



The University of
Nottingham

POST OCCUPANCY EVALUATION REPORT

AMENITIES BUILDING

INTERNATIONAL HOUSE

SIR COLIN CAMPBELL BUILDING



MARCH 2011

**Post Occupancy Evaluation: Amenities Building, International House,
Sir Colin Campbell Building
For the University of Nottingham**

1. Introduction

QTC Projects were appointed to carry out the Post Occupancy Evaluation following the submission of a tender for services in February 2010 to the Development Director, University Estate Office. The appointment was confirmed on 18 October 2010.

2. Scope of the Review

Evaluation Technique

The evaluation was conducted at strategic review stage (2-3 years after handover) and has been undertaken in line with the criteria and guidance contained in the HEFCE/AUDE publication, 'Guide to Post Occupancy Evaluation'.

Analysis

Analysis broadly followed the University's brief for undertaking the evaluation and consisted of reviewing all written information received concerning the building together with information collated from the questionnaires and workshop. Particular areas reviewed were:

Purpose and scope of project (brief)
Some aspects of the building procurement process
Building user feedback
Cost management and control
Construction and project management
Functional and technical performance

Questionnaires

Questionnaires were developed to obtain information feedback from four specific groups:

- a) User
 - a representative sample of 83 users of the three buildings evaluated consisting of academic, support staff, post graduate students, building tenants and residential users
- b) Consultant Design Team
 - Architect
 - Project Manager
 - Quantity Surveyor
 - Services Consultant
 - Structural Engineer
- c) Estate Office – Development and Operations & Facilities Sections
- d) Main Contractor

A Sample of the User Questionnaires is shown in Appendix 1

Interviews

Interviews were held with the following:

- a) Estate Office
 - Tim Brooksbank, Development Director
 - Richard Wigginton, Project Officer
 - Barry Chadwick, Operations & Facilities Director
 - Tracey Nelson, Housing Co-ordinator

A meeting also took place with representatives from the Operations and Facilities Team
- b) Make Architects
 - John Prevc
 - James Goodfellow
- c) GTMS Project Manager/QS
 - Alastair Wolstenholme
 - Colin Bearne
- d) Adams Kara Taylor Structural Engineers
 - Gerry O'Brien (by Telephone)
- e) AECOM Building Services
 - Sasha Krstanovic
- f) Building Users
 - Tracy Sisson, Graduate Centre Manager
 - Pam Bath, International Office
 - Angela Lindley, Institute for Work, Health & Organisations
 - Lynn Brown, Centre for English Language Education
 - Patricia Hulme, School of Contemporary Chinese Studies
 - Jo Derbyshire, Innovation Park Manager
 - Nicola Dean, Aspire Café Manager

Comments were also received from Katie Turner, Student Services Centres Manager
- g) Main Contractor
 - Martin Burton (formerly of ROK/SOL)

Workshop

A one day workshop was held on 8 March 2011 (a list of attendees is shown in Appendix 2).

The format for the workshop was a presentation by QTC Projects acting as facilitator which included feedback from the user satisfaction questionnaires. The workshop helped to highlight the key issues that had been raised in the questionnaires and interviews which were then discussed and debated.

The information from the workshop provided important comment which has been incorporated into this report.



3. Building Data

	<u>Floor Area</u>	<u>No of Storeys</u>
Amenities Building	2,500m ²	4 storeys
International House	3,662m ²	5 storeys
Sir Colin Campbell Building	5,329m ²	3 storeys
	<u>Types of space</u>	<u>Occupants</u>
Amenities Building	Teaching/seminar rooms Offices Prayer rooms Social space Café/kitchen Residential Flats	Graduate Centre Student Services Chaplaincy Nottingham Hospitality
International House	Teaching/seminar rooms Language laboratory Offices	CELE IWHO International Office Contemporary Chinese Studies
Sir Colin Campbell Building	Offices Business units Central reception Seminar rooms Social breakout area	Innovation Park Admin Business Unit Tenants
<u>Start on site</u>	8 January 2007	
<u>Date completed</u>	29 August 2008-24 October 2008	
<u>Cost (excl vat)</u>	£23.62m	
<u>Design Team</u>		
Architect	Make Architects, London	
Project Manager/QS	Gardiner Theobald LLP, London	
Services Engineer	AECOM Building Services, London	
Structural Engineer	Adams Kara Taylor, London	
<u>Contractor</u>	Rok Sol Construction Ltd, Nottingham	
<u>Building Contract</u>	JCT 2005 with Contractors Design Supplement	

4. Project Background and Description

The three buildings comprising the Amenities Building, International House and Sir Colin Campbell Building form the first phase of the Jubilee Campus Expansion masterplan. This plan builds on the original masterplan prepared by Hopkins Architects and extends/enhances existing facilities so that the University can meet future needs and establish the appropriate environment for learning, research and business collaboration.

Outline planning permission was granted for the expansion in November 2005 and includes infrastructure, landscaping and the re-alignment of Triumph Road. Full planning approval was granted in July 2006.

The University criteria for the delivery of a successful design was primarily to follow the principles of the expansion plan and at the same time create signature buildings of iconic form. These would promote the business of the University and also provide the right mix of accommodation. A key element would be to engender innovation in the buildings' design, promote sustainability and demonstrate energy efficiency.

The conceptual design for the Amenities Building and International House can be summarised in the Architects' design statement:

"A series of pavilion structures set within the landscape which grow from the ground like geological land forms. The finished buildings thus represent an abstraction of this initial design concept, being wedge shaped emerging from the ground plane to address Triumph Road

The unique form of each building is given additional visual impact by a rainscreen cladding system of terracotta tiles which are arranged in a random pattern of rich reds and browns, representing a contemporary take on the City's traditional red brick architecture".

The Sir Colin Campbell Building was also inspired by the concept of a building that emerges from the ground plane merging with the surrounding landscape in the shape of grass mounds rising either side of Triumph Road to bridge the primary route through the campus and create a new gateway. The building was awarded the 'Nottingham Science City Development Project 2009' for its innovative design and its contribution to science and innovation.

The three buildings were designed in a manner that required optimal operational energy. The insulation to the buildings' envelope exceeds minimum requirements. The solar control glazed window area is also below the minimum required by Building Regulations and set within deep reveals to provide a degree of solar shading. The renewable energy source incorporated into the design is provided by a closed loop system which extracts embodied energy from the nearby lake. The thermal mass of the buildings also helps to regulate internal temperatures.

The Sir Colin Campbell building is clad in zinc shingles to tie in with the visible zinc standing seam roofing of the Amenities Building and International House but contrasting strongly with their vibrant terracotta cladding.

The Amenities Building has its main façade 'addressing' Triumph Road with a main entrance at both ends of the building. The ground floor comprises teaching/seminar rooms arranged around a central core of toilets, staircase/lift and service risers. This was originally to be fitted out as a Health and Fitness area but unfortunately agreement could not be reached between the University and external fitness provider.

The ground floor also includes a café and student support area. The teaching/seminar rooms continue on the first floor which also provides accommodation for the Graduate Centre. Perimeter rooms make full use of the generous heights where possible and provide good natural light.

On the upper floors six studio flats and two 3 bed flats provide accommodation for University staff and visitors.

International House provides predominantly office accommodation on five floors configured in a similar format to the Amenities Building around a central service core which includes some internal teaching rooms. The main entrance lobby and exhibition space is accessed via Triumph Road with a further entrance facing the campus. Unlike the Amenities Building, International House only has one lift.

The three storey Sir Colin Campbell Building contains a range of facilities which include office, event, exhibition and teaching spaces and incubator units for start up businesses. The majority of these facilities are concentrated in the portion of the building to the west of Triumph Road, while the more elongated structure on the other side of the road to the east houses the business incubator units. The bridge link provides breakout space for the buildings occupants which is a key design feature of the building. The triple height reception area accessed off Triumph Road also forms a positive visual impression to visitors and provides some exhibition space.

A key element of all three buildings is their adaptability with the spaces designed to give maximum flexibility to meet the University's changing requirements. Thus spaces can be reconfigured where necessary to provide a cellular or open plan arrangement.



Externally, the landscaping forms an integral part of the masterplan with the boulevard playing an important role in knitting together the various elements of the campus and establishing a strong link between areas of water; the lake to the west and the River Lean to the east. The boulevard also incorporates a 2 metre wide water rill and jet fountains together with tree planting which defines the length of this important landscape feature.

As a traffic calming measure and in order to open up important vistas, the existing Triumph Road has been realigned. During the early design stage of the project a separate planning application was given approval to erect a 60m high steel sculptured spire which now forms a strategic landmark adjacent the Sir Colin Campbell Building.

The three buildings were completed in 2008 with all academic departments able to move into the buildings on a phased basis for the start of the new academic year.

5. User Satisfaction

Building user satisfaction has been assessed from the responses to the questionnaires received and analysis of the comments made. Appendix 3 shows a range of bar charts covering the following areas:

- Satisfaction with specific room types, ie seminar room, offices, reception, language laboratory, social/networking space, prayer rooms and overall impact of the building.
- Security
- Accessibility
- Cleanliness
- Air quality
- Internal room temperature
- Distraction from noise
- Lighting conditions, natural and artificial
- Data connectivity at the workspace
- AV equipment in teaching/lecture rooms

Overall, 83 responses were received across the three buildings from a representative group comprising academic and support staff and postgraduate students. Responses were also received from occupants of the residential units in the Amenities Building.

The responses on the seminar/teaching rooms, the majority of which are in the Amenities Building, show a reasonable level of satisfaction. This is less so in International House due to the comments on the internal rooms. A mixed response was received on the satisfaction with both main and departmental reception points. In International House 33% of respondents were dissatisfied with the reception points for CELE and IWHO. This reflects the limited engagement these departments had with the Design Team at the early development stage of the project.

The International House response to satisfaction relating to offices was very good but CELE and IWHO were generally not satisfied with the shared offices. In the Sir Colin Campbell Building there was a good response for this room type. All other room types showed, on average, a positive response with the least satisfied groups being CELE and IWHO.

Responses on security and accessibility were generally good although responses from the occupants of the Sir Colin Campbell Building reflected previous breaches of security that had occurred in the building (this has now been addressed with the installation of additional security cameras).

Cleanliness was considered good although occupants of International House had commented on the need for improvements. For many, the toilets were the main area of concern.

The responses on air quality and temperature reflected the poor performance of the heating and ventilation systems which the occupants had experienced since the building was handed over in 2008. Overall, 47% of respondents considered all three buildings to be unacceptably cold in winter. Another area of concern recorded in the responses was the perceived problem with inadequate sound insulation between rooms, both offices and seminar rooms. 34% of respondents considered the problem to be significant.

Natural and artificial light was considered to be generally good, although some comments were made relating to the lack of blinds to high level windows. ICT/Data at workstations and in seminar rooms recorded a good level of satisfaction despite some negative comments regarding the limited number of desk sockets (Sir Colin Campbell Building) and their accessibility.

Satisfaction with the prayer rooms, social space including the Aspire café was recorded as being very good.

Resulting from the questionnaire responses, interviews and various discussions, a number of issues have been highlighted and were presented at the POE workshop for further discussion/debate. The issues have been grouped under the following headings and considered in more detail in this report.

- Procurement
- Project and Cost Management
- Design/User Issues
- Building Performance
- Construction Issues
- Operations and Facilities Issues
- Sustainability

6. Procurement

The building contract used was the JCT 2005 Design and Build contract with relevant amendments. This was used in conjunction with a single stage tender process. There is general agreement that in the current economic climate, the single stage rather than the two stage approach provides best value and it is recommended that this process should continue for the foreseeable future.

The building may have been better detailed if a more traditional JCT contract had been used but there is no guarantee that this would have achieved the same level of cost effectiveness. Overall the quality of the finishes is generally good despite having to undertake a value engineering exercise at both early design stage and as part of the contractor negotiations.

The appointment of the main contractor was carried out through the OJEU process following which a detailed tender report was prepared. This included a rigorous assessment of the tender documentation received from the four tenders submitted. Two of the tenders were further evaluated and clarification meetings held.

The contractor selected for appointment was regional rather than national based and although some comments from the design team inferred that a larger, national contractor may have had more influence and be able to apply more pressure on subcontractors, the arrangement in fact worked well and this was confirmed by the consultants at the workshop. Also the selection of the lowest tender received which was from a known and trusted contractor. This is particularly relevant bearing in mind that the contractor was initially appointed on a letter of intent (expenditure limit of £100k) with the remit of working with the design team to achieve a further £3.2m savings on the original tender offer.

Furthermore the letter of intent applied strict deadlines for the achievement of target savings and delivery of the contractor's proposals. It is to the credit of the contractor, Design Team/Cost Consultants and University Estate Office that these were achieved.

The appointment of the consultants was made through the University's normal consultant agreements. The Architects acted as lead consultant and were involved in the selection process for the appointment of the preferred Services Engineers and Structural Engineers. The University entered into separate agreements for these appointments. The appointment of the consultant Project Manager/Quantity Surveyor and CDM Co-ordinator were also direct appointments.

The Design Team (Architects, Services and Structural Engineers) were novated to the main contractor at RIBA Stage D. There is now a consensus view that the retention of the Services Engineer on the client side would provide better client support in terms of monitoring, quality control and commissioning. It should be noted that the University has now adopted the policy of retaining the Services Engineers on the client side on all subsequent capital projects.

Recommendations

The use of single stage tendering should continue for the foreseeable future

Retention of the Services Engineers on the client side should continue in order to maintain effective monitoring, quality control and assist with commissioning

7. Project and Cost Management

The project was managed primarily through the appointment of the consultant Project Manager and the support of the University's Project Officer acting as the main interface with the University client and the various user departments.

Communication during the project development through to completion and handover was essential for the success of the project. This was particularly crucial bearing in mind the various demands of the different users and the construction procurement issues that ensued. Evidence from the user departments indicates that from their point of view this was competently handled by the Project Officer and a good relationship existed. Comments made in the interviews with users confirm this.

Management of a very large development, with essentially three projects running concurrently plus the management of works relating to the road re-alignment and sculpture (Aspire) was a major undertaking and relied on a good working relationship between the Project Manager and Project Officer. That this relationship existed was evident from the interviews but it was felt that it worked better during the design and pre-construction stage. Once construction started and the demands of the project increased it was not always easy to obtain a quick response from the consultant Project Manager when early decisions and presence on site was needed. This may be due to remote location of the consultant's base. This needs to be addressed on future projects and the options/advantages considered of appointing an additional project manager to work on site or operating from a more locally based office. It was noted that an additional project manager was appointed to assist with client moves and relocations as the project came closer to handover.

The consultant Project Manager worked closely with the Quantity Surveyor in managing the various elements of expenditure against the allocated budget and effective change control procedures were applied. Table 1 shows the various changes in budget from Stage C to Final Account.

TABLE 1
CONSTRUCTION COSTS

	£
• Stage C	19,652,000
• Stage D	21,552,000
• Pre Tender Estimate	22,581,312
• Lowest Adjusted Tender	25,903,000
• Agreed Contract Sum	22,538,340
• Cost of Variations	1,102,922
• Final Account	23,620,044



In the early design stages a lower budget had been approved with higher costs emerging by the time the project reached Stage D. These had to be value engineered down to a lower figure. A disappointing and difficult tendering exercise followed with little interest shown from contractors at a time when the market was at its peak. This is reflected in the number of tenders returned and the difference between the pre-tender estimate and the lowest adjusted tender. There followed a period of negotiation with the preferred contractor to agree a contract sum aligned to budgets approved at that time.

The subsequent cost of variations can be mainly attributed to:

- Fitting out of the ground and first floor shell space in the Amenities Building
- Fitting out of catering space in the Amenities Building
- Fitting out of the first and second floors of the Sir Colin Campbell Building

The above additions amount to just under £1m of the total variation costs and although these have increased the final account figure, approval at the time followed correct procedures and have allowed the buildings to be fully utilised from handover onwards.

Some elements of the budget were considered to be tight and it is estimated that the design and irregular shapes of the buildings have added around 10% to the total construction cost. However the Design Team were following the University's brief and delivered the signature buildings required by the client. There were no claims for loss and expense nor any liquidated and ascertained damages applied.

Recommendations

On future projects, University budgets need to be carefully assessed and be flexible enough to meet the needs of the project whilst achieving value for money

Where consultant Project Managers are remotely located from site, the University should consider the options/advantages of appointing additional project management support provided either from an on site base or operating from a more locally based office

8. Design/User Issues

A good relationship exists with Nottingham City Council and no major issues emerged during the planning process. Indeed the Council were very supportive and regarded the development as an asset to the City.

All three buildings display a unique iconic form and have developed from the concept that they should sit within a parkland setting as signature buildings. In assessing whether these extrovert forms impact adversely on the function of the buildings, there is little to criticise other than perhaps the creation of some irregular shaped spaces where furniture layouts using standard units work less well than in a more conventionally shaped room. This is noticeable in some of the rooms in the circular part of the Sir Colin Campbell Building.

Comments have been made by users that the use and location of the entrances to the Amenities Building and International House are confusing and the security measures to the doors fronting Triumph Road are ineffective since the buildings can, in any case, be accessed from the campus side. This does not create the right impression to visitors who, having been confronted with an entrance they cannot enter from Triumph Road, have to navigate around the adjacent car park to find the other entrances to the buildings.

The purpose of the swipe card access was to deter the general public from gaining access to the buildings from Triumph Road and act as a deterrent. It is accepted that this is not entirely successful and this policy will be reviewed as the development of the campus extends along Triumph Road. Additional footpaths will also be considered.

The flexibility and adaptability of the buildings' internal form has been achieved through the use of non-loadbearing internal partition walls and raised floors incorporating a service void for conduits for power and data which terminate in floor boxes. This works well and in the Amenities Building has enabled the speedy transition from a sports fitness area to general teaching rooms when the fitness centre provider withdrew from the agreement. The provision of teaching rooms has avoided the need to build additional teaching space elsewhere, although it has created some internal rooms which are not liked by users. Installation of full height glazing to some of the existing walls facing the corridor might help. The provision of such internal rooms for teaching purposes should be avoided where possible on future projects when deep plan building footprints are used. (The University is now assessing the possibility of providing a glazed wall to the internal teaching rooms in International House).



Teaching Room – Naturally lit



Internal Teaching Room

The Utilisation rates for 2008 and 2009 show the teaching rooms to be, on average, above the percentage norm for the Higher Education sector as a whole. In comparing the internal rooms with those that have natural light the utilisation rates show no significant difference except for Room B19 in the Amenities Building which only achieved 7% utilisation for 2009.

The floor boxes which house the electrical sockets are not particularly liked due their perceived difficult access from under the desk when plugging in portable equipment. A desktop cable management system would have been a better solution but would have been more expensive.

One of the positive design aspects of these buildings is the level of fenestration and how the natural light improves the quality of the internal spaces. This is evident in the area occupied by the International Office which is well liked by staff and is generally open plan. Other departments in International House benefit less from this due to their accommodation being in cellular offices.

At the briefing and early design stages, the International Office played an important role in defining how they wanted their space to be configured. This has also helped in the design of their reception/waiting area whereas in other departments the reception does not function as originally intended and the absence of any waiting space is very noticeable.

This has been a successful approach for the International Office and the project may have benefitted from a similar level of consultation with other end users by combining design development with regular user consultation.

International House has a spacious entrance and foyer area made larger by the decision not to install a reception counter. Observations would indicate that this area is not used to its full potential and it is agreed that more use could be made of this space for exhibitions and displays.

In the Amenities Building favourable reports were received on the use of the Postgraduate Centre with good use made of the dedicated seminar room and postgraduate lounge which is used both as a study area and as a social space. One student commented:

'The building is always clean and appears to be well maintained. I have always found it a good place to escape to for periods of intense concentration as well as to attend seminars and discussion groups'

There were some comments on environmental performance and these are covered in the next section.

There has also been positive feedback on the prayer room facilities but the Multi-Faith Room is not well used and this needs to be reviewed with the University's Chaplaincy to determine whether this room could be released for alternative use.

The residential units in the Amenities Building are arranged on the top two floors. The units, which form part of the University's staff accommodation portfolio, are very popular and there is a quick turn round to maximise letting potential which is usually for one to three months duration. The accommodation is used for new starters (staff relocating eg. from overseas) and visitors.

A well furnished communal lounge is also provided and, combined with the use of Café Aspire creates an environment conducive to meeting colleagues or other people. The three bedroom units work well as they can be let to a family or a group of colleagues. Again, the Housing Co-ordinator advised on the mix of units at the design stage and this early involvement has contributed to the success of the units. Overall the facility works well and should be replicated in other buildings where residential units for staff and visitors are to be provided.

The fit out of the Café Aspire has worked well, demonstrated by the level of use of this facility. The success of the venue has put pressure on the bookable private dining area especially at lunch time and a separate dining room would have been preferred. However due to the layout of the building and internal circulation this would be difficult to retrofit. Some further comments have been made by the Café Manager but these are more operational and can be dealt with through the normal works request system. A list of these items is shown in Appendix 4.

The Amenities Building provides a small Student Services Centre at the entrance to the building. This is a valuable asset for students seeking advice some of which is often confidential. The accommodation comprises two offices one of which doubles up as a reception counter which can be closed off out of opening hours. There is a small lobby area in front of the counter which is used for dispensing guidance leaflets and other information and also for one-to-one discussions with students. Some comments have been made by the Student Services Centres Manager:

- When the reception shutters are down there is a lack of daylight in the office (the configuration of the side cladding and fenestration prevent any alterations to this room)
- Lack of confidentiality at the counter when two advisors are seated at the counter and dealing with students. Given the nature of the work done by Student Services and its confidentiality – the Counselling Service see students at the centre for instance – a separate interview room away from the corridor and main entrance would work a lot better (this option should be explored in any future provision for Student Services)
- People use the fire exit as a way of getting out of the building in non-emergency situations and Student Services staff have no way of stopping them

The entrance and reception area to the Sir Colin Campbell Building is an impressive area extending the full height of the three storey building. This gives a feeling of light and space as one enters and the bold interior colours are in keeping with the ethos of the building.

The reception area is considered too small by the users particularly the Innovation Park Manager who would have preferred her office to form part of the reception. Using the store room (A02) as the reception with the counter area extending into the foyer space would have been a better option. (This proposal was considered during the design process but was rejected in preference to a standalone reception area being provided).

Recommendations

The policy of limiting access to the Amenities Building and International House from Triumph Road by swipe card should be reviewed as the development of the campus extends along Triumph Road. Additional footpaths should also be considered

The provision of internal teaching rooms with no natural light should be avoided where possible on future projects when deep plan building footprints are used. Consideration should be given to installing glazed partition corridor walls to some of the internal rooms where appropriate

The low utilisation rate of teaching room B19 in the Amenities Building should be investigated

Where budgets allow, consider the installation of cable management systems to desks in conjunction with floor boxes where raised floors are used

During the design development stage, ensure early consultation with users so that their requirements are fully understood. This should be done within the University's normal working guidelines

Review the use of the Multi-Faith Room with the University Chaplaincy

The residential units work well and should be replicated in other buildings where residential units for staff and visitors are to be provided

Student Services Centre:

- *investigate the provision of a separate room for confidential interviews away from the main counter and corridor as part of any future provision for Student Services*

9. Building Performance

Winter Heating

The design philosophy for the heating and cooling to the building was to make effective use of the embodied energy which would be extracted from the nearby lake. The following is an extract from the Architects' and Services Engineers' design statement and explains how the system was intended to work:

'Artificial heating and cooling is provided by a closed loop system which extracts embodied energy from a vital natural resource already in existence on the campus: the nearby lake. Highly efficient heat exchangers submerged in the lake reject or absorb the embodied energy stored within this sizeable body of water. This energy is then routed to a series of reversible heat pumps which provide heating and cooling to air handling units within the building, therefore replacing the need for conventional gas-fired boilers and air cooled chillers.

Exposed concrete columns and slab soffits provide the thermal mass to regulate internal temperatures and aid night time cooling. Pressurised floor plenums deliver fresh air, cooled or heated, to interior spaces. Stale, warm air is then extracted via grilles located above doorways and ducted back to air handling units for heat recovery'.

In evaluating the performance of the building, the problems that occurred with the installation of this system, its operation and the length of time it took to correct the faults have been the biggest criticism from users of all three buildings. Overall, 66% of users who responded to the questionnaires were dissatisfied with the level of heating in winter and 45 separate written comments were received on this subject.

In order to understand why this occurred, it is necessary to review the circumstances around which the system was designed and installed. The key facts are as follows:

- The Services Consultant provided the concept design and performance specification from which design calculations and drawings were to be produced. No monitoring or quality control was carried out as this was not part of the Consultant's brief
- The detailed design for the closed loop system was the responsibility of Geothermal International who were a subcontractor to the main contractor
- To ensure full accountability and liability for defects caused by Geothermal International, (who were not a party to the main contract between the University and main contractor) there was a collateral warranty in place between Geothermal International and the University

- The lake has a changing temperature due to constant recirculation: it should not have been assumed by Geothermal International that it was a static body of water.
- The lake is considered too shallow to operate the closed loop system effectively – it should have been at least another metre deep. Therefore the lake's finite energy reserve did not match the heating demands of the building
- The lake had a weir but this was overlooked by Geothermal International in their calculations
- The plate heat exchangers were undersized
- The main contractor appointed his own mechanical and electrical subcontractor. Their performance was considered far from satisfactory with poor supervision and calibre of staff. Later the company ceased trading
- The main contractor went into administration which further delayed the rectification

The Operations and Facilities section of the Estate Office, who were responsible for the operation of the building after handover, were critical of the heating and cooling system when installed, considering it to be “over complicated, inefficient and with no backup.” It was felt to be “unreliable, complete with a lot of confusion on how it should operate.” Also “the reliability of the system has proven to be poor. This is mainly due to some of the control hardware components, the complex BMS software which has been written and as a result of the way the systems have been piped, particularly on the load side.”

The collateral warranty gave protection to the University for any third party defects and Geothermal International took full responsibility for the system's shortcomings although it took some time for the company to acknowledge the problems. It is unfortunate that it has taken over two years to resolve and the occupants have had to endure three winters of unacceptable temperatures within the buildings.

The length of time was exacerbated by the solutions put forward by Geothermal International which, once tested and run over the winter months, failed to solve the problems. In the end, the only solution was to install separate gas-fired boilers which now form a supplementary heat source and provide adequate backup (90%) to key parts of the building.

There is no doubt that the closed loop system of extracting energy from a ground or lake source is a viable and sustainable method of heating and cooling and, designed and installed correctly, the University intends to adopt this method on future building projects where appropriate. The experience gained on this project and the lessons learned will therefore provide invaluable guidance and briefing.

The decision by the University not to novate the Services Consultant in future is a major shift in procurement policy but one which will have a positive impact on future designs. It is therefore recommended that the Services Consultants retained on future projects have experience of these systems and undertake a quality and monitoring role as well as more involvement in the system design and specification. Also any innovative system needs to incorporate some form of backup in the event of failure of the main plant. The checks and tests made at the commissioning stage need to be further strengthened and the system modelled on winter time temperatures and conditions prior to acceptance at handover. The appointment of a specialist commissioning engineer within the contract may be appropriate on future projects and will assist with achieving the required BREEAM credits.

The other issue to consider is the impact this problem has had on the users of the buildings and how the “crisis” was handled by the Estate Office over a protracted period of time. In this situation the main actions needed are to keep the users of the building reasonably warm via alternative forms of heating and to provide sufficient information to staff on what is happening and the remedial action being taken. From the comments received neither of these actions was handled particularly well by the Estate Office and this has been accepted.

The temporary electric heaters had limited affect as their distribution had to be restricted due to the electrical load on the buildings, particularly International House. Operations and Facilities have agreed to meet with user representatives to discuss the problems and how this can be handled better in the future should a similar situation arise. It is important that the Estate Office

has a contingency plan in place that will ensure business continuity and procedures established clearly setting out how this should be handled. Adequate information issued through the Estate Office Helpdesk is crucial.

Summer Cooling

Summer temperatures within the building have been much more satisfactory but mention has been made of certain rooms being too hot and stuffy, especially the internal rooms and rooms with no opening windows. Specific rooms mentioned are:

Amenities Building	B14	Seminar Room
	B15	Graduate Centre Lounge
International House	A08	Office
	A09	Seminar Room
	A11	Office
	A12	Seminar Room

The above rooms need to be inspected and the temperatures and ventilation tested/re-balanced.

Sound Insulation

The issue of inadequate sound insulation between rooms has also been raised in all three buildings:

- Inadequate soundproofing between seminar rooms
- Noise from plant room in seminar room A02(AB)
- Speaking tests cannot be conducted on A Floor(IH)
- Problems with insulation between A09, A12 and A26(IH)
- Noise from A08 heard in A07(IH)
- Noise transmission between offices on D and E Floors (IH)
- Interview Room B31(IH) is unsuitable for confidential tutorials/meetings
- Ductwork/grilles connecting A13 and A31(SCCB) compromise the sound insulation

Further discussions with users should take place to identify specific rooms and in situ sound insulation tests undertaken. This will objectively identify performance levels and allow remedial measures to be taken if necessary.

Lighting

Lighting, both natural and artificial, is considered generally good. The configuration of multiple windows in many of the rooms in the Amenities Building and International House gives a good level of light and adds to the quality of the rooms.

There have been some comments concerning glare from some of the high level windows in the offices. Blinds have been fitted to windows in some offices but this is not a consistent policy and further assessment is recommended.

Lifts

The lifts installed in all three buildings are the Ecocell type manufactured by Morrison Vermaport. The lifts are very energy efficient and battery powered. This avoids the need for a motor room thereby saving space. As power is taken from the batteries to operate the lift, any unused energy is fed back to recharge the batteries. However if the lifts are heavily used all energy is drained from the batteries and a period of 'resting' is needed while recharging takes place. During this period the lifts are inoperative which has caused problems ranging from mere inconvenience to major difficulties for disabled users who have no other means of vertical access.

There is only one lift in International House to deal with the general traffic to and from the upper floors and the level of student traffic to the International Office.

On future projects, the specification of the lift should be carefully considered to ensure that where Ecolifts are installed they can adequately cope with the traffic demands and frequent use.

Recommendations

Winter Heating

The Services Consultants should continue to be retained on future projects on the client side and have experience of ground/lake source heat pump systems and undertake a quality and monitoring role as well as more involvement in the system design and specification.

Any innovative system needs to incorporate some form of backup in the event of failure of the main plant

The checks and tests made at the commissioning stage need to be further strengthened and the system modelled on winter time temperatures and conditions prior to acceptance at handover

The appointment within the contract of a specialist commissioning engineer may be appropriate on future capital projects

Low temperatures on Monday mornings have caused discomfort during cold spells. Where the temperature drops considerably out of normal hours the building management system should be adjusted to compensate for the lower temperatures

Operations and Facilities should meet with user representatives to discuss the issue of communication and how this can be handled better in the future should a similar situation arise

The Estate Office should have a contingency plan in place that will ensure business continuity is sustained and procedures established clearly setting out how this should be handled

Ensure adequate information is issued through the Estate Office Helpdesk

Summer Cooling

The rooms identified as having problems need to be inspected and the temperatures and ventilation tested/re-balanced

Sound Insulation

Construction issue drawings should be checked to confirm whether any additional insulation has been included

Partition junctions need to be checked at ceiling level and below the raised floor where acoustic baffles may have become dislodged

Further discussions with users should take place to identify specific rooms where problems have been experienced and in situ sound insulation tests undertaken. Remedial action to be taken where necessary

Lighting

Blinds have been fitted to windows in some offices but this is not a consistent policy and further assessment is recommended

Lifts

On future projects, the specification of the lift should be carefully considered to ensure that, where Ecolifts are installed, they can adequately cope with the traffic demands and frequent use

10. Construction Issues

As mentioned earlier in the report, the main contractor was procured through competitive tender and appointed following final negotiation. The contractor had a full team of staff allocated to the project who were proactive and helpful. The good relationship with the University worked well and ensured that construction issues were resolved in a pragmatic and non-confrontational manner. Overall, the project was a tremendous learning experience with the development of new products and building techniques required to deliver the architectural forms for the three buildings.

The design of the structural frame was complex and presented real challenges in terms of 'buildability'. A cantilevered scaffold arrangement had to be developed and inclined mast climbers were used for the first time. Other issues related to the installation of the windows, the profile of which had to be designed to cater for the slope of the elevations.

Problems occurred with the delivery and installation of the rainscreen cladding. The cladding subcontractor performed badly and went out of business during the progress of the works. In order to ensure continuity, the University was forced to pay the rainscreen cladding manufacturer (MBK – Germany) directly resulting in further expenditure. Also additional terracotta tiles had to be ordered from Germany which affected the programme.

It is difficult to assess whether any of these issues could have been avoided if done differently but certainly allowing more time for the contractor to plan the relevant packages of work within the project at "the front end" of the Design and Build contract might have helped.

Prior to completion of making good defects, the main contractor went into administration leaving a number of construction defects outstanding. These were:

- Completion of repairs to balconies due to rainwater penetration on International House
- Problems of smells from the kitchen extract entering the Amenities Building
- Commissioning of boilers (this has now been completed)
- Discharge of the planning condition relating to contaminated land
- Address leaks in rooms A21 and C05 in International House

In the absence of the main contractor, the Estate Office is handling the outstanding defects through the relevant subcontractors.

Commissioning was considered problematic made more so by the complicated heating control systems and the absence of a retained Services Consultant. Clear commissioning procedures should be set out in the Employers Requirements document on future projects. The retention of the Services Consultant on the client side should help this process and there may be justification for the appointment of a commissioning engineer on projects involving complicated mechanical and electrical services. Other issues relating to specific buildings are:

Amenities Building

There have been ongoing problems and evidence of leaks around the shower trays in the residential units. At present this has been addressed through re-sealing around the shower tray. Correct detailing and upstands may have prevented this.

International House

Users have commented that due to the slope of the front elevation, rainwater runs down the face of the building and discharges over the main entrance. This makes the paving very slippery in very cold weather. The Architects have commented that the details for the cladding allow for a 'lip' which catches the rainwater. This should be checked on site.

Sir Colin Campbell Building

The building is clad in zinc shingles with the windows, which have large projecting sills, set within the cladding. Rainwater run-off from the windows below the sills is causing differential weathering to the cladding. The Architects have therefore been asked for assistance with this issue. The rusting screw fixings to the windows have now been replaced with stainless steel.

Recommendations

On Design and Build contracts ensure sufficient time is allowed in the programme for adequate planning of relevant packages of work by the contractor prior to construction commencement

Complete the outstanding defects left by the main contractor

Ensure adequate commissioning procedures are in place and incorporate these in the Employers Requirements document

Employ a commissioning engineer if deemed appropriate

Monitor the shower tray seals in the residential units for potential leaks

Ensure the weathering detail on the front face cladding of International House above the main entrance is fit for purpose

On future projects where zinc cladding is specified, the Design Team should be mindful of potential irregular weathering around projections such as sills to windows

11. Operations and Facilities Issues

Operations and Facilities raised a number of issues relating to the heating/cooling and ventilation systems. These have been recorded and referred to in an earlier section of this report.

At the meeting with Operations and Facilities staff, reference was made to the Project Communication Framework process map which is intended to aid communication between the Capital projects team and those responsible for the operation and maintenance of the buildings once handed over. It was acknowledged that communication has improved but the formal process map was still not being followed. Further discussions are needed between the two sections within the Estate Office with the aim of setting out a more simplified communication framework that is workable and agreed by both parties.

Grounds Maintenance have raised the problem with the steepness of the grass banks around the Sir Colin Campbell Building where these exceed 60 degrees although a safe method of working has now been established. There is also evidence of settlement and slump of the soil banks. Turf close to the windows on the west and east side of Triumph Road has resulted in mowing debris left on the windows after mowing and problems of noise/disturbance to building occupants. A narrow, flat, paved margin between the grass and windows to both flat and sloping grassed areas might have been a better solution which would not have compromised the design intent.

A suggestion has been made regarding operations and maintenance manuals and, to assist the Operations and Facilities team, a schedule of maintenance tasks required on future new buildings in the first 6-12 months would be helpful. Also, that information within the manuals should reflect up to date as fitted/as built arrangements.

The users of the buildings, particularly in the Amenities Building and International House, were concerned about the cleanliness of the toilets and that this was below standard. Where student traffic is at its peak, these facilities are well used and it is important that an appropriate cleaning regime is put in place for these areas.

An issue related to this is the flushing of the toilets with the current push button application not being positive and the level of hand pressure needed is excessive in some instances. This should be investigated and adjustments made to the mechanism if necessary.

On security matters, it was confirmed that liaison with the Security Officer had improved but however keys and schedules could have been issued sooner. Problems of break-ins have occurred in both International House and Sir Colin Campbell Building but it was confirmed that security had now been upgraded with a further security camera added.

At handover, cleaners' cupboards within buildings are not fitted out with shelves although these can be supplied on request through the Estate Office. The room data sheets should reflect this.

There is also the need to improve the quality of the control components (some of the pressure differential switches have failed)

Recommendations

Further discussions are needed between the two sections within the Estate Office with the aim of setting out a more simplified communication framework that is workable and agreed by both parties

On future projects consideration should be given to the steepness of grass banks in relation to maintenance/safety

On future projects consider incorporating a schedule of maintenance tasks required on new buildings in the first 6-12 months as part of the information issued at handover

Ensure that information within the operations and maintenance manuals issued at handover reflects as fitted/as built arrangements

Ensure the appropriate level of cleaning is carried out to toilet areas

Inspect the flushing mechanism to the toilet cisterns and make adjustments where necessary

Ensure keys and schedules are issued in good time

Add the provision of shelving to cleaners' cupboards to the room data sheets as an Employee supply and fix item via the Estate Office works request system

Review the specification of control components such as pressure differential switches

12. Sustainability

The combination of low demand and an energy efficient environmental control system, with less overall heating and cooling needed, has allowed the load requirements to be delivered via lake coupled reversible heat pumps as part of a renewable energy system. However this has been compromised by the necessity to install gas fired boilers for backup purposes.

The buildings are highly insulated with the external envelope exceeding the requirements of the Building regulations Part L 2006 and the area of windows (fitted with solar control glass) is less than 50% of the overall facades. The system of air input into the buildings at low level naturally rising to high level and then discharged provides an additional 10-15% saving in energy.

In summary, the following annual carbon emissions have been predicted:

International House	53kgCO ₂ /m ²
Amenities Building	87kgCO ₂ /m ² (higher due to catering gas loads)
Sir Colin Campbell Building	47kgCO ₂ /m ²

These figures estimated for carbon emissions are said to represent savings of 53-57% in comparison to notional building calculations under Part L of the Building Regulations for similar buildings. Now that the buildings are in use the predictions need to be validated against operational data.

The buildings' design and projected energy performance were not assessed against BREEAM criteria but it is estimated they would achieve a rating of 'very good'. However it is not clear what impact the necessity for gas fired boilers would have had on this rating. The University's policy on energy/sustainability of new buildings has now changed and capital projects are now formally assessed.

Other sustainable initiatives include:

- Collection of rainwater which is channelled down the roof of the buildings into gravel beds which feed into swales and in turn discharge into the lake.
- 'Wind catchers' installed in the Sir Colin Campbell Building which draw fresh air down into the building
- Heat recovery during winter or venting air directly to the atmosphere during peak cooling periods using motorised dampers
- Centrally mounted sun pipes in the Sir Colin Campbell Building drawing natural light into the interior without adding to solar gain
- Lighting systems controlled by movement sensors
- Sophisticated Building Management System for all three buildings
- Energy efficient, battery powered passenger lifts

Recommendations

Now that the buildings are in use, figures for energy efficiency and carbon footprint need to be validated against operational data

13. Summary of Recommendations

Procurement

The use of single stage tendering should continue for the foreseeable future

Retention of the Services Engineers on the client side should continue in order to maintain effective monitoring, quality control and assist with commissioning

Project and Cost Management

On future projects, University budgets need to be carefully assessed and be flexible enough to meet the needs of the project whilst achieving value for money

Where consultant Project Managers are remotely located from site, the University should consider the options/advantages of appointing additional project management support provided either from an on site base or operating from a more locally based office

Design/User Issues

The policy of limiting access to the Amenities Building and International House from Triumph Road by swipe card should be reviewed as the development of the campus extends along Triumph Road. Additional footpaths should also be considered

The provision of internal teaching rooms with no natural light should be avoided where possible on future projects when deep plan building footprints are used. Consideration should be given to installing glazed partition corridor walls to some of the internal rooms where appropriate

The low utilisation rate of teaching room B19 in the Amenities Building should be investigated

Where budgets allow, consider the installation of cable management systems to desks in conjunction with floor boxes where raised floors are used

During the design development stage, ensure early consultation with users so that their requirements are fully understood. This should be done within the University's normal working guidelines

Review the use of the Multi-Faith Room with the University Chaplaincy

The residential units work well and should be replicated in other buildings where residential units for staff and visitors are to be provided

Student Services Centre:

- investigate the provision of a separate room for confidential interviews away from the main counter and corridor as part of any future provision for Student Services

Winter Heating

The Services Consultants should continue to be retained on future projects on the client side and have experience of ground/lake source heat pump systems and undertake a quality and monitoring role as well as more involvement in the system design and specification.

Any Innovative system needs to incorporate some form of backup in the event of failure of the main plant

The checks and tests made at the commissioning stage need to be further strengthened and the system modelled on winter time temperatures and conditions prior to acceptance at handover

The appointment within the contract of a specialist commissioning engineer may be appropriate on future capital projects

Low temperatures on Monday mornings have caused discomfort during cold spells. Where the temperature drops considerably out of normal hours the building management system should be adjusted to compensate for the lower temperatures

Operations and Facilities should meet with user representatives to discuss the issue of communication and how this can be handled better in the future should a similar situation arise

The Estate Office should have a contingency plan in place that will ensure business continuity is sustained and procedures established clearly setting out how this should be handled

Ensure adequate information is issued through the Estate Office Helpdesk

Summer Cooling

The rooms identified as having problems need to be inspected and the temperatures and ventilation tested/re-balanced

Sound Insulation

Further discussions with users should take place to identify specific rooms where problems have been experienced and in situ sound insulation tests undertaken

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Blinds have been fitted to windows in some offices but this is not a consistent policy and further assessment is recommended

Lifts

On future projects, the specification of the lift should be carefully considered to ensure that, where Ecolifts are installed, they can adequately cope with the traffic demands and frequent use

Construction Issues

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Complete the outstanding defects left by the main contractor

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On future projects where zinc cladding is specified, the Design Team should be mindful of potential irregular weathering around projections such as sills to windows

Operations and Facilities Issues

Further discussions are needed between the two sections within the Estate Office with the aim of setting out a more simplified communication framework that is workable and agreed by both parties

On future projects consideration should be given to the steepness of grass banks in relation to maintenance/safety

On future projects consider incorporating a schedule of maintenance tasks required on new buildings in the first 6-12 months as part of the information issued at handover

Ensure that information within the operations and maintenance manuals issued at handover reflects as fitted/as built arrangements

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Add the provision of shelving to cleaners' cupboards to the room data sheets as an Employee supply and fix item via the Estate Office works request system

Review the specification of control components such as pressure differential switches

Sustainability

Now that the buildings are in use, figures for energy efficiency and carbon footprint need to be validated against operational data

APPENDIX 1

Sample Questionnaire



POST OCCUPANCY EVALUATION

BUILDING USER SATISFACTION QUESTIONNAIRE

BUILDING: INTERNATIONAL HOUSE

Occupation (Please tick most relevant or state in 'other')

Administrative staff
 Researcher
 Lecturer
 Student
 Other.....

Date

An evaluation of your building is being conducted to assess how well it performs for those who occupy it. This information will be used to assess areas that might need improvement and provide feedback that can be used for the benefit of similar future buildings.

Please complete the following questions relating to the above project by ticking the appropriate boxes and adding comments where requested. Answers to questions 5 – 9 should relate to your own workspace. Completed questionnaires should be emailed to Tony@qtcprojects.co.uk

1 – Satisfaction with types of space in building

Please rate the overall quality of the following areas:

(Please tick)

A: Seminar Room	Poor	1	2	3	4	5	Excellent
B: Office (single)	Poor	1	2	3	4	5	Excellent
C: Office (shared)	Poor	1	2	3	4	5	Excellent
D: Admin/Reception	Poor	1	2	3	4	5	Excellent
F: Other <i>(Please state)</i>							
.....	Poor	1	2	3	4	5	Excellent
G: Overall Impact	Poor	1	2	3	4	5	Excellent

2 - Security

2.1 How safe do you feel in the building? (*Please tick*)

Unsafe

Very safe

1	2	3	4	5	6	7	8	9	10
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3 - Accessibility

3.1 How accessible is the building?

Not Accessible

Very accessible

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

4 - Cleanliness

4.1 How clean is the building?

Dirty

Clean

1	2	3	4	5	6	7	8	9	10
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5 - Air Quality

5.1 Are you content with air quality at your workplace?

Not content

Very content

1	2	3	4	5	6	7	8	9	10
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5.2 Is the air fresh or stale?

Stale

Fresh

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

5.3 Is the air humid or dry?

Too humid

Too dry

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

5.4 Do you have control over natural ventilation (ie opening windows)?

No

Yes

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

6 - Temperature

6.1 Is the temperature in winter too cold or too hot?

Too cold									Too hot
1	2	3	4	5	6	7	8	9	10

6.2 Is the temperature in summer too cold or too hot?

Too cold									Too hot
1	2	3	4	5	6	7	8	9	10

6.3 Do you have control over temperature?

No									Yes
1	2	3	4	5	6	7	8	9	10

7 - Noise

7.1 Do you suffer distraction caused by noise in your part of the building?

Very significant									Not significant
1	2	3	4	5	6	7	8	9	10

8 - Light

8.1 Is there too much or too little natural light?

Too little									Too much
1	2	3	4	5	6	7	8	9	10

8.2 Is the level of artificial light too high or too low?

Too low									Too high
1	2	3	4	5	6	7	8	9	10

9 - ICT/Data

9.1 How well is voice and data connectivity provided at the workspace?

Inadequate									Well provided
1	2	3	4	5	6	7	8	9	10

10 - Comments

If you have any additional comments that you would like to make about any aspect of the building and your working environment please note them here. If relevant to a particular question please give the question number.

Thank you for completing the questionnaire.
Completed forms should be returned to Tony@qtcprojects.co.uk



APPENDIX 2

POE Workshop Attendees

Appendix 2

Post Occupancy Review Workshop

Held on Tuesday 8 March 2011

List of Attendees

Building User Representatives

Pam Bath	International Office
Tracy Sisson	Graduate Centre Manager
Joan Leake	Institute of Work, Health & Organisations

University Estate Office

Mark Bonsall	Senior Engineer
Tim Brooksbank	Development Director
Gary Byard	Security
Barry Chadwick	Operations & Facilities Director
Steve Gilbert	Senior Building Surveyor
Lisa Haynes	Space Resource Manager
Cliff Hogan-George	Domestic Services Operations Manager
Tracey Nelson	Housing Co-ordinator
Tim Rudge	Energy Manager
Richard Wigginton	Project Officer

Project Manager/QS

Alastair Wolstenholme	Gardiner Theobald LLP
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Design Team

David Patterson	Make Architects
James Goodfellow	Make Architects
Sasha Krstanovic	AECOM

Contractor

Martin Burton	ROK/SOL
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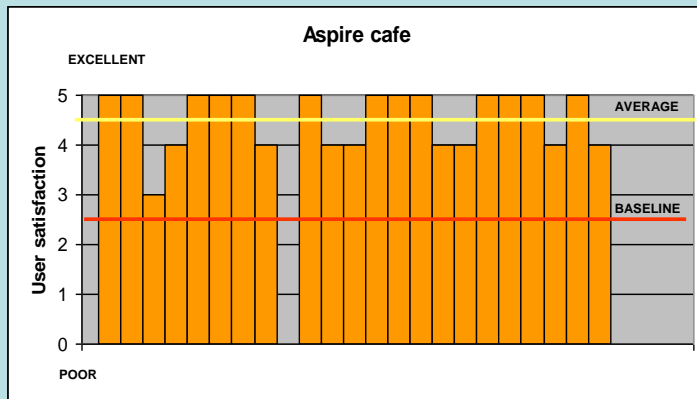
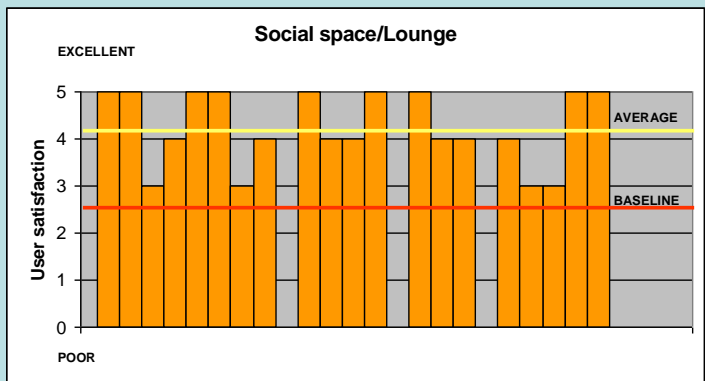
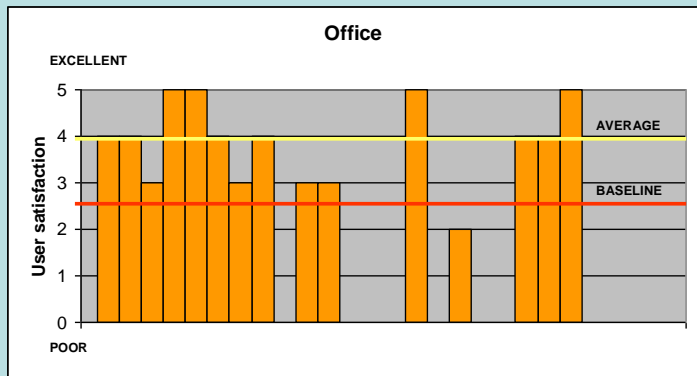
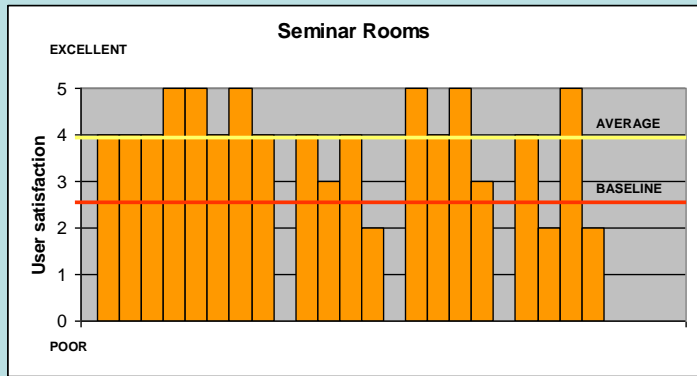
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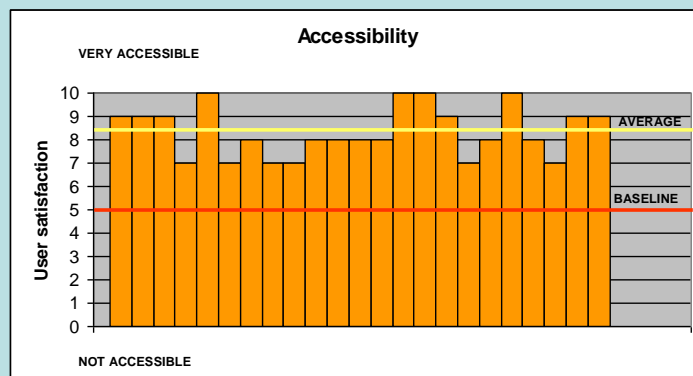
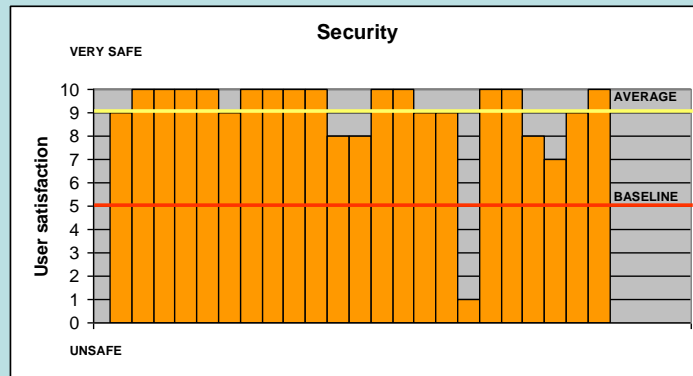
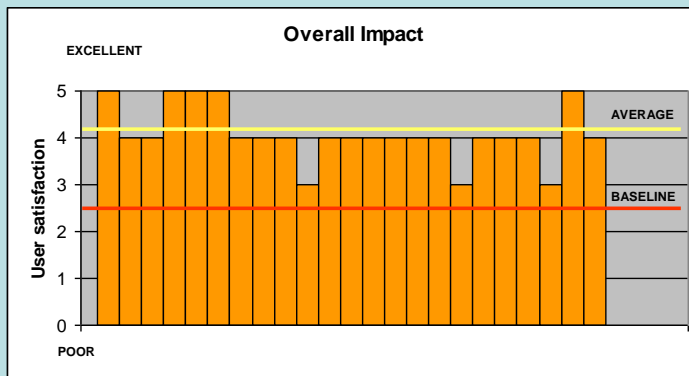
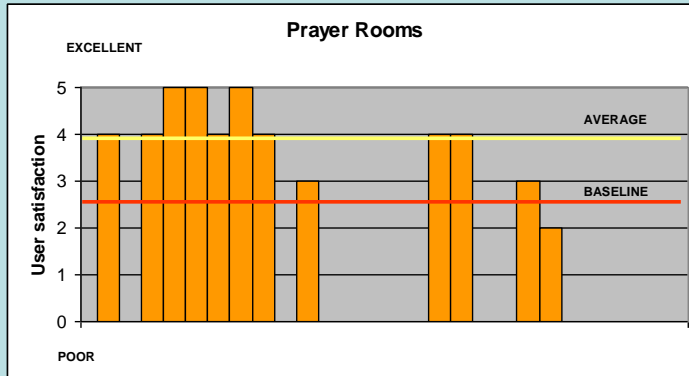
Jo Derbyshire	Innovation Park Manager
Joanna Black	Contemporary Chinese Studies
Helen Foster	International Office
Lynn Brown	Centre for English Language Education
Jason Yarnall	Estate Office – BMS Engineer
Chris Dickinson	Estate Office – General Maintenance Manager

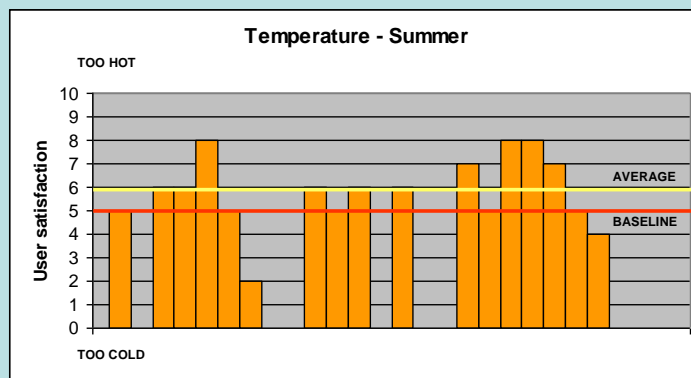
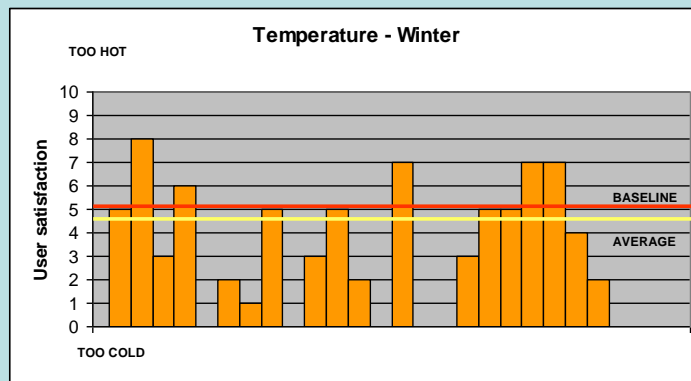
APPENDIX 3A

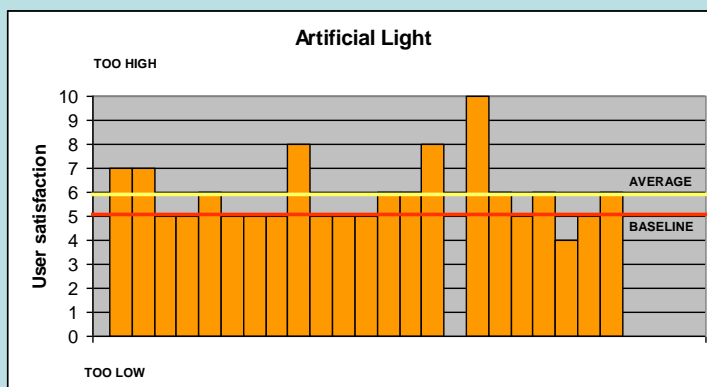
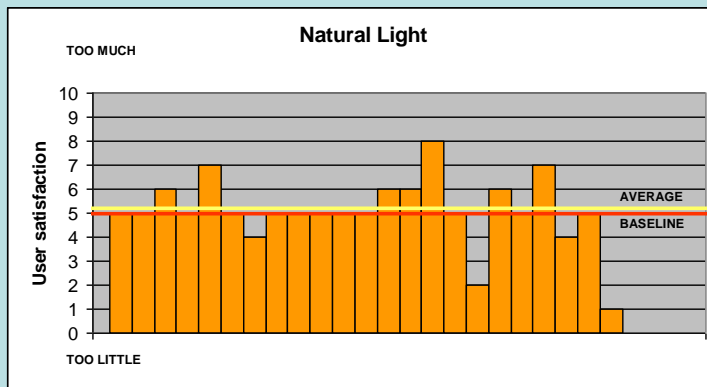
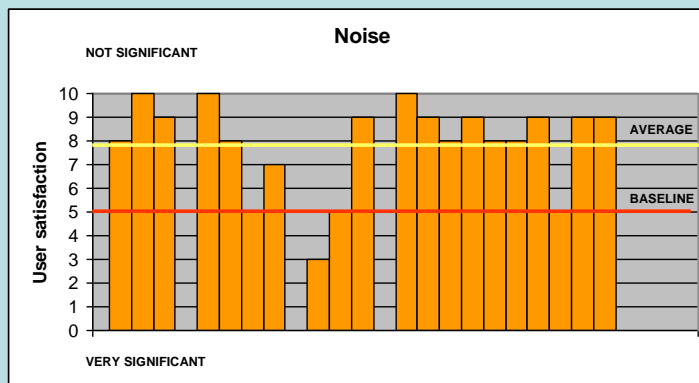
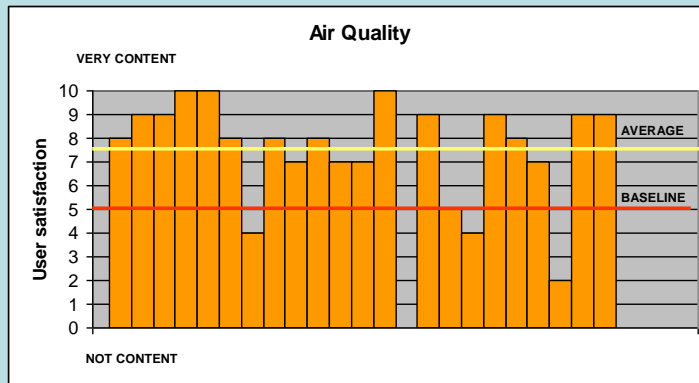
User Satisfaction Charts

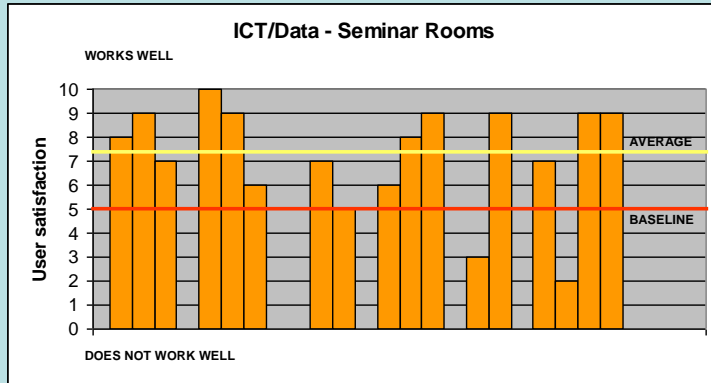
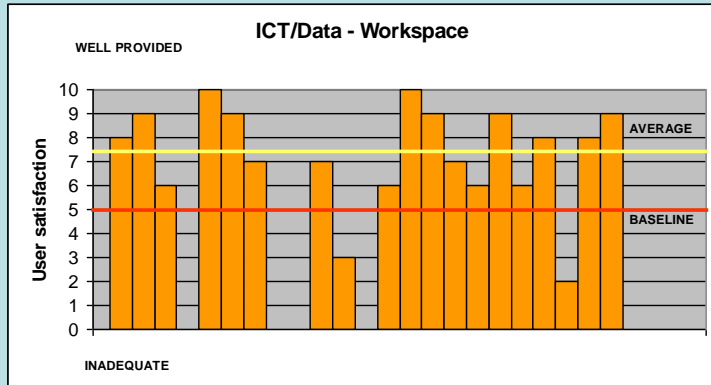
AMENITIES BUILDING







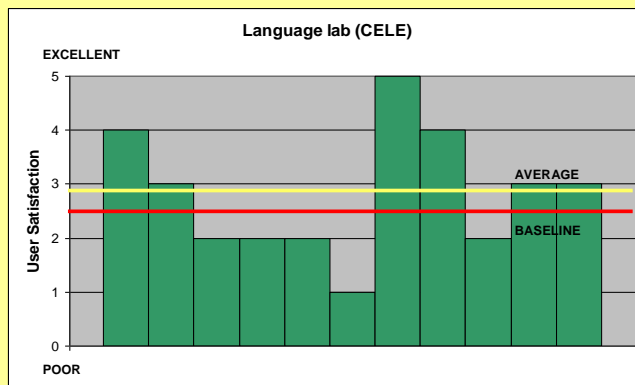
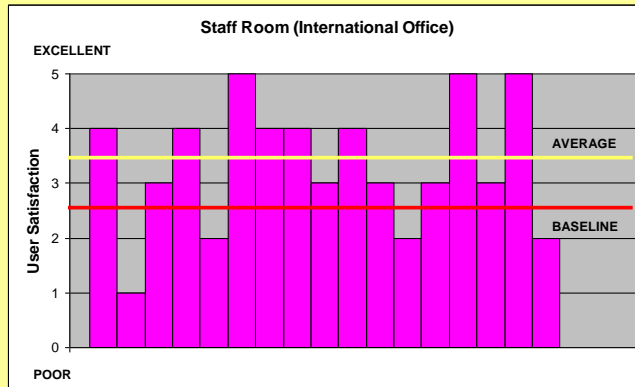




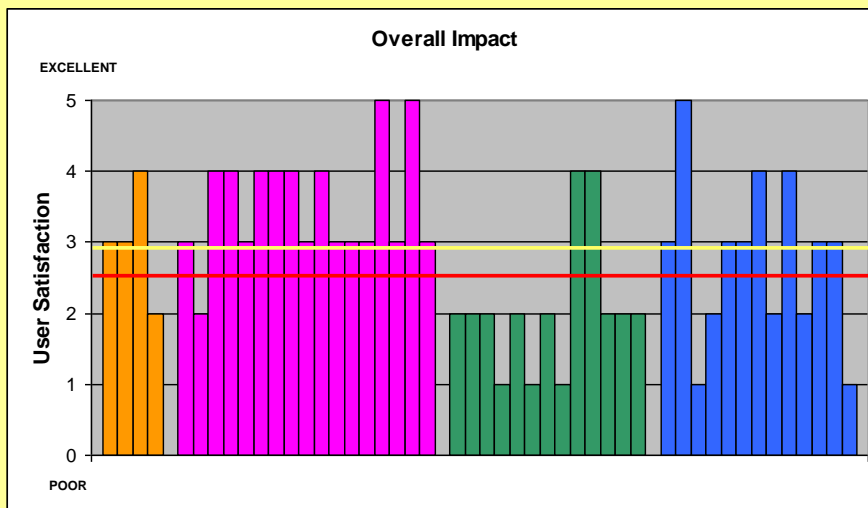
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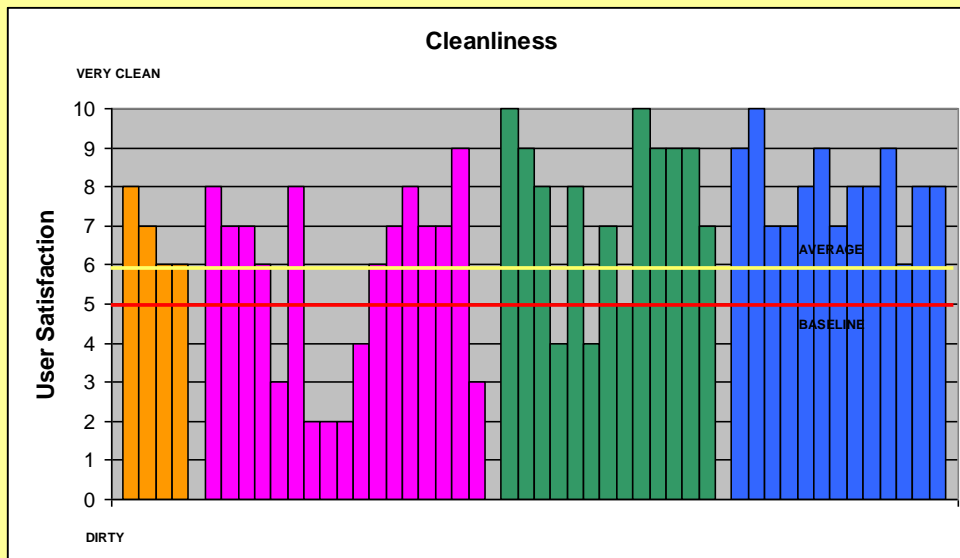
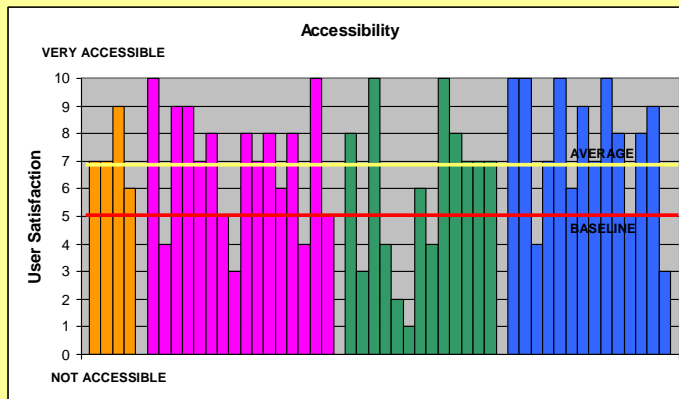
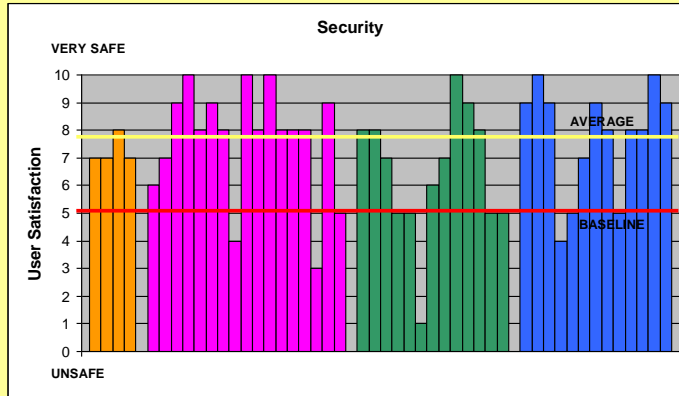
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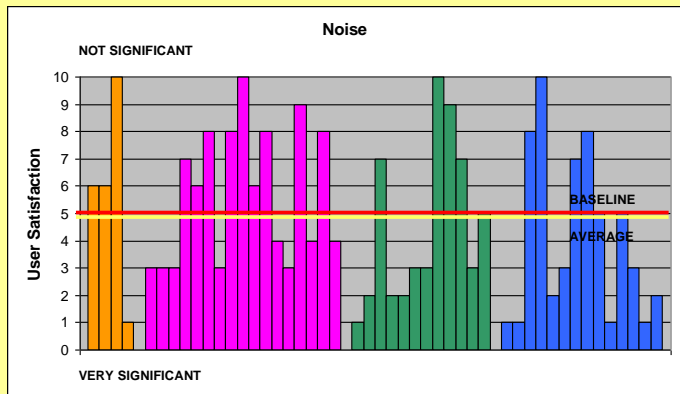
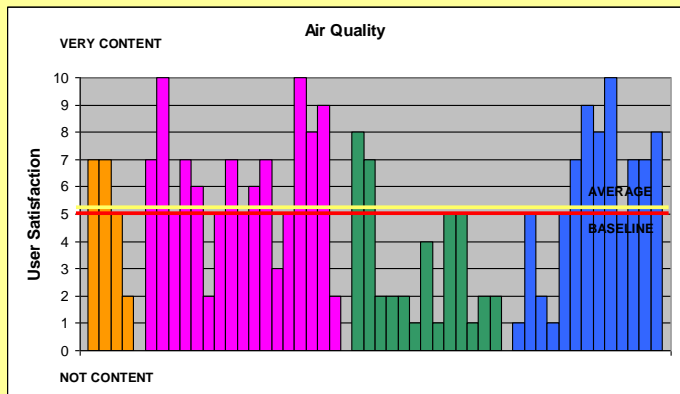
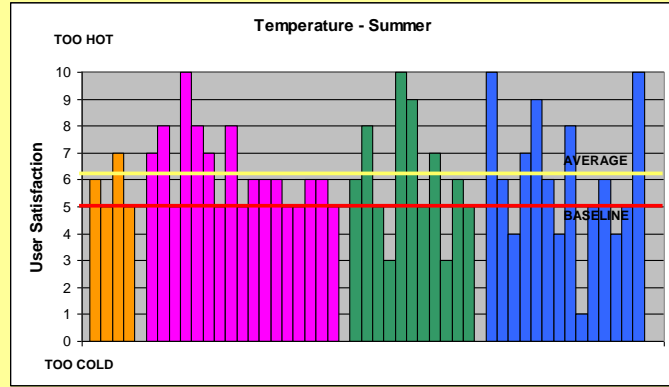
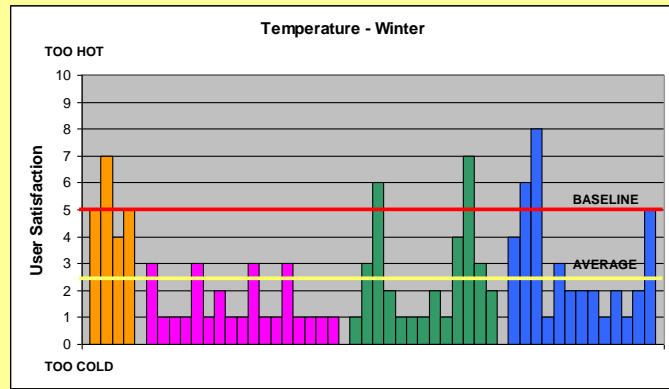
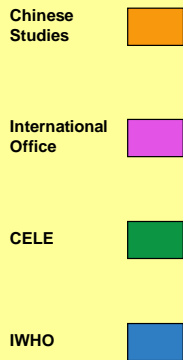
INTERNATIONAL HOUSE

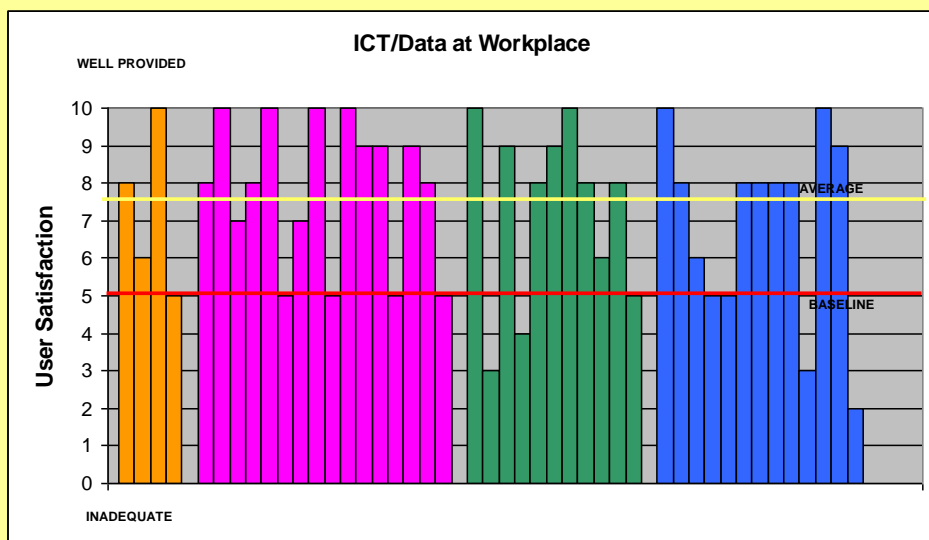
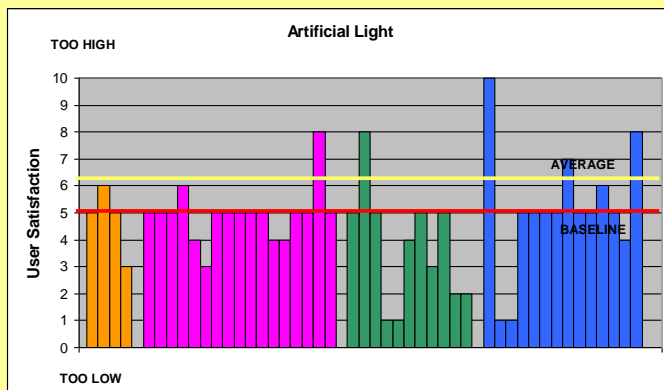
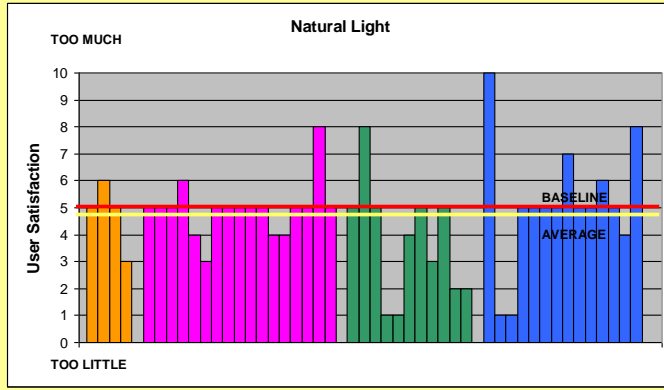


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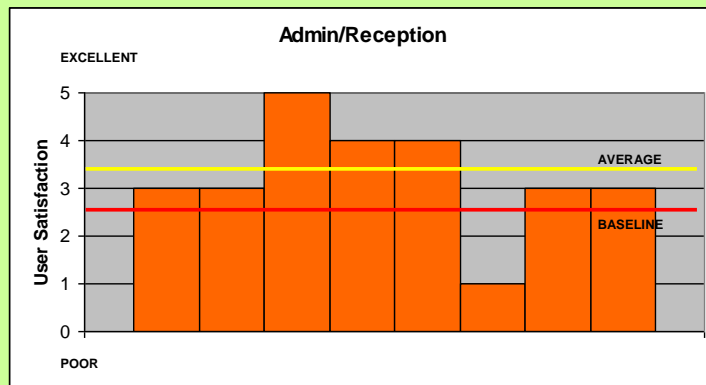
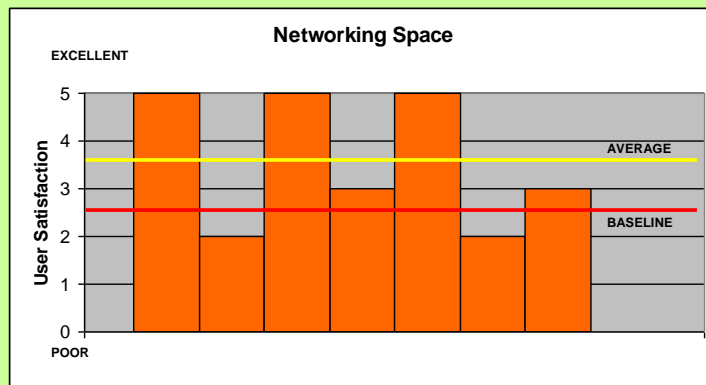
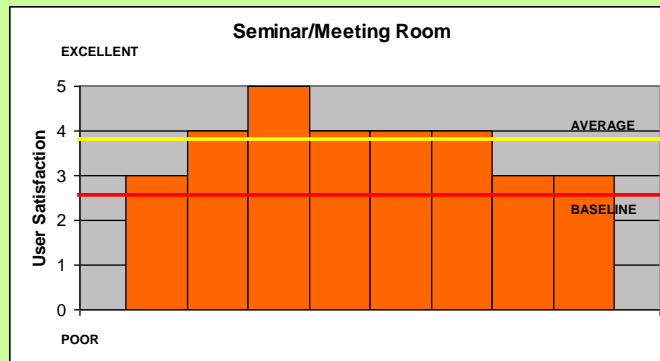
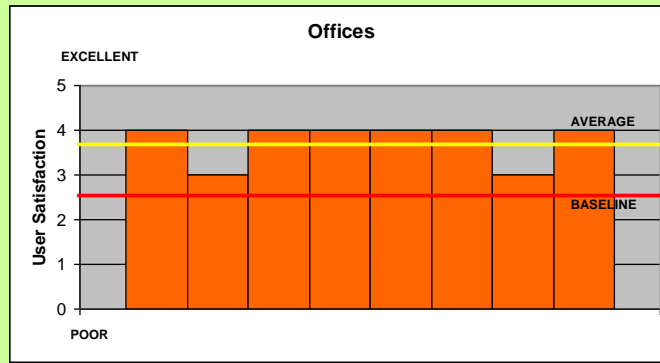


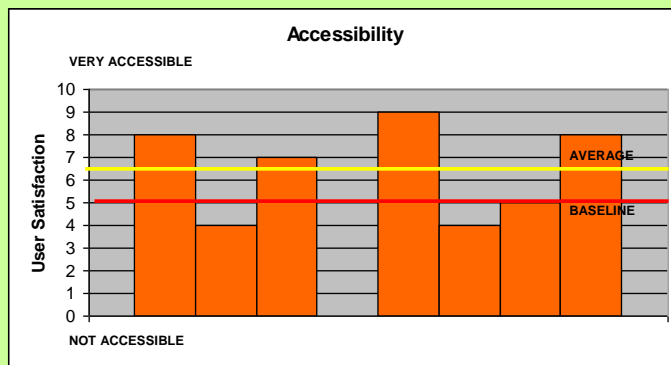
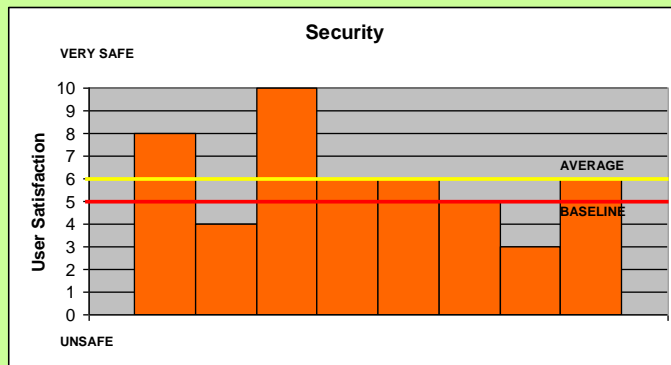


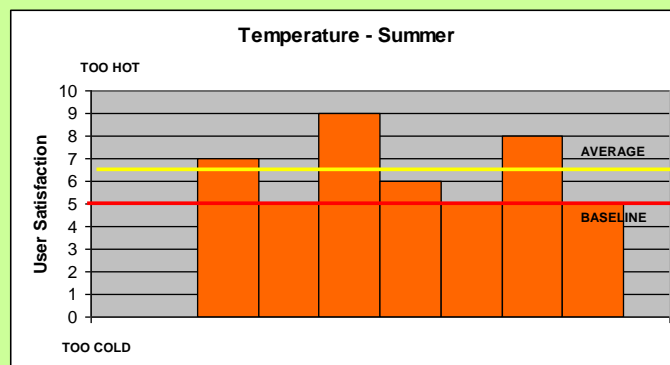
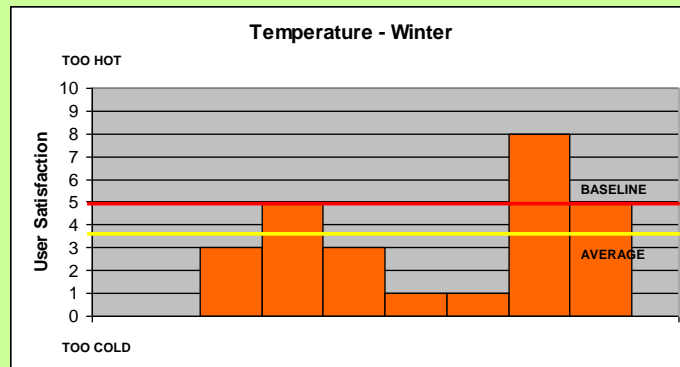
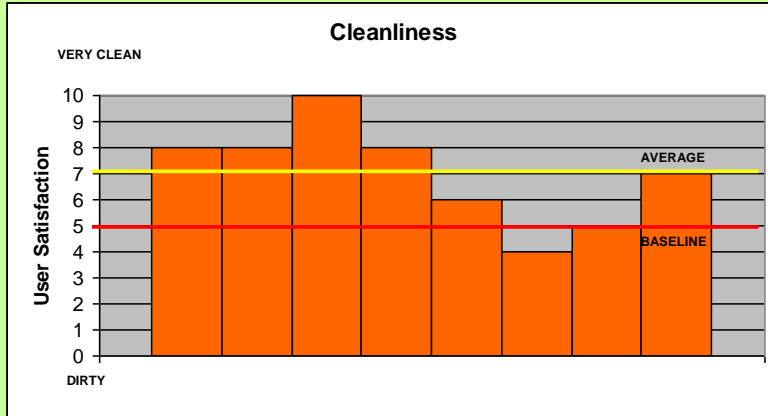
APPENDIX 3C

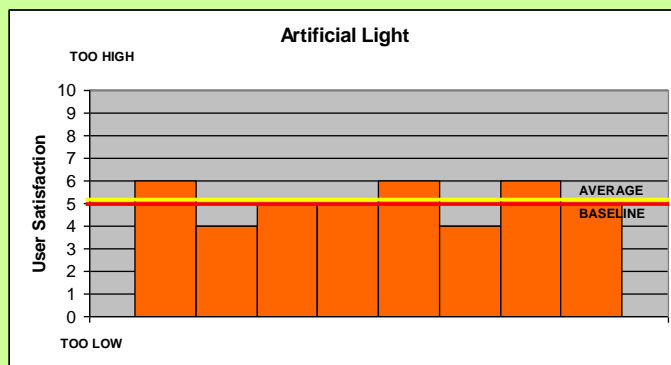
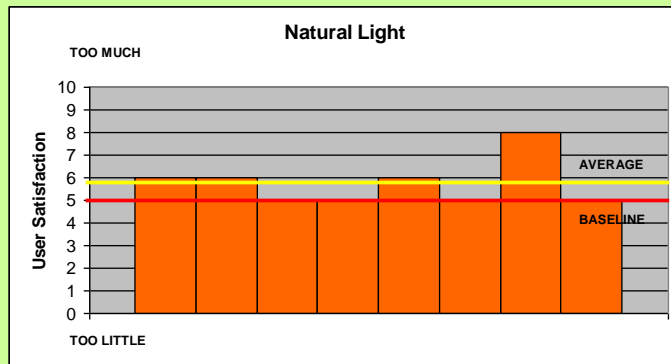
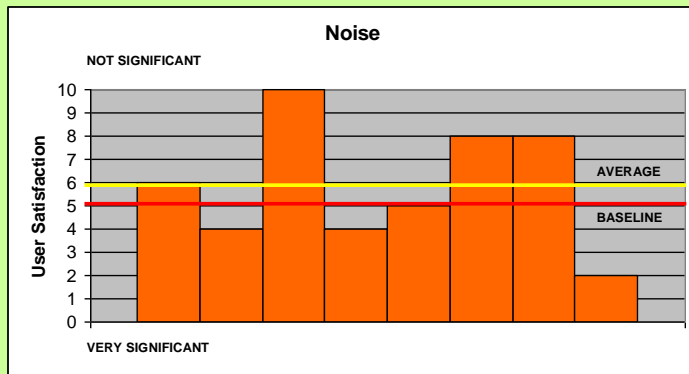
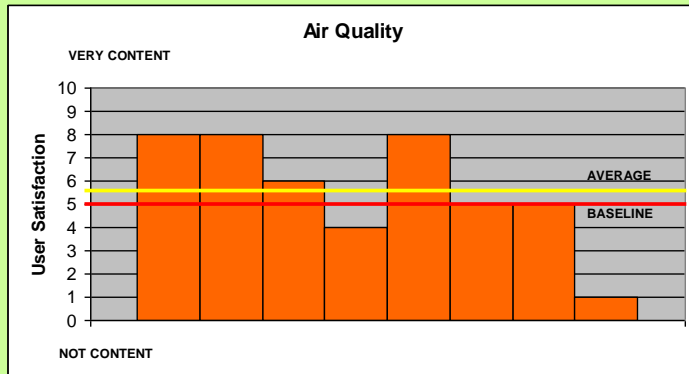
User Satisfaction Charts

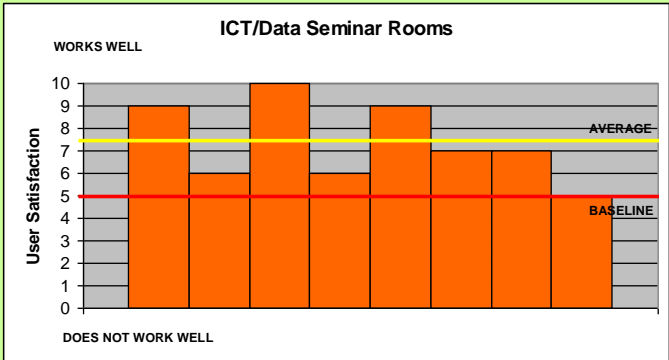
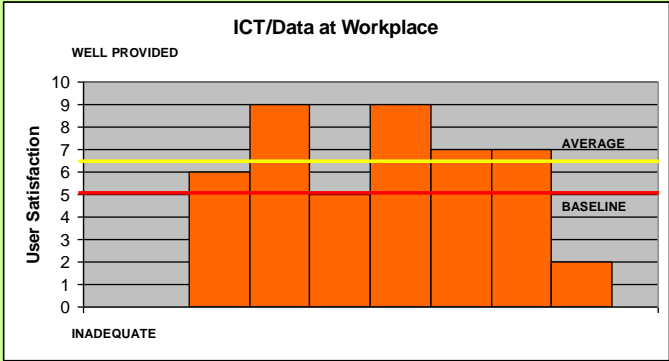
SIR COLIN CAMPBELL BUILDING











APPENDIX 4

Items raised by users to be dealt with via Works Request system

Café Aspire

- check the recessed light fittings in the kitchen to ensure to ensure they are securely fixed
- paint the plywood flush doors in the kitchen area
- provide bin adjacent the patio for cigarette ends

Student Services Centre

- provide free standing notice board
- address unauthorised egress to fire exit