Post Occupancy Evaluation Report
Harrington Hall Hotel

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Executive summary

Introduction

Eight Versa has been appointed to undertake a post occupancy evaluation (POE) study of Harrington Hall Hotel. This report will demonstrate compliance with the BREEAM R&F Post Occupancy Evaluation (POE) credit issue criteria and confirm the sought credit may be awarded. This report also demonstrates compliance with the exemplary level criteria and therefore and innovation credit may be awarded.

Summary of recommendations

This report presents the results obtained from the POE study based on 12 months of energy data from the preceding period January 2024 and December 2024, and survey responses received from the building occupants in accordance with BREEAM methodology.

In addition to demonstrating compliance with the associated BREEAM Man 05 credit issue, as well as the exemplary level criteria, the post occupancy evaluation highlighted the following findings. As part of addressing areas where performance varied from what was expected, and in cases where this was found to be sub-optimal, Eight Versa has provided the following recommendations.

POE Parameters:	Recommendation:
Thermal Comfort	Overall, thermal comfort was rated particularly well with humidity levels and temperature stability rated particularly positively. Airflow and temperature levels were rated slightly worse, as they had "somewhat dissatisfied" responses. The negative responses received in relation to temperature levels and airflow comfort can be a product of specific locations below ventilation vents. This should be further investigated.
Internal Lighting	Lighting levels were well received by the occupants with almost 90% of the responses being either "very satisfied" or "satisfied". Light quantity and quality, amount of glare, natural light and lighting control, did however have one out of the nine responses rated as "somewhat dissatisfied"
Air Quality	Air quality was rated positively in odour and dust levels with no "dissatisfied" responses. Mould and fungi levels, as well as air quality consistency, had one "somewhat dissatisfied" response. Fresh air levels also had one negative response, a "dissatisfied" feedback out of nine provided by occupants.
Acoustic Comfort	Overall, building users were particularly satisfied with air conditioning noise, outdoor noise levels, general building equipment noise, sound privacy and distracting noise levels, with no dissatisfied responses. Air conditioning noise had the best feedback with seven responses out of nine being "very satisfied", and the other two rated as "satisfied". Outdoor noise levels, general building equipment noise and distracting noise levels had six responses as "very satisfied" and three as "satisfied". Lastly, sound privacy had four responses as "very satisfied" and five as "satisfied".
Workspace Layout	Building occupants were mostly satisfied with the workspace layout, especially in the location and arrangement of workspace equipment and proximity to view areas, with all users being "very satisfied", "satisfied" or "somewhat satisfied" · The trend described above was also applicable to other areas, although work and desk space, available storage, workspace furnishing comfort and appearance and quality of workspace furnishing had at least one "dissatisfied" response. It is therefore recommended that the implementation of smart storage methods should be considered without compromising workspaces so that occupants can store their personal items such as coats and bags.
Energy Performance	The current energy usage is significantly higher than the design values. Overall, the predicted energy was lower than the metre reading calculations hence building is currently performing worse than it was designed. However, to gain a better understanding of the development's energy consumption data should be collected over a longer period, and half hourly sub-metered data should be collected to determine energy consumption per building area and service (heating/cooling, ventilation, lighting, hot water, equipment). An analysis of the performance of the building services and more detailed analytics can be provided by ongoing re-commissioning, narrowing down potential issues, and highlighting the worst performing aspects. This is highlighted in the operational infrastructure strategy and roadmap section.

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BREEAM Requirements

BREEAM Credit Conformity Statement

This report confirms compliance with the BREEAM 2014 R&F methodology and confirms that the available credit has been achieved for the Man 05: Post Occupancy Evaluation (POE) credit issue. This report also demonstrates compliance with the exemplary level criteria and concludes that the innovation credit can also be awarded for the scheme with a plan to implement quarterly interval requirements as detailed in the operational infrastructure strategy and roadmap section of this report.

Eight Versa is an independent party in line with the BREEAM criteria, consisting of a party independent of the design process with a credible level of independence. No conflict of interest has occurred as a result of the production of this report.

BREEAM 2014 R&F- Man 05: Aftercare - Post Occupancy Evaluation

Undertaking a POE is part of the credit criteria for building aftercare in the Management section of BREEAM 2014 R&F. Feedback from building users is essential in informing the operational processes, including re-commissioning activities, and maintaining or improving productivity, health, safety and comfort.

In alignment with the requirement criteria listed under Man 05, the POE carried at the premises Harrington Hall Hotel has been conducted in line with the following methodology:

- Overview of project design intent, procurement, construction and handover processes.
- Collation of feedback from stakeholders on the design and environmental conditions of the building including, but not limited to:
    - Indoor light, temperature, air quality,
    - Control, operation and maintenance,
    - Facilities and amenities,
    - Access and layout, and,
- Annual readings of the Key Performance Indicator (KPI): Energy consumption, and performance of any sustainable resources.
- Comparison of actual versus design performance.

BREEAM requires the communication of above information to all relevant stakeholders in order to share good practice and inform changes in user behaviour, building operational processes, procedures, and system controls. This can appear in the form of a building case study publicly available via an online source or press release and should include:

- Project description,
- BREEAM rating and score,
- Key innovative and low-impact design features of the building,
- Project cost,
- Project size,
- Community use facilities,
- Innovative construction management techniques,
- Predicted and actual carbon dioxide emissions,
- Outcomes of the POE (occupant feedback and KPI information).

Following outlines in line with the exemplary level criteria, have also been considered when developing this report.

There are, or will be, operational infrastructure and resources in place to coordinate the following activities at quarterly intervals for the first three years of building occupation:

- Collection of occupant satisfaction, energy consumption and (where available) water consumption data.
- Analysis of the data to check the building is performing as expected and make any necessary adjustments to systems controls or to inform building user behaviours.
- Setting targets and/or appropriate actions for reducing water and energy consumption and monitor progress towards these.
- Feedback any 'lessons learned' to the design team and developer for use in future projects.
- Provision of the actual annual building energy, water consumption (where available and accessible) and occupant satisfaction data to BRE for the purpose of future BREEAM performance benchmarking.

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Introduction

Aim of the report

The aim of this report is to elaborate on the process, results and analysis following a POE of Harrington Hall Hotel.

Eight Versa was appointed to undertake the POE of the development in operation as part of fulfilling the landlord requirements as outlined in the BREEAM Manual provided to the fit-out team.

The data in this report covers a 12-month period of occupancy in the building over the period January 24 – December 24.

Post Occupancy Evaluation (POE)

POE is the process of gathering and analysing data on a building's performance in use. This should be carried out after at least 12 months following handover, when the users have settled in and can provide sufficient detail to allow valuable real-world insight into a development's performance in operation.

By assessing the functionality of the building fabric, services and technologies, as well as user satisfaction and wellbeing, POE can effectively demonstrate where buildings are realising their potential to deliver energy and cost efficiency, as well as promote health and wellbeing. Eight Versa' approach to POE is outlined in Figure 1.

The practical aim of this is to highlight any immediate teething problems that can be addressed, ensuring occupant satisfaction as far as possible, as well as closing any performance gaps in relation to energy and water consumption. As a tool, POE can work to drive continuous improvement of the building's impact on the environment and its occupants. The results and analysis in this report should therefore be used by the project owner to communicate good practice, areas for improvement, and inform or encourage change in user behaviour and operational processes to all users of the building.

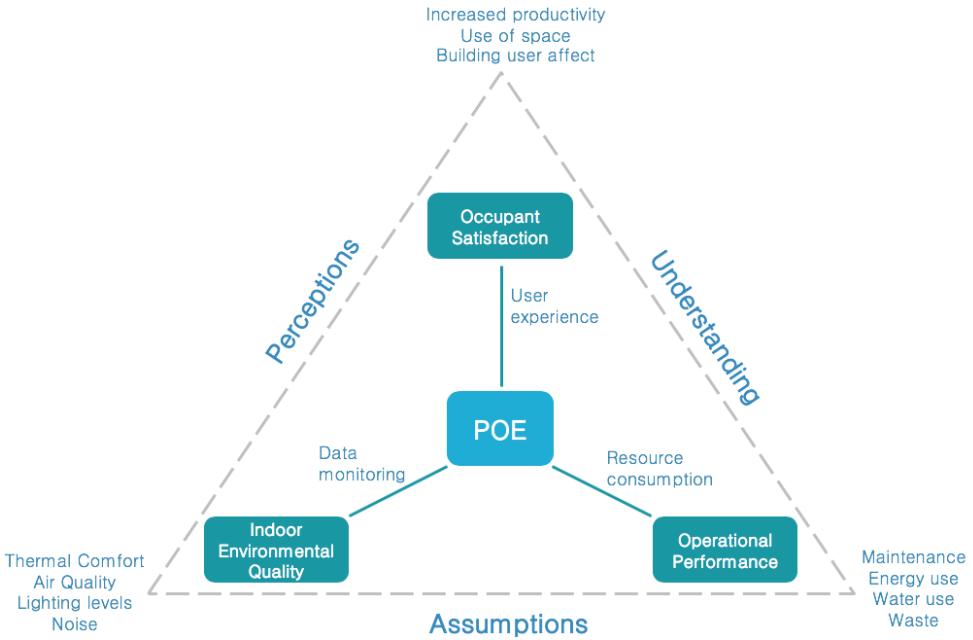

Figure 1: Eight Versa' approach to POE.

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Development Description

About the Project

The Harrington Hall Hotel development is assessed using the BREEAM 2014 R&F. Floor plans for the Harrington Hall Hotel can be seen overleaf in Figures 2 to Figure 4. Facilities within the Harrington hotel include a wellness centre, screening room, coworking spaces and a stylish bar and dining space for food and drinks. In terms of Amenities, housekeeping and laundry services, smart home technology as well as pet-friendly accommodations are included.

The Man 05: Aftercare - POE credit issue was one such credit required by the BREEAM Refurbishment & Fit Out Obligations Manual, and which was sought as part of the BREEAM Refurbishment & Fit-Out 2014 assessment, for which this report was commissioned. The following pages outline the findings from energy and water data from the preceding period, and survey responses received for the building occupants.

BREEAM Credits

The following section details those credits as part of the BREEAM 2014 R&F which have particular relevance to the Post Occupation Evaluation study.

Credit Issue		Credits Available
Health and Wellbeing		
Hea 01	Visual comfort	7
Hea 02	Indoor air quality	5+2
Hea 04	Thermal modelling	3
Ene 01	Reduction of energy use and carbon emissions	15
Ene 02	Energy Monitoring	2

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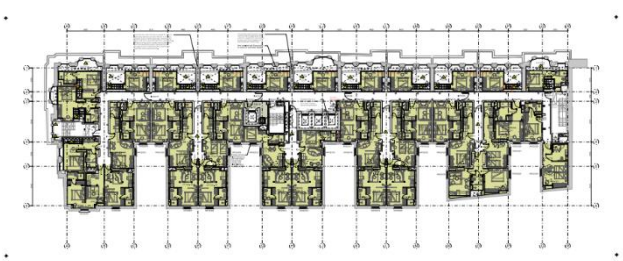
Development Drawings

Figure 2: Proposed ground floor plan for Harrington Hall Hotel

Figure 3: Proposed first floor plan for Harrington Hall Hotel

Figure 4: Second floor plan for Harrington Hall Hotel



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Methodology

Overview

The following pages provide the basis upon which the evaluation study has been undertaken.

Methodology

The methodology used by Eight Versa aligns with industry best practice and draws upon methodology from pre-approved environmental assessment standards such as BREEAM, LEED, and the WELL Building Standard. The process involves a combination of a desk-based study and qualitative and quantitative data collection to provide a comprehensive understanding of the building's operational performance.

Review of Design Intent and Construction Process

As part of the Post-Occupancy Evaluation (POE), the analysis includes a review of the design, procurement, construction, and handover processes to assess how well the original design intent has been translated into actual building performance. This review identifies potential discrepancies between design expectations and operational realities, highlighting any lessons learned from the construction and commissioning phases.

Quantitative Data

This holistic methodology has ensured that our report captures all aspects of operational performance, creating a true picture of how the building is performing in operation. This report draws on audit data, building energy performance and water consumption data. All were compared against industry benchmarks and design values.

Energy consumption data was collected over a period of 12 months, between initial occupation of the development in January 2024 and December 2024.

Qualitative Data

In addition to quantitative analysis, the POE integrates qualitative insights gathered from building users and facilities management teams. This includes feedback on:

- Design and Environmental Conditions – User satisfaction regarding aspects such as indoor air quality, thermal comfort, lighting, and acoustic conditions.
- Control, Operation, and Maintenance – The effectiveness of control systems, ease of use for building occupants, and the maintainability of building services.
- Facilities and Amenities - Feedback on the adequacy and functionality of spaces, shared facilities, and overall user experience.

The feedback was obtained through structured occupant surveys, stakeholder interviews, and engagement with facilities management teams to provide a holistic perspective on the building's operational performance.

Findings from this data have been structured in accordance with the BREEAM methodology for Man 05, ensuring a standardised and robust evaluation process.

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POE Parameters

The following parameters were evaluated throughout Harrington Hall Hotel development as part of the POE exercise conducted.

Thermal Comfort

Despite being highly variable, there are four key parameters which impact a person's individual sensation of temperature, these are:

- Air temperature
- Radiant temperature
- Air speed; and,
- Humidity.

Whilst there are a number of secondary factors which can affect this, including a person's metabolic rate and clothing insulation, the above factors, notably air and radiant temperature and humidity, are most salient to an indoor environment and form the basis or our evaluation of thermal comfort.

Poor thermal comfort has the capacity to seriously impact building occupant satisfaction, proving distracting and uncomfortable, impeding concentration, and negatively impacting productivity.

Air and Radiant Temperature

Air temperature is simply the temperature of the air surrounding the body. When considering thermal comfort, this is combined with the mean radiant temperature (MRT), which factors in the surrounding surface temperatures. MRT is an important factor and has a greater influence than air temperature on how we lose or gain heat, for example the experience of sitting near a large window.

Relative Humidity

Internal humidity levels are a result of the amount evaporation of water from local moisture sources, and are affected by rates of ventilation, and levels of external humidity. Simply, this is an indicator of the volume of water vapour held in the air. High humidity levels affect thermal comfort levels as the existing vapour in the air prevents the evaporation of sweat from the skin, leading spaces to feel 'muggy'.

Humidity is also important in the context of microbiological growth, which can adversely affect the health and wellbeing of building occupants.

Air Quality

Humans produce and exhale carbon dioxide (CO_2), therefore concentrations of CO_2 in occupied indoor spaces are higher than external ambient concentrations. As the outdoor air ventilation rate per person decreases, the indoor to outdoor difference in CO_2 concentration increases. CO_2 can significantly impact productivity and decision-making capabilities. CO_2 is a concern in small spaces, densely occupied spaces, or spaces with poor ventilation.

It is widely recognised that occupants feel most comfortable and perform best within CO_2 levels of 600 ppm or less. When CO_2 levels reach 1,000 ppm, occupants may start to experience light headaches, slight fatigue, and difficulty to concentrate, therefore negatively affecting performance. When indoor CO_2 levels reach 2,500 ppm, occupants begin displaying unsatisfactory performance, with significant impairment of cognitive functions across specific tasks, especially when exposed for 2.5 hours or more.

Perception of air quality can also be attributed to unpleasant or distracting odours, and factors such as dust, mould and fungi which can have an impact on occupant heath and respiratory wellbeing. Levels of fresh air also contribute to a pleasant working environment, preventing this from feeling 'close' or unpleasantly stale.

Positive air quality can be promoted through appropriately commissioning ventilation systems and ensuring that buildings do not have unnecessary air leakages. This should be an appropriate balance of providing necessary levels of fresh air and preventing unwanted drafts.

Internal Lighting

Ensuring appropriate levels of illumination within the workspace is crucial to ensure tasks can be undertaken safely, quickly, comfortably, and with accuracy. This should therefore be tailored towards the tasks required within a specific workplace, and to the needs of the occupants.

It is estimated that in the region of 80% of all sensory information is received by the eyes in the workplace, and as such, lighting levels can have a serious bearing on employee productivity. If specified or commissioned incorrectly, lighting can cause discomfort to occupants as a result of excessive or insufficient lighting levels, glare, reflections, or from lighting flicker. Such discomfort can affect employee alertness, concentration, and state of mind. This can also affect the health of occupants, leading to eyestrain, headaches, which in turn leads to reduced productivity and an increase in absenteeism.

Electricity consumption for lighting is also of relevance, which comprises up to 20% of all electricity generated in the UK. As such, it is important to ensure that lighting is not over specified, creating unnecessary costs and negative environmental impact.

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Acoustic Comfort

Consistent or harsh sounds within the built environment can cause distractions to building users leading to disruption of tasks and processes which reduce productivity.

Building acoustics are a recurring theme of building user dissatisfaction, particularly in environments where concentration or quiet discussion is an important commodity.

It is therefore essential to foster an appropriate acoustic environment, thereby minimising occupant exposure to unnecessary sound. This can be done through ensuring building systems are appropriately sized and attenuated to reduce building noise, as well as ensuing appropriate levels of acoustic insulation are provided within element build-ups, such as walls and floors.

Taking building layout into consideration is also critical in ensuring appropriate acoustic privacy - allowing building occupants to undertake their jobs effectively with minimum disruption, whilst contributing to enhanced interaction, concentration, satisfaction and productivity.

Workspace Layout

Well laid out and designed spaces provide user satisfaction and improve our perception of a space. Functionality and appearance of design, coupled with comfort, adjustment, and ergonomics of workspace are all factored into our perception of a space, as are additional commodities such as a view. Working in comfortable spaces directly improves building occupant productivity, removing distractions, inconveniences, and discomfort, and reducing mental and physical stress and boosting concentration.

In addition, to boosting the mental health of building occupiers, workspace layout can mitigate adverse physical health brought about through the workplace. Designing a space well, with carefully considered ergonomic solutions, helps prevent repetitive injuries and strains, and provides spaces which are accessible to all building users.

Energy Performance

There is significant evidence to suggest that buildings do not perform as efficiently in operation as designed, often using significantly more energy, and providing a less preferable internal environment than anticipated. This divergence between the as-designed and in-operation performance of a building is often referred to as 'the performance gap'. The result of this is that even smart or green buildings such as those which have received BREEAM certification, could be running inefficiently in practice.

Significant gaps in such performance often indicate that buildings are using far more energy than designed, leading to increased utility and maintenance costs. This often also results in decreased user satisfaction, where the building users are often not engaging with the building services correctly or sub-optimally, leading to reduced quality of internal environment and impacting workforce productivity accordingly.

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Thermal Comfort Results

Overall results

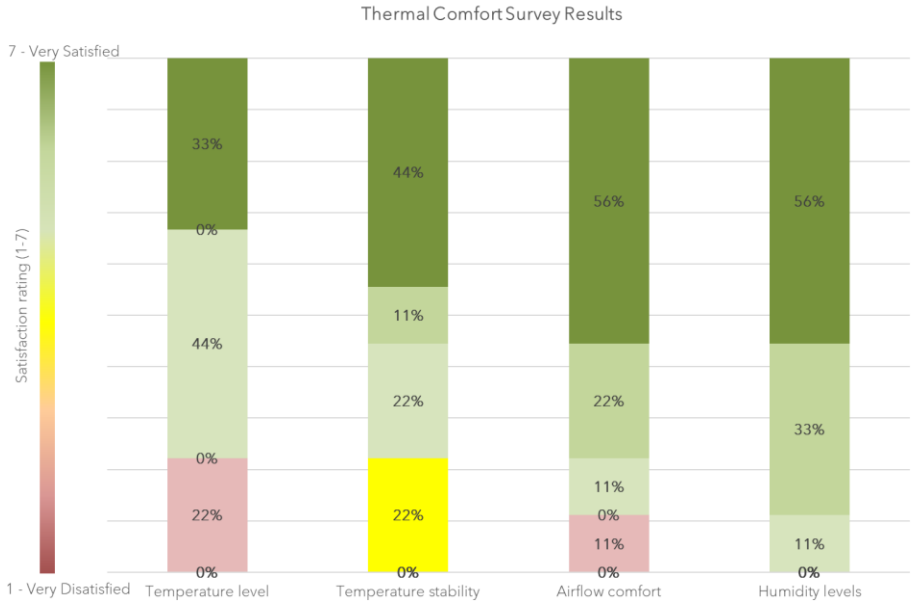

Figure 5: Thermal comfort survey results.

Results Summary

Qualitative survey responses have allowed for a detailed analysis of how thermal comfort has been perceived by the building users over the past 12 months. This is outlined in Figure 5.

Thermal comfort was rated well with humidity levels and temperature stability rated particularly positively without any dissatisfied responses. Airflow comfort and temperature levels were rated slightly worse, as they had some negative responses.

The negative responses received in relation to airflow comfort and temperature level can be a product of specific locations that are directly below ventilation vents. This should be investigated further.

Overall, Thermal comfort is rated well across the hotel with most users being satisfied with the comfort across Harrington Hall Hotel areas.

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Productivity Results

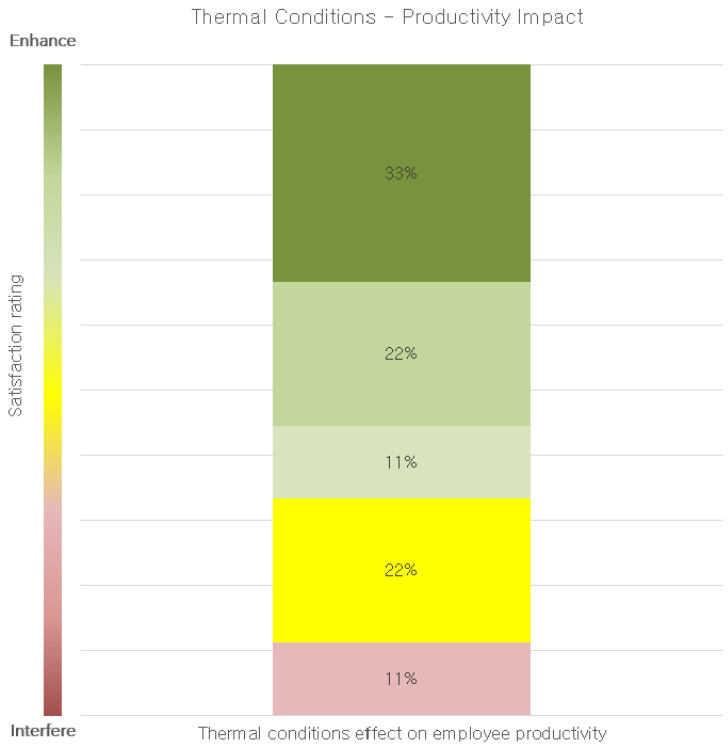

Figure 6: Thermal comfort conditions productivity impact.

Productivity Summary

Figure 6 presents the overall thermal conditions impact on productivity. This figure highlights that a third of the occupants were "very satisfied", with 22% being "satisfied" and 11% "somewhat satisfied". A share of 22% of occupants rated as "neither satisfied nor dissatisfied" the impact of thermal conditions on productivity.

Only one out nine occupants rated the thermal conditions as "somewhat dissatisfied". This negative response could be related to the spaces occupied but also could be a result of each person's clothing level. Nevertheless, generally speaking, the results are clear that occupants are satisfied with thermal comfort in their workplace.

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Lighting Comfort Results

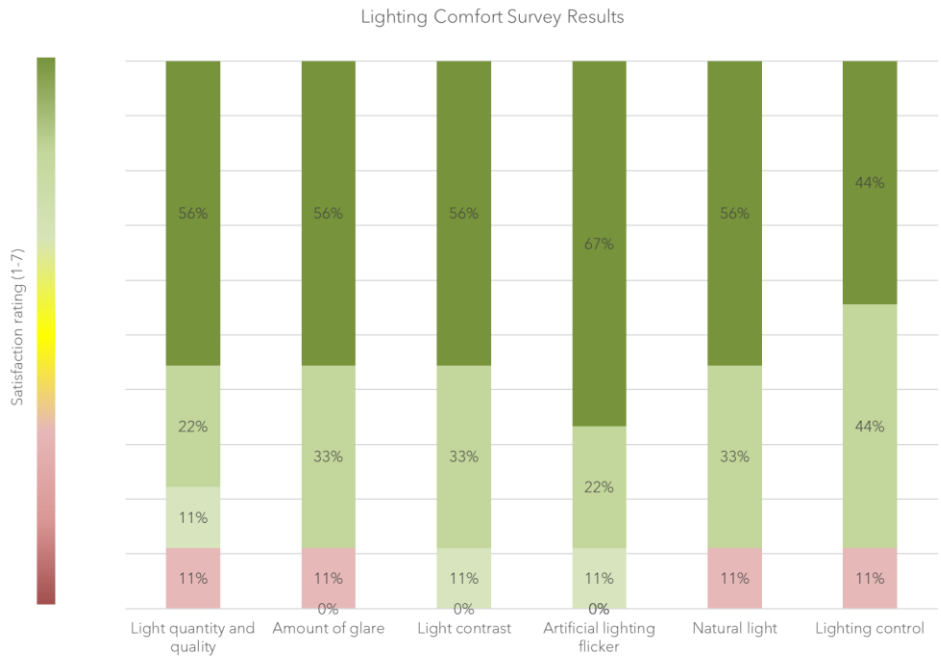

Figure 7: Lighting comfort survey results.

Overall Results Summary

Generally, building occupants were satisfied with the internal lighting conditions within the building, praising the quantity and quality of light, amount of glare, lighting contrast, artificial lighting flicker, natural light and lighting control. These results are outlined in Figure 7.

Light contrast and artificial lighting flicker were very well received by occupants with no dissatisfied responses. More than half of the responses were rated as "very satisfied" with the remaining being rated as "satisfied" or "somewhat satisfied". Lighting quantity and quality, amount of glare, natural light and lighting control had all one "somewhat dissatisfied" response.

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Productivity Results

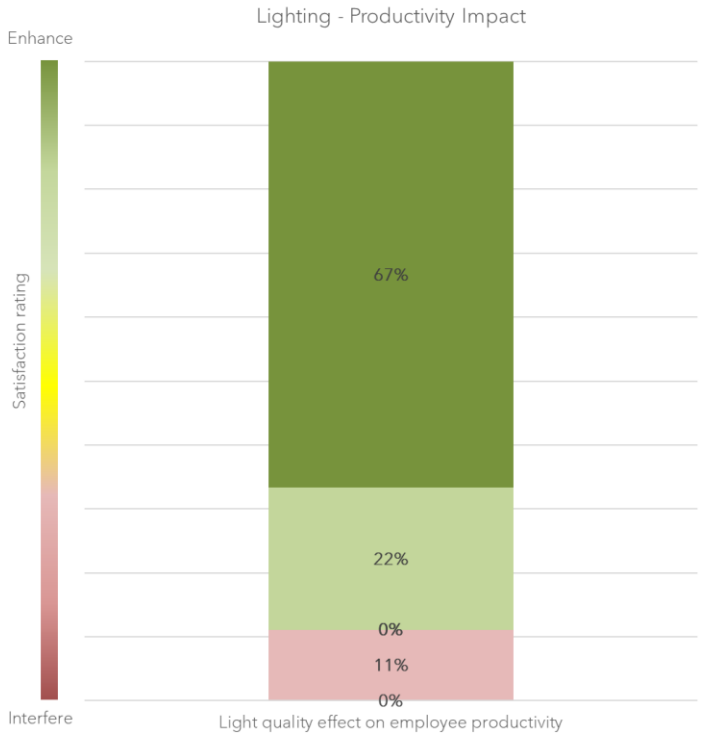

Figure 8: Lighting productivity impact.

Productivity Summary

Lighting impact on productivity was rated partially positively with 67% of occupants "very satisfied" and 22% "satisfied". As seen in Figure 8, only one out of nine occupants were "somewhat dissatisfied" with how lighting affects their productivity.

These negative responses seemed to be related to light quantity, amount of glare, natural light and lighting control, as highlighted in figure 7 of the previous page. This is a function of the building type, however the implementation of local controls to provide supplementary task lighting and make sure most areas can be supplemented with as much natural light as possible for employees with different lighting needs may be considered.

Nevertheless, overall occupants' perception of lighting is that it does not negatively affect their productivity which is good but there is scope for improvement.

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Air Quality Results

Overall Results

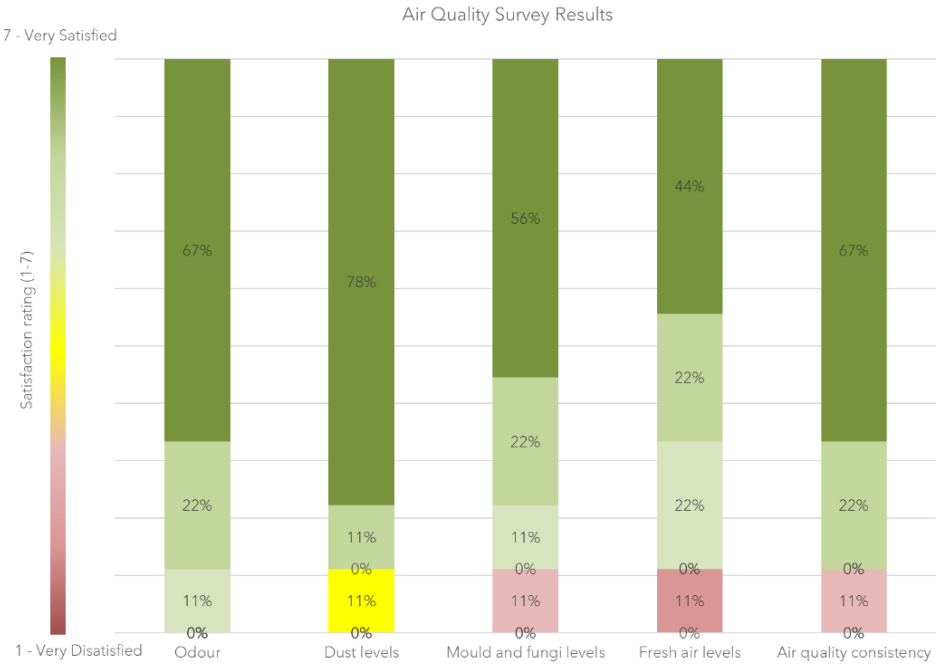

Figure 9: Air quality survey results.

Overall Results Summary

Generally, building occupants rated air quality positively. As seen in Figure 9, most of the categories were rated positively in odour, dust and mould and fungi levels, fresh air and air quality consistency, with almost 90% of all responses being "very satisfied", "satisfied" or "somewhat satisfied".

Mould and fungi levels, fresh air levels and air quality consistency had dissatisfied responses which highlights the impact of the specific areas and locations not being equally fully ventilated providing same air quality consistency and thermal comfort.

The level of satisfaction for the air quality consistency category correlates also with the data collected on thermal comfort category related to temperature levels where levels of dissatisfaction were also reported.

Overall, air quality results were positive and despite the negative responses the overall air quality feedback is favourable.

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Productivity Results

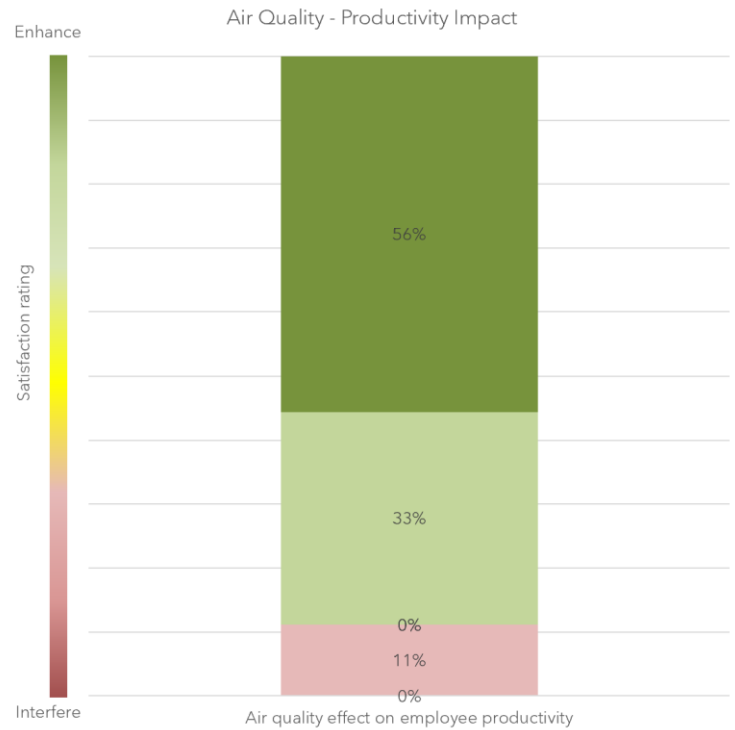

Figure 10: Air quality productivity impact.

Productivity Summary

As per Figure 10, building user's perception of air quality on their performance was generally rated satisfactory, with 56% and 33% of building occupants generally believing this enhanced productivity. The remaining 11% did not seem to believe this have contributed to their productivity. Out of all the occupants one reported negative impact on their productivity.

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Acoustic Comfort Results

Acoustic Comfort Results

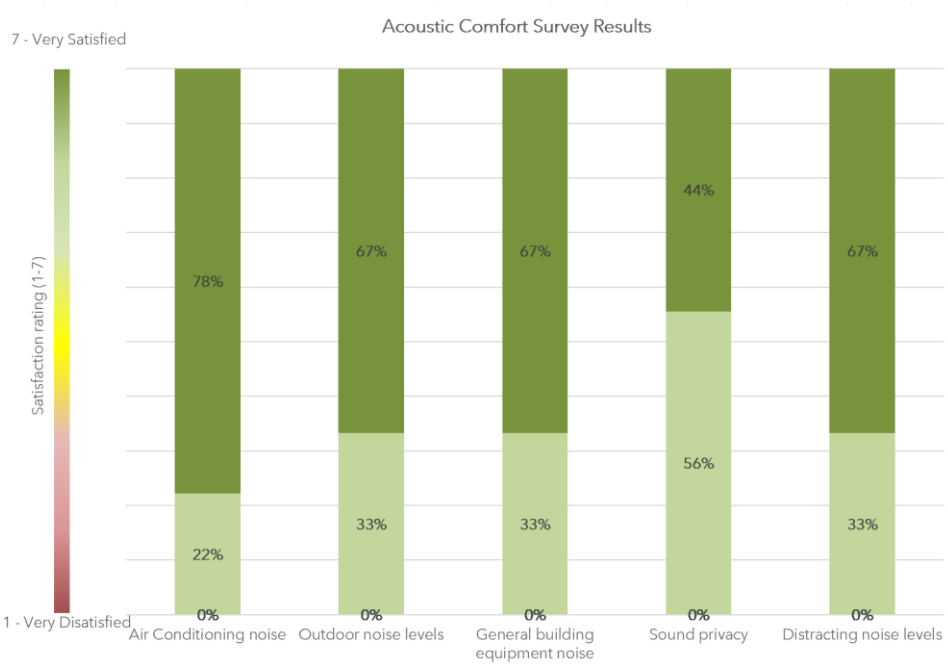

Figure 11: Acoustic comfort survey results.

Acoustic Comfort Results Summary

Overall, building users were particularly satisfied as shown in Figure 11. The responses were particularly satisfied with air conditioning noise, outdoor noise levels, general building equipment noise, sound privacy and distracting noise levels with no dissatisfied responses.

Air conditioning noise was rated the best, with 78% of occupants rating the noise problem as “very satisfied”.

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Productivity Result

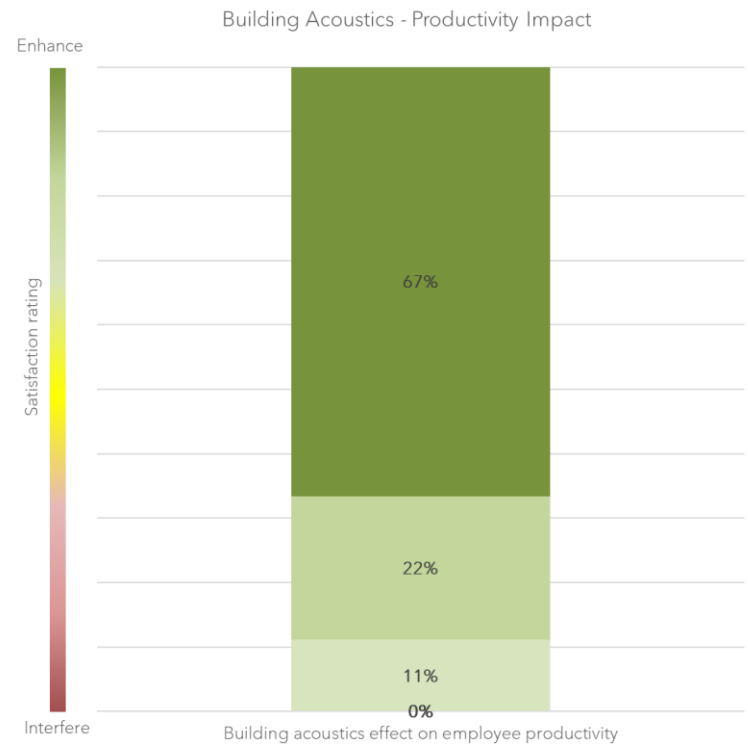

Figure 12: Building acoustics productivity impact.

Productivity Summary

As per Figure 12, all occupants agreed that building acoustics have positively impacted their productivity at work. This highlights that the building does create acoustic levels that enhance productivity. It is recommended that the building keeps implementing suitable measures to minimise the impact of noises and keep the positive feedback on occupants' productivity.

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Workspace Layout Results

Workspace Layout Results

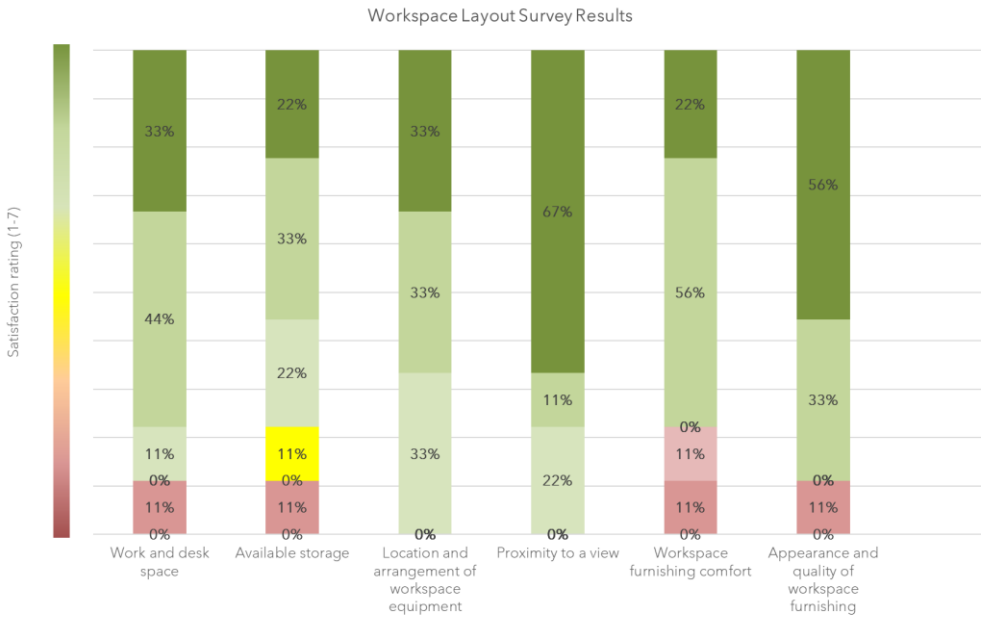

Figure 13: Workspace layout survey results.

Workspace Layout Summary

As seen in Figure 13, the building occupants were mostly satisfied with the workspace layout with exception of available storage and workspace furnishing comfort.

The available storage of workspace equipment is a category where 22% of occupants did not rate it as "satisfied". It would be worth understanding what best distribution of storage would work for the type of activities undertaken in those spaces. Workspace and furnishing comfort also had 22% of negative responses. This may well be an issue of the nature of the building and recent furnishing which may need to be reviewed to use all available space in the building. Therefore, the current layout may need to be reassessed.

Nevertheless, the overall response to all the categories can be seen as positive and satisfactory to most occupants, with each category having at least 78% of positive feedback.

Access and Layout

With regards to the building's accessibility and layout in the city of London, the site is 1 mile away from Hyde Park, in the heart of South Kensington, and only 3 min away from the Gloucester Road station, which is served by the Circle, District and Piccadilly lines. It can be easily accessible with public transport, cycling lanes, and cars.

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Productivity Results

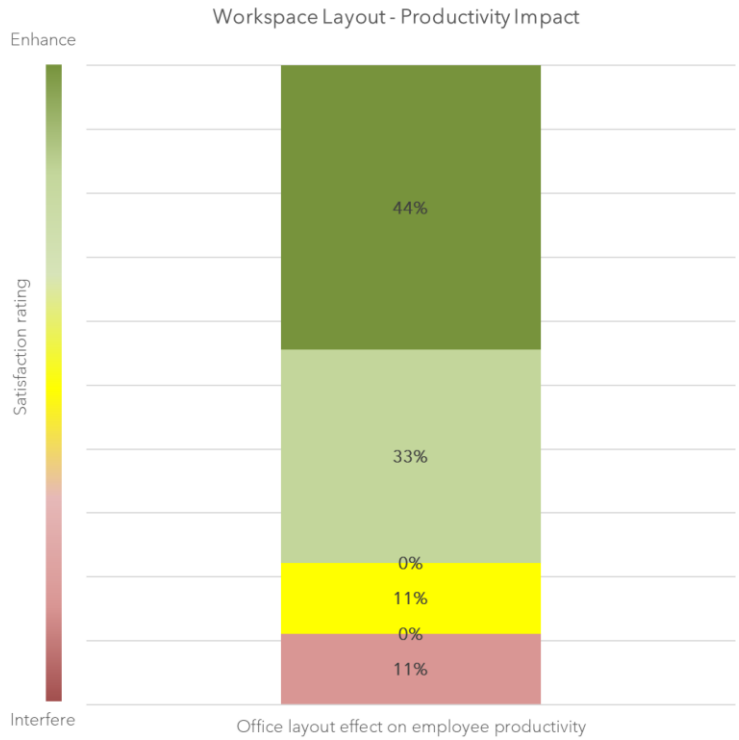

Figure 14: Workspace layout productivity impact.

Productivity Summary

As displayed in Figure 14 overall, the consensus on workspace layout was moderately satisfactory and enhancing employee productivity with 77% of the occupants rating it positively. Despite the negative responses to the categories highlighted in figure 11, overall, the workspace furnishing comfort were well received by the respondents and allow building users to conduct their jobs effectively and efficiently. Only one out of nine users rated the workspace layout as a negative factor for productivity.

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Energy and Water Performance Evaluation

Quarterly energy consumption results

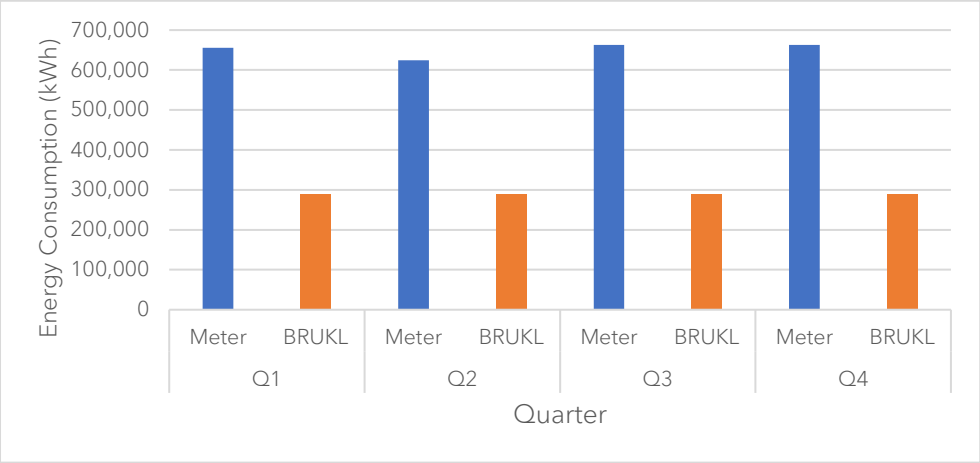

Figure 15: Quarterly energy consumption for the development

Figure 15 shows a comparison of the predicted building energy consumption taken from the development BRUKL document, comparing this against 12 months of metered energy data from the Harrington Hall Hotel building operation. Harrington Hall Hotel does not use any gas on site, all energy used is electricity.

The current energy usage is significantly higher than the design values. Overall, the predicted energy was lower than the meter reading calculations hence building is currently performing worse than it was designed.

However, to gain a better understanding of the development's energy consumption data should be collected over a longer period, and half hourly sub-metered data should be collected to determine energy consumption per building area and service (heating/cooling, ventilation, lighting, hot water, equipment). An analysis of the performance of the building services and more detailed analytics can be provided by ongoing re-commissioning, narrowing down potential issues, and highlighting the worst performing aspects.

The actual energy usage reported for 2024 is 2,605,096 kWh, whilst the designed energy usage was 1,155,486 kWh annually. Actual carbon emissions are 354 tonnes/CO_2 annually, whilst they were set at 157tonnes/CO_2, using latest part L carbon factors.

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Monthly Electricity Consumption Results

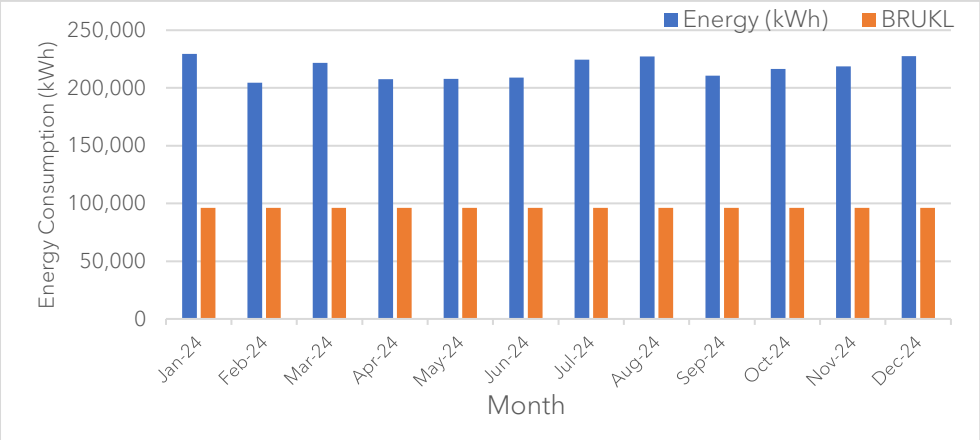

Figure 16: Monthly energy consumption for the development

Electricity consumption is the primary source of energy demand within the Harrington Hall Hotel and associated with the following energy uses:

- Cooling;
- Auxiliary Power;
- Lighting;
- Equipment;
- Heating; and
- Hot Water.

The development does not have PVs installed.

The monthly development's electricity consumption over the period January 24 – December 24 can be seen in Figure 16. There is no gas on site. A review of the electrical consumption indicated that a peak in electricity consumption on the months of January, July, August and December. The higher usage during the highlighted months is due to higher cooling loads in summer, and higher domestic hot water usage in winter, when people have longer and warmer showers. Despite this, monthly energy consumption was fairly constant in 2024, with a minimum monthly usage of 204,408kWh and a maximum of 229,402kWh.

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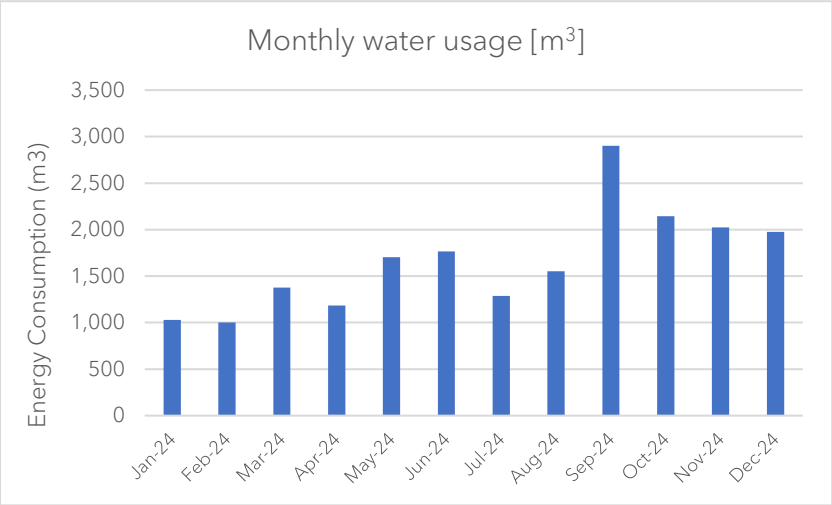
Monthly Water usage Results

Monthly water usage is presented in the graph below. The total water usage across 2024 for the Harrington Hotel was 19,948 m^3. Highest month usage was September with a total usage of 2,903m^3.



The actual water usage is 1,776 litres/m^2 annually. The estimated energy usage for hot water in the BRUKL file is 41.7kWh/m2. Assuming a 50°C temperature rise, a 4.85 DHW efficiency (specified in the BRUKL), and a 0.005kWh/litre per day loss the storage, water usage can be calculated, and it's slightly above the water usage across Harrington Hotel in 2024.

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Operational Infrastructure Strategy and Roadmap

Eight Versa presents an operational strategy roadmap to coordinate activities at quarterly intervals during the first three years of building occupation. Some of this measures are already being implemented in the Harrington Hall Hotel, like energy and water data gathering, allowing building managers to check building's performance and uncover any unusual patterns such as peaks in energy or water usage. Further details of this strategy are presented below.

Collection of Data

Data collection systems with user-friendly display capabilities, are an important part of the operational strategy for the Harrington Hall Hotel. These systems should be installed and linked to the main BMS, with updated software tools that will enhance energy savings and allow users to control energy and water usage.

Energy data, in the form of half hourly meters will be installed and displayed. Submeters will be installed, to control lighting, heating, cooling, ventilation, hot water and equipment uses, allowing for a breakdown of energy use and a more tailored control of usage. As an example, if hot water daily energy usage is expected to be within a certain range, any leaks or unusual hot water uses will be easily detected.

Indoor temperature sensors, humidity sensors and air quality detectors will allow for environmental and comfort data. Building users' feedback and satisfaction data will be gathered, via customer feedback kiosks, also called emoji feedback stations.

Waste and recycling data will be gathered and compared to the number of hotel users every quarter.

Analysis of data

All the data collected will be gathered, reported and analysed in quarterly meetings. During these meetings all the data will be compared against previous quarters, with especial attention on the same quarter of the previous year.

Data will be checked and analysed monthly by building managers, if possible, even weekly. This will allow for a more regular control of usage, allowing for a faster detection of anomalies.

The software installed will allow for automatic alerts when data is above specific thresholds, visual graphs and trends, what will enable an effortless control an analysis of all data gathered. Artificial intelligence predictive maintenance data will ensure energy systems are operating as intended.

Targets

Specific targets will allow for an ultimate objective when data is collected and analysed. It will also enhance change in certain areas to allow for targets to be met.

A reasonable target is an annual improvement in energy efficiency of 10%, when considering the number of users (and nights spend) in the hotel. In other words, the energy per occupant every night at the hotel will be targeted with a reduction of 10% on a year-by-year basis.

In order to achieve targets, building managers should engage with occupants and staff. As an example, engaging with occupants to reduce their energy impact throughout their stay, with a potential reward for best users, could help achieve significant results.

Internal communication is also key to ensure targets are met. Employees will be informed and engaged in the targets. Awareness campaigns, as well as training sessions should be implemented to ensure all employees are engaged with the programme and aware of the company's plan and goals.

External communication is also considered. Detailing how the plan's results will be communicated to external stakeholders, using sustainability reports or press releases, is an important part of the strategy plan to improve energy efficiency and reduce carbon emissions.

Feedback

Based on results obtained, building managers should provide lessons learned to the designed team, for them to consider these measures in future projects. Specific actions that enhance reduction in hot water usage, or any other areas, should be provided to the design team and implemented in future hotel projects.

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Conclusion and Recommendations

Conclusion

Overall, the development was found to be operating as intended, and building occupants were generally satisfied with the building environment, functionality, and impact on their ability to work effectively.

By conducting a review of the design intent, procurement, construction, and handover processes, and combining this with direct feedback from building users and facilities management teams, the evaluation has provided a detailed comparison of actual versus designed performance. This analysis has identified key areas for improvement, particularly in control, operation, and maintenance, as well as the usability and effectiveness of building facilities.

Recommendations have been given to provide an improvement in these areas, with the further aim of reduced operating and maintenance costs, as well as improved employee satisfaction, productivity, and reduced absenteeism. These should be communicated by the relevant party to those with control over these aspects to ensure optimal operation within the premises.

In line with the operational strategy roadmap presented in this report, the Harrington Hall Hotel plans to coordinate its operational activities with data gathering and analysis, on a quarterly basis, as a minimum. The hotel will liaise with occupants, employees and external stakeholders, as well as set targets and provide feedback on measures to be considered for the design team on future hotel projects.

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Harrington Hall Hotel

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Appendix

BRUKL File

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Harrington Hall Hotel

As designed

Date: Fri Dec 04 12:08:34 2020

Administrative information

Building Details

Address: 5-25 Harrington Gardens, London, SW7 4JW

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.13

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.13

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: ENERGYVIEW CONSULTING LTD

Telephone number: 07837047051

Address: Southgate Chambers, 37-39 Southgate Street, Winchester, SO23 9EH

Criterion 1: The calculated CO_2 emission rate for the building must not exceed the target

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	52.4
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	52.4
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	37.6
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.93	1.9	01000001:Surf[6]
Floor	0.25	0.7	0.7	00000000:Surf[0]
Roof	0.25	0.47	0.7	010000BA:Surf[15]
Windows***, roof windows, and rooflights	2.2	1.34	2.1	04000075:Surf[8]
Personnel doors	2.2	2.2	2.2	00000013:Surf[5]
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]
$U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

* There might be more than one surface where the maximum U-value occurs.
** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.
*** Display windows and similar glazing are excluded from the U-value check.
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air Permeability	Worst acceptable standard	This building
$m^3/(h.m^2)$ at 50 Pa	10	7.5

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	0.9 to 0.95

1- Ground Floor HVRF (PURYM350YNW-A1)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.42	2.67	0	0	0.65
Standard value	2.5*	2.6	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

2- 1st Floor HVRF (PURYM450YNW-A1)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.46	3.23	0	0	0.65
Standard value	2.5*	2.6	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

3- 2nd Floor HVRF (PURYM350YNW-A1)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.42	2.67	0	0	0.65
Standard value	2.5*	2.6	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

4- 3rd Floor HVRF (PURYM400YNW-A1)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.55	2.97	0	0	0.65
Standard value	2.5*	2.6	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

5- 4th Floor HVRF (PURYM300YNW-A1)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.4	2.87	0	0	0.65
Standard value	2.5*	2.6	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

6- 5th Floor HVRF (PURYM300YNW-A1)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.4	2.87	0	0	0.65
Standard value	2.5*	2.6	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

7- 6th & 7th Floor HVRF (PURYM300YNW-A1)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.4	2.87	0	0	0.65
Standard value	2.5*	2.6	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

8- Lower Ground Floor HVRF (PURYM450YNW-A1)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.46	3.23	0	0	0.65
Standard value	2.5*	2.6	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

1- DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	4.85	0.005
Standard value	2*	N/A
* Standard shown is for all types except absorption and gas engine heat pumps.		

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
00.08	-	-	-	0.6	-	-	-	-	-	-	N/A
00.09	-	-	-	0.6	-	-	-	-	-	-	N/A
00.11	-	-	-	0.6	-	-	-	-	-	-	N/A
00.14	-	-	-	0.6	-	-	-	-	-	-	N/A
00.18	-	-	-	0.6	-	-	-	-	-	-	N/A
00.16	-	-	-	0.6	-	-	-	-	-	-	N/A
00.06	-	-	-	0.6	-	-	-	-	-	-	N/A
01.38	-	-	-	0.6	-	-	-	-	-	-	N/A
01.06	-	-	-	0.6	-	-	-	-	-	-	N/A
01.04	-	-	-	0.6	-	-	-	-	-	-	N/A
01.32	-	-	-	0.6	-	-	-	-	-	-	N/A
01.29	-	-	-	0.6	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
01.27	-	-	-	0.6	-	-	-	-	-	-	N/A
01.31	-	-	-	0.6	-	-	-	-	-	-	N/A
01.25	-	-	-	0.6	-	-	-	-	-	-	N/A
01.26	-	-	-	0.6	-	-	-	-	-	-	N/A
01.22	-	-	-	0.6	-	-	-	-	-	-	N/A
01.21	-	-	-	0.6	-	-	-	-	-	-	N/A
01.19	-	-	-	0.6	-	-	-	-	-	-	N/A
01.18	-	-	-	0.6	-	-	-	-	-	-	N/A
01.16	-	-	-	0.6	-	-	-	-	-	-	N/A
01.17	-	-	-	0.6	-	-	-	-	-	-	N/A
01.14	-	-	-	0.6	-	-	-	-	-	-	N/A
01.09	-	-	-	0.6	-	-	-	-	-	-	N/A
01.11	-	-	-	0.6	-	-	-	-	-	-	N/A
01.12	-	-	-	0.6	-	-	-	-	-	-	N/A
01.20	-	-	-	0.6	-	-	-	-	-	-	N/A
01.24	-	-	-	0.6	-	-	-	-	-	-	N/A
01.28	-	-	-	0.6	-	-	-	-	-	-	N/A
01.33 MEZZANINE	-	-	-	0.6	-	-	-	-	-	-	N/A
01.36	-	-	-	0.6	-	-	-	-	-	-	N/A
01.35	-	-	-	0.6	-	-	-	-	-	-	N/A
01.37	-	-	-	0.6	-	-	-	-	-	-	N/A
01.34 MEZZANINE	-	-	-	0.6	-	-	-	-	-	-	N/A
01.39	-	-	-	0.6	-	-	-	-	-	-	N/A
01.01	-	-	-	0.6	-	-	-	-	-	-	N/A
01.02	-	-	-	0.6	-	-	-	-	-	-	N/A
01.03	-	-	-	0.6	-	-	-	-	-	-	N/A
01.05	-	-	-	0.6	-	-	-	-	-	-	N/A
01.35 MEZZANINE	-	-	-	0.6	-	-	-	-	-	-	N/A
01.36 BEDROOM 3	-	-	-	0.6	-	-	-	-	-	-	N/A
03.34	-	-	-	0.6	-	-	-	-	-	-	N/A
02.10	-	-	-	0.6	-	-	-	-	-	-	N/A
01.37 BEDROOM 3	-	-	-	0.6	-	-	-	-	-	-	N/A
02.27	-	-	-	0.6	-	-	-	-	-	-	N/A
02.26	-	-	-	0.6	-	-	-	-	-	-	N/A
02.01	-	-	-	0.6	-	-	-	-	-	-	N/A
02.03	-	-	-	0.6	-	-	-	-	-	-	N/A
02.04	-	-	-	0.6	-	-	-	-	-	-	N/A
02.06	-	-	-	0.6	-	-	-	-	-	-	N/A
02.02	-	-	-	0.6	-	-	-	-	-	-	N/A
02.08	-	-	-	0.6	-	-	-	-	-	-	N/A
02.07	-	-	-	0.6	-	-	-	-	-	-	N/A
02.12	-	-	-	0.6	-	-	-	-	-	-	N/A
02.13	-	-	-	0.6	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
02.15	-	-	-	0.6	-	-	-	-	-	-	N/A
02.16	-	-	-	0.6	-	-	-	-	-	-	N/A
02.17	-	-	-	0.6	-	-	-	-	-	-	N/A
02.18	-	-	-	0.6	-	-	-	-	-	-	N/A
02.20	-	-	-	0.6	-	-	-	-	-	-	N/A
02.21	-	-	-	0.6	-	-	-	-	-	-	N/A
02.25	-	-	-	0.6	-	-	-	-	-	-	N/A
02.23	-	-	-	0.6	-	-	-	-	-	-	N/A
02.22	-	-	-	0.6	-	-	-	-	-	-	N/A
02.24	-	-	-	0.6	-	-	-	-	-	-	N/A
02.19	-	-	-	0.6	-	-	-	-	-	-	N/A
02.14	-	-	-	0.6	-	-	-	-	-	-	N/A
03.37	-	-	-	0.6	-	-	-	-	-	-	N/A
02.11	-	-	-	0.6	-	-	-	-	-	-	N/A
02.09	-	-	-	0.6	-	-	-	-	-	-	N/A
02.05	-	-	-	0.6	-	-	-	-	-	-	N/A
01.06	-	-	-	0.6	-	-	-	-	-	-	N/A
01.05 BEDROOM 3	-	-	-	0.6	-	-	-	-	-	-	N/A
01.05 BEDROOM 2	-	-	-	0.6	-	-	-	-	-	-	N/A
01.04 BEDROOM 3	-	-	-	0.6	-	-	-	-	-	-	N/A
01.03 BEDROOM 2	-	-	-	0.6	-	-	-	-	-	-	N/A
01.03 BEDROOM 3	-	-	-	0.6	-	-	-	-	-	-	N/A
01.02 BEDROOM 3	-	-	-	0.6	-	-	-	-	-	-	N/A
01.02 BEDROOM 2	-	-	-	0.6	-	-	-	-	-	-	N/A
01.01 BEDROOM 2	-	-	-	0.6	-	-	-	-	-	-	N/A
01.39 BEDROOM 2	-	-	-	0.6	-	-	-	-	-	-	N/A
01.39 BEDROOM 3	-	-	-	0.6	-	-	-	-	-	-	N/A
01.38 BEDROOM 2	-	-	-	0.6	-	-	-	-	-	-	N/A
01.01 BEDROOM 3	-	-	-	0.6	-	-	-	-	-	-	N/A
01.38 BEDROOM 3	-	-	-	0.6	-	-	-	-	-	-	N/A
01.36 BEDROOM 2	-	-	-	0.6	-	-	-	-	-	-	N/A
01.04 BEDROOM 2	-	-	-	0.6	-	-	-	-	-	-	N/A
01.37 BEDROOM 2	-	-	-	0.6	-	-	-	-	-	-	N/A
03.01	-	-	-	0.6	-	-	-	-	-	-	N/A
03.06	-	-	-	0.6	-	-	-	-	-	-	N/A
03.35	-	-	-	0.6	-	-	-	-	-	-	N/A
01.34	-	-	-	0.6	-	-	-	-	-	-	N/A
03.36	-	-	-	0.6	-	-	-	-	-	-	N/A
03.07	-	-	-	0.6	-	-	-	-	-	-	N/A
03.08	-	-	-	0.6	-	-	-	-	-	-	N/A
03.33	-	-	-	0.6	-	-	-	-	-	-	N/A
03.31	-	-	-	0.6	-	-	-	-	-	-	N/A
03.30	-	-	-	0.6	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
03.28	-	-	-	0.6	-	-	-	-	-	-	N/A
03.32	-	-	-	0.6	-	-	-	-	-	-	N/A
03.26	-	-	-	0.6	-	-	-	-	-	-	N/A
03.27	-	-	-	0.6	-	-	-	-	-	-	N/A
03.22	-	-	-	0.6	-	-	-	-	-	-	N/A
03.21	-	-	-	0.6	-	-	-	-	-	-	N/A
03.19	-	-	-	0.6	-	-	-	-	-	-	N/A
03.18	-	-	-	0.6	-	-	-	-	-	-	N/A
03.17	-	-	-	0.6	-	-	-	-	-	-	N/A
03.16	-	-	-	0.6	-	-	-	-	-	-	N/A
03.14	-	-	-	0.6	-	-	-	-	-	-	N/A
03.13	-	-	-	0.6	-	-	-	-	-	-	N/A
03.09	-	-	-	0.6	-	-	-	-	-	-	N/A
03.11	-	-	-	0.6	-	-	-	-	-	-	N/A
03.12	-	-	-	0.6	-	-	-	-	-	-	N/A
03.10	-	-	-	0.6	-	-	-	-	-	-	N/A
03.15	-	-	-	0.6	-	-	-	-	-	-	N/A
03.20	-	-	-	0.6	-	-	-	-	-	-	N/A
03.23	-	-	-	0.6	-	-	-	-	-	-	N/A
03.29	-	-	-	0.6	-	-	-	-	-	-	N/A
03.25	-	-	-	0.6	-	-	-	-	-	-	N/A
03.24	-	-	-	0.6	-	-	-	-	-	-	N/A
04.25	-	-	-	0.6	-	-	-	-	-	-	N/A
04.23	-	-	-	0.6	-	-	-	-	-	-	N/A
04.22	-	-	-	0.6	-	-	-	-	-	-	N/A
04.24	-	-	-	0.6	-	-	-	-	-	-	N/A
04.15	-	-	-	0.6	-	-	-	-	-	-	N/A
04.12	-	-	-	0.6	-	-	-	-	-	-	N/A
04.11	-	-	-	0.6	-	-	-	-	-	-	N/A
04.08	-	-	-	0.6	-	-	-	-	-	-	N/A
04.21	-	-	-	0.6	-	-	-	-	-	-	N/A
04.18	-	-	-	0.6	-	-	-	-	-	-	N/A
04.29	-	-	-	0.6	-	-	-	-	-	-	N/A
04.30	-	-	-	0.6	-	-	-	-	-	-	N/A
04.31	-	-	-	0.6	-	-	-	-	-	-	N/A
04.32	-	-	-	0.6	-	-	-	-	-	-	N/A
04.02	-	-	-	0.6	-	-	-	-	-	-	N/A
04.03	-	-	-	0.6	-	-	-	-	-	-	N/A
04.04	-	-	-	0.6	-	-	-	-	-	-	N/A
04.05	-	-	-	0.6	-	-	-	-	-	-	N/A
04.26	-	-	-	0.6	-	-	-	-	-	-	N/A
04.27	-	-	-	0.6	-	-	-	-	-	-	N/A
04.01	-	-	-	0.6	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
04.06	-	-	-	0.6	-	-	-	-	-	-	N/A
04.09	-	-	-	0.6	-	-	-	-	-	-	N/A
04.10	-	-	-	0.6	-	-	-	-	-	-	N/A
04.13	-	-	-	0.6	-	-	-	-	-	-	N/A
04.14	-	-	-	0.6	-	-	-	-	-	-	N/A
04.16	-	-	-	0.6	-	-	-	-	-	-	N/A
04.17	-	-	-	0.6	-	-	-	-	-	-	N/A
04.20	-	-	-	0.6	-	-	-	-	-	-	N/A
04.19	-	-	-	0.6	-	-	-	-	-	-	N/A
05.25	-	-	-	0.6	-	-	-	-	-	-	N/A
05.23	-	-	-	0.6	-	-	-	-	-	-	N/A
05.22	-	-	-	0.6	-	-	-	-	-	-	N/A
05.24	-	-	-	0.6	-	-	-	-	-	-	N/A
05.15	-	-	-	0.6	-	-	-	-	-	-	N/A
05.12	-	-	-	0.6	-	-	-	-	-	-	N/A
05.11	-	-	-	0.6	-	-	-	-	-	-	N/A
05.08	-	-	-	0.6	-	-	-	-	-	-	N/A
05.21	-	-	-	0.6	-	-	-	-	-	-	N/A
05.18	-	-	-	0.6	-	-	-	-	-	-	N/A
05.29	-	-	-	0.6	-	-	-	-	-	-	N/A
05.30	-	-	-	0.6	-	-	-	-	-	-	N/A
05.31	-	-	-	0.6	-	-	-	-	-	-	N/A
05.32	-	-	-	0.6	-	-	-	-	-	-	N/A
05.02	-	-	-	0.6	-	-	-	-	-	-	N/A
05.03	-	-	-	0.6	-	-	-	-	-	-	N/A
05.04	-	-	-	0.6	-	-	-	-	-	-	N/A
05.05	-	-	-	0.6	-	-	-	-	-	-	N/A
05.26	-	-	-	0.6	-	-	-	-	-	-	N/A
05.27	-	-	-	0.6	-	-	-	-	-	-	N/A
05.28	-	-	-	0.6	-	-	-	-	-	-	N/A
05.01	-	-	-	0.6	-	-	-	-	-	-	N/A
05.06	-	-	-	0.6	-	-	-	-	-	-	N/A
05.07	-	-	-	0.6	-	-	-	-	-	-	N/A
LOUNGE/WORKSPACE	-	-	-	0.9	-	-	-	-	-	-	N/A
05.17	-	-	-	0.6	-	-	-	-	-	-	N/A
05.16	-	-	-	0.6	-	-	-	-	-	-	N/A
05.20	-	-	-	0.6	-	-	-	-	-	-	N/A
05.19	-	-	-	0.6	-	-	-	-	-	-	N/A
06.11	-	-	-	0.6	-	-	-	-	-	-	N/A
06.12	-	-	-	0.6	-	-	-	-	-	-	N/A
06.09	-	-	-	0.6	-	-	-	-	-	-	N/A
06.07	-	-	-	0.6	-	-	-	-	-	-	N/A
06.17	-	-	-	0.6	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
06.20	-	-	-	0.6	-	-	-	-	-	-	N/A
06.19	-	-	-	0.6	-	-	-	-	-	-	N/A
06.21	-	-	-	0.6	-	-	-	-	-	-	N/A
07.01	-	-	-	0.6	-	-	-	-	-	-	N/A
06.14	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.20	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.19	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.18	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.14	-	-	-	0.6	-	-	-	-	-	-	N/A
04.07	-	-	-	0.6	-	-	-	-	-	-	N/A
06.08	-	-	-	0.6	-	-	-	-	-	-	N/A
06.10	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.12	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.11	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.13	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.09	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.07	-	-	-	0.6	-	-	-	-	-	-	N/A
05.09	-	-	-	0.6	-	-	-	-	-	-	N/A
05.10	-	-	-	0.6	-	-	-	-	-	-	N/A
05.13	-	-	-	0.6	-	-	-	-	-	-	N/A
05.14	-	-	-	0.6	-	-	-	-	-	-	N/A
06.22	-	-	-	0.6	-	-	-	-	-	-	N/A
06.23	-	-	-	0.6	-	-	-	-	-	-	N/A
06.24	-	-	-	0.6	-	-	-	-	-	-	N/A
06.25	-	-	-	0.6	-	-	-	-	-	-	N/A
06.02	-	-	-	0.6	-	-	-	-	-	-	N/A
06.03	-	-	-	0.6	-	-	-	-	-	-	N/A
06.04	-	-	-	0.6	-	-	-	-	-	-	N/A
06.05	-	-	-	0.6	-	-	-	-	-	-	N/A
06.01	-	-	-	0.6	-	-	-	-	-	-	N/A
06.06	-	-	-	0.6	-	-	-	-	-	-	N/A
06.13	-	-	-	0.6	-	-	-	-	-	-	N/A
06.15	-	-	-	0.6	-	-	-	-	-	-	N/A
06.16	-	-	-	0.6	-	-	-	-	-	-	N/A
06.18	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.06 SEPARATE BEDROOM 3	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.06 SEPARATE BEDROOM 2	-	-	-	0.6	-	-	-	-	-	-	N/A
06.20 MEZZANINE	-	-	-	0.6	-	-	-	-	-	-	N/A
06.21 MEZZANINE	-	-	-	0.6	-	-	-	-	-	-	N/A
CHECK IN/CONCIERGE	-	-	-	0.9	-	-	-	-	-	-	N/A
00.17	-	-	-	0.6	-	-	-	-	-	-	N/A
01.07	-	-	-	0.6	-	-	-	-	-	-	N/A
00.12	-	-	-	0.6	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
00.13	-	-	-	0.6	-	-	-	-	-	-	N/A
00.04	-	-	-	0.6	-	-	-	-	-	-	N/A
00.05	-	-	-	0.6	-	-	-	-	-	-	N/A
00.10	-	-	-	0.6	-	-	-	-	-	-	N/A
00.03	-	-	-	0.6	-	-	-	-	-	-	N/A
WAITING AREA	-	-	-	0.9	-	-	-	-	-	-	N/A
ENTRANCE LOBBY	-	-	-	0.9	-	-	-	-	-	-	N/A
00.15	-	-	-	0.6	-	-	-	-	-	-	N/A
00.19	-	-	-	0.6	-	-	-	-	-	-	N/A
PRIVATE DINING/FUNCTION ROOM	-	-	-	0.9	-	-	-	-	-	-	N/A
MEETING ROOM/PRIVATE DINING 02	-	-	-	0.9	-	-	-	-	-	-	N/A
MEETING ROOM/PRIVATE DINING 01	-	-	-	0.9	-	-	-	-	-	-	N/A
00.07	-	-	-	0.6	-	-	-	-	-	-	N/A
LIBRARY	-	-	-	0.9	-	-	-	-	-	-	N/A
01.10	-	-	-	0.6	-	-	-	-	-	-	N/A
01.15	-	-	-	0.6	-	-	-	-	-	-	N/A
01.13	-	-	-	0.6	-	-	-	-	-	-	N/A
01.23	-	-	-	0.6	-	-	-	-	-	-	N/A
01.33	-	-	-	0.6	-	-	-	-	-	-	N/A
01.30	-	-	-	0.6	-	-	-	-	-	-	N/A
01.08	-	-	-	0.6	-	-	-	-	-	-	N/A
00.01	-	-	-	0.6	-	-	-	-	-	-	N/A
00.02	-	-	-	0.6	-	-	-	-	-	-	N/A
03.38	-	-	-	0.6	-	-	-	-	-	-	N/A
03.39	-	-	-	0.6	-	-	-	-	-	-	N/A
03.40	-	-	-	0.6	-	-	-	-	-	-	N/A
03.04	-	-	-	0.6	-	-	-	-	-	-	N/A
03.02	-	-	-	0.6	-	-	-	-	-	-	N/A
03.03	-	-	-	0.6	-	-	-	-	-	-	N/A
03.05	-	-	-	0.6	-	-	-	-	-	-	N/A
04.28	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.17	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.16	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.15	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.10	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.08	-	-	-	0.6	-	-	-	-	-	-	N/A
RELAXATION POOL AREA	-	-	-	0.9	-	-	-	-	-	-	N/A
STEAM ROOM	-	-	-	0.9	-	-	-	-	-	-	N/A
TREATMENT ROOM 01	-	-	-	0.9	-	-	-	-	-	-	N/A
YOGA STUDIO	-	-	-	0.9	-	-	-	-	-	-	N/A
GYM	-	-	-	0.9	-	-	-	-	-	-	N/A
TREATMENT ROOM 02	-	-	-	0.9	-	-	-	-	-	-	N/A
B1.03 SEPARATE BEDROOM 1	-	-	-	0.6	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
B1.01	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.02 SEPARATE BEDROOM 2	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.02 SEPARATE BEDROOM 1	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.02 SEPARATE BEDROOM 3	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.03 SEPARATE BEDROOM 2	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.02	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.04 SEPARATE BEDROOM 1	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.03 SEPARATE BEDROOM 3	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.04 SEPARATE BEDROOM 2	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.03	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.06 SEPARATE BEDROOM 1	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.04 SEPARATE BEDROOM 3	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.05 SEPARATE BEDROOM 2	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.04	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.05 SEPARATE BEDROOM 3	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.05	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.06	-	-	-	0.6	-	-	-	-	-	-	N/A
B1.05 SEPARATE BEDROOM 1	-	-	-	0.6	-	-	-	-	-	-	N/A
BS2. STAFF FACILITIES	-	-	-	0.9	-	-	-	-	-	-	N/A
BS2. ADMIN	-	-	-	0.9	-	-	-	-	-	-	N/A
BS2. STAFF FACILITIES	-	-	-	0.9	-	-	-	-	-	-	N/A
BS2. ADMIN	-	-	-	0.9	-	-	-	-	-	-	N/A
B1.21	-	-	-	0.6	-	-	-	-	-	-	N/A
BISTRO/COFFEE SHOP	-	-	-	0.9	-	-	-	-	-	-	N/A
ADMIN/SECURITY	-	-	-	0.9	-	-	-	-	-	-	N/A
MEMBERS BAR	-	-	-	0.9	-	-	-	-	-	-	N/A
SCREENING	-	-	-	0.9	-	-	-	-	-	-	N/A
SAUNA	-	-	-	0.9	-	-	-	-	-	-	N/A
SPA RECEPTION/LOUNGE	-	-	-	0.9	-	-	-	-	-	-	N/A

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
00.07 BATHROOM	-	100	-	41
00.08	-	100	-	43
00.09	-	100	-	50
00.10 BATHROOM	-	100	-	35
00.11	-	100	-	47
00.12 BATHROOM	-	100	-	36
00.03 BATHROOM	-	100	-	34
00.02 BATHROOM	-	100	-	19
00.13 BATHROOM	-	100	-	36
00.14	-	100	-	45

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
00.16 BATHROOM	-	100	-	38
00.17 BATHROOM	-	100	-	34
00.19 BATHROOM	-	100	-	34
00.18	-	100	-	54
00.18 BATHROOM	-	100	-	57
00.16	-	100	-	53
00.05 BATHROOM	-	100	-	24
00.06	-	100	-	52
01.38	-	100	-	45
01.38 BATHROOM	-	100	-	22
01.39 BATHROOM	-	100	-	22
01.01 BATHROOM	-	100	-	22
01.06	-	100	-	50
01.04 BATHROOM	-	100	-	22
01.04	-	100	-	46
01.02 BATHROOM	-	100	-	21
01.03 BATHROOM	-	100	-	20
01.07 BATHROOM	-	100	-	24
01.08 BATHROOM	-	100	-	30
01.32	-	100	-	44
01.31 BATHROOM	-	100	-	21
01.30 BATHROOM	-	100	-	21
01.29	-	100	-	39
01.28 BATHROOM	-	100	-	23
01.27	-	100	-	38
01.31	-	100	-	37
01.25	-	100	-	41
01.25 BATHROOM	-	100	-	21
01.26	-	100	-	43
01.22	-	100	-	39
01.21 BATHROOM	-	100	-	21
01.21	-	100	-	38
01.19 BATHROOM	-	100	-	24
01.19	-	100	-	38
01.18	-	100	-	38
01.17 BATHROOM	-	100	-	23
01.16	-	100	-	41
01.17	-	100	-	42
01.16 BATHROOM	-	100	-	21
01.14 BATHROOM	-	100	-	24
01.14	-	100	-	37
01.13 BATHROOM	-	100	-	23
01.09	-	100	-	36

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
01.11	-	100	-	67
01.12	-	100	-	36
01.10 BATHROOM	-	100	-	22
01.15 BATHROOM	-	100	-	22
01.20	-	100	-	34
01 LINEN STORE	72	-	-	13
LINEN CHUTE	72	-	-	6
01.23 BATHROOM	-	100	-	25
01.24	-	100	-	38
01.28	-	100	-	37
01.33 MEZZANINE	-	100	-	46
01.36	-	100	-	47
01.35	-	100	-	52
01.37	-	100	-	46
01.34 MEZZANINE	-	100	-	48
01.39	-	100	-	49
01.01	-	100	-	52
01.02	-	100	-	49
01.03	-	100	-	46
01.05	-	100	-	47
01.35 MEZZANINE	-	100	-	31
01.36 BEDROOM 3	-	100	-	13
01.36 STAIRS	-	80	-	29
03.34	-	100	-	42
02.10	-	100	-	37
01.37 BEDROOM 3	-	100	-	12
02.27	-	100	-	49
02.27 BATHROOM	-	100	-	24
02.26	-	100	-	19
02.26 BATHROOM	-	100	-	30
02.25 BATHROOM	-	100	-	23
02.01	-	100	-	44
02.01 BATHROOM	-	100	-	25
02.02 BATHROOM	-	100	-	21
02.03	-	100	-	36
02.03 BATHROOM	-	100	-	21
02.04 BATHROOM	-	100	-	24
02.04	-	100	-	39
02.05 BATHROOM	-	100	-	23
02.06 BATHROOM	-	100	-	22
02.06	-	100	-	38
02.02	-	100	-	37
02.08	-	100	-	41

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
02.08 BATHROOM	-	100	-	21
02.07 BATHROOM	-	100	-	23
02.07	-	100	-	43
02.12 BATHROOM	-	100	-	23
02.12	-	100	-	39
02.13 BATHROOM	-	100	-	21
02.13	-	100	-	38
02.15 BATHROOM	-	100	-	24
02.15	-	100	-	38
02.16 BATHROOM	-	100	-	22
02.16	-	100	-	38
02.17 BATHROOM	-	100	-	23
02.17	-	100	-	42
02.18	-	100	-	41
02.18 BATHROOM	-	100	-	21
02.20 BATHROOM	-	100	-	24
02.20	-	100	-	37
02.21 BATHROOM	-	100	-	23
02.21	-	100	-	36
02.25	-	100	-	36
02.23	-	100	-	67
02.23 BATHROOM	-	100	-	34
02.22 BATHROOM	-	100	-	22
02.22	-	100	-	36
02.24	-	100	-	38
02.24 BATHROOM	-	100	-	22
02.19	-	100	-	36
02.19 BATHROOM	-	100	-	22
02.14 BATHROOM	-	100	-	22
02.14	-	100	-	34
03.37	-	100	-	42
02.11	-	100	-	41
02.11 BATHROOM	-	100	-	25
02.10 BATHROOM	-	100	-	30
02.09	-	100	-	33
02.05	-	100	-	37
01.37 STAIRS	-	80	-	28
01.06	-	100	-	27
01.05 STAIRS	-	80	-	27
01.05 BEDROOM 3	-	100	-	12
01.05 BEDROOM 2	-	100	-	15
01.04 BEDROOM 3	-	100	-	15
01.03 BEDROOM 2	-	100	-	15

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
01.03 STAIRS	-	80	-	28
01.03 BEDROOM 3	-	100	-	12
01.02 BEDROOM 3	-	100	-	14
01.02 BEDROOM 2	-	100	-	13
01.02 STAIRS	-	80	-	29
01.01 STAIRS	-	80	-	29
01.01 BEDROOM 2	-	100	-	13
01.39 BEDROOM 2	-	100	-	11
01.39 STAIRS	-	80	-	29
01.39 BEDROOM 3	-	100	-	14
01.38 BEDROOM 2	-	100	-	13
01.01 BEDROOM 3	-	100	-	14
01.38 STAIRS	-	80	-	28
01.38 BEDROOM 3	-	100	-	15
01.36 BEDROOM 2	-	100	-	13
01.04 STAIRS	-	80	-	27
01.04 BEDROOM 2	-	100	-	12
01.37 BEDROOM 2	-	100	-	16
03 KITCHEN	-	90	-	112
03.36 BATHROOM	-	100	-	36
03.37 BATHROOM	-	100	-	28
03.01 BATHROOM	-	100	-	28
03 KITCHEN	-	90	-	111
03.01	-	100	-	46
03.06	-	100	-	34
03.06 BATHROOM	-	100	-	30
03.34 BATHROOM	-	100	-	34
03.35	-	100	-	43
04 KITCHEN	-	90	-	100
05 KITCHEN	-	90	-	105
01.34	-	100	-	55
03.35 BATHROOM	-	100	-	31
03.36	-	100	-	39
02 LINEN STORE	72	-	-	15
03.07	-	100	-	53
03.07 BATHROOM	-	100	-	30
03.08	-	100	-	22
03.08 BATHROOM	-	100	-	35
03.09 BATHROOM	-	100	-	28
03.33	-	100	-	47
03.33 BATHROOM	-	100	-	31
03.32 BATHROOM	-	100	-	26
03.31	-	100	-	40

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
03.31 BATHROOM	-	100	-	26
03.30 BATHROOM	-	100	-	29
03.30	-	100	-	42
03.29 BATHROOM	-	100	-	28
03.28 BATHROOM	-	100	-	27
03.28	-	100	-	42
03.32	-	100	-	40
03.26	-	100	-	45
03.26 BATHROOM	-	100	-	26
03.27 BATHROOM	-	100	-	28
03.27	-	100	-	47
03.22 BATHROOM	-	100	-	28
03.22	-	100	-	42
03.21 BATHROOM	-	100	-	26
03.21	-	100	-	42
03.19 BATHROOM	-	100	-	29
03.19	-	100	-	41
03.18 BATHROOM	-	100	-	27
03.18	-	100	-	42
03.17 BATHROOM	-	100	-	28
03.17	-	100	-	46
03.16	-	100	-	45
03.16 BATHROOM	-	100	-	26
03.14 BATHROOM	-	100	-	29
03.14	-	100	-	40
03.13 BATHROOM	-	100	-	29
03.13	-	100	-	39
03.09	-	100	-	39
03.11	-	100	-	73
03.11 BATHROOM	-	100	-	40
03.12 BATHROOM	-	100	-	27
03.12	-	100	-	39
03.10	-	100	-	41
03.10 BATHROOM	-	100	-	27
03.15	-	100	-	39
03.15 BATHROOM	-	100	-	27
03.20 BATHROOM	-	100	-	27
03.20	-	100	-	36
03.23	-	100	-	45
03.23 BATHROOM	-	100	-	30
03.24 BATHROOM	-	100	-	35
03.29	-	100	-	40
02 LINEN STORE	72	-	-	18

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
03.25	-	100	-	36
03.25 BATHROOM	-	100	-	33
03.24	-	100	-	39
02 LINEN STORE	72	-	-	16
02 LINEN STORE	72	-	-	17
04.08 BATHROOM	-	100	-	25
04.25	-	100	-	45
04.25 BATHROOM	-	100	-	27
04.24 BATHROOM	-	100	-	23
04.23	-	100	-	38
04.23 BATHROOM	-	100	-	23
04.22 BATHROOM	-	100	-	26
04.22	-	100	-	40
04.21 BATHROOM	-	100	-	25
04.20 BATHROOM	-	100	-	24
04.24	-	100	-	38
04.15 BATHROOM	-	100	-	26
04.15	-	100	-	39
04.14 BATHROOM	-	100	-	24
04.12 BATHROOM	-	100	-	26
04.12	-	100	-	38
04.11 BATHROOM	-	100	-	26
04.11	-	100	-	37
04.08	-	100	-	37
04.10 BATHROOM	-	100	-	24
04.09 BATHROOM	-	100	-	24
04.13 BATHROOM	-	100	-	24
04.17 BATHROOM	-	100	-	27
04.21	-	100	-	38
04.18	-	100	-	38
04.28 BATHROOM	-	100	-	32
04 KITCHEN	-	90	-	102
04.29	-	100	-	40
04.29 BATHROOM	-	100	-	25
04.30 BATHROOM	-	100	-	25
04.30	-	100	-	39
04.31 BATHROOM	-	100	-	25
04.31	-	100	-	39
04.01 BATHROOM	-	100	-	25
04.32 BATHROOM	-	100	-	25
04.32	-	100	-	41
04.02 BATHROOM	-	100	-	25
04.02	-	100	-	41

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
04.03 BATHROOM	-	100	-	26
04.03	-	100	-	39
04.04	-	100	-	39
04.04 BATHROOM	-	100	-	25
04.05 BATHROOM	-	100	-	25
04.05	-	100	-	39
04.06 BATHROOM	-	100	-	27
04.26	-	100	-	40
04.26 BATHROOM	-	100	-	31
04.27 BATHROOM	-	100	-	28
04.27	-	100	-	41
04.01	-	100	-	40
04.06	-	100	-	28
STAIRS	-	80	-	55
04.07 BATHROOM	-	100	-	36
04.09	-	100	-	41
04.10	-	100	-	41
04.13	-	100	-	40
04.14	-	100	-	40
04.16	-	100	-	39
04.16 BATHROOM	-	100	-	24
04.17	-	100	-	44
04 CORE CIRCULATION	-	96	-	54
05.08 BATHROOM	-	100	-	26
04.18 BATHROOM	-	100	-	28
04.19 BATHROOM	-	100	-	23
04.20	-	100	-	44
04.19	-	100	-	41
05.25	-	100	-	46
05.25 BATHROOM	-	100	-	29
05.24 BATHROOM	-	100	-	25
05.23	-	100	-	38
05.23 BATHROOM	-	100	-	24
05.22 BATHROOM	-	100	-	27
05.22	-	100	-	41
05.21 BATHROOM	-	100	-	26
05.20 BATHROOM	-	100	-	25
05.24	-	100	-	39
05.15 BATHROOM	-	100	-	27
05.15	-	100	-	39
05.14 BATHROOM	-	100	-	25
05.12 BATHROOM	-	100	-	27
05.12	-	100	-	39

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
05.11 BATHROOM	-	100	-	27
05.11	-	100	-	38
05.08	-	100	-	38
05.10 BATHROOM	-	100	-	25
05.09 BATHROOM	-	100	-	25
05.13 BATHROOM	-	100	-	25
05.17 BATHROOM	-	100	-	28
05.21	-	100	-	39
05.18	-	100	-	38
05.28 BATHROOM	-	100	-	33
05 KITCHEN	-	90	-	106
05.29	-	100	-	41
05.29 BATHROOM	-	100	-	26
05.30 BATHROOM	-	100	-	26
05.30	-	100	-	40
05.31 BATHROOM	-	100	-	26
05.31	-	100	-	40
05.01 BATHROOM	-	100	-	27
05.32 BATHROOM	-	100	-	26
05.32	-	100	-	42
05.02 BATHROOM	-	100	-	26
05.02	-	100	-	42
05.03 BATHROOM	-	100	-	27
05.03	-	100	-	40
05.04	-	100	-	40
05.04 BATHROOM	-	100	-	27
05.05 BATHROOM	-	100	-	26
05.05	-	100	-	40
05.06 BATHROOM	-	100	-	28
05.26	-	100	-	41
05.26 BATHROOM	-	100	-	32
05.27 BATHROOM	-	100	-	29
05.27	-	100	-	42
05.28	-	100	-	35
05.01	-	100	-	41
05.06	-	100	-	29
05.07	-	100	-	49
05.07 BATHROOM	-	100	-	24
06.07 BATHROOM	-	100	-	30
LOUNGE/WORKSPACE	34	-	-	630
06.08 BATHROOM	-	100	-	25
05.16 BATHROOM	-	100	-	25
05.17	-	100	-	45

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
05.16	-	100	-	40
05.20	-	100	-	45
05.18 BATHROOM	-	100	-	30
05.19 BATHROOM	-	100	-	24
05.19	-	100	-	42
06.11	-	100	-	37
06.12	-	100	-	41
06.09 BATHROOM	-	100	-	25
06.10 BATHROOM	-	100	-	25
06.09	-	100	-	39
06.11 BATHROOM	-	100	-	25
06.07	-	100	-	37
06.14 BATHROOM	-	100	-	25
06.17	-	100	-	37
06.12 BATHROOM	-	100	-	25
PLANT	30	-	-	331
STAIRS	-	80	-	48
06.21 BATHROOM	-	100	-	27
06.20	-	100	-	33
06.19	-	100	-	56
06.20 BATHROOM	-	100	-	28
06 CIRCULATION 1	-	96	-	206
06.13 BATHROOM	-	100	-	25
06.21	-	100	-	46
STAIRS	-	80	-	52
07.01	-	100	-	56
06.14	-	100	-	40
06.15 BATHROOM	-	100	-	25
B1.20 BATHROOM	-	100	-	30
06.16 BATHROOM	-	100	-	25
B1.20	-	100	-	38
06.17 BATHROOM	-	100	-	26
B1.19	-	100	-	42
B1.19 BATHROOM	-	100	-	31
06.18 BATHROOM	-	100	-	40
B1.17 BATHROOM	-	100	-	30
B1.15 BATHROOM	-	100	-	27
B1.18 BATHROOM	-	100	-	31
B1.18	-	100	-	45
STAIRS	-	80	-	71
B1.14 BATHROOM	-	100	-	30
B1.14	-	100	-	47
04.07	-	100	-	47

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
06.08	-	100	-	36
B1.12 BATHROOM	-	100	-	31
06.10	-	100	-	37
B1.12	-	100	-	46
B1.11 BATHROOM	-	100	-	30
B1.11	-	100	-	46
B1.13	-	100	-	47
B1.09 BATHROOM	-	100	-	30
B1.10 BATHROOM	-	100	-	30
B1.09	-	100	-	46
B1.13 BATHROOM	-	100	-	31
B1.07	-	100	-	44
B1.07 BATHROOM	-	100	-	36
STAIRS	-	80	-	47
STAIRS	-	80	-	56
05.09	-	100	-	43
05.10	-	100	-	44
05.13	-	100	-	43
05.14	-	100	-	43
06.22	-	100	-	41
06.22 BATHROOM	-	100	-	26
06.23 BATHROOM	-	100	-	26
06.23	-	100	-	40
06.24 BATHROOM	-	100	-	26
06.24	-	100	-	40
06.01 BATHROOM	-	100	-	27
06.25 BATHROOM	-	100	-	26
06.25	-	100	-	42
06.02 BATHROOM	-	100	-	26
06.02	-	100	-	42
06.03 BATHROOM	-	100	-	27
06.03	-	100	-	40
06.04	-	100	-	40
06.04 BATHROOM	-	100	-	27
06.05 BATHROOM	-	100	-	26
06.05	-	100	-	40
06 KITCHEN	-	90	-	105
06.06 BATHROOM	-	100	-	28
06.01	-	100	-	41
06.06	-	100	-	29
06.13	-	100	-	40
06.15	-	100	-	38
06.16	-	100	-	38

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
06.18	-	100	-	59
06.19 BATHROOM	-	100	-	24
B1.06 BATHROOM	-	100	-	38
B1.06 SEPARATE BEDROOM 3	-	100	-	20
B1.06 SEPARATE BEDROOM 2	-	100	-	22
06.20 MEZZANINE	-	100	-	42
06.21 MEZZANINE	-	100	-	26
CHECK IN/CONCIERGE	34	-	-	688
00.17	-	100	-	54
00.14 BATHROOM	-	100	-	39
01.07	-	100	-	49
00.12	-	100	-	48
00 CIRCULATION 1	-	96	-	114
00.13	-	100	-	68
00.04	-	100	-	57
00.05	-	100	-	35
00.06 BATHROOM	-	100	-	39
00.09 BATHROOM	-	100	-	38
00.08 BATHROOM	-	100	-	39
00 CIRCULATION 2	-	96	-	392
00.10	-	100	-	44
00.11 BATHROOM	-	100	-	47
STAIRS	-	80	-	121
00.03	-	100	-	39
00.01 BATHROOM	-	100	-	22
00.15 BATHROOM	-	100	-	42
WAITING AREA	34	-	-	579
REFUSE DELIVERY	72	-	-	103
AWC	-	100	-	40
ENTRANCE LOBBY	-	90	15	2134
WC	-	100	-	55
00.15	-	100	-	41
01.05 BATHROOM	-	100	-	21
00.19	-	100	-	64
CIRCULATION	-	96	-	90
DELIVERIES/HOLDING	72	-	-	70
STORE	72	-	-	6
LINEN CHUTE	72	-	-	6
01.11 BATHROOM	-	100	-	34
KITCHEN	-	90	-	539
STORE	72	-	-	9
PRIVATE DINING/FUNCTION ROOM	-	90	15	329
MEETING ROOM/PRIVATE DINING 02	-	90	15	243

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
00.04 BATHROOM	-	100	-	39
STAIRS	-	80	-	73
MEETING ROOM/PRIVATE DINING 01	-	90	15	239
00.07	-	100	-	45
LIBRARY	23	-	-	982
POST ROOM	72	-	-	34
01.09 BATHROOM	-	100	-	23
01.10	-	100	-	38
01.15	-	100	-	36
01.13	-	100	-	36
01.18 BATHROOM	-	100	-	22
01.12 BATHROOM	-	100	-	22
01.22 BATHROOM	-	100	-	23
01.20 BATHROOM	-	100	-	22
STAIRS	-	80	-	83
01.23	-	100	-	41
01.27 BATHROOM	-	100	-	22
01.24 BATHROOM	-	100	-	30
01.33	-	100	-	46
01.26 BATHROOM	-	100	-	23
01.29 BATHROOM	-	100	-	24
01.30	-	100	-	36
01.32 BATHROOM	-	100	-	25
01.37 BATHROOM	-	100	-	22
01 CORE CIRCULATION	-	96	-	75
STAIRS	-	80	-	68
01 CIRCULATION 6	-	96	-	214
01 CIRCULATION 5	-	96	-	189
01 CIRCULATION 1	-	96	-	156
01 CIRCULATION 4	-	96	-	198
01 CIRCULATION 3	-	96	-	167
01 CIRCULATION 2	-	96	-	142
01.36 BATHROOM	-	100	-	23
01.08	-	100	-	19
REFUSE	72	-	-	5
STAIRS	-	80	-	48
00.01	-	100	-	47
00.02	-	100	-	47
03.38 BATHROOM	-	100	-	28
03.38	-	100	-	41
03.39 BATHROOM	-	100	-	28
03.39	-	100	-	41
03.40 BATHROOM	-	100	-	28

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
03.40	-	100	-	43
03.03 BATHROOM	-	100	-	29
03.02 BATHROOM	-	100	-	28
03.04	-	100	-	41
03.02	-	100	-	43
03.03	-	100	-	41
03.04 BATHROOM	-	100	-	28
03.05 BATHROOM	-	100	-	28
03.05	-	100	-	41
04.28	-	100	-	35
B1.16 BATHROOM	-	100	-	30
B1.17	-	100	-	47
B1.16	-	100	-	45
B1.08 BATHROOM	-	100	-	31
B1.15	-	100	-	54
B1.10	-	100	-	43
B1.08	-	100	-	43
BS 1 REFUGE	72	-	-	10
RELAXATION POOL AREA	-	100	-	560
REFUGE	72	-	-	9
MALE CHANGING WC	-	100	-	34
STEAM ROOM	-	64	-	78
STAIRS	-	80	-	65
FEMALE CHANGING WC	-	100	-	38
MALE CHANGING CIRCULATION AREA	-	90	-	212
BS1 CORE CIRCULATION	-	96	-	116
TREATMENT ROOM 01	38	-	-	357
YOGA STUDIO	-	64	-	171
GYM	-	64	-	357
TREATMENT ROOM 02	38	-	-	357
DELIVERIES	72	-	-	38
BS1 BOH CIRCULATION	-	96	-	181
BS1 STORE	72	-	-	26
BS1 STORE	72	-	-	11
BS1 CL. ST	72	-	-	11
BS1 CELLAR	72	-	-	11
BS1 STORE	72	-	-	12
BS1 BOOTH SEATING	72	-	-	12
BS1 BOOTH SEATING	72	-	-	12
BS1 BOOTH SEATING	72	-	-	12
BOOTH SEATING	72	-	-	14
B1.03 SEPARATE BEDROOM 1	-	100	-	16
B1.01	-	100	-	76

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
B1.21 BATHROOM	-	100	-	33
BS1 CL. ST	72	-	-	24
BOOTH SEATING	72	-	-	13
B1.02 SEPARATE BEDROOM 2	-	100	-	16
B1.01 BATHROOM	-	100	-	30
B1.02 SEPARATE BEDROOM 1	-	100	-	16
B1.02 SEPARATE BEDROOM 3	-	100	-	23
B1.03 SEPARATE BEDROOM 2	-	100	-	16
B1.02	-	100	-	34
B1.02 BATHROOM 2	-	100	-	30
B1.02 BATHROOM 1	-	100	-	35
B1.04 SEPARATE BEDROOM 1	-	100	-	16
B1.03 BATHROOM 2	-	100	-	30
B1.03 BATHROOM 1	-	100	-	35
B1.03 SEPARATE BEDROOM 3	-	100	-	23
B1.04 SEPARATE BEDROOM 2	-	100	-	16
B1.03	-	100	-	35
B1.06 SEPARATE BEDROOM 1	-	100	-	15
B1.04 BATHROOM 2	-	100	-	30
B1.04 BATHROOM 1	-	100	-	35
B1.04 SEPARATE BEDROOM 3	-	100	-	23
B1.05 SEPARATE BEDROOM 2	-	100	-	16
B1.04	-	100	-	35
B1.05 BATHROOM 2	-	100	-	30
B1.05 BATHROOM 1	-	100	-	35
B1.05 SEPARATE BEDROOM 3	-	100	-	23
B1.05	-	100	-	35
B1.06	-	100	-	35
B1.05 SEPARATE BEDROOM 1	-	100	-	15
BS2. STAFF FACILITIES	34	-	-	722
BS2. ADMIN	34	-	-	506
BS2. STAFF FACILITIES	34	-	-	770
BS2 CIRCULATION	-	96	-	316
BS2. ADMIN	34	-	-	553
BS2 STAIRS	-	80	-	78
B1.21	-	100	-	59
BS2. PLANT	30	-	-	2262
BISTRO/COFFEE SHOP	-	90	15	1774
BS1 CIRCULATION	-	96	-	1018
02 CIRCULATION 6	-	96	-	214
02 CIRCULATION 5	-	96	-	189
02 CORE CIRCULATION	-	96	-	75
02 CIRCULATION 4	-	96	-	198

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
02 CIRCULATION 3	-	96	-	167
02 CIRCULATION 1	-	96	-	156
02 CIRCULATION 2	-	96	-	142
03 CIRCULATION 6	-	96	-	244
03 CIRCULATION 5	-	96	-	217
03 CORE CIRCULATION	-	96	-	86
03 CIRCULATION 4	-	96	-	216
03 CIRCULATION 3	-	96	-	190
03 CIRCULATION 1	-	96	-	175
03 CIRCULATION 2	-	96	-	162
04 CIRCULATION 6	-	96	-	184
04 CIRCULATION 5	-	96	-	182
05 CIRCULATION 4	-	96	-	209
04 CIRCULATION 4	-	96	-	205
04 CIRCULATION 3	-	96	-	159
04 CIRCULATION 1	-	96	-	163
04 CIRCULATION 2	-	96	-	150
05 CIRCULATION 1	-	96	-	168
05 CIRCULATION 2	-	96	-	155
05 CIRCULATION 6	-	96	-	169
05 CIRCULATION 5	-	96	-	168
CIRCULATION	-	96	-	57
05 CIRCULATION 3	-	96	-	164
06 CIRCULATION 2	-	96	-	494
00 CIRCULATION 3	-	96	-	134
ADMIN/SECURITY	34	-	-	354
FEMALE WC's	-	100	-	170
FEMALE CHANGING SHOWER CUBICLES	-	90	-	95
FEMALE CHANGING CIRCULATION AREA	-	90	-	218
MALE CHANGING SHOWER CUBICLES	-	90	-	72
MALE WC'S	-	100	-	114
MEMBERS BAR	-	90	15	819
PLANT	30	-	-	453
REFUSE	72	-	-	5
REFUSE	72	-	-	5
REFUSE	72	-	-	5
REFUSE	72	-	-	5
REFUSE	72	-	-	5
SCREENING	34	-	-	726
SAUNA	-	64	-	83
SPA RECEPTION/LOUNGE	-	90	15	919
STAIRS	-	80	-	111
02.09 BATHROOM	-	100	-	28

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
STAIRS	-	80	-	68
STAIRS	-	80	-	48
STAIRS	-	80	-	74
STAIRS	-	80	-	54
STAIRS	-	80	-	52
STAIRS	-	80	-	51
STAIRS	-	80	-	67

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00.08	NO (-86.8%)	NO
00.09	NO (-91.6%)	NO
00.11	NO (-79.9%)	NO
00.14	NO (-90.2%)	NO
00.18	NO (-93%)	NO
00.16	NO (-85.2%)	NO
00.06	NO (-76%)	NO
01.38	NO (-42.1%)	NO
01.06	NO (-49.7%)	NO
01.04	NO (-42.5%)	NO
01.32	NO (-85.4%)	NO
01.29	NO (-88.5%)	NO
01.27	NO (-95.1%)	NO
01.31	NO (-90.4%)	NO
01.25	NO (-87.9%)	NO
01.26	NO (-87.9%)	NO
01.22	N/A	N/A
01.21	N/A	N/A
01.19	N/A	N/A
01.18	N/A	N/A
01.16	NO (-87.9%)	NO
01.17	NO (-87.7%)	NO
01.14	NO (-87.4%)	NO
01.09	NO (-85.6%)	NO
01.11	NO (-95.8%)	NO
01.12	NO (-94.4%)	NO
01.20	N/A	N/A
01.24	NO (-94.2%)	NO
01.28	NO (-86.6%)	NO
01.33 MEZZANINE	NO (-85.7%)	NO
01.36	NO (-41.5%)	NO
01.35	NO (-55.6%)	NO
01.37	NO (-42%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
01.34 MEZZANINE	NO (-95.6%)	NO
01.39	NO (-42.4%)	NO
01.01	NO (-44.1%)	NO
01.02	NO (-54.6%)	NO
01.03	NO (-44.7%)	NO
01.05	NO (-42.2%)	NO
01.35 MEZZANINE	NO (-71.2%)	NO
01.36 BEDROOM 3	NO (-76%)	NO
03.34	NO (-80.8%)	NO
02.10	N/A	N/A
01.37 BEDROOM 3	NO (-68.3%)	NO
02.27	NO (-98%)	NO
02.26	NO (-84.8%)	NO
02.01	NO (-88.9%)	NO
02.03	NO (-93.2%)	NO
02.04	NO (-87%)	NO
02.06	NO (-95%)	NO
02.02	NO (-88.3%)	NO
02.08	NO (-87.9%)	NO
02.07	NO (-87.9%)	NO
02.12	NO (-87.8%)	NO
02.13	NO (-88%)	NO
02.15	NO (-84.1%)	NO
02.16	NO (-93.3%)	NO
02.17	NO (-87.7%)	NO
02.18	NO (-87.9%)	NO
02.20	NO (-85.4%)	NO
02.21	NO (-83.6%)	NO
02.25	NO (-83.8%)	NO
02.23	NO (-95.3%)	NO
02.22	NO (-93.3%)	NO
02.24	NO (-92.9%)	NO
02.19	NO (-93.4%)	NO
02.14	NO (-93.4%)	NO
03.37	NO (-58%)	NO
02.11	NO (-89.9%)	NO
02.09	NO (-92.9%)	NO
02.05	NO (-85.7%)	NO
01.06	NO (-66.1%)	NO
01.05 BEDROOM 3	NO (-69.5%)	NO
01.05 BEDROOM 2	NO (-75.4%)	NO
01.04 BEDROOM 3	NO (-75.2%)	NO
01.03 BEDROOM 2	NO (-75.9%)	NO
01.03 BEDROOM 3	NO (-70.9%)	NO
01.02 BEDROOM 3	NO (-82.8%)	NO
01.02 BEDROOM 2	NO (-75.5%)	NO
01.01 BEDROOM 2	NO (-74.5%)	NO
01.39 BEDROOM 2	NO (-72.1%)	NO
01.39 BEDROOM 3	NO (-74.9%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
01.38 BEDROOM 2	NO (-70.2%)	NO
01.01 BEDROOM 3	NO (-78.2%)	NO
01.38 BEDROOM 3	NO (-74.1%)	NO
01.36 BEDROOM 2	NO (-67%)	NO
01.04 BEDROOM 2	NO (-70.3%)	NO
01.37 BEDROOM 2	NO (-76%)	NO
03.01	NO (-58.7%)	NO
03.06	NO (-67.9%)	NO
03.35	NO (-71%)	NO
01.34	NO (-62.8%)	NO
03.36	NO (-71.3%)	NO
03.07	NO (-97.1%)	NO
03.08	NO (-79.3%)	NO
03.33	NO (-86.5%)	NO
03.31	NO (-90.7%)	NO
03.30	NO (-83.4%)	NO
03.28	NO (-94%)	NO
03.32	NO (-87.2%)	NO
03.26	NO (-86.8%)	NO
03.27	NO (-86.8%)	NO
03.22	NO (-86.7%)	NO
03.21	NO (-86.9%)	NO
03.19	NO (-80.2%)	NO
03.18	NO (-92.1%)	NO
03.17	NO (-86.5%)	NO
03.16	NO (-86.8%)	NO
03.14	NO (-81.3%)	NO
03.13	NO (-80.1%)	NO
03.09	NO (-77.3%)	NO
03.11	NO (-92.9%)	NO
03.12	NO (-92.1%)	NO
03.10	NO (-87.5%)	NO
03.15	NO (-90.6%)	NO
03.20	NO (-90.3%)	NO
03.23	NO (-87.7%)	NO
03.29	NO (-83.6%)	NO
03.25	NO (-89.8%)	NO
03.24	N/A	N/A
04.25	NO (-86.5%)	NO
04.23	NO (-89.5%)	NO
04.22	NO (-81.6%)	NO
04.24	NO (-87.2%)	NO
04.15	NO (-83%)	NO
04.12	NO (-79.8%)	NO
04.11	NO (-81.5%)	NO
04.08	NO (-76.3%)	NO
04.21	NO (-80.7%)	NO
04.18	N/A	N/A
04.29	NO (-66.3%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
04.30	NO (-64.2%)	NO
04.31	NO (-65.4%)	NO
04.32	NO (-65.4%)	NO
04.02	NO (-75.8%)	NO
04.03	NO (-74.8%)	NO
04.04	NO (-65.2%)	NO
04.05	NO (-65.1%)	NO
04.26	NO (-80.5%)	NO
04.27	NO (-72.8%)	NO
04.01	NO (-77.9%)	NO
04.06	NO (-76.5%)	NO
04.09	NO (-90.3%)	NO
04.10	NO (-90.8%)	NO
04.13	NO (-90.3%)	NO
04.14	NO (-90.6%)	NO
04.16	NO (-90.3%)	NO
04.17	NO (-88.5%)	NO
04.20	NO (-91.3%)	NO
04.19	NO (-90.9%)	NO
05.25	NO (-86.4%)	NO
05.23	NO (-84.4%)	NO
05.22	NO (-77.6%)	NO
05.24	NO (-87.1%)	NO
05.15	NO (-78.8%)	NO
05.12	NO (-73.1%)	NO
05.11	NO (-76.3%)	NO
05.08	NO (-71.5%)	NO
05.21	NO (-74%)	NO
05.18	N/A	N/A
05.29	NO (-70%)	NO
05.30	NO (-68.5%)	NO
05.31	NO (-69.2%)	NO
05.32	NO (-69.1%)	NO
05.02	NO (-78.6%)	NO
05.03	NO (-77.6%)	NO
05.04	NO (-69.1%)	NO
05.05	NO (-69%)	NO
05.26	NO (-80.2%)	NO
05.27	NO (-73.5%)	NO
05.28	NO (-82.9%)	NO
05.01	NO (-80.3%)	NO
05.06	NO (-79%)	NO
05.07	NO (-87.1%)	NO
LOUNGE/WORKSPACE	NO (-77.9%)	NO
05.17	NO (-87.1%)	NO
05.16	NO (-90.3%)	NO
05.20	NO (-91%)	NO
05.19	NO (-90.8%)	NO
06.11	NO (-76.4%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
06.12	NO (-79.1%)	NO
06.09	NO (-78.5%)	NO
06.07	NO (-82%)	NO
06.17	N/A	N/A
06.20	NO (-87.7%)	NO
06.19	NO (-76.6%)	NO
06.21	NO (-89.1%)	NO
07.01	NO (-85%)	NO
06.14	NO (-79.5%)	NO
B1.20	NO (-90%)	NO
B1.19	NO (-84.7%)	NO
B1.18	N/A	N/A
B1.14	N/A	N/A
04.07	NO (-86%)	NO
06.08	NO (-75.9%)	NO
06.10	NO (-76.4%)	NO
B1.12	NO (-95.8%)	NO
B1.11	NO (-88.2%)	NO
B1.13	N/A	N/A
B1.09	N/A	N/A
B1.07	NO (-94.1%)	NO
05.09	NO (-90.3%)	NO
05.10	NO (-90.8%)	NO
05.13	NO (-90.2%)	NO
05.14	NO (-90.5%)	NO
06.22	NO (-70.7%)	NO
06.23	NO (-69%)	NO
06.24	NO (-70.5%)	NO
06.25	NO (-70%)	NO
06.02	NO (-79.1%)	NO
06.03	NO (-78.2%)	NO
06.04	NO (-70.2%)	NO
06.05	NO (-70.1%)	NO
06.01	NO (-93.7%)	NO
06.06	NO (-93.2%)	NO
06.13	NO (-78.8%)	NO
06.15	NO (-78.1%)	NO
06.16	NO (-78.6%)	NO
06.18	NO (-87.1%)	NO
B1.06 SEPARATE BEDROOM 3	N/A	N/A
B1.06 SEPARATE BEDROOM 2	NO (-95.7%)	NO
06.20 MEZZANINE	NO (-87.2%)	NO
06.21 MEZZANINE	NO (-82.8%)	NO
CHECK IN/CONCIERGE	NO (-48.6%)	NO
00.17	NO (-86.7%)	NO
01.07	NO (-97.5%)	NO
00.12	NO (-90.5%)	NO
00.13	NO (-85.5%)	NO
00.04	NO (-93.4%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00.05	NO (-81.5%)	NO
00.10	NO (-79.3%)	NO
00.03	NO (-61.2%)	NO
WAITING AREA	N/A	N/A
ENTRANCE LOBBY	NO (-56.6%)	NO
00.15	NO (-71.7%)	NO
00.19	NO (-76.8%)	NO
PRIVATE DINING/FUNCTION ROOM	NO (-65.6%)	NO
MEETING ROOM/PRIVATE DINING 02	NO (-61.6%)	NO
MEETING ROOM/PRIVATE DINING 01	NO (-60%)	NO
00.07	NO (-83.2%)	NO
LIBRARY	NO (-67.5%)	NO
01.10	NO (-94.2%)	NO
01.15	NO (-94.6%)	NO
01.13	NO (-85.5%)	NO
01.23	NO (-91.1%)	NO
01.33	NO (-72.9%)	NO
01.30	NO (-94.4%)	NO
01.08	NO (-86.3%)	NO
00.01	NO (-73%)	NO
00.02	NO (-62.2%)	NO
03.38	NO (-56.8%)	NO
03.39	NO (-58.5%)	NO
03.40	NO (-58.5%)	NO
03.04	NO (-58.5%)	NO
03.02	NO (-71.6%)	NO
03.03	NO (-69.7%)	NO
03.05	NO (-58.1%)	NO
04.28	NO (-80.6%)	NO
B1.17	NO (-71.5%)	NO
B1.16	NO (-82.6%)	NO
B1.15	NO (-81.8%)	NO
B1.10	NO (-88%)	NO
B1.08	N/A	N/A
RELAXATION POOL AREA	NO (-81.9%)	NO
STEAM ROOM	N/A	N/A
TREATMENT ROOM 01	N/A	N/A
YOGA STUDIO	N/A	N/A
GYM	N/A	N/A
TREATMENT ROOM 02	N/A	N/A
B1.03 SEPARATE BEDROOM 1	N/A	N/A
B1.01	NO (-89.7%)	NO
B1.02 SEPARATE BEDROOM 2	N/A	N/A
B1.02 SEPARATE BEDROOM 1	N/A	N/A
B1.02 SEPARATE BEDROOM 3	N/A	N/A
B1.03 SEPARATE BEDROOM 2	N/A	N/A
B1.02	NO (-69.6%)	NO
B1.04 SEPARATE BEDROOM 1	N/A	N/A
B1.03 SEPARATE BEDROOM 3	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
B1.04 SEPARATE BEDROOM 2	N/A	N/A
B1.03	NO (-71.2%)	NO
B1.06 SEPARATE BEDROOM 1	NO (-90.8%)	NO
B1.04 SEPARATE BEDROOM 3	N/A	N/A
B1.05 SEPARATE BEDROOM 2	N/A	N/A
B1.04	NO (-69.3%)	NO
B1.05 SEPARATE BEDROOM 3	N/A	N/A
B1.05	NO (-69.2%)	NO
B1.06	NO (-79.7%)	NO
B1.05 SEPARATE BEDROOM 1	N/A	N/A
BS2. STAFF FACILITIES	N/A	N/A
BS2. ADMIN	N/A	N/A
BS2. STAFF FACILITIES	N/A	N/A
BS2. ADMIN	N/A	N/A
B1.21	NO (-91.4%)	NO
BISTRO/COFFEE SHOP	NO (-53.5%)	NO
ADMIN/SECURITY	NO (-50.1%)	NO
MEMBERS BAR	NO (-90.3%)	NO
SCREENING	NO (-86.3%)	NO
SAUNA	N/A	N/A
SPA RECEPTION/LOUNGE	N/A	N/A

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m^2]	11231.4	11231.4
External area [m^2]	12377.7	12377.7
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	8	3
Average conductance [W/K]	10530.8	0
Average U-value [W/m^2K]	0.85	0
Alpha value* [%]	10.21	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
	B1 Offices and Workshop businesses
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
100	**C1 Hotels**
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger terminals
	Others: Emergency services
	Others: Miscellaneous 24hr activities
	Others: Car Parks 24 hrs
	Others: Stand alone utility block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	7.19	7.19
Cooling	0.8	3.19
Auxiliary	3.89	4.37
Lighting	19.58	14.57
Hot water	41.7	74.23
Equipment*	29.72	29.72
TOTAL**	**73.17**	**103.55**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	181.85	109.68
Primary energy* [kWh/m^2]	222.38	309.96
Total emissions [kg/m^2]	37.6	52.4

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	327.7	18.8	15.2	0.9	2.5	5.98	5.93	3.4	8.35
	Notional	117.5	86.6	12.8	6.3	2.3	2.56	3.79	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	250.6	7.8	11.6	0.4	2.4	5.98	5.93	3.4	8.35
	Notional	97.5	59.2	10.6	4.3	2.3	2.56	3.79	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	200.6	7.5	9.3	0.4	2.4	5.98	5.93	3.4	8.35
	Notional	90.5	51	9.8	3.7	2.3	2.56	3.79	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	233.4	7.7	10.6	0.3	2.4	6.11	6.69	3.55	9.42
	Notional	106.3	47.1	11.5	3.5	2.3	2.56	3.79	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	73.8	3.4	2.7	0.2	2.4	7.65	5.96	3.42	8.39
	Notional	54.5	32.5	5.9	2.4	2.3	2.56	3.79	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	225.5	9.7	9.6	0.4	2.4	6.5	7.22	3.46	10.17
	Notional	82.4	32.6	8.9	2.4	2.3	2.56	3.79	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	191.8	91.7	7	4.3	5.8	7.65	5.96	3.42	8.39
	Notional	89.1	109.4	9.7	8	3.9	2.56	3.79	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	431	49.9	19.4	1.9	5.6	6.16	7.22	3.46	10.17
	Notional	149.4	93.5	16.2	6.9	4.6	2.56	3.79	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

Heat dem [MJ/m2] = Heating energy demand
Cool dem [MJ/m2] = Cooling energy demand
Heat con [kWh/m2] = Heating energy consumption
Cool con [kWh/m2] = Cooling energy consumption
Aux con [kWh/m2] = Auxiliary energy consumption
Heat SSEFF = Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER = Cooling system seasonal energy efficiency ratio
Heat gen SSEFF = Heating generator seasonal efficiency
Cool gen SSEER = Cooling generator seasonal energy efficiency ratio
ST = System type
HS = Heat source
HFT = Heating fuel type
CFT = Cooling fuel type

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.36	00000000:Surf[1]
Floor	0.2	0.7	00000000:Surf[0]
Roof	0.15	0.4	00000013:Surf[0]
Windows, roof windows, and rooflights	1.5	1.3	00000001:Surf[1]
Personnel doors	1.5	2.2	00000013:Surf[5]
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building

$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\text{-}Min}$ = Minimum individual element U-values [W/(m²K)]

* There might be more than one surface where the minimum U-value occurs.

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	7.5