

# Advanced Engineering Centre

Business Case (January 2015)



**University of Brighton**

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## 1 Executive Summary

- An Advanced Engineering Centre is to be created in Brighton to allow the expansion and enhancement of the partnership between Ricardo and the University of Brighton in the design and development of novel low carbon internal combustion engines.
- The existing facilities used by the Ricardo and the University are divided between Shoreham and Brighton and present limited scope for growth and enhancement. A central facility is required which will further enhance joint working, allow the installation of state of the art equipment, provide flexibility for future expansion and create opportunities for the cross transfer of knowledge, ideas and practices between the Ricardo and the University and within the interrelated academic activities of teaching and research.
- The region has a high concentration of higher value advanced engineering companies. Intervention is required to support advanced research and to meet the demand for specialist engineers required by advanced engineering companies in the region. Focussed investment is needed to respond to rapid changes in technology and intensive international competition – with the objective of maintaining the competitiveness of companies in the region.
- The central objective of the Centre is to advance the design and development of novel low carbon internal combustion systems, with the wider objectives of advancing technological knowledge and supporting the advanced training needs of the next generation of engineers.
- The Centre will generate around 30-35 additional research posts, plus 15 additional academic/technical engineering posts to support teaching and will deliver an additional 60 trained engineering graduates per annum into the local employment market. The Centre will increase employment space by 3,600 sqm and provide facilities which will be used to support research and training - but will also be made available for use by local engineering companies. Local companies will have access to state-of-the-art manufacturing facilities and to specialist expertise. Training and support will be readily accessible to local companies to increase skill levels in the workforce.
- The Centre directly addresses three of the strategic priorities which are central to the SEP – Successful Businesses, Build Competitive Advantage and Skills and Workforce.

The Centre will support business investment in the growth of manufacturing and create the conditions for enterprise to flourish by facilitating research in advanced engineering and providing access to state of the art facilities. The Centre focuses on an area – advanced automotive engineering – where the UK and region has a competitive advantage. The Centre will improve productivity through the creation and better use of higher skill levels in advanced engineering – and by supporting the development and expansion of the provision of university undergraduate and postgraduate student places in engineering and related academic subject areas.

Employees of Ricardo and other companies using the Centre will have access to business and management courses offered by the University. Graduates from the Centre will leave with skills directly relevant to the companies which participated in their training – a significant boost will be given to the transition of graduates to the workforce.

- Investment in new advanced facilities is necessary in order to maintain competitiveness in research and the training of engineers. Seeking to continue with existing and increasingly outmoded facilities is not an option. The ability to develop facilities within existing buildings is limited by structural constraints and inadequate services – effectively the only option to accommodate new advanced equipment and research facilities is the construction of a new building with the required services. The Centre would not achieve its objectives if it was entirely a University initiative – the involvement of Ricardo as a company at the forefront of advanced engineering is central to the delivery of its objectives and to the benefits which will arise from the Centre.
- The cost of the new Centre is £17.81m. This is to be funded from HEFCE STEM grant of £5m (the award of funding was confirmed in December 2014), University funding of £2m towards teaching facilities in the new building and £3.5m being spent on refurbishing engineering laboratories an

existing building; £7.0m from the Local Growth Fund and commercial funding of £0.31m to meet the cost of research facilities in the new building.

- The Advanced Engineering Centre is to combine teaching and research facilities. The new build element is to be located next to an existing building and running cost efficiencies will arise. It will be possible to increase student numbers to fund the additional costs associated with the teaching component of the building. The co-location with commercially funded research facilities provides further efficiencies and the benefit of an additional income stream – the value of contract research programmes undertaken in partnership with Ricardo is expected to exceed £3.9m per annum by 2020.
- The University is experienced in the development of new research and teaching buildings - in recent years it has constructed a new £24m biosciences building and is currently undertaking the £29m refurbishment of its main science and engineering building.
- Procurement of the consultant team by the University has been from recognised framework agreements, which has provided the University with OJEU compliant appointments - these have been pre-tendered and therefore appointments can be made in a much shorter timescale than having to undertake a full tendering process.
- The construction contract will be subject to a competitive tender process in accordance with EU guidelines. An OJEU advertisement was published on 24 January 2015 (see 2015/S 017-025835).
- As a new build project, development risks will arise – which include cost overruns and programme delays. The University has established mechanisms for managing these risks. The University benefits from a close working relationship with Brighton & Hove City Council's planning department and early consultation will be carried out to limit planning risks.
- The new building will be located on the University's Moulsecoomb campus, which is well established and has seen various building developments since it was opened in the early 1960s. The University has received the support of local stakeholders for previous developments. The Advanced Engineering Centre has support from Brighton and Hove City Council and more widely from local commercial and academic partners.
- A project board and stakeholder steering group already exists to oversee the on-going refurbishment of the main science and engineering building on the Moulsecoomb campus. A joint project board comprising senior representatives from the University and Ricardo has been established to oversee the research element of the Advanced Engineering Centre project.

## 2 Background

### 2.1 Ricardo

Ricardo is the leading specialist in combustion engine research in the UK. It specialises in the design and development of combustion engines. The company operates in all combustion engine markets including utility, motorcycle, passenger car, commercial vehicle, off-road, power generation, rail and marine applications.

The Shoreham Technical Centre is the head office of Ricardo and the largest of its international network of technical facilities. It is also the longest established, having been opened in 1919. Its engineering, design, development test and library and information facilities are amongst the most advanced in the global markets in which the company operates. The Shoreham Technical Centre currently has over 600 employees.



### 2.2 Commercial partnership

Since 1992 the University of Brighton has worked in strategic partnership with Ricardo UK Ltd in the field of internal combustion engineering research.

The partnership capitalises on the University's expertise in Laser diagnostic techniques and modelling to inform the design and development of novel low carbon internal combustion systems. These systems have a direct environmental impact by improving the fuel efficiency of vehicles and achieving a reduction in CO<sub>2</sub> emissions.

During the 1990s the partnership with Ricardo underpinned the establishment of the Centre for Automotive Engineering as part of the University of Brighton. Investment by Ricardo and the University resulted in the expansion of research facilities and creation of the Sir Harry Ricardo Research Laboratories. These laboratories operate as a secure facility and support joint projects between the University, Ricardo and third party automotive manufacturers (including BMW, Toyota and Chrysler) and petroleum companies (including BP and PETRONAS).

The growth of the University's research base during the late 1990s and early part of this century was accommodated within existing building by the release of laboratories no longer required for teaching, this reflected the decline in student recruitment to engineering courses. Over the last three years this trend had reversed and the University has seen a significant growth in the number of undergraduate engineers.

Students have been attracted to the University in part due to the research reputation of the Centre for Automotive Engineering.

The University now intends to expand and enhance the Internal Combustion Research Centre (approximately 600 sqm) to create, in partnership with Ricardo, a UK Centre of Excellence in Internal Combustion Research (approximately 2,500 sqm). Teaching will occupy approximately 1,100 sqm within a new building of 3,600 sqm.

The Advanced Engineering Centre will provide a dedicated joint research facility where University staff will work alongside Ricardo engineers to undertake fundamental research to assist with the design of the next generation of internal combustion engines. This both meets the strategic priorities of the UK Automotive Council and supports the training of the next generation of automotive design engineers.

### **2.3 Combustion systems research**

The University of Brighton has built a long-term 20 year relationship with Ricardo focused on combustion systems research and laser diagnostics. A leading research team has been assembled, together with advanced technical facilities. To meet the increasingly challenging efficiency and air quality requirements, a dedicated centre of excellence in combustion system diagnostics and optimisation is required. This will also support growth in advanced UK propulsion system manufacture.



The Advance Engineering Centre, based at the University of Brighton, will be jointly staffed by University researchers and Ricardo engineers.

The Centre will provide the opportunity to enhance and extend existing partnerships with:

- other leading combustion research groups and engine manufacturers in the UK;

- the key funding organisations such as Engineering and Physical Sciences Research Council (EPSRC), Technology Strategy Board (TSB) and the European R&D Framework programme;
- combustion engine manufacturers and suppliers; and
- the UK Automotive Council technology group.

The University and Ricardo UK Ltd have successfully maintained and grown the existing Automotive Engineering Research Centre over a 20 year period. This has been achieved through joint EPSRC, TSB and EU programmes, together with commercial research contracts with third parties.

New cutting-edge facilities (such as test rigs) are needed to provide capacity to meet continuing growth in the joint research base. Over a 5 year period the University group has been successful in gaining partnership grants worth over £18m.

Previous joint research projects resulted in Ricardo gaining engine development contracts valued at £15m in the first half of 2013 – this represents 22% of the overall engine contract income for the company in this period.

## 2.4 Research ratings

In the Research Assessment Exercise (RAE) 2008, 70% of the University's research in the Mechanical, Aeronautical and Manufacturing Engineering area of assessment was judged as 3\* level and above. RAE Quality profiles are as follows:

- 4\*** Quality that is world-leading in terms of originality, significance and rigour.
- 3\*** Quality that is internationally excellent in terms of originality, significance and rigour but which nonetheless falls short of the highest standards of excellence.
- 2\*** Quality that is recognised internationally in terms of originality, significance and rigour.
- 1\*** Quality that is recognised nationally in terms of originality, significance and rigour.

**Unclassified** Quality that falls below the standard of nationally recognised work. Or work which does not meet the published definition of research for the purposes of this assessment.

As a consequence of strategic investment between 2008 and 2014, the University has increased the number of staff submitted for assessment in the Research Excellence Framework (REF) 2014.

## 2.5 Research growth and funding

It is estimated that the ratio of Ricardo-based engineers to University staff working on joint programmes at any time is around 2:1. This corresponds to a total joint research staff base of around 30 full-time equivalent staff.

The University and Ricardo anticipate that this overall staff base will grow to between 60 and 100 staff over the next 5 to 10 years. This will achieve critical mass. Financial sustainability will be achieved through growth in contract research programmes, joint EPSRC projects, TSB projects and EU Horizon 2020 programmes.

The Centre will support both academic and industrial research activities, providing a dedicated facility for UK excellence in internal combustion technology and skills development.

### **3 Strategic Case**

#### **3.1 Business need**

An Advanced Engineering Centre is to be created in Brighton to allow the expansion and enhancement of the partnership between Ricardo and the University of Brighton in the design and development of novel low carbon internal combustion engines.

The existing facilities used by the Ricardo and the University are divided between Shoreham and Brighton and present limited scope for growth and enhancement. A central facility is required which will enable joint working, allow the installation of state of the art equipment, provide flexibility for future expansion and create opportunities for the cross transfer of knowledge, ideas and practices between the Ricardo and the University and within the interrelated academic activities of teaching and research.

The new Centre will enable University staff to work alongside Ricardo engineers to assist with the design of the next generation of internal combustion engines in line with the strategic priorities of the UK Automotive Council and support the development of future generations of automotive design engineers. These research facilities build on, and complement, the testing facilities already established by Ricardo in Shoreham within the Vehicle Emissions Research Centre.

The Centre will incorporate a suite of state-of-the-art engineering workshops for the training of the next generation of professional engineers. The increased supply of highly qualified design engineers will support regional growth in companies focussing on sustainable technologies and environmental engineering. Potential areas of employment in environmental engineering are identified as the proposed Rampion Wind Farm, local energy and waste recover facilities and retrofit engineering companies being supported through the Green Growth Platform.

The Advanced Engineering Centre will complement the Central Research Laboratory (CRL) to be provided as part of the Preston Barracks redevelopment. The CRL has secured funding from the Coast to Capital Local Enterprise Partnership and will provide high-tech manufacturing space for start-ups and SMEs. The Advanced Engineering Centre and the CRL will be located within a few minutes walking distance of each other. The combination of these two facilities, Along with the recently funded Digital Catapult, will create an innovation hub for the region and will establish the Moulsecoomb campus and adjoining Preston Barracks as drivers for technology led growth.

#### **3.2 The Project**

The project is to create an Advanced Engineering Centre located in new and refurbished accommodation on the University of Brighton's Moulsecoomb campus.

The Advanced Engineering Centre will occupy a new building of approximately 3,600 sqm connected to the University's Cockcroft building, which is currently undergoing a major refurbishment (due for completion early in the 2015-16 academic year).

The new build element of the project will be achieved rapidly, with building work commencing in June 2015 for completion in November 2016.

The cost of the new Centre is £17.81m. This is to be funded from HEFCE STEM grant of £5; University funding of £2m towards teaching facilities in the new building and £3.5m being spent on refurbishing engineering laboratories an existing building; £7.0m from the Local Growth Fund and commercial funding of £0.31m to meet the cost of research facilities in the new building. As the University has been successful in gaining HEFCE STEM funding, it has been possible to increase the size of the new building.

Matched funding will be leveraged from the University of Brighton, Ricardo and HEFCE for the project. The University will provide on-going investment of £0.2m per annum towards research infrastructure costs, a contribution of £2m towards the capital infrastructure investment and at least £2.5m investment in capital equipment. The facilities will also allow the University to leverage increasing contributions to the project from student fees from 2017 onwards - this will not be possible without the additional specialist engineering facilities which will be made available by the project.

Ricardo has agreed to provide capital equipment investment of £0.35m and recurrent investment in the facilities of £0.26m per annum. The project will also leverage an estimated £19.5m in research contracts to fund staff and equipment within the Centre over a six year period.



### 3.3 Objectives

The region has a high concentration of higher value advanced engineering companies. Intervention is required to support advanced research and to meet the demand for specialist engineers required by advanced engineering companies in the region. Focussed investment is needed to respond to rapid changes in technology and intensive international competition – with the objective of maintaining the competitiveness of companies in the region.

The central objective of the Centre is to advance the design and development of novel low carbon internal combustion systems, with the wider objectives of advancing technological knowledge and supporting the advanced training needs of the next generation of engineers.

The Centre will complement the recently established Vehicle Emission Research Centre at Ricardo. It is already anticipated that Master level training will be supported by a combination of the Vehicle Emission Research Centre and the Advanced Engineering Centre. Similarly, joint research will be supported by drawing on techniques developed at both sites.

The Centre is to create the capacity to increase the supply of graduate and postgraduate engineers. It is anticipated that 60 additional engineers will graduate each year and will be available to enter into jobs in the region. These engineers will have specialist training to support growth in advanced manufacture and the environmental technologies in the region.

The supply of highly qualified engineers will:

- support the up-skilling of the local workforce to meet the demands of growth in specialist engineering SMEs in the region, particularly in the growth hubs at Shoreham, Newhaven and Burgess Hill; and
- underpin the development of a local technopole for enhancing advanced capability in the automotive sector in the areas of vehicle electronics and engine performance linked to Ricardo.

Higher value jobs will be created which the Coast to Capital LEP and City Deal see as driving growth of future employment in the sub-region.



### **3.4 Outputs**

The Centre will generate around 30-35 additional research posts, plus 15 additional academic/technical engineering posts to support teaching and will deliver an additional 60 trained engineering graduates per annum into the local employment market. The Centre will increase employment space by 3,600 sqm and provide facilities which will be used to support research and training - which will also be made available for use by local engineering companies. Such use will include access to state-of-the-art manufacturing facilities and to specialist expertise. Training and support will be readily accessible to local companies to increase skill levels in the workforce.

Recent research from the Sutton Trust 2013 (The Postgraduate Premium) showed that postgraduates earn a premium of £200,000 over a working life when compared with graduates. A similar figure is given for the additional earnings of graduates over non-graduates. Furthermore, the premium is higher in the STEM subjects. This development will therefore add a minimum of £12m, and up to £24m, to the economic value of the earnings of the students.

### **3.5 Key Strategic Benefits**

The Centre directly addresses three of the strategic priorities which are central to the SEP – Successful Businesses, Build Competitive Advantage and Skills and Workforce.

The Centre will support business investment in growth and create the conditions for enterprise to flourish by facilitating research in advanced engineering and providing access to state of the art facilities. The Centre focuses on an area – advanced automotive engineering – where the UK and region has a competitive advantage.

Investment in new advanced facilities is necessary in order to maintain competitiveness in research and the training of engineers. Seeking to continue with existing and increasingly outmoded facilities is not an option. The ability to develop facilities within existing buildings is limited by structural constraints and inadequate services – effectively the only option to accommodate new advanced equipment and research facilities is the construction of a new building with the required services.

The Centre would not achieve its objectives if it was entirely a University initiative – the involvement of Ricardo as a company at the forefront of advanced engineering is central to the delivery of its objectives and to the benefits which will arise from the Centre.

The Coast to Capital Strategic Economic Plan identifies Environmental Technologies and Advanced Manufacturing Engineering as two of five priority sectors where the region has a competitive advantage. This proposal will develop a “nucleus of innovation” that links both these sectors. In the case of internal combustion research the partnership between the University and Ricardo has developed an international profile with global reach. The growth in this sector is recognised as key to export led growth and contributing to Brighton becoming a successful growth centre within the South East. Linked to the Smart Specialism, the complementary, internationally, recognised Vectronics Research Centre within the University which focuses on vehicle electronics provides the platform along with the Internal Combustions Engines Research Centre to develop ‘a regional science/technopole linked to established capability and the Industrial Strategy for Growth focused on automotive sector e.g. vehicle electronics and engine performance linked to Ricardo’. The project also meets the identified skills priorities within the Coast to Capital Strategic Economic Plan required to improve productivity and growth.

Within the City Deal proposal, University-business collaboration is seen as the main opportunity to harness the greatest return for the City region focussed on Growth Centres such as Preston Barracks (Lewes Road Corridor) with a technology driven focus which would provide links to the evidenced growth in environmental technologies in Shoreham, Newhaven and Burgess Hill Science Park.

The Centre will provide additional direct employment space expanding and enhancing the existing research facility from 600 sqm to approximately 2,500 sqm and indirectly through increasing the University's capacity (from 900 to 1,200 engineering students) to provide highly skilled and specialist engineers to underpin the regional growth in the ‘green’ sustainable technology and environmental engineering industries. The Centre will create additional investment and jobs in the University and Ricardo. Further investment and jobs will be created by the companies for which the Centre undertakes research and provides future employees.

The Centre will also augment the recently approved Marine and Environmental Engineering UTC in Newhaven. The Centre will provide opportunities for the further development of students from the UTC, through full-time or part-time study for higher level qualifications. The combination of skills in the Centre and UTC will assist adaption to climate change across the region.

### **3.6 Key Stakeholders and their roles and responsibilities**

The University of Brighton is the key stakeholder, working in partnership with Ricardo. The University will take full responsibility for the development, management and operation of the Advanced Engineering Centre. Ricardo is the key commercial partner. It will base staff at the Centre, provide equipment and fund, both directly and in partnership with others, research programmes.

### **3.7 Strategic options for delivery, risks and constraints**

A detailed analysis of strategic options for delivery is provided as part of the economic case and option appraisal.

The strategic options considered included continuing with existing partnership arrangements at current levels of activity, alternative partnership arrangements, expanding research without additional teaching facilities and expanding research in conjunction with increased student numbers. Strategic options cannot be entirely separated from development options – options are presented of locating the Advanced Research Centre on other sites and within existing buildings.

The best option for delivery of the Centres objectives has been assessed as the expansion of research facilities on the University's Moulsecoomb campus, in a new building which also incorporates additional teaching facilities.

Risks attaching to strategic options are identified as including reliance on the partnership with Ricardo and possible future changes in the demand for engineering courses. The University has a strong research base and will be able to adjust the mix of its research to respond to changes in partnership arrangements,

emergence of new partners and availability of new sources of funding. The University will also respond flexibly to changes in student demand. The University has demonstrated its ability to increase overall student numbers by providing new courses in response to demand. Strategic objectives are not static over time. As part of the University, the Advanced Engineering Centre will be able to respond to changes in circumstances, funding streams and different patterns of demand for research and teaching and learning.

Strategic constraints arise from the ability of the University to support commercial initiatives. It addresses these constraints by partnership arrangements.

The economic case and option appraisal also considers delivery risks. The Advanced Engineering Centre will be part of the University and builds upon an established relationship with Ricardo. The University has extensive experience of the development of new buildings and the management of complex projects. The project will be subject to development risks, which mostly relate to cost overruns and programme delays - these will be minimised by careful management.

The key development constraints are funding and programme – it will be necessary to deliver the Advanced Engineering Centre to a tight budget and programme. This is achievable, with careful management.

### 3.8 Initial affordability assessment

The table below provides the development and operational costs of the Advanced Engineering Centre and associated funding. The Advanced Engineering Centre will be part of the University, which will fund its day to day operational and staffing costs. The table shows the expected level of recurrent funding from the University and research and commercial income from Ricardo.

Funding source	2015-16 £'000	2016-17 £'000	2017-18 £'000	2018-19 £'000
Local Growth Fund (grant funding)	4,500	2,500		
University	3,500	2,000	1,400	2,000
HEFCE (grant funding)	5,000			
Ricardo		4,310	4,100	4,200
<b>Total funding</b>	<b>13,000</b>	<b>8,810</b>	<b>5,500</b>	<b>6,200</b>
Development cost	13,000	4,810		
Operational costs		4,000	5,500	6,200
<b>Total costs</b>	<b>13,000</b>	<b>8,810</b>	<b>5,500</b>	<b>6,200</b>

Funding source	2019-20 £'000	2020-21 £'000	Later Years £'000	Total £'000
Local Growth Fund (grant funding)				7,000
University	2,600	3,200	3,200	17,900
HEFCE (grant funding)				5,000
Ricardo	4,200	4,200	4,200	25,210
<b>Total funding</b>	<b>6,800</b>	<b>7,400</b>	<b>7,400</b>	<b>55,110</b>
Development cost				17,810
Operational costs	6,800	7,400	7,400	37,300
<b>Total costs</b>	<b>6,800</b>	<b>7,400</b>	<b>7,400</b>	<b>55,110</b>

### 3.9 Long term sustainability

The Advanced Engineering Centre is to combine teaching and research facilities. The new build element is to be located next to an existing building and running cost efficiencies will arise. It will be possible to increase student numbers to fund the additional costs associated with the teaching component of the building. The co-location with commercially funded research facilities provides further efficiencies and the benefit of an additional income stream – the value of contract research programmes undertaken in partnership with Ricardo is expected to exceed £4.2m per annum by 2020.

## **4 Strategic context**

### **4.1 Overview**

The creation of an Advanced Engineering Centre on the Moulsecoomb campus will take place in the context of the University's involvement in other significant developments on the adjoining Preston Barracks site, in Brighton and Hove and in the Gatwick Diamond area.

The provision of a Central Research Laboratory on Preston Barracks, the development of the new Advanced Engineering Centre and Business School buildings at Moulsecoomb, the opening of the Digital Catapult Centre in New England House and the possible new higher education centre in Horsham will give a significant boost to the manufacturing and commercial sector in the region.

### **4.2 Preston Barracks site**

The University's Moulsecoomb campus adjoins the Preston Barracks development site.

The 2.2 hectare Preston Barracks site is owned by Brighton and Hove City Council and was acquired from the Ministry of Defence because of its strategic significance and potential to contribute towards many of the City's priorities. The primary objective has been to create a first class, sustainable, employment-led, mixed-use development that would act as a regenerative catalyst. The site is seen as an 'urban gateway' to the City linking the universities of Brighton and Sussex.

The 2011 planning brief reflected the changed context of considering redevelopment as part of a wider package that included the University's Moulsecoomb campus and Mithras House site. The brief sought a mixed development across the three sites that would provide a strong and identifiable city quarter for the benefit of all.

In 2012 a new master plan was commissioned covering the extended development area, the results of which lead to a detailed assessment of financial viability and a review of delivery options. In July 2013 the City Council agreed to enter into negotiations for the disposal of the site to the University of Brighton and its development partner.

### **4.3 Preston Barracks redevelopment**

In July 2014 Brighton and Hove City Council entered into a conditional agreement with the Cathedral Group and the University of Brighton for the sale of the Preston Barracks site. The Cathedral Group (which has been acquired by Development Securities) is to develop the site as a significant mixed-use regeneration scheme for the City.

The Preston Barracks site and adjoining University land are to be developed to provide 1,316 student beds, new academic buildings, 350 new homes and 25,000 sq. ft. of retail space.

### **4.4 Preston Barracks Central Research Laboratory**

The redevelopment of Preston Barracks is to include provision of a Central Research Laboratory (CRL).

The CRL is to be a 55,000 sq. ft. commercial building for start-ups and SMEs in the high-tech manufacturing space. Funding of £7.7 million has been secured from the Coast to Capital Local Enterprise Partnership. The aim of the project is to attract enterprising and hi-growth companies and increased international investment into Brighton and Hove.

The CRL will be deeply rooted in the ingenuity and creativity of Brighton's entrepreneurial community. Brighton is a small city with big ideas and great potential to generate transformational products and inventions. Over the next two years Cathedral will be working with the widest possible array of partners and future users to create a comprehensive support network for manufacturing and design-led start-ups in the City.

Features of the CRL will include:

### **Workspace**

Inspiring, super-flexible and well-designed workspace, tailored to the needs of makers. Members of the CRL will be able to rent a desk, cluster of desks, self-contained office space, studios or project rooms. All on highly flexible terms. They will also have access to meeting rooms, breakout spaces and cafes. These spaces will be designed by award winning creative teams.

### **Prototyping and manufacturing labs**

Access to between 5,000 and 10,000 square feet of high specification, prototyping and small batch manufacturing equipment. The space will be shared by users of the CRL and proactively managed by a team of on-site engineers and technicians, who will always be on site to offer expert support. Core facilities will include: woodworking, a machine shop, rapid prototyping, finishing, desktop design, textiles and electronics. The lab will include both traditional tools and sophisticated digital manufacturing equipment, as well as the software platforms they require.

### **Community programming and mentoring**

This is one of the most important elements of the CRL. The community programme will be carefully curated to ensure it is relevant to the needs and interests of the CRL members, but is likely to include: showcases of residents' work, talks from inspiring entrepreneurs, informal meet-ups, master classes from lawyers, accountants and IP experts and the ability to receive one-to-one mentoring from experts in design, business and manufacturing.

### **Access to finance**

Cathedral is developing partnerships with seed stage investment funds, groups of private investors, crowd funding platforms and start-up loan providers to maximise the chances of the CRL members getting funded. Moreover, Cathedral is developing the CRL Pitch School programme, which will provide intensive tutoring on how to pitch a hardware business to different types of investor and how to run a successful crowdsourcing campaign.

## **4.5 University campus developments**

In addition to the Advanced Engineering Centre, the University has immediate plans for provision of a new Business School building and significant expansion in the volume of student accommodation.

Site options being explored for the new Business School building include co-location with the Advanced Engineering Centre between the existing Cockcroft and Watts buildings. Consultants have been appointed to work with the University to develop a brief for the new building, which is likely to be at least 4,500 sqm in area.

Current plans show the development of new student accommodation on the car park fronting Mithras House.

Other ideas being explored included the provision of a student hub and a new university administration building (replacing Mithras House, which would be converted to student accommodation).

The combined development of the Preston Barracks and University sites will create a central focus for innovation on the Moulsecoomb campus.

## **4.6 Digital Catapult Centre**

Brighton and Hove is one of three cities in the country which made a winning bid to become home to a Digital Catapult Centre. The centre will open at New England House, Brighton, in March 2015 and create a space for creative and tech start-ups and small and medium enterprises (SMEs) to develop and share digital ideas. Funding of £0.5m has been secured by the Coast to Capital Local Enterprise Partnership.

The Digital Catapult Centre is an R+D lab where SMEs, start-ups, large corporates, universities and others can come together to work on innovative digital projects, to create real value from new products and services. Digital Catapult Brighton will operate around three principles: innovation, collaboration and openness.

A key focus will be on the field of real-time, location-based data, known as the 'internet of place', with Brighton already home to international specialist companies such as Brandwatch, iCrossing and DC Storm. The tech and creative industry represents 15% of all employment in the City and generates about £720 million for the economy.

The Digital Catapult Centre will be implemented by a consortium led by Coast to Capital, including key partners the University of Brighton and Wired Sussex, as well as American Express, Brighton and Hove City Council and Gatwick Airport. The University will work with SMEs on low-risk innovations to accelerate new digital products and services to market.

#### **4.7 Establishing a University of Brighton presence in Horsham**

The University has entered into negotiations to acquire the former Novartis site in Horsham. These discussions are at an early stage, but if the purchase goes ahead, the University plans to open an innovative, high-quality centre for higher education that will give a major boost to jobs, skills and business opportunities in the Gatwick Diamond area. This development is subject to the University receiving funding from the Government's Regional Growth Fund and HEFCE.

The University will be working closely with Horsham District Council and the Coast to Capital Local Enterprise Partnership to develop plans in a way that benefits the local economy and the local community.

The University has a longstanding interest in and commitment to the Gatwick Diamond area (dating back to 2007), where there is a lack of higher education provision; a large number of businesses and employees who could benefit from professional development and an airport that makes the area very attractive to international students.

The University estimates the centre could create an estimated 2,250 new jobs; bring £1.7bn of investment to the region and provide around 3,500 places on undergraduate and postgraduate courses, in addition to the places it already provides to more than 20,700 students at its five existing campuses in Hastings, Eastbourne and Brighton and Hove.

#### **4.8 Burgess Hill Science Park**

In addition to the intended development of Novartis site in Horsham, discussions are taking place which would increase the University's support of the Science Park in Burgess Hill. These initiatives will extend the University's connectivity with the manufacturing sector.

The University's new Research and Enterprise Office on Manor Royal is part of its strategy to engage directly with companies in Crawley, with a view to building research led collaborations.

## 5 Impact

### 5.1 Benefits of the Advanced Engineering Centre to SMEs

The provision of manufacturing facilities alongside the automotive engineering research-base will enable the Centre to provide wider support to engineering companies in the region. A particular focus will be on the provision of specialist manufacturing support to SMEs, building on the partnerships the University has previously established - relationships have been developed through the Green Growth Platform, KTPs, contract research and consultancy activity. Allied to this are the variety of opportunities the University provides for student placements and graduate internships with a range of manufacturing companies across Sussex.

The Centre will improve productivity through the creation and better use of higher skill levels in advanced engineering – and by developing and expanding the provision of university undergraduate and postgraduate student places in engineering and related academic subject areas. The facilities will allow the university to expand the range of both undergraduate and postgraduate courses as well as short course provision to support the needs of regional engineering industry.

Employees of Ricardo and other companies using the Centre will have access to business and management courses offered by the University. Graduates from the Centre will leave with skills directly relevant to the companies which participated in their training – a significant boost will be given to the transition of graduates to the workforce.

### 5.2 Supply chain partners

In addition to the major partnership projects with Ricardo, the Centre will also support other regional supply chain partners through access to both specialist expertise and facilities. Partners are identified as:

OEMs:	McLaren Automotive Alexander Dennis Rolls Royce (BMW) Mini (BMW) Vauxhall (General Motors)
Tier 1 partners:	Delphi Unipart
Consultancies:	AVL Powertrain Engineering (Shoreham by Sea Office) PTL Powertrain Technology Integral Powertrain Ltd
SME start-ups:	COX Powertrain Libertine FPE Ultramo

The University has previously worked in partnership with a number of these companies (eg Libertine, Delphi and Rolls Royce) and will be seeking to build new relationships with other supply-chain companies, especially SMEs.

### 5.3 New teaching programmes

The Centre will provide a state-of-the-art infrastructure to further develop our engineering portfolio by allowing:

(i) Expansion of the Engineering Doctorate for the doctoral training of engineers in industry which we have recently developed in partnership with Ricardo to support the ongoing professional development of their engineers. This facility will allow the expansion of this provision to other companies in the automotive industry supply chain.

(ii) Increased capacity for the training of PhD students in broader areas of mechanical and manufacturing engineering as well as automotive engineering.

(iii) Development and expansion of specialist masters-based courses linked to the research base, to increase specialist postgraduate training for the automotive industry including, for example:

- MSc Automotive Engine Design
- MSc Powertrain Engineering
- MSc Automotive Electronic Engineering

(iv) Increased opportunity for the diversification of existing undergraduate engineering programmes to include state-of-the-art manufacturing techniques such as additive manufacturing.

(v) Increased capacity for the provision of a broader range of short courses for continuous professional development to support staff development within local engineering companies. This would include courses for upskilling the local engineering work force in the application of the latest engineering technologies.

All of these programmes will be developed in partnership with local industrial partners and SMEs through the Advanced Engineering Industrial Advisory Board.

#### **5.4 Research contracts**

There will be two strands:

- a research contracts will be generated through the partnership with Ricardo – these will be supported by Ricardo's business development team;
- b the University will increase its range of other contract research projects across the broader engineering design and manufacturing technology base

#### **5.5 Meeting business development needs**

The university has a network of specialist Business Development Managers who work flexibly across a range of industries. They are able to offer advice to enable businesses requiring university expertise to access it. Two of these are based within science disciplines. Through a Business Helpdesk we are able to inform businesses of other sources of support they can access to grow their enterprise including opportunities for training and development. Latterly, this has involved advising about the range of grants available through Coast to Capital LEP. We also have a team which focuses on working to develop collaborative research bids under the various EU funding streams. The other service is provided by the highly effective KTP Centre that has nearly 30 years' experience of developing programmes to link academics to industrial R and D projects. The majority of over 200 KTPs have been linked to applications surrounding scientific and technological development.

#### **5.6 Link to the Coast to Capital Strategic Economic Plan**

The Strategic Economic Plan (SEP) has identified a market failure in both under-utilisation of the skills and expertise within the workforce, and a mismatch between employers' requirements and what the workforce can offer.

A lack of higher level skills in the workforce compared with other regions is identified as a constraint on growth. A fifth of businesses report skills gaps or skill shortage vacancies. The skills and quality of the workforce is a key consideration when businesses are considering locating or investing in an area. Improving the workforce will help maintain the international competitiveness of the area for inward investment.

Particular groups - young people without qualifications and those in lower level occupations - will also be increasingly be at risk of economic exclusion as the skill requirements of jobs accelerates. Targeted interventions will help this group adjust to the changing requirements of the labour market and to make a full contribution to, and benefit from, growth.

The SEP sets out the objectives of:

- affecting a successful school to work transition;
- enhancing the skills of those already in the workforce;
- encouraging businesses to invest in 'up-skilling' their workforce.

The skills strategy of Coast to Capital has three priorities:

- stimulating the demand for skills by encouraging business ambition;
- ensuring skills provision meets the needs of businesses, focussing on the priority sectors identified by Coast to Capital;
- ensuring that people make informed decisions about their learning choices.

Priority actions include:

- developing a leadership and management programme for SMEs across all sectors;
- developing a package of targeted co-investment initiatives aimed at addressing market failures in providing higher-level skills within priority sectors;
- supporting and establishing innovation networks and skills partnerships to enable dialogue between businesses and learning providers about identifying and responding to skills needs;
- promoting enterprise education and work preparation in schools, colleges and universities, so that they become a core part of all learning programmes.

The Advanced Engineering Centre will respond to the Coast to Capital skills strategy in the following ways:

- a by providing a mixed environment where commercial research is undertaken alongside teaching, students will be better prepared for the transition to the workplace;
- b direct contact with commercial companies will allow a greater appreciation of the type and level of skills required by SMEs;
- c there will be greater opportunities for employees of commercial companies to attend the University and to improve their knowledge and skills base;
- d it will be possible to provide complementary business courses, to develop leadership and management skills;
- e. regional access to state-of-the-art engineering facilities to support innovation and provide opportunity for joint research and Knowledge Exchange (through, for example, Innovate UK Grants and Knowledge Transfer Partnership Programmes)
- f the University will be able to build on existing programmes to promote STEM to young people and promote the training and employment of women in engineering through STEM Sussex;
- g the Centre will provide a base for joint promotional activities such as the Engineering Education Scheme, Nuffield Bursary Scheme and Women's Engineering Society events;
- h support the Newhaven UTC (UTC@Harbourside) in providing pathways to higher education for STEM students and providing state-of-the-art access to facilities and expertise.

## 6 Economic case and option appraisal

### 6.1 Options

The University has undertaken an option appraisal at two levels – firstly looking at high level strategic options and secondly looking at alternative building development options.

### 6.2 Strategic options

Substantial benefit has been gained from research activity in the area of internal combustion systems, both for the University and Ricardo and in terms of wider economic and educational gains. Discontinuing or reducing this activity was therefore not considered as an option.

The following strategic options were identified and appraised:

#### **Option 1 Continue with current research activities and partnership arrangements**

**Description** Continuation of the current activities on the existing basis without expansion and retaining the existing accommodation and equipment.

**For** The existing activities are well established and have proven to be sustainable. This option presents little risk.

**Against** Advances in technology require investment in new equipment and facilities. Continuing on the current basis is likely to result in a progressive reduction in the quality of research outcomes. A critical mass is required to allow investment in leading edge equipment and to attract research staff of high calibre – at the current size the Advanced Engineering Centre would be too small to achieve critical mass.

#### **Option 2 Continue with current research activities without partnership arrangements**

**Description** Continuation of the current activities and ending partnership arrangements. The University would then take sole responsibility for the research.

**For** The University would potentially have greater control over research activities.

**Against** Substantial benefits arise from partnership arrangements, particularly around sharing of expertise and knowledge. Fundamentally the University could not sustain the current level of research activity without support and funding from a partner.

#### **Option 3 Continue with current research activities and seek alternative partnership arrangements**

**Description** Continuation of the current activities and seeking alternative partnership arrangements. The University would end its relationship with Ricardo and seek an alternative partner.

**For** An alternative partner may provide higher funding levels and a more international reach.

**Against** There is an established and successful relationship with Ricardo, seeking an alternative partner may not be successful and outcomes are less certain. An alternative partner may not have a focus on the mechanical engineering strengths of the University.

#### **Option 4 Expand research activities with existing partnership arrangements**

**Description** Expanding research activities on the current basis and retaining the existing accommodation and equipment.

**For** Expansion of activities will allow critical mass to be achieved, generating investment in leading edge equipment and attracting high calibre researchers. Without expansion, the quality of research activity will decline. Investment in Brighton will secure the future of

research in the region, rather than elsewhere. Without new and enhanced facilities it will be difficult to attract and retain top academics, engineers and doctoral students who can jointly develop research activities and attract new sources of funding.

Against There is a risk that income will not increase sufficiently to meet higher fixed costs. There is a risk of loss of financial viability at an increased size.

#### **Option 5 Expand research activities without partnership arrangements**

Description The University undertakes the expansion of research activities without partnership arrangements, occupying existing accommodation and using existing equipment.

For The University would have greater control over the areas of expanded research.

Against Seeking to expand without involvement of a partner would be unaffordable for the University and is unlikely to achieve the necessary critical mass of highest quality research.

#### **Option 6 Expand research activities and seek alternative partnership arrangements**

Description The University undertakes the expansion of research activities with a new partner, occupying existing accommodation and using existing equipment.

For An alternative partner may have greater capacity to fund an expansion in research levels.

Against There is an established and successful relationship with Ricardo, seeking a suitable alternative partner may not be successful and outcomes are less certain.

#### **Option 7 Expand current research activities with the existing partnership arrangements without increase in teaching capacity**

Description Expand research activities on the current partnership basis and maintain current levels of teaching activity.

For Student demand for engineering courses has reduced in the past. The current increase in demand may be temporary and it may not be appropriate to invest in additional capacity.

Against The increase in student numbers in engineering responds to demand and has wider economic benefit. Higher student numbers will generate additional fee income, which will assist the sustainability of the Advanced Engineering Centre.

#### **Option 8 Expand current research activities with the existing partnership arrangements and with an increase in teaching capacity**

Description Expand research activities on the current partnership basis and increase the level of teaching activity.

For An increase in student numbers in engineering responds to demand and has wider economic benefit. Higher student numbers will generate additional fee income, which will assist the sustainability of the Advanced Engineering Centre. There is a need to support regional growth in environmental technologies, meet demand for engineering graduates and to increase the level of skills in the workforce. Expansion provides the opportunity to leverage University funding through additional tuition fee income.

Against Student numbers cannot be increased within the existing buildings, which are already at capacity. New accommodation and facilities will be required.

### 6.3 Scoring of strategic options

Strategic options have been assessed by scoring out of 10 against the following criteria:

- i Meets the strategic objectives of the University
- ii Improves research quality
- iii Attracts additional grant funding and sponsorship
- iv Improves long term sustainability of research activities
- v Attracts high quality researchers
- vi Increases student applications and tuition fee income
- vii Has wider economic benefits

No weighting has been applied to the criteria as they are assessed as being of broadly equal importance.

Option	1	2	3	4	5	6	7	8
<b>Criteria</b>								
i	3	2	2	5	3	4	5	7
ii	6	4	3	6	5	6	6	7
iii	6	4	3	6	5	6	6	6
iv	2	4	3	5	4	5	5	6
v	2	2	2	5	4	4	6	7
vi	3	2	2	4	4	4	4	8
vii	4	3	2	4	3	4	5	7
<b>Total score</b>	<b>26</b>	<b>21</b>	<b>17</b>	<b>35</b>	<b>28</b>	<b>33</b>	<b>37</b>	<b>48</b>

The option achieving the highest score is Option 8 to expand current research activities with the existing partnership arrangements and with an increase in teaching capacity.

### 6.4 Development options

#### Option 1 Retain existing accommodation without refurbishment

**Description** The Centre of Excellence in Internal Combustion Research is currently located in the University's Heavy Engineering Block. This building dates from the early 1960s and has been subject to periodic updating. In this option, the new Advanced Engineering Centre would be located in this existing accommodation, with use of laboratories in the connected Cockcroft building. Costs would arise in refurbishing the accommodation and updating building services to allow the installation of new equipment.

**For** This is the lowest cost option. No cost arises from the use of land owned by the University. The objective of locating the Advanced Engineering Centre on the University's Moulsecoomb campus would be achieved.

**Against** The building has a limited life without major refurbishment. The volume of space would be insufficient to allow expansion. Fundamentally, the existing space is too small to accommodate the Advanced Engineering Centre. The accommodation would not be of sufficient quality and the installation of equipment would be restricted by the limitations of the building services. There would be insufficient space to allow the expansion of teaching activities.

## **Option 2 Refurbish existing accommodation**

Description	The Centre of Excellence in Internal Combustion Research is currently located in the University's Heavy Engineering Block. The Heavy Engineering Block would be refurbished for use by the Advanced Engineering Centre.
For	This has a reduced cost compared to new build. No cost arises from the use of land owned by the University. The objective of locating the Advanced Engineering Centre on the University's Moulsecoomb campus would be achieved.
Against	The age of the Heavy Engineering Block will result in relatively high refurbishment costs. The refurbishment would provide some limited additional space but fundamentally the space available would be too small to accommodate the Advanced Engineering Centre and would compress space available for existing teaching activity and not allow for future expansion. The life of the building would only be marginally extended.

## **Option 3 Relocate to new accommodation on a remote site**

Description	A site would be purchased for the construction of a new building for the Advanced Engineering Centre. It would be necessary to undertake a search for a suitable site and to meet the purchase costs.
For	The opportunity would arise to create a distinctive identity for the Advanced Engineering Centre. The provision of purpose built accommodation would be attractive to staff and provide a high quality working environment. The building would be suitable for purpose and could be designed for future flexibility. A high energy efficiency building would be provided with low running costs and an extended life.
Against	There is no certainty that a suitable site could be found. Additional cost would arise from the purchase of the site. Costs would arise from the relocation of staff. Efficiencies from the co-location with other University facilities and staff would be lost. It would not be feasible to undertake teaching at the new site, because of the distance from other University facilities. This is a high cost option, because of the requirement to purchase a site and construct a new building.

## **Option 4 Relocate to refurbished accommodation on a remote site**

Description	An existing building would be purchased for use by the Advanced Engineering Centre and would be subject to refurbishment.
For	This is a lower cost option compared to acquisition of a site and construction of a new building.
Against	The disadvantages of a remote site would arise. Refurbishment would involve compromises and the accommodation is less likely to be suitable for purpose. The building is unlikely to be energy efficient and future flexibility would be limited.

## **Option 5 Construct new accommodation on the current site**

Description	A new building would be constructed on University land adjacent to existing facilities.
For	The advantages arising from a new building would arise, with the advantages of co-location with other University activities. The University is able to provide a site at no cost to the project. Synergies would arise from interrelations with other academic disciplines and the availability of a wide range of equipment and facilities.
Against	Some constraints will arise from location on a developed site, which may not be of the ideal shape or size. Development on a working campus will place some restrictions on construction, particularly relating to noise and hours of working.

## 6.5 Scoring of development options

Strategic options have been assessed by scoring out of 10 against the following criteria:

- i Development cost
- ii Development risk
- iii Travel distance to location
- iv Co-location with academic and other services
- v Certainty of site availability
- vi Environmental impact
- vii Planning risk
- viii Improvement in quality of facilities and ability to install equipment
- ix Ability to attract students and researchers

No weighting has been applied to the criteria as they are assessed as being of broadly equal importance.

Option	1	2	3	4	5
<b>Criteria</b>					
i	9	7	4	6	8
ii	9	7	4	6	7
iii	8	8	4	4	8
iv	8	8	3	3	8
v	8	8	3	3	8
vi	6	5	4	5	4
vii	8	8	3	4	7
viii	1	5	8	5	8
ix	1	5	6	5	8
<b>Total score</b>	58	61	39	41	66

The option achieving the highest score is Option 5 to construct new accommodation on the current University site.

## 6.6 Shortlisted options

The shortlisting process has combined the strategic and development options. The highest ranking strategic options are those involving an expansion of research and teaching activity retaining the existing arrangements with Ricardo. The highest ranking development option involves new development on University land.

The shortlisted options are:

- (a) Expansion of research activity with the creation of an Advanced Engineering Centre in a new building on University land retaining the existing partnership arrangements with Ricardo – with the inclusion of additional teaching capacity.
- (b) As option (a) but in a reduced size building on University land without additional teaching capacity.

## 6.7 Cost benefit analysis - affordability

### Option (a) estimated cost and funding

Source of funding	Amount £'000	Profile
STEM teaching capital funding (contribution to new learning laboratories/workshops)	5,000	2015-16 financial year
Institution's own funds (Existing refurbishment and contribution to new learning laboratories/workshops)	3,500 2,000	2015-16 financial year 2016-17 financial year
Other public investment: Local Growth Funding allocated by Coast to Capital (contribution to new research facilities)	4,500 2,500	2015-16 financial year 2016-17 financial year
Private investment Ricardo Capital Equipment (contribution to new research facilities)	310	2016-17 financial year
Total cost	<b>17,810</b>	

### Option (b) estimated cost and funding

Source of funding	Amount £'000	Profile
Institution's own funds (Existing refurbishment and contribution to new learning laboratories/workshops)	3,000	2015-16 financial year
Other public investment: Regional Growth Deal (contribution to new research facilities)	4,500 2,500	2015-16 financial year 2016-17 financial year
Private investment Ricardo Capital Equipment (contribution to new research facilities)	310	2016-17 financial year
Total	<b>10,310</b>	

## 6.8 Cost benefit analysis – commercial risks

### **Risk 1 Grant funding is not forthcoming**

Description	Development of the Advanced Engineering Centre is subject to the receipt of grant funding towards the capital cost.
Impact	If this grant funding not forthcoming the University will not be able to afford the capital cost of the development.
Likelihood	Low – the University has offers of Local Growth Fund and HEFCE STEM funding.
Mitigations	The University should be able to respond to any grant conditions to ensure that funding is confirmed.
Cost	The implication of grants not being confirmed is significant.

### **Risk 2 Ricardo withdraws from the partnership arrangements**

Description	Ricardo is unable to continue the partnership arrangements with the University or reduces the level of its involvement.
Impact	The success of the Advanced Engineering Centre is predicated on the involvement of Ricardo. However, the University undertakes research in a number of related areas and it will be possible to make continued use of the facilities.
Likelihood	Low
Mitigations	Other commercial partners may be interested in use of the facilities, in addition to use by the University for other similar purposes.
Cost	There would be a loss of recurrent commercial income to the University.

### **Risk 3 Recurrent grant funding for research is reduced or ceases**

Description	The University receives recurrent grant funding for research from various bodies.
Impact	There would be a negative impact on the sustainability of the Advanced Research Centre.
Likelihood	Low
Mitigations	The University would change the balance of research activities to correspond to areas where grant funding is available.
Cost	There would be a loss of recurrent grant income to the University.

### **Risk 4 Recruitment of students to engineering courses reduces**

Description	Student recruitment to engineering courses has increased resulting in a requirement for additional teaching space as part of the Advanced Engineering Centre.
Impact	Funding has been sought from HEFCE to incorporate teaching space in the Advanced Engineering Centre. If engineering student numbers reduce in future it will be possible to use this space for the teaching of other courses or to undertake other research activities.
Likelihood	Low

Mitigations	Additional student numbers or new research contracts will be required in order to maintain overall income levels.
Cost	There would be a loss of tuition fee income (currently £9,000 per annum for UK and EU students), unless there was a corresponding increase in other student numbers or additional research income.

## 6.9 Cost benefit analysis – development risks

As a new build project, development risks for both options will arise. These risks are identified as follows:

### **Risk 1      Design issues**

Description	Difficulties may arise in specifying the building and reconciling different requirements.
Impact	Potential to cause delays and increase costs.
Likelihood	Low
Mitigations	The University is experienced in managing projects and establishing arrangements to quickly resolve design and specification issues.
Cost	Additional professional fees will arise if designs are subject to change.

### **Risk 2      Planning consent**

Description	Planning consent will be required for the new building. Planning consent will only be forthcoming if the selected site is acceptable to the planning authority and there is no adverse environmental or ecological impact.
Impact	Potential to cause a delayed start to construction of the new building.
Likelihood	Low
Mitigations	<p>The University has previously gained planning consent for a biosciences building on the Moulsecoomb campus, which is larger but otherwise similar to the Advanced Engineering Centre. The areas of the campus which are not available for development for planning reasons have been identified by the University.</p> <p>The University has a close working relationship with Brighton &amp; Hove City Council. The City Council is supportive of the development. The University seeks to achieve a high standard of design and construction, which is likely to gain the support of the planning authority.</p>
Cost	Any delay to the project is likely to increase tender prices for the construction contract and give rise to some additional professional fees.

### **Risk 3      Construction costs exceed estimates**

Description	Tender prices are received which exceed cost estimates.
Impact	It will be necessary to undertake a value engineering exercise to bring costs within budget.
Likelihood	Medium
Mitigations	A cost plan will form part of the project management arrangements. Changes will be made to the project to remain within budget.
Cost	No overall increase in cost should arise.

## **6.10 Key Findings**

Maintaining current levels of research activity using existing facilities is not an option – only by expanding activities and providing new accommodation will it be possible to maintain research quality and achieve a critical mass. Substantial value arises from the relationship with Ricardo and joint working between engineers from Ricardo and researchers from the University is central to the concept of an Advanced Engineering Centre.

## **6.11 Recommendations and preferred option**

The preferred option is the expansion of research activity in partnership with Ricardo by the provision of an Advanced Engineering Centre in a new building on the University's Moulsecoomb campus incorporating additional accommodation to allow the expansion of postgraduate and undergraduate student numbers.

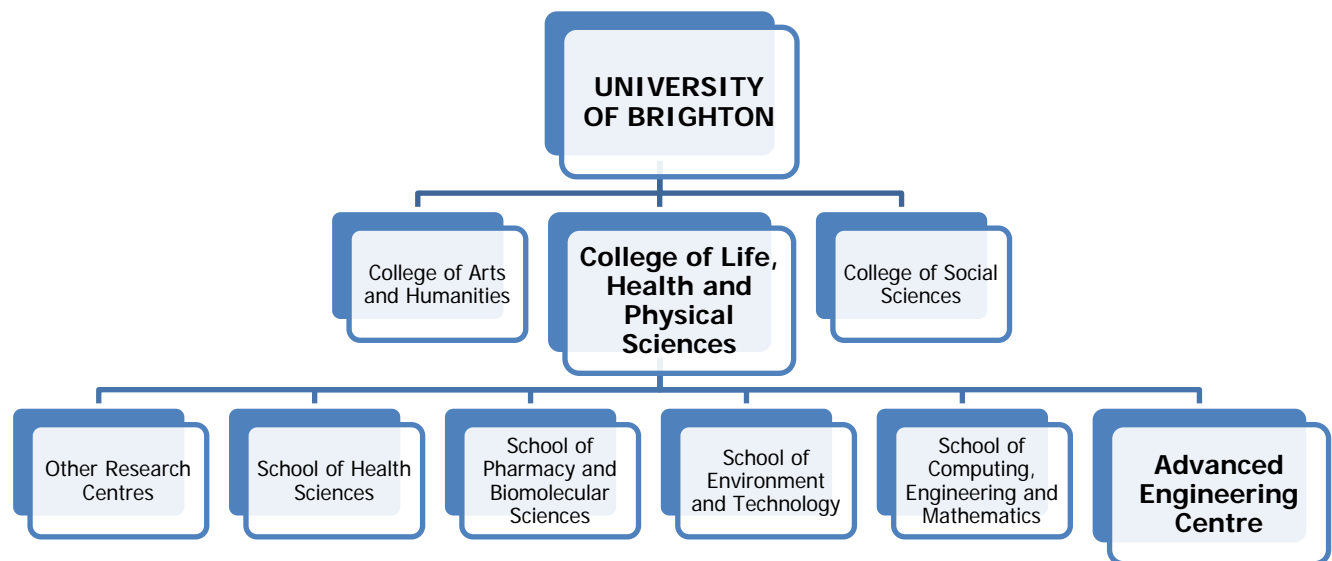
## 7 Project management

### 7.1 Operation of the Advanced Engineering Centre

The Advanced Engineering Centre will form part of the University, within the College of Life, Health and Physical Sciences.

The Advanced Engineering Centre will be managed by Morgan Heikal, currently Head of the Centre for Automotive Engineering and Ricardo Professor of Automotive Engineering. Professor Heikal will report to Professor Andrew Lloyd, Dean of the College of Life, Health and Physical Science. Professor Lloyd will have overall responsibility for the operation of the Centre.

The organisational structure is shown below:



A joint supervisory body will oversee the operational management of the Advanced Engineering Centre following completion of the new building. The 'Internal Combustion Research Centre Management Board' will be established comprising senior representatives from Ricardo and the University. The Management Board will be chaired by Professor Lloyd.

All the direct costs of the Centre will be met by the University. Ricardo will meet the cost of its staff based in the Centre and will fund the University for all other costs.

### 7.2 Transitional arrangements

The new Centre will need to be constructed and commissioned concurrently with existing research work.

Current joint research projects will continue during the development phase using the existing facilities at Ricardo's Shoreham Technical Centre and within the Sir Harry Ricardo Research Laboratories in the University.

The current Joint Programme Management Group, which comprises the lead researchers from Ricardo and the University, will have responsibility for the transfer of projects from the old facilities to the new facilities during 2016.

## 8 Building development

### 8.1 Overview

The University is experienced in achieving completion of capital developments to programme and budget. Major new buildings have been completed in recent years on the University's campuses in Hastings, Falmer and Moulsecoomb.

Recent projects in Moulsecoomb include the construction of the £24m Huxley building and the £29m refurbishment of the Cockcroft building.

A new building is to be provided for the Advanced Engineering Centre located on the Moulsecoomb campus. Logistical issues, such as site access, are the same as experienced with the Huxley building and Cockcroft refurbishment.

Works will be scheduled in order that the most disruptive elements of the project are undertaken, where possible, in the summer vacation 2015. The project does not impact significantly on other academic space and it will be possible for the campus to remain fully operational during the works. There is no identified requirement for temporary accommodation or decanting to other sites.

### 8.2 Project management arrangements

A Project Group will be established which will be responsible for the development project. The Project Group will be chaired by the Chief Operating Officer of the University, as the member of the Senior Management Team with responsibility for the University's budget and estate with ultimate responsibility for the delivery of capital projects on behalf of the Vice-Chancellor. The Project Board will receive regular Project Monitoring/Dashboard Reports from the Project Manager. An example report is provided in **Appendix A**.

The Project Group will report to the Capital Programme Advisory Group (CPAG), which reports directly to the Senior Management Team and Vice-Chancellor. CPAG oversees all capital building projects and its membership includes the Deputy Vice-Chancellor (Professor Chris Pole), the Chief Operating Officer (Sue McHugh) and the Dean of the College of Life, Health and Physical Sciences (Professor Andrew Lloyd).

Quarterly reports will also be provided to the Coast to Capital and Greater Brighton Economic Board using the suggested template provided in **Appendix B**. The form of the report can be altered to meet the requirements of Coast to Capital and Greater Brighton Economic Board.

The University's Director of Estate and Facilities Management (Mike Clark) will have responsibility for the construction and contractual elements of the project, with support from his professional team. The Project Management Team will include specialist consultancy appointments.

The Project Group will establish a Stakeholder Steering Group, chaired by the Dean of the College of Life, Health and Physical Sciences, which will be responsible for working with Project Management Team to ensure that the user specifications are met.

### 8.3 Procurement Strategy

Procurement of the consultant team and contractor will be from recognised Framework Agreements (such as iESE), which will provide the University with OJEU compliant appointments (as they have already been pre-tendered). Appointments from established Framework Agreements can be made in a much shorter timescale than having to undertake a full OJEU process. Use of this procurement route is reflected in the timescales detailed below.

The appointment of the building contractor will also be a significant factor in successfully delivering the project. The University has determined that the construction contract should be subject to a competitive tender process in accordance with EU guidelines (see OJEU contract notice 2015/S 017-025835 dated 24 January 2015). A market engagement process is to be undertaken to encourage responses to the tender invitation. A two Stage Design and Building contract is to be adopted, with novation of the design team.

## 8.4 Implementation Timescales

The key milestones for the project are detailed below:

Milestone 1: Project Management Team appointed - October 2014

Milestone 2: Initial Design Brief approved - November 2014

Milestone 3: Planning application approved - August 2015

Milestone 4: Building contractor appointed - March 2015

Milestone 5: Construction completed - December 2016

Milestone 6: Transfer of equipment and staff from Ricardo and the University to the new Advanced Engineering Centre completed - March 2017

Milestone 7: Advanced Engineering Centre operating at maximum capacity - March 2020

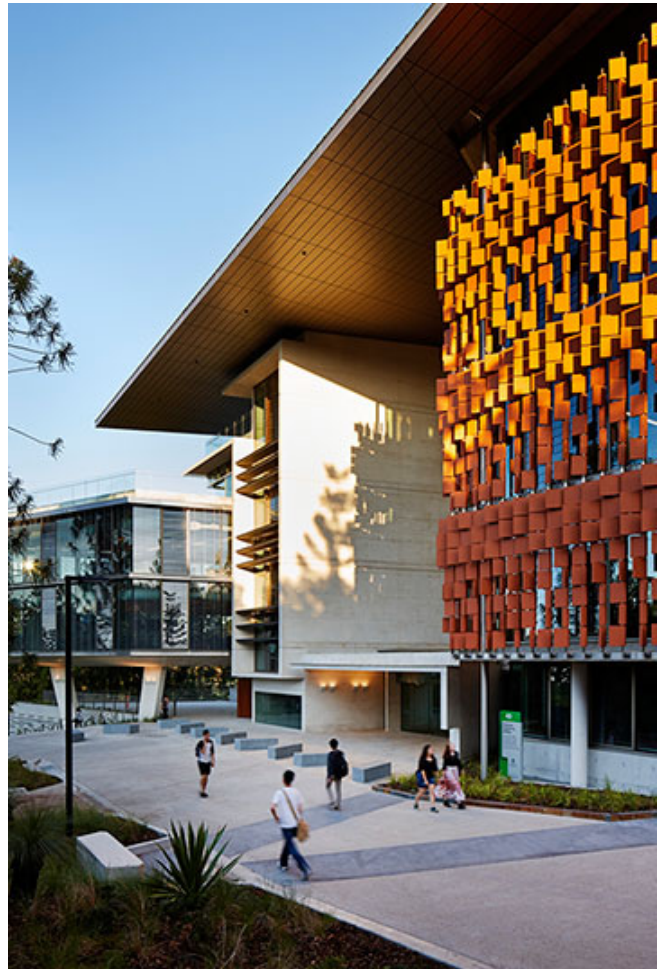
## 8.5 Appointment of design consultant and cost consultants

Hassell are currently working with the University on campus master planning as part of the preparation of a new Estate Strategy. The appointment of Hassell has been extended to encompass the conceptual design stage of the Advanced Engineering Centre.

Hassell have relevant experience as joint architects of the Advanced Engineering Building at the University of Queensland, Australia. Details of this project can be found at <http://www.hassellstudio.com/en/cms-projects/detail/advanced-engineering-building/>.

Shown right and below is the Advanced Engineering Building (AEB) at the University of Queensland. This is a state-of-the-art engineering building with flexible teaching and learning spaces.

The building integrates teaching and research laboratories in addition to large scale manufacturing and civil engineering research laboratories.





Feasibility Designs for the Advanced Engineering Centre are currently being progressed by Hassell. Design ideas which are being explored are illustrated in the images overleaf.

Artist impressions of Design Concepts  
for the Advanced Engineering Building,  
University of Brighton, Moulsecoomb  
Campus



## **8.6 Project plan**

Detailed project planning will commence following appointment of the consultancy team. At this stage, the University is working to an outline project programme and expenditure profile – these are provided in **Appendix C**.

## **8.7 Contract Management Approach**

A dedicated client-facing Project Manager will be assigned to the project and will be supported by external consultants. External consultants will provide an independent level of technical advice to ensure the preparation of a detailed user brief. The Project Manager will co-ordinate and be the principal focal point for the project team and the end users/stakeholders.

## **8.8 Development risks**

A full assessment will be made of accommodation development risks. The identified risks include delays in gaining planning consent, cost escalation and construction delays.

The planning context is very positive as there is a pre-existing Master Plan for development of the Moulsecoomb campus. This has been jointly developed with Brighton & Hove City Council and provides for the location of an additional academic building on the campus.

This 'brown field' development will have minimal environmental impact.

A realistic assessment has been made of build costs, reflecting the cost of other recent high specification building developments. The joint project board will provide senior management oversight of project costs and programme and will be supported by an external project management team.

The developing risk register for the project is attached in **Appendix D**.

## 9 Financial case

### 9.1 Funding profile

The funding profile and sources of funding is as follows:

#### Capital Funding

Funding source	2015-16 £'000	2016-17 £'000	2017-18 £'000	2018-19 £'000
Local Growth Fund (Grant funding)	4,500	2,500	-	-
University	3,500	2,000	-	-
HEFCE (Grant funding)	5,000	-	-	-
Ricardo		310	-	-
<b>Total Capital Funding</b>	<b>13,000</b>	<b>4,810</b>	<b>-</b>	<b>-</b>

Funding source	2019-20 £'000	2020-21 £'000	Later Years £'000	Total £'000
Local Growth Fund (Grant funding)	-	-	-	7,000
University	-	-	-	5,500
HEFCE (Grant funding)	-	-	-	5,000
Ricardo	-	-	-	310
<b>Total Capital Funding</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>17,810</b>

#### Revenue Funding

Funding source	2015-16 £'000	2016-17 £'000	2017-18 £'000	2018-19 £'000
Local Growth Fund (Grant funding)	-	-	-	-
University	-	-	1,400	2,000
HEFCE (Grant funding)	-	-	-	-
Ricardo	-	4,000	4,100	4,200
<b>Total Revenue Funding</b>	<b>-</b>	<b>4,000</b>	<b>5,500</b>	<b>6,200</b>

Funding source	2019-20 £'000	2020-21 £'000	Later Years £'000	Total £'000
Local Growth Fund (Grant funding)	-	-	-	-
University	2,600	3,200	3,200	12,400
HEFCE (Grant funding)	-	-	-	-
Ricardo	4,200	4,200	4,200	24,900
<b>Total funding</b>	<b>6,800</b>	<b>7,400</b>	<b>7,400</b>	<b>37,300</b>

Total public funding is identified of £7m from the Local Growth Funding and £5m from HEFCE. The University is contribution £2m to the new building and £3.5m as the refurbishment cost of laboratories to be used by the Advanced Engineering Centre.

Total revenue funding from the University is estimated at £12.4m over a five year period which includes tuition fee and income from other sources. Revenue funding from Ricardo is estimated at £24.9m over five years in support of research projects.

The overall funding/cost model is provided in the table below.

## Overall Funding/Cost Model

Funding source	2015-16 £'000	2016-17 £'000	2017-18 £'000	2018-19 £'000
Local Growth Fund (Grant funding)	4,500	2,500	-	-
University	3,500	2,000	1,400	2,000
HEFCE (Grant funding)	5,000	-	-	-
Ricardo	-	4,310	4,100	4,200
<b>Total funding</b>	<b>13,000</b>	<b>8,810</b>	<b>5,500</b>	<b>6,200</b>
Development cost	13,000	4,810		
Operational costs		4,000	5,500	6,200
<b>Total costs</b>	<b>13,000</b>	<b>8,810</b>	<b>5,500</b>	<b>6,200</b>

Funding source	2019-20 £'000	2020-21 £'000	Later Years £'000	Total £'000
Local Growth Fund (Grant funding)	-	-	-	7,000
University	2,600	3,200	3,200	17,900
HEFCE (Grant funding)	-	-	-	5,000
Ricardo	4,200	4,200	4,200	25,210
<b>Total funding</b>	<b>6,800</b>	<b>7,400</b>	<b>7,400</b>	<b>55,110</b>
Development cost				17,810
Operational costs	6,800	7,400	7,400	37,300
<b>Total costs</b>	<b>6,800</b>	<b>7,400</b>	<b>7,400</b>	<b>55,110</b>

## 9.2 Building development costs

The Advanced Engineering Centre is to be achieved within a total capital budget of £17.81m which provides for a new building costing £14.31m and refurbishment of laboratories in the existing Cockcroft building costing £3.5m.

The design period for the Advanced Engineering Centre is October 2014 to May 2015. At the date of this updated Business Case (January 2015), the design is not sufficiently advanced to provide a detailed cost analysis.

The table below provides a preliminary budget breakdown for the £14.31m new build element of the project. The construction contract value is estimated at £9.6m, professional fees at £0.92m and other costs at £0.955m (mainly relating to furniture and equipment). A project contingency of £0.45m is assumed.

<b>Construction contract</b>	<b>£</b>	<b>9,600,000</b>
<b>Professional fees</b>		
Architect		375,000
Structural, Mechanical and Electrical Services Engineer		250,000
Quantity Surveyor		75,000
Employer's Agent		85,000
Planning Supervisor		30,000
Acoustic advice		5,000
DDA and access advice		5,000
Transport/travel advice		5,000
Environmental/Ecological advice		10,000
VAT advice		20,000
Investigations and surveys		20,000
BREEAM advice		5,000
Electromagnetic compatibility advice		5,000
Professional fee contingency		30,000
	Sub-total	<b>920,000</b>
<b>Other costs</b>		
Local Authority planning and Building Control fees		30,000
Furniture, fittings and equipment		850,000
Removals		15,000
Data/telephones/comms		30,000
Security/locks		10,000
Fire equipment		10,000
Signage		10,000
	Sub-total	<b>955,000</b>
<b>Project Contingency</b>		<b>450,000</b>
<b>Total cost excluding VAT</b>		<b>11,925,000</b>
	VAT	2,385,000
<b>Total cost including VAT</b>		<b>14,310,000</b>

### 9.3 Value Added Tax

The University is partially exempt for purposes of VAT. The general tax position of universities is that they are unable to recover VAT, which increases the cost of capital projects by 20%.

There are circumstances in which it is possible to achieve some level of VAT recovery with the approval of HMRC. The extent of VAT recovery will depend on the specific use of the building and how the recovery can be managed within the scope of the University's agreed partial exemption method.

Preliminary advice has been received from the University's VAT advisers (Deloitte). Further advice is to be commissioned to examine the VAT costs arising from the future use of the building and the interaction with the University's partial exemption method. The University will seek to maximise VAT recovery for this project. The level of VAT recovery will be agreed in advance with HMRC and will be applied to the project.

### 9.4 Development contingency and cost overruns

A project contingency of £450,000 is assumed. The project will form part of the University's Capital Programme. The Capital Programme includes a further contingency provision to cover all current projects. Cost overruns which arise above the project contingency will be a call on the Capital Programme contingency funded by the University.

Any reduced VAT liability will be applied as an addition to the project contingency, to provide primarily for higher construction costs. It is recognised that currently there are high levels of activity in the construction industry and potential shortages of labour and materials resulting in higher tender prices.

## 9.5 Operational costs

The Advanced Engineering Centre will have separate funding streams for research and teaching. For purposes of illustration, the income and expenditure position (2012-13 actuals) for the existing Centre for Automotive Engineering is summarised as follows:

<b>Income</b>	£
HEFCE research grants	182,600
Other research grants/commercial income	721,200
<b>Total income</b>	<b>903,800</b>
<b>Expenditure</b>	
Research staff	560,100
Non-pay costs	195,200
Central costs - academic	51,600
Central costs – support	15,100
Accommodation charges	126,900
<b>Total expenditure</b>	<b>948,900</b>
<b>Annual deficit</b>	<b>45,100</b>

The University is able to absorb operating deficits where variable costs are being met. This is on the basis of the interrelationship between teaching and research. The new Advanced Engineering Centre will allow a significant increase in research activity, with the levels of income generation as indicated in the funding profile provided in Section 7.1 above.

## 9.6 Revenue budget arrangements

The Advanced Engineering Centre will be part of the University. The University operates devolved budget arrangements and the Centre will be part of the College of Life, Health and Physical Sciences for budget purposes (the University is structured with three Colleges which each comprise a number of Schools). The total annual budget of the College of Life, Health and Physical Sciences is £28m (2014-15). The University has a total annual turnover of £183m (2013-14 outturn).

The University will meet the fixed costs of the Advanced Engineering Centre. Commercial research is undertaken on a full cost basis and therefore income from Ricardo and collaborative research projects with third parties will contribute to the overhead costs of the University. Reductions in overhead contributions can be sustained by the University.

The increase in student numbers made possible by the Advanced Engineering Centre will generate tuition fee income which will further contribute to overheads.

## **10 Management case**

### **10.1 Project Dependencies**

The key project dependency is funding. The University owns the site of the new Advanced Engineering Centre and there is no impediment to quickly proceeding with the building design, submission of planning application and appointment of the construction professional team and building contractor. This work can commence as soon as funding is confirmed.

### **10.2 Project/Programme governance, organisation structure and roles**

The Advanced Engineering Centre will form part of the University, within the College of Life, Health and Physical Sciences. The governance arrangements of the University require that all new building projects are approved by its Board of Governors and are included in an Annual Capital Programme. All necessary approvals will be sought at the meeting of the Board of Governors on 21 November 2014.

The building project will be overseen by the Capital Programme Advisory Group (CPAG), which reports to Senior Management Team and the Vice-Chancellor. CPAG meets monthly and receives 'Dashboard' reports on the progress of individual projects. Progress and budget reports are made to the termly meetings of the Finance and Employment Committee of the Board of Governors.

The building project will be managed by a Project Group, chaired by the University's Chief Operating Officer, who is a member of the Senior Management Team.

Operational management of the Advanced Engineering Centre following completion of the new building will be overseen through the establishment of the Internal Combustion Research Centre Management Board comprising senior representatives from Ricardo and the University.

### **10.3 Communications and stakeholder management**

The Project Group will establish a Stakeholder Steering Group which will be responsible for working with Project Management Team to ensure that the user specifications are met.

The University has established communication systems to consult with users of new buildings, student and staff users of the campus and other members of the wider community. The structures established for the major refurbishment of the Cockcroft building will be extended to the new Advanced Engineering Centre building.

### **10.4 Project/programme reporting**

Established systems of reporting will operate as detailed above. The development professional team will report to the Project Group (Appendix A), which will report to the Capital Programme Advisory Group (CPAG). CPAG reports to the Senior Management Team and the Vice-Chancellor. Project level reports are provided to the Finance and Employment Committee and to the Board of Governors.

Quarterly reports will also be provided to the Coast-to-Capital and Greater Economic Board using the template provided in Appendix B.

### **10.5 Key issues for implementation**

Key issues have been identified as part of this Business Case. The University is in a position to rapidly implement the development and operation of the Advanced Engineering Centre.

### **10.6 Risk management strategy**

The University has established systems of risk management. Reporting arrangements are implemented to ensure early identification of development planning, cost and programme issues. Management structures are in place to ensure a rapid response to identified issues. Communication systems are in place to provide feedback.

## **10.7 Project/programme evaluation**

The building project will be subject to a post-occupancy evaluation. The University frequently commissions external consultants to undertake this evaluation. Surveys of building users are also conducted to establish views concerning the functionality of new buildings. Issues with new buildings are raised by the University community and are quickly responded to.

It is usual practice of all University research groups to submit an annual report and to be subject to the internal research and academic committees. Peer group review is undertaken.

The research work of the Advanced Engineering Centre will be subject to review under the periodic research assessment process led by HEFCE.

The financial position of the Centre will be subject to scrutiny by the Business and Community Committee, which is a sub-committee of the Academic Board.

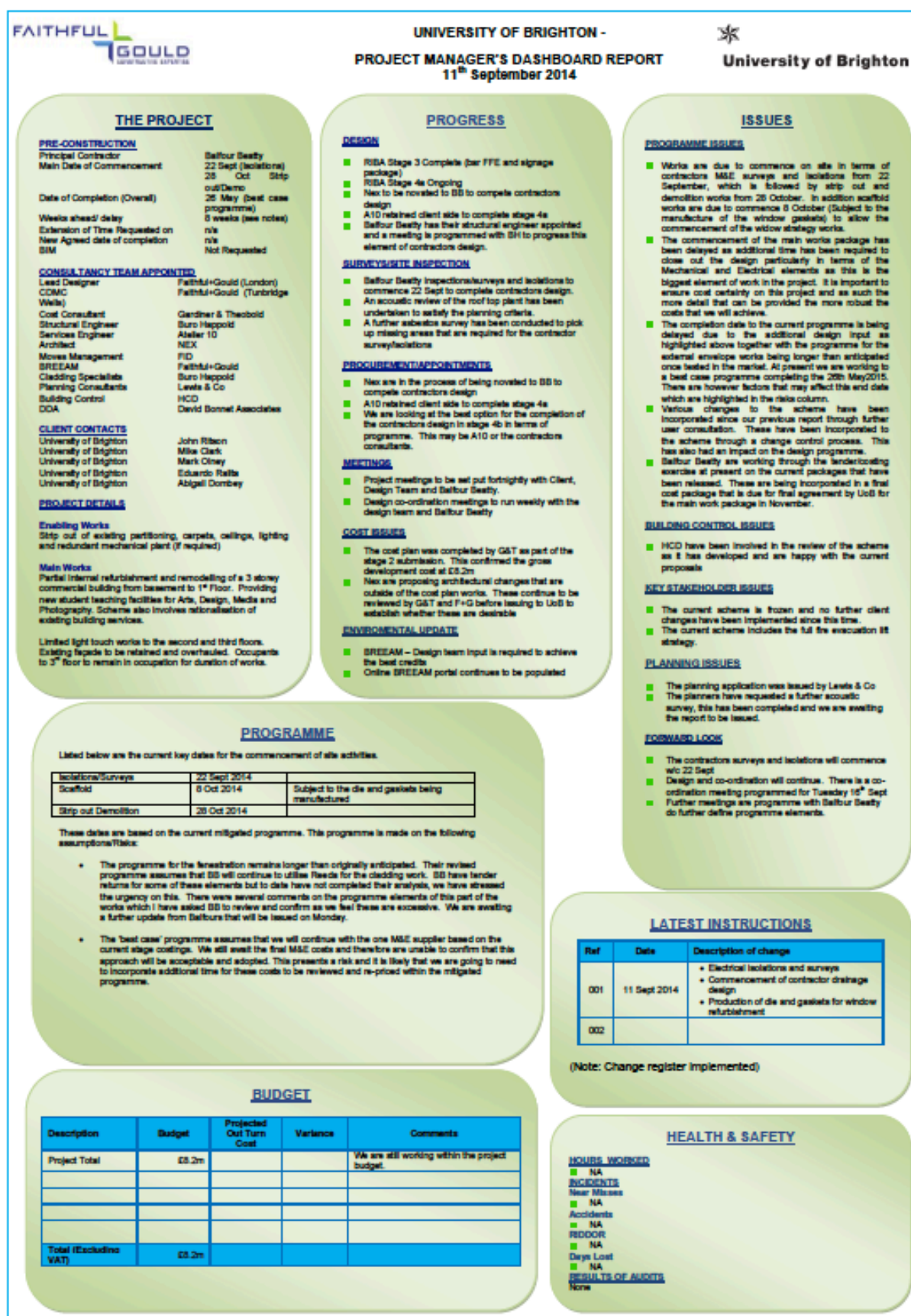
## **10.8 Accountability, evaluation and audit**

Accountability will be achieved by means of the Management Board, the Research Strategy Committee and the Academic Board of the University, which has ultimate responsibility for research quality and standards.

The Advanced Engineering Centre will fall within existing budgetary arrangements and will be subject to authorities and procedures as laid down under the University's Financial Regulations.

All existing audit arrangements will apply to the Centre including requirements for review by the University's Internal Audit section. The Audit Committee of the Board of Governors is attended by staff from the Internal Audit section and the University's External Auditors (currently KPMG).

## Project 'Dashboard' and Project Highlight reports



## Project Highlight Report

<b>Project Name</b>			
<b>Project Code</b>		<b>Project Plan</b>	
<b>Project Manager</b>			
<b>Highlight Report Date</b>			
<b>Period Covered</b>			
<b>Current Project Status</b>			
<b>Overall RAG Status*</b>	<div style="display: inline-block; width: 20px; height: 20px; background-color: green; margin-right: 5px;"></div> <b>Green</b>		
<b>Programme**</b>	<b>Risk**</b>	<b>Scope**</b>	
<div style="display: inline-block; width: 20px; height: 20px; background-color: green; margin-right: 5px;"></div> <b>Green</b>	<div style="display: inline-block; width: 20px; height: 20px; background-color: orange; margin-right: 5px;"></div> <b>Amber</b>	<div style="display: inline-block; width: 20px; height: 20px; background-color: green; margin-right: 5px;"></div> <b>Green</b>	
<p><i><b>Red:</b> Activities are not on schedule or unmanageable against scope, the current due date is later than the baseline date and is highly likely to remain so. An Issue should be documented below for this milestone.</i></p> <p><i><b>Amber:</b> Activities are not on schedule, the current due date is later than the baseline date, however, it is possible to recover this milestone bringing the current due date in line with the baseline date or the board has approved a rebaselined date. A Risk should be documented below for this milestone.</i></p> <p><i><b>Green:</b> Activities are on schedule or manageable against scope, current due date is the same, or earlier than, the baseline date.</i></p>			
<b>Budget**</b>	<div style="display: inline-block; width: 20px; height: 20px; background-color: green; margin-right: 5px;"></div> <b>Green</b>		
<p><b>Budget Status:</b></p> <p><i><b>Red:</b> Current Budget exceeds approved budget by more than 10%, or forecast spend has increased by more than 10% for budget period for this report</i></p> <p><i><b>Amber:</b> Forecast spend has increased by less than 10% for this report</i></p> <p><i><b>Green:</b> Proceeding to plan</i></p>			

Current budget allocation is as follows:





### Executive Summary

\*The lowest RAG for Schedule/Risk/Scope/Budget is an indicator of the Overall RAG Status (Red/Amber)

\*\*If you are flagging a Red/Amber RAG status you must indicate the reason in the Executive Summary

MILESTONES DUE DURING THE PREVIOUS PERIOD					
Task ID***	Key Milestones-	Baselined Date	Forecast Date	RAG***	Comments
				<div style="display: inline-block; width: 20px; height: 20px; background-color: orange; margin-right: 5px;"></div> <b>Amber</b>	
				<div style="display: inline-block; width: 20px; height: 20px; background-color: orange; margin-right: 5px;"></div> <b>Amber</b>	
				<div style="display: inline-block; width: 20px; height: 20px; background-color: orange; margin-right: 5px;"></div> <b>Amber</b>	

\*\*\*If your RAG milestone is Amber/Red you need to indicate the reason in comments

DELIVERABLES FOR THE NEXT PERIOD					
Task ID*** *	Key Milestones-	Baselined Date	Forecast Date	RAG***	Comments
				 Green	
				 Green	
				 Green	
				 Green	






\*\*\*\*Insert Task ID from your project plan

### Current Issues


Issue No.	Description	Updates	Priority

Please ensure that you are updating your Issue and Risk logs in alignment with the Current Issues and Top Three Risks sections in Highlight Report

### Risks to the Project

Reference No.	Description	Mitigation	RAG***
			 Amber
			 Amber
			 Amber
			 Amber
			 Amber

## Standard Reporting Template Coast-to-Capital and Greater Brighton Economic Board

PROJECT	Advanced Engineering Centre Project	
PARTNERS	University of Brighton & Ricardo	
Project RAG Rating:		 GREEN
Project Status Update:		
<ul style="list-style-type: none"> <li>— .</li> <li>— .</li> <li>— .</li> <li>— .</li> <li>— .</li> <li>— .</li> </ul>		
Future Key Milestones:		
Milestone:	Delivery Date:	

[illegible][illegible]

## Expenditure profile

	Oct 2014 £'000	Nov 2014 £'000	Dec 2014 £'000	Jan 2015 £'000	Feb 2015 £'000	Mar 2015 £'000	Apr 2015 £'000	May 2015 £'000	Jun 2015 £'000	Jul 2015 £'000	Aug 2015 £'000	Sept 2015 £'000	Oct 2015 £'000	Nov 2015 £'000	Dec 2015 £'000
Refurbishment	245	245	245	245	245	245	245	245	245	245	245	222			
Construction													279	372	466
Professional Fees		57	57	57	57	57	84	84	84	27	23	23	23	23	23
Other costs															
Contingency													22	26	39
Total	245	302	302	302	302	302	329	329	329	272	268	245	324	421	528
VAT	49	60	60	60	60	60	66	66	66	54	54	49	65	84	106
Total	294	362	362	362	362	362	395	395	395	326	322	294	389	505	634

	Jan 2016 £'000	Feb 2016 £'000	Mar 2016 £'000	April 2016 £'000	May 2016 £'000	Jun 2016 £'000	Jul 2016 £'000	Aug 2016 £'000	Sept 2016 £'000	Oct 2016 £'000	Nov 2016 £'000	Oct 2017 £'000	Dec 2017 £'000	Total £'000
Refurbishment														2,917
Construction	559	838	931	1,025	1,025	838	745	651	559	559	559	194		9,600
Professional Fees	23	23	23	23	23	23	23	23	23	9	9	14	2	920
Other costs			100						300	300	255			955
Contingency	44	48	48	39	35	31	26	26	29	13	17	7		450
Total	626	909	1,102	1,087	1,083	892	794	700	911	881	840	215	2	14,842
VAT	125	182	220	217	217	178	159	140	182	176	168	43		2,968
Total	751	1,091	1,322	1,304	1,300	1,070	953	840	1,093	1,057	1,008	258	2	17,810

## Project Risk Register

[illegible]

## RISK REGISTER

## MITIGATED RISK SCORE



REF	RIBA Stage	RISK DESCRIPTION/ CATEGORY	SUGGESTED MITIGATED MEASURES	TARGET DATE	RESPONSIBILITY		PROBABILITY			IMPACT				mitigated SCORE Pxl	Time Delay	COMMENTS
					OWNER	MANAGER	H	M	L	H	M	L	C T F			
		Cause 'As a result of....'														
1.00		PLANNING					3	2	1	3	2	1				
2.00		SURVEYS														
3.00		PROJECT DEFINITION /SCOPE OF WORK														
4.00		PROJECT PROGRAMME														
5.00		LEGAL / CONTRACTUAL														
6.00		CLIENT, CORPORATE / PROJECT GOVERNANCE /														
7.00		BUSINESS CASE /FINANCIAL AND COMMERCIAL														
8.00		DESIGN														
9.00		HEALTH & SAFETY														
10.00		PUBLIC RELATIONS														
11.00		CONSTRUCTION PHASE /MAINTENANCE														

## Capital Project Report Template

This template is used to provide monthly reports to Capital Projects Advisory Group and University Management Group and Termly Reports to the Board of Governors Finance & Employment Committee.

THE UNIVERSITY OF BRIGHTON

**CONFIDENTIAL**

CAPITAL PROJECTS ADVISORY GROUP

Estates update

### Summary

This paper updates CPAG on current estates issues.

### Decisions required

None

### Financial implications and risks

To note the risks/areas of concerns identified for each project

### Further information

Further information is available from the Director of Estate and Facilities Management

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Project	Current status	Risks/areas of concern	Student/ staff experience	Programme	Budget
<b>City campus</b>					
Project 1	A	A	A	A	G
Project 2	A	A	A	A	A
<b>Eastbourne campus</b>					
Project 1	G	G	N/A	N/A	G
<b>Falmer campus</b>					
Project 1	G	G	G	G	G
Project 2	G	G	G	G	G
<b>Hastings campus</b>					
Project 1	G	G	G	G	G
Project 2	R	R	R	R	R
<b>Moulsecoomb campus</b>					
Project 1	G	G	G	G	G
Project 2	A	A	A	A	A
Project 3	G	G	G	G	G
Project 4	G	A	G	A	A
Project 5	A	A	G	A	G
<b>Estate strategy</b>					
Estate strategy update	G	G	G	G	G

<b>CITY CAMPUS:</b>					<b>RAG status</b>
<b>Project 1</b>					
<b>Current status:</b>					
					<b>A</b>
<b>Risks/areas of concern:</b>					
					<b>A</b>
<b>Student/staff experience:</b>					
					<b>A</b>
<b>Programme:</b>					
	<b>Initiation date:</b>		<b>Planning:</b>		<b>A</b>
	<b>Construction:</b>		<b>Completion:</b>		
<b>Budget:</b>					
	<b>Original budget:</b>		<b>Current budget:</b>		<b>G</b>
	<b>Spend to Oct-14:</b>		<b>Projected:</b>		
	<b>Spend to Oct-14:</b>		<b>Projected:</b>		

Prepared by: University of Brighton  
Date: 28 January 2015  
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