

## 5. CONSTRUCTION METHODOLOGY AND SEQUENCING

### Introduction

- 5.1 This chapter describes the anticipated construction methodology and sequencing of the Development. Consideration of likely significant effects on the environment that may arise during the construction phase, and any necessary mitigation measures, are provided within the respective technical chapters of this ES.
- 5.2 Planning for construction of the Development is necessarily broad at this stage and may be subject to modification. This chapter is based on reasonable assumptions, experience and professional judgement and it allows for an assessment of the realistic “worst case” construction phase effects.

### Anticipated Programme

- 5.3 The construction of the Development is anticipated to commence in 2021, subject to planning permission being granted. The Development is expected to be fully operational by 2031. Table 5.1 shows an indicative construction programme. The Development is likely to be built out in an east to west approach.

**Table 5.1 Indicative Construction Programme**

Construction Year of Development	Construction (square metres (sqm))*		
	Year	Under Construction	Cumulative Operational
1	2021	31,500	0
2	2022	31,500	31,500
3	2023	31,500	63,000
4	2024	31,500	94,500
5	2025	31,500	126,000
6	2026	31,500	157,500
7	2027	31,500	189,000
8	2028	31,500	220,500
9	2029	31,500	252,000
10	2030	31,500	283,500
11	2031	0	315,000

*\*Note: the floorspace set out above excludes a potential lorry park / layover of up to 1 hectare in area. Should this potential use be built out, the indicative year for the commencement of its construction would be 2025.*

## Controlled Waters

5.4 The remediation strategy for the Site (submitted in support of the planning application) has been agreed in principle with the Environment Agency (as set out in e-mail correspondence from the EA dated 3<sup>rd</sup> May 2018, included at Appendix 2.2 of the ES). Therefore, no further Land Contamination studies have been submitted in support of the planning application. The remediation strategy includes the following measures:

- Contaminated soils and waters derived from excavations undertaken as part of redevelopment works at the Site will require careful management to minimise the potential for the spread and migration of any such contamination;
- A Material Management Plan may be required to assist with the redevelopment of some of the land parcels at the Site to assist with reuse of site-won contaminated soils;
- A gas risk assessment specific to each land parcel will be required to provide a robust assessment of ground gas risks in line with the proposed developments, once they are known, and to determine the requirements for ground gas protection measures in proposed structures, if deemed necessary;
- A programme of groundwater monitoring will be undertaken to provide information on baseline groundwater quality to manage ongoing environmental liabilities with regards to potential contamination risks to controlled waters. This information may also be used to support future development proposals; and
- A Remediation Verification Report (RVR) is required for each land parcel to demonstrate that the requirements of each land parcel specific remediation plan have been satisfactorily implemented.

## Outline Construction Methodology

5.5 The Development is expected to be built out on the Site over a 11-year period, as set out in Table 5.1. Therefore, the description of the construction works set out below applies to each construction scenario.

5.6 The implementation of advanced works, comprising strategic green infrastructure, would start on the first day of the construction of the Development.

## Construction Machinery

5.7 Consideration has been given to the types of plant that are likely to be used during the construction process. The plant and equipment likely to be associated with each key element of the construction process are set out in Table 5.2.

**Table 5.2 Plant used during the Construction Process**

Type of Equipment	Required for Construction Phase
Tracked/wheeled 360 degree excavators	✓
Excavator mounted hydraulic breakers	✓
Excavator mounted hydraulic crushers	✓
Mortar batching plant	✓
Topsoil screening and mixing equipment	✓
Dumpers	✓
Mobile cranes	✓
Hand held tools including breakers (pneumatic and hydraulic)	✓
Power tools including percussion drills, cutting disks, pipe-threaders	✓
Piling equipment	✓
Wheel washing plant	✓
Scaffold	✓
Mobile access platforms	✓
Delivery trucks	✓
Skips / Skip trucks	✓
Forklift trucks	✓
Ready mix concrete wagons	✓
Concrete placing booms & pumps	✓
Concrete batching plant	✓
Road sweepers	✓
Rail track-mounted plant	✓

## Access Road Construction and Enabling Works

5.8 The initial stages of the construction will include the new permanent access routes into the Development and secondary internal roads. It is anticipated that the internal roads will be constructed up to base-course level and used for construction traffic routes as the Development is built.

5.9 Enabling works would take place in parallel with the access road construction and comprise :

- Installation of contractors site set up, including office and welfare facilities;
- Arboricultural works – including the protection of trees/vegetation to be retained and removal of hedgerow and trees, where applicable;
- Ecological works, where required;
- Installation of site hoarding;

- Ground modelling works will be carried out, including topsoil stripping and stockpiling for later use; and
- Installation of temporary surface water management measures.

5.10 Prior to the main construction works commencing, there is also likely to be the need to access the Site to carry out further targeted surveys and investigation works that are required to complete the detailed design of the Development.

5.11 Specific offices and welfare facilities for construction staff will be required on Site, including welfare facilities and on-Site catering. The contractor's compounds will be located on hardstanding within the Site and the facilities will be relocated to different parts of the Site in line with the sequenced construction of the Development. The compounds will be appropriately located to facilitate construction for each sequence.

#### Excavation and Sub-Structure Works

5.12 Excavation work, preparation of the building plots and associated infrastructure to agreed levels, including formation of swales and drainage courses, will be carried out in advance of the construction of individual units on the Site.

5.13 Sub-structure works may involve both the excavation and construction of traditional concrete pads and deep strip foundations, piling, or alternative ground improvement measures to suit the varying ground conditions anticipated.

#### Infrastructure Works

5.14 Appropriate infrastructure to serve the Development will be installed on the Site as follows:

- The new permanent access routes into the Development will be established with secondary internal roads constructed; and
- All necessary utilities and drainage works.

5.15 It is anticipated that the base of the internal roads will be constructed and used for construction traffic routes as the Development is built out. The permanent access to the Site will be established prior to the main construction works commencing and this will be set up with security control, wheel washing and vehicle holding in order to adequately manage all construction traffic accessing the Site.

### *Drainage Works*

- 5.16 The sustainable drainage system (SuDS) would be constructed on the Site during the earthworks and to suit the sequencing of individual units.
- 5.17 All site works will be undertaken with CIRIA (2001) Control of Water Pollution from Construction Sites<sup>i</sup> which promotes environmental good practice for control of water pollution arising from construction activities.
- 5.18 Construction vehicles will be properly maintained to reduce the risk of hydrocarbon contamination and will only be active when required. Construction materials will be stored, handled and managed with due regard to the sensitivity of the local water environment and thus the risk of accidental spillage or release will be minimised.
- 5.19 The Control of Pollution (Oil Storage) (England) Regulations 2001<sup>ii</sup> (CPOSR) require any tanks storing more than 200 litres of oil to have secondary bunding. The secondary bunding must have a capacity of *'not less than 110% of the container's storage capacity or, if there is more than one container within the system, of not less than 110% of the largest container's storage capacity or 25% of their aggregate storage capacity, whichever is the greater'* (Regulation 3(2)(a) of the CPOSR). Any above ground storage tanks will be located on a designated area of hardstanding. No underground storage tanks will be used during the construction period. The storage of liquids such as degreasers, solvents, lubricants and paints will be in segregated, bunded enclosures.
- 5.20 The construction phase drainage system will be designed and managed to comply with BS6031 "The British Standard Code of Practice for Earthworks"<sup>iii</sup>, which details methods that should be considered for the general control of drainage on construction sites. Further advice is contained within the Geotechnical Design, General Rules (BS EN 1997)<sup>iv</sup> which should be read in conjunction with Basis of Structural Design (BS EN 1990)<sup>v</sup>.

### *Superstructure Works*

- 5.21 This stage of the construction process will involve the erection of portal steel frames and cladding panels to enclose the buildings forming part of the Development, including associated loading docks and office areas. The steelwork will be erected using mobile cranes and mobile extendable working platforms, the latter also being used to erect the cladding and roofing. A high tolerance concrete floor will be poured within the buildings and internal dividing walls constructed following by ventilation, heating and lighting services. External to the building, concrete hardstandings will be constructed.

### *Landscaping*

5.22 Landscaping works will involve some ground modelling works and the establishment of green spaces within the Site, including soil preparation, tree and vegetation planting, seeding, and construction of footpaths/cycle routes. The ground modelling works will be undertaken concurrently with the site preparation and substructure works outlined above, prior to the commencement of the main construction works. Peripheral landscaping planting would be undertaken early in the construction programme.

### **Material and Resource Use**

5.23 This section describes the materials and other resources required for construction of the Development.

### *Construction Materials*

5.24 The primary construction materials to be used include:

- Concrete;
- Steelwork;
- Metal built up roofing systems;
- Insulation;
- Aluminium; and
- Glass reinforced plastic (GRP).

5.25 Due to the outline nature of the Development, its future occupiers are unknown and therefore it is not possible to quantify the volume of construction materials for the Development.

### **Construction Phase Vehicle Movements**

5.26 Construction vehicle movements to and from the Site will be managed to minimise the impact on the local road network by way of a Construction Traffic Management Plan (CTMP), which can be secured by an appropriately worded planning condition or obligation, as necessary. Table 5.3 provides an indicative level of construction traffic trip generation associated with the construction phase of the Development on an average weekday between 06:00 – 24:00.

5.27 The Heavy Goods Vehicle (HGV) movements during the construction phase will be dispersed across the working day outside of the AM and PM peak periods, enforced under the CTMP. The arrival and departure of light vehicles would be concentrated during the morning and evening periods, but would be less than the predicted levels of traffic during the operational phase of the Development. Operational Development trips would commence following the occupation of the Development.

**Table 5.3: Construction Traffic**

Vehicle Type	Average Trips per Day (two-way)
HGV	200
Cars / Vans	486

5.28 The 'peak' combined construction and operational Development trips have been calculated for each year of the construction programme to 2030. These trips peak in 2030, which is the last full year of construction work before the Development is completed and fully operational in 2031. Table 5.4 specifies the Combined Construction and Operational Development Traffic in 2030, which represents the worst-case in-combination impact of construction and operational traffic.

**Table 5.4: Combined Construction and Operational Development Traffic in 2030**

Vehicle Type	Average Trips per Day (two-way)
HGV	2,100
Cars / Vans	6,603
<b>Total</b>	<b>8,703</b>

5.29 The 'peak' construction and operational Development trips set out in Table 5.4 are less than that those generated in 2031, when the Development is fully operational.

#### Construction Traffic Access and Management

5.30 Wherever possible, HGVs will access the Site via Eschol Road, Stoke Road, Ropers Lane and the A289, thereby avoiding built up areas. This routing strategy for construction deliveries will form part of the CTMP. There will be no restrictions on access for light vehicles, although it is anticipated the majority of these will enter the Site area via the route detailed above.

5.31 If abnormal or oversized loads are required to deliver materials to the Site, notice will be given to the Council, and depending on the traffic routing, and also to the Police, the Fire Brigade, and other emergency services, sufficiently in advance of any required road closure and/or diversion dates.

- 5.32 If any hazardous materials are identified on the Site during the course of the construction works, these materials will be transported to a licensed disposal site using permitted routes as identified in the CTMP.
- 5.33 The management of internal HGV movements within the Site, which will be associated with the earthworks that will be required during the construction of each phase of the Development, would be in accordance with an approved CTMP.
- 5.34 All vehicle unloading will take place within the Site and will not affect public highways or adjacent occupiers, except for works to public highways.
- 5.35 The management of all construction traffic and access will be carried out in accordance with an approved CTMP as set out below:
- Planning and managing both vehicle and pedestrian routes;
  - The elimination of reversing, where possible;
  - Safe driving and working practices;
  - Protection to the public;
  - Adequate visibility splays and sight lines;
  - Provision of signs and barriers; and
  - Adequate parking for off-loading storage areas.

### **Controls to Protect the Environment**

- 5.36 The environmental controls and mitigation measures required to eliminate, reduce or offset any likely significant adverse effects on the environment during the construction phase are identified below. It is anticipated that these controls and measures will be secured by appropriately worded planning conditions or obligations, as necessary:
- Preparation of a CEMP, including the CTMP, which clearly sets out methods for managing environmental issues arising as a result of the construction works, including supply chain management issues;
  - Requirement to comply with the CEMP and CTMP will be included as part of the contract conditions for each element of the construction work. All contractors tendering for construction work will be required to demonstrate that their proposals can comply with the content of the CEMP and CTMP and any other conditions or obligations relating to the construction phase that are imposed;



- In respect of necessary departures from the above, procedures for prior notification to the Council, as appropriate, and affected parties will be established;
- Establishing a dedicated point of contact and assigning responsibility to deal with construction related issues if they arise. This will be a named representative from the principal contractor's construction team;
- Production of a newsletter to be circulated to the surrounding neighbours and authorities; and
- Regular dialogue with the Council and the local community.

## CEMP

5.37 The preparation of a CEMP is an established method of managing environmental effects resulting from construction works. The CEMP will detail the implementation of measures in accordance with environmental commitments outlined in the ES, relevant environmental policy, requirements of planning conditions, planning agreements and other legislative requirements

5.38 The CEMP will be submitted to the Council (and other statutory authorities), and approved by the Council, prior to the commencement of construction works. Compliance with the CEMP will be to be secured by planning condition or planning obligation, as appropriate. The structure of the CEMP will include the following:

- A table showing the objectives, activities (mitigation/optimisation measures), and responsibilities for the implementation of those activities;
- The broad plan of the work programme including working hours and delivery times;
- Details of prohibited or restricted operations (location, hours etc.);
- Institutional arrangements for the implementation of the CEMP and for environmental monitoring: responsibilities, role of the environmental authorities, participation of stakeholders;
- Contact during normal working hours and emergency details outside working hours;
- Provision for reporting, public liaison, and prior notification of particular construction related activities;
- The mechanism for the public to register complaints and the procedures for responding to such complaints; and
- The details of proposed routes for HGVs travelling to and from the Site.

### *Temporary Hoardings*

5.39 The Site will be secured by hoardings to prevent unauthorised access to the construction works. The hoardings will comprise a combination of solid hoarding, weld mesh fencing and temporary "herus" fencing to suit the various boundary conditions and security requirements of the Site. Appropriate directional signage will be provided and main access points to the Site will be controlled with a manned vehicle security barrier and a pedestrian turnstile arrangement. Only fully inducted personnel will be provided with the necessary security pass to access the Site via these turnstiles or vehicle security barrier point, for those personnel accessing the Site via vehicle.

### *Lighting*

5.40 For lighting during remediation, demolition and construction of the Development, a Lighting Management Plan (LMP) will be prepared and agreed with the Council in advance of remediation, demolition or construction activities commencing on-Site (and can be secured by planning condition, as necessary). The LMP will specify the location of any temporary lighting throughout the construction programme to ensure that the siting of such features considers the surrounding sensitive receptors and ensure that any effect of the lighting is acceptable. In order to further reduce any lighting effect during the remediation, demolition and construction phases of the Development, the following best practice measures will be implemented as part of the proposed LMP:

- Specified working hours, uses of lighting and the location of temporary floodlights will be agreed with the Council. The proposed location of lighting will take into consideration the location of sensitive receptors;
- Lighting will be adaptable and switched off when not required, unless specifically needed for construction activities or for Health and Safety requirements;
- Source intensity (glare) caused by poorly directed area lighting will be minimised by ensuring that the light fittings comply with industry specifications and when lights are installed, they must be horizontally mounted and directed into the centre of the Site and comply with good design and installation that meets the requirements of CIE 150 (2003)<sup>vi</sup>;
- Temporary lighting fixtures will be installed and designed to provide full cut-off or will be directionally shielded as required post-installation to ensure that artificial light is controlled and substantially confined to the object(s) intended to be illuminated;
- Light spill will be minimised by avoiding poorly sited lights on the boundary of the Site;

- Contributions to sky glow will be minimised by the use of modern lighting equipment designed to comply with CIE 126 (1997)<sup>vii</sup> with appropriate tilt angles and shields to avoid upward light loss; and
- Hoarding lighting should be sympathetic with the surrounding exterior environment. The lighting equipment selected should be of warm white light correlated colour temperature and have appropriate optics and glare control accessories to limit light pollution.

5.41 These measures are recommended by relevant British Standards (BSI), the International Commission on Illumination (CIE), the Institute of Lighting Professionals (ILP), The Society of Light and Lighting (SLL), Construction Industry Research and Information Association (CIRIA) and the Health & Safety Executive (HSE) and represent best practice measures.

#### Hours of Work

5.42 Construction working hours on the Site will be agreed with the Council through the CEMP process. However, it is likely that the standard hours of work will be adhered to. These are:

- Monday to Friday, 8am to 6pm;
- Saturday, 8am to 1pm; and
- Sunday and Bank Holidays, no noisy activities on-site.

5.43 All construction work proposed to be undertaken outside of these hours will be subject to prior agreement of, and/or reasonable notice to the Council, as appropriate.

5.44 Night-time working will be restricted to exceptional circumstances. There may be some out of hours construction deliveries made to the Site by prior agreement of, and/or reasonable notice to the Council, as appropriate.

#### Management of Construction Workers

5.45 All contractors will be required to complete a method statement and risk assessment and obtain a works permit from the Applicant/developer prior to commencing any works on the Site. Each contractor will also be required to register and fully participate in the Considerate Constructors Scheme. All personnel will be inducted by the contractor and this induction will include explanation of the Site specific rules, including consideration of neighbours, working hours, site restrictions, access and egress arrangements etc.

## Response to Complaints

- 5.46 Any complaints relating to the construction phase will be logged on-site and, where necessary, reported to the relevant individual within the Council, as appropriate, (and vice versa) as soon as practicable.

## Prior Notice

- 5.47 In the event of unusual activities or events occurring during the construction phase, these will be notified to the Council, as appropriate, and relevant property owners or occupiers in advance. The relevant activities that will require prior notice will be agreed with the Council, as appropriate, once the detailed programme of construction is defined. This will include:

- Necessary night-time, weekend or evening working (outside core areas) of a type which may affect properties; and
- Road or footpath closures/diversions and movements of wide loads (unlikely to be required).

- 5.48 The local community will be kept informed during the construction phase of the Development through press adverts, the Council, and through direct notification to Parish Councils as appropriate. Letter drops to nearby residents will also be undertaken in advance of construction work commencing.

## References

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- <sup>i</sup> CIRIA C532 (2001) Control of Water Pollution from Construction Sites Guidance for consultants and contractors  
<sup>ii</sup> The Control of Pollution (Oil Storage) (England) Regulations 2001, Statutory Instrument 2001 No. 2954  
<sup>iii</sup> British Standards Institution (December 2009) BS6031:2009 Code of Practice for Earthworks  
<sup>iv</sup> British Standards Institution (December 2004) BS EN 1997-1:2004 Eurocode 7. Geotechnical Design. General Rules.  
<sup>v</sup> British Standards Institution (2002) BS EN 1990: 2002 Basis of Structural Design  
<sup>vi</sup> CIE (2003) 150:2003 Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations  
<sup>vii</sup> CIE (1997) 126-1997 Guidelines for minimizing sky glow