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## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0) Introduction</td>
<td>1</td>
</tr>
<tr>
<td>2.0) Environmental Impact Assessment (EIA)</td>
<td>3</td>
</tr>
<tr>
<td>3.0) Assessment Approach</td>
<td>4</td>
</tr>
<tr>
<td>4.0) Application Site and Surrounding Area</td>
<td>5</td>
</tr>
<tr>
<td>5.0) Proposed Development</td>
<td>8</td>
</tr>
<tr>
<td>6.0) Summary of Topic Assessment</td>
<td>14</td>
</tr>
<tr>
<td>6.1) Introduction</td>
<td>14</td>
</tr>
<tr>
<td>6.2) Socio-Economic</td>
<td>14</td>
</tr>
<tr>
<td>6.3) Traffic and Transport</td>
<td>15</td>
</tr>
<tr>
<td>6.4) Air Quality</td>
<td>17</td>
</tr>
<tr>
<td>6.5) Noise and Vibration</td>
<td>20</td>
</tr>
<tr>
<td>6.6) Ground Conditions</td>
<td>24</td>
</tr>
<tr>
<td>6.7) Water</td>
<td>25</td>
</tr>
<tr>
<td>6.8) Ecology</td>
<td>26</td>
</tr>
<tr>
<td>6.9) Archaeology and Built Heritage</td>
<td>27</td>
</tr>
<tr>
<td>6.10) Wind Microclimate</td>
<td>29</td>
</tr>
<tr>
<td>6.11) Daylight, Sunlight and Overshadowing</td>
<td>31</td>
</tr>
<tr>
<td>6.12) Waste and Energy</td>
<td>33</td>
</tr>
<tr>
<td>6.13) Townscape and Visual</td>
<td>34</td>
</tr>
<tr>
<td>6.14) Cumulative Effects</td>
<td>36</td>
</tr>
<tr>
<td>7.0) Conclusions</td>
<td>38</td>
</tr>
<tr>
<td>Contacts and Environmental Statement Availability</td>
<td>43</td>
</tr>
</tbody>
</table>
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1.0 INTRODUCTION

1.1.0 This document is a Non-Technical Summary (NTS)\(^1\) of the Environmental Statement (ES), prepared on behalf of Barking Riverside Limited (the ‘Applicant’) to accompany a Planning Application to London Borough of Barking and Dagenham for the development of the Barking Riverside site (herein referred to as the ‘Application Site’).

1.1.1 The Proposed Development will consist of the construction of up to 10,800 new homes, with new schools, social and community, retail and employment opportunities. See section 2 for further details of the Proposed Development and Figure 1.2 for the illustrative masterplan.

1.1.2 The location and boundaries of the land to be developed on (hereafter referred to as the ‘Application Site’) are shown on Figure 1.1. The Application Site is approximately 179.3 hectares (ha) and is located approximately 2 km south of Barking town centre. The Application Site is centred on National Grid Reference TQ 47050, 82450, OS Coordinates 547050, 182450. See section 4 below for further details.

Figure 1.1: Application Site Boundary

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\(^1\) Non-Technical Summary – A document that conveys key information to enable the public to understand and assess the Proposed Development and the potential impacts.
Figure 1.1: The Illustrative Masterplan
1.1.3 Under the Town and Country Planning (Environment Impact Assessment) Regulations 2011 (as amended 2015), an Environmental Impact Assessment (EIA) is required to support the planning application for a development of the scale and nature proposed (as described in more detail in the following section).

1.1.4 An Environmental Statement is a report which describes the EIA process and its findings. This document provides the non-technical summary of the ES (Volumes 2, 3 and 4) that accompany the planning application. The full findings of the ES are presented in a comprehensive set of documents that can be viewed at Planning Department of the London Borough of Barking and Dagenham Town Hall, 1 Town Square, Barking, IG11 7LU. Hard copies of the NTS can be obtained at £50 from Temple Group Ltd, Devon House, 58-60 St Katharine's Way, London, E1W 1LB.

2.0 ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

2.1.1 EIA is a process used to ensure planning decisions are made with full knowledge of a proposed development’s likely significant effects. It helps to ensure that any effects are reduced or prevented, while encouraging the enhancement of positive effects.

2.1.2 This ES has been prepared to support a planning application under section 73 (s.73) of the Town and Country Planning Act 1990.

2.1.3 The purpose of the s.73 application is to make adjustments to the planning conditions attached to the planning permission granted in July 2009. The Planning Permission (Ref 08/008877/FUL) granted on 23 July 2009, followed an earlier site wide Planning Permission (Ref 04/01230/OUT), which was granted on 7 August 2007.

2.1.4 The adjustments have been made to reflect the evolution of the Proposed Development. The adjustments include accommodating the provision of an Overground Rail Link (ORL) rather than the Docklands Light Rail (DLR), which was accommodated in the original planning applications, and other subsequent changes to the plans of the outline scheme to accommodate this.

2.1.5 The content of the ES has been agreed with London Borough of Barking and Dagenham and the statutory consultees to meet the requirements of the regulations. The Proposed Development has been assessed with particular consideration to: existing use of the Application Site; adjacent land uses; planning policies and law; the need for the development; and effects during construction and during use.

2.1.6 The ES is split into four volumes as follows:

- Volume 1: Non-Technical Summary (NTS) - this document, which is provided as a standalone document but also forms Volume 1 of the ES.
- Volume 2: Main Text – contains the main text of the ES and should be read in conjunction with Volumes 3 and 4.
• Volume 3: Technical Appendices – the appendices to the ES, including additional information, data and figures.
• Volume 4: Annexes – contains the follows documents, which are also capable as being read as standalone document:
  o Annex A: Biodiversity Strategy;
  o Annex B: Code of Construction Practice (CoCP) Part A;
  o Annex C: Baseline Desk Study, Data Review and Outline Remediation Strategy;
  o Annex D: Flood Risk Assessment;
  o Annex E: Sustainability Framework.

2.1.7 The topic assessments included in the ES and their corresponding chapters are:
• Socio-economic (Chapter 5);
• Traffic and Transport (Chapter 6);
• Air Quality (Chapter 7);
• Noise and Vibration (Chapter 8);
• Ground Conditions (Chapter 9);
• Water (Chapter 10);
• Ecology (Chapter 11);
• Archaeology and Built Heritage (Chapter 12);
• Wind Microclimate (Chapter 13);
• Daylight, Sunlight and Overshadowing (Chapter 14);
• Waste and Energy (Chapter 15);
• Townscape and Visual (Chapter 16); and
• Cumulative Effects (Chapter 17).

2.1.8 Scoping of an ES is essential to identify aspects that require detailed assessments and to consider comments of stakeholders. Scoping identifies the issues that are likely to be of most importance during the EIA and eliminates topic areas of little concern. A Scoping Note was submitted to the London Borough of Barking and Dagenham on 14 August 2015 who subsequently provided a Scoping Opinion on 17 September 2015. It was agreed that the following topics need not be assessed:
• Electromagnetic Compatibility (construction and operation); and
• Light related Effects (construction and operation).

2.1.9 The Archaeological and Built Heritage was also reduced in scope to only consider archaeology effects arising from the construction phase of the Proposed Developed (as described in more detail in section 6)

3.0 **ASSESSMENT APPROACH**

3.1.1 The general approach to assessing environmental impacts and effects is to consider the current conditions on and around the Application Site for each environmental issue, and then to compare them with the predicted conditions
during the construction and operation phases of the Proposed Development. Where there are international, national or local standards, policies or guidelines of relevance to these proposals, these are also taken into account.

3.1.2 In order to assess the potential impacts and effects of the Proposed Development on the environment, the sensitivity of existing resources (or receptors\(^2\)) are considered in conjunction with the scale (or magnitude) of the predicted impacts to establish the significance of the predicted effects.

3.1.3 Mitigation measures are proposed to reduce the significance of an effect. The effect is then reassessed to identify if the effect has been fully mitigated and the likely remaining (residual) effect, if any.

3.1.4 Each topic area takes this same general approach to assessment, as outlined in Figure 3.1.

Figure 3.1: The Assessment Process

3.1.5 Section 6 set out the findings of the EIA process. The order in which the topic sub sections appear matches the order in which they are considered within Volume 2 of the ES.

3.1.6 In addition to assessing the effects arising from the Proposed Development in isolation those additional effects (referred to as cumulative effects) arising from the Proposed Development in conjunction with other proposed development in the vicinity of the Application Site have also been assessed. See section 6.13 for further detail.

4.0 **APPLICATION SITE AND SURROUNDING AREA**

4.1.1 The Application Site comprises approximately 179.3 ha of predominantly former industrial land in the south of the London Borough of Barking and Dagenham,

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\(^2\) Receptors could include people and ecological receptors (both animals and plants). They are evaluated in terms of their value and their sensitivity or susceptibility to likely changes.
approximately 2 km to the south of Barking town centre and 800 m to the south of the A13. Access to the Application Site is via Choats Road, Renwick Road and River Road. Figure 1.1 shows the location of the Application Site and the immediate surrounding area.

4.1.2 Choats Road provides access to the A13 Goresbrook interchange to the northeast of the Application Site (see Figure 6.5 for key road names).

4.1.3 The surroundings of the Application Site are mixed in character. To the northwest of the Application Site is an established residential area predominantly consisting of two storey semi-detached housing built circa 1990, known as Great Fleete. The north of the Application Site is bounded by the A13 and the southern boundary comprises a 2 km frontage to the River Thames (see Photograph 4.1). Industrial estates adjoin the east and west boundary of the Application Site.

Photograph 4.1: View from Footpath 47 to the Southeast of the Application Site

4.1.4 The aerial photograph in Figure 4.1 shows a number of existing buildings that are still present within and adjacent to the Application Site. Block B a disused switch station associated with the former power stations, Block C another disused switch station, Block D a current National Grid switch station (outside of the application boundary), Block E a current National Grid substation (outside of the application boundary) and Block F a temporary office compound for Barking Riverside Ltd. Figure 4.1 also shows an area of largely bare earth (Area A) which is now existing housing as shown in Photograph 4.2.
Figure 4.1: Existing Buildings to the South-West of the Application Site

Photograph 4.2: Stage 1 Housing (in Area A shown on Figure 4.1), Completed and Occupied
4.2 Historic Use of the Application Site

4.2.1 The Application Site was historically used for industrial purposes. The original Barking power station was constructed in the mid-1920s. The power station was extended between 1931 and 1939 and between 1952 and 1954 (three separate power generation structures were built). These extensions considerably impacted on the landscape of the western part of the site with rail lines, power lines and tramways established around the power stations. See Figure 4.2 which shows the Ordnance Survey map for the area dated 1961-63.

4.2.2 The power stations were closed in the 1980s and early 1990s. The closure of the power stations left the Application Site in a derelict state apart from a cluster of semi-vacant commercial properties and a large hard-surfaced area which has been used temporarily for Sunday markets, container storage and various industrial yards.

5.0 PROPOSED DEVELOPMENT

5.1 Alternatives Considered

5.1.1 The chosen location of the Proposed Development has been tested through both the regional and local spatial planning processes, the outcome of which found the Application Site to be an appropriate location for a development of this type and size. As such, further consideration of alternative locations has not been undertaken.

5.1.2 The Proposed Development itself is the result of a thorough analysis of environmental constraints and opportunities, access issues and market demand, with the description of development as set by the extant permission. A number of alternatives have therefore be considered by the Applicant including:

- The do-nothing alternative, a largely theoretical scenario for EIA assessment purposes where the Proposed Development is not progressed enabling a comparison of future change with and without the Proposed Development can be assessed
- Alternative design / layout in the context of the design evolution

5.1.3 In terms of different design solutions for the Proposed Development itself, these have been driven principally by the need to accommodate the proposals by Transport for London for an extension of the Gospel Oak to Barking town centre railway line into the Application Site with a new London Overground station also located within the Application Site (referred to as the Overground Rail Link (ORL))\(^3\), serving the Application Site and the wider area.

\(^3\) The ORL is not proposed for approval through this application and is to be applied for separately by Transport for London and Network Rail.
Figure 4.2: Ordnance Survey Map for the Barking Riverside Area dated 1961-63 © PCA 2015
5.1.4 Central to the evolution of the design was an understanding of the existing character of the Application Site and the surrounds in order to retain, protect and enhance the most important existing features within it and surrounding it, as well as the need to address the legacy of former use and contamination of the Application Site.

5.1.5 Various iterations of layouts, heights and densities were developed, responding to these environmental constraints and opportunities as well as the infrastructure complexities of accommodate the Overground Rail Link and station (ORL). These are as shown in Figures 5.1. to 5.3

**Figure 5.1: Masterplan Iteration dated 16 September 2014**

![Image of Masterplan Iteration dated 16 September 2014]

**Figure 5.2: Masterplan Iteration dated 9 July 2014**

![Image of Masterplan Iteration dated 9 July 2014]
5.2 Proposed Development

5.2.1 The Proposed Development is a mixed-use development comprising of up to 10,800 residential dwellings, up to 65,600 sq. m of built floorspace for other uses such as retail and a communal care home.

5.2.2 The full planning description is as follows:

“Development comprising or to provide a mixed use development for up to 10,800 residential dwellings and in addition up to 65,600 sq.m. of built floorspace for retail uses (classes A1 to A5), business premises (Class B1), hotel (Class C1), communal care home and other residential institutions (Class C2), sui generis live work units, community and social facilities (Classes D1 and D2) (for uses such as libraries, primary health care facilities, places of worship and assembly, community facilities, crèche and pre-school facilities, care facilities for the young, old and/or infirm, sport and leisure development). In addition, development will also provide: one secondary school of up to 8 forms of entry (with maximum gross site area of 44,585 sq.m.) including ancillary accommodation and facilities plus a sports field up to 14,313 sq.m (gross site area; up to 2 no.; up to 3-form entry primary schools (with a maximum gross site area of 15,000 sq.m. each). Additional educational accommodation (Class D1) is also to be provided in the form of an ecology centre of up to 250 sq.m. and in addition, a maximum of two multi storey car parks to provide for 1000 spaces in total. Such development to include the remediation of the former Renwick Road landfill site and former power station foundations, and the continuation of the remediation of the remainder of the site in accordance with the principles established by the 1994 permission (LPA Ref. TP/43/93) to provide for revised ground contours and development platforms, strategic landscape and works to create new and improved/retained ecological reserves, retention of city farm, open space (including parks, play spaces, promenades and piazzas, formal and informal play space), laying out and/or improvement of alteration to existing service infrastructure (to include the laying of foul and surface water drainage infrastructure and water attenuation), new and alteration to existing vehicular and pedestrian access and routes, diversion of existing statutory footpath no. 47, works to existing river wall, bund and flood defences, alterations to existing T jetty and coal wharf. Ancillary engineering and other operations.”
5.2.3 The distribution of the proposed land uses across the different stages has been designed to reflect the transport links and natural features, for example, the proximity to the River Thames. The ORL will create a new station within the Application Site to link the Proposed Development to Barking through an extension to London Overground’s Gospel Oak - Barking line. The District Centre will be centred around the ORL station and will become the mixed use local centre of the Proposed Development.

5.2.4 The Proposed Development is split into four spatial areas defined as ‘stages’. Whilst the actual boundaries of these stages are illustrative, the quantum of residential and non-residential land use within each, is set and for approval. Figure 1.2 shows the illustrative masterplan and Figure 5.4 shows the different stages and character areas of the Proposed Development.

5.2.5 Based on Figure 5.4 the indicative implementation schedule being as follows:

- Stage 1 has already been partially built and is expected to be completed in 2017. It includes a number of mixed uses including approximately 1,400 residential units and a primary school;
- Stage 2 is the largest stage in the Proposed Development including approximately 4,300 residential dwellings. This stage will include the district centre, ORL station and an education campus incorporating a primary school, a secondary school and a special educational needs school. Construction of Stage 2 is due to be completed by 2021;
- Stage 3 consists of approximately 2,200 residential units with other mixed uses and is expected to be completed by 2029; and
- Stage 4 includes approximately 3,000 residential dwellings with other mixed uses. Construction of Stage 4 is due to be completed by 2031.

5.2.6 It is anticipated that construction work will commence on the ORL in 2017 and it will commence in operation in 2021.

5.3 Construction Programme

5.3.1 The construction for the Proposed Development is anticipated to take approximately twenty one years in total. Work started on Stage 1 in 2010 and the completion date for the Proposed Development is expected to be 2031. The phasing of the construction of the different elements of the Proposed Development is not set as part of this application, although the EIA is based on a series of assumptions that represent a reasonable chronology of how the Proposed Development could be built out over the next 15 years.

5.3.2 The standard working hours for all construction activity will be 08.00 to 18.00, Mondays to Fridays, and 08.00 to 13.00 on Saturdays. Work outside these hours will be limited to internal works and installation of utility services.

5.3.3 The routing of the construction vehicles will be closely controlled with restricted access routes during particular stages to minimise impact of activity.
Figure 5.4: Illustrative Masterplan Character Areas and Indicative Stages of the Proposed Development
6.0 **SUMMARY OF TOPIC ASSESSMENTS**

6.1 **Introduction**

6.1.1 Environmental effects have been assessed for the construction phases (temporary) and operational phase (permanent). Operational effects describe those that would exist after the Proposed Development has been built and is occupied and in use.

6.2 **Socio-Economic**

6.2.1 The socio-economic assessment focusses on the effects of the Proposed Development on the local population (including residents of the Proposed Development as it gets built while other stages are still in construction) in terms of economic and employment opportunities, housing, education, health, open spaces and community facilities.

6.2.2 The Proposed Development is likely to impact upon the immediate area around Barking Riverside, an area with a current population of approximately 10,700 as well as the wider London Borough of Barking and Dagenham, which has a population of over 198,000. The local area is characterised by:

- Housing pressures – acute pressures in terms of overall housing provision to meet need and affordability;
- Unemployment – relatively high levels of unemployment, below average wages and a strong reliance on low-value added sectors of the economy;
- Deprivation – Barking and Dagenham is amongst the top 10 most deprived boroughs in England; and
- Health demand – strong demand from the resident population and the high GP to patient ratios.

6.2.3 During the construction phase likely beneficial effects are assessed as a result of the employment opportunities. Over the construction period, up to approximately 1,050 full time jobs per annum would be supported along with the potential for training and practical experience across a range of trades.

6.2.4 The Proposed Development is assessed will lead to ongoing major beneficial effects when in use. The provision of approximately 2,900 affordable homes within the Proposed Development should reduce the barriers to housing which was identified as an issue in the area. The resident population of 27,000 (almost a 15% increase in the Barking and Dagenham population) will contribute to the local economy through their spending. This is estimated to be approximately £24m household expenditure per annum spent in the immediate area around Barking Riverside and a total of £94m per year spent across Barking and Dagenham as a whole. There will also be increased council tax revenues (£11.6m per annum). In addition, when fully complete, the Proposed Development will generate around 2,200 full time jobs (in place of the approximately 50 jobs currently existing on the Application Site).

6.2.5 Potential major adverse effects are assessed as likely during operation as a result of the increased demand for certain services and facilities in the local area: an
increased demand for primary school places (2,471) and secondary school and post 16 places (792); increased demand for GPs and dentists; and additional pressure on current open space provision.

6.2.6 These will be in part mitigated through new facilities within the Proposed Development, including a primary school, a campus school incorporating a secondary school, a primary school and a special educational needs school, health provision on-site and the quality of the open space and sports grounds to be provided. Further provision for education and health, for example the third and fourth primary school, would need to be delivered to mitigate these effects further. To this end, Barking Riverside Limited are willing to provide the space for these schools (as accommodated in the illustrative masterplan) thus enabling the local education authority to their own application for these schools.

Conclusion

6.2.7 Due to the significant increase in population inherent with the Proposed Development is likely to lead to additional pressure on current open space provision in the wider area, despite the introduction of significant new large areas of usable open space (including Pylon Park) within the Application Site. Whilst the reduction in available open space per capita is predicted to reduce in quantitative terms, it is also anticipated that in qualitative terms that the additional open space being provided by the Proposed Development will be significantly better than that in the local area in terms of quality, diversity, accessibility and connectivity.

6.2.8 No other significant adverse residual or cumulative effects on socio-economic receptors have been identified during construction and use of the Proposed Development provided the proposed mitigation is put in place.

6.3 Traffic and Transportation

6.3.1 A detailed study of the effects of the Proposed Development on local roads, public transport, cyclists and pedestrians is included within a Transport Assessment submitted as part of this application. The Guidelines for Environmental Assessment (IEMA, 2006), have then been used as a framework for assessing these transport changes in terms of their effects on residents and site users both within and surrounding the Proposed Development.

6.3.2 The Application Site and its surroundings currently support a low level of pedestrian and cyclist use, with infrastructure provision for both being of variable quality in the local area. Three bus routes service the vicinity of the Application Site, and two of them (the EL1 and EL2) are due to be enhanced in terms of routing and frequency in the future. London Underground services are available from Barking, Upney and Becontree stations to the north of the Application Site, whilst Barking railway station also provides access to London Overground and mainline rail.

6.3.3 The Public Transport Accessibility Level (Figure 6.1) at the centre of the Application Site in 2015 is calculated to be 0 (i.e. no public transport accessibility).
6.3.4 A Transport for London red route, the A13, runs to the north of the Application Site and the principal roads of note in the local network are River Road, Renwick Road and Choats Road.

6.3.5 Construction related impacts are assessed as of the year 2021. Construction traffic would as far as possible be directed along the strategic road network to reduce impacts upon the local road network, and adherence to the Code of Construction Practice (including the production of Traffic Management Plans, traffic safety measures and core working hours) will further reduce related impacts.

6.3.6 The Overground Rail Link and associated Barking Riverside Overground railway station is assumed to be completed by 2021, mitigating potential impacts related to the capacity of both new and existing Overground and mainline services to accommodate the new population. Similarly, the 2021 Barking Riverside Bus Strategy will also be in place at an early point during the construction phasing and will deliver beneficial effects to bus users both within and surrounding the site.

6.3.7 A pedestrian delay of 2.4 minutes (specifically relating to the closure of Choats Road) is identified as a result of construction in addition to a potential increased risk of accidents involving pedestrians and cyclists as a result of construction traffic.

6.3.8 The highway scheme proposed as part of the Proposed Development, in combination with the ‘Steel Approach’ scheme promoted by Transport for London and London Borough of Barking and Dagenham to provide an additional connection to the Proposed Development from the A13, will reduce and manage traffic flows within and surrounding the Proposed Development, and would minimise impacts upon road users during both construction and operation in terms of severance, journey time impacts, accidents and safety impacts.

6.3.9 During operation, again the effects on the capacity of London Overground and mainline rail services is assessed as being neutral, whilst impacts upon bus users would range from minor beneficial to major adverse during peak hours, although
these impacts would be only experienced on certain sections and not the entirety of the bus routes.

6.3.10 For pedestrians and cyclists, the permanent closure of the existing walk and cycle route along Choats Road and diversion through the Proposed Development will lead to a significant adverse impact in terms of pedestrian delay compared to the current situation, however in general, the changes to the pedestrian and cycle connections across the Proposed Development would have a major beneficial effect on pedestrians and cyclists in terms of severance, delay and amenity.

Conclusion

6.3.11 For this topic a range of transport related effects, both adverse and beneficial, can relate to one type of impact. This is because the effects depend on the location within and around the Proposed Development. For example, beneficial effects may arise from an extended bus route to some areas of the Proposed Development, however, existing sections of the bus route may at the same time be affected by passenger overcrowding.

6.3.12 In general terms, the transport infrastructure (existing, combined with proposed) is assessed as being sufficient to accommodate the Proposed Development. The effects on road and public transport users, are also on balance, not significantly changed from the existing context (albeit there may be variations in the types of effects that are beneficial or adverse).

6.3.13 By 2031, the Proposed Development is assessed as leading to significant beneficial effects for both pedestrians and cyclists using Barking Riverside and its surrounds.

6.4 Air Quality

6.4.1 Due to existing and predicted future air pollutant levels (both Nitrogen Dioxide (NO₂) and PM10), the entirety of the London Borough of Barking and Dagenham has been declared an Air Quality Management Area (AQMA). Monitoring data from the vicinity of the Application Site (monitoring location shown in Figure 6.2) indicate that mean annual NO₂ objectives (from the Air Quality Action Plan relevant to the Air Quality Management Area) could be exceeded at roadside locations along the A13 to the north of the Application Site, however, background concentrations across the Application Site are likely to meet the objective.

6.4.2 The air quality assessment considers the effects of demolition, excavation and construction activities including emission to air from construction vehicles and machinery and dust. The effects of emissions from traffic and emissions from buildings (including associated plant and machinery) on local air quality once the Proposed Development is occupied and in use, is also assessed.

4 Refers to Solid or liquid particulate matter found in air with a particle diameter of 10 micrometres or less (one thousandth of a millimetre (0.001 mm) or one-seventh the width of a human hair).
Figure 6.2: Air Quality Monitoring Sites
6.4.3 There is potential for occasional and moderate impacts on nearby residential receptors from construction dust, primarily during earthworks and from construction traffic leaving the worksite. Best practice measures, as required by the Code of Construction Practice, would be implemented to minimise or remove these impacts, including:

- damping down un-surfaced roads and working areas in dry conditions;
- fully sheeting vehicles carrying loose or potentially dusty material to or from the worksite;
- organising the site so that physical barriers or screens are installed to limit the dispersal of dust emissions and loose materials are covered as soon as possible;
- minimum drop heights from conveyers and loading equipment;
- no materials to be burnt on-site;
- dust suppression when cutting, grinding or sawing materials (e.g. water sprays or local extraction).

6.4.4 Even with these measures in place, it is difficult to completely eliminate dust generation and therefore the overall effect of construction dust on the immediate surrounds of the Application Site is assessed as being of temporary and of minor significance.

6.4.5 During construction of the Proposed Development, temporary and limited in duration adverse effects upon a small number of properties alongside the A13 and A1153 are expected in terms of increased NO\textsubscript{2} levels, based on a worse-case scenario. Emissions from construction machinery will be controlled to acceptable levels through the requirements of the Code of Construction Practice, which includes such measures as no vehicle or equipment to be left idling, use of catalytic converters, requirements for plant and machinery to be well-maintained and the use of electric cranes where possible.

6.4.6 During operation of the Proposed Development, adverse effects in terms of increased NO\textsubscript{2} levels are anticipated at one location along the A13 (again this is considered the worst-case scenario). No other significant effects are expected.

6.4.7 The energy strategy for the Proposed Development is to include a central combined heat and power (CHP) unit, supplemented by a number of individual boilers (as well as a range of alternative energy generation measures, e.g. solar panels / photovoltaics). The final technology used in the combined heat and power plant will be subject to detailed design and dependent on technological advances in the industry between the current time and when the equipment is procured. For this reason, air quality modelling associated with this equipment, and an Air Quality Neutral Assessment (AQNA), will be undertaken when this information becomes available. The Applicant, is however, committed to ensuring the Proposed Development meets the requirement for air quality neutrality and should there be any exceedances, these will be off-set through on-site or off-site mitigation measures.

**Conclusion**

6.4.8 Significant local air quality effects as a result of emissions from construction and
operational traffic are expected to be limited to a small number of receptors on the A13 and A1153. These results should be considered worst-case because the modelling results are based upon reduced traffic speeds from the worst-case peak traffic periods, which overestimate likely average daily emissions.

6.4.9 No significant local air quality effects are expected as a result of construction dust generation, or the use of construction and operational plant.

6.5 Noise and Vibration

6.5.1 The baseline noise conditions have been established through the information gathered during two separate survey exercises. Noise sensitive receptors which have the potential to be affected by the Proposed Development include dwellings introduced by earlier stages of the Proposed Development, whilst subsequent stages are still being constructed. In addition, the effect on the nearest residential receptors to the northwest of the Application Site are considered.

6.5.2 The requirements for noise assessment, including the use of noise exposure categories and that the operational noise rating level does not exceed the background sound level, were all agreed with the London Borough of Barking and Dagenham.

6.5.3 The noise and vibration assessment considered the effects of demolition, excavation and construction associated with the Proposed Development, the effects associated with construction and operational traffic and also noise from building services mechanical plan (during operation).

6.5.4 The current general noise environment is characterised by road traffic noise along surrounding roads, industrial noise and aircraft noise. There was little variation in noise levels across the Application Site where noise levels were generally around 54 decibels (dB) or below during the day and 51 dB or below during the night, but were elevated when closer to the surrounding roads. The east and west of the Application Site are also affected by noise from industrial premises; however, the noise level expected at proposed dwellings is relatively low.

6.5.5 The assessment of noise effects from construction works has been completed by calculating the distance from typical construction activities beyond which significant effects are not likely to be incurred. Assuming the requirements of the Code of Construction Practice are met, temporary minor adverse effects are assessed as likely during construction, particularly during demolition and piling activities, at surrounding properties which are occupied as part of an earlier stage of the Proposed Development. Noise levels sufficient for a moderate adverse effect to occur may happen if driven piling (piling that involves hammering, vibrating or pushing into the earth) is carried out; however, due to the relatively short duration of noise exposure a moderate adverse effect is unlikely to occur. Where possible, driven piling should be avoided to minimise noise effects. Best practicable means will be employed on site to control noise from construction activities.

6.5.6 Screening distances based on industry standard measured data have also been used to estimate the likelihood of impacts from construction vibration. Should driven piling be used, then there is the potential for a short term moderate adverse effect at adjacent dwellings. Otherwise vibration from construction activities is
anticipated to be negligible or minor.

6.5.7 The potential noise and vibration impact of construction traffic using the existing road network and the new roads within the Proposed Development has been calculated using standard calculation methods. This has indicated short term negligible or minor adverse effects at dwellings adjacent to heavy goods vehicles (HGV) traffic routes, which include:

- Choats Road, between Renwich Road and Crown Street;
- Wharf Road leading to River Road;
- Choats Road towards the east of the Application Site.

6.5.8 Detailed information on mechanical plant to be used during operation of the Proposed Development will be developed at subsequent stages of planning, however, the Proposed Development will comply with the requirements of LBBD in relation to noise limits, and in light of this, noise from these sources would have a negligible impact.

6.5.9 Potential noise effects resulting from operational traffic on the existing road network has been calculated using standard calculation methods to be negligible in the long term. In the short term, changes to the road network at the junction of A13 and Renwick Road which are not part of this application, are predicted to have a major adverse effect on dwellings adjacent to Renwick Road between Steel Approach and Choats Road. The additional impact of the Proposed Development traffic on the noise from this section of road is predicted to be negligible.

Figure 6.3: Noise Exposure Categories (NECs) for Buildings within the Illustrative due to Daytime Road Traffic Noise.

6.5.10 The suitability of the Application Site in noise terms for the Proposed Development
has been assessed for buildings and external spaces within the Proposed Development when operational. The majority of the Application Site is predicted likely to fall in Noise Exposure Categories (NECs) a or b (i.e. suitable for the uses proposed) (see Figure 6.3). The fronts of buildings (facades) facing new main roads within the Proposed Development (i.e. Esplanade, Crown Crescent, Riverside Drive, Crown Street – see Figure 6.5) are predicted likely fall into noise exposure category c (the higher noise exposure level) and specific consideration of acoustic design measures will be required at the detailed design stage to ensure the internal noise level guidelines are met.

6.5.11 Guideline external noise levels are likely to be met for in the majority of both residential amenity areas and the external school playground areas (see Figure 6.4). In the limited number of locations where the noise level requirements are not predicted to be met, suitable alternative relatively quiet areas are available elsewhere in the Application Site.

Figure 6.4: Noise Contour Plot for the Predicted External Noise Levels within the Proposed Development due to Road Traffic Only.

Conclusion

6.5.12 No significant residual noise and vibration effects are expected to occur, except cumulative effects resulting from the Proposed Development in combination with other developments proposed in the surrounding area, which is discussed in the cumulative effects section below.
Figure 6.5: Barking Riverside Road Network 2031
6.6 **Ground Conditions**

6.6.1 An assessment of ground conditions, using a risk based approach, was undertaken to look at the potential for ground contamination associated with the Application Site and potential risks these may have on receptors (e.g. surface water bodies, general public or future residents) during the proposed construction works and ultimately when the Proposed Development is in use.

6.6.2 The Application Site has had a long history with uses including power stations, landfilling of waste material, chimneys, storage tanks and railway tracks. These historical uses have resulted in a number of identified sources of contamination representing a potential risk to receptors.

6.6.3 A number of potentially adverse effects have been identified from both existing contamination in the ground and the potential for spills/impacts associated with the construction works.

6.6.4 Demolition and construction works will be subject to a range of controls required under current legislation and managed through adoption of industry standard working practices as identified within the Code of Construction Practice. This should prevent construction workers coming into direct contact with any potential contaminants or ground gases. Remaining effects during construction comprise the risk of contaminants potentially leaching into and degrading aquifers.

6.6.5 During operation, potential adverse effects include contaminants leaching into and degrading aquifers, contaminants in groundwater migrating to surface water bodies, health effects upon future site users from direct contact with skin, ingestion and inhalation of contaminated soils or dust, and health effects from ground gas generation.

6.6.6 The proposed strategy for the remediation of the Application Site and the proposed working procedures are assessed as being sufficient to mitigate these potential adverse effects. These include clean drilling techniques, introducing a capping layer (an impermeable layer laid within the soil to restrict the movement of contaminants), gas protection measures for buildings and the completion of piling works risk assessments.

6.6.7 Much of the proposed mitigation that forms part of the Proposed Development will result in significant beneficial effects to the environment, namely the placement of a capping layer across the Application Site (to both limit the potential for infiltration and to prevent direct contact with underlying contamination) and the planned remediation of a former landfill in Stage 3 (to the north of Choats Road).

**Conclusion**

6.6.8 The additional characterisation and remediation works completed will mean that upon completion of the Proposed Development, the risk of contamination posed to occupants, soil, waterbodies, flora and fauna, would be negligible and therefore no significant residual adverse effects have been identified.
6.7 Water

6.7.1 Following consultation with the Environment Agency and Thames Water, the potential significant effects of the Proposed Development upon water environment receptors have been assessed using a series of numerical analysis and modelling simulations, as well as professional judgement. A Flood Risk Assessment (FRA) has also been prepared.

6.7.2 The Application Site comprises, approximately, 179 ha of predominantly brownfield former industrial land, fronting the River Thames. The River Thames, Ship & Shovel Relief Sewer and Goresbrook form the southern and northeastern boundary of the Application Site. The Goresbrook discharges into the River Thames via the Horseshoe Corner Sluice. The Buzzard Mouth Creek flows through the Stage 1 area to the west of the Application Site and enters a culvert just upstream of River Road, discharging to the River Thames via the Buzzard Mouth Sluice. (See Figure 6.6 for key watercourse features).

Figure 6.6: Overview of Key Watercourse Features

6.7.3 Located downstream of the River Thames Barrier, the Application Site currently benefits from raised tidal defences along its southern perimeter to a level of 7.1m above ordnance datum, equivalent to a design standard of protection against the 1 in a 1000 year (0.1% annual exceedance probability) flood event. A series of fluvial flood defences are installed which act to mitigate against the potential occurrences of flooding. These include control gates and screens, in addition to the Goresbrook pumping station.

6.7.4 During two significant historical tidal flood incidences (1928 and 1953) it is of note that neither resulted in flood levels that reached the Application Site.

6.7.5 Within the Application Site, current land use includes hardstanding, buildings, heavily compacted ground and green space. Stage 2 contains a former landfill
which has replaced the natural geology at this location influencing the Application Site’s permeability. Within the reminder of the Application Site the underlying geology is predominately impermeable and characteristically clay.

6.7.6 The Flood Risk Assessment prepared supports previous work by the London Borough of Barking and Dagenham, confirming that the Application Site is an appropriate location for the Proposed Development relevant to flood risk.

6.7.7 Consideration has been given to the embedded mitigation measures which form part of the Proposed Development including: the already constructed flood compensation areas and detention basins; the proposed implementation of a site-wide Sustainable Urban Drainage Strategy (SuDS); and best practice measures within the Code of Construction Practice.

6.7.8 Given these mitigation measures, the potential effects during site preparation and construction are considered to be largely negligible although the residual risk of accidental pollution incidents and surface water run-off prior to completion of the proposed Sustainable Urban Drainage Strategy remains. The potential effect of these is considered to be minor to moderate adverse in relation to surface water drainage and water quality.

6.7.9 Potential effects which may arise from the operation of the Proposed Development have been assessed to be of minor beneficial significance in relation to surface water drainage, surface water quality and fluvial flooding. With respect to flood defences and tidal flooding, potential effects are considered to be negligible.

Conclusion

6.7.10 The Flood Risk Assessment concludes that the location of the Proposed Development is appropriate in terms of flood risk, and adherence to the requirements of the Code of Construction Practice and Sustainable Urban Drainage Strategy ensures the Proposed Development will result in no significant residual effects relating to water quality, surface water drainage and fluvial and tidal flooding.

6.8 Ecology

6.8.1 The assessment was carried out using the Chartered Institute of Ecology and Environmental Management (IEEM) guidelines for Ecological Impact Assessment. All habitats and species within the Application Site were given a biodiversity value reflecting their geographic significance. Consultation with statutory consultees such as Natural England and the Environment Agency was carried out in order to gain their opinion on the proposed mitigation measures.

6.8.2 The Application Site supports a number of valuable ecological receptors. These include six non-statutory designated sites present within 2 km of the Application Site, of which two (The River Thames and Tidal Tributaries Site of Importance for Nature Conservation (SINC) and Goresbrook and Ship and Shovel Sewer SINC) are located immediately adjacent.

6.8.3 Various species of terrestrial invertebrates found within the Application Site were of regional value (including a rare ground beetle, Scybalicus oblonguiscullus) but
limited to the specially created brownfield habitat in the west of the Application Site. Habitats and species of metropolitan value within the Application Site include mudflat, saltmarsh, coastal grassland, shelduck and oystercatcher, water vole and over wintering birds. All other habitats and species present were assessed as of value in the vicinity of the site only or of value locally.

6.8.4 The Biodiversity Strategy has been prepared as part of the planning application and details the proposals for habitat creation within the Proposed Development, measures to minimise impacts upon ecological receptors through both construction and operation, and monitoring proposals. When these measures are combined with the requirements of the Code of Construction Practice, the majority of impacts during construction are assessed as likely to be neutral. Due to the creation of higher quality habitat (compared to the existing) proposed in the north of the Application Site as part of the construction works, the Proposed Development is assessed as having a minor beneficial effect on wetland habitats and associated species, and moderate beneficial effects on populations of widespread reptiles. The creation of open mosaic habitat (patchworks of bare, previously disturbed ground and grassland attracting rich invertebrate and bird assemblages) will also result in a moderate beneficial effect.

6.8.5 The greatest impacts on the operational phase of the Proposed Development is considered likely to occur as a result of increased levels of human activity in the area and predation of water voles and reptiles by domestic animals such as cats. Even with mitigation measures such as designing in limited and seasonal access to ecologically sensitive areas, and the creation of new high quality wetland areas, pressures resulting from disturbance and the reduction of suitable breeding habitat is assessed as resulting in a minor adverse impact on breeding birds such as linnet, skylark and meadow pipit and reptiles and a moderate adverse impact on water voles.

Conclusion

6.8.6 Potential construction related effects are minimised through the provisions of the Biodiversity Strategy and the Code of Construction Practice, and the creation of new and enhanced habitats during the construction period will lead to a number of significant beneficial effects. The only significant adverse effect during construction is likely due to disturbance (and habitat loss) related to ground and scrub nesting birds. During operation, the only significant adverse effects are expected on water voles in relation to potential predation by domestic cats and disturbance more generally.

6.9 Archaeology and Built Heritage

6.9.1 Archaeology has been assessed through a desk-based assessment in accordance with the Chartered Institute for Archaeologists standards and guidance.

6.9.2 Only construction effects related to archaeology are considered, because once built and in use the Proposed Development is unlikely to have any significant effects on the archaeological resource beyond those likely to arise during the construction phase. Both construction and operational effects are considered in relation to built heritage.
6.9.3 The Application Site is located on the floodplain of the River Thames, soil deposits which represent a significant palaeo-environmental\textsuperscript{5} archaeological resource. These deposits are regarded as being a resource of regional value, with high potential for prehistoric remains within them.

6.9.4 If actually present, any such remains are likely to be considered to be of national significance. However, there is no evidence currently available to confirm that such remains occur within the Application Site.

6.9.5 Palaeo-environmental deposits could be affected by piling, leading to a moderate adverse effect. For the extant planning permission, mitigation of the palaeo-environmental deposits was carried out in the form of a borehole survey and review of previous work which has added greatly to the understanding of the palaeo-environmental nature of the area. No further mitigation is considered necessary.

6.9.6 In the northern area of the Application Site piling and/or excavation required to provide flood compensatory storage capacity has the potential to give rise to moderate adverse impacts on prehistoric deposits. The potential deposits are located at some depth, and it is likely that any excavation will be through made ground only (ground created by filling with material from elsewhere). The effect will be mitigated by the capping (an impermeable layer placed over contaminated materials to prevent movement of contaminants) of the majority of the Application Site.

6.9.7 Evidence of surviving (relict) historic landscapes may be affected by the capping of contaminated ground and also by piling/pile probing, leading adverse effects, however, there is no need for further mitigation as any relict historic landscape is already buried by pulverised fuel ash (from the power station) which overlays the Application Site and is therefore not accessible.

6.9.8 In terms of cultural heritage, there are no designated buildings or structures within or adjacent to the Application Site. Within Stage 4, several buildings associated with the former power stations are of local historic interest (but undesignated). These are generally disused and in a state of disrepair, within a degraded setting.

6.9.9 The Proposed Development will see the majority of the buildings and structures retained, and some renovated for education, cultural and leisure uses. Provided this is done sensitively, there is likely to be some minor beneficial impacts.

**Conclusion**

6.9.10 There are no significant residual effects. The geo-archaeological survey works carried out to-date has already resulted in a beneficial effect as it has contributed greatly to the understanding of the area during the prehistoric period. There is also likely to be a minor beneficial effect on cultural heritage with the retention and renovation of a number of buildings and structures within the Proposed Development.

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\textsuperscript{5} Paleo-environmental relates to an environment of a past geological age
6.10 Wind Microclimate

6.10.1 The assessment considers the size and shape of the Proposed Development in conjunction with long term wind climate statistics to assess the likely effect of the Proposed Development on the local wind conditions, and pedestrian comfort and safety within and around the Proposed Development (the Lawson criteria). The approach to the assessment was agreed with the London Borough of Barking and Dagenham.

6.10.2 Prevailing winds at the Application Site blow from the southwesterly direction (Figure 6.7). Wind speeds are generally highest during winter, when frequent strong winds blow from the west-south-west direction, and lowest during summer. Cold northeasterly winds are also common during spring.

6.10.3 Existing wind conditions in and around the Application Site are generally expected to be safe and suitable for current pedestrian activities, though the Rivergate Centre’s open spaces have the potential to be slightly windy for leisure uses during winter and, in the absence of localised protection, for outdoor seating throughout the year.

Figure 6.7: Annual Wind Climate at the Application Site

6.10.4 The Proposed Development introduces a number of mid-to-high rise buildings, at the same time as introducing more sensitive activities, including outdoor amenity spaces. However, substantial soft landscaping is proposed across the Application Site and within the amenity spaces, which is expected to help reduce wind levels.

6.10.5 Wind conditions in and around the Application Site are expected be safe for all users. The Proposed Development is therefore expected to have negligible effect, relative to existing site conditions, with regards to pedestrian safety.

6.10.6 In terms of pedestrian comfort, conditions on thoroughfares across the Application
Site, including the waterfront promenade, are expected to be largely suitable for pedestrian use.

6.10.7 Conditions have the potential to be too windy for pedestrians entering and exiting buildings comfortably, at least during winter, at two locations around exposed building corners along the riverfront. Given the potential to purposely locate or shelter entrances these effects are considered to be of minor adverse significance. All other plots are expected to have significant building frontages with suitable conditions for entrances.

6.10.8 Much of the retail frontages across the District Centre and within Hill Town are expected to enjoy suitable conditions for window shopping and entering/exiting. Some areas such as Station Square are relatively open, particularly during the construction phase, and may be too windy in places for outdoor seating. Uses such as outdoor cafés are expected to require purposely designed landscaping measures to locally shelter the seating area. However, much of the Station Square is expected to be suitable for general recreational activities, such as for a meeting point or awaiting a bus. These effects are considered to range from negligible to moderate adverse. This is illustrated in Figure 6.8.

**Figure 6.8: Wind Microclimate Suitability Assessment**

6.10.9 Other major open spaces are likely to be suitable for expected recreational activities and these effects are considered to be of negligible significance.

6.10.10 The courtyards of the residential buildings are expected to be suitable for general recreational activities, such as for children’s play spaces, with much of each courtyard further suitable for outdoor seating at least during summer. These effects are considered to range from negligible to no worse than minor adverse.

6.10.11 Within the surrounding area, wind conditions are not expected to materially change. The likely environmental effect of the Proposed Development on the
surrounding area is therefore expected to be of negligible significance.

6.10.12 A number of techniques can reduce the effects of wind when each stage is designed in more detail: careful design of exposed corners; purposeful locating of entrances to buildings in more sheltered areas and away from corners wherever possible; setting entrances back in recesses where required in windier areas; purposeful locating of seating areas in more sheltered areas; and design of landscaping around sensitive spaces such as seating areas.

**Conclusion**

6.10.13 As would be expected in an urban development of the scale of the Proposed Development, a few localised areas may be marginally windy for more sensitive activities such as outdoor sitting. Some entrances may also be marginally windy, but tolerable, for entering and exiting buildings, particularly during the construction phases. Overall, the residual effect on the wind microclimate within the Proposed Development is therefore expected to be generally negligible, and no worse than minor adverse and not considered significant.

**6.11 Daylight, Sunlight and Overshadowing**

6.11.1 This assessment was carried out to determine the likely effects of the Proposed Development on the amount of daylight and sunlight experienced by residential buildings close to the Application Site and also the residential buildings proposed within the Application Site itself. To assess the likely effect of the Proposed Development, modelling studies have been carried out in accordance with the industry standards (Building Research Establishment guidelines) (see Figure 6.9). The assessment approach was agreed with the London Borough of Barking and Dagenham.

6.11.2 There are no existing sensitive receptors within the surrounding area or the Application Site with the potential to be significantly affected by the Proposed Development in terms of the amount of daylight or sunlight they receive. Ecological receptors, such as the Goresbrook and Ripple Nature Reserve currently enjoy good access to sunlight.

6.11.3 The Proposed Development will introduce sensitive occupants to the Application Site, with the majority of blocks including residential uses.

6.11.4 During the construction process, the level of daylight and sunlight availability and overshadowing within the Application Site will vary depending on the extent of obstructions created through construction. It will generally be less significant than for the completed Proposed Development. The completed Proposed Development is therefore considered to represent the worst-case scenario.

6.11.5 Overall, the potential for internal daylight amenity is considered good for a development of the proposed scale. There are no significant areas considered unlikely to achieve satisfactory internal daylight for a habitable room. The effect on daylighting within the Proposed Development is therefore considered to range from negligible to minor adverse.

6.11.6 Overall, across the Application Site the potential for sunlight amenity within
Habitable rooms is considered good for a development of the proposed scale and the effect on sunlight to buildings within the Proposed Development is therefore considered to range from negligible to no worse than minor adverse.

Figure 6.9: Daylight, Sunlight and Overshadowing Model

6.11.7 The public open spaces, including Station Square, Sports Park, Pylon Park and the Waterfront, enjoy good access to sunlight. Most of the residential courtyards also have good access to sunlight. There are a number of north facing courtyards which would be considered poorly sunlit. Most of these spaces are small and well served by alternative surrounding well sunlit spaces. The effect of overshadowing of the amenity spaces is considered to range from negligible to moderate adverse.

6.11.8 The Proposed Development is expected to have negligible effect on the surrounding area, including overshadowing of the Goresbrook or Ripple Nature Reserve.

6.11.9 A number of techniques can maximise daylight and sunlight when each stage is designed in more detail. These include: purposeful design of the interior layouts to position more sensitive rooms, such as kitchens and living rooms in better lit areas; utilising dual aspects wherever possible; limiting the room sizes in poorer lit areas; and, the use of large windows is expected to generally result in satisfactory internal daylighting. Living rooms should also be positioned wherever possible in areas receiving the greatest sunlight.

6.11.10 At lower levels of denser built areas, provision and design of balconies will
generally need to consider internal daylight and sunlight. In the poorest lit area, balconies would ideally be positioned above less sensitive rooms, such as the bedrooms, of the apartments below.

Conclusion

6.11.11 As would be expected in an urban development of the scale of the Proposed Development, and based on experience of similarly massed developments elsewhere, a few apartments may have internal daylighting below guideline recommendations and achieving recommended amounts of sunlight across the entire Application Site may not be viable.

6.11.12 Overall, the residual effect on daylight, sunlight and overshadowing within and as a result of the Proposed Development is expected to be generally negligible, and no worse than minor adverse and is therefore not considered significant

6.12 Waste and Energy

Waste

6.12.1 The assessment has been undertaken to determine estimates of the types and quantities of waste likely to be generated during construction and operation of the Proposed Development, as well as considering how the Proposed Development performs against local and regional policy targets.

6.12.2 Due to its brownfield nature (i.e. previously developed land, now derelict for the most part), waste generation at the Application Site is currently limited.

6.12.3 Construction, excavation and demolition waste from the Proposed Development will mainly be reused or recycled on site at designated recycling centres. Non-hazardous demolition and excavation waste will almost all be reused or recycled on site, such as within the road infrastructure and public realm. An estimated 43,000m$^3$ of hazardous spoil is likely to be generated. On-site treatment will limit the amount of hazardous waste requiring off-site disposal.

6.12.4 Choice of construction materials and techniques will be informed by sustainability principles within the Sustainability Framework and Waste Strategy (an appendix to the Sustainability Framework) for the Proposed Development, while a Site Waste Management Plan and the Code of Construction Practice will ensure that resource efficiency principles are implemented during construction to minimise resource consumption and waste generation.

6.12.5 The residential properties of the Proposed Development are estimated to generate approximately 13,100 tonnes of domestic waste per annum once occupied. Mitigation measures such as the provision of community education on recycling and waste minimisation, and provision of facilities in the home to allow pre-sorting of 50% of waste into recyclable waste streams, will help to minimise this waste generation. This should limit the impact on the local waste management facilities while contributing positively to borough recycling and composting targets.

6.12.6 The potential to utilise anaerobic digestion plants and other locally sited waste management technologies in the London Sustainable Industrial Park may bring
further benefits in terms of waste management and low carbon energy.

6.12.7 Residual impacts in terms of both construction and operational waste generation and impacts on the capacity of local waste management facilities are assessed to be minor adverse.

**Energy**

6.12.8 An Energy Strategy has been produced for the Proposed Development and accompanies the planning application.

6.12.9 The baseline for the Application Site is one of minimal energy demand and associated carbon emissions due to the brownfield nature of the Application Site (i.e. previously developed land, now derelict for the most part).

6.12.10 The Energy Strategy proposes the construction of a combined heat and power (CHP) plant at a central energy centre and a district heating system to deliver a 35% carbon reduction improvement over the 2013 Building Regulations. If the 35% reduction cannot be achieved using the district heating or CHP plant alone, on-site solar panels Photovoltaic (PVs) will be installed. The intention is that the district heating system will also be able to connect to off-site consumers in the locality.

6.12.11 A ‘fabric first’ approach will be taken to the design of the buildings, which involves maximising the performance of the components and materials that make up the building fabric. The size, shape and orientation of buildings will be considered in order to optimise solar gain and improve energy efficiency. This follows the energy hierarchy of the London Plan.

6.12.12 Residual operational effects are assessed to be minor beneficial in terms of local security of energy supply and energy efficiency improvements above the baseline.

**Conclusion**

6.12.13 There are no significant residual effects in relation to waste and energy as a result of the Proposed Development.

6.13 **Townscape and Visual**

6.13.1 Landscape and townscape can be used interchangeably in the context of this assessment, reflecting the open nature of the wider landscape but also the built up urban character of the areas immediately adjacent to the Application Site. The landscape assessment identifies the effect of the Proposed Development (including during its construction) on the character and quality of the landscape. The visual assessment is undertaken separately and involves an assessment of the effects of the Proposed Development on key views surrounding the Application Site (see Figure 6.10) and a number of Accurate Visual Representations were also prepared to illustrate this.

6.13.2 The majority of the undeveloped area of the Application Site is a post-industrial landscape of various industrial style buildings, landfill, energy infrastructure and some regenerating vegetation. There is an open feel to the Application Site visually with long range views to the River Thames and to the south, the London
Sustainable Industrial Park, and the industrial areas at Dagenham.

6.13.3 The Application Site is more constrained to the north with the existing rail and road infrastructure, and residential development. The residential development for Stage 1 is a contemporary range of properties with large green sustainable drainage areas and a park, giving this area a new character.

6.13.4 The impact of the Proposed Development is significant in the wider area, including south of the Thames (see **Figure 6.11**). During construction there are likely to be moderate but temporary adverse effects on the views of residents to the northwest, residents of Thamesmead, users of the River Thames and users of London Sustainable Industrial Park. During operation, the landscape and visual impacts are considered to be beneficial, with the change from post-industrial decayed landscape to a well-designed, sustainable, multi-functional development.

**Figure 6.10: Viewpoints Plans**
6.13.5 The Proposed Development has fully achieved the strategic landscape objectives identified in the All London Green Grid SPG (2012), through:

- Creation of the extensive Pylon Park, with a strong wetland character;
- A series of green squares, allotments and play spaces created across the development, creating green links within and beyond the development; and
- Enhanced and attractive access to the River Thames, with a variety of character.

Conclusion

6.13.6 The Proposed Development will have temporary adverse impacts on the landscape and certain views during its construction phases, however, impacts upon the landscape character and views once the Proposed Development is complete are considered to be beneficial, with the regeneration of a mainly derelict post-industrial landscape into a landmark at this location of the River Thames.

Figure 6.11: Proposed View from Thamesmead looking North across the Thames to the Application Site from Viewpoint 13
(Note: massing and height shown is the maximum permissible under the proposed parameters)

6.14 Cumulative Effects

6.14.1 There are two types of cumulative effects: Type 1 which result from the interaction of individual effects from the Proposed Development on a particular receptor (intra-project effects), and, Type 2 which result from the combined effects of different, committed (and reasonably foreseeable) development within 1 km of the Application Site, alongside the Proposed Development. Figure 6.12 identifies those schemes included within the cumulative effects assessment.
6.14.2 The in-combination effect of noise from the construction of Stage 2, alongside noise from increased construction traffic along Renwick Road and the deterioration of local views across the Application Site, will affect residential receptors directly to the west and northwest of the Application Site. This adverse cumulative effect is however, temporary and is partly ameliorated when considered in-combination with beneficial effects such as reduced flood risk and construction employment opportunities.

6.14.3 During operation, cumulative effects on surrounding residential and commercial receptors will mostly be beneficial, with improvements in local transport infrastructure, increased local spending, new community facilities and improved landscape and views, leading to a significant in-combination beneficial effect. New residents in the Proposed Development itself will benefit from the same effects, in-combination with a secure energy supply and affordable housing. This significance of this permanent beneficial effect on the local community is reduced (but still significant) when it is considered alongside increased pressure on primary school places, health services and open spaces as a result of the large increase in population.

Figure 6.12: Cumulative Schemes within 1 km of the Application Site

6.14.4 The cumulative effects on ecological receptors from aspects such as noise, air quality, disturbance and pollution events are inherently included in the consideration of overall effects upon these receptors.

6.14.5 The assessment of inter-project cumulative effects has identified that, in general, due to the size of the Proposed Development, the increase in effects as a result of the Proposed Development in-combination with other proposed schemes, is
marginal in comparison to the effects generated by the developments on their own.

6.14.6 Exceptions to this include cumulative effects on educational provision (specifically the provision of primary school places), which would change from minor adverse when considering the Proposed Development on its own, to moderate adverse when considered with the development of housing at Bastable Avenue and Renwick Road, and, moderate adverse cumulative air quality effects expected upon a limited number of residential receptors along the A13 and A1153, during both construction and operation.

Conclusion

6.14.7 A mixture of temporary adverse and beneficial effects, as a result of the Proposed Development, are expected to affect surrounding residential receptors, in-combination, during construction. The effects are however minor and even when considered cumulatively are not expected to be significant.

6.14.8 During operation, significant beneficial cumulative effects can be expected on new residents and surrounding residential and commercial receptors, as a result of the Proposed Development, and the only adverse impacts somewhat reducing this benefit is as a result of increased pressure on community facilities.

6.14.9 The assessment of inter-project cumulative effects has identified no significant effects as a result of the Proposed Development being considered alongside other consented (and reasonably foreseeable schemes), such as the proposed Overground Rail Link (ORL), with the two exceptions being significant cumulative air quality effects on a limited number of residential receptors outside of the Proposed Development and further pressure on education provision in the local area.

7.0 CONCLUSIONS

7.1.1 Table 7.1 outlines the effects which have been considered likely to occur during both construction and operation, once measures have been put in place to minimise any likely adverse environmental effect and, in some cases, enhance the benefits accrued from the Proposed Development.

Table 7.1: Summary of Likely Effects for each Topic Assessment (for Construction and Operation)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Residual Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio-economic</td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>Temporary major beneficial impact due to increase in employment during construction with the potential to draw upon the local labour pool and reduce unemployment.</td>
</tr>
<tr>
<td>Operation</td>
<td>Permanent moderate to major beneficial impacts resulting from an increase in housing supply, especially affordable housing and a consequential increase in population and spending in the local area. Both existing and future residents will also benefit from the creation of new employment opportunities within the Proposed Development. Permanent moderate adverse impacts upon existing and future residents in relation to an increase in demand for open space and leisure facilities.</td>
</tr>
</tbody>
</table>
### Topic: Traffic and Transport

#### Construction
Permanent moderate to major beneficial effects associated with the implementation of new and extended bus services, and a general decrease in disruption to pedestrians and cyclists (with the exception of the closure of Choats Road which would cause delays due to diversion);

Temporary moderate to major adverse effects associated with increased traffic flows and congestion, along with an increased risk of accidents due to construction traffic for road users, pedestrians and cyclists.

#### Operation
For this topic a range of transport related effects, both adverse and beneficial, are provided relating to one impact. This is because the effects depend on the location within and around the Proposed Development. Both permanent major beneficial and adverse effects are therefore associated with new and extended bus services combined with increased bus usage, and also in relation to traffic-related severance due to increased traffic flows.

Permanent neutral to major adverse effects are expected during operation relating to congestion and also the increased risk of accidents for road users due to increased traffic flow.

Permanent major beneficial effects are associated with reduced severance and delay, improved amenity for pedestrians and cyclists.

### Topic: Air Quality

#### Construction
Temporary moderate adverse air quality effects on a small number of residential locations alongside the A13 (Alfred Way and Newham Way) and the A1153 (Lodge Avenue).

#### Operation
Permanent moderate adverse air quality effect on one receptor alongside the A13 (Newham Way).

### Topic: Noise and Vibration

#### Construction
No significant residual effects.

#### Operation
No significant residual effects.

### Topic: Ground Conditions

#### Construction
With mitigation, minor adverse effects on aquifers (through migration of contaminants) become negligible during the construction stage.

#### Operation
During operation, there are a number of significant beneficial effects as a result of the remediation strategy for the Application Site. This includes reduced potential for health effects upon future residents and site users, from exposure to contaminants associated with the Application Site’s previous uses and the limiting of the potential for leaching of contaminants into both surface and groundwater bodies.

### Topic: Water

#### Construction
Minor to moderate adverse effects are expected on the quality of surface water runoff during construction, with consequential impacts on the water quality of nearby surface water bodies (e.g. Goresbrook and Buzzards Mouth Creek).

#### Operation
No significant residual effects.

### Topic: Ecology

#### Construction
Neutral effects are expected to many habitats and species during construction (due to habitat loss and subsequent recreation), however, there are also a number of minor and moderate beneficial effects as a result of the creation of new habitats.

The only moderate adverse effect is on the following ground and scrub nesting birds: linnet, skylark, meadow pipit and song thrush.

#### Operation
All residual effects are neutral during operation with the exception of permanent moderate adverse impacts on water voles due to human disturbance and predation from domestic pets.

### Topic: Archaeology and Built Heritage

#### Construction
Palaeo-environmental deposits could be affected by piling, leading to a moderate adverse effects. Mitigation, which involved geo-archaeological surveys, has already
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<tr>
<th>Topic</th>
<th>Residual Effect</th>
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<td>been carried out as part of the previous extant planning permission, and has led to a better understanding of the area during the prehistoric period. Other residual effects are considered to be negligible.</td>
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<tr>
<td>Operation</td>
<td>Only construction effects are considered for archaeology. The operation of the development would have no likely significant effects on the archaeological resource beyond those likely to arise during the construction phase. The majority of the existing buildings and structures of historical interest (at the site level), will be retained, and some renovated for education, cultural and leisure uses. Provided this is done sensitively, there is likely to be some minor beneficial impacts with regards to built heritage.</td>
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<tr>
<th>Topic</th>
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<tr>
<td>Wind Microclimate</td>
<td>No significant residual effects.</td>
<td>No significant residual effects expected, and the Proposed Development may provide a slight sheltering effect for those existing properties in Stage 1.</td>
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<tr>
<td>Daylight, Sunlight and Overshadowing</td>
<td>No significant residual effects.</td>
<td>No significant residual effects.</td>
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<td>Waste and Energy</td>
<td>No significant residual effects.</td>
<td>No significant residual effects.</td>
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<tr>
<td>Townscape and Visual</td>
<td>Moderate adverse but temporary effects on landscape character and local views are expected during the construction period due to the industrial nature of construction plant and visual disruption from expected earthworks. This is likely to affect residents to the northwest, as well as residents across the river at Thamesmead, and users of the London Sustainable Industries Park.</td>
<td>Adverse visual and landscape effects during construction would give way to moderate beneficial, permanent effects once the Proposed Development is complete. The magnitude of change to the landscape and local views will be high, however, the change from a post-industrial decayed landscape to a well-designed, sustainable, multi-functional development is seen as beneficial.</td>
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<td>Cumulative Effects</td>
<td>The in-combination effect of noise from the construction of Stage 2, alongside noise from increased construction traffic along Renwick Road and the deterioration of local views across the Application Site, will affect residential receptors directly to the west and northwest of the Application Site. This adverse cumulative effect is temporary, however, and is partly ameliorated when considered in-combination with beneficial effects such as reduced flood risk and construction employment opportunities.</td>
<td>During operation, cumulative effects on surrounding residential and commercial receptors will mostly be beneficial, with improvements in local transport infrastructure, increased local spending, new community facilities and improved landscape and views, leading to a significant in-combination beneficial effect. Increased pressure on schools, health services and open spaces will somewhat reduce this effect. The assessment of inter-project cumulative effects has identified no significant effects as a result of the Proposed Development being considered alongside other consented (and reasonably foreseeable schemes), such as the ORL, with the two exceptions being significant cumulative air quality effects on a limited number of residential receptors outside of the Proposed Development and further pressure on education provision in the local area.</td>
</tr>
</tbody>
</table>

7.1.2 As would be expected with a regeneration project of this scale and complexity, the construction and operation of the Proposed Development will result in substantial
change both within the Application Site and within the surrounding area. The impact of this change has the potential to result in a number of likely effects on the environment, which in themselves have the potential to be both beneficial and adverse.

7.1.3 With the implementation of the mitigation measures identified, particularly including those outlined within the Code of Construction Practice, the Outline Remediation Strategy, the Biodiversity Strategy and the Sustainability Framework, it is considered likely that many of the potential adverse effects (especially during construction) will be minimised or avoided altogether. Likewise through the iterative design and assessment process, efforts have been made to maximise the likely beneficial effects.

7.1.4 The Proposed Development is considered likely to result in the following significant benefits:

- increase in employment during construction and operation;
- increased spending in the local area;
- an increase in housing supply, and alleviation on the barriers to housing;
- increased patronage on bus services;
- decrease in severance and delay for cyclists and pedestrians;
- improved amenity for pedestrians and cyclists;
- reduced potential for health effects and pollution events associated with ground contamination; and
- positive effects on habitats and fauna.

7.1.5 The ES has also identified a number of likely significant adverse effects, these include:

- localised severance and delay for pedestrians due to the closure of Choats Road during the construction phase;
- increased congestion at a limited number of junctions during the construction phase;
- a temporary increase in risk of accidents and safety risk for pedestrians, cyclists and road users during construction;
- air quality effects on small number of residential locations alongside the A13 and A1153;
- the risk of changes to the runoff of surface water and reduction in water quality within nearby surface water bodies as a result of pollution incidents during construction;
- temporary visual impacts during construction on residents, users of the River Thames and the nearby industrial park;
- a reduction in the water vole population during operation of the Proposed Development from human disturbance and predation; and
- a reduction in the per capita provision of open space and leisure facilities within the Barking Riverside area.

7.1.6 The assessment is based on predominantly worst-case scenarios due to the outline nature of the application, and therefore the assessment outcomes can be considered design to be conservative. There also remain further opportunities at
the detailed stages to potentially identify additional measures to mitigate the few remaining residual significant adverse effects.

7.1.7 Overall, the Proposed Development is assessed as acceptable in terms of local, strategic and national policy and is considered to appropriately address and respond to environmental, cultural and socioeconomic considerations.
CONTACTS AND AVAILABILITY OF THE ENVIRONMENTAL STATEMENT

The Environmental Statement is available for viewing by the public during normal office hours at the Planning Department of the London Borough of Barking and Dagenham Town Hall, 1 Town Square, Barking, IG11 7LU. More information can be found at https://www.lbbd.gov.uk.

Copies of the Non-Technical Summary, the full Environmental Statement and other associated documents are available (subject to availability) by writing to:

Temple Group Ltd, Devon House, 58-60 St Katharine’s Way, London, E1W 1LB.

Hard copies of the Environmental Statement are priced at:

- £50 for Environmental Statement, Volume 1 – Non-Technical Summary.
- £250 for Environmental Statement, Volume 2 – Main Text.
- £250 for Environmental Statement, Volume 3 – Supporting Appendices.
- £250 for Environmental Statement, Volume 4 – Supporting Annexes

CD copies of the complete Environmental Statement (Volumes 1, 2, 3 and 4) are priced at £20.