



# Open Door

Transform buildings, treasure the past.

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案例征集入选者



RIBA 

 BRITISH  
COUNCIL

 OPEN  
DOOR  
Transform Buildings. Treasure The Past.

## **RIBA Open Door Submission**

### **Canongate Block 2**

#### **Project Description**

The Canongate project is a complex conservation and energy efficiency project, involving a large group of owners and support from a number of grant funders. It was a pilot project for the delivery of sensitive retrofit works within the Edinburgh World Heritage site, and as such faced significant scrutiny. The project centred around Block 2 of Basil Spence's Canongate Housing development, which is Category B listed.

We believe that this project represents an exemplar retrofit, and explores key themes that are increasingly relevant, to briefly summarise, we believe the specifics that make this project both unique and successful are:

- A collaborative and engaged approach to working with the owners throughout, this included monthly meetings and votes at key stages to make the process as open as possible whilst building an understanding of the building and its challenges within the group.
- An exemplar retrofit project which successfully tackles a hard-to-treat construction type, in particular the architectural intent of the original included expressed concrete elements at floors and around windows which presented major thermal bridging issues.
- A project where health and wellbeing were paramount, one of the key drivers for the project was to eradicate the mould and damp issues which plagued the building and improving the indoor air quality.
- A thoughtful conservation project of a listed building within a World Heritage site, the building is listed and a key example of Spence's unique contextual modernism. As such preservation of the aesthetic of the blocks was vital, through archive research and working with a specialist we were able to identify the original colour scheme of the building and reinstate this, through steps like this and replacing the uPVC windows that had replaced many of the original window units we were able to enhance the significance of the site whilst improving its performance.
- An evidence-based approach which demonstrates the benefits of collaborating with others, to adopt a fabric-first approach and address issues such as humidity we had to develop a comprehensive understanding of the existing fabric. We were able here to make use of our own expertise in building performance evaluation, as well as a multitude of specialists to develop a holistic and robust understanding of the existing building before beginning on our retrofit design.

Conservation and sustainability can both be quite siloed and specialist areas of practice. It is a rarity to see a project which can serve as an exemplar of both - something we as a practice would love to see more of. The retrofit of our existing housing stock over the coming years is an essential task, but it would be terrible if this was at the expense of the cherished architectural character and joy of our towns and cities. We have shown here that it is possible to make a dramatic difference to the energy efficiency of a building, whilst enhancing its architectural significance, and improving the health and comfort of its inhabitants. We believe that is something that should be celebrated.

On a larger scale it provides a valuable case study for the retrofit of our 20th century heritage. Our practice was selected for the project because of our balance of conservation and retrofit expertise and we believe that this produced a well balanced delivery of this project - achieving both the sensitive restoration of the external fabric whilst improving the lives of the people within it. By focussing equally on conservation principles and evidence-based whole-house retrofit, we feel the approach to the building is one which addresses all of its long-term issues and also makes it

safer, healthier, and easier to maintain in the future. The completed project ensures that the building and site will continue to be used as intended, enriching the lives for its occupants and protecting the significance of a conservation asset, and continuing to contribute to the World Heritage site.

## 英国皇家建筑师协会 Open Door 项目提交案例

### 修士门二区（Canongate Block 2）

#### 项目描述

修士门项目是一个建筑保护和能效提升项目，涉及到的业主数量庞大，收到了许多拨款和资助。同时，它也是一个在世界文化遗产之城爱丁堡进行的敏感区建筑修缮试点项目，因此面临着严格的审查。本次项目主要围绕由建筑师巴兹尔·斯宾塞（Basil Spence）设计的修士门住宅发展项目二区展开，该建筑群被列入B级建筑名录。

我们认为这个项目可以作为建筑修缮的典范，它探索了紧密相关的几项关键主题。简单总结来说，我们认为本项目的独特和成功之处表现在以下几个方面：

- 自始至终与业主进行合作、让业主参与项目。每月召开会议、关键阶段进行投票表决，以尽量保障整个过程的公开，使所有参与人员对建筑本身和项目具备的挑战有一定的了解。
- 面对棘手的建筑类型，成功解决各种问题。尤其是原始建筑在地板和窗户周围运用了混凝土构件，导致了严重的热桥问题。
- 将人们的健康和幸福感放在第一位。进行本项目的其中一个重要原因就是为了解决建筑物长期存在的发霉和潮湿问题，以及改善室内空气质量。
- 本次项目选择的建筑物是世界文化遗产之城内的一座受保护建筑，也是巴兹尔·斯宾塞（Basil Spence）先生独特的现代主义风格的典范，因而意义深远。保留街区的美感至关重要。通过对档案资料进行研究，以及与专家的合作，我们确定了建筑物的原始配色方案并将其复原。另外，之前很多原始的窗户被替换为UPVC窗户，我们对这些UPVC窗户也做了更换，从而在提升性能的同时也提升了其重要性。
- 采取基于实例的方案，展现了与他人合作的积极作用，以构造结构优先来解决潮湿问题，我们必须先全面了解现有的结构。在开始进行修缮设计之前，我们利用自身在建筑性能评估方面的经验，和众多专家一同对原有建筑进行了全面深入的了解。

建筑保护和可持续性设计都是需要专业操作的实践领域，通常难以兼容。一个项目同时作为两方面典范实属罕见——我们期望看到更多这样的项目。未来几年内肯定需要对现有的住房进行修缮，但我们不能以毁坏珍贵的建筑、剥夺城市带给我们的欢乐为代价。本次项目展示了我们有能力，改善一座建筑的能效、同时提升其建筑意义、改善居民的健康和舒适度，这点值得庆祝的。

从更广泛的意义来说，本次项目为20世纪建筑遗产的修缮提供了有价值的研究案例。之所以能被选中参与该项目，是因为我们对于建筑保护和修缮两方面专业知识的平衡掌握，这也使得本项目在这两点上实现了平衡——对于敏感的外部结构进行修复的同时，也改善了建筑物内居民的生活。通过同等重视保护原则和基于实例的整体房屋修缮，我们认为该建筑的修缮方式要既能解决长期存在的问题，又能使其在未来更安全、更健康、更易于维护。完成的项目确保了建筑物会继续发挥以往的使用价值、丰富其居住者的生活、延续其作为被保护建筑的重要性，继续为世界遗产地做出贡献。

## **RIBA Open Door Submission**

### **Canongate Block 2**

#### **Project team**

##### *Core –*

Project architect:	John Gilbert Architects
Structural engineer:	David Narro Associates
Services / fire engineer:	Atelier10
Quantity Surveyor:	NBM Construction Cost Consultants
Principal designer advisor:	CDM Scotland

##### *Consultants –*

Wall tie / borescope survey:	Stanger
Concrete specialist:	Gray Concrete
Materials analysis:	Scottish Lime Centre
Acoustic surveyor:	New Acoustics
Thermographic survey:	IRT
Airtightness / smoke test:	Thermal Image UK
Ventilation / air flow model:	Energy Systems Research Unit (ESRU) - University of Strathclyde
Wufi calculations:	Greenguage
Asbestos survey:	CDM Scotland
Paint specialist:	Fiona McLachlan - University of Edinburgh ESALA
Conservation statement:	Simpson & Brown

#### **John Gilbert Architects Team**

Project lead / conservation architect:	Scott Abercrombie
Building performance analyst:	Barbara Lantschner
Site architect:	Hugo Target
Conservation consultant:	John Gilbert



# Canongate Block 2

RIBA Open Door





# Project Overview

- Constructed 1969, design by Sir Basil Spence, Glover and Ferguson.
- Pilot project focusses on Block 2
- Category B listed building within the Edinburgh World Heritage Site
- Mix of 12 residential units and 2 commercial units
- Original construction of concrete frame with uninsulated cavity brick and stone wall
- The owners of the block formed the client group and were supported by Edinburgh World Heritage
- Project cost of £700k, funding from 2no energy efficiency funds, 1no conservation funding programme and owners contributions



Pre-works photo 2018



Pre-works photo 2018



Block layout



Post-works 2021



Typical floor plan



# Issues

- Fabric issues included spalling concrete, failing render, missing wall ties, single-glazed windows with rotting frames, surface condensation, and high-levels of asbestos use
- Environmental issues included poor indoor air quality, a relatively air-tight construction with no ventilation, damp and mould growth throughout affecting the comfort and health of residents and high running costs.
- Conservation issues included the original colour scheme being lost, over 50% of windows replaced with uPVC units and poor quality patch repairs to board-marked concrete.



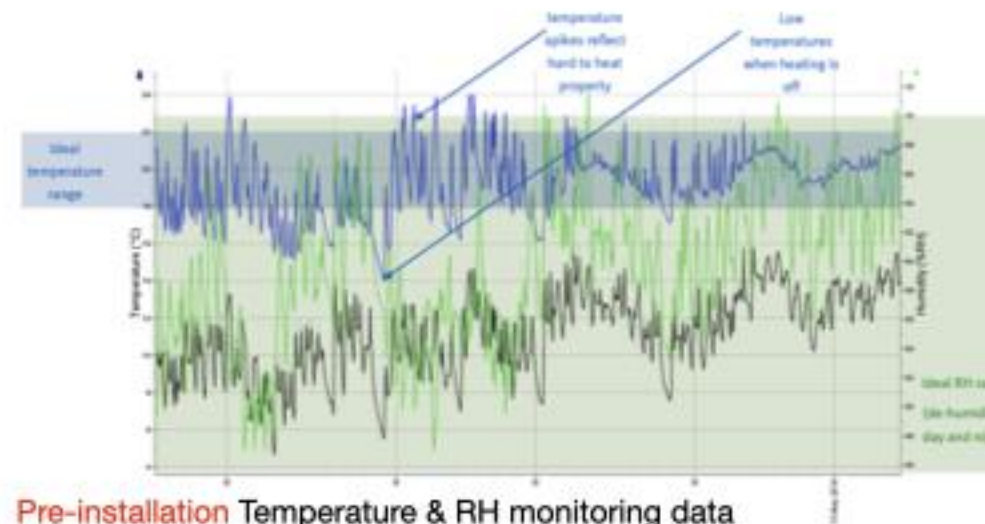
Mould occurring along a thermal bridge



Draught excluders at doors & windows



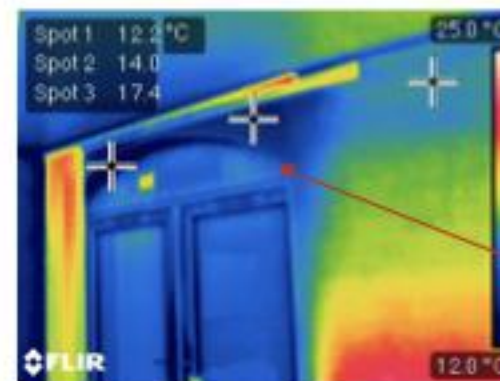
Single glazing condensate rotting frames



Pre-installation Temperature & RH monitoring data

Address	Air Permeability (Average) m <sup>3</sup> /h/m <sup>2</sup>	Air Permeability (Negative Test) m <sup>3</sup> /h/m <sup>2</sup>	Air Permeability (Positive Test) m <sup>3</sup> /h/m <sup>2</sup>	Air Changes per Hour (Average) ACH	Air Changes per Hour (Negative Test) ACH	Air Changes per Hour (Positive Test) ACH
73/6 Canongate	5.12	5.20	5.04	6.65	6.76	6.55
2/3 Brown's Close	3.02	3.05	3.00	3.90	3.94	3.87
2/2 Brown's Close	5.36	5.26	5.45	7.32	7.19	7.45

Pre-installation air-tightness testing results

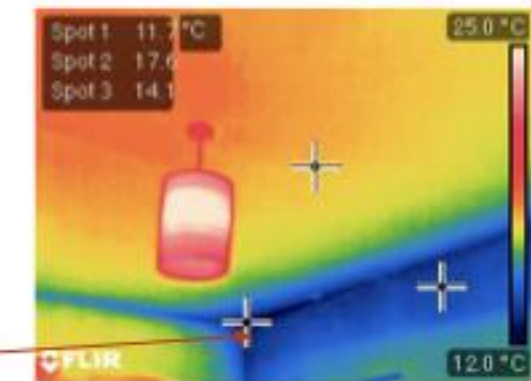
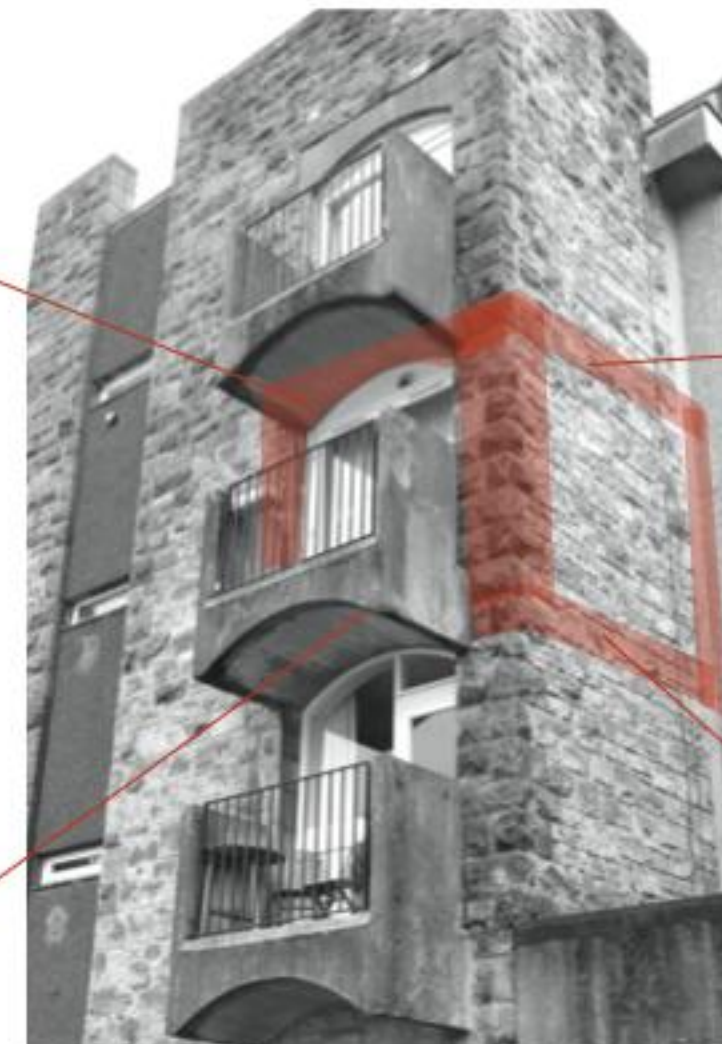


Concentrated areas of heat loss are shown in dark blue due to the presence of thermal bridging through the concrete balconies.

Evidence of regions of cold air ingress around windows is also visible in the image below.

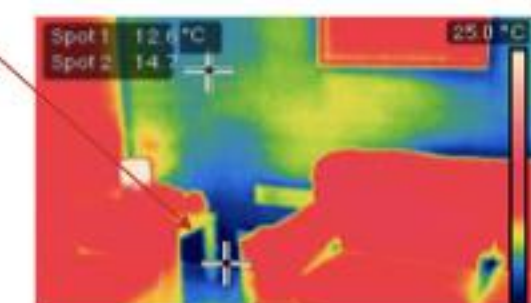


Pre-installation Thermographic Analysis



The cold spot at the ceiling to wall junction shows temperatures below 12°C which might lead to surface condensation.

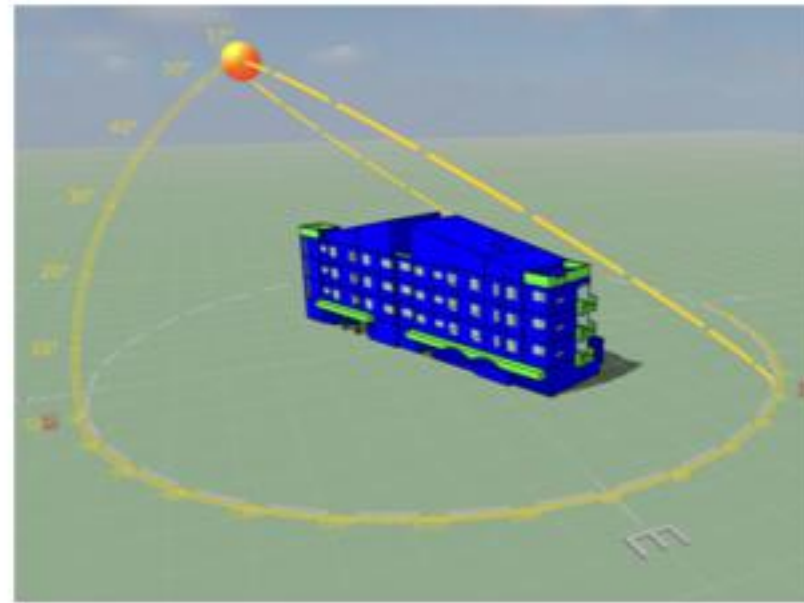
Cold air within the cavity leads to heterogeneous patterns and relatively low surface temperature shown in green and blue colours.



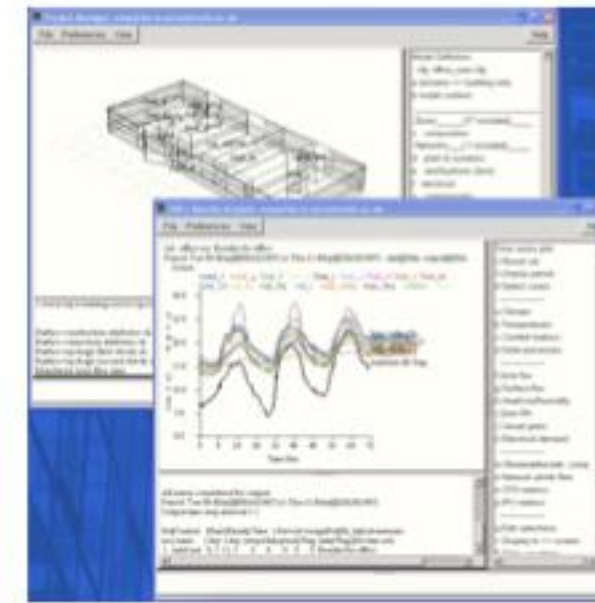


# Method

- The first phase of the project involved gathering as much knowledge about the building as we could, including archive research, a suite of in-situ Building Performance Evaluation studies and materials analysis
- The second phase involved designing the retrofit, working closely with the owners including monthly presentations on progress, and ensuring the owners had final say on the measures selected through regular votes
- The third phase involved pre-site testing, for the retrofit measures this included commissioning a ventilation model and dynamic thermal modelling of the full block, hygrothermal simulations to assess the specification of cavity wall insulation and trials of the complex concrete repairs for the conservation work.
- The fourth phase was delivery on site where JGA served as both architects and clerk of works, steering the project through the pandemic to see it delivered within the funding budget.
- The fifth phase includes Post Occupancy Evaluation which is currently underway, and hopefully future phases with neighbouring blocks that form part of the wider development - one of whom has already commissioned the team to prepare a feasibility study.



IES model developed by Atelier10



ESP-r ventilation model developed by ESRU at University of Strathclyde



Existing in-situ U-value monitoring: Point 1 = 1.6 and 2 = 2.2W/m<sup>2</sup>K



Boroscope surveys being undertaken to cavity brick/stone wall (above)  
Archive drawing: Precast concrete window surrounds (Right)



copyright Canmore  
Archive drawings / research



Round table meeting with owners



Workshop with Grey Concrete, to establish best bonding methods between old and new concrete



# Measures

- Ventilation: centralised MVHR units installed to all properties, including associated works such as concealing ductwork, forming undercuts to doors
- Windows: Replacement of existing windows with a mix of new double and triple glazed units to match the original designs, including air-tightness taping to perimeter
- Insulation: Cavity wall insulation generally, acoustic insulation to MVHR cupboards and a raised floor constructed in loft / drying room to accommodate insulation below
- Controls: Installation of smart controls for the new active systems
- External walls: Installation of remedial wall ties, repairs to cement harling, repointing to stonework, repainting to reinstate original colour scheme.
- Roofs: Renewal of roof finish and replacement of failing asbestos eaves boards.
- Concrete: Conservation repair of spalling concrete, including repairs replicating the original mix and board-marked shuttering



MVHR installed into an existing cupboard lined with wood wool, lowered ceilings in halls to conceal ducts

Replacement window and door screens installed



User friendly MVHR and new heating controls

Cavity wall insulation



Repairs to cast in-situ concrete completed

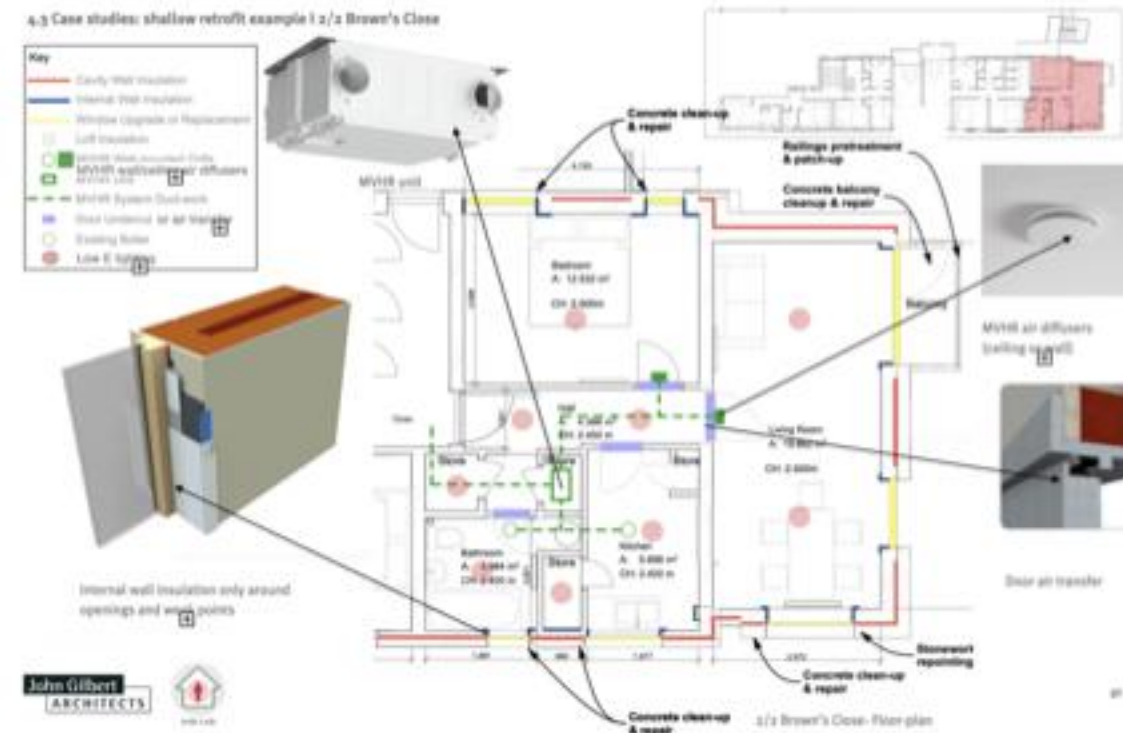


Repairs to render, repointing, and redecoration to match original colours



# Outcomes

- The significance of the building has been enhanced
- The indoor air quality and comfort conditions within the building has been improved
- Risks of surface condensation / mould growth / dampness affecting the integrity of the building fabric have been mitigated
- Owners / tenants energy bills have been reduced
- Improvement in wall u-value from 1.45W/m<sup>2</sup>K (average), to 0.33W/m<sup>2</sup>K.
- The operational carbon emissions of the building reduced by 46%
- Average reduction in primary energy for residential properties of 58%
- Properties now comply with Scottish Government 2032 energy-use targets for privately and social rented properties.



Typical flat plan



Completed images



Before / After

















## **John Gilbert Architects – Overview**

John Gilbert Architects is a Scottish design studio, passionate about designing places for people and the planet.

The practice is now 30 years old and has established a reputation for a commitment to the conservation of housing in Scotland and a commitment to sustainable design. In recent years that has seen the practice develop expertise in Passivhaus design for new-build, and in conservation and responsible retrofit practices for existing buildings.

We now employ 20 staff and work on projects across the UK, from the highlands and islands of Scotland to the South of England. As well as working on our own projects we are increasingly engaged as specialist consultants to deliver high-standards of conservation or energy efficiency on projects by other architects - this has allowed us to diversify the range of projects the practice is involved in to include schools, sports centres and town halls.

We were selected for the Canongate project for our joint specialisms in conservation and retrofit, making us the ideal fit for this complex project with the competing aims of improving the fabric efficiency of the block, without having a negative impact on its architectural significance.



## **Scott Abercrombie – Overview**

Scott Abercrombie is an associate director at John Gilbert Architects. He has overseen the growth of the conservation sector for the practice in recent years and helped to secure commissions including work on category-A listed properties such as the Gallery of Modern Art in Glasgow.

Scott is accredited in conservation by the RIBA and in interdisciplinary conservation by the IHBC. He fell for conservation once in practice and built his experience through being mentored by John Gilbert and enthusiastically engaging with heritage activity in Glasgow.

Scott is the former conservation committee convenor of the Glasgow Institute of Architects having held the post for three years, taking on the position at a time when the committee faced being lost, and building its numbers back up. He remains an active council member and trustee of the GIA.

He is currently the chair of The Alexander Thomson Society, a charity which promotes the work of the Victorian architect Alexander 'Greek' Thomson. His role also involves campaigning for the preservation of Thomson's work, most notably Egyptian Halls. His work encouraged the establishment of a new body, Save Egyptian Halls, led by Scottish Civic Trust, which aims to take on the building. Scott now serves as secretary for this new organisation.

John Gilbert Architects is renowned for its involvement in the repair and maintenance of tenements, and this was a passion instilled in Scott through working with John. Scott recently developed and launched a new service, the Tenement Toolbox, a fixed price tenement condition survey for private homeowners aimed at making seeking professional advice less intimidating and more affordable for owners.

Scott represents a young generation of conservation architects trying to establish a foothold in an area of the profession traditionally dominated by older architects. He was recently selected by the RIBA as one of their Rising Stars in architecture, the only Scottish, and conservation-focused, member of the 2021 cohort. He cares deeply about the preservation and future-proofing of Scotland's built heritage and has devoted his career thus far, as well as volunteering his own time, to this aim.

He has worked on a range of projects during his time in practice, from new-build housing through to post-war retrofit, but it is in the conservation of historic buildings that his career has focussed.

His most prominent completed project was the conservation and retrofit of Basil Spence's B-listed Canongate Housing in Edinburgh, which garnered significant attention and has been shortlisted for the AJ Retrofit awards as well as receiving a special commendation for conservation at the GIA awards. This £1m project restored the Spence's block, whilst also reducing the energy demand of the properties by 50%.

Scott is a prolific young architect who is passionate about the conservation and sustainable refurbishment of historic buildings, and he actively encourages others to share in that passion. Given the imperative to retain and reuse our built fabric, his skills and enthusiasm are incredibly relevant and important at this time.

英国皇家建筑师协会 Open Door 项目交稿  
修士门二区

项目团队

核心成员-

项目建筑师:	John Gilbert Architects (约翰·吉尔伯特建筑师事务所)
结构工程师:	David Narro Associates (大卫·纳罗咨询公司)
服务/消防工程师:	Atelier 10 环境设计咨询公司
工料测量师:	NBM Construction Cost (工程造价咨询公司)
首席设计师顾问:	CDM Scotland

顾问-

系墙铁/孔探检测:	Stanger (斯坦格检测公司)
混凝土专家:	Gray Concrete (格雷混凝土建筑公司)
材料分析:	Scottish Lime Centre (苏格兰石灰中心)
声学测试工程师:	New Acoustics (新声学咨询公司)
热成像检测:	IRT
气密性/烟雾检测:	Thermal Image UK 英国热成像检测公司
通风/气流模型:	斯特拉思克莱德大学能源系统研究组
WUFI计算:	Greenguage
石棉检测:	CDM Scotland
涂料专家:	Fiona McLachlan 爱丁堡大学建筑与景观建筑学院 (ESALA)
保护工程报告书:	Simpson & Brown (公司)

John Gilbert Architects Team (约翰·吉尔伯特建筑师事务所团队)

项目负责人/保护建筑师:	Scott Abercrombi
建筑性能分析师:	Barbara Lantschner
现场工程师:	Hugo Target
建筑保护顾问:	John Gilbert



## 约翰·吉尔伯特建筑师事务所概况

约翰·吉尔伯特建筑师事务所是一家苏格兰建筑设计事务所，热衷于设计公众人文场所。

事务所成立30年间，一直致力于苏格兰的房屋维护和可持续住宅设计，在该领域内享有盛誉。近年来，事务所在新建筑的被动式节能屋设计以及现有建筑的保护和修缮方面积累了专业技术。

公司现有20名员工，参与项目遍及英国各地，近至苏格兰高地和岛屿，远至英格兰南部。除本公司项目外，愈多为其他建筑师项目提供高标准维护或节能方面的咨询，因而获取了各类项目经验，包括学校、体育中心和市政厅等。

建筑维护和修缮的专业性让我们能够做到提升建筑结构效率的同时维护建筑的价值，项目契合度让我们中选参与修士门二区项目。

## Scott Abercrombie简介

斯科特·艾伯克龙比(Scott Abercrombie)是约翰·吉尔伯特建筑师事务所的副总监。最近几年来，作为事务所建筑保护部门主管负责承接如格拉斯哥现代艺术美术馆等A类建筑的修缮工作。

斯科特持有英国皇家建筑师协会(RIBA)的保护建筑师资格认证和历史建筑保护研究所(IHBC)的跨学科保护建筑师资格认证。基于项目实践，他燃起了对建筑保护的热爱，之后在约翰·吉尔伯特(John Gilbert)的指导下，以及格拉斯哥建筑遗产的项目工作，他积累了丰富的经验。

斯科特曾任苏格兰皇家建筑师协会(RIAS)格拉斯哥分会(GIA)的保护委员会会议召集人。他任职时正值委员会的困难时期，在就职的三年里委员会重现活力。如今他作为会员，仍担任格拉斯哥分会(GIA)的受托人。

斯科特同时兼任亚历山大·汤姆森协会(The Alexander Thomson Society)的主席。该协会为慈善机构，负责推广维多利亚时代建筑师亚历山大·格雷克·汤姆森(Alexander Greek Thomson)的作品。斯科特筹办各类建筑保护活动以维护汤姆森的建筑设计，其中一个保护重点就是埃及大楼(Egyptian halls)。在苏格兰公民信托组织的支持下，他主张成立了Save Egyptian Halls（埃及大楼维保会）并担任该机构的干事。

约翰·吉尔伯特建筑师事务所以房屋修缮和维护业务而闻名。在与约翰的合作中，斯科特对这一领域产生了浓厚的兴趣。他最近开发了一项新业务，“房屋工具箱”(the Tenement Toolbox)，按固定价格为私人业主调查房屋状况，以减轻大众在寻求专业建议时的心理和经济负担。

斯科特代表了保护建筑师的年轻一代，他们想在这片以往以资深建筑师为主导的专业领域里开展事业。斯科特最近被英国皇家建筑师协会(RIBA)评选为建筑新星，是2021年建筑新星中唯一来自苏格兰的建筑师，也是唯一一位专攻建筑保护的建筑师。他非常关心苏格兰建筑遗产的保护和未来适用性，从业以来为此投入了大量时间和精力。

斯科特曾参与新建住宅和战后住宅改造等多类型项目，但他最关注的依然是历史建筑保护。

他最得意的项目是修士门住宅的保护和修缮项目。该住宅群位于爱丁堡，由巴兹尔·斯宾塞(Basil Spence)设计，被列入B级建筑名录。这一项目受到了极大关注，入围了《建筑师杂志》改造奖(the AJ Retrofit Awards)，并被授予GIA保护奖特别奖。该项目耗资100万英镑，对修士门街区进行了修缮，同时将项目住宅的能源需求降低了50%。

斯科特作为经验丰富的年轻建筑师对历史建筑的修缮和可持续发展充满热情，积极地鼓励他人参与到这项事业中。本项目涉及建筑结构的保护和重新利用，斯科特的能力和热情在项目中发挥了重要作用。