

2016 specification
first exams in 2018



GCSE AQA

Case Studies with Exam Prep

The Changing Economic World

Filwood Green Business Park, Bristol

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Teacher's Introduction

This resource has been developed to provide case studies and exam preparation material to support the GCSE AQA specification (8035) **3.2.2 Section B: The Changing Economic World**.

This detailed case study is on **Filwood Green Business Park, Bristol, UK** representing an example of how modern industrial development can be more environmentally sustainable.

The case study includes a main content section which can be used as part of a lesson plan or distributed to students for self-guided research; a selection of ICT interactive links to further students' research around each topic and a set of Springboard Images and discussion questions (also available as a PPT file accessible by digital download) which makes a fantastic starter activity.

*A webpage containing all the links listed in this resource is conveniently provided on ZigZag Education's website at **zzed.uk/8808***

You may find this helpful for accessing the websites rather than typing in each URL.

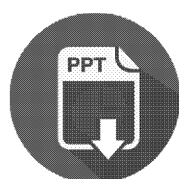


The exam preparation section which follows the case study contains a summary table, bringing together all of the key facts and figures relating to the case study; rapid-fire revision questions (with answers) to help recall and retention of the main points; and an exam-style question and mark scheme, written in the style of the AQA sample material, so that students can practice answering questions relating to case studies and applying relevant knowledge in their answers.

The resource may be used as a source of reference for the required case studies for individual study, or for group work leading to discussion or debate. Subheadings in the information sections are designed to enable tabulated comparisons of social, economic and environmental impacts.

Other detailed case studies are available for this topic area representing locations in countries with differing levels of development based on World Bank Income classifications:

- Brazil (NEE)
- Kenya (LIC)



A PowerPoint presentation containing the Springboard Images starter activity to accompany this resource is available as a free digital download. Just register for free updates using the link below to download all available content for your school or purchasing site.

November 2018

Free Updates!

Register your email address to receive any future free updates* made to this resource or other Geography resources your school has purchased, and details of any promotions for your subject.

* resulting from minor specification changes, suggestions from teachers and peer reviews, or occasional errors reported by customers

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Filwood Green Business Park – An Environmental Industrial Development

Part 1: Case Study



Content

Background information:

In general, the main function of business parks make them largely energy-consuming places. Environmental consciousness is often non-existent or severely lacking and expansion takes priority over protecting the environment. Business parks are often located in areas that are not well connected to public transport links. This means that a lot of people have to drive a car to work, resulting in CO₂ emissions being produced before arriving at work. Congestion also becomes a problem as the large number of employees means that there is a lot of travelling to the business park. Deliveries both to and from the business park also contribute to congestion and CO₂ emissions.

The business activity that takes place within a park also means that the energy requirements are such as these are substantial, with occupants carrying out a range of energy-intensive tasks using computers, machines and other pieces of technology. Around the clock security and lighting may be left on overnight both deliberately and unintentionally, meaning that energy is being used even when the building is not in use. Another problem arises from the fact that business activity often produces a large amount of waste and not all sites have the facilities to deal with this.

Filwood Green Business Park

Filwood Green Business Park is a different type of business park. The development was created by Bristol City Council and the Homes and Communities Agency, is environmentally sustainable and provides workspace for small and medium-sized business and start-ups, the majority of which take an environmentally friendly approach to business.

Filwood Green Business Park is located in Knowle West in South Bristol and opened on 28th May 2015. It was developed as part of the regeneration and sustainable development of South Bristol, with the idea for a sustainable business park coming from the residents of Knowle West themselves.

Funding of £5.195 million was provided by the European Regional Development Fund, with a further £6.1 million of funding came from the West of England Local Enterprise Partnership and the Revolving Infrastructure Fund. The design team was composed of a range of development projects, including CH2M Hill, Stride Treglows, RSK and Sweco.

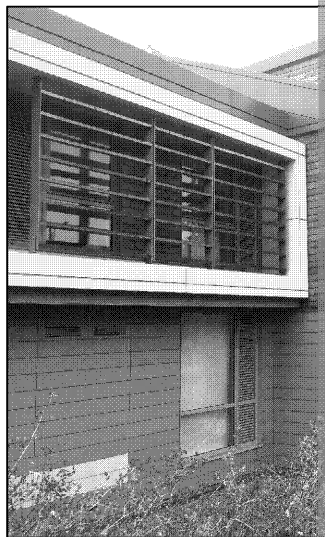


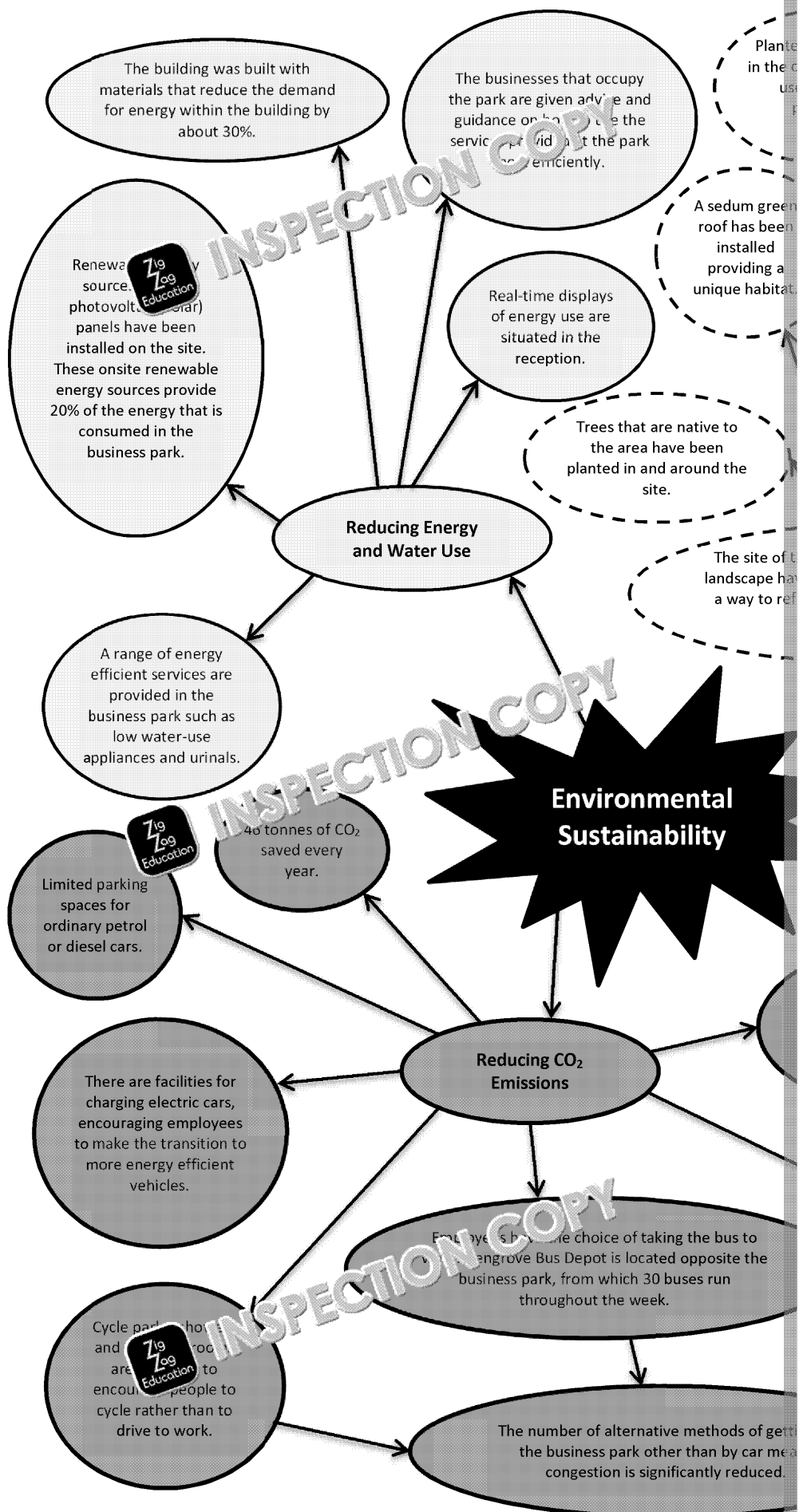
Figure 1 – Filwood Green Business Park

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This mind map shows how the business park has been designed and constructed in a sustainable way:



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Business development

While environmental sustainability had always been a key aim of the development of the site is, of course, business and industry. The success and development within the site has not been at all compromised by the environmentally sustainable design with 30 businesses now working from the range of office spaces and workspaces that Filwood Green Business Park has to offer.

The facilities available at Filwood Green Business Park include furnished offices for businesses of a variety of sizes, meeting rooms available for research or as a client meeting space, and board rooms, and a 'work hub' (see Figure 2) that provides space for external businesses to meet clients or for monthly charge.

Networking events are also organised by the business park in order to provide tenants and external businesses with the opportunity to meet with potential trading partners.

A range of small and medium sized businesses and start-ups are now working from Filwood Green Business Centre, providing a range of goods and services, from natural and sugar-free ice pops to appliance repairs.

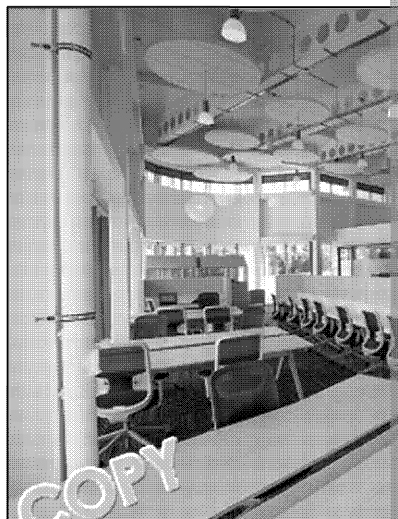


Figure 2 – the Work Hub at Filwood Green Business Park

Green Warehouse was one of the first businesses to move to Filwood Green Business Park and is a testament to the environmental ethos that is desirable among manufacturers. The company produces recycling bins that have been produced from 100% post-consumer recycled plastic that is used in product packaging in the UK and the recycled plastic that is used in product packaging in the UK also.

MTS Environmental, a team of environmental scientists, is another of the businesses at Filwood Green Business Park that are dedicated to sustainable business development. Environmental works alongside waste and construction industries in order to ensure that all work is environmentally sustainable.

Success of Filwood Green Business Park

Filwood Green Business Park has been highly commended for both its environmental credentials and the quality of its design. The site was built with the aim of meeting the highest standards of sustainability, achieving a BREEAM Outstanding rating. In 2016 the business park received a BREEAM score of 85, the second most sustainable industrial building in the UK.

The business park won five awards in the first year of being launched: The Bristol Regional Green Capital Award for an Ecobuilding, 2degrees Celsius Award 2015 – chosen by a panel of 5,000 professionals in the sector, and Green Business Park was chosen for contributing to the development of sustainable business.

Filwood Green Business Park is clear evidence that environmentally sustainable development is possible.

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Fact Table

Name	Filwood Green Business Park
Location	Knowle West, South Bristol
Opened	28 th May 2015
Funding	<ul style="list-style-type: none"> £5,495 million from the European Regional Development Fund £6.2 million from the West of England Partnership Revolving Infrastructure Fund
Developed by	Bristol City and Council and the Homes and Communities Agency
Design team	<ul style="list-style-type: none"> CH2M Hill Stride Treglows RSK Sweett Group
Reduced energy use	<ul style="list-style-type: none"> Building materials reduce demand for energy Onsite renewable energy sources provide 10% of energy consumed
Reduced water use	Low water use appliances have been installed and do not require any water
Reduced CO₂ emissions	<ul style="list-style-type: none"> 46 tonnes of CO₂ saved annually 40% reduction in CO₂ Cycle paths, footpaths and the nearby bus route provide a number of alternatives to driving Cycle parks and showers are provided for staff
Ecologically supporting characteristics	<ul style="list-style-type: none"> 'Wildlife-friendly' zone Plant boxes Planters in the car park Sedum green roof Native trees
Example of businesses working from the business park	<ul style="list-style-type: none"> Green Warehouse MTS Environmental
Awards	<ul style="list-style-type: none"> Bristol Post Green Capital Award for an outstanding business park 2degrees Champion 2015

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BREEAM	A method for measuring and assessing the sustainability of a building.
Congestion	The build-up of traffic.
Design team	A group of people from a range of disciplines who have been contracted to design and develop the business park.
Green building	A building that is environmentally friendly.
Ecological diversity	A range and variety of species and habitats.
Ecologically supportive	Helps maintain the diversity and health of the site.
Electric cars	Cars that run on electricity rather than petrol, designed to be more energy efficient than conventional cars.
Energy efficient	Provides the same service or product using a smaller amount of energy.
Environmentally sustainable	Meets the demands of the current generation without reducing the capacity of future generations to meet their needs.
European Regional Development Fund	A fund that aims to reduce the economic gap between different areas.
Homes and Communities Agency	Housing development and regeneration in the UK.
Solar panels	Technology that allows energy from sunlight to create electricity.
Renewable energy	Energy produced from sources that are not depleted.
Sedum green roof	A roof that is covered in a range of low-growing plants.
Start-ups	New businesses that are in the early stages of development.
West of England Local Enterprise Partnerships Revolving Infrastructure Fund	A fund for development of infrastructure projects about economic or housing growth.

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ICT interactive page

Rather than type out these we

Useful websites:

- ☞ The Filwood Green website provides plenty of information on the key business park.
<http://filwoodgreen.co.uk/>
- ☞ Take a look at the BRE website, where an example is given of how is decided.
http://www.breeam.com/BREEAM2011SchemeDocument/Content/03_a_building_s_breeam_rating.htm

News story:

- ☞ This article was written nearly a year after the business park was opened, details about the unique project.
<http://www.southwestbusiness.co.uk/sectors/construction-and-comm/report--can-bristols-green-business-park-live-up-to-the-hype--100320>

Website:

- ☞ This video explains the benefits of having a green roof, such as the sed Green Business Park has, and how the roof is constructed.
<https://youtu.be/cbzOUC0UIC>

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Springboard 1

'Filwood Green Business Park is an example of our ambitions for our year as Europe combines the highest level of environmental sustainability with strong economic activity for people. It is a leading project in the regeneration of South Bristol, a demonstration of organisations working together to deliver local jobs and growth.'



The above is a quote from George Ferguson, the Mayor of Bristol at the

1. How is this business park helping deliver local jobs and encouraging local businesses?
2. What features allow for the business park to be 'the highest level of environmental sustainability'?

Springboard 2



This is one of the cycle paths running through Filwood Green Business Park.

1. Why is it important to encourage the employees at Filwood Green Business Park to use public transport or cycle to work?
2. Discuss in small groups the design features of the business park that attract employees who drive to work.



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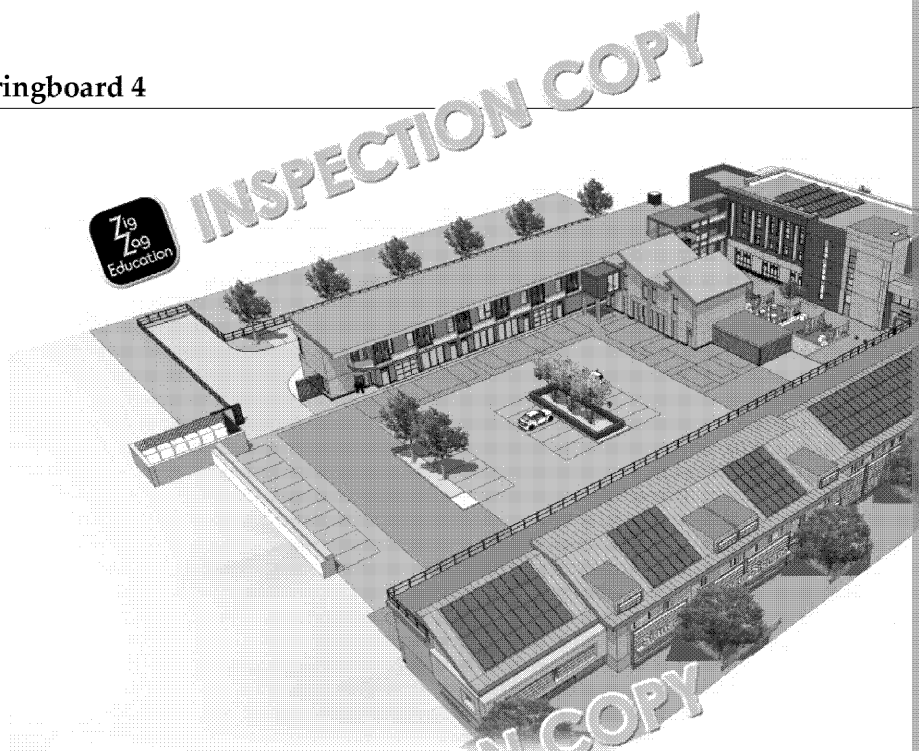


Springboard 3



1. Why are ordinary business parks and buildings environmentally unsustainable?
2. What could this office block do to be more environmentally sustainable?

Springboard 4



The photograph is a computer generated plan of the Filwood Green Business Park.

1. What companies were involved with designing this business park?
2. What can you see in this picture that is evidence of an environmentally sustainable design?

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Springboard Suggested Answers

Springboard	Q	Suggested answers / Discussion Points
1	1	<ul style="list-style-type: none"> The business park is available for use by small and medium-sized start-ups, as opposed to TNCs and large businesses. The small businesses and start-ups that use the facilities. Provides the opportunity for new businesses to develop. The business park organises networking events for businesses to find partners and therefore expand.
	2	<ul style="list-style-type: none"> Reduced energy demand compared to conventional buildings. Produces its own renewable energy. Low water use appliances have been installed, such as showers. The 'wildlife friendly' zone, sedum green roof, bird boxes. Employees are encouraged to use transport other than cars, such as walking to work or taking the bus.
2	1	<ul style="list-style-type: none"> To reduce congestion in the area. To reduce carbon emissions and increase the environment.
	2	<ul style="list-style-type: none"> Limited car parking spaces. Easily accessible via cycle paths. Easily accessible via footpaths. Bus depot opposite from which 30 buses run through the area. Charging points for electric cars. Cycle parks and shower facilities for those who cycle to work.
3	1	<ul style="list-style-type: none"> Lights are left on overnight even when the offices are not occupied. Security systems operate all through the night. The building materials are not designed to conserve energy and so lose a lot of heat energy. <p>A large amount of waste is produced; sometimes it is not recycled.</p> <ul style="list-style-type: none"> Computer and technology work is a large part of the work done in business parks/offices, which uses a lot of electricity. Often located out of town and a lot of traffic congestion on the commute to work.
	2	<ul style="list-style-type: none"> Turn off lights at night. Put up blinds/curtains to conserve heat in the winter. Build cycle parks and showering facilities to encourage people to cycle to work. Install solar panels on the roof so it can generate some of its own energy. Recycle as much of its waste as possible. Invest in energy efficient and water efficient services and equipment.
4	1	<ul style="list-style-type: none"> CH2M Hill Stride Treglows RSK Sweett Group
	2	<ul style="list-style-type: none"> Sedum green roof on large parts of the building. Solar panels. A limited car parking space in comparison to the size of the site. Lots of trees/greenery around the site. Waste/recycling centre.

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Part 2: Exam Preparation

Summary

Filwood Green Business Park

Background information	
Location	Gowle West, South Bristol
Occupied by	Small and medium sized businesses and start-ups
Development led by	Bristol City Council and the Homes and Communities Agency
Date the park opened	28 th May 2015
Funding	<ul style="list-style-type: none"> The European Regional Development Fund provided the main source of funding The West of England Local Enterprise Partnership provided £6,236 million from the Infrastructure Fund
Design team	CH2M Hill, Stride Treglows, RSK and Sweeting
Features	
Reduction in energy use	<ul style="list-style-type: none"> The construction materials used reduce embodied carbon Real-time displays of energy use in reception Provision of energy efficient services and facilities
Reduction in CO ₂ production	<ul style="list-style-type: none"> 46 tonnes of CO₂ saved every year 40% reduction in CO₂ production Use of on-site renewable energy sources such as solar panels 20% of the energy consumed Cycle paths, footpaths and Hengrove Bus Rapid Transit provide a route for employees of the business park with a number of employees driving to work
Ecologically supportive features	<ul style="list-style-type: none"> 'Wildlife-friendly' zone, with diverse grassland Bird boxes Planters in the car park for local projects Sedum green roof Native trees planted in and around the site
Work space available	<ul style="list-style-type: none"> Office space, workshops and studios suitable for businesses of a range of sizes Networking events are organised to help businesses find trading partners
Awards	
Awards	<ul style="list-style-type: none"> The Green Capital Award for 2015 Green Champion 2015

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Quick-fire Questions: Filwood Green Business Park

1	When was Filwood Green business Park opened?	
2	How much funding was provided by the European Regional Development Fund?	
3	How many organisations were involved in designing the business park?	
4	By how much have the building materials that were used to create the building reduced the demand for energy?	
5	How many tonnes of carbon are saved every year?	
6	How much of the energy used at the business park is produced from renewable energy?	
7	What feature has been installed on the roof of the building to make the building more ecologically supportive?	
8	What type of businesses is the park used by?	
9	What BREEAM score did the building receive?	
10	What are the two awards that Filwood Green Business Park has won for its design and environmental credentials?	

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Quick-fire Answers: Filwood Green Business Park

1	When was Filwood Green Business Park created?	28th May 2015
2	How much funding was provided by the European Regional Development Fund?	£5,495 million
3	How many organisations were involved in designing the business park?	4
4	By how much have the building materials that were used to create the building reduced the demand for energy by?	30%
5	How many tonnes of carbon are saved every year?	46 tonnes
6	How much of the energy used at the business park is produced from renewable energy?	20%
7	What feature has been installed on the roof of the building to make the building more ecologically supportive?	Sedum green roof
8	What type of businesses is the park used by?	Small and medium sized businesses
9	What BREEAM score did the building achieve?	93%
10	What are the two awards that Filwood Green Business Park has won at for its design and environmental credentials?	Bristol Post Green Capital

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Extension Questions: Filwood Green Business Park

1. Why are conventional business parks not very environmentally sustainable?
2. Explain how the design of the building has reduced the energy and water consumption.
3. How has it been ensured that the environmental sustainability of the building does not hinder the business activity and development that is possible?
4. Why is it important to maintain the ecological diversity of a site? How can this be achieved?
5. Why do you think making a business or industrial building environment more sustainable is important for development?

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Extension Answers: Filwood Green Business Park

1.
 - Usually lots of emissions and congestion is created by people travelling to and from the park, often out of town
 - Emissions and congestion increased by delivery vehicles travelling to and from the park
 - The activity in business parks is energy intensive
 - Around the clock security and lighting often means energy is being used even when the park is closed
 - Business activity and development is prioritised over and above maintaining the area
 - A lot of waste is produced, much of which is often not recycled
 2.
 - Low water use appliances such as waterless urinals have been installed
 - The materials used to build the business park reduce energy demand by being energy efficient
 - Renewable energy is produced on site, for example by photovoltaic panels
 - Renewable energy sources are needed
 - Real-time displays of energy use are shown in reception to increase awareness
 - Energy efficient facilities and services have been installed and the tenants are encouraged to best to use these facilities
 3.
 - Energy efficient facilities enable the same service to be provided from a smaller footprint
 - The facilities available to the tenants are equal to that which could be found in a traditional office
 - There are a range of office and work spaces available depending on the size of the business
 - Networking events provide the businesses within the park the opportunity to meet and collaborate with trading partners
 4.
 - So ecosystems are not disrupted
 - So ecosystem services are not diminished
 - To maintain natural spaces and biodiversity
 - To ensure ecosystems do not become fragile
 - To maintain the recreational and leisure values of areas
- Designers have managed this by:
- Planting native trees
 - 'Wildlife-friendly' zone
 - Species rich grassland
 - Sedum green roof
 - Planters in the car park
 - Installing bird boxes
5.
 - Unsustainable business development will eventually exhaust resources
 - It is good to plan for the future
 - Business and industry needs to become more environmentally friendly in order to survive
 - Being environmentally sustainable will reduce the demands on services (roads, water supply and energy supply)
 - If a business park is developed to use less energy, then money can be saved and the cost of electricity can be produced on site rather than having to buy it from an external source
 - It is easier and cheaper for a business park to be constructed in a way that is sustainable than to make these changes after the business park has been built
 - It is important to set an example for future projects to show that sustainable business development is possible

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Exam-style Question

With reference to a modern industrial development you have studied, discuss how the UK can become more environmentally sustainable.

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Level Marking

Level	Mark	Description
1	1–2	<ul style="list-style-type: none">The student evidences basic knowledge of the topic in question.The student evidences limited understanding of the connections between environments and processes. (AO2)
2	3–4	<ul style="list-style-type: none">The student evidences some knowledge of the topic in question.The student evidences a good understanding of the connections between environments and processes. (AO2)
3	5	<ul style="list-style-type: none">The student evidences thorough knowledge of the topic in question.The student evidences a firm understanding of the connections between environments and processes. (AO2)

Indicative Content:

- Students should identify reasons why industry traditionally has a significant environmental impact.
- Students should discuss, with reference to a particular case study, how improvements can be made to minimise these impacts.

Suggested Content:

- Traditional business parks use a huge amount of energy in the lighting and heating. Filwood Green Business Park was built with materials that reduce this energy demand and renewable energy sources, such as photovoltaic panels, have been installed onsite and provide 20% of the energy used.
- Business parks are often out of town, and poorly connected to public transport. Air and noise pollution are created through people commuting to work. Filwood Green Business Park has reduced this through providing only limited parking spaces for ordinary petrol or diesel cars and encouraging surrounding cycle paths and footpaths to get to work or to use public transport.
- The building of business parks often means that natural ecosystems and habitats are destroyed. Filwood Green Business Park has counteracted this through planting native trees in and around the park, creating 'wildlife-friendly' zones of rough grassland and a pond, and installing bird boxes.
- The environmental sustainability of Filwood Green Business Park has not come at the expense of the business industry that takes place within the centre.

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