in adjoining/ interconnected pool hall.

It has been advised by Sports Centre staff that the visitor numbers to the centre averages approximately 25,000 per month (equating to 820 per day). It has been considered that this number does not reflect the number of sports facility users and would also include casual visitors, observers, parents, supporters, etc. The facilities are open to the general public between 7am and 10pm weekdays and 9am to 5pm at weekends.

3.5 SPORTS AND LEISURE - contd

3.5.3 Les Quennevais Sports Centre - contd

Heating for the building is provided by 2 No gas fired boilers, each with an output of 550kW and a single CHP unit, rated at 109kW heat output and 70kW electrical output. The boilers and CHP units are believed to have been replaced in 2009 and are therefore in very good condition. However, the CHP unit has been installed by Jersey Gas with an additional heat exchanger, located immediately above the unit in the plantroom. The heat exchanger is reported to have been installed post commissioning, to dump excess heat to atmosphere. This is undesirable and raises questions about the unit's selection (refer to photo). During the survey, the controls displayed an electrical output of 72kW, contributing to the Building's consumption of 150kW.

The CHP and gas fired boilers provide LTHW heating to four indirect water calorifiers also located within the plantroom. These provide domestic hot water for the entire centre.

LTHW circuits from the boilers serve LTHW heater batteries incorporated into the AHUs. The pool AHU incorporates heat recovery, heat exchangers that recuperates heat from the exhaust air and transfers it to the incoming fresh air.

Two plate heat exchangers are installed to heat the training and learner pool water. Heat is transferred from the LTHW heating circuit.

Each pool has a cover that is in place at night when the pool is unoccupied. Each pool's circulation pumps (5 total) installed as run/standby are fitted with inverter speed drives. It is reported that the frequency speed drives were introduced in 2010. It is understood that the pool AHU operates at low speed when pool hall conditions allow.

Eight AC/heatpump condenser units were identified throughout the centre, which reportedly operate with R22 refrigerant. It is believed that the replacement of these units is being coordinated and soon to be carried out.

Some areas such as; lobby, reception, changing rooms, cafe and fitness rooms have had the light fittings replaced with LED type in 2010. The pool hall and squash courts followed suit in 2011. The sports hall and adjacent corridors are scheduled to have the lighting replaced with LED type in 2012. PIR occupancy switching exists in some areas.

An observation during the survey recognized that the main entrance doors had inherent design flaws. There are two sets of PIR operated sliding doors that open and close as visitors enter/leave the building. The inner doors are in close proximity to the outer doors and both door sets open when the visitor approaches and passes through, allowing external air to enter the foyer and beyond. The problem is caused by both door sets being so close to each other and no time delay between opening sequences.

The wash hand basins in the washrooms all have spray, percussion operated taps to minimise water wastage.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.5 SPORTS AND LEISURE - contd

3.5.3 Les Quennevais Sports Centre - contd

The BMS is networked and monitored by management at Fort Regent.

Recommended energy survey initiatives to analyse:

- Conduct a CHP evaluation to ensure that it is operating at its optimum performance and to better utilise the "dumped" excess heat currently wasted at the air cooled exchanger; do the JEC "buy back" electricity?
- PIR occupancy sensors within the sports hall when the LED lighting is installed
- The introduction of additional heat saving measures may be counterproductive on this site due to the installation of the CHP unit

3.5.4 Les Quennevais Playing Fields

Les Quennevais Playing Fields, located at St Brelade, are on the grounds that surround the Sports Centre. The grounds consist of multiple sports playing fields, various sports club houses and two changing pavilions (main and small). The sports clubs such as; lawn bowls, pétanque, croquet, tennis clubs and crèche are believed to be separately metered and not included within the survey.

The main pavilion, as shown above, also accommodates the crèche, which is reportedly metered separately. The hot water for each of the eleven changing rooms is provided by 3 No. Domusa 27-55kW oil fired boilers, which are reported to operate via time clocks. The time clock switching on/off times may require attention as grounds staff have reported the availability of hot water when the changing rooms are unused. Oil meters have recently been installed to monitor oil consumption from the nearby oil storage tank.

The small changing pavilion has two domestic hot water storage heaters, each with a 60kW oil fired burner. The burner operation is reported to operate via the time clock. This also requires checking for suitable on/off times to suit changing room use. Oil meters have recently been installed to monitor oil consumption from the nearby, dedicated oil storage tank.

The playing field has a number of areas that have flood lighting, such as; tennis courts, astro-turf pitches and the football pitch. It has been advised that each flood light has a 2kW input. All flood lights are switched on/off by grounds staff when each pitch/court is used. The staff work daily shift hours to accommodate the potential for late finishes in the evening.

The tennis courts have 8 pylons, each with 2 lamp fittings. However, even though the tennis club is separately metered, it is reported that the floodlights are switched from the Sports Field's metered supply.

The astro-turf pitch has 8 pylons with a total of 16 lamps. The football pitch has 4 pylons with a total of 16 lamps; see photo.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.5 SPORTS AND LEISURE - contd

3.5.4 Les Quennevais Playing Fields - contd

The lights in the small and main changing pavilion are switched with timed on rocker switches to reduce the possibility of lights being inadvertently left on.

There are three borehole pumps located at the western perimeter of the site that provide the playing field irrigation water.

The mains cold water services for the site has not been confirmed and if separately metered to each of the leased club houses.

Recommended energy survey initiatives to analyse:

- Solar collectors for each changing pavilion to provide domestic hot water.
- Confirm the site's electrical and mains cold water services, identify all buildings and their respective meters, as uncertainty currently exists

3.5.5 Fort Regent Sports Centre

Fort Regent Sports Centre was built circa 1814 as military fortification. The decision to develop the fort into the sports/leisure centre was taken in 1967. The main roof was added in 1974, Gloucester Hall in 1978 and Queens Hall in 1988. The Fort is currently used as sports facilities and concert venue by the State's Education, Sports and Culture.

The facilities are open to the general public between 7am and 10pm weekdays and 9am to 5pm at weekends.

There are a number of buildings/areas within the Fort that are leased to tenants and are separately metered. These are believed to include; the Sea Cadets, the nursery, the signal station and the Modern Hotels Group that operate the Piazza café and catering. These areas have been omitted from the survey.

There are two areas of the Fort that are run down, unoccupied and no longer functional, which are the cable car building and the swimming pool. These areas have also been omitted from the survey.

The Building's thermal envelope is a mixture of dense granite within the surrounding ramparts, steel with single glazing of the enclosing roof and brickwork for the Queens Hall (refer to photo), which show all of construction elements from different eras. Further observations that are revealed from this particular photo are the quartz radiant heaters and the lighting switched on. The radiant heaters are most appropriate for this particular application with high ceilings and poor thermal values of the envelope. The lighting is switched on despite the evident high levels of sunlight passing through the glazing. It is feasible to introduce daylight sensors in these open spaces to switch lighting on only during periods of insufficient daylight.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.5 SPORTS AND LEISURE - contd

3.5.5 Fort Regent Sports Centre - contd

All services throughout the entire site, whether heating or provision of domestic hot water is through electrical power only. Due to the large area of the site and piecemeal additions to the site during recent decades, there is no central plant and all equipment is installed locally to each of the areas served, therefore explaining the higher than expected electrical energy consumption and costs.

Heating in the large open areas such as the Piazza, Queens hall, Gloucester Hall and common walkways are through the use of quartz radiant heaters. Information has been provided that estimates a total of 838kW radiant heating if all switched on. However, only selected quartz heaters are switched on (refer to photo below).

The gymnasium at the North end and admin offices within the Queens Hall are heated/ cooled through the use of Daikin heat pumps (15No.). The AC units are scheduled for replacement as all existing units operate with R22 refrigerant. The changing rooms, dance and martial arts studios located along the southern ramparts and two along the northern ramparts are heated by VES AHUs with electrical heater batteries. There are nine AHUs, each with 30 kW electrical heater batteries. These AHUs and heater batteries are operated by PIR occupancy sensors. It has been reported that all of these AHUs operate with half heating capacity (15kW) to conserve energy, without compromising occupancy comfort.

The domestic hot water heating is through localized hot water storage heaters (9No.), totaling 53kW electrical power.

It has been reported that LED lighting is being scheduled to replace existing lighting in the Gloucester Hall, queens Hall and Piazza area. Other areas such as the gym and fitness studios already have LED lighting and PIR occupancy sensors. The six squash courts also have PIR occupancy controlled lighting.

All cold water points of use are supplied from mains water and it is understood that there are no water storage tanks. Washroom taps are spray percussion type, which minimise the potential for water wastage.

Access to Fort Regent from the main Pier road car park is via the two escalators. The escalators are in continuous operation during the open hours of the centre. It has been reported that their electrical power is supplied from the leisure centre.

All long term recommendations depend on future plans for the site, as it is understood that the future is under intense scrutiny and the subject of much public/political debate.

In the event that major development of Fort Regent goes ahead, then improved M&E Services infrastructure should be considered. It may be feasible to incorporate district heating services from the newly commissioned waste incinerator at La Collette. The free heat could also be used with absorption chillers if the development required cooling/air conditioning.

Recommended energy survey initiatives to analyse:

- Daylight sensors to all areas where glazing allows sufficient sunlight

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.5 SPORTS AND LEISURE - contd

3.5.6 Springfield Sports Centre

The Springfield Sports Facility and Stadium were built in 1996 and currently used by State's Education, Sports and Culture. The facility is divided into two buildings known as the Community hall building and the Grand Stand building. The evaluation of the Building's thermal envelope is considered to be in line with the Building Regulations current at that time, which is relatively energy efficient. The Community hall building comprises of the ground and first floor, whilst the Grand Stand building comprises ground, first and second floors. The centre does not have a swimming pool, but has a football ground with floodlighting.

The Building has two areas that are sub-leased to two tenants that operate a crèche and a cafeteria. Each of the tenants has separate electrical and gas meters. However, the utility bills are billed direct to the Sports Centre and each tenant is then sub-charged, based upon their meter readings.

It has been advised by Sports Centre staff that the monthly occupancy numbers are approximately 15,000, averaging at around 490 per day. The gym and fitness centre are open to the general public, while the sports hall and function room (Blue room) are used by community groups by arrangement only.

Heating for the Community hall building is provided by two separate boiler rooms, each with a single Clyde gas fired boiler, with an output of 92kW. One boiler room serves part of the ground floor and crèche. The other boiler room serves the remainder of the ground floor and part of the first floor. The sports hall on the first floor is heated by a gas fired radiant heater system at high level. It has been advised that this is only used on Wednesday evening when the ladies bingo night is held. All other heating in the Community building is through LTHW circuits from the boilers serving wall mounted radiators fitted with TRVs.

The Grand Stand Building has all electric heating either by AC/heatpump or wall mounted electric radiators. All existing AC units operate with R22 refrigerant. The "Blue room" function room on the first floor has 4 No ceiling cassettes.

Some areas such as the gymnasium, lobby and changing rooms have had the light fittings recently replaced with LED type. The lighting in the sports hall has been re-designed and replaced with fewer light fittings and with lower energy lamps. PIR occupancy sensors have been installed in many areas to minimise lights being left switch on unnecessarily.

The football pitch has floodlighting, comprising of 4 pylons with a total of 40 lamps. It has been advised that each lamp has an input of 2kW and the pitch usage with floodlighting is, two evenings per week during the football season, estimated to be 40 floodlight matches per season. There is also lighting at high level, underneath the stadium canopy that is separately switched.

The changing rooms (home and away team) have domestic hot water supplied from the nearby electric hot water storage cylinders. The 2 No 300 litre Megaflo cylinders, each with 12kW heating are located in the store room behind the bar area. The switching of these is by a timed on switch (max 6 hrs) that are usually switched on before a football match.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.5 SPORTS AND LEISURE - contd

3.5.6 Springfield Sports Centre - contd

The BMS is standalone and accessed via the ground floor boiler room. An Enviromon monitoring system has been installed to monitor the domestic hot water temperature and air temperatures in the changing rooms and gym areas. There is a PC monitor located on the reception desk that can be used to access this system. It has been reported that nuisance call out charges by service contractors has been reduced due to this system's recent introduction.

Recommended energy survey initiatives to analyse:

- The four AC units located in the "blue room" are manually controlled on/off. It has been reported that they can be left switched on after the room has been vacated. Timed on switching, say 1 hour, can be installed

3.6 LA MOYE PRISON

As Jersey's only prison, HM Prison La Moye is mixed-use and so has to provide accommodation for men, women, young offenders and vulnerable prisoners. Consequently, there are four distinct areas of the prison which have been set aside for each category of inmate.

The prison was opened in the mid 1970's and originally built to house 150 inmates, although there has been significant development over the past ten years and whilst there is theoretical capacity for over 300 inmates, due to the need for segregation, the actual capacity could never reach anything like that level. This will inevitably result in higher levels of energy consumption than other prisons using the standard benchmark of kWh/per prisoner.

Diagram 1: Site Plan as at end of 2009

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.6 LA MOYE PRISON - contd

The shaded areas of the plan above indicate the original 1970's construction which is generally 2 storeys high, constructed of pre-cast concrete panels with a flat roof and single glazed. In addition, there are some workshops of steel portal frame construction and heated green houses.

The later developments include:

2001 - Control Room (Orange)
2003 – Phase 1 – RTU (Red)
2004 – Temp Classrooms (Green)
2006 – Phase 2 – Kitchen and J Wing (Purple)
2009 – Phase 3 – K and L Wing and Multi-purpose Block (Yellow)

The new developments are a mix of 2 and 3 Storey and of traditional and prefabricated construction, but are mostly of well insulated cavity construction with block work outer skins and standing seam roofs.

A new visitor's centre is nearing completion adjacent to the entrance; and there are plans to completely redevelop the original buildings over the next 5 – 15 years as indicated on the model to the left, although most of the future phases are yet to have funding approved.

Most of the prisoner accommodation is currently within the new blocks, with the existing blocks converted to other use, i.e:

E and F Wing – Original 1970's – Basic Regime and Segregation 57 Cells, all currently empty
G Wing – Original 1970's – Outside Workers 27 Cells, 6 currently occupied
H Wing – Phase 1 2003 – Women Prisoners 35 Cells, 14 currently occupied
J Wing Phase 2 – 2006 – Vulnerable Prisoners 62 Cells, 35 currently occupied
K Wing Phase 3 – 2009 – Remand and Young Offenders 58 Cells, 37 currently occupied
L Wing Phase 3 – 2009 – Enhanced Remand 88 Cells, 74 currently occupied

The current occupation level is slightly below the average of around 180, but that is still well below the maximum theoretical capacity. Two of the original 1970's blocks have been "mothballed" thermally by means of manual isolation (blocks 14 and 19); and three further blocks are partially mothballed (blocks 11, 13 and 16).

The original Prison was heated by central HTHW boilers with a fully ducted distribution via underground ducts, although problems with corrosion of the site mains resulted in a decentralisation project in the late 1980's, which saw the formation of 4 additional boiler rooms within old calorifier rooms feeding the local accommodation and other Calorifier rooms where the installation of boilers was not feasible.

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.6 LA MOYE PRISON - contd

Two of the workshops have electric heating via the mechanical ventilation system, one a stand-alone carpentry workshop built around 10 years ago (block 28); and the other a 1980's extension to the main block (block 18).

All of phase 2 and 3 are heated by a wet underfloor system; and all have their own boiler plant with the exception of:

- The Multi-Purpose Block – which is fed from J Wing
- The Control Room – which is fed from the old stores boiler

All the recent developments have mechanical ventilation systems which recover the heat from the toilet and other building extracts, but most of the 1970's accommodation is naturally ventilated. The only cooling on the site is to the control room block, which houses the main site server.

In addition to the building heating, some of the green houses were heated during the winter months to assist plant growth which obviously is very wasteful; and if it were possible to find a waste heat source for this, both energy savings could be made; and heating periods extended.

The only gas on site is bottled LPG used for catering purposes.

The site is controlled by a Honeywell BMS, which appears to be well understood and utilised by the site engineers. The new cell blocks are intended to have their temperature set back at night to 16°C, although this was not represented on the BMS. Assuming it works, this facility would allow the heating in empty cells to be set back when not in use (subject to resolving operational issues).

Whilst thermally, the prison performs well relative to UK benchmarks, electrical consumption is much higher. Part of the increase in electrical consumption is the availability of televisions, IT and kettles in every cell.

The site has three incoming electrical supplies, one high voltage and two low voltage. As part of the next phase of the site development, it is proposed to install a second transformer to pick up the two LV supplies which will result in a reduced tariff, thus if this element of works can be advanced, savings will be realised sooner.

Although there is a lighting control system (APEX) in the newer cell blocks, which the users are endeavouring to maximise the benefit of, during the survey it was noted that lights were on (albeit only 25% of the tubes) when there was sufficient natural daylight to not need artificial lighting.

The areas where the user has identified potential excessive consumption are:

- Laundries – Used continuously by inmates with no thought to energy usage
- Heated food cabinets – There are 7 of these, each rated at 6kW, which have no time control and therefore rely solely on staff remembering to control them
- Lighting – Change external security lighting to LED

Recommendations:

- Bring forward the installation of the new transformer (currently planned for phase 5 in 3-4 years' time) – this will reduce the electrical tariff for 40% of the site load.
- Install timers on cell block servery hot plates (rated at 6kW each)
- Install CHP and central HWS distribution to laundries
- Install controls to set back heating in un-used cells
- Change flood security lighting to LED
- Improve control on greenhouse heating

3.0 GENERAL OVERVIEW OF PROPERTIES SURVEYED - contd

3.6 LA MOYE PRISON - contd

Recommendations - contd

- Replace boilers installed in late 1980's
- Solar Thermal for HWS
- Thermal Insulation of heating distribution at high level in circulation areas
- Valve muffs in plantrooms
- Insulate Plate Heat Exchangers in Calorifier rooms
- Review Greenhouse heating
- Switch to E7 tariff

4.0 RESULTS OF BENCHMARKING AND ELECTRICAL DATA ANALYSIS

Here the dashboard data provided is compared to benchmarks for the relevant type of property. It is noted that due to the latitude of Jersey, it is expected heating and lighting costs would outperform the UK benchmarks used by 20% to 30%; however the benchmarks have not been adjusted as not all benchmarking guides are separated into these elements.

There were also additional discrepancies with some of the dashboard data. Les Quennevais Playing Fields consists of a number of buildings and there is uncertainty about which of these are actually on the meter that the dashboard has been provided for.

The administrative buildings exhibit the biggest issues with dashboard data. Where South Hill is concerned, we have been advised that the dashboard data is only available for one of the three meters servings the site, which covers only the electrical supply to the first and ground floor. All other electrical supplies serving the second floor and porta-cabins are not included in the dashboard. The energy calculations have been based on the ground and the first floor area including the original second floor area.

The Police Headquarters consist of one main building and three others that the police occupy; it is not known whether the dashboard only accounts for the main building, or any of the others as well. It is assumed that the data corresponds to the HQ building only, as this is known to have a separate meter and the results correlate with the benchmarking.

Philip le Feuvre has been modified since its original build date to share space with the neighbouring building. We have been advised that there is now only one meter for both buildings, so the total floor area has been used for benchmarking.

After discussion it was not ascertained if Morier House and Hill Street have a single or separate electricity meters. Both building are heated via the same oil fired boilers so for the purposes of benchmarking the total floor area has been used.

It has been confirmed that the electrical dashboard data for Howard Davis Farm is incorrect and the data is not available. As such the figure for total cost in 2010 was used for benchmarking.

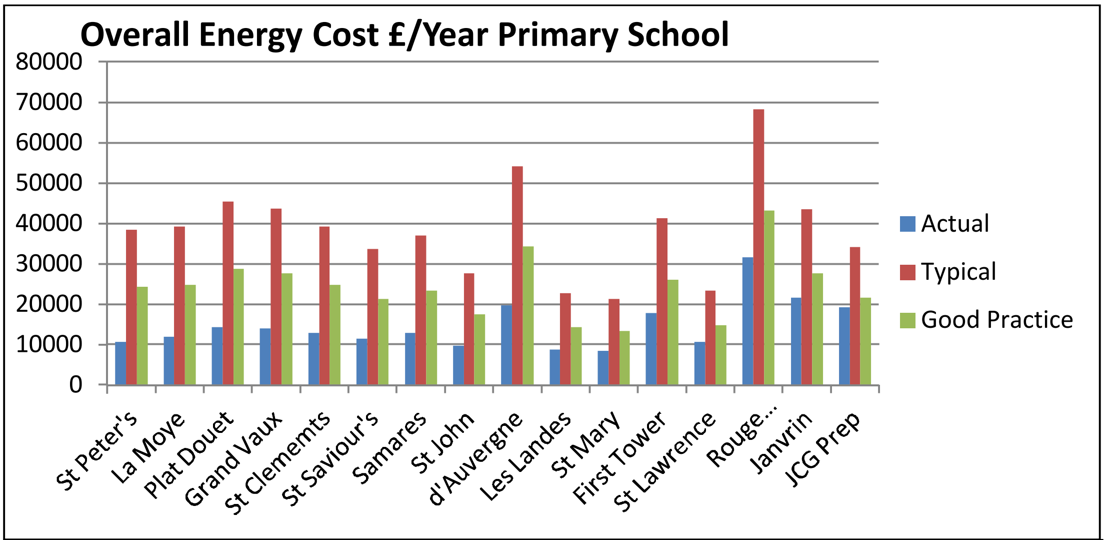
Similarly, there were no dashboards available for the fire station so previous electricity and oil bills were used.

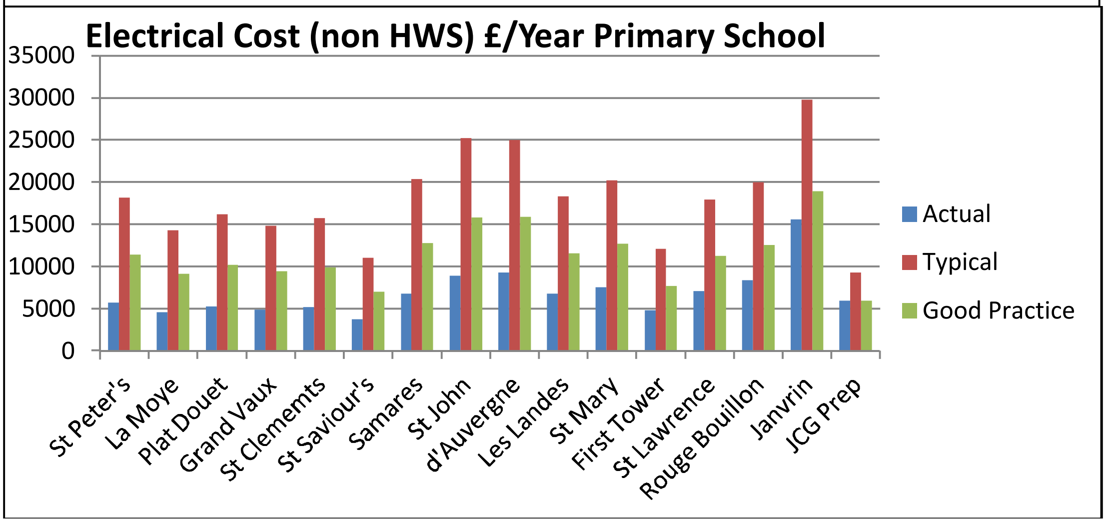
The dashboard data for Maritime House has also been confirmed as incorrect and so the electrical billing figures for 2010 were used instead.

4.1 PRIMARY SCHOOLS

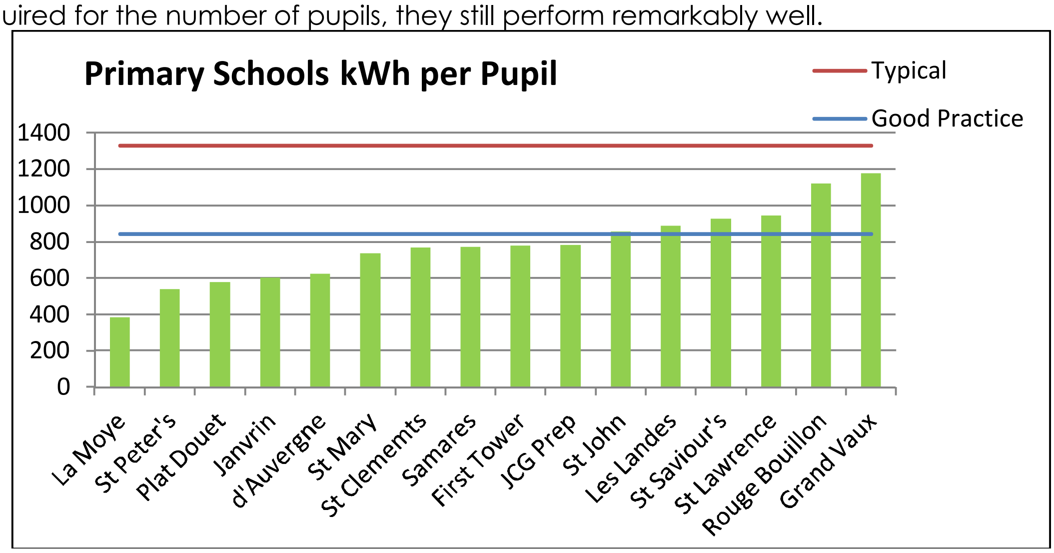
The benchmarking exercise indicates that the overall consumption of all the primary schools studied is between 45% and 90% of good practice, as shown below. One reason for such good performance is expected to be due to the location of the sites compared to the UK average, as explained at the start of this section. This does not, however, explain why the primary schools in particular perform so well relative to the benchmarks, compared to other properties surveyed. We believe this is due to the fact that each school has its own caretaker and during the surveys it became clear that the majority are very motivated to save energy wherever they can in order to reduce the running costs and stretch their budgets further. The majority of the schools have relatively simple systems and so it is feasible for caretakers to be able to take it upon themselves to manage energy usage. This is borne out by the fact that the smaller schools generally perform better than the larger ones.

The electrical only costs show a similar pattern to overall costs, with schools performing between 50% and 100% of good practice. Despite this, it was obvious during the surveys that there is certainly scope for further savings with recurring issues such as improving lighting controls, replacing spotlights and fitting timers on water heaters; albeit that with relatively low energy costs (typically £8-10,000.00 per School).



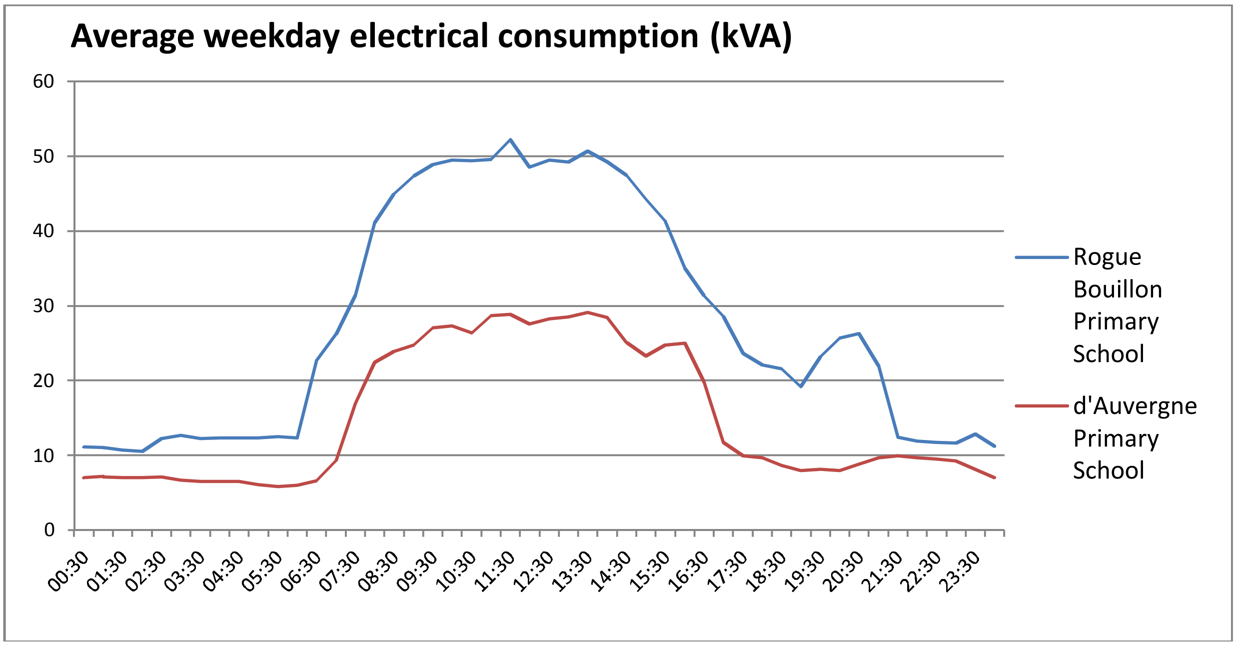


The energy consumption per pupil is primarily higher relative to benchmarks, with five of the schools being greater than good practice; however, this is due to the schools being under-populated compared to standard practice. For example, the typical area per pupil is 6m², whereas Rouge Bouillon and Grands Vaux provide 13.3m² and 16.5m² respectively. This 'excess' area is still heated, as no parts of the schools are mothballed, so given that these school are heating over double the area required for the number of pupils, they still perform remarkably well.

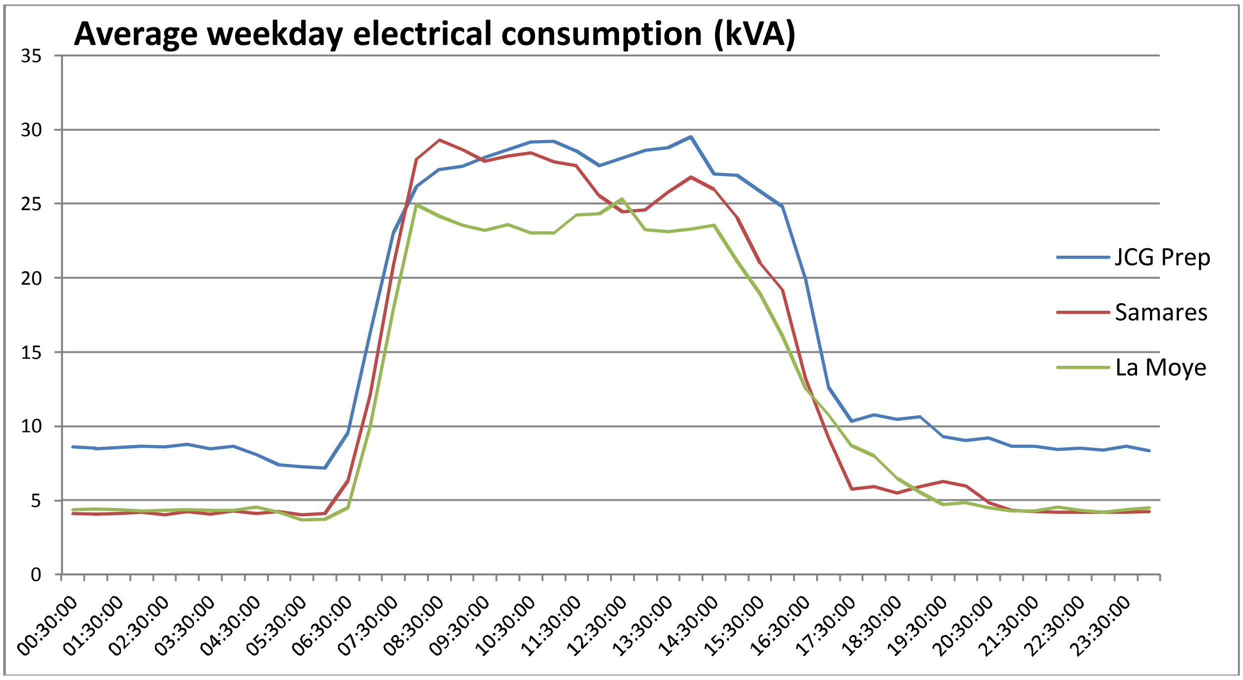


4.1 PRIMARY SCHOOLS - contd

The daily electrical usage of most of the schools is as expected, i.e. pick up between 7 and 8am, drops off at approximately 5pm and maintains a flat base rate overnight. Two schools, however, show abnormalities, as can be seen in the graph below. Rouge Bouillon has a jump in consumption at 7pm – it is thought that this is when the contract cleaners occupy the building. D'Auvergne has a less pronounced anomaly but electrical consumption increases slightly after 8pm and presents an opportunity to investigate usage with a view to making an immediate saving.



Additionally, a number of the primary schools have an increase in electrical consumption between 06:00 and 06:30, as Rouge Bouillon above and JCG Preparatory, Samares and La Moye shown below. There should be scope here to make savings by delaying the uptake in consumption to approximately 08:00.



4.1 PRIMARY SCHOOLS - contd

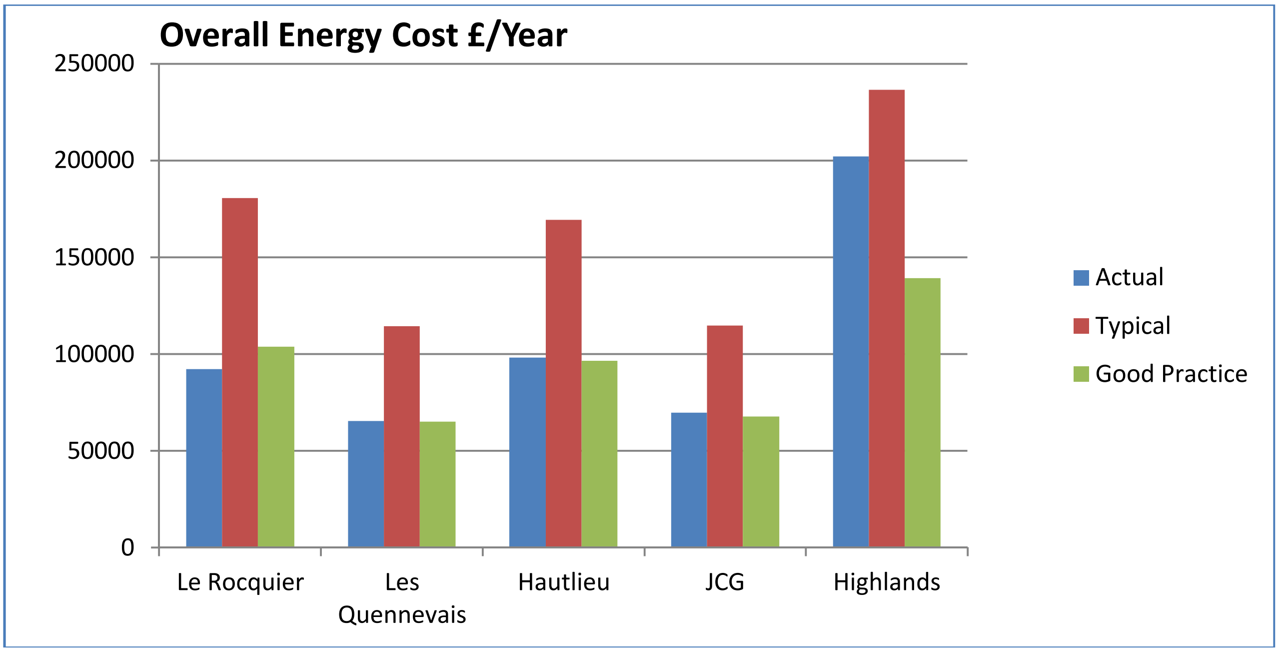
Table 4.1 Primary School Power Factors

Site	Power Factors		
	Min	Max	Average
D'Auvergne	1	1	1
First Tower	0.97	0.99	0.98
JCG Prep	0.89	0.96	0.91
La Moye	1	1	1
Rouge Bouillon	0.91	0.95	0.94
Samares	0.99	1	1
St Clements	0.99	1	1
St John	0.99	1	1
St Mary	0.99	1	1

Table 4.1 shows the power factor of the schools (where data is available) and all sites have an excellent power factor except for JCG Prep and Rouge Bouillon. These are still very good, but worth investigating.

4.2 SECONDARY SCHOOLS AND CofFE

The analysis of secondary schools indicates a similar pattern of good performance, but not quite to the extent of the primary schools. The graph below shows overall energy consumption and it can be seen that four of the schools operate around best practice, with Highlands College of Further Education consuming closer to typical. This is due to Highlands being a much larger, older and more diverse site, but the estate does offer potential savings of £60,000/year if consumption is brought down to good practice in line with the other sites.

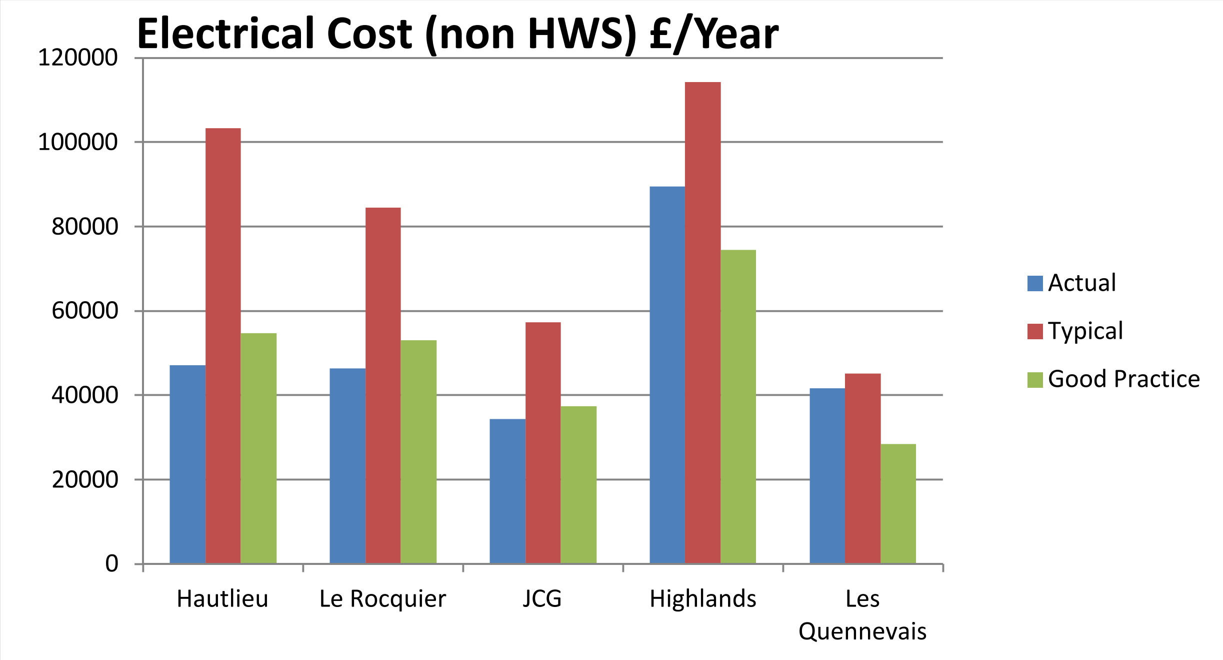


When considering electrical costs alone, Les Quennevais is the worst performer compared to the benchmarks. This is due to the heating here being predominantly electric night storage. Again, Highlands CofFE is above good practice; and the other schools are below good practice.

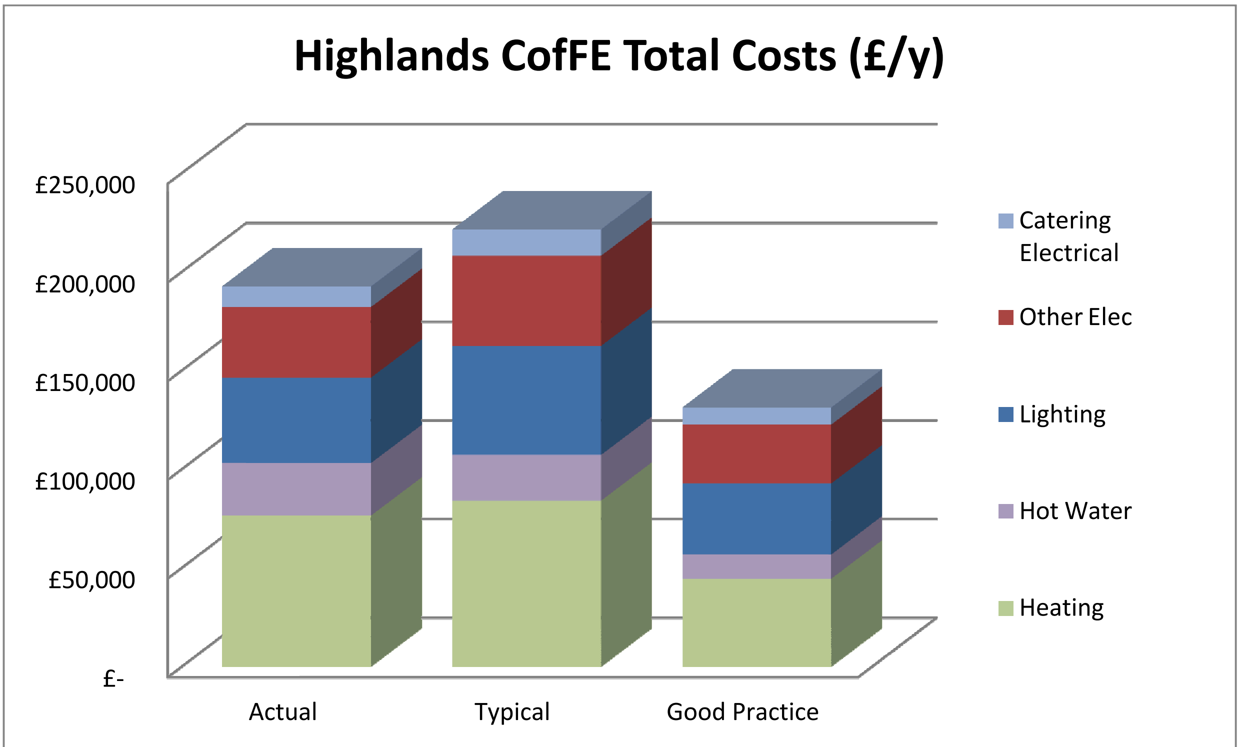
4.0 RESULTS OF BENCHMARKING AND ELECTRICAL DATA ANALYSIS - contd

4.2 SECONDARY SCHOOLS AND CofFE - contd

As mentioned at the start of this section, due to the location of Jersey, we would expect good performance relative to benchmarks and there are opportunities for savings on all the sites.



The benchmarking graph for Highlands CofFE, below, shows that the key areas for saving compared to good practice are from hot water consumption and heating. In these categories, £45,000 is potentially available if brought to good practice.



4.2 SECONDARY SCHOOLS AND CofFE - contd

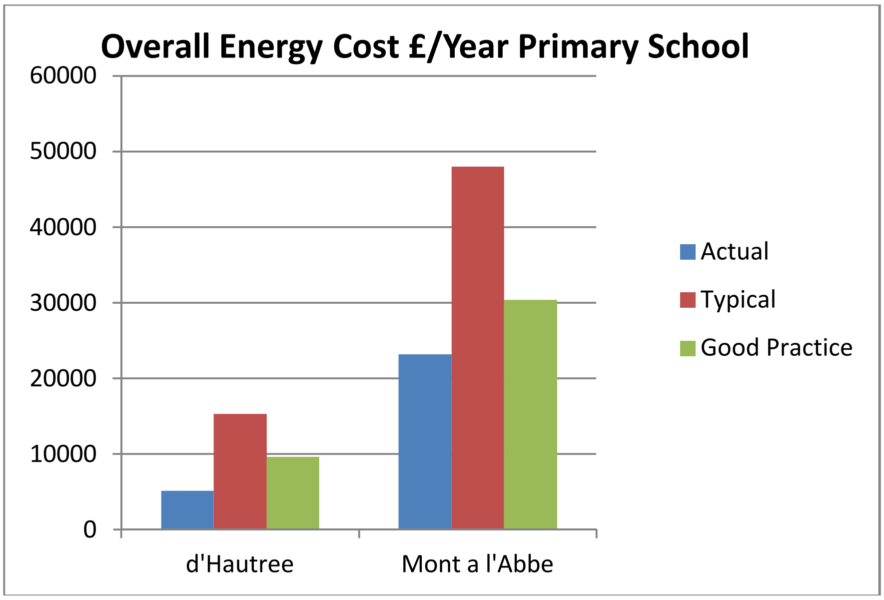
Table 4.2 shows the power factors for the secondary schools and again these are very good. At 0.95 average, Jersey College for Girls performs the worst but this is still high and it is unlikely to be financially viable to address this.

Table 4.2 Secondary School Power Factors

Site	Power Factors		
	Min	Max	Average
Highlands CofFE	0.98	0.99	0.99
Hautlieu	0.97	1	0.99
Les Quennevais	0.99	1	1
JCG	0.90	0.98	0.95

4.3 SPECIAL NEEDS SCHOOLS

The special needs schools were benchmarked against primary schools as no specific benchmarking figures were available. We would expect these schools to fare badly compared to primary schools due to additional space, equipment and facilities required but they also performed well as shown below:

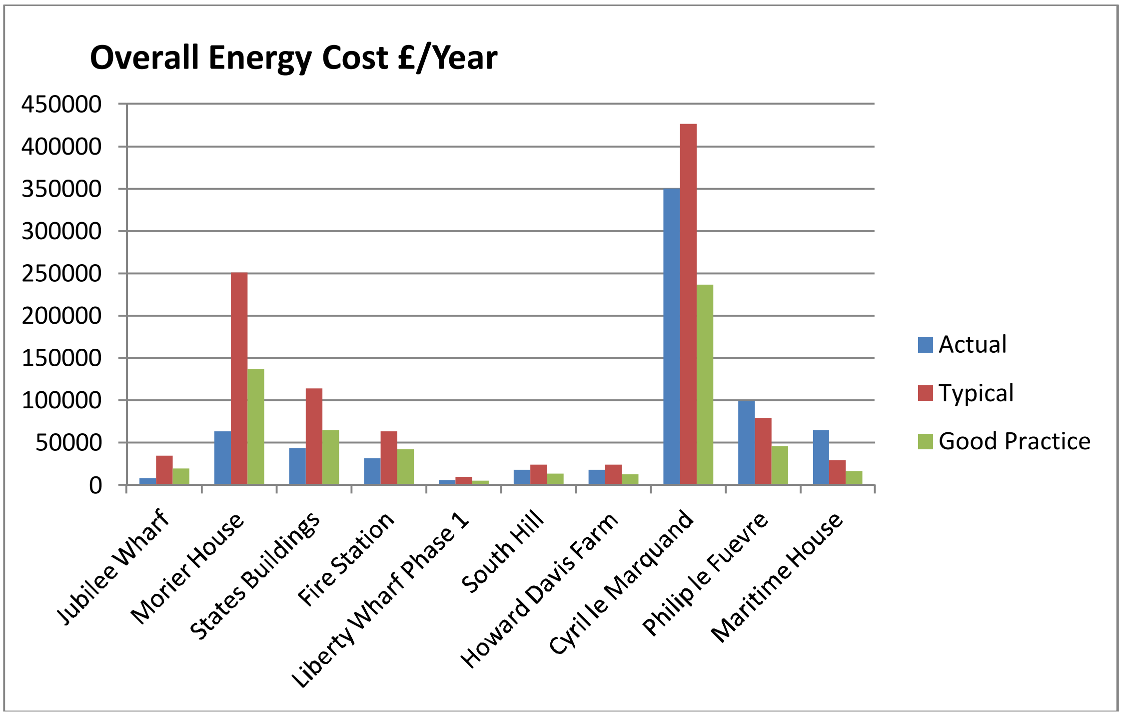


The two schools performed much worse where kWh/pupil is concerned though due to the high area per pupil – d'Hautree house has 53 m² per pupil, almost ten times the 6m² typical for primary schools.

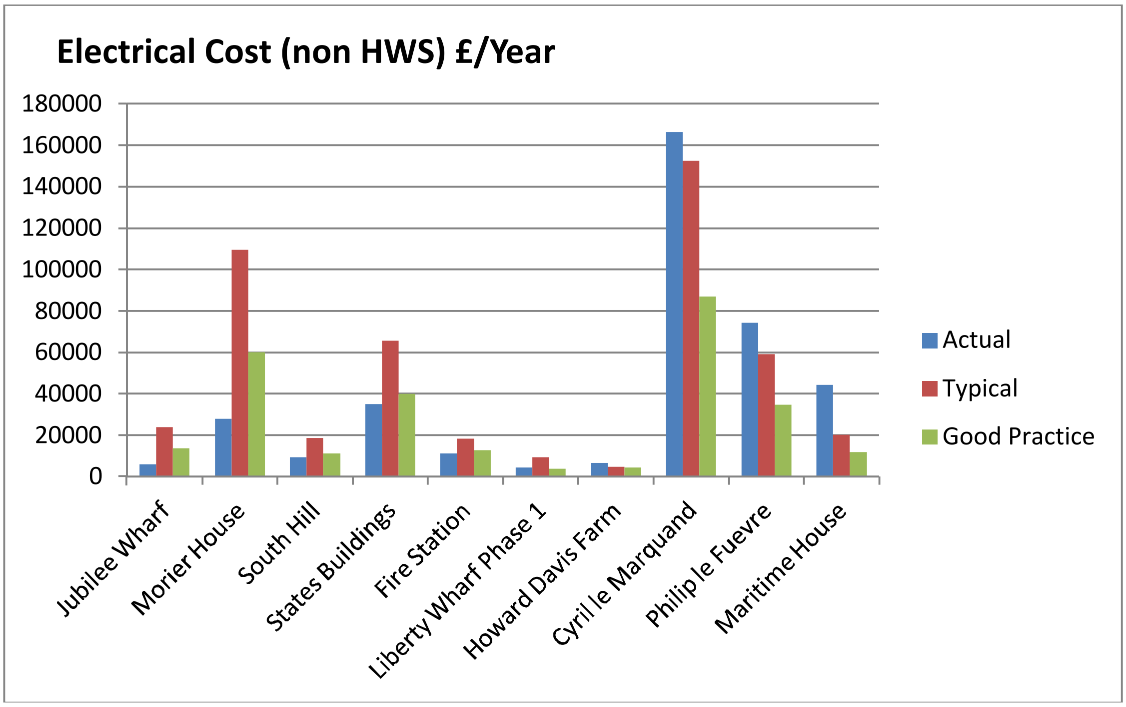
4.4 ADMINISTRATIVE BUILDINGS

The administrative buildings show a much more varied performance. As can be seen from the graph, performance ranges from 40% of good practice at Jubilee Wharf to nearly 400% of good practice at Maritime House. Cyril le Marquand, however, presents the greatest individual opportunity for cash savings due to the quantity of energy consumed. A cash saving of just over £100,000 is available if brought to good practice. An additional £70,000 is available by bringing the three worst performing buildings to typical standards; or double that if the building can be brought to good practice.

4.4 ADMINISTRATIVE BUILDINGS - contd



Philip le Feuvre, Maritime House and Cyril le Marquand also present themselves as the greatest consumers of electricity. Cyril le Marquand performs above typical electrically, so this is an area more important to focus on than thermal consumption.



The graph below shows the daily electrical profile for South Hill, which is an administrative building and as such will be largely unoccupied after approximately 6pm, other than by cleaners. As such the increase in electrical consumption from 7pm to day time usage at 9pm is unexpected and should be investigated. Additionally, the night-time load is 50% the daytime peak; this is much higher than expected and present a further opportunity to investigate savings potential.

4.4 ADMINISTRATIVE BUILDINGS - contd

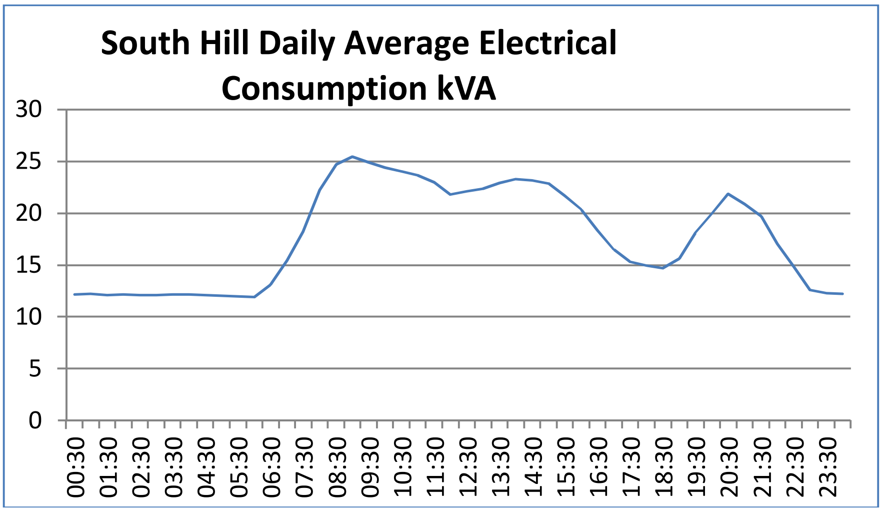


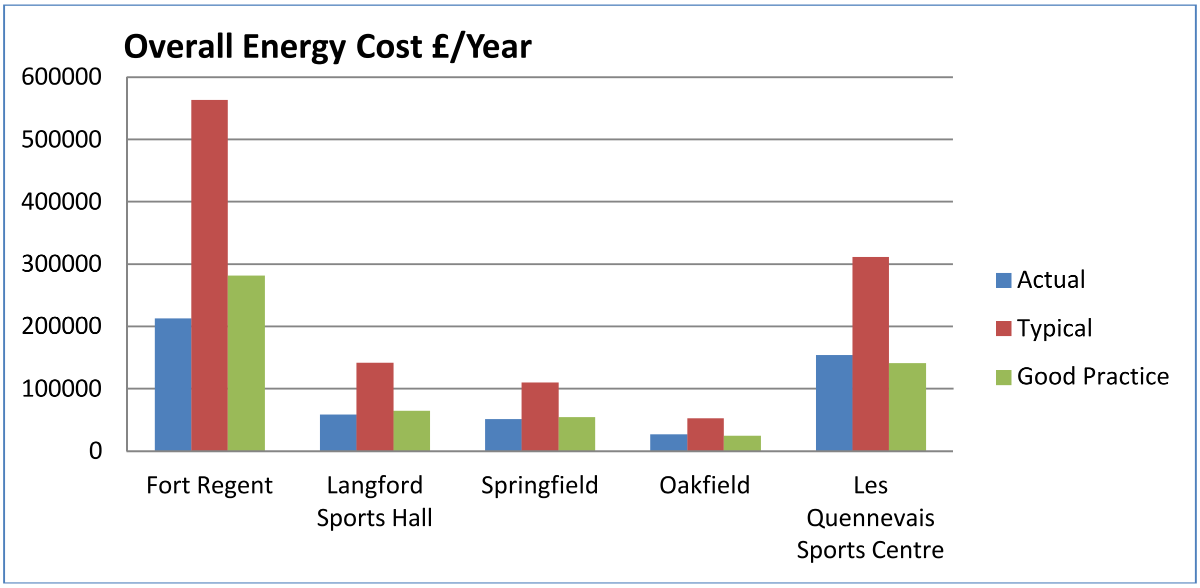
Table 4.3 shows the power factors the administrative buildings. Cyril le Marquand is the only building where savings are likely to be financially viable to achieve.

Table 4.3 Administrative Buildings Power Factors

Site	Power Factors		
	Min	Max	Average
Fire Station	0.90	1	0.98
Jubilee Wharf	0.99	1	1
Liberty Wharf Phase I	0.93	0.96	0.95
Maritime House	0.97	0.98	0.98
South Hill	0.99	1	1
States Building	0.92	0.97	0.94
Cyril le Marquand	0.80	0.90	0.84

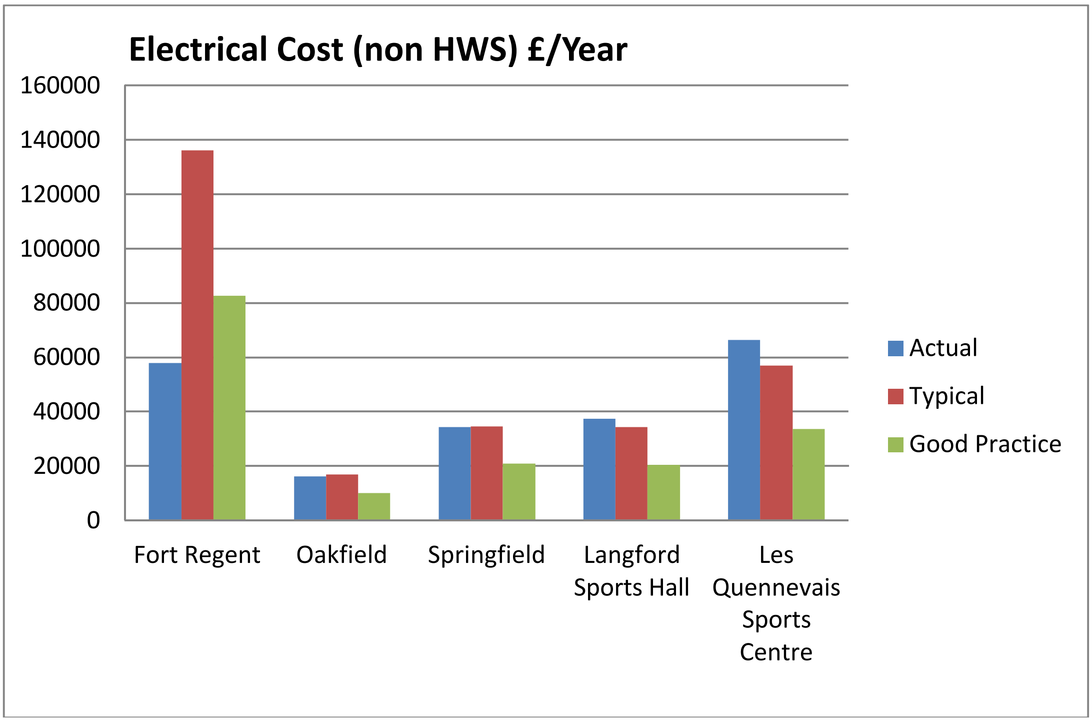
4.5 SPORTS AND LEISURE

The benchmarking for the sports sites again shows a general pattern of good overall energy consumption, with the sites approximately or better than good practice.



4.5 SPORTS AND LEISURE - contd

Further analysis, however, shows that, when just considering electrical costs, Les Quennevais and Langford are both above typical and Springfield and Oakfield both between typical and good practice.



This is particularly surprising for Les Quennevais Sports, where a CHP unit should supply part of the electrical demand; and should thus put more of a demand on fossil fuels and reduce electrical consumption.

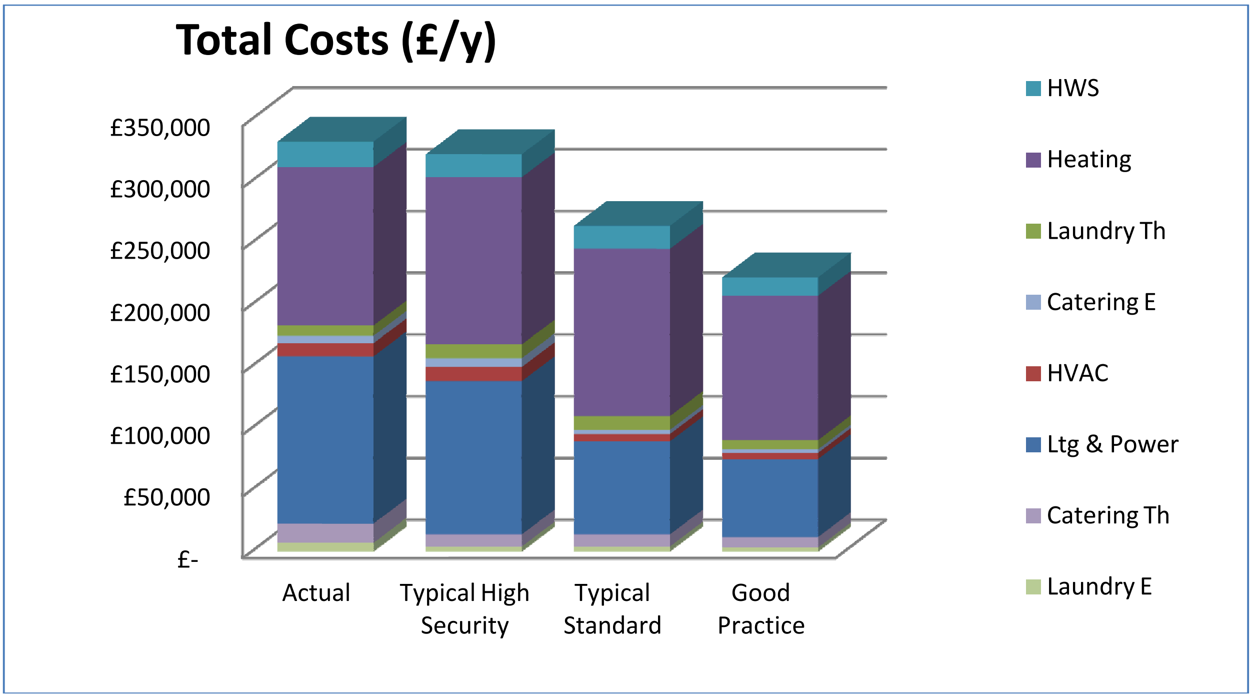
The table below shows the power factors for the sports and leisure facilities. Those most worthy of investigating are Springfield Stadium, at 0.86 but as low as 0.79; and Fort Regent on the second meter, with an average of 0.76.

Table 4.4 Sport and Leisure Facilities Power Factors

Site	Power Factors		
	Min	Max	Average
Fort Regent Meter 1	0.84	0.95	0.90
Fort Regent Meter 2	0.68	0.86	0.76
Langford Sports Hall	0.84	0.92	0.88
Les Quennevais Sports Centre	0.90	0.94	0.92
Oakfield	0.86	0.92	0.88
Springfield Stadium	0.79	0.93	0.86

4.6 LA MOYE PRISON

The prison's overall performance is approximately typical for a high security facility; however it is difficult to benchmark due to the uniqueness of the facility providing for various categories of offenders. The prison should also fare poorly by virtue of the fact it is well under-populated and the benchmarks are calculated on a kWh-per-inmate basis (although some blocks have been mothballed to reduce waste). Due to the scale of consumption at the prison, this should present some of the best opportunities for big cash savings; although there will be operational issues, which will take precedence over energy saving.



Roughly half of the electrical supply to the Prison is currently on a standard, low voltage tariff, but there are plans to change to high voltage by the installation of a transformer for the laundry and admin in 4 to 5 years' time. Table 4.5 shows that by changing the transformer, immediate savings of approximately £2,700 will be made, so it is suggested that this project is brought forward as soon as possible.

Tariff Option	MD Cost	Day Cost	Unit Costs	Total	Saving
LV Std Tariff	9,119	311	47,417	56,847	-
LV E7 Tariff	9,119	349	46,445	55,913	934
HV Std Tariff	8,529	311	45,297	54,138	2,709
HV E7 Tariff	8,529	349	45,184	54,062	2,785

5.0 INVEST-TO-SAVE PROJECTS CONSIDERED

The following is a schedule of projects which were considered in detail although not all projects were appropriate for all sites:

i) Improve roof insulation – provide roof insulation where none or a minimal amount currently exists.
ii) Replace/Repair Windows – Replace single glazed windows with coated double glazed and where double glazing exists, replace fittings for any poorly fitting panes.
iii) Draught Proofing – Particularly where it is infeasible to replace windows or doors.
iv) Add Cavity insulation - provide cavity wall insulation where none or minimal amount currently existed.
v) Replacement of existing plant for new, e.g. boilers, chillers, AC.
vi) Improved time control, e.g. on AC, AHU, Water Heaters and other ancillary equipment.
vii) Change heating type – replace heating system with a design more suited to the application.
viii) Provide additional pipework insulation – insulate hot water distribution pipes.
ix) Lagging of pipework components – In boiler rooms where components, e.g. flanges and valves, are currently uninsulated.
x) Address abnormalities in electrical demand profiles – were available assess daily usage profiles and identify anomalous consumption.
xi) Provide solar (PV) installation or solar hot water collectors to supplement electrical/thermal load.
xii) Power factor correction – where existing average power factor is around or below 0.9.
xiii) Replace spotlights – install LED spotlights where currently tungsten bulbs are fitted.
xiv) Additional lighting controls – install or replace PIRs, daylight sensors, contact switches, key switches and timers where appropriate.
xv) Install Combined Heat and Power (CHP) units – to meet the base (summer) thermal load.
xvi) Adding urinal (Cistermiser type) controls; replacing existing WCs with low flush type; installing percussion taps to reduce water consumption.
xvii) Change hot water system to point of use – replace central water heaters with smaller local heaters or instantaneous heaters.
xviii) Zoning/Improve control of heating system – allow reduction of thermal load by only supply heating when and where required.
xix) Review HVAC defects – improve efficiency of HVAC systems.
xx) Training - of operatives in use of BMS and other systems and network connect BMS to encourage better and more frequent control.
xxi) Install BMS system – Where there currently is no system to give central, site-wide control, or to replace a dated system.
xxii) Install TRVs – Where currently none present.

In addition to the above, there are a number of additional areas with significant energy saving potential highlighted during the survey and analysis, as mentioned in the preceding sections of this report. These have been added to the projects schedule; and include:

i) La Moye Prison – Replace security floodlights with LED.
ii) La Moye Prison – Bring forward installation of new transformer and switch to HV E7 tariff for immediate savings.
iii) La Moye Prison & Howard Davis Farm – Review greenhouse heating; change operations to make savings
iv) St John's Primary School – Replace standard thermostats with tamperproof
v) Les Quennevais Secondary School – Install heated door curtain to automatic double doors.
vi) Langford Sports Centre – Install door closers between pool hall and foyer to stop draft of warm air to the outside.

5.0 INVEST-TO-SAVE PROJECTS CONSIDERED - contd

The Project Schedule in Appendix A provides a comparison of each of the projects under consideration and identifies:

- Project overview – nature and purpose of the works
- Approximate value, timescales and significant factors influencing the project budget
- Outline phasing/scheduling of the projects to deliver best value
- Scope for cost savings
- Risks issues

6.0 PROJECT ASSESSMENTS AND RECOMMENDATIONS

Project assessments have been made on the basis of the lifetime stated in the project schedule in Appendix A. This ranges from 10 to 20 years and depends on the lifespan of the item and the likelihood of the property changing in terms of energy consumption.

The priorities for individual projects have been assessed using the model in Section 2.0, as follows:

- **Priority 1 - Low Investment with Medium to High Savings Potential**, i.e. those projects with the shortest payback times and can be actioned quickly, without the need to apply for significant funding; "quick wins".

- **Priority 2 - Medium Investment with Medium to High Savings Potential,** i.e. those projects that have a higher investment relative to energy spend than priority 1 projects, but retain short payback times.

- **Priority 3 - High Investment but High Savings Potential**, These projects require a much higher investment but will yield savings to match, e.g. major plant replacement or technology projects.

- **Priority 4 - All Projects with low Savings Potential and High Investment Projects with Medium Savings Potential**, These projects have a low savings potential relative to investment and are not financially viable, i.e. they will not pay themselves off within the project lifetime. Where there are motivators other than cost, some of these projects may be worthy of consideration.

The following summarises the findings of the financial analysis undertaken as part of the project schedule in Appendix A:

6.0 PROJECT ASSESSMENTS AND RECOMMENDATIONS - contd

6.1 PRIORITY 1 – LOW INVESTMENT WITH MEDIUM TO HIGH SAVINGS POTENTIAL

- Investment: £298,000; Annual Savings: £86,000; Payback; 3.5 years (Pessimistic)

Primary, Secondary and Special Needs Schools	Lagging of pipeline components	Installation of additional lighting controls	Replace Spotlights w/LED	Change Heating Type (Oil for elec. radiant)	Install Cistermisers	Training of operatives	Improve time control on ePoU water heaters	Install Tamperproof Thermostats	Install Heated Door Curtain	Address abnormalities in electrical demand profile	Replace/Repair Windows	Replace Boiler
JCG Prep			X				X					
St Mary's Primary			X				X					
First Tower Primary	X				X		X					
Janvrin Primary	X	X				X	X					
Rouge Bouillon Primary	X	X	X				X			X		
Samares Primary	X						X					
St Lawrence Primary	X		X			X	X					
St Peter's Primary	X						X					
St John's Primary			X					X				
St Saviour's Primary							X					
La Moye Primary							X					
Grands Vaux Primary		X	X			X	X					
d'Auvergne Primary							X			X		
Les Landes Primary		X	X				X					
St Clement's Primary		X				X	X					
Plat Douet Primary			X				X					
Highlands College of FE	X		X	X								X
Le Roqcuier Secondary	X	X									X	
Jersey College for Girls						X						
Hautlieu Secondary		X										
Les Quennevais Secondary		X							X			
d'Hautree House Special Needs		X	X									
Mont a l'Abbe Special Needs		X	X									

6.0 PROJECT ASSESSMENTS AND RECOMMENDATIONS - contd

6.1 PRIORITY 1 – LOW INVESTMENT WITH MEDIUM TO HIGH SAVINGS POTENTIAL - contd

- Investment: £298,000; Annual Savings: £86,000; Payback; 3.5 years (Pessimistic)

Administration, Sports and Other Facilities	Lagging of pipeline components	Installation of additional lighting controls	Power Factor Correction	Replace Floodlights	Disconnect steam humidifiers	Training of operatives	Improve time control on ePoU water heaters	Bring forward transformer installation	Improve AC Control	Address abnormalities in electrical demand profile	Time Control on Servery Hotplates	Improve heating control/zoning	Review Heating (Greenhouse)	Install Door Closers
Jubilee Wharf		X					X							
Howard Davis Farm		X												
Morier House					X									
Cyril le Marquand					X	X								
Liberty Wharf							X							
States Building						X								
South Hill		X								X				
Maritime House		X					X							
Fire Station		X												
Springfield Stadium									X					
Oakfield Sports Centre						X			X	X				
Langford Sports Centre	X	X				X								X
Fort Regent		X	X											
Les Quennevais Sports		X												
La Moye Prison	X			X				X			X	X	X	
Police HQ		X												

6.2 PRIORITY 2 – MEDIUM INVESTMENT WITH MEDIUM TO HIGH SAVINGS POTENTIAL

- Investment: £999,000; Annual Savings: £118,000; Payback; 8.5 years (Pessimistic)

Primary, Secondary and Special Needs Schools	Repair Windows	Replace Immersion heater w/instantaneous	Add Cavity Insulation	Replace Boilers	Installation of additional lighting controls	Install TRVs to all rads
St Mary's Primary				X		
Janvrin Primary			X			
Rouge Bouillon Primary	X			X		
St Lawrence Primary					X	
Plat Douet Primary		X				
Highlands College of FE				X		X

6.0 PROJECT ASSESSMENTS AND RECOMMENDATIONS - contd

6.2 PRIORITY 2 – MEDIUM INVESTMENT WITH MEDIUM TO HIGH SAVINGS POTENTIAL - contd

- Investment: £999,000; Annual Savings: £118,000; Payback; 8.5 years (Pessimistic)

Administration, Sports and Other Facilities	Repair Windows	Installation of additional lighting controls	Install CHP Unit	Add Cavity Insulation	Power Factor Correction	Replace Boilers
Morier House		X				
Cyril le Marquand		X				
Howard Davis Farm						X
States Building		X		X		
South Hill	X					
Philip le Feuvre		X				
Fire Station						X
Springfield Stadium					X	
La Moye Prison			X			X
Police						X

6.3 PRIORITY 3 – HIGH INVESTMENT BUT HIGH SAVINGS POTENTIAL

- Investment: £139,000; Annual Savings: £12,000; Payback; 11.5 years (Pessimistic)

Primary, Secondary and Special Needs Schools	Installation of additional lighting controls	Replace Boilers
First Tower Primary		X
La Moye Primary	X	
JCG Prep	X	
Samares Primary	X	
d'Hautree House		X

6.0 PROJECT ASSESSMENTS AND RECOMMENDATIONS - contd

6.3 PRIORITY 3 – HIGH INVESTMENT BUT HIGH SAVINGS POTENTIAL - contd

- Investment: £139,000; Annual Savings: £12,000; Payback; 11.5 years (Pessimistic)

Administration, Sports and Other Facilities	Power Factor Correction	Provide Add'l Pipeline Insulation
Cyril le Marquand	X	
Fort Regent	X	
La Moye Prison		X

6.4 PRIORITY 4 – ALL PROJECTS WITH LOW SAVINGS POTENTIAL AND HIGH INVESTMENT PROJECTS WITH MEDIUM SAVINGS POTENTIAL

- Investment: £923,000; Annual Savings: £31,000; Payback; 29.8 years (Pessimistic)

Primary, Secondary and Special Needs Schools	Improve Roof Insulation	Replace/Repair Windows	Draught Proofing	Add Cavity Insulation	Replace/Improve AC Plant Control	Install PIR/door contact switches in cupboards	Install Push Button Taps/Flow Restrictors	Replace Existing WCs with Low Flush	Zoning of Heating System
First Tower Primary			X	X			X		
La Moye Primary		X							
JCG Prep								X	X
St Mary's Primary	X			X				X	
Grands Vaux Primary	X								
Janvrin Primary		X							
St Lawrence Primary			X					X	
St Peter's Primary			X			X			
d'Auvergne Primary						X		X	
Rouge Bouillon Primary								X	
St John's Primary								X	
Plat Douet Primary								X	
JCG		X							
Les Quennevais					X				
d'Hautree House								X	

6.0 PROJECT ASSESSMENTS AND RECOMMENDATIONS - contd

6.4 PRIORITY 4 – ALL PROJECTS WITH LOW SAVINGS POTENTIAL AND HIGH INVESTMENT PROJECTS WITH MEDIUM SAVINGS POTENTIAL - contd

- Investment: £923,000; Annual Savings: £31,000; Payback; 29.8 years (Pessimistic)

Administration, Sports and Other Facilities	Improve Roof Insulation	Add Cavity Insulation	Replace/Improve AC Plant Control	Install Solar Thermal Collectors
South Hill		X	X	
Fire Station	X	X		
Les Quennevais Playing Fields				X
La Moye Prison				X

6.5 PROJECTS NOT FINANCIALLY VIABLE

- Investment: £4,221,000; Annual Savings: £69,000; Payback; 61.3 years (Pessimistic)

Primary, Secondary and Special Needs Schools	Install BMS	Replace Windows	Review Ductwork	Change HWS to ePoU	Power Factor Correction	Replace Windows	Improve Roof Insulation
JCG Prep					X		
St Mary's Primary					X		
First Tower Primary							X
Janvrin Primary							X
Rouge Bouillon Primary				X			
St Saviour's Primary		X					X
Les Landes Primary		X					
Highlands College of FE	X					X	
Hautlieu Secondary			X				
d'Hautree House Special Needs		X					

6.0 PROJECT ASSESSMENTS AND RECOMMENDATIONS - contd

6.5 PROJECTS NOT FINANCIALLY VIABLE - contd

- Investment: £4,221,000; Annual Savings: £69,000; Payback; 61.3 years (Pessimistic)

Administration, Sports and Other Facilities	Install BMS	Insulate Plate Heat Exchangers	Change HWS to ePoU	Power Factor Correction	Improve Roof Insulation	Replace Chillers	Provide PV	Replace Windows	Change Heating Type
Howard Davis Farm	X		X					X	
Morier House						X			
Cyril le Marquand								X	
States Building					X				
South Hill					X	X			
Fire Station								X	X
Oakfield Sports Centre				X					
Langford Sports Centre				X					
La Moye Prison		X					X		

APPENDIX A

PROJECT SCHEDULE

APPENDIX B

SURVEY AND ASSESSMENT DATA – Primary Schools

APPENDIX C

SURVEY AND ASSESSMENT DATA – Secondary Schools

APPENDIX D

SURVEY AND ASSESSMENT DATA – Special Needs Schools

APPENDIX E

SURVEY AND ASSESSMENT DATA – Administrative Buildings

APPENDIX F

SURVEY AND ASSESSMENT DATA
– Sports and Leisure

APPENDIX G

SURVEY AND ASSESSMENT DATA – Prison