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Planning Design Economics

Barry Waterfront

**Environmental Statement
(August 2009), Addendum
(January 2010) and Addendum
2 (June 2010)**

Non Technical Summary

June 2010

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1.0 Introduction

Purpose of Document

1.1 This document is a Non-Technical Summary of an Environmental Statement (ES) (August 2009), supporting ES Addendum (January 2010) and a second ES Addendum (June 2010) and has been prepared on behalf of Persimmon Homes, Taylor Wimpey and BDW Trading Ltd (Barratt South Wales) ('the Consortium'). Outline planning permission is sought at Barry Waterfront for a mixed use development of residential, retail, cafés, bars and restaurants, hotel and office uses with associated infrastructure works.

1.2 The ES sets out the results of an Environmental Impact Assessment ('EIA') of the proposed development. The EIA process aims to ensure that any significant effects arising from a development are systematically identified, assessed and presented to help local planning authorities in determining planning applications. If measures are required to minimise or reduce effects then these are clearly identified.

1.3 For the Barry Waterfront project, the EIA has been carried out due to the scale and nature of the proposals and the location and characteristics of the site. It has been completed in accordance with best practice and relevant legislation and has addressed those matters agreed with the Vale of Glamorgan Council as being required to address the impacts of the proposed development. These matters comprise:

- Transportation
- Landscape & Visual
- Ecology
- Archaeology
- Water Resources, Drainage and Flooding
- Ground Conditions and Contamination
- Noise & Vibration
- Air Quality
- Socio-Economic Effects
- Arboriculture

Background & Form of Application

1.4 The Barry Waterfront proposals have evolved following consultation with the local community and stakeholders. This included public exhibitions (12 – 13 June 2009) which were advertised through the local media, on posters, on the project website (www.barrywaterfront.com) and on posters throughout the town.

1.5 A number of meetings with key stakeholders were also held during the preparation of the application including key consultees such as the Environment Agency.

- 1.6 The Non-Technical Summary incorporates any changes that are required as a result of the second ES Addendum (June 2010) that has been prepared for the Barry Waterfront application which takes into consideration consultation responses received to date and a number of minor alterations that have been made to the Masterplan and associated parameter plans. The Non-Technical Summary has been reproduced as a single standalone document for clarity.

The Outline Application

- 1.7 The application which has been submitted is an 'outline' application which seeks approval, in principle, of the development proposal. The application reserves all detailed elements for the project which will be submitted at a later date.

Need for the Development

- 1.8 The site is located to the south of Barry Town Centre and represents one of the most significant development opportunities within the Vale of Glamorgan. It is considered that the regeneration of this derelict brownfield site is key to the continued regeneration of Barry and to the Vale meeting housing supply targets in line with national planning guidance.

- 1.9 Barry is the highest order settlement within the Council area with the widest range of services. The site is within easy walking distance of the town centre. It is therefore the most sustainable location for new development within the Vale of Glamorgan.

- 1.10 The Barry Waterfront site is allocated within the Vale of Glamorgan Unitary Development Plan as a 'Comprehensive Development Area' (CDA). Specifically, the UDP recognises the site's potential to deliver a mixed use scheme which will be residential led. The creation of an active waterfront including bars and cafes is a key aspiration for the Council and the Consortium providing a visitor destination as well as local services. Development of local offices, retail and a hotel use will provide local employment opportunities within an accessible District Centre. A new road will be provided as part of the scheme linking Barry Town Centre and Barry Island.

Consideration of Alternatives

- 1.11 It has been necessary to consider whether there are alternative options to the development of these proposals on this site. The alternatives considered include the 'Do Nothing' scenario, a lower density residential scheme, a higher density residential scheme, the need for a foodstore, alternative designs and layout, link road and traffic management, the location of the District Centre, Public Open Space network, residential layout and alternative phasing. Full details of the considerations given to each alternative are provided at paragraphs 3.25 to 3.71 of the January 2010 ES Addendum and are summarised below.

The “Do Nothing Scenario”

- 1.12 One scenario is to ‘do nothing’ however this is not considered an appropriate option given the necessity to bring into beneficial use this large area of brownfield land and tackle the site’s contamination issues.
- 1.13 The site is allocated for development and contributes some 40% of the total housing land supply in the district. To “Do Nothing” and not develop the site in accordance with its development plan allocation would require the finding and development of alternative sites in potentially less sustainable locations in order to ensure the availability of a five year housing land supply, as required by the Welsh Assembly Government.

Consideration of a Lower Density Residential Scheme

- 1.14 The development of a lower density residential scheme would affect the provision of an adequate supply of housing within the Vale of Glamorgan. It would also require a more dispersed building layout, which would not enable the delivery of an acceptable urban design solution with strong links to existing development at Barry Town Centre and Barry Island.
- 1.15 A lower density residential scheme would also not be in accordance with the development plan allocation for the site, which expects the Barry Waterfront development to deliver a high density scheme.

Consideration of a Higher Density Residential Scheme

- 1.16 The development of a higher density scheme within Barry Waterfront would require an increase in the number of flats and a reduction in the number of amenities within the development such as the amount of Public Open Space. This would not reflect market demand and would be at odds with the planning policy. It would also require higher building heights and would affect the attractiveness and viability of development.
- 1.17 Higher density development would cause future infrastructure capacity issues such as school capacity, public health and local services, as well as the road network. The additional environmental effects of a larger development could also be harder to mitigate against and may render the scheme unacceptable.

Consideration of Need for Foodstore

- 1.18 The Vale of Glamorgan Retail study (2009) identifies a quantitative and qualitative need for an additional supermarket within Barry. There are no sequentially preferable sites within Barry that could accommodate a foodstore of the size required. It would also provide an anchor to the proposed District Centre to attract other A1 retailers (shops) and A3 operators (restaurants and cafes) to locate within the District Centre and would encourage linked trips, where visitors to one facility also visit other facilities in a single trip.

Consideration of Alternative Designs and Layout

- 1.19 The design and layout of development has evolved over a two-year period and takes into account the consultation responses that have been received to date, as well as analysis of the physical constraints and potential connectivity through the site. It is considered that this is the optimal design and layout solution within the Barry Waterfront site and will not preclude any future development that may occur within the adjacent Mole site.

Link Road and Traffic Management

- 1.20 Alternatives to the provision of a link road from Barry Town Centre to Barry Island have not been considered as this has been a key requirement of the Local Planning Authority from the outset. The link road will be single carriageway as it is not considered appropriate for the link road to be dual carriageway because this will encourage more vehicular traffic to access Barry Island.
- 1.21 The internal scheme layout has been driven by the creation of direct footpath and cycle links within and beyond the site, as well as linking with three local railway stations. Alternative access options are limited due to site constraints outlined at Paragraph 3.57 of the ES Addendum (January 2010).

Location of the District Centre

- 1.22 Alternative locations for the District Centre were considered in relation to visual and physical impact, contribution to the street scene and highways access, egress and servicing. Taking these into account the proposed District Centre location within the centre of the development is considered most appropriate. It also forms a central hub for the Barry Waterfront site.

Public Open Space Network

- 1.23 Public Open Space networks were considered in relation to connectivity and sustainability as well as legal covenants that cover certain parts of the site. The submitted proposals are preferred as they represent an urban scheme which focuses on the quality of the public realm as opposed to the overall quantum. They also make full use of the water as a resource and community facility in its own right.

Residential Layout

- 1.24 The preferred residential layout is optimal for reflecting the existing street layout within Barry and Barry Island, capitalising on the waterfront setting and taking into account constraints such as the cliff face and associated overshadowing. It also maximises physical, social, environmental and economic benefits.

Consideration of Alternative Development Phasing

1.25

The proposed phasing is considered to be a reasonable assumption based on the construction of approximately 175 units a year during the initial phases of development, rising to 225 units a year in later phases between 2010 and 2020. This is an ambitious target however a longer phasing period would have implications for the Council's 5 year housing land supply requirement and would have more negative effects on transport, air and noise effects. It would also take longer to achieve a critical mass for the District Centre to become the central hub of the scheme.

2.0 The Site and Its Surroundings

- 2.1 The application site (see site location at **Appendix 1**), is divided into four distinct areas West Pond, South Quay, Arno Quay and East Quay. The site is located between the Town Centre, Barry Island and the harbour. The railway between Cardiff and Barry Island borders the perimeter.
- 2.2 The existing Waterfront development comprises some 690 residential units together with a retail area incorporating a retail food store and non-food retail units as well as a medical centre. To the west of Gladstone Bridge is the Innovation Quarter which comprises a range of office and business starter units.
- 2.3 The site can be accessed by all modes of surface transport. Cardiff International Airport is some 5.6 km to the north west, while the dock gates allow access to the Waterfront by boat from the sea.
- 2.4 An aerial photograph is attached as **Appendix 2** which puts the site in context.
- 2.5 The Barry Waterfront application site has a significant industrial past following its development as major coal export centre in the mid 19th Century. The industrial heritage of Barry Waterfront has left behind a number of physical features within the site, however, it has also led to elevated concentrations of contaminants in hotspots across the site that will be remediated as part of the development.
- 2.6 The East Quay area originally formed two graving docks and included a pump house. The southern graving dock still remains however the northern dock is now filled in and forms a flat area of land south of the Dock Office. The ground is slightly raised where the pump house was located.
- 2.7 Land at Arno Quay has been landscaped as a flat gravelled surface. This landform is the result of the remediation of the northern areas of Barry Docks during the 1990s which included earthworks, the removal of foundations and sub-surface structures from upper levels, the removal of contamination hotspots and the provision of a capping layer.
- 2.8 West Pond comprises a relatively flat grassed area with a number of rubble tips and a gravel path running through the centre. The remains of a derelict tank wash are located at the south-eastern edge of West Pond.
- 2.9 A number of extant buildings remain within the South Quay development area including the concrete bases of storage tanks, a tiled floor surface and a Research Vessels Services building. The area also contains a number of sunken concrete pits and pipe outlets and remnants of railway lines at the dock edge.

3.0 The Proposed Development

3.1 The Consortium of Persimmon Homes, Taylor Wimpey and BDW Trading Ltd is applying to the Vale of Glamorgan Council for outline planning permission for the following:

Development of vacant land at Barry Waterfront for residential (C3), retail (A1), cafés, bars and restaurants (A3), hotel (C1) and, offices (B1), community and leisure uses (D1 and D2). Development of vehicular and pedestrian/cycle access including a new link road, re-grading of site to form new site levels and associated infrastructure works, parking, servicing, landscaping, public realm and public open space provision.

3.2 The application site comprises an area of 43 hectares (106 acres) which includes the following key areas (see Character Area Plan at **Appendix 3**):

- a **District Centre:** This forms the mixed use ‘heart’ of the Barry Waterfront development comprising offices, a hotel, retail, café, restaurants bars and dwellings as well as education (in the form of a one-form entry school) and community uses. The aim of the District Centre development is to create a vibrant and attractive destination as well as a hub for both new and existing communities.
- b **West Pond:** This area will comprise terraced housing and open space as an extension of Barry Town.
- c **South Quay Parkside & Waterside:** The area will be developed for housing and a public realm area with small scale commercial uses.
- d **Arno Quay:** Arno Quay offers a gateway opportunity to Barry Waterfront and will comprise residential development, a small ground floor café/drinking establishment and public open space.
- e **East Quay:** This area, adjacent to the Local Authority’s Dock Offices, will form a peninsula residential development and will incorporate a major public open space for use by the wider Barry community.

3.3 The overall mix of uses includes up to :

- 2,000 residential units;
- 8,825 sq m of retail uses (including petrol filling station);
- 1,820 sq m of restaurants, bars and cafes;
- 400 sq m of community uses;
- 2,760 sq m education use;
- 3,500 sq m hotel; and
- 3,450 sq m office space.

3.4 A land use plan is provided at **Appendix 4** which provides details of where the various uses are proposed as part of this planning application.

3.5

An illustrative masterplan which provides a view of how the site could be developed within the set parameters is attached as **Appendix 5**.

4.0 EIA Methodology and Scope

- 4.1 The EIA process is intended to ensure that any significant environmental effects, either beneficial or adverse, arising from a proposed development are identified so that they can be taken into account when reaching a decision on a planning application. This allows any adverse impacts to be identified and, if necessary, measures put in place to address them.
- 4.2 The scope of this EIA has been informed through engagement with the Council and consultees via a request for a Scoping Opinion to clarify the potential significant environmental effects which require assessment as the scheme has been developed. The assessment of environmental effects has been carried out in accordance with current legislation and best practice guidance.
- 4.3 The ES considers each 'environmental subject' in separate chapters. Each of these chapters follows a similar format whereby a methodology is set out, the current conditions identified ('the baseline conditions'), and the potential effects of the development considered.
- 4.4 Where adverse impacts arise, measures are suggested to reduce or avoid these effects. These are known as 'mitigation measures'. The chapters conclude by describing the resulting impacts following implementation of the mitigation measure. A summary of each of the technical ES chapters is provided in the following sections of this Non Technical Summary.
- 4.5 For clarification, the EIA includes the school site in its assessment however excludes the Mole site, which lies outside the Consortium's ownership and control. Notwithstanding this, the Mole site has been factored in to the Transport Assessment as accommodating 4,000 sq m leisure development to ensure that adequate access can be maintained for any future development on the Mole. This assumption has also been tested through the Noise and Air Quality Assessments as they use the same base data for traffic flows. The Mole has not been considered in the other technical studies as the impact will be dependent upon the type of development that will come forward on the Mole site, which is currently unknown.

5.0 Transportation

- 5.1 Transport is a key element in the creation of any development. Whilst the Barry Waterfront site is well situated to take advantage of existing transport infrastructure and facilities, it is also important to ensure that these opportunities are maximised whilst ensuring that impacts of increased movement in the area are minimised both for environmental and social reasons.
- 5.2 The proposals put forward are aimed at strengthening transport connections, minimising the need to travel through the provision of a mixed use development which encourages an improved modal split and minimises the impact on the surrounding highway network. The overarching objective is to develop a package of transportation measures which will encourage people to live, work and visit a new sustainable urban quarter of Barry.
- 5.3 The area surrounding the site is well connected to local transport infrastructure and has been assessed through a number of site visits. Several railway stations are close to the different site areas offering fast and frequent services to the surrounding area. Buses also serve the nearby Waterfront area and existing foodstore on Ffordd y Mileniwm.
- 5.4 Pedestrians and cyclists are catered for by a segregated cycleway/footway adjacent to Ffordd y Mileniwm, elsewhere in Barry pedestrian facilities are present along all urban roads but cycle routes and crossing facilities are scarce.
- 5.5 Due to the nature of the site there are currently no internal roads however Ffordd y Mileniwm (constructed during the initial phase of the Waterfront regeneration) is a high quality single carriageway local distributor road. Ffordd y Mileniwm provides access to Barry via Gladstone Bridge and also towards Cardiff via the A4055.
- 5.6 Traffic conditions have been assessed in detail at 21 road junctions. The results of the assessment indicate that the highway network is busy and many of the junctions already operate close to capacity. The results indicate that the Cardiff Road/Palmerston Road junction already operates over capacity.
- 5.7 A future baseline of 2020 has been considered without the construction of the Barry Waterfront scheme. During the period 2008-2020 it is anticipated that traffic in and around Barry will continue to increase. Without any highway improvements this will lead to a worsening of travel conditions as increased traffic levels will result in capacity issues at several additional junctions.

Impacts During Construction

- 5.8 During construction of Barry Waterfront it will be necessary to move both staff and materials to and from the site. Many of these movements will necessitate the use of large vehicles. In order to minimise the effects of this traffic there will be designated routes for construction traffic and movements will be managed to avoid causing congestion at peak times.

Impacts after Completion

- 5.9 Barry Waterfront will represent a significant urban extension to Barry however it is anticipated that due to the mixed use nature of the site (to include residential, employment, retail, education and leisure uses) there will be lower number of trips external to the site than might be expected for a development of this scale. In addition to this the location of the site will enable many journeys to be undertaken by walking, cycling, bus and train.
- 5.10 Much of Barry (including the town centre) lies within walking distance of the site and a 15 minute cycle ride extends to the outer edges of the town. In order to improve conditions for cycling and walking the development will incorporate footways throughout and a waterside cycleway/footway. In addition the consortium will work with the local authority to implement improved routes for walking and cycling to key destinations such as the nearby railway stations, the town centre and Barry Island. The intention of these routes will be to create direct, pleasant and safe routes which will encourage walking and cycling trips.
- 5.11 Public transport through the site will be provided by a bus service which will operate through the site. The bus stops will have high quality waiting facilities and raised kerbs to allow level boarding.
- 5.12 A continuation of Ffordd y Mileniwm will be constructed through the site connecting to Barry Island and providing an alternative route to Harbour Road. This road will serve the different areas of the Waterfront development by a mixture of priority and signalised junctions and also provide a strategic link for the town.
- 5.13 Those journeys which are undertaken by private car will have an impact on the operation of the surrounding highways. Forecasting using traffic models indicates that additional junctions would operate over capacity as a result of traffic related to the Barry Waterfront development.
- 5.14 Improvement works have been identified which could improve the operation of those junctions identified as having potential congestion issues either as a result of growth in base traffic or the Barry Waterfront development. At the request of the local authority improvement works have been restricted to only those junctions where major improvements in available traffic capacity can be achieved.

6.0 Landscape & Visual

- 6.1 Fieldwork and desktop studies have been used to assess and evaluate the existing townscape character (i.e. the recognisable pattern of elements, such as the style of architecture within a particular area that make it different or unique to other adjacent areas) and how the character within the study area is impacted upon by the proposed development. In addition the effects on visual amenity (i.e. the value of a particular area or view in terms of what is seen) as a result of the proposed development was also assessed from a number of key locations within the study area.
- 6.2 The study area for this topic covers a 2km radius from the centre of the site and encompasses Barry Docks and the surrounding areas, extending to Hayes Lane in the east to the fringes of Porthkerry Park in the west, the residential area of Gibbonsdown in the north and extending out across Barry Island and into the Bristol Channel to the south.
- 6.3 The proposed development site has gone through substantial changes since the port was at its peak. This has involved the removal of many industrial features associated with the docks, including buildings, cranes, railway tracks and oil storage tanks. As a result it has left a degraded, post industrial landscape, which is predominately poor in terms of visual quality and containing a mix of grassland, 'brownfield' vegetation over spoil and scrub, and areas of concrete.
- 6.4 There are several planning and landscape designations within the study area including the two Grade II historic parks of Romilly Park and Cold Knap Park and the Conservation Areas of Barry Marine and Barry Garden Suburb. There are also over forty listed buildings within the study area, though none are located within the development boundary itself. The Barry, Rhoose and St. Athan Green Wedge is located to the west of the study area.
- 6.5 Impacts on townscape character will be greatest from within the docks and from locations immediately surrounding the proposed development site, such as Ffordd y Mileniwm. The design of the residential developments will result in them being at a scale and form that is sympathetic to the traditional street patterns that surround the site, helping to integrate the development into the existing, established townscape character.
- 6.6 Visual impacts once all phases of the development are complete are considered to be beneficial rather than adverse, as views will typically change from a townscape that is in decline to one that has been regenerated, with a more aesthetic, coherent urban townscape that compliments the surrounding built form.

- 6.7 As you move away from the development, impacts decrease as a combination of existing buildings and landform restrict views towards the site and the wider surroundings within Barry Docks.
- 6.8 There will be no significant adverse or beneficial effects on the character or visual amenity of the two historic parks, the Conservation Areas or the Green Wedge as a result of the proposed development, as views are predominately restricted by existing buildings, landform and vegetation.
- 6.9 Impacts on listed buildings will be restricted to the North Hydraulic Pumping House and the Dock Office during the construction phase, as both have direct views of the development site. The proposed development is likely to enhance the setting of these two buildings.

7.0 Ecology

- 7.1 In order to assess the impact of the illustrative masterplan on the ecological features (scrub, grassland, birds etc.) at Barry Waterfront, a combination of desk and field surveys were undertaken between February and September 2008.
- 7.2 The area proposed for development is not covered by, or located in close proximity to, any feature or site designated for its nature conservation interest although two geological Sites of Special Scientific Interest (SSSI) lie to the south beyond the existing urban settlement of Barry Island.
- 7.3 The proposed development site currently supports a limited number of habitat types – principally grassland, scrub, early colonising vegetation and bare ground – that have established over this industrial (Brownfield) site in the period since it was last in general use as part of the Port of Barry. As part of the survey work undertaken, these habitats were found to support nesting and passage (migratory) birds, a population of Slow-worm (South Quay only), foraging bats and a range of terrestrial invertebrates (e.g. butterflies, beetles, and dragonflies etc).
- 7.4 The habitats and species found within and immediately adjacent to the proposed development site were each assigned an ‘ecological value’ at a geographical scale ranging from ‘District’ (Barry) to ‘within the application site boundary’. The potential impacts of the scheme on these features were then assessed using best practice guidelines published by the Institute of Ecology and Environmental Management (IEEM).
- 7.5 As part of the site preparation works in advance of construction, the level of the site would need to be raised to address flood issues and this would effectively remove most of the existing habitats. This activity would result in a significant adverse impact on the habitats as well as on nesting birds, common reptiles and terrestrial invertebrates. A significant adverse impact on bats was not predicted given the absence of roosting opportunities within the site and that most bat activity was associated with foraging (mainly by Common Pipistrelle Bats) around the scrub at the site boundaries.
- 7.6 A range of mitigation measures to avoid or minimise the impacts of the development during construction and operation (i.e. post construction) have been incorporated into the illustrative scheme masterplan, although given the development requirements (housing numbers) and site constraints (e.g. ground contamination, requirement to raise site levels etc), mitigation to replace the habitats likely to be affected on a like-for-like basis would not be practicable.
- 7.7 During the site preparation and construction phase, effects on habitats and species would be minimised (mitigated) through measures such as the retention and protection of the cliff/cliff base on South Quay, retention of

grassland at East Quay, avoidance of key periods (e.g. bird nesting season) during clearance works and retention/protection of scrub habitat at the site boundaries.

- 7.8 As part of the illustrative masterplan, the development would provide new habitat features including 'brown roofs' on buildings in parts of the District Centre and a Brownfield meadow in the south western part of the site. This would effectively replace some of the existing brownfield habitat at the site, and would contribute to providing features of use to birds and invertebrates.
- 7.9 Other measures incorporated into the illustrative masterplan and scheme parameters include new scrub planting, a wildflower meadow, swale and wildflower meadow strip and a network of street trees. The population of Slow Worms at South Quay would be transferred to suitable habitat off-site and grassland supporting locally rare plant species at West Pond would similarly be transferred to retained grassland at East Quay. The retention of grassland at East Quay and design of Public Open space in this area would retain nesting opportunities for the Skylark.
- 7.10 Overall, the development of the site is likely to result in a significant adverse impact for the existing site habitats although the mitigation measures proposed would allow for some retention and/or provision of new habitats, albeit at a smaller scale. This in turn would provide resources for continued use of the site by birds, foraging bats and terrestrial invertebrates. For these groups, the significance of any adverse impacts is likely to reduce over the long term as planting matures although an overall loss of biodiversity (largely due to the scale of area subject to development) at the site is likely to arise as a result of development.

8.0 Archaeology

- 8.1 The Glamorgan-Gwent Archaeological Trust, Projects Division (GGAT Projects) have undertaken an assessment of the effect on the archaeological resource. The assessment reviewed information held by the regional Historic Environment Record (HER) and the National Monuments Record (NMR), as well as cartographic and documentary sources. Aerial photographs were examined and a site visit conducted.
- 8.2 A total of 84 sites of archaeological interest were identified within the study area. A single Scheduled Ancient Monument St Barruch's Chapel is located 0.37km east of the development area. There are twenty Listed Buildings in the archaeology study area; seventeen are Grade II and three are Grade II*, namely the former Docks Office, the statue of David Davies and the Docks Sliding Bridge.
- 8.3 The development area lies within a landscape of archaeological complexity, with important remains of all periods. The potential for buried prehistoric remains in the development area is indicated by the discovery of a Neolithic Axe. The present study has proved the existence of number of prehistoric, Roman, Early-medieval and medieval sites in the surrounding area, providing an indication of the archaeological potential of the site.
- 8.4 The proposed development has been assessed as having a major effect on No. 1 Dock and Barry Docks Railway System without mitigation. There are minor effects predicted on the remaining 27 sites. To mitigate the effect on these sites it is recommended that any intrusive excavations such as piling and ground remediation works, except in the north of Arno Quay, the southeast of West Pond and the southern area of South Quay, be carried out under the conditions of an archaeological Watching Brief with contingencies.
- 8.5 Drainage runs will need to break through the wall of No. 1 Dock at four locations. Although elements of the dock wall have undergone alteration, it is possible that parts may be original and therefore of archaeological interest, as such a Watching Brief would be required to mitigate the potential effect on the dock wall of No. 1 Dock.
- 8.6 The proposed development has been assessed as having a moderate effect on East Quay Graving Docks, Research Vessel Services, and the Warehouse and Oil Storage Terminal. In order to mitigate the effect on these remains, a Level 1 Building Survey, as set out in English Heritage's *Understanding Historic Buildings: A guide to good recording practice* (2006), should be conducted before the commencement of any site demolition of remaining buildings and break-up of slabs/hardstandings at surface level.
- 8.7 There is potential for the survival of underground structural elements of the Pump House at East Quay as no remediation works have been carried out at

this location; as such an archaeological Watching Brief with contingencies on any ground clearance, levelling and excavations in this area will mitigate the effect on such remains.

9.0 Water Resources, Drainage and Flooding

- 9.1 Water resources, draining and flooding are key elements to be considered as part of the Waterfront Barry development. The site is situated adjacent to Barry Dock No 1 and the impact of the development on groundwater, surface water, drainage and flood risk need to be minimised.
- 9.2 The four distinct areas of the site, namely Arno Quay, East Quay, West Pond and South Quay area are all low lying former dockside. There is a long history of industrial use which has resulted in ground and groundwater contamination. The sites contain made ground (areas of land that are man-made) and many areas are underlain by highly compressible Estuarine Alluvium. Most of the sites are classed as a non-aquifer although a minor aquifer is present across part of West Pond. The development will include remediation measures to treat on-site much of the soil contamination encountered. The more severe contaminated soil and groundwater will be removed from site.
- 9.3 During extreme tide events, the dock gates are opened and there are large areas of the site that are at risk of flooding, taking into account the effects of climatic change. The site will be raised to provide a thickness of clean cover across the site and to provide protection against flooding. Much of the site will be covered over with roads, hard standings and buildings, the storm water run-off will be conveyed via a drainage system into the dock. The drainage has been designed to store water during extreme tidal events when surface water is unable to discharge into the dock. During the initial construction phase of development, the potential flood pathways to development areas will be protected by temporary bunding.
- 9.4 A new foul drainage network will be formed across the development site, connecting into the existing gravity drains at West Pond, Arno Quay and East Quay. Due to existing levels and the length of foul drainage required, gravity sewers will not be able to transmit flows from most of South Quay and all of East Quay, pumping stations will be required at two locations.
- 9.5 The presence of contaminated groundwater poses a potential risk to both the surface water and groundwater during construction and after completion. The remediation measures include the on-site treatment of soils, with the more severe contaminated soil and water removed from site. The works could result in contamination of surface water and groundwater from the construction activities via spillages and migration of existing contamination. Mitigation measures will be incorporated as part of the works, consisting of management plans and best practice, together with the control and removal of source material, and potential use of driven piles. These mitigation measures would be controlled via a Construction Environmental Management Plan (CEMP).

10.0 **Ground Conditions and Contamination**

- 10.1 The existing ground conditions and contamination present on the site is a key element to be considered as part of the Waterfront Barry development. The site is a brownfield, former industrial dockside area with made ground present throughout, and the development will impact on the ground conditions and contamination.
- 10.2 Barry Docks was formed in the 1880's by the extensive development of the tidal mudflats separating Barry Island to the mainland. Extensive filling took place across East Quay, Arno Quay and South Quay and part of West Pond. The remainder of the West Pond area was originally left as a pond between the dock and a causeway formed at the current location of Harbour Road, the pond was systematically infilled in phases between the 1900's and 1950's. This has resulted in varying thicknesses of made ground up to 11m in places. Previous developments on site include tank farms, coal staiths, railway sidings, ship and vehicle repairs, joinery, warehouses, together with railway engine storage and dismantling. These past uses have resulted in ground and groundwater contamination, the most severe is within the former Tank Farm area in South Quay. Monitoring of gas concentrations has shown elevated concentrations of methane and carbon dioxide originating from the made ground and estuarine alluvium. A radon gas report for the site has revealed that basic protection measures are required for this site.
- 10.3 As part of the redevelopment of the site, the site will need to be cleared and concrete slabs broken up. Remediation measures will be required, consisting of excavation and on-site treatment of contaminated soil together with the removal from site of the more severe contaminated soil and free product groundwater. An appropriate thickness of clean cover material will be required across the residential areas of West Pond and across South Quay and East Quay.
- 10.4 Raising the site to provide clean cover and also to protect the site from flooding will result in consolidation due to the presence of significant thickness of Estuarine Alluvium across West Pond and East Quay. To ensure that long term settlement is reduced to an acceptable level, surcharging (compaction of ground) with additional volumes of fill for a period of around six months is required across parts of West Pond and East Quay. Whilst some of this surcharge material may be obtained from areas of the site currently above the flood level, a volume of fill may need to be imported onto the site. Once surcharging is complete, this material could then be excavated and used to make up levels in other parts of West Pond, South Quay and East Quay.
- 10.5 The presence of contaminated soil and groundwater poses a potential risk to workers during the construction works and to the general public prior to mitigation. Similarly, there is a potential impact on neighbouring sites from the disturbance and/or mobilisation of contaminated material. The mitigation measures include the on-site treatment of contaminated soil together with the

removal of the more severe contaminated soil and groundwater as part of the remediation works. The works will be undertaken in accordance with agreed method statements and risk assessments, mitigation measures will include suitable Personal Protective Equipment, dust suppression measures and wheel washing facilities together with health and safety training and warning signs. The remediation measures will also include a clean cover across the site which will protect the site users and neighbouring sites after completion.

- 10.6 Key mitigation measures will be controlled via the Construction Environmental Management Plan (CEMP).
- 10.7 The presence of ground gas also poses a potential risk to site workers during construction and future users of the site during completion. The risks to site workers may be mitigated by the use of safe working practices and confined spaces procedures during the construction phase. Mitigation measures, consisting of gas membranes beneath floor slabs together with a below slab venting measures are proposed for development in East Quay, West Pond and South Quay, no such measures are required for Arno Quay. However, a Radon report has indicated that basic Radon protection measures are required for all sites, consisting of a synthetic membrane beneath the floor slab.

- 11.0 Noise & Vibration**
- 11.1 The Noise and Vibration technical study has considered the noise and vibration effects of the proposed development; specifically the effects of existing conditions on the development and the effects of noise and vibration generated by the proposed development on surrounding properties, during construction and during the operation/occupation of the proposed development.
- 11.2 The assessment has been based on a series of environmental noise measurements undertaken at the site and noise predictions, to identify any noise impacts that are likely as a result of the construction and operation of the proposed development.
- 11.3 The impact of noise and vibration during construction of the proposed development has been predicted and assessed in accordance with BS 5228. Mitigation measures have been recommended, which when implemented and incorporated within the Construction and Environmental Management Plan for the development, will ensure that the impact of noise and vibration during the construction of the development is adequately monitored and controlled.
- 11.4 An assessment has been carried it out in accordance with government guidance, to determine the suitability of the site for the proposed residential elements of the development. This assessment has identified that noise need not constrain the proposed development and that with appropriate construction techniques, determined at the detailed design stage, better than 'reasonable' internal noise levels will be experienced within all proposed dwellings during both the day and the night, with the provision of 'good' internal noise levels also being achievable.
- 11.5 The impact of potential increases in road traffic noise levels, as a result of new vehicles accessing the site and as a result of the proposed new development access roads has been assessed. For the majority of receptors, it is predicted that at most, road traffic noise levels will be barely perceptible and considered to be of 'negligible' to 'minor adverse' impact. Significant increases in road traffic noise of 'moderate to major adverse' impact significance have been predicted within one discrete receptor area next to the site's primary access to the north on Ffordd y Mileniwm, with potential mitigation measures to reduce these impacts identified. Significant increases in road traffic noise of 'moderate to major adverse' impact have been predicted within a very small receptor area next to the site southern primary access at the junction with Clive Road, with a mitigation strategy to reduce the impact in this area presented which could include the implementation of localised noise barriers.
- 11.6 Limiting noise levels have been set for any fixed plant, such as air conditioning units, that may be associated with the proposed development. Complying with the proposed limits will ensure that complaints are unlikely and that the impact of such plant is negligible.

12.0 Air Quality

12.1 The air quality study comprises two key elements:

- Assessment of potential fugitive dust emissions during the demolition/construction-phase of works at the development site; and,
- Detailed modelling of emissions from traffic movements associated with the scheme once operational.

Potential Effects from Dust

12.2 The assessment of air quality impacts resulting from dust emissions during the construction-phase was undertaken by following best practice guidance.

12.3 The results of the assessment indicate that, due to the relatively large-scale nature of the Barry Waterfront development area and the residential nature of properties surrounding the site, a Construction Environmental Management Plan (CEMP) for the works will be produced by the Consortium. This will be agreed with the Vale of Glamorgan prior to the commencement of demolition/construction activities as previously highlighted.

12.4 The CEMP will contain a number of best practice control measures (including those particularly appropriate to this kind of development that are designed to prevent dust becoming airborne and to contain dust generating activities such as demolition and construction within enclosures wherever possible to prevent dispersion beyond the construction site boundary. These are anticipated to include, among others, dust suppression using water bowsers and the restriction of vehicle speeds and movements on site through the introduction of designated haulage routes. With the CEMP in place, no significant long-term air quality impacts are anticipated as a result of the demolition/construction-phase of works at the Barry Waterfront site.

Potential effects from Vehicle Emissions

12.5 The potential impact on local air quality of vehicle emissions associated with the scheme was assessed. The study focussed on nitrogen dioxide and fine particulate matter both of which are considered to be key pollutants associated with human health effects, and are directly related to vehicle combustion emissions.

12.6 The results of the air quality modelling indicate that, when the proposed development scheme is fully operational (anticipated to be in 2020), relevant national air quality objectives protective of human health are predicted to be achieved at all assessed locations. The incremental increase in concentrations of nitrogen dioxide and fine particulate matter in 2020 as a result of the proposed development are not anticipated to be significant. Furthermore, due to improving background air quality conditions with time due to technological

advances (for example, better engine design and fuel quality) concentrations in 2020 are anticipated to be less than those observed in 2008.

12.7

Overall, air quality is considered to be a low priority concern for the proposed development. Correspondingly, no mitigation measures are anticipated to be required for the operational-phase of the scheme.

13.0 **Socio-Economic Effects**

- 13.1 The most significant socio-economic impacts of the proposed development will be:
- 1 A capital investment of about £150 million;
 - 2 An increase of 700 direct jobs based on the site (510 full time equivalent), all of which would be additional to the area;
 - 3 800 net additional direct and indirect jobs spread across the local area;
 - 4 900 net additional direct and indirect jobs spread across the South East Wales region (including those in the local area);
 - 5 Up to 1,990 temporary construction jobs spread over a 9 year period;
 - 6 Up to 2,000 additional dwellings including an element of affordable housing;
 - 7 An increase in the resident population of Barry Waterfront of approximately 4,600 people; and,
 - 8 A stronger and more attractive retail offer.
- 13.2 The development will involve some transfer of existing jobs from the surrounding area but will make an important contribution to reducing local levels of unemployment and enhancing the strength of the local economy.
- 13.3 The housing element of the scheme will be important in contributing to meeting housing (including affordable housing) needs in the area.
- 13.4 The proposed development is not expected to generate a significant additional demand for local doctors, nursery or leisure and recreation facilities beyond existing levels of provision. The anticipated increased demand for community facilities would encourage increased integration between the new community at Barry Waterfront and the existing community in the surrounding area.
- 13.5 The sustainable location of the development and proximity to good public transport links means that the impact upon commuting will be minor in nature.
- 13.6 The retail impact assessment has demonstrated that there is available capacity for the convenience and comparison retail elements of the scheme. It also concludes that the scheme will not have a significant detrimental effect on any existing store nor harm the vitality and/or viability of any existing centre.
- 13.7 The proposed development will serve to enhance the regeneration of Barry Waterfront through significant new capital investment by raising the level of economic activity and expenditure in the local area, as well as by enhancing the profile of the area as a vibrant and sustainable mixed use development area.
- 13.8 As a result of the additional children that will reside at Barry Waterfront an assessment of the child yield and school capacity reveals that a one form entry school will be required to meet the requirements of the proposals. This is

proposed on site within the District Centre character area. Existing capacity within the existing secondary schools is sufficient to satisfy the requirements of the proposals and there will be no adverse impacts.

14.0 **Arboriculture**

- 14.1 Fieldwork and desktop studies have been used to assess and evaluate the existing trees within the study area and the impact the proposed development may have on them.
- 14.2 Consultation with the local authority tree officer has confirmed that there are no trees protected by Tree Preservation Orders (TPOs) in the study area. The proposed development will result in a loss of the majority of the scrub within the development area. All the scrub offers little or no amenity value.
- 14.3 The development will also result in a loss of trees in South Quay. These trees are typically of lower quality, some being identified for removal under the British Standard Assessment which has been carried out in support of the application.
- 14.4 The main boundary trees along the Barry Island cliff top and along the northern boundaries of the study area, will be mainly unaffected by the development.
- 14.5 A few larger trees are present internally within the development area but their numbers are low and their present contribution to the amenity of the site is negligible. The condition of these trees is typically poor, or they comprise mainly species that are unsuitable for long-term retention within the proposed development.
- 14.6 The majority of the effect of the development will be negligible and there will be no significant adverse effects on the overall tree resource.
- 14.7 The landscape proposals for the development, includes the provision of significant tree planting (in excess of 800) and provision of green open space (6.14 hectares), as an integral part of the development. The quantity and potential value of the proposed landscape significantly outweighs the value of the vegetation lost and within the context of a redeveloped site, is likely to result in significant residual benefits over time.

15.0 Residual and Cumulative Effects

- 15.1 The EIA assesses the potential for interaction of environmental effects and concludes that the construction period holds the greatest potential for impacts which are proposed to be extensively mitigated. This will be particularly important when new residential units are occupied and construction continues across the remaining phases of the development.
- 15.2 The overall construction is likely to last in the order of 10 years and as a result there is the potential for a number of effects to occur if not managed correctly. At the outset there is the likely requirement to import material onto the site in order to commence the surcharging activities however it is hoped that this could be kept to a minimum in the first phase through the use of material on site. Material import over the lifetime of the project will require extensive numbers of Heavy Good Vehicles to access the site which will need to be managed with the routes of least impact controlled.
- 15.3 The earthworks proposed in the early stages of the construction process are likely to result in a number of interrelated impacts such as noise, air (predominantly dust), visual, ecology, ground conditions and transport impacts.
- 15.4 Key environmental effects during this period include:
- Impacts to construction workers/general public from contaminated soils
 - Dust associated with the earthworks activity
 - Visual impact of the construction site
 - Construction noise (including a period of piling)
 - Construction vibration from piling
 - Emissions from construction vehicles and construction workers traffic
 - Ecological impacts from site clearance
- 15.5 The proposed phased approach is likely to control these impacts and along with the measures proposed through the Construction Environmental Management Plan (CEMP), it is envisaged that impacts will be sufficiently minimised to avoid significant environmental effects.
- 15.6 A key period on site will be when units are occupied and construction continues across the remainder of the site. By 2015 /2016 approximately 1,000 units would have been occupied. There will be the potential therefore for interrelated environmental effects to be experienced by these new receptors. More localised noise and dust issues could therefore cause more significant environmental effects compared to those witnessed in the first 5 years of construction where receptors are generally more distant from the development site.

- 15.7 The CEMP will include measures to mitigate for such potential effects on existing and new residential receptors. Specific measures are provided within the ES where any works are in close proximity to the new residential units.
- 15.8 During the full operational phase (2020 onwards), it is predicted that there will be some residual environmental effects however these are predicted to be predominantly beneficial following the implementation of mitigation measures. The exception to this relates to ecology where residual significant effects are predicted and an overall loss of biodiversity likely to occur. Mitigation measures are incorporated within the proposals although like for like mitigation is not practicable for this project. The significance of these effects is however predicted to reduce in the longer term.
- 15.9 The main beneficial impacts are associated with site remediation, landscape and visual and socio/economic benefits.

16.0 Conclusions

16.1 The Environmental Impact Assessment (EIA) has considered a number of topics and assessed the potential for significant effects to occur. These topics include:

- Transportation
- Landscape & Visual
- Ecology
- Archaeology
- Water Resources, Drainage and Flooding
- Ground Conditions and Contamination
- Noise & Vibration
- Air Quality
- Socio-Economic
- Arboriculture

16.2 The separate papers within the full Environmental Statement contain the detailed analysis of impacts and mitigation and should be referred to for the complete assessment. Detailed mitigation strategies where appropriate will be controlled via the use of planning conditions and/or a legal agreement.

16.3 The EIA assesses the potential for interaction of environmental effects and concludes that the construction period holds the greatest potential for impacts which are proposed to be extensively mitigated. This will be particularly important when new residential units are occupied and construction continues across the remaining phases of the development.

16.4 Following the implementation of mitigation measures set out in the technical studies that comprise the submitted ES (August 2009), ES Addendum (January 2010) and ES Addendum 2 (June 2010) no major adverse residual effects will occur as a result of the proposed Barry Waterfront development, apart from ecological impacts. These are, however, inevitable given the allocation of the site for development and the requirement to raise levels within the site to enable development to take place. Ecological impacts are also anticipated to reduce in the long term.