OXFORD HEET CASE STUDY 3: UNIVERSITY OF OXFORD IT SERVICES BUILDING, 7-19, BANBURY ROAD OXFORD

BUILDING DESCRIPTION

A row of three, Grade II listed Victorian buildings, originally designed as seven town houses known collectively as Park Villas. Currently they provide offices, training rooms and ancillary accommodation for Oxford University by Oxford University IT Services Department. The second of a three-phased upgrade of each building in turn is currently underway.

Walls are uninsulated brick, topped by a lightweight roof insulated at ceiling level. Uninsulated mansard walls and exposed roof slopes cause occupied attic spaces to be too hot in summer and too cold in winter. This causes occupants to rely on portable electric air coolers or heaters, which are expensive to run. Limited headroom under roof slopes suggests these would be best insulated externally; in order to do this, existing roof coverings in fair condition would have to be stripped off and then re-laid.

Windows are historic timber sashes or side-hung casements, partially upgraded by draught stripping, or the installation of secondary glazing. Occupants reported difficulty in operating the secondary glazed sash windows, but had no difficulties operating secondary glazed casements. Some windows being draught stripped require more routine external re-decoration to preserve their service life. There are problems with glare in rooms where windows face directly east or west.

Central heating is provided via old gas fired boiler plant, which occupants perceive to be constantly breaking down. As a result, portable electric heaters have been deployed in various parts of the building. Whilst primary pipework is lagged where upgrade works have been completed, final radiator connections are not. This undermines local TRV control of radiators. Minimal hot water demand renders point-of-use heaters appropriate.

Lighting is generally locally switched with fluorescent lamps of varying age, style and condition – the basement has on/off PIR lighting control.

Natural ventilation is the norm, with the exception of the PC workshop, which is an internal room with no operable windows to the outside, and the print room where controlled levels of humidity and ventilation are required. The PC workshop suffers from significant heat gain during the summer and is therefore equipped with a wall mounted heat pump unit. A de-humidifier is installed in the print room. There is some local mechanical extract to kitchenettes, with older units contributing to heat loss because they do not have back draught shutters

Laudable efforts are being made to improve thermal performance, but without sub-metering, the impact of improvements have been impossible to assess. There may be benefit in bringing forward re-slating of some roofs to effect insulation upgrades

Window improvements, such as installation of secondary glazing need to address operability. Reinstating shutters or fitting thermally lined curtains could further enhance performance.

The sensitive historic location would restrict the benefits that could be derived from renewable technologies, as these would be visually intrusive.

HERITAGE VALUE

Built in three blocks of differing, but essentially classical style as handsome middle class housing just outside Oxford City Centre on land owned by University College. Original leases date their completion from 1859/1858-9/1848-9 respectively. Architectural details support their attribution to Samuale Lipscomb Secker, architect of Park Town (1853), for St John's College. Connected together between 193 and 1977, by rear extensions as a single University department and service

Aesthetic Value: '*Value deriving from the ways in which people draw sensory and intellectual stimulation from a place'*

Building	Setting
Interesting and attractive group displaying variety of massing and detailing in the classical language that pre-dated the more eclectic Gothic/Renaissance style that characterises much of North Oxford.	Southern end of inner residential suburb, marking transition from the City Centre on an important and busy city artery.

Communal Value: *'Value deriving from meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory'*

Represents an important part of the development of housing in Oxford (nos. 15-19 predate Park Town) and as a precursor of the whole North Oxford project. Later uses by Oxford University as office, training and help desk facilities by its Computing Services (OUCS, now part of IT services), has opened use of the buildings to a wider public)	Integral part of, and precursor to, the North Oxford housing development, the importance of which was recognised early (1968), as a Conservation Area.

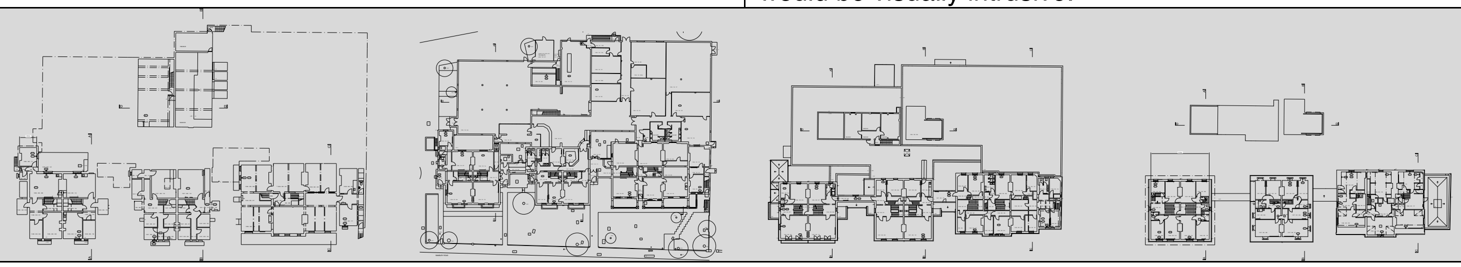
Evidential Value: *'Value deriving from the potential of a place to yield evidence about past human activity'*

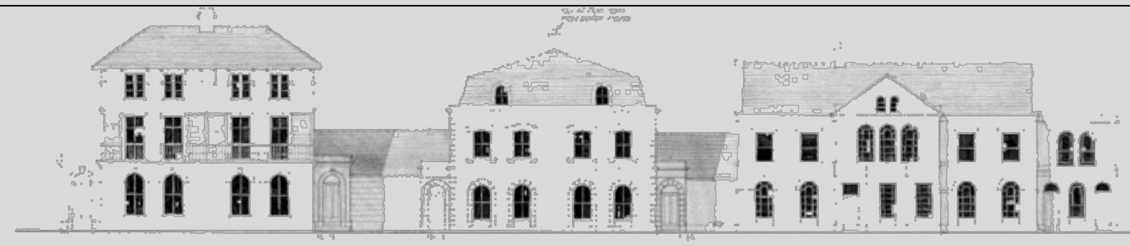
Part of Oxford's historical development in which middle classes found attractive accommodation in helping to service the University's requirements. Scale and variety in architectural treatment is a reminder of past lifestyles and aspirations. Leases provide information on the sequence of development.	Integral part of, and precursor to, the North Oxford housing development, the importance of which was recognised early (1968), as a Conservation Area.

Historical Value: *'Value derived from the ways in which past people, events and aspects of life can be connected through a place to the present'*

Value from the survival of the buildings in essence on the road frontage. Use of semi-detached houses to create the effect of one large house demonstrates the change of middle class taste from groups-of-three (15-19) and, more importantly, terraces (Park Town).	Integral part of, and precursor to, the North Oxford housing development, the importance of which was recognised early (1968), as a Conservation Area.

Credit is acknowledged for most factual information, to the separate draft Conservation Plans drawn up for these three villas by Oxford University Estates Service (May 2012)





OXFORD HEET CASE STUDY 3: BANBURY ROAD VILLAS

Element	Assessment	Maintenance Issues	Retrofit Options	Heritage Impact		Planning Permission/LBC required	Advice Required	Recommendations/Comments
FABRIC								
Pitched Roofs	Timber structure with sarking felt and slate coverings, clay hip tiles, lead flashings and secret gutter linings.	Check integrity of flashings, keep gutters and downpipes free from debris, as blocked pipes can lead to dampness in walls and thermal discomfort via evaporative cooling of fabric.	Apply insulation above roof ties within loft spaces	Low	☺		Architect, Conservation specialist	Applying additional insulation at ceiling level is a quick and cost effective measure with low heritage impact.
	Roof over numbers 7-13 are unoccupied and insulated at ceiling level.		As above	Low	☺		Architect, Conservation specialist	As above
	Roof over numbers 15-17 is partially occupied and uninsulated		Apply insulation up to a maximum of 300mm thick above ceiling level.	Low	☺			Easy and cost effective measure
			Apply insulated plasterboard lining to underside of sloped roof structure in occupied areas below main ceiling.	Medium	😐	Listed Building Consent	Architect, Conservation specialist	Not suitable where removal of linings would affect internal features, or increased thickness of linings would compromise headroom.
			Apply rigid insulation boards to external surface of roof structure.	Medium	😐	Listed Building Consent, Planning permission	Architect, Conservation specialist	External eaves and verge details would have to be modified, and roof coverings replaced. Internal linings can be retained. Best applied where external coverings are due for replacement. Moderately expensive.
			Apply insulated roofing membrane above rafters to minimise ventilation heat loss from 'room-in-the-roof' spaces.	Low	☺	Listed Building Consent	Architect, Conservation specialist	Applying multi foil insulation above rafters is most cost effective when carried out in conjunction with replacement roof covering. External eaves and verge details can be retained, but roof coverings would have to be replaced.
			Apply insulated roofing membrane below rafters to minimise ventilation heat loss from 'room-in-the-roof' spaces.	Low	☺	Listed Building Consent	Architect, Conservation specialist	Applying multi foil insulation below rafters ensures that headroom is maintained. External coverings, eaves and verge details can be retained, but internal linings would have to be replaced.
External Walls	Uninsulated solid brick with stucco finish to west, south and north elevations; fair faced brick to east.	Discoloured stucco patch to the central bay of number 15-17, probably due to the application of a mix that was not consistent with the original for repair work	Insulate walls	High – External insulation would hide historic stucco detailing	☹	Listed Building Consent, Planning permission	Architect, Conservation specialist	Applying wall insulation offers a high potential energy saving, but would be extremely damaging to internal and external decorative features. There is also an increased condensation risk. Not recommended in this instance.
				High - Internal insulation would reduce floor space and hide historic internal detailing.	☹			
	Lower roof mansard with slate tile covering	Check integrity of flashings, keep gutters and downpipes free from debris, as blocked pipes can lead to dampness in walls below.		Low- Insulation can be applied between studs from the inside.	☺	Listed Building Consent	Architect, Conservation specialist	Not suitable where removal of linings would affect internal features. In this instance, there are no significant internal features.
				Low - Insulation can be applied between studs from the outside.	☺	Listed Building Consent, Planning permission		Suitable where removal of linings would affect internal features, but would require planning consent for replacement covering. Best applied where external coverings are due for replacement. Could be expensive.

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	Basement level walls	Be alert to signs of dampness and failure of basement waterproofing, causing damage to internal finishes	Insulate walls	Low – insulation can be applied internally	☺	Listed Building Consent	Architect, Conservation specialist	Ensure that the basement wall can dry out to the inside, and condensation is avoided by preventing moist air from coming into contact with the cold basement wall. Where there are floor joists above the basement, care must be taken that ventilation pathways are not compromised. Specialist advice is essential.
Ground Floor	Suspended timber floor over uninsulated basement.		Apply draught sealing to floorboard joints, or impervious floor covering	Low	☺	Listed Building Consent		Take care to ensure that basement ventilation is not compromised.
Windows	Generally timber framed sash, or side hung casement windows, single glazed	Regular maintenance to prevent rotting of timber frames	Windows to nos. 7-9 have secondary glazing installed.	Medium	😐	Listed Building Consent	Architect, Conservation specialist	Care should be taken to ensure that design of the secondary system is complements the style of the existing windows, and does not compromise opening of windows. In this instance occupants reported difficulties in operating the installed system.
		Replace broken panes to reduce draughts and prevent water ingress	Some windows have original timber shutters retained.	Low	☺			Shutters are an effective means of preventing heat loss at night, and glare control by day. Where they are original, can add character to a historic building.
		Clean regularly, particularly in city centre locations as dirty windows reduce the benefits of natural daylight.	Sample window at ground floor level of no. 19 has been draught stripped.	Low	☺	Listed Building Consent	Architect, Conservation specialist	Draught stripping is a relatively simple and cost effective measure. Ensure that windows being draught stripped are in good condition to start with – the long-term benefits would be compromised by inadequate maintenance in the first instance.
External Doors	Solid timber panelled doors with draught lobbies to principal entrances and potential for lobbies to all others.		Draught stripping to all outer doors	Low	☺		Architect, Conservation specialist	Draught stripping is a relatively simple and cost effective measure. On principal entrance doors that are subject to heavy traffic, seals would be vulnerable to damage, hence detail needs careful consideration.
			Introduce internal doors off entrances that are not lobbied to create new draught lobbies.	Low	☺	Listed Building Consent	Architect, Conservation specialist	Draught lobbies are particularly effective in high traffic areas. In this instance principal entrances already have them. On doors with limited use benefits are less apparent, particularly if the door is properly draught stripped.
Roof windows	Single glazed, steel framed conservation style roof windows to roof slopes in occupied attic spaces at nos. 15-17.	Steel frames are not thermally broken, single glazing results in significant heat loss. Condensation risk is increased, which in turn has caused steel frames to rust.	Replace with thermally efficient modern conservation style roof windows.	Low	☺	Listed Building Consent	Architect, Conservation specialist	The roof windows in this instance are on hidden roof slopes and are therefore not directly visible on facades, however it is desirable to match the style and character of the existing as closely as possible.
		Clean regularly, particularly in a city centre location like this as dirty glazing would reduce benefits of day lighting.	Consider photo electric sensors and blinds in conjunction with overall lighting strategy.	Low	☺		Lighting Engineer	Day light from roof windows and roof lights can help to reduce the need for electric lights to provide general illumination and task lighting. With increased use of IT, high levels of general illumination can cause glare.

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		Ensure opening gear is in good condition	Ensure windows are easily operable	Low	☺		Architect, Conservation specialist	Operable roof windows are a useful means of providing natural ventilation – ‘rooms in the roof’ or occupied lofts are often warmer during the summer months than spaces on lower levels. As they are often mounted high up, special operating gear may be required for example manual or electric teleflex systems, or simple pole winders.

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SERVICES								
Boilers	Two, Ideal Concorde CX70 gas fired boilers located within the basement of no.11 Banbury Road.	Complaints of frequent breakdowns form occupiers. Boiler nameplates suggest maximum efficiency of 80%	Replace with new, higher efficiency boilers. Modern condensing boilers can achieve 93-97%.	Low			HVAC Engineer	The existing plant appears to have exceeded its service life, given the level of complaints from occupiers and the extensive use of portable electric heaters that are expensive to run. Existing flue locations should be retained to avoid detrimental visual impact
Heating Controls	A TREND control system is installed, however majority of the features appear to be disabled and only simple time clock control is being used. The building is not separated into different control zones.	Panel has facility for PC based diagnostic connection, but its usefulness is compromised by a lack of sub-metering.	Introduce heating zones and sub-metering across the heating system, particularly areas with different use patterns.	Medium		Listed Building Consent	Architect, Conservation Specialist, HVAC Engineer	Use pattern across most of the building is continuous in daytime. However there are a number of basement seminar rooms and meeting areas where use is more intermittent and there may be benefits to more active heating control of such locations. At its most extensive, this could be an expensive process involving re-routing of low-pressure hot water (LPHW) pipework that could impact on key internal features. An alternative would be to install zone control valves on the existing circuits and link these to wireless thermostats and thermostatic radiator valves (TRVs)
Distribution Pipework	Low Pressure Hot Water (LPHW) distribution system, with significant amount of un-lagged pipework making final connections to radiators through the building. Main distribution pipework within nos. 7-11 have been well insulated as part of recent refurbishment works. Main distribution pipework within nos. 13-19 is not insulated.	Build-up of sludge and limescale within pipework can cause corrosion of pipework and other components whilst reducing their efficiency over time.	Periodic power flushing of the system	Low			HVAC Engineer	This should be carried out as part of regular maintenance cycle.
		Unlagged pipework leads to heat loss and undermines local control via TRVs	Apply lagging to uninsulated pipe runs	Medium		Listed building consent only if likely to affect historic features.	HVAC Engineer, Conservation Specialist	This needs to be sensitively done to avoid compromising key internal features.
Heat Emitters	Predominantly pressed steel radiators with thermostatic radiator valves (TRVs), of varying ages.	Build-up of sludge and lime scale in radiators can cause corrosion reduce their efficiency over time.	Periodic power flushing of the system	Low			HVAC Engineer	This should be carried out as part of regular maintenance cycle.
	Portable electric heaters are being used in upper floor areas that have not been refurbished, and where roofs are not insulated.	Regular testing to ensure that these are safe.	Improve primary heating installation. Provide roof insulation to attic spaces that are too cold in winter.					Use of portable electric heating is not recommended – these are energy inefficient and expensive to run. Where used in conjunction with a primary heating system that is in good working order, they can compromise the effectiveness of controls.
Domestic Hot Water	Domestic hot water is provided via local point of use electric heaters of various ages throughout nos. 7-19. This is appropriate in this instance, given the limited hot water demand in the building.	Regular testing to ensure that these are safe.	Replace older boilers with more efficient modern ones	Low	☺		HVAC Engineer	Carefully consider pipework routes and locations to avoid damaging historic fabric.

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Ventilation	The building is naturally ventilated, via operable sash, casement or sliding windows or doors in office areas, the main reception and seminar rooms. There are a number of roof windows in the occupied roof space of nos. 17-19, where occupants complain of overheating in the summer, and portable cooling units are extensively used.	Ensure locks and handles are in good working order, especially where secondary glazing has been installed. Where necessary, provide operating instructions to users so that historic fabric is not damaged.		Low	☺			Management plan only for lower floors. In addition install thermally efficient, operable roof windows and improved thermal insulation to occupied roof space. This would provide better occupant control of summer conditions without recourse to electrically operated cooling units.
	Local mechanical extract is provided to sanitary accommodation and kitchenettes. Some of the older mechanical ventilation units are not fitted with back draught shutters, allowing cold air from outside into the building when fans are not operating.		Ensure ductwork penetrations through external building fabric are well sealed. Replace older units with modern energy efficient ones that have back draught shutters.	Low	☺		HVAC Engineer	Older style mechanical extract units are less energy efficient than more modern ones. Where there are a number of them in a building the aggregate effect on overall energy consumption can be significant.
			Install passive infra-red (PIR) sensor activated controls to all mechanical extract vents.	Low	☺		HVAC Engineer	This should reduce energy use by ensuring that fans only work when the rooms are occupied.
	The PC repair workshop is an internal room with no operable windows to the outside. It is fitted with a wall mounted fan-coil unit.	The fan coil unit, although old appears to be in good working order	Install a more energy efficient cooling unit.	Low	☺		HVAC Engineer	Fan coil units can be a flexible, controllable, medium maintenance and low capital cost means of providing active cooling where options are limited as in this instance.
	The basement print room requires humidity control, and high rates of ventilation because of the printing processes it houses. This area is fitted with a de-humidifier and no humidification, suggesting that there is an issue with damp.	Investigate all potential sources of damp; leaking water supply, heating or drainage pipework, especially where these are hidden.	Install a more energy efficient de-humidifier	Low	☺		HVAC Engineer	Consider also, relocating the print facility in a building with less sensitive historic fabric.
Lighting	Generally, fluorescent lamps of varying age, style and condition, all controlled via local, manual switches.		Install modern low energy lamps with daylight sensor controls, and where appropriate, local task lighting.	Low	☺		Lighting Engineer	Most parts of the building benefit from good natural light via existing windows. By coupling low energy fittings with daylight sensor controls and local task lighting (individual desk lamps), background lighting can be made very efficient, with individual control for occupants via their desk lamps.
	The basement areas in recently refurbished parts of the building (nos. 7-13) have passive infra-red (PIR) on/off control.	Ensure PIR settings are set at appropriate levels for use.	Extend PIR on/off controls to all 'back of house areas throughout the building	Low	☺		Lighting Engineer	PIR controls are an effective measure for minimising lighting energy consumption in intermittently used areas like toilets and kitchenettes.
MANAGEMENT								
Sub-Metering	There do not appear to be any sub-meters installed in the building.		Install sub-meters so that use patterns can be effectively monitored in different parts of the building.	Low	☺		HVAC Engineer Electrical Engineer Conservation Specialist	Upgrades are being conducted on a piecemeal basis throughout the building. Sub-metering would make it possible to compare the impact of alternative solutions. Lack of it makes evaluation difficult.
Conservation Plans	Conservation plans and policies have been prepared for each of the three buildings. These include checklists identifying significant features.	Refer to plans and policies as appropriate before specifying repairs or maintenance work.	Update as retrofit options are evaluated and implemented	Low	☺ ☺		Conservation Specialist	Potentially an invaluable reference for future maintenance or upgrade work if actively updated.

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RENEWABLE OPTIONS								
Solar Thermal Hot Water	Primary roof slopes face due east or west and are overshadowed by trees. Solar gain potential is limited. Hot water use is minimal.			High	☹	Listed Building Consent	Conservation Specialist Renewables Consultant	This would impact historically important Oxford roofscape. Not recommended
Photovoltaics	Primary roof slopes face due east or west and are overshadowed by trees. Solar gain potential is limited.			High	☹	Listed Building Consent	Conservation Specialist Renewables Consultant	This would impact historically important Oxford roofscape. Not recommended
Wind Turbines	Wind resource assessment required.			High	☹	Listed Building Consent	Conservation Specialist Renewables Consultant	This would impact historically important Oxford roofscape. Not recommended
Biomass Boilers	These could be considered as a boiler replacement option.			Medium	😐		Conservation Specialist Renewables Consultant	Heritage impact in relation to routing of flues. Carry out cost-benefit analysis prior to main boiler replacement, note issues around additional plant space and flues.
Ground Source Heat Pump	Building size suggests the depth/ area of pipework would be substantial. Less efficient in historic buildings as these tend to have higher air change rates. Heat pumps work best on buildings with highly insulated, airtight envelopes that can be heated with relatively low temperature systems such as under floor heating. Resizing/additional heat emitters would be needed.			High	😐		Conservation Specialist Renewables Consultant	Heritage impact in relation to routing of larger pipework and heat emitters. Carry out cost-benefit analysis prior to main boiler replacement,
Air Source Heat Pump	Limited potential for location of outdoor units. Performance issues with heat pumps in historic buildings as noted above. Resizing/additional heat emitters would be necessary.			High	☹		Conservation Specialist Renewables Consultant HVAC Engineer	Not recommended in this instance due to sensitivity of adjoining outdoor spaces
Combined Heat and Power Unit	Limited hot water use means consistent heat demand to enable the CHP unit to run efficiently is not possible. It would also require coupling with back-up boilers and has implications on plant space, and require additional flues.	Shorter service interval than conventional boilers		Medium	😐		Renewables Consultant HVAC Engineer	Carry out cost-benefit analysis prior to main boiler replacement, note issues around additional plant space and flues.