

BroadwayMalyan^{BM}

S.36 Application Portbury Dock Renewable Energy Plant Design and Access Statement

Prepared by Broadway Malyan on
behalf of E.ON Climate & Renewables
UK Developments Limited August 2009



Portbury Dock Renewable Energy Plant

Design and Access Statement

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1.0 Introduction

This Design and Access Statement has been prepared to support a s36 application for a Biomass Renewable Energy Plant at Royal Portbury Dock, North Somerset.

The application has been submitted by E.ON Climate & Renewables UK Developments Limited (EC&R). This Design and Access Statement has been prepared by Broadway Malyan. Broadway Malyan is a leading UK planning, architecture and urban design practice.

The purpose of this statement is to appraise the site and demonstrate how the wider context has influenced design principles and access arrangements for the proposed development. Whilst the form and design of the Renewable Energy Plant will be developed following approval, this statement is intended to assist in the establishment of a number of key design and development principles to be delivered through the detailed design process.

This statement reflects the latest national guidance on Design and Access Statements, including:

- Circular 01/06 'Guidance on Changes to the Development Control System' (DCLG, 2006); and

- 'Design and Access Statements, How to write, read and use them' (CABE, 2006).

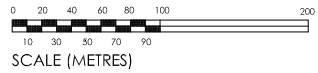
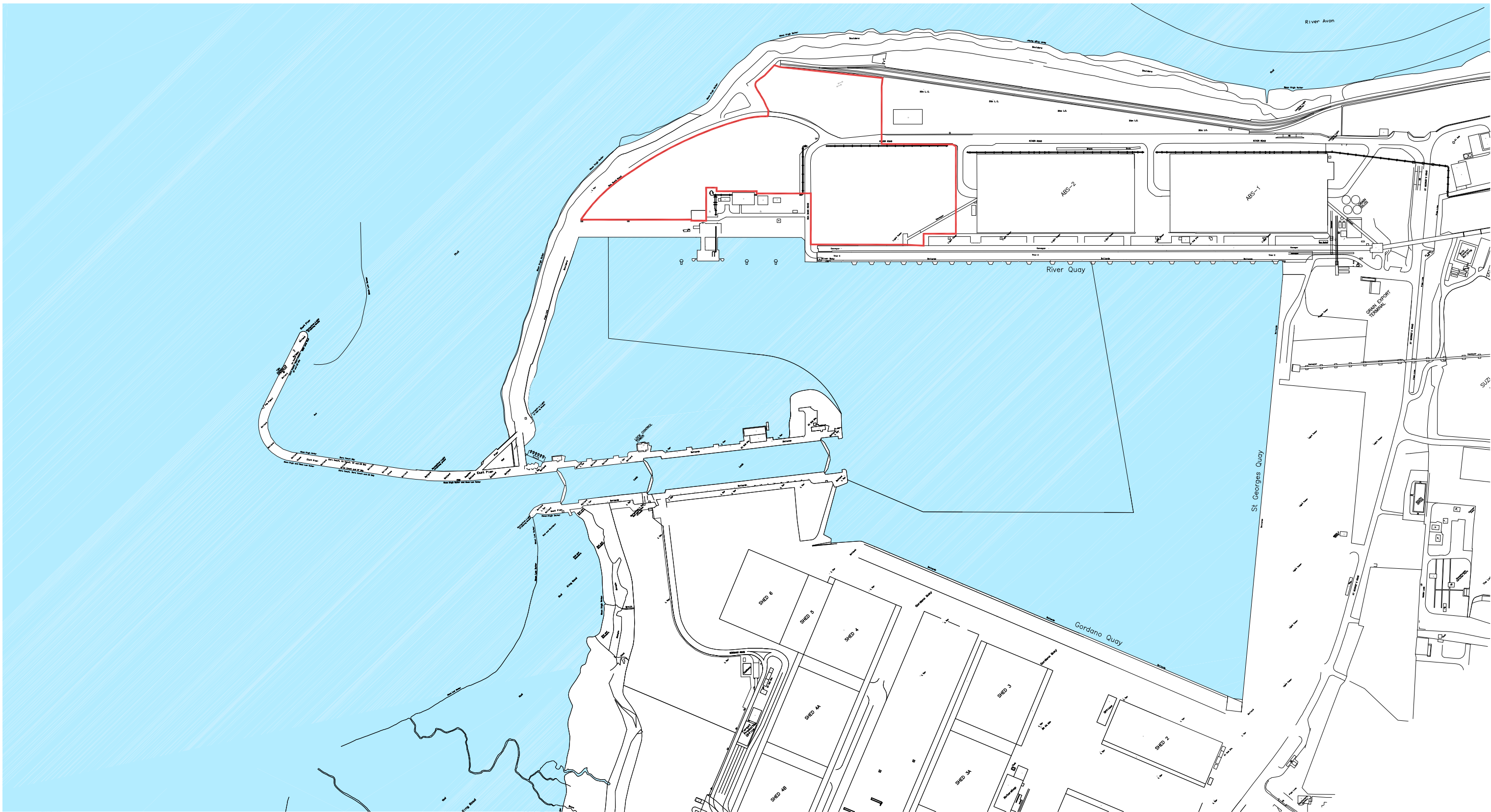
Regard has also been had to North Somerset Council guidance on Design and Access Statements.

In order to describe and explain the design principles that have informed the indicative layout, siting, appearance and scale of the proposed Renewable Energy Plant this statement provides a wider context to the proposal before following the structure as outlined in 'Design and Access Statements, How to write, read and use them' (CABE 2006), namely:

- Use;
- Amount;
- Layout;
- Scale;
- Landscaping;
- Appearance; and
- Access.

The statement concludes by confirming the key proposed design and development principles for the proposed Portbury Dock Renewable Energy Plant. The process for maintaining design quality through the detailed design stage is also considered.

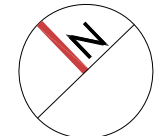
A location plan showing the plant in its wider context is included in this section.



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Client
E-ON

Project
Portbury Dock Renewable Energy Plant

Description
Location Plan

Status

Scale 5000 @A3	Drawn ir	Date Aug 09
Job number 26289	Drawing number Figure 1	Revision

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2.0 Background and Context

Wider Context

This section of the Design and Access Statement provides some background and context to the Portbury Dock Renewable Energy Plant proposal. In particular the following areas are considered:

- Renewable Energy and Climate Change
- E.ON's Renewable Energy Commitment
- Choice of Biomass as a Renewable Fuel
- Site selection
- Plant Components and Operation
- Public Consultation

Renewable Energy and Climate Change

In 1997 the UK Government signed up to the Kyoto Protocol in which industrial nations agreed to reduce their collective emissions of greenhouse gases (GHG), particularly carbon dioxide by 5.2% from 1990 levels by the period 2008 to 2012 and help to tackle climate change. This has led to the introduction of a number of schemes / directives which will impact on the energy industry, which is the largest single contributor to GHG emissions in the UK.

The United Nation's Framework Convention on Climate Change and its Kyoto Protocol provide

real impetus for combating climate change through the stabilisation of greenhouse gases in the atmosphere. A very important consideration is the production of the greenhouse gas, carbon dioxide, a key mechanism for the production of which is the combustion of fossil fuels such as coal, oil and gas. By ratifying the Kyoto Protocol, the UK government is legally bound to reduce its emissions of greenhouse gases below 1990 levels.

In February 2003, the UK government published its Energy White Paper detailing its new energy policy and aiming to ensure that energy, the environment and economic growth are properly and sustainably integrated. The White Paper puts forward plans to avoid over-dependence on imported energy by developing renewable energy sources within the UK.

In May 2007, the Department of Trade and Industry published a White Paper on Energy: Meeting the Energy Challenge. The paper confirmed the intention to strengthen the Renewable Obligation, increasing the Obligation to up to 20% as and when increasing amounts of renewables are deployed.

The UK has a lot of work to do to increase the amount of electricity generated from renewables

sources. In the UK in the year 2000, renewables (excluding large hydro plant and mixed waste incineration) supplied only 1.3% of our electricity, compared with 16.7% in Denmark, 4% in the Netherlands, 3.2% in Germany and 3.4% in Spain. The government's aim is for the UK to produce 10% of its electricity from renewables by 2010 with an aspiration to double this to 20% by 2020.

The UK Government has introduced the Renewables Obligation (RO), in order to provide additional support for the development of renewable electricity generation. The RO was introduced on 1st April 2002, through the Renewables Obligation Order (ROO) for England & Wales. Under the RO, licensed electricity suppliers are obliged to meet a defined percentage of their retail sales from renewable sources. The RO started at 3% in the financial year 2002/3 and rises in stages to 15.4% in 2015/16.

The proposed Renewable Energy Plant at The Royal Portbury Dock is part of E.ON's commitment to achieving its Renewables Obligation.

E.ON's Renewable Energy Commitment

E.ON is the world's largest privately owned energy company. Electricity and gas are the core business of the company with leading positions in Europe and the US Midwest. E.ON UK plc's holding company, E.ON AG, is based in Düsseldorf and is responsible for managing the E.ON group as a whole. E.ON UK plc was formed following E.ON's purchase of Powergen UK plc in 2002. Powergen UK plc was formed in 1989 from the Central Electricity Generating Board (CEGB) as part of the privatisation of the electricity industry in the United Kingdom.

E.ON Climate & Renewable UK Developments Ltd is making a major contribution to the growth in renewable energy. In the UK, EC&R is one of the UK's leading renewable generation businesses. EC&R already generates enough green energy to meet the residential power needs of a city the size of Manchester. EC&R's current portfolio of operational projects consists of onshore and offshore wind farms, hydro power schemes and biomass-fuelled generation. These include the UK's first offshore wind farm and the largest dedicated biomass fired power plant in Scotland at Lockerbie. E.ON UK's objective is to increase its renewable generation capacity to 1,100MW by 2010 and to help build a sustainable future for generations to come.

EC&R's proposals for Royal Portbury Dock represent a further commitment to developing renewable energy generation capability.

Choice of Biomass as a Renewable Fuel

As noted earlier EC&R is developing a portfolio of renewable energy capacity utilising a variety of sources. At Royal Portbury Dock, EC&R intends to utilise biomass.

The Technical Annex to the Companion Guide to PPS 22 'Planning for Renewable Energy' confirms the role of biomass in renewable energy generation and defines the material regarded as potential biomass sources.

Paragraph 4 of the Technical Annex confirms that *'.....biomass differs from most other sources of renewable energy to the extent that the fuel can be grown rather than harnessed, and it gives off carbon dioxide when burned. However, these fuels are regarded as 'carbon neutral', because the carbon released on combustion is only that which was absorbed during crop growth – the gas is simply recycled. So, when it is used in combustion in place of fossil fuels, a net reduction in carbon emissions is achieved.'*

The design of the plant reflects the process required to convert the biomass fuel to electricity and heat.

Site Selection

In identifying Royal Portbury Dock as an appropriate site a number of factors have been considered, namely:

- fuel supply and access
- land availability
- electrical connection
- site suitability

Fuel Supply and Access

E.ON is committed to developing a diverse and secure portfolio of sustainable energy sources.

The source of fuel at the proposed plant can only be confirmed once the plant has the relevant approvals and commitments. This is because EC&R is only able to commit to the necessary long term supply contracts once there is confidence that the plant can be viably developed.

Given the scale of the proposed energy generation, which delivers positive sustainability, efficiency and viability outcomes, it is necessary to

provide for the transportation of a substantial amount of fuel to the site from distance.

The biomass production industry is a developing market, and particularly immature in the UK where in addition pressures on land are significant. EC&R therefore envisages that the bulk of material used by the plant will come from overseas. Ship is the most fuel efficient means of importing such material, hence the port-side location.

All fuel sourced, either in the UK or overseas will be from Forestry Stewardship Council Certified Sustainably Managed Forests (or an appropriate equivalent).

To maximise the benefits of the port-side location and minimise the level of local delivery traffic, EC&R has committed to no more than 30% of the fuel being delivered by road. The majority, and at least 70%, is likely to come by sea. This flexibility is required to maintain security of supply and to make use of potential waste wood and virgin wood sources in the region. Good motorway access is therefore important. The Port also has rail access, which depending upon the source of fuel and rail line capacity may provide a further fuel delivery option.

The Royal Portbury Dock is therefore a highly accessible location with a good sea, road and potentially rail access.

Land Availability

The Royal Portbury Dock site is a suitable location well served by transport infrastructure. The site is in the ownership of The Bristol Port Company and EC&R has a lease agreement to facilitate its development and use for a Renewable Energy Plant. The site therefore enables E.ON to deliver on its commitment to reduce the carbon intensity of its electricity generation.

A Sequential Test undertaken as part of the Flood Risk Assessment supporting this application has demonstrated that there are no other sites in the area that are available or suitable for the proposed Renewable Energy Plant.

Proximity to the electricity infrastructure

The plant will be connected into the National Grid via an existing 132kV substation approximately 2.5 km to the southwest of the proposed development site, adjacent to the Royal Portbury Dock Estate at Portishead. The cable will be owned and maintained by Western Power Distribution and installed under their permitted development rights.

Site Suitability

The site is considered suitable for biomass renewable energy generation as:

- It is well served by the transport network
- The site is brownfield and is in an established dockland and industrial area
- The site is of sufficient size to accommodate the development
- The site is in close proximity to potential users of heat, including development areas around the Royal Portbury Dock.

Plant Components and Operation

The plant will comprise the following key elements:

- Fuel Store – the processed fuel store likely to consist of a series of circular section silos. The fuel will be reclaimed by automatic conveyors. The capacity of the store will be equivalent to at least fourteen days operation at full output such that the plant can continue to operate between ship deliveries and over weekends and bank holidays when no new local deliveries to the plant are made. From this store the fuel will be conveyed to small

buffer silos in the boiler house. The buffer silos will have a limited capacity of around one hour and will be used to meter the flow of fuel to the boiler.

- Boiler House – the fuel store will feed fuel into the combustor, housed in the boiler house. The fuel will be burnt in the combustor to generate steam through heating of water. Steam will be fed into the turbine housed in the turbine hall. The Boiler House will have a footprint of approximately 50 metres by 100 metres and a height of approximately 64 metres.
- Turbine Hall – This building will house the Steam Turbine and generator which will generate electricity. This building will have a footprint of approximately 45 metres by 25 metres and a height of approximately 30 metres.
- Flue Gas Treatment and Stack. Flue gas resulting from the combination process will be cleaned and filtered prior to emission to air in line with current legislation. A stack of 120 metres will be used to emit the treated flue emission to air. This height of stack will enable the required dispersal to be achieved to realise emissions and air quality standards.
- A Hybrid Cooling Tower System – A recirculating cooling water (CW) system will be used to condense the steam turbine exhaust using hybrid cooling towers. A hybrid cooling tower system uses a low level mechanical draught tower incorporating both “wet” and “dry” sections to minimise plume visibility. The heated cooling water from the steam turbine condenser initially passes through tubes in the dry section where part of the heat is removed by the air current induced by the fans. The water is then cooled further by an evaporative process in the wet section of the tower. The heated air from the dry section is then mixed in the upper part of the tower with the vapour from the wet section. This lowers the relative humidity before the air current leaves the cooling tower, which significantly reduces plume formation above the tower.
- Administration Building – the plant will also accommodate an administrative and technical building.

The detailed design of the plant will in large part need to respond to the type of boiler, turbine and other equipment utilised. The efficiency, robustness and suitability of plant technology will be a key factor the choice of primary contractor.

The providers of the boiler, turbine and related equipment be engaged following competitive bidding in due course. Therefore the exact configuration of the plant infrastructure and thereby the location and massing of buildings can only be determined once the primary contractors have been appointed.

Public Consultation

EC&R has undertaken extensive public consultation in preparing this planning application. Consultation methods have included:

- Attendance at stakeholder meetings
- Public Exhibitions

The predominant issues raised in consultation have been traffic generation; the environmental/sustainability justification; noise, air and visual impacts; the impact on the operation of the Port; and the relationship to aspirations to introduce a commuter rail link to Portishead.

Full details of the public consultation exercise are included in the Statement of Community Involvement which accompanies this application.

3.0 Site Appraisal

Site Description

This section of the Design and Access Statement considers the site and its context and establishes a number of design challenges and opportunities to be addressed through the development.

Location

The site lies in the district of North Somerset in the South West of England at the border of the district boundary with Bristol City. The site is approximately 12 km to the south-west of Bristol City Centre, and approximately 2km north-west of the M5 motorway between junctions 18 and 19. The site is adjacent to the Severn Estuary and is bounded on its north-eastern side by the River Avon.

Immediate Surroundings

The site lies at the northern, seaward edge of the Royal Portbury Dock operational area. An animal feed store, consisting of two buildings and associated infrastructure lie immediately to the south of the application site with the Dock itself

located to the west. The mouth of the River Avon is located to the east.

The Royal Portbury Dock Estate contains a number of large buildings and structures including, grab unloader cranes and the ABS sheds (animal feed stores). The wider Port area contains a number of tall buildings and structures including the ADM Milling building, Avon Mill, No. 5 Granary and three wind turbines.

The majority of the Port is covered with built structures, access roads and hard standings used for storage and car parking. A network of vegetation, amenity and screen planting, is located to the south, east and north around the Royal Portbury Dock Estate, but does little to change the industrial character of this area.

The Site

The site extends to approximately 4.9 hectares and is largely flat. The development site consists of a hardstanding on reclaimed land and is currently used for temporary motor vehicle storage. The site and immediate surroundings was created by The Bristol Port Company in the early 1990s with land reclaimed from the Severn Estuary.

Wider Context

The site lies at the northern extent of the Royal Portbury Dock.

As noted in the Environmental Statement the plant will be visible to a greater or lesser degree from various points in the wider area. Many of these views will, however, be at some distance and will not be out of keeping with the industrial character of the site. It will therefore not have a significant impact on visual amenity.

4.0 Development Considerations

Planning Context

National and regional planning policy is supportive of the development of Renewable Energy generating capacity. Opportunities to recover energy from waste are also supported. Development is to be consistent with environmental objectives including the protection of biodiversity, air quality and the landscape.

The continued expansion of port operations and associated activities at Royal Portbury Dock is supported in the Development Plan where, amongst other things, the development has no unacceptable implications for traffic congestion and the environment.

A Planning Statement is submitted in support of this application.

Use

The proposed use for the development site is for a Renewable Energy Plant. The illustrative layout is included in this section.

The proposed Renewable Energy Plant is effectively an industrial use, utilising a substantial amount of material brought in via the port. It is therefore consistent the port infrastructure / industrial character of this part of the Severn Estuary. Emerging guidance confirms that industrial sites are potentially suitable for waste to energy projects.

Amount

The proposed Renewable Energy Plant will have a generating capacity of 150 MW electricity with provision to supply heat energy and will be designed accordingly.

The total floorspace is confirmed later in this section.

The operation of the plant will generate in the order of 109 vehicle movement into and 109 movements out of the site on a daily basis. The Transport Assessment submitted in support of the planning application demonstrates that this level of traffic can be accommodated by the local highway and motorway network.

Layout

The layout of the site and proposed Renewable Energy Plant is a combination of a number of factors and principally:

- Access
- Operation of the Plant

The layout of the plant is largely determined the operational structure and adjacencies of the plant.

The starting point for the plant process is the Fuel Store. The fuel store then provides a regular supply of material to the Boiler House. The Boiler House, housing the combustor has a close process relationship with the Turbine House, Flue Gas Filter, Stack and a Hybrid Tower Cooling System.

An illustrative layout plan is included in this section.

There is greater flexibility as to the location of the Administration Building and Workshop, A contractor's area has been included in the site layout both to provide for the construction period and longer term maintenance works.

A further, temporary contractor's area will be identified within the Royal Portbury Dock site once the development is committed. This area will be utilised during the construction phase.

Scale

The scale of the development reflects its purpose and intended generating capacity.

The floorspace, footprint and height of the principal elements of the development are estimated as follows:

	Length (m)	Width (m)	Footprint (m)	Height (m)
Hybrid Cooling Towers (2 banks)	75	15	1125	40
Boiler House	100	50	5000	64
Fabric Filter Unit	20	15	300	25
Fuel Silos (10)	-	30	--	35
Stack		5	-	120
Turbine House Building	45	25	1125	30
Administration Building	40	12	480	4
Workshop	40	12	480	10

The most dominant and visible elements of the proposed development are the Fuel Store, Boiler House, Hybrid Cooling Tower and chimney Stack.

The massing of Fuel Store and Boiler House are dictated by their function and the equipment housed. The height of the stack is required up to 120 m to optimise the achievement of emissions standards.

A series of visualisations of the scheme are included in this section. A series of photomontages are also included in the Environmental Statement which accompanies the application.

Landscaping

The landscaping approach to the site will reflect the following principal objectives:

- To create a functionally effective, attractive and above all safe working environment in the Renewable Energy Plant compound.
- To facilitate Sustainable Drainage.

Appearance

Design Concepts

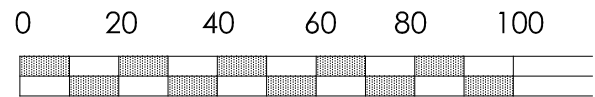
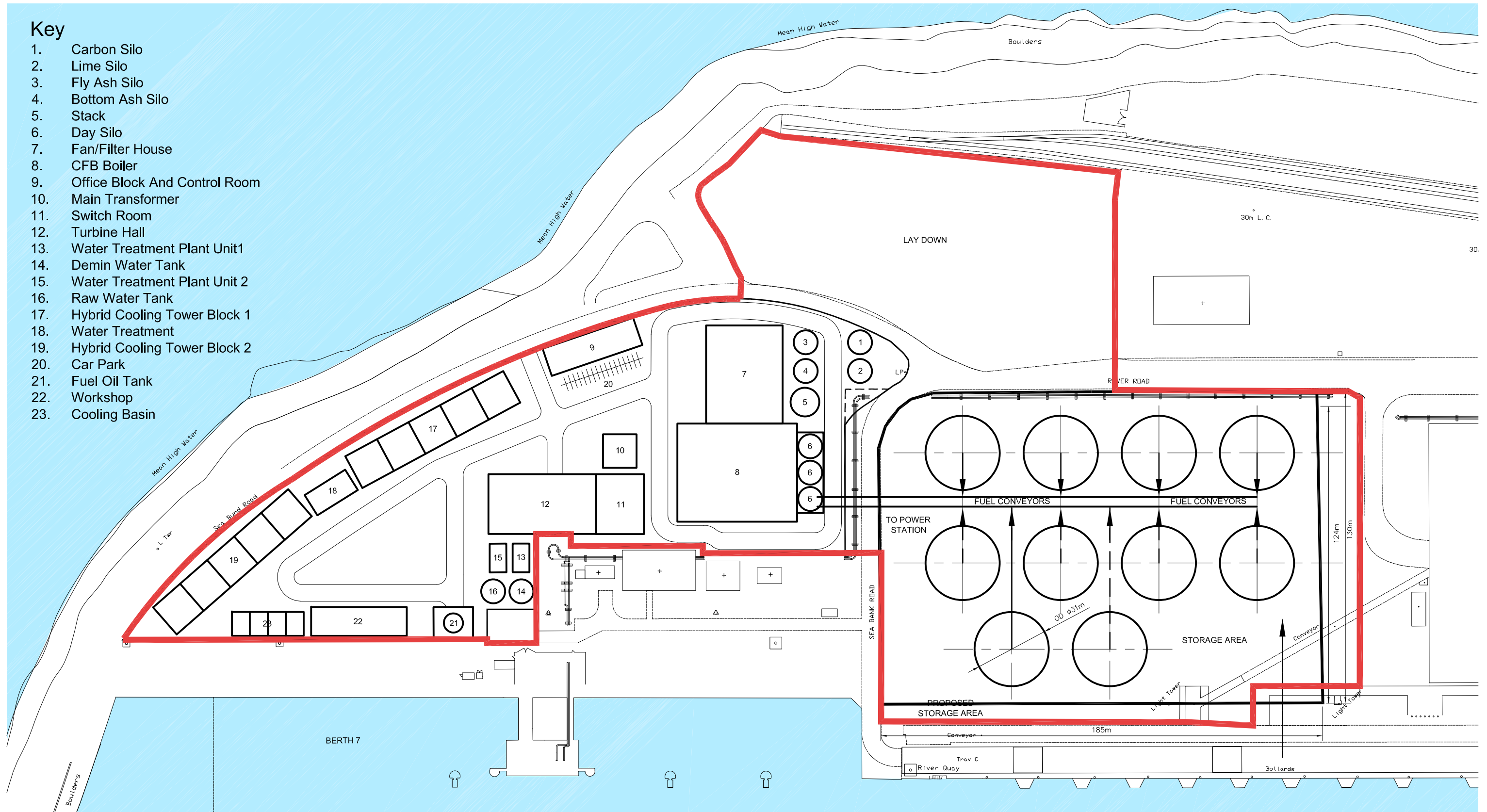
The overall objective for the detailed design of the Renewable Energy Plant will be to create a clean industrial character consistent with its role, the use of sustainable energy generation technology and its visible location and context.

A Design Concept plan and a series of Illustrative Visualisations are included in this section.

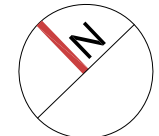
Whilst the site is locally prominent the overall image of the site is intended to be one of a

Key

- 1. Carbon Silo
- 2. Lime Silo
- 3. Fly Ash Silo
- 4. Bottom Ash Silo
- 5. Stack
- 6. Day Silo
- 7. Fan/Filter House
- 8. CFB Boiler
- 9. Office Block And Control Room
- 10. Main Transformer
- 11. Switch Room
- 12. Turbine Hall
- 13. Water Treatment Plant Unit1
- 14. Demin Water Tank
- 15. Water Treatment Plant Unit 2
- 16. Raw Water Tank
- 17. Hybrid Cooling Tower Block 1
- 18. Water Treatment
- 19. Hybrid Cooling Tower Block 2
- 20. Car Park
- 21. Fuel Oil Tank
- 22. Workshop
- 23. Cooling Basin



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Client
E-ON
 Project
Portbury Dock Renewable Energy Plant
 Description
Illustrative Plan

Status
 Scale
1:1500 A3
 Job number
26289
 Drawn
ir
 Drawing number
Figure 2
 Date
Aug 09
 Revision

Original size 100mm @ A3 Copyright Broadway Malyan Limited

contemporary functional, modern, industrial bordering the Severn Estuary. It will offer architectural character and aesthetic quality through the use of visually strong and wherever possible, sustainable materials.

Design Elements

Within the context of the design approach outline above it is proposed that the detailed layout seeks to develop on the following design elements:

- Focal points, reinforcing legibility and entry points to the plant.
- Key elevations / building lines – particular emphasis in terms of design should be taken to developing strong, well considered elevations to buildings facing all site boundaries.

Materials

It is envisaged that where possible buildings will be constructed using material integral to the design and external appearance.

Cladding materials would be selected on a basis of compliance with the requirements to be affordable, long lasting in an urban industrial atmosphere (with minimal maintenance requirements). Environmental sustainability will also be

building set in an industrial/dockland environment considered with regard to energy consumption in production and transportation, use of natural resources and capability to be recycled.

In detailed design the opportunity will be taken to introduce an element of architectural interpretation to the key and/or most prominent elements of the development.

Massing / Roof lines

Where appropriate opportunities will be taken to develop the appearance of otherwise simply profiled buildings by considering refinement to the roof lines and so forth to create additional interest and reflect some examples of more traditional industrial development in the wider area.

Lighting

Lighting will be used to meet health and safety requirements and maintain a degree of visibility of the built form after dark. However light pollution and impact of local habitat areas will be minimised.

Access

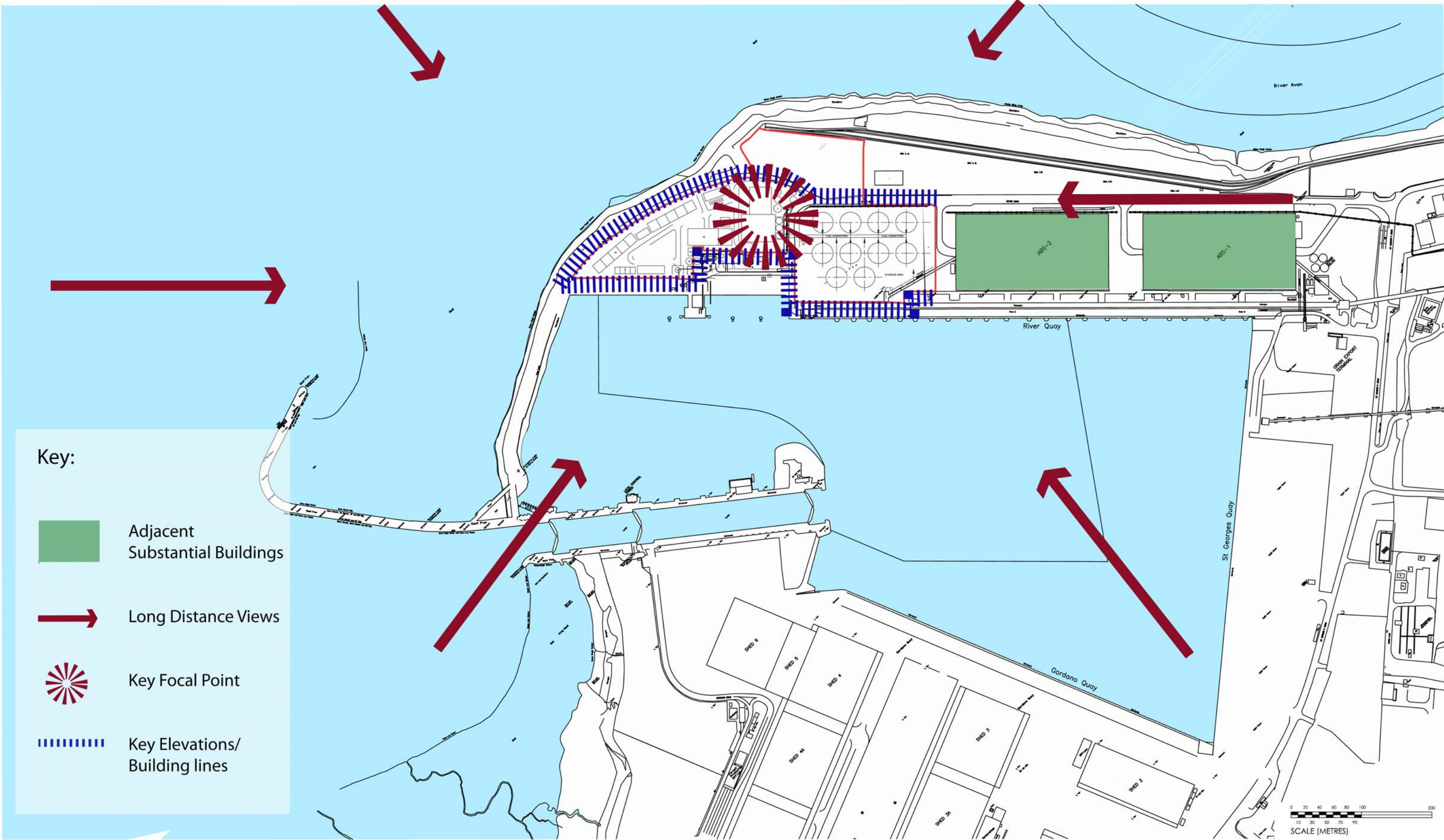
The site is accessed from Junction 19 of the M5 and the A369 via Royal Portbury Dock Road. This is a two way single carriageway which is largely a private road in the ownership of The Bristol Port

Company and is only a public highway as it approaches the M5/J19 junction. Within the Dock the site is readily accessible with existing vehicular access via the inner local access roads.





Access to the core of the site will be controlled by a gatehouse at the southern end of the site compound. Visitor parking will be provided outside of the core area, with visitors entering the site on foot.

Staff car parking will be provided within the core compound area. Disabled visitor and staff parking will be provided.

Disabled access will be provided to and throughout the Administration Building. It is considered inappropriate and unsafe to seek to provide access to operational parts of the site which are effectively equipment. As noted by the Building Regulation 2000 Part M 'Access to and use of Buildings' the requirements for disabled access do not apply to any part of a building which is used solely to enable the building or any service or fitting in the building to be inspected, repaired or maintained.



Key:

-  Adjacent Substantial Buildings
-  Long Distance Views
-  Key Focal Point
-  Key Elevations/ Building lines

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Design Concept

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Scale	Drawn	Date
1:5000 @A3	ir	Aug 2009
Job number	Drawing number	Revision
26289	E_006	
Original size 100mm @ A3 Copyright Broadway Malyan Limited		

No uncontrolled public access is to be provided to the site, or the plant compound in the interest of health and safety and security.

Proposed Portbury Dock Renewable Energy Plant

Indicative Visualisations, August 2009



View from the Northwest



View from the North



View from the South



View from the West

5.0 Design and Development Principles and Process

EC&R acknowledges the importance of design and is committed to delivering a development which meets its operational requirements and sustainability objectives, whilst adding to the built and natural character of this part of the Severn Estuary.

Principles

In developing a detailed scheme in conjunction with its primary contractors EC&R, intends to adopt the following design and development principles:

1. A development that responds to the location of the site and the operational requirements of a renewable energy plant.
2. To construct the development to achieve BREEAM good standard (or relevant equivalent) whilst striving where possible for very good and/or excellent.
3. To adopt a sustainable drainage system that achieves run-off from the site equivalent to green field run-off.

Process

As noted earlier the detail of the scheme cannot be developed until such time as a primary contractor has been appointed.

The primary contractor will be required to retain architectural and design advisors. However EC&R will retain an executive position on design through the detailed design process.

EC&R will appoint a reputable UK architect and design practice to advise EC&R and the contractor's design team. EC&R will also engage an artist to work with design team.

EC&R, and its design advisors, will 'sign-off' any detailed proposals or drawings prior to issue to the local authority and other stakeholders for comment or acceptance.