

POST OCCUPANCY EVALUATION REPORT

HUMANITIES BUILDING



MAY 2013

FINAL Rev 1

1. Introduction

QTC Projects were appointed to carry out the Post Occupancy Evaluation following the submission of a tender for services dated 23 November 2012 to the Development Director, University Estate Office.

2. Scope of the Review

Evaluation Technique

The evaluation was conducted at Project Review stage (1 – 2 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
- Sustainability - Assessment against BREEAM criteria
 - Review of energy efficiency measures incorporated into the design
 - Reference to the University's Carbon Management Plan

Questionnaires

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

- a) User (On-line survey)
 - The survey was sent to 383 people from the School of Humanities, the majority of which were based in the building and consisting of academic and support staff and PGR students. 131 completed questionnaires were received which is a high response rate at 34%
- b) Consultant Design Team
 - Architect
 - Project Manager
 - Quantity Surveyor
 - Building Services Engineer
 - Structural Engineer
- c) Estate Office – Development

d) Main Contractor

A Sample of the User Questionnaires is shown in Appendix 1.

Interviews

Interviews were held with the following:

- a) School of Humanities
 - Professor Stephen Mumford (former Head of School)
 - Dr Alyson Heery, School Manager
 - Debra Booter, Arts Faculty Manager
 - Tracy Sisson, School and Research Administration Officer
- b) Estate Office
 - Tim Brooksbank, Development Director
 - James Hale, Capital Projects Officer
 - Barry Chadwick, Operations and Facilities Director
- c) CPMG Architects - Hugh Avison
- d) Turner & Townsend Project Manager - Anthony Blackburn
- e) Turner & Townsend Cost Consultant - Martyn Cooper
- f) Arup Building Services/Structural Engineers - Steve Fernandez

Workshop

A one day workshop was held on 30 April 2013 (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

Name	Humanities Building
Size	4303m ² (Gross Area)
No of Storeys	3 storeys
Occupants	<u>School of Humanities</u> Archaeology Philosophy Theology Art History Classics
Types of space	Offices (cellular and open plan) Research Student space Meeting/seminar rooms Centrally Timetabled rooms Archaeology Laboratories IT Resource room Digital Humanities Centre

Construction Period	60 weeks
Start on site	21 June 2010
Completion	18 August 2011

Net Construction Costs

At Start of Construction	£5,497,348
At Final Account stage	£6,095,000 (including additional works)

<u>Funding</u>	University
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Consultant Team

Project Manager	Turner & Townsend, Nottingham
Architects	CPMG, Nottingham
Cost Managers/QS	Turner & Townsend, Nottingham
Building Services Engineer	Arup, Nottingham
Structural Engineer	Arup, Nottingham

<u>Contractor</u>	Clegg Construction Ltd, Nottingham
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<u>Building Contract</u>	JCT Design & Build 2005
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4. Project Background and Description

The building provides new accommodation for the School of Humanities, replacing existing facilities and incorporating expansion space for future increases in academic staff and teaching provision. Originally the building was planned to accommodate the Departments of Archaeology, Philosophy, Classics and Theology but Art History was added during the early design development.

The proposal was to move these Departments to the edge of campus. It is understood not everyone in Humanities was in favour of this re-location but PMG advised that this move should take place and be approved through Finance Committee.

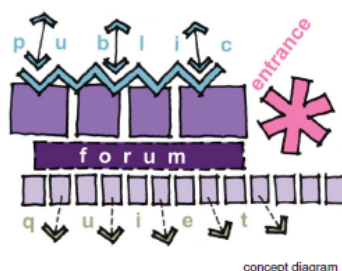
The architectural design was procured via a competition based on an outline brief prepared by the University's Estate Office in May 2009. The aims set out for the building were:

- To provide a building which respects the existing landscape and listed building context
- To provide a strong presence with functional offices, learning and teaching spaces
- To allow for future expansion
- To allow for flexibility in the internal spaces
- To achieve a BREEAM 'excellent' rating
- To complete the construction of the building within the maximum allowable budget of £5.5m (excluding fees, equipment, direct costs and vat)



The location of the building lies on the west side of the campus on Beeston Lane, with Cavendish Hall of Residence to the rear and with a new landscaped link to the School of History. There are also seven existing listed buildings and mature trees in close proximity to the site.

The building plan form consists of two elements. The south facing element contains the smaller cellular offices over three storeys. The north facing element contains the larger teaching and specialist areas on the ground floor and open plan PGR space and some cellular offices on the upper two floors.



These two elements are separated by a three storey atrium (forum) space creating a focal point for the building and a direct entrance from the external landscaped area. A wealth of natural light is brought into the building via the atrium space.

Externally, the building sits comfortably within the existing landscape which has been enhanced by new works to link the new building to the existing School of History (soft landscaping, paving and water feature, new entrance façade to Lenton Grove).

A simple palette of materials has been used for the two elements with pre-patinated zinc standing seam cladding, light coloured rendered panels and glazed curtain wall system to the elevation facing Beeston Lane. The elevation facing Cavendish Hall consists of buff facing brickwork which frames the glazed curtain walling set back behind solar shading panels.

Terracotta rainscreen cladding is used at the entrance to the building together with a tri-column supported roof-height canopy.



The two main elements of the building



Elevation facing Cavendish Hall

Building work commenced in June 2010 and, despite some delays during construction, was completed in August 2011, two weeks before the start of term. The works to Lenton Grove (School of History) and the Plaza were completed in October of that year.

The construction of the main building (excluding Lenton Grove and the Plaza which were additional works) came within the 5% allowable tolerance on the approved budget.

The project achieved a BREEAM 'excellent' rating although this needs to be confirmed following a final assessment. The rating has been achieved through the inclusion of key innovative technologies such as the use of a ground source heat pump. A list of initiatives is shown in the sustainability section of this report.

A full list of project milestones is shown in Table 1.

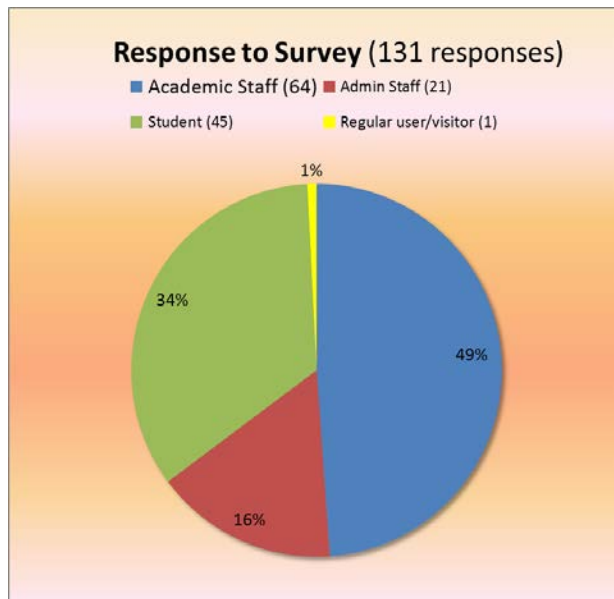
Table 1 Project Milestones

Project Manager appointed	20 Jan 2009
Design competition submissions	26 June 2009
Design Team appointments confirmed	Oct 2009
Budget confirmed	6 Nov 2009
Stage C report	27 Nov 2009
Planning application submitted	9 Feb 2010
Stage D report	12 Feb 2010
Tenders submitted	1 April 2010
Planning approval	21 April 2010
Tender report	4 May 2010
Contractor appointed	18 May 2010
Contract start date	21 June 2010
Contract completion date	20 June 2011
Practical Completion certificate issued	18 Aug 2011
Final Account agreed	13 Sep 2012

5. User Satisfaction

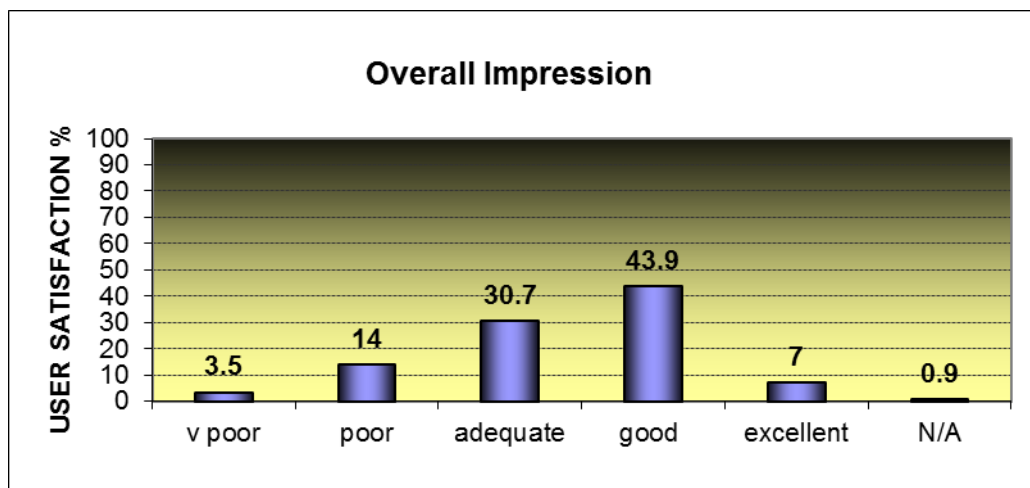
Building user satisfaction has been assessed from the responses to the questionnaires received and analysis of the comments made. The results are shown in a series of bar charts covering the following areas:

- Satisfaction with specific room types, ie shared and cellular offices, networking space, meeting rooms, central timetabled rooms, Archaeology Labs, storage and overall impression of the building
- Security
- Accessibility
- Cleanliness
- Internal room temperature
- Distraction from noise
- Lighting conditions, natural and artificial
- Data connectivity at the workspace
- AV equipment in teaching/lecture rooms

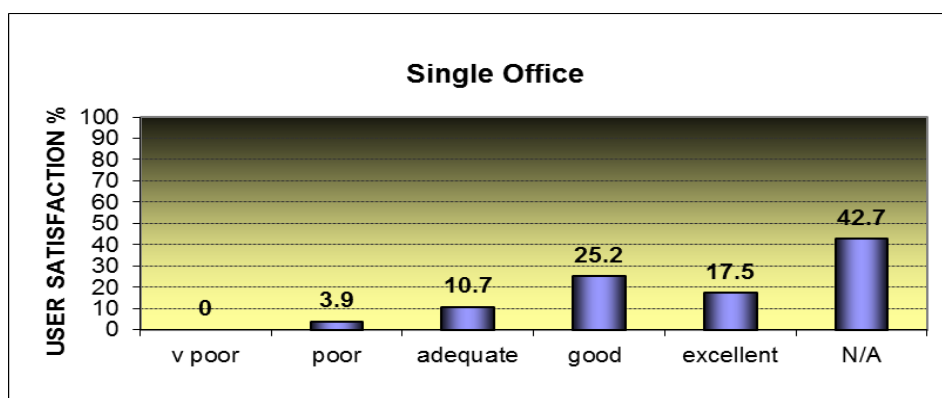


Overall, 131 responses were received from a representative group comprising academic and support staff and PGR students.

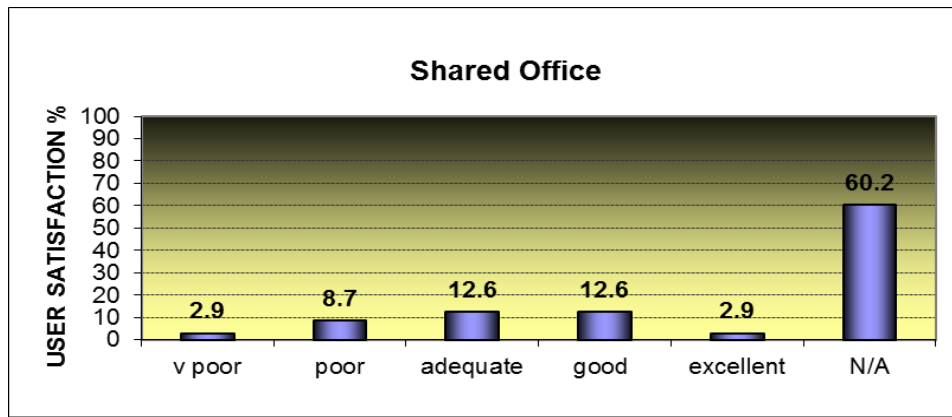
The overall impression from the users point of view is that whilst only 7% of respondents thought the building was excellent over 74% rated it adequate to good.



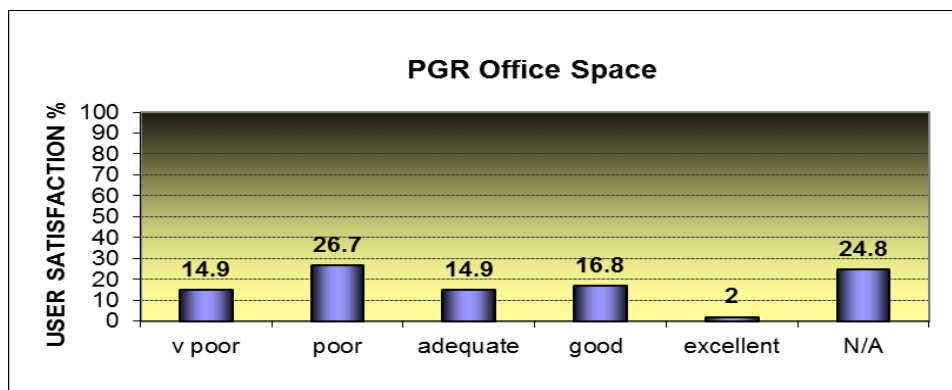
The single offices in the building comply with the University's space norms providing offices of approximately 13m², 15m² and 18m² relative to the grade of post of the staff occupant. Only 59 respondents occupied single offices but of those 75% rated them good to excellent.



The shared offices were occupied by 41 respondents with marginally less satisfaction compared to the single offices. This is due mainly to a perceived distraction caused by working in a shared space.

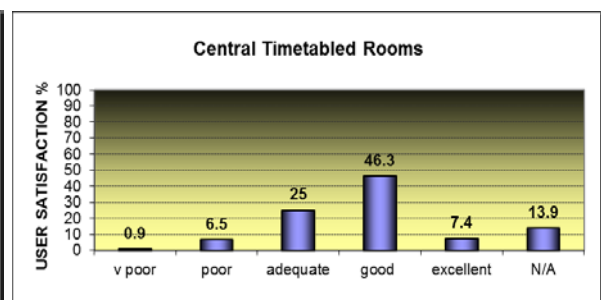
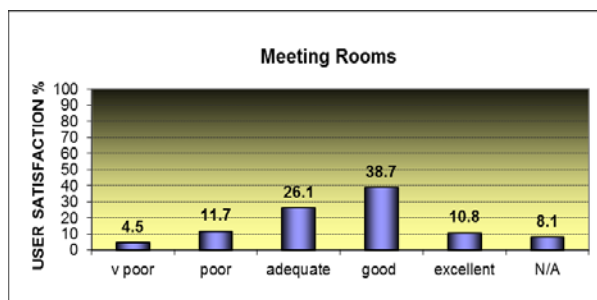


Probably the most dissatisfaction relating to office space was from the PGR students. A lot of comment has been made about this space not only from the students themselves but also from academic staff. In real terms, 42 people who responded to the survey thought the space was very poor or poor.

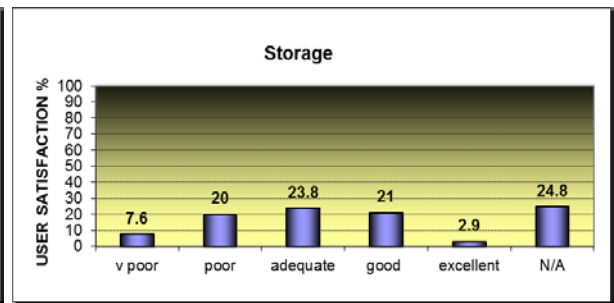
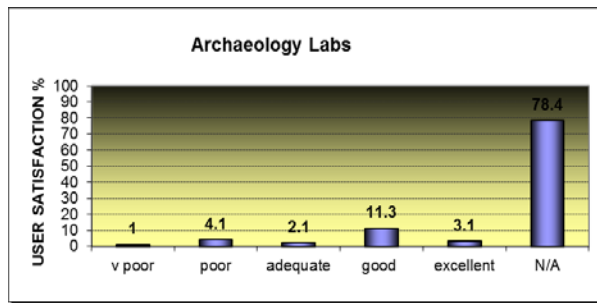


The meeting rooms were generally satisfactory, probably marked down due to lack of adequate AV facilities. This was a decision the School took rather than a deficiency in the design brief.

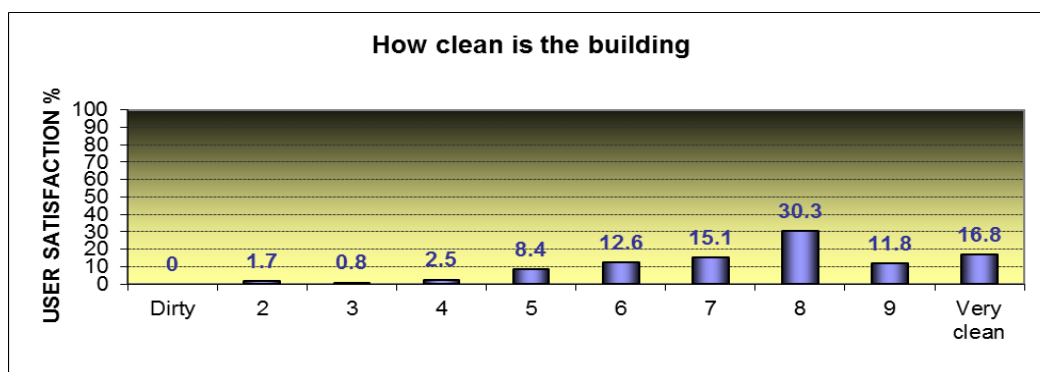
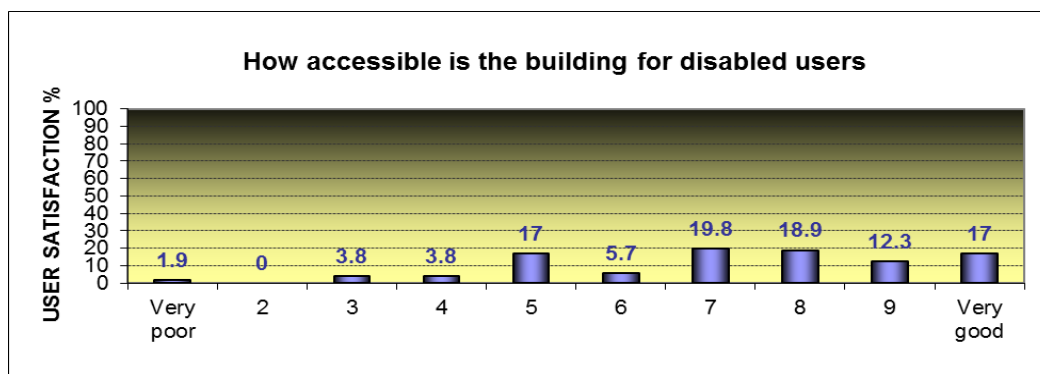
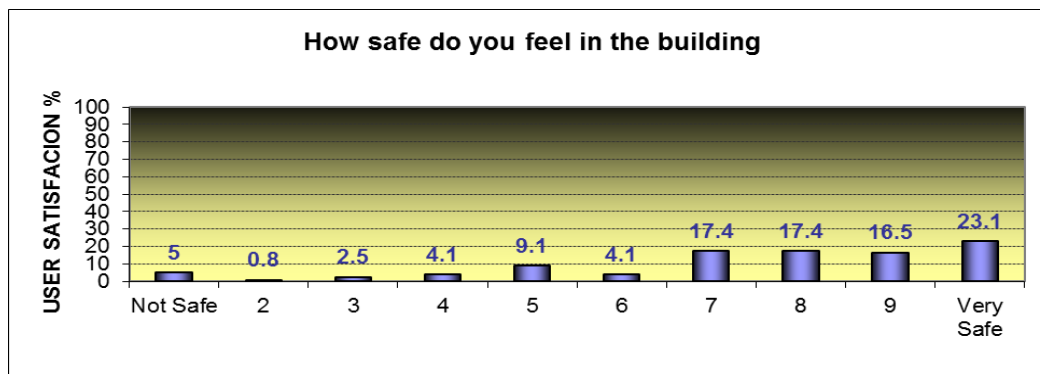
58 out of 108 respondents thought the central timetabled rooms were considered good with some regarding them as excellent.



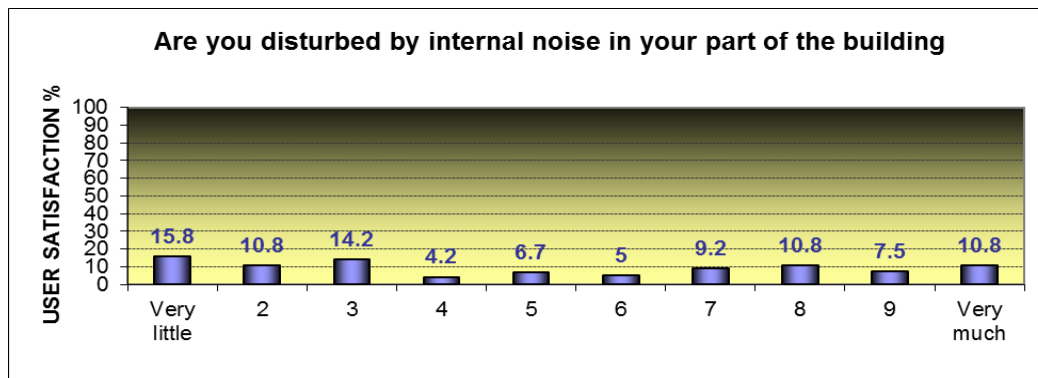
The archaeology laboratories were only relevant to 21 respondents with over 50% of these rating these spaces as good to excellent. Storage provision did not score well, with the view that more storage is needed in the building.



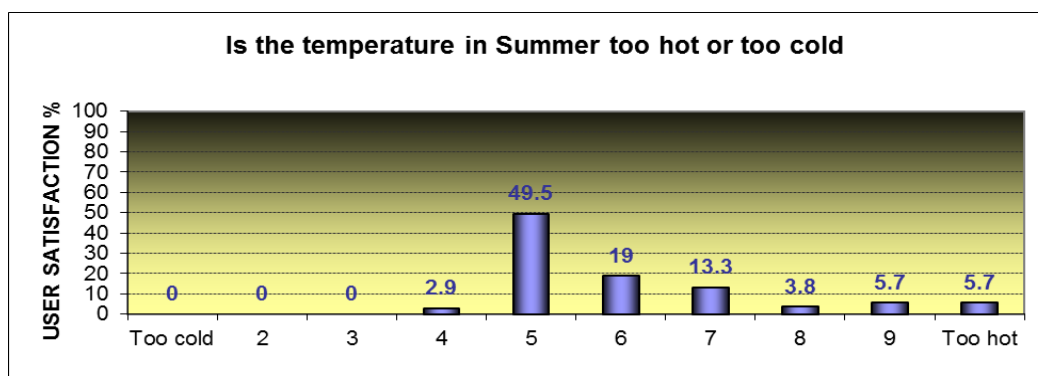
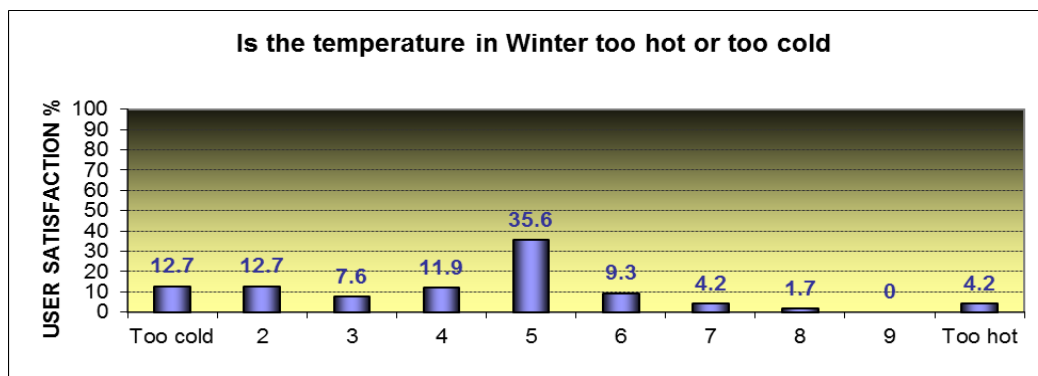
Looking at the charts for building amenity and comfort, most users felt safe in the building and it was considered fairly accessible. Cleanliness was considered good overall but in assessing the written comments, there were some issues with the cleanliness of the toilets.



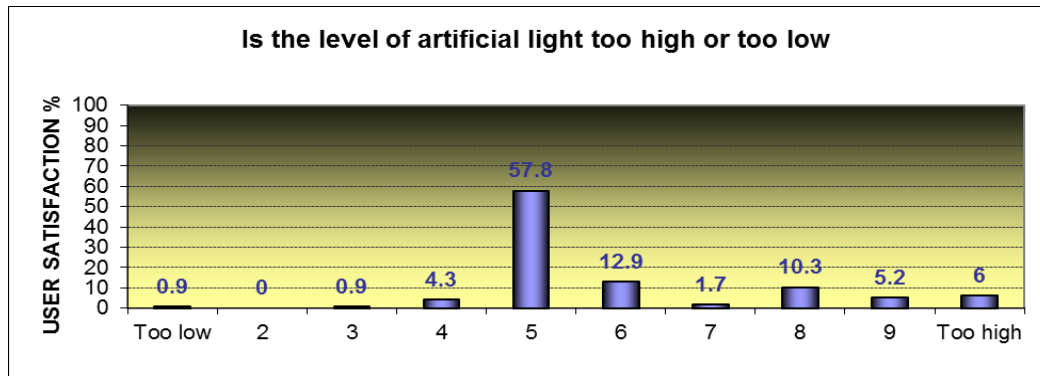
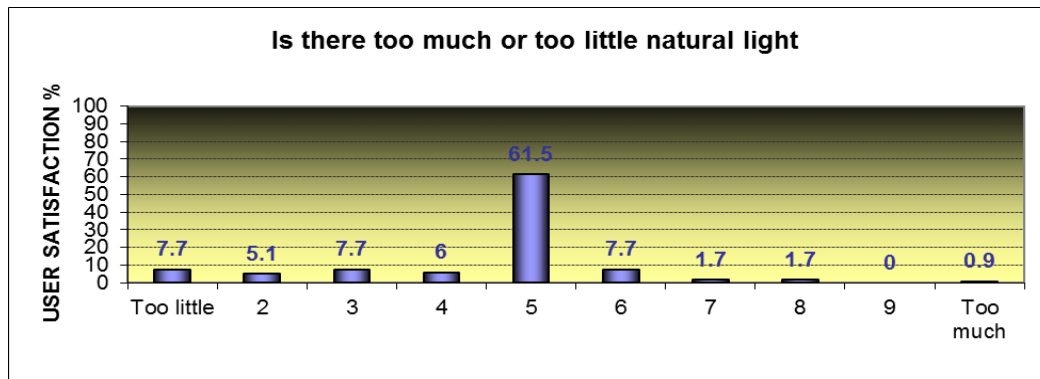
The response to the disturbance from noise question presented scores across the full range. Again scores were probably marked down due to working in open plan offices and some noise emanating from the Forum space.



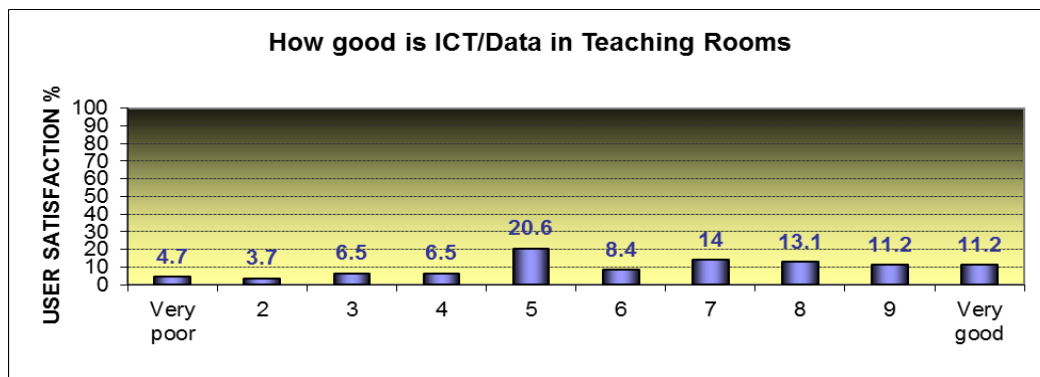
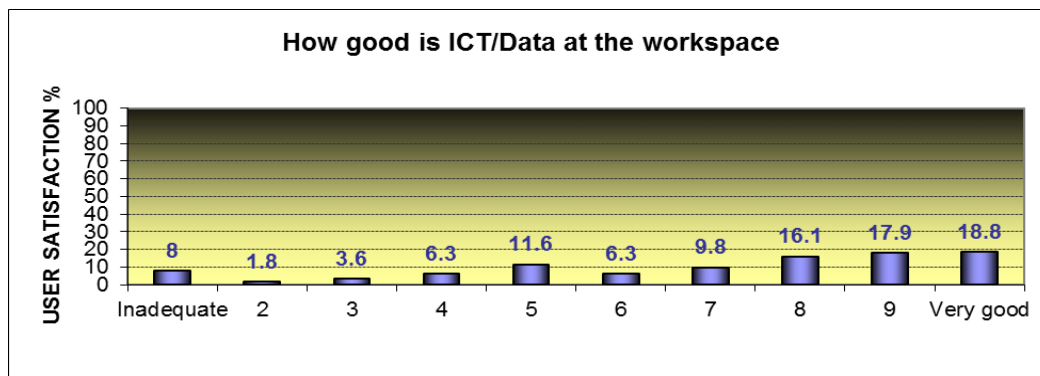
Regarding temperatures in the building, the charts show that for winter, some users felt on the cold side perhaps due to the automatic opening windows which users had no control over. Comfort levels in summer were better, with 72% of respondents finding the temperature acceptable.



The charts for natural and artificial light show a fairly standard picture with around 60% of respondents considering the levels are about right. Comments concerning the solar shading on the south side of the building probably contributed to the negative scores regarding levels of natural light.



The scores on how good the ICT is at the workplace were across the full range although 74% presented a positive score. A similar response was given to the rating of ICT in the teaching rooms.



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.

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

6. User Issues

A number of user issues were raised during the interviews and from the questionnaire returns which were discussed at the workshop. These are listed below and commentary given.

Common Room

There was considerable feedback from users regarding the lack of a common room. This issue was raised again at the workshop. The University space norms policy allows 0.5m² per person and this was applied in the original brief and schedule of accommodation to calculate an area of 51m² including kitchenette facilities. The Architects' interpretation of this requirement was to share this area across all three floors by providing oversized kitchens capable of accommodating a limited provision of seating.

Furthermore, there was a view that staff could use the open social spaces within the atrium. This has not materialised as actual use of these spaces is predominantly by students.

This scheme proposal was signed off in liaison with the PMG School user representative.

It is recommended on future projects which include staff offices, that adequate space is designated as a common room and that the Estate Office should work with user representatives to seek to provide this facility.

Office Space

Comments were made by users on the size of academic offices, some regarding them as too small to cater for small group tutorials. On examining the space allowed for offices, provision within the completed building complies with the University's space norms. It is considered that providing larger offices would not have been space efficient.

PGR Office Space

The feedback from the satisfaction survey shows that over 40% rated this space as poor or very poor. Criticisms focus on the space being more of a "corridor" rather than an area for quiet study. Cross circulation is caused by the location of academic offices on the far side of the PGR space and notices on the entrance doors to the space have been posted to deter use by UG students. The photocopy area is also included in this space.



The design of this space has not fully worked and on future projects where PGR space is required, the Design Team should work with users to understand individual requirements on the basis that different Schools'/Faculties' PGR's have diverse needs.

Teaching Rooms

There are five central timetabled teaching rooms (CTR's) provided in the building and the audit of use carried out in October 2012 shows a relatively high level of use.

Table 2 Central Timetabled Rooms

Room	Usage	Occupancy	Utilisation
A1	88.89%	39.06%	34.72%
A2	94.44%	55.82%	52.72%
A3	77.78%	48.21%	37.5%
A21	63.89%	51.09%	32.64%
A22	91.67%	46.67%	42.78%
Overall	69.44%	40.14%	33.39%

There are some comments regarding capacity of rooms and the lack of Lecture Capture facilities. Also the lack of a tiered lecture theatre has been mentioned although this was never included in the brief and the available project budget could not have sustained this.

The comments made by users on the AV facilities in the CTR's have been put to IT Services Teaching Room Support Group who considered that there were a number of factors which they believe accounted for the majority of comments received. These are summarised as follows:

1. Unfortunately due to a delay in completing the main contract the impact on the AV installation schedule was quite severe, to such an extent that we were finishing off the installations the first week of term. As with any installation there are initial snags and issues that need resolving which we addressed as quickly as possible, but given term was underway access to the rooms was difficult.
2. With users faced with unfamiliar equipment, training sessions were organised and written guides produced and displayed in all CTR's. Unfortunately we were repeatedly called for assistance only to find that the user was doing something different to the instructions.

3. Another issue that caused major problems was the introduction by IS of PCs going into hibernation. Once the severity of the problem became apparent, actions were taken to remove this facility from CTR machines.
4. The classification of A21, a room containing specialist equipment (Multislide) as a seminar room caused major complaints. This was because Timetabling had scheduled activities into the room, based on its classification, that required standard seminar room AV facilities. As relocating virtually all classes to alternative suitable accommodation wasn't feasible, we devised a solution of installing old AV facilities in tandem with the Multislide equipment. This solution although not ideal, seemed to provide academics with the facilities to teach their students.
5. At the time of construction Lecture Capture (Echo 360) facilities were only installed in Interactive Teaching Rooms (ITR's) and as the Humanities building didn't contain any ITR's, the facility was unavailable. Where the academics might be getting confused is that IS are planning on rolling out our software versions of Echo 360 to all CTR's, but technical difficulties have caused the postponement of the rollout until the technical issues have been resolved.
6. We received feedback on the height of the lecterns, but not on the lack of or unsuitability of them. In response, a taller version of the same lectern has since been adopted as standard.

Given the issues users experienced at the start of session last year, some of the criticism is warranted. However, IT Services state that since those early days the issues have been resolved and any feedback given taken into consideration when planning future projects.

Archaeology staff have commented that the teaching laboratories (principally A06) are smaller than in their previous building and that this has added 20 hours of teaching to each module due to the number of repeat classes now required.

As the rooms have the same seating capacity as those in the previous building, this was not raised at PMG.

Meeting Rooms

Meeting rooms (one per floor) have been provided with reasonable capacities. There are also three small consultation rooms ranging from 9.2m² to 14.6m² on floors B and C. The issue with the larger rooms from a user point of view is the lack of AV facilities. Such provision was not included in the brief as mentioned earlier in this report. The School made the decision not to fund AV facilities.

Recommendations

- i) It is recommended on future projects which include staff offices, that adequate space is designated as a common room and that the Estate Office should work with user representatives to seek to provide this facility*
- ii) The need for a dedicated space of quiet study for PGR students should be taken into account in the design process*
- iii) The University may wish to consider adopting a standard AV specification which includes a reasonable level of facilities in meeting rooms on future projects*

7. Design Issues

A number of comments relating to design were raised during the interviews and from the questionnaire returns which were discussed at the workshop. These are listed as follows and commentary given:

Design Brief

The design brief was compiled by the University's Estate Office based on assessment of current facilities and School plans and approved by PMG. This was issued to the Architects at the competition stage and provided a good level of detail and background information on which the architectural firms could submit their design entries.

The brief was later developed following the appointment of the Architects as the Stage C and D designs were progressed. The brief's schedule of accommodation included an allowance for growth of 143m² (5.4%). At stage C the building area was increased by a further 340m² to accommodate the additional Department of Art History but growth space reduced to 3%.

It is always difficult to accurately assess future growth and it is recommended on future projects that guidance is sought from PMG on the projected planned growth and ratified by Finance Committee.

User involvement at the early design stage was via the Dean who was a member of PMG. It was questioned at the workshop whether the School Manager should also be on the Group. Users have also commented that they would have liked to have been involved in the selection process for the Architects' appointment and would have preferred more consultation at the beginning.

This is normally dealt with by PMG through appropriate Faculty/School representation and it is recommended that the user representative on PMG should be advised to seek input from colleagues such as School Managers. It was also noted that meetings with end users took place once the Design Team was appointed which helped to understand their requirements and expectations.

The Capital Project Officer should also work with the user representative on PMG to identify previous best practice in the approach to meeting the aspirations of the building user.

Planning Stage

There were no major issues at the planning stage. Some good background work had already taken place in reviewing site options as part of the Hopkins Master Plan site appraisal report. The historic building context for this development was understood by the appointed architects and the design statements submitted to the City Council set this out clearly.

Atrium

A main feature of the building's design was the central atrium. This space was felt by all to work well as a focal point, providing a naturally lit three storey space incorporating social areas, private study and access to offices.



Atrium space



Solar shading to southwest elevation

Solar Shading to Southwest Elevation

In order to reduce solar gain and glare on the southwest side of the building, this elevation is shielded by a mesh screen. Although this screen works as intended, occupants of the offices have complained that their rooms are dark and at times have to be supplemented by artificial light. It is understood that a number of materials were considered and samples presented to PMG for comment.

Discussion at the workshop resolved that the density of weave may have been too great and a wider, more open weave might have been more appropriate. This needs to be borne in mind on future projects whilst taking account of BREEAM thermal requirements.

Temperature Control

Users have commented that the heating is now working much better compared to the first year of occupancy. However there are still some problem areas reported by users:

- Classrooms A21 and A22 are too warm
- Offices that are too cold but heating cannot be adjusted locally
- Variable temperatures in offices
- Problems with automatic windows opening repetitively and at inappropriate times resulting in them being locked down
- Noisy actuators on automatic opening windows

Further checks need to be made to address these issues and whether further balancing of the heating system is needed. Complaints by users need to be directed to the Estates Helpdesk for further investigation.

Computer Room A17

The requirement for this facility came in at a later stage. It was not included in the original briefing document or at Stage C. The location of this room is not ideal for out of hours operation as it is located in the far corner of the ground floor some distance from the main entrance to the building. It does not have its own external access which would have been useful.

On future projects the use of such spaces needs to be clearly understood at the early design stage to ensure that out of hours access is achievable without compromising the security of the building. In this particular case removing the out of hours arrangement might be the best course of action. (Note: access has now been amended to restrict use out of hours to Humanities students and staff only).

Access for Disabled People

Issues have been raised concerning accessibility for disabled users of the building. In particular the route to disabled parking and that there is only one recognised space. It has been confirmed that the provision of accessible parking spaces meets Building Control standards and the Estate Office has confirmed that there are three additional spaces outside Lenton Grove and Cavendish Hall which are considered to be within easy reach.

The folding doors on the accessible toilets are said to be difficult to use and that standard room doors are heavy to open. Regarding the weight of internal doors often there is a conflict between the requirements for acoustic doors and the needs of disabled users. It is recommended that the door closers are inspected to see if some adjustment can be made.

Acoustics

There were a number of comments emanating from the user survey concerning sound insulation of offices and that this was inadequate in some instances. (eg conversations in the small consultation rooms can be clearly heard in the adjacent PGR space). The Architects have stated that the noise reduction criteria exceeds building regulations and that the offices have been built to school specification standards which should be more than adequate.

It may be that there is sound leakage through certain elements such as doors and these may need adjustment.

Recommendations

- i) The user representative on PMG should seek input from colleagues such as the School Manager to ensure adequate involvement of end users. The Capital Project Officer should also work with the user representative on PMG to identify previous best practice in the approach to meeting the aspirations of the building user*
- ii) It is always difficult to accurately assess future growth in space terms and it is recommended on future projects that guidance is sought from PMG on the projected planned growth and ratified by Finance Committee*
- iii) Where solar shading is fitted using mesh screens ensure that the most appropriate material and density of weave is used whilst taking account of BREEAM thermal requirements*
- iv) Consider carrying out further checks on the automatic windows and the balancing of the heating system. Further complaints by users need to be directed to the Estates Helpdesk for investigation*
- v) On future projects the use of computer labs needs to be clearly understood at the early design stage to ensure that out of hours access is achievable without compromising the security of the building*
- vi) Sound leakage should be checked around doors where an issue of poor sound insulation has been reported*
- vii) It is recommended that the door closers are inspected to see if some adjustment can be made*

8. Construction Issues

Programme

The construction period for this project was 60 weeks. Building work commenced in June 2010 and, despite some delays during construction, was completed two weeks before the start of term. The additional works requested by the client, namely the works to Lenton Grove and the Plaza were completed two months later.

Extensions of time were granted for eight weeks due to underground works (requirement for hand digging) and adverse weather conditions. There were some minor issues at handover regarding defects and having to cope with ongoing work to the extension at Lenton Grove. However, these did not have a major impact on the end user.

Concern has been expressed that the contractor was promising completion to programme which in the end did not materialise. Increased programme management may have helped in this case through the consultant project manager applying sufficient pressure on the contractor.

Late Change to Post Tensioned Concrete Floor Slabs

The contractor's decision to change to post tensioned concrete floor slabs was a late change in the design process and made on the basis that this could save time and helped with improved floor to ceiling heights. However this change required extensive re-design which the Architects state significantly delayed the structural frame procurement and had a detrimental knock-on effect on the delivery of construction information.

Construction changes of this magnitude need to be carefully considered to fully assess the implications of added design time and potentially consequential delay.

Outstanding Defects

There are no outstanding defects recorded.

Health and Safety

There were no issues of health and safety - the contractor conducted site operations in a satisfactory manner.

Recommendations

- i) Provide increased programme management and ensure the Project Manager applies sufficient pressure on the contractor to insist they are honest with timescales*
- ii) Significant late construction changes need to be carefully considered to fully assess the implications of added design time and potentially consequential delay*

9. Facilities and Operations

Discussions at the workshop confirmed that there was communication with the Facilities and Operations Team during the progress of the project. The Maintenance Team are keen to be brought into the design development process at an early stage. On handover, this generally coincided with the busiest time of the year.

It was suggested that a specific person from the Maintenance Team be nominated to work with the project team and that a series of visits should be arranged during construction.

During the commissioning stage there were no major issues apart from some fine tuning needed on the Building Management System. The main contractor through the M & E subcontractors appointed their own commissioning engineer. Following handover, the user client felt unclear who should be contacted regarding faults and defects and the very tight moving-in schedule did not help. This should be made clearer from the outset and although the contractor did issue some user guidance on the operation of the building, the adoption of a 'soft landing' style involving the contractor, design team and Estate Office might help.

The maintenance Team representatives at the workshop confirmed there were some problems initially after handover but these were dealt with and there were no long term issues.

Regarding Operations and Maintenance (O&M) manuals, it would help if these were completed sooner and an early draft copy of the manuals would certainly help.

Recommendations

- i) A specific person from the maintenance team should be nominated to work with the project team and a series of visits should be arranged during construction.*
- ii) Following handover, the building users need to have a clear understanding of the process by which faults/defects are reported*
- iii) The adoption of a 'soft landing' style may help in easing the transition between commissioning/handover and initial occupation*

10. Project Management

As with all University capital projects, this project was overseen and monitored by the PMG which has representation on the Group from the building user client. In this particular case this was the Dean.

The Consultant Project Manager produced a detailed Project Execution Plan which set out clearly the scope and broad objectives for the project, communication protocol and change control procedures.

Comments have been made regarding the written change control procedure which could have been more detailed and more explicit. The need to act quicker in making decisions was needed and hence the need to gather information and costs in a timely manner.

There were minimal client changes, the main ones being the extension to Lenton Grove and the Plaza external works. Budgets were adjusted for these items and a separate completion date agreed.

Risk management was a key part of the project monitoring process. This was handled well with a risk register being produced at an early stage and monitored by the PMG.

Recommendations

i) Review written change control procedures to enable decisions on changes and costs to be made in a timely manner

11. Procurement and Cost Management

Procurement

The appointment of the Project Manager and Quantity Surveyor took place very early on in the project which helped the process of defining the brief and gaining an understanding of the objectives and scope of the project.

The Architects acted as lead design consultant, being appointed following the outcome of a design competition. This has proved to be a worthwhile and beneficial process as it enables the client to consider a range of design initiatives and different approaches to interpretation of the brief.

The Architects and Structural Engineers were novated to the contractor at stage D+ with the Building Services Engineers being retained on the client side to provide a monitoring role and quality control service. It is considered that stage D+ or stage E is the most appropriate point in the design process at which to novate as more design certainty has been achieved by this stage.

The main contractor appointment followed standard OJEU and University procedures. Following a pre-qualification exercise, five contractors were invited to tender for the proposed works. The appointment of the preferred contractor took place following a detailed assessment of tenders, the process and recommendations being set out in a detailed tender report approved by PMG.

The form of contract used was the JCT Design and Build contract 2005 (revised 2009). This form of contract worked well and is considered to provide good value in balancing cost and quality.

Cost Management

Table 3 shows the development and control of costs during the construction phase leading up to the final account. A sample of cost reports track the anticipated final construction cost against the agreed contract sum.

Table 3 Cost Management

No	Date	Construction Budget	Overall Budget	Construction Forecast	Overall Forecast	Remaining Contingency
1	30/7/10	5,497,348	7,998,452	5,528,013	7,998,452	112,335
2	27/8/10			5,529,014		111,334
3	28/9/10			5,527,155		113,193
4	1/11/10			5,529,019		111,329
5	29/11/10			5,538,530	8,104,345	101,818
6	22/12/10			5,578,035	8,110,153	62,314
7	2/2/11			5,571,726		68,622
8	28/2/11			5,602,999		67,349
9	11/5/11			5,626,666		30,128
10	24/6/11			5,618,639		0
11	13/9/11		8,110,153	6,106,927	8,184,305	
12	11/12/11			6,094,376	8,112,300	
	13/9/12	Final Account		6,095,000		

The final account was agreed and issued 12 months after completion and reflects the client changes relating to the additional works. The budget was increased to take account of these together with changes to VAT. Taking the Lenton Grove works and Plaza out of the overall costs brings the final cost within the 5% allowable tolerance.

A value engineering exercise took place during the development of the project which helped to ensure costs were refined and that 'buildability' continued to be cost effective.

Costs were managed well on this project. Regular cost plans and cost checks were prepared prior to construction and once this commenced, regular cost reports were produced. The PMG was kept regularly informed through the cost reports and was able to monitor expenditure effectively.

12. Sustainability

The design brief for this project stipulated a BREEAM target of 'Excellent' which conforms to the requirement of the University's Carbon Management Plan. Although this has been achieved, the final certificate confirming this is still outstanding and needs to be actioned by the assessors as a matter of urgency.

It is a requirement of the Nottingham City Council Planning Guidelines that 10% of all energy used (interpreted through CO₂ emissions) in new developments over 1000m² be obtained from low carbon emission or renewable energy sources. The design intent was that following an appraisal of possible options this would be achieved through the provision of a ground source heat pump system. This proposal was included in the Energy and Sustainability statement submitted to the City Council in March 2010.

Energy Consumption figures have been obtained from the University's Estate Office for the period 1 October 2011 to 28 September 2012. The summary totals including comparative CO₂ emissions are as follows:

	kWh/annum	kgCO ₂ /m ² /annum
Gas	61,280	2.63
Electricity	310,194	38.90
Total	371,474	41.53

Actual emission rates fall short of the target emission rate (TER), building emission rate (BER) and the energy performance certificate (EPC) calculated at the design stage. This is due to the fact that the design figures and EPC do not include consumption from electrical small power. The comparisons are shown below:

	kgCO ₂ /m ² /annum
Actual	41.53
TER	22.2
BER	16.2
EPC	19.79

The figures need further investigation to check data and actual performance to determine whether any system adjustments need to be made. Monitoring of energy consumption should be an ongoing process.

The University's Energy management Officer has commented that on obtaining the Ground Source Heat Pump (GSHP) data on MeterRing it was found that the gas boilers were providing most of the building Heating & HWS load. However, some adjustments have now been made and the GSHP is now providing the majority of the heating load, with a corresponding reduction in gas consumption.

A number of energy efficiency and sustainability initiatives have been incorporated into the building, namely:

- Open Loop Ground Source Heat Pump
- Passive design
- Underfloor heating
- High efficiency gas condensing boilers
- Sustainable urban drainage system (SUDS)
- Sensor controlled lighting

Recommendations

- Final certificate confirming the BREEAM 'Excellent' rating should be obtained as a matter of urgency*
- Continue to monitor energy consumption and make system adjustments where necessary*

13. Conclusion

Overall, the building is performing well, but is perhaps overshadowed by the level of critical comments made by some users. Comments may well reflect the views that some were not in favour of the re-location and there was concern that the nature of user representation on PMG was not effective in championing user needs and aspirations.

As mentioned earlier in this report, 74% of user responses to the satisfaction survey rate the building adequate to good. This is a lower rating compared to other similar building post occupancy evaluations such as Mathematical Sciences where 75% of users rated it good to excellent.

There are therefore lessons to be learnt and the recommendations identified in this report should help in addressing these when applied to future capital projects.

14. Summary of Recommendations

User Issues

- i) It is recommended on future projects which include staff offices, that adequate space is designated as a common room and that the Estate Office should work with user representatives to seek to provide this facility
- ii) The need for a dedicated space of quiet study for PGR students should be taken into account in the design process
- iii) The University may wish to consider adopting a standard AV specification which includes a reasonable level of facilities in meeting rooms on future projects

Design Issues

- i) The user representative on PMG should seek input from colleagues such as the School Manager to ensure adequate involvement of end users. The Capital Project Officer should also work with the user representative on PMG to identify previous best practice in the approach to meeting the aspirations of the building user
- ii) It is always difficult to accurately assess future growth in space terms and it is recommended on future projects that guidance is sought from PMG on the projected planned growth and ratified by Finance Committee
- iii) Where solar shading is fitted using mesh screens ensure that the most appropriate material and density of weave is used whilst taking account of BREEAM thermal requirements
- iv) Consider carrying out further checks on the automatic windows and the balancing of the heating system. Further complaints by users need to be directed to the Estates Helpdesk for investigation
- v) On future projects the use of computer labs needs to be clearly understood at the early design stage to ensure that out of hours access is achievable without compromising the security of the building.

vi) Sound leakage should be checked around doors where an issue of poor sound insulation has been reported

vii) It is recommended that the door closers are inspected to see if some adjustment can be made

Construction Issues

i) Provide increased programme management and ensure the Project Manager applies sufficient pressure on the contractor to insist they are honest with timescales

ii) Significant late construction changes need to be carefully considered to fully assess the implications of added design time and potentially consequential delay

Facilities and Operations

i) A specific person from the maintenance team should be nominated to work with the project team and a series of visits should be arranged during construction.

ii) Following handover, the building users need to have a clear understanding of the process by which faults/defects are reported

iii) The adoption of a 'soft landing' style may help in easing the transition between commissioning/handover and initial occupation

Project Management

i) Review written change control procedures to enable decisions on changes and costs to be made in a timely manner

Sustainability

i) Final certificate confirming the BREEAM 'Excellent' rating should be obtained as a matter of urgency

ii) On future projects consider making the contractor responsible for achieving the appropriate BREEAM rating

iii) Continue to monitor energy consumption and make system adjustments where necessary

APPENDIX 1

Sample Questionnaire

POST OCCUPANCY EVALUATION

BUILDING USER SATISFACTION QUESTIONNAIRE (On-line survey method used)

BUILDING: HUMANITIES BUILDING

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

Academic staff

Admin staff

Student

Visitor

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.

1 – Satisfaction with types of space in building

Please rate the overall quality of the following areas:
(Please tick)

A: Single Office	1 V Poor	2	3	4	5 Excellent	N/A
B: Shared Office	1 V Poor	2	3	4	5 Excellent	N/A
C: PGR Office space	1 V Poor	2	3	4	5 Excellent	N/A
D: Networking Space	1 V Poor	2	3	4	5 Excellent	N/A
E: Meeting Rooms	1 V Poor	2	3	4	5 Excellent	N/A
F: Central Timetabled rooms	1 V Poor	2	3	4	5 Excellent	N/A
G: Archaeology Labs	1 V Poor	2	3	4	5 Excellent	N/A
H: Storage	1 V Poor	2	3	4	5 Excellent	N/A
I: Overall Impression	1 V Poor	2	3	4	5 Excellent	N/A

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

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

5 - Temperature

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

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

5.2 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 - Noise

6.1 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

7 - Light

7.1 Is there too much or too little natural light?

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

7.2 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

8 - ICT/Data

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

Inadequate

Well provided

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

8.2 Is the AV equipment in the teaching/lecture rooms effective?

Does not work well

Works well

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

Post Occupancy Review Workshop

Held on Tuesday 30 April 2013

List of Attendees

User Representatives

Debra Booler	Arts Faculty Manager
Peter Davies	PGR Student (Classics)
Eddy Faber	Archaeology Lab Technician
Lindsay Hutchinson	Community Forum Representative
Holly Miller	Research Staff member
Prof Wyn Morgan	Director of Teaching and Learning
Gaby Neher	Lecturer and Director of Teaching
Tracy Sisson	School and Research Admin Officer
Sachi Tsukamoto	PGR Student
Lloyd Weeks	Head of Dept of Archaeology

Estate Office

Mark Bonsall	Senior Engineer
Tim Brooksbank	Development Director
Chris Dickinson	General Manager Maintenance
Steve Gilbert	Senior Building Surveyor
James Hale	Project Officer
Lisa Haynes	Space Resource Manager

Design Team

Hugh Avison	CPMG – Architects
Anthony Blackburn	Turner and Townsend – Project Manager

Contractor

Mick Pyecroft	Clegg Construction
Ben Roffey	Clegg Construction

Apologies

Martyn Cooper	Turner and Townsend – QS
Steve Fernandez	Arup – Building Services and Structural Engineers

APPENDIX 3

Floor Plans

Humanities Building - A Floor Plan



Key



Designated Badge-Holder Parking



Access Ramp



Automatic Doors



Accessible Lift



Entrance



Accessible Entrance



Evacuation Chair



Emergency Refuge



Toilet (Female / Male)



Accessible Toilet



Shower



Accessible Shower



Stairs



Lift



Central Timetabled Room



Circulation



Reception

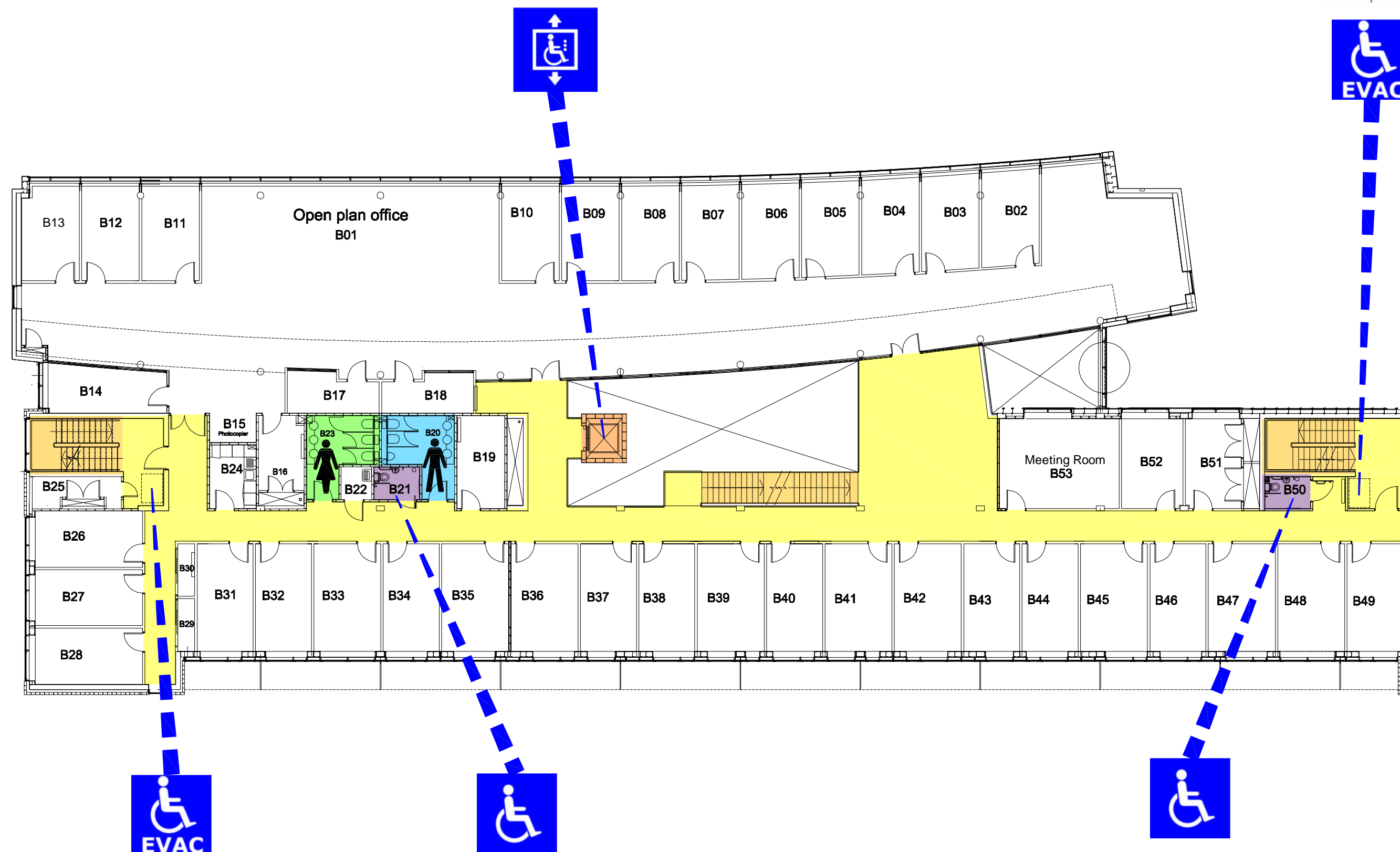


Refectory/Cafe



Fire Assembly Point

Humanities Building - B Floor Plan



Key



Designated Badge-Holder Parking

Access Ramp

Automatic Doors

Accessible Lift



Entrance

Accessible Entrance

Evacuation Chair

Emergency Refuge



Toilet (Female / Male)

Accessible Toilet

Shower

Accessible Shower



Stairs

Lift

Central Timetabled Room

Circulation

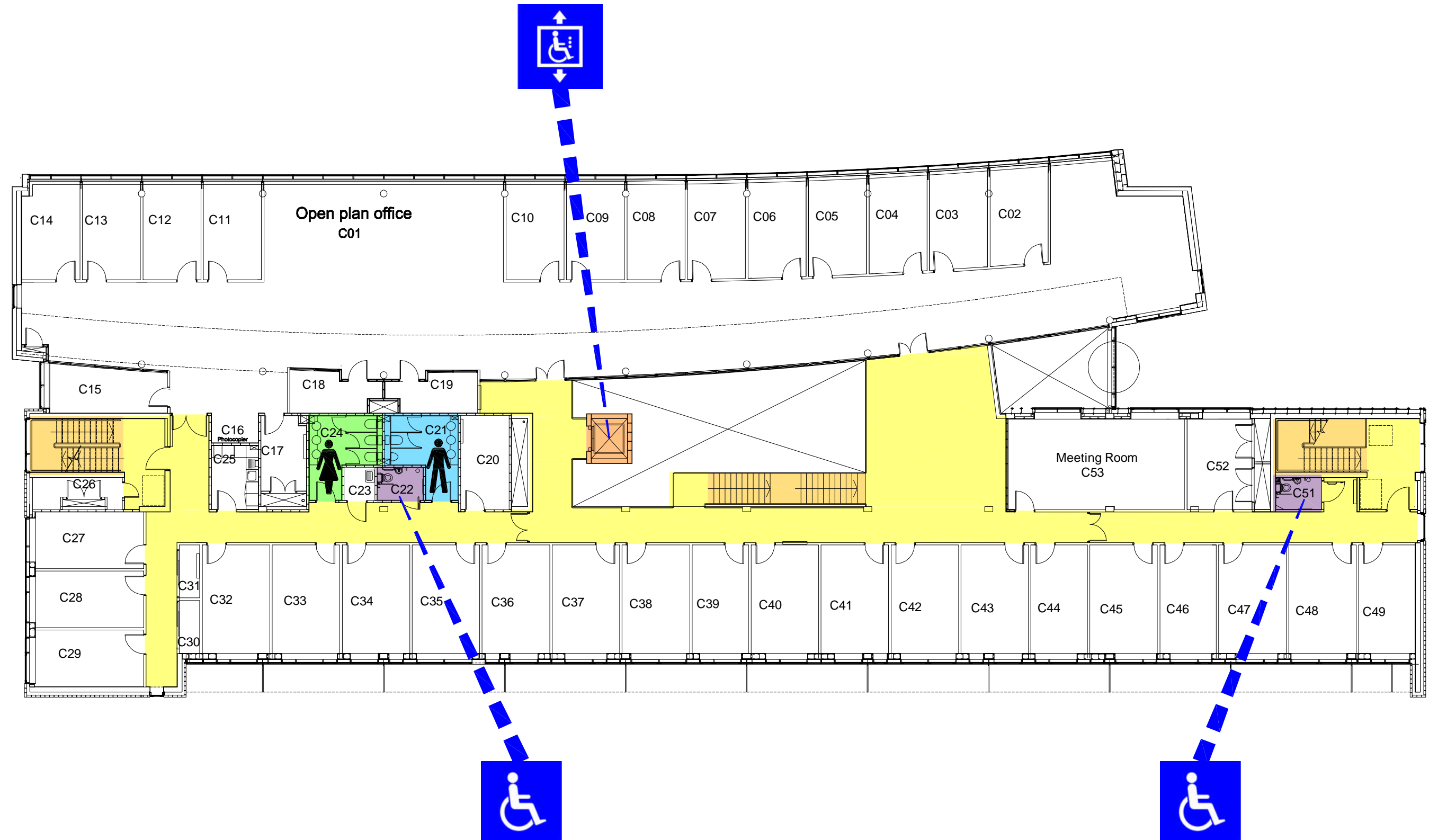


Reception

Refectory/Cafe

Fire Assembly Point

Humanities Building - C Floor Plan



Key

	Designated Badge-Holder Parking		Entrance		Toilet (Female / Male)		Stairs		Reception
	Access Ramp		Accessible Entrance		Accessible Toilet		Lift		Refectory/Cafe
	Automatic Doors		Evacuation Chair		Shower		Central Timetabled Room		Fire Assembly Point
	Accessible Lift		Emergency Refuge		Accessible Shower		Circulation		