# 4.1 INTRODUCTION

This chapter of the ES describes the proposed demolition and construction strategy and programme, including all key activities that will be undertaken prior to the occupation of the proposed development. This information is required for the purposes of identifying and assessing the potential environmental impacts and likely environmental effects of the proposed development in the technical assessments reported within the three volumes of the ES.

Planning for demolition and construction, including potential phasing, is necessarily broad at this stage, given that the planning application is in outline and a contractor is not appointed at this stage. As such, it may be subject to modification during any future detailed demolition and construction planning. For this reason, the following chapter is based on reasonable assumptions in the demolition and construction programme.

### 4.1.1 Updates for the Revised December 2020 Submission

As discussed in Chapter 2 of this ES, following on from the initial planning application submitted in April 2020 (LPA application reference number 20O/0997), a number of consultation comments were received from LCC and other statutory consultees which resulted in amendments to the design of the proposed development. The construction strategy outlined in this chapter has been updated to align with the revised December 2020 design.

## 4.2 PHASING OF THE PROPOSED DEVELOPMENT

For the purposes of the ES, it has been assumed that the 'opening year' for all development within the application site is 2028, with site preparation and enabling works commencing in Q3 2024.

The indicative phasing of construction is detailed in Table 4.1 and shown on Figure 4.1. It should be noted that a number of the phases will take place concurrently. The total length of the construction phase is anticipated to be 4 years and 2 months. Throughout this ES, reference to the 'construction phase' is considered to include the demolition works.

#### Table 4.1

Indicative programme of construction works

CONTENT	START DATE	FINISH DATE	DURATION
Demolition & Site Preparation	July 2024	May 2025	43 weeks
Hoardings & site establishment	July 2024	August 2024	4 weeks
Demolition & site clearance	July 2024	February 2025	26 weeks
Site preparation & remediation	December 2024	May 2025	20 weeks
Construction works	January 2025	September 2028	182 weeks
Infrastructure works	December 2024	June 2025	24 weeks
Phase 1	January 2025	April 2026	65 weeks
Phase 2	November 2025	August 2026	40weeks
Phase 3A	January 2026	January 2027	50 weeks

CONTENT	START DATE	FINISH DATE	DURATION
Phase 3B	April 2026	September 2027	70 weeks
Phase 4	August 2026	March 2028	78 weeks

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# 4.3 SITE LOGISTICS

#### 4.3.1 Hours of Operation

Construction Works on site will be limited to the hours of between 07:00 and 19:00 Mondays to Fridays and between 07:00 and 13:00 on Saturdays. No works will be undertaken on Sundays, Public Holidays or outside these proposed hours, unless agreed in writing with LCC.

#### 4.3.2 Considerate Contractor's Scheme

The site and its constituent construction phases will be registered with the UK's "Considerate Contractor's Scheme". This scheme ensures that contractors carry out their operations in a safe and considerate manner; with due regard to pedestrians and site users. A newsletter updating local residents and businesses on site progress and forthcoming works will be issued on a regular basis. Progress photos will also be displayed on a community notice board located on the site's hoarding, while contact details will also be displayed to allow any queries or complaints to be lodged by the public.

#### 4.3.3 Site Security

All security operations will be implemented in accordance with the latest British Standards and in full compliance with the Private Security Industry Act 2001 (1). Security arrangements will ensure unauthorised access is prevented at all times to the work areas. All staff/operatives will undertake a detailed project specific induction before being issued with access ID badges.

#### 4.3.4 Transportation of Materials

The number of daily construction vehicle movements is expected to fluctuate throughout the construction phase, reaching the maximum figure during the latter half of the period. The maximum number of daily vehicle movements generated during the peak of the construction phase has been estimated by the Club to be up to 114, comprising up to 88 Heavy Goods Vehicle (HGV) movements and up to 26 Light Goods Vehicle (LGV) movements. However, to ensure a robust, worst case scenario has been considered, the relevant environmental assessments have assumed that 100 percent of the 114 maximum daily movements will be made by HGVs.

The majority of HGV movements are expected to take place between 08:00 and 14:00. Deliveries will be carefully scheduled to avoid multiple vehicles arriving at the site simultaneously, which could result in vehicles having to wait at the site entrance. A primary construction vehicle route has been developed to limit traffic impacts to particular roads. The proposed primary construction vehicle route is shown in Figure 4.2.

### 4.3.5 Traffic Management and Access

The proposed site access and egress strategy is shown in Figure 4.3. It is envisaged that a 'one way' system will be in operation for all vehicle movements through the application site, with approaching vehicles accessing the site only via the existing Park End Car Park gates on Goodison Road. This 'entry' point will always be marshalled by a gateman who will advise the drivers' contact of its arrival and desired offloading point.

Once entered into the site, all vehicle and construction plant movements will observe a mandatory 5mph speed limit, with the gateman escorting the delivery vehicle to its offloading point for handover to the respective trades supervisor to manage the safe offloading of vehicles at their designated storage point. It should be noted that the vehicle access route through the site will be segregated from pedestrian areas by means of a fence or Vehicle Control Barrier (VCB) to minimise the potential for accidental contact between pedestrians and vehicles.

Once a vehicle has been safely offloaded, the trades supervisor will escort the vehicle to the site exit point at the gates on Bullens Road, where the gateman at this location will ensure a safe exit from site back onto the highway.

As a continuation of the site policy to keep vehicles and pedestrians segregated at all times, the site compound areas will have designated pedestrian routes from the contractors vehicle parking area to the site welfare and office accommodation. In addition, a clearly identified pedestrian route is provided to the site entry point at the Park End stand with controlled admittance only to authorised persons in possession of accredited site ID badges having undertaken the mandatory site induction.

It should be noted, that for short periods, the perimeter roads, Goodison Road, Gwladys Street, and Bullens Road, may be subject to road closures during the demolition phase.

A limited amount of space will be available on site for contractor parking, in the designated area indicated in Figure 4.3; however, this is unlikely to provide sufficient parking for all construction workers. Construction workers will be restricted from parking on streets in the immediate vicinity, on account of the existing parking restrictions surrounding the site. Some parking will be set aside within the Blue Base on Salop Street, L4 4BZ, for construction worker vehicles. Vehicles not able to park within this area will need to park within publicly available or private car parks in the local area. Accordingly, construction worker traffic will be spread widely across the surrounding road network.

It is proposed that a Construction Environmental Management Plan (CEMP) will be prepared and submitted to LCC prior to the construction phase commencing (secured by condition). The CEMP will include a Construction Transport Plan that will set out measures to assist in the management of construction worker traffic. The proposed measures will actively encourage construction workers to utilise public transport, walking, cycling and car share opportunities wherever practical.

#### 4.3.6 Site Offices & Welfare Accommodation

It will be necessary during the course of the main construction programme, to provide on-site office and site welfare accommodation in accordance with Construction, Design and Management (CDM) Regulations 2015 (5) Schedule 2.

For the initial activities during the site preparation works, accommodation will be located in the existing vacant areas within the Park End Stand until such time that the area is to be demolished.

Site temporary accommodation will consist of all office and welfare facilities for the personnel on site. This will be designed for a peak of up to approximately 100 operatives and 20 staff including subcontractors. Depending on the period of site works, accommodation provision may consist of stacked units placed with a mobile crane.

# 4.4 DEMOLITION AND SITE PREPARATION WORKS

## 4.4.1 Hoarding and Site Establishment

Once the specialist contractor's final demolition sequence plan has been developed, it will be necessary to secure the site by erecting a minimum 2.4m high Hardstaff Hoarding around the perimeter of the site. This will essentially consist of a concrete block to form a Vehicle Control Barrier (VCB) with a timber façade (Hoard-it system) on the outside, to ensure segregation from pedestrians and public vehicles requiring necessary access around the existing stadium whilst the demolition works are in progress.

It is relatively easy to install and alter as and when required, with all components being reusable. Hoardings will be inspected daily and maintained when required and lighting will be provided on all hoardings in the highway.

As the site offices and welfare compounds will be positioned predominantly within the existing Goodison Park Car Park, this will reduce the initial hoarding requirements considerably, until such time as the demolition of the existing structure is ready for commencement.

### 4.4.2 Demolition & Site Clearance

Prior to any demolition works being carried out, the existing pitch area and sub-services will be removed, and an oversite hardstanding formed to provide a level mat on which to manoeuvre heavy demolition plant. It is currently proposed that this will include the retrieval and safe storage of historic burial ashes.

Prior to any works being carried out, existing artefacts adorning Goodison Park will be removed and retained to prevent damage during construction works. A full intrusive asbestos survey will be conducted within all structures to be demolished, and any asbestos removed under licence before any other demolition works are carried out.

The soft stripping of all non-structural elements will be undertaken using hand techniques. The material arising will then be separated and placed into designated skips for recycling off site.

Once the existing areas have been soft stripped and sealed off to prevent unauthorised access, heavy demolition plant will move in to begin the sequential demolition of the ground's existing structure. Full details relating to the detailed methodology will be developed in conjunction with a



specialist contractor and submitted at/following reserved matters stage in due course.

### 4.4.3 Site Preparation & Remediation

Once the main structural elements are down and removed from site, the residual foundations and basements will be grubbed up and any voids filled in to form a level oversite to allow new construction works to progress. The proposed ground investigation will also be undertaken at this time and should remediation be considered necessary, a remediation strategy will be prepared and agreed with LCC and the remediation will be undertaken in accordance with this strategy.



## Figure 4.2

Primary Construction Vehicle Route between the Site and the motorway network (M57) (indicated in blue)





## Figure 4.3

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Construction Vehicle Site Access & Egress Strategy





Gwladys Street

Logistic plan to be updated at appropriate intervals throughout Construction period Not to scale and for illustrative purpose only

## 4.5 CONSTRUCTION WORKS

#### 4.5.1 Infrastructure works

Prior to construction of the proposed buildings, the following infrastructure works will be undertaken at the site:

- Construction of the main drainage & sewer system and statutory utilities main pipework/ductwork for future connections to the individual blocks; and
- Construction of access roads, car parking and kerbing up to sub-base levels to provide routes for vehicular and pedestrian access and hardstanding areas for storage during the construction of the individual blocks.

#### 4.5.2 **Building Construction**

The construction strategy described below is relevant to construction of all buildings within Phases 1 to 4 of the construction phase.

#### 4.5.2.1 Foundation and Drainage Works

Dependant on the final detailed design proposals, the foundation design may involve a 'piled' solution for some blocks, as opposed to strip or pad foundations, which would be used where possible. As such, it will be necessary to ensure that the surrounding areas to be piled are able to support travelling heavy plant and being able to withstand the standard parameters of 20kN/m<sup>3</sup> ground loading. However, it is likely that this could be provided by using recycled crushed concrete from the existing stadium's structure. Should this be the case, this may warrant the use of a 'crusher' located onsite, to reduce the number of offsite vehicle movements and potential impact on the surrounding areas.

The substructure works will comprise the following activities:

- Foundation excavation and casting;
- Installation of perimeter and under-slab storm water and foul drainage infrastructure;
- Ground floor slab formation and casting; and
- Perimeter statutory utilities ducting (to receive wireways and services at a later date).

#### 4.5.2.2 Superstructure Works

This will include concrete works for each block and may include some or all of the following, dependant on final detailed design requirements:

- In-situ or precast concrete columns, wall units and floor units; and
- Precast staircases and lift shafts.

#### 4.5.2.3 Structural Steel Frames

Dependant on the final detailed design proposals, a number of the multistorey blocks may be constructed using structural steelwork framing techniques, as follows:

- Steelwork columns (beams and bracing); and
- Metal decking (stud welded to receive solid in-situ concrete).

#### 4.5.2.4 Roof Steelwork

Dependant on the final detailed design proposals, a number of the multistorey blocks may be constructed using structural steelwork framing techniques, as follows:

- Assembly of steelwork trusses or portal frames;
- Purlins to receive roof coverings; and
- Associated bracing to ensure stability.

#### 4.5.2.5 Roofing

Final roofing materials selection will be dependent on the detailed design proposals, but may comprise:

- Timber roof carcassing or trusses to receive felt, lath and tile finishes;
- Aluminium standing seam roofing system; and
- Single ply membrane flat roofing.

#### 4.5.2.6 Elevational Façade Finishes

This stage may include:

- Lightweight secondary steel framing to receive external cladding panels of metal or glazed composition;
- Traditional brickwork and blockwork masonry or manufactured masonry panels;
- External doors of timber or metal composition; and
- Aluminium or UPVC windows.

#### 4.5.2.7 Mechanical, Electrical and Plumbing (MEP and Fit-Out)

The following works are anticipated during this stage:

- Mechanical & Electrical installations;
- Construction of blockwork and drywall partitions;
- Lift installation(s) (where applicable);
- Completion of floor, wall and ceiling finishes;
- Installation of IPS Sanitaryware Panels; and
- Installation of fixtures and fittings.

#### 4.5.2.8 External Works

Hard and soft landscapi construction programme.

# 4.6 LIKELY MACHINERY AND PLANT REQUIREMENTS

The exact machinery and plant requirements are unknown at present and will be dependent upon the appointed contractor(s).

Where necessary, assessments have been based on anticipated plant requirements, methods and their associated noise levels etc. in line with appropriate standards (e.g. British Standard (BS)5228: Noise and vibration control on construction and open sites).

Table 4.3

#### **Typical Construction Plant Requirements**

#### **PLANT & EQUIPMENT**

Hoarding	g and Site Establishment
Generato	or (Power)
Demoliti	on
Generato	or (Power)
Generato	or (Welding)
Compres	sor, tractor mounted
Water bo	Dwser
Tracked	excavator
Diesel fr	ont end loader (wheeled)
Diesel hy	ydraulic shovel
Tipper Lo	orry
Lorry	
Site fork	lift truck
Tracked	excavator fitted with brea
Pneuma	tic circular saw
Lorry mo	ounted road sweeper
Tracked	crane
Dump tr	uck
Site Prep	paration & Remediation
Generato	or (Power)
Diesel fr	ont end loader (wheeled)
Tipper Lo	orry
Lorry	
Lorry mo	ounted road sweeper

Hard and soft landscaping will be completed towards the end of the

Plant Requirements

t

aker and/or pneumatic breaker

ode



PLANT & EQUIPMENT	PLANT & EQUIPMENT	PLANT & EQUIPMENT	
Tracked excavator	Diesel hydraulic shovel	Hand-held electric circular sav	
Construction	Tipper Lorry		
Tracked excavator	Lorry	4.7 MATERIALS	
Site fork lift truck	Site fork lift truck	4.7.1 Demolition	
Tipper Lorry	Tracked excavator fitted with breaker and/or pneumatic breaker	It is expected that the	
Lorry	Pneumatic circular saw	demolition:	
Diesel hydraulic shovel	Lorry mounted road sweeper	<ul> <li>Concrete from sup stairs;</li> </ul>	
Lorry mounted road sweeper	Tracked crane		
Auger. lorry mounted	Dump truck	<ul> <li>Masonry from inter</li> </ul>	
Oscillatory boring machine for bored piling	Site Preparation & Remediation	<ul> <li>Steel frame, window</li> </ul>	
Crane lorry mounted	Generator (Power)	<ul> <li>Earth spoil from exe</li> </ul>	
Lorry mounted crane	Diesel front end loader (wheeled)	To enable consideratio	
Concrete pump. lorry mounted	Tipper Lorry	quality and noise during	
Concrete Mixer	Lorry	that all material would disposal.	
Poker vibrator	Lorry mounted road sweeper	The designation and ro	
Power float	Tracked excavator	specific chemical test	
Vibratory roller	Construction	tests, and, if required, it	
Road roller	Tracked excavator	negislation. It the mate managed under a Mate	
Dumpers	Site fork lift truck		
Scaffold frames and clips	Tipper Lorry	4.7.2 Construction	
Scaffold poles and clips	Lorry	At this stage of the pl	
Hand-held electric circular saw	Diesel hydraulic shovel		
Table 4.3 details the assumptions that have been made in terms of	Lorry mounted road sweeper		
machinery and plant requirements.	Auger. lorry mounted		
Table 4.2	Oscillatory boring machine for bored piling	Concrete and timbe	
Typical Construction Plant Requirements	Crane lorry mounted	<ul> <li>Glass and aluminit</li> </ul>	
PLANT & EQUIPMENT	Lorry mounted crane	<ul> <li>Brick/ Blockwork fo</li> </ul>	
Hoarding and Site Establishment	Concrete pump. lorry mounted	Wherever possible, ma	
Generator (Power)	Concrete Mixer	maximise recycling.	
Demolition	Poker vibrator		
Generator (Power)	Power float	4.8 CONSTRUC	
Generator (Welding)	Vibratory roller	MANAGEM	
Compressor, tractor mounted	Road roller	4.8.1 The Purpos	
Water bowser	ter bowser Dumpers		
Tracked excavator	Scaffold frames and clips	will be governed by a	
Diesel front end loader (wheeled)	Scaffold poles and clips	condition to any future	



atio of waste types will be determined through site data, including Waste Acceptance Criteria (WAC) t will be disposed off-site in accordance with relevant erial is suitable for re-use, this would need to be erials Management Plan.

# on

lanning and design process, the overarching key nts of the scheme are likely to include the following:

- nd roofs;
- substructure, basement and lift cores;
- er frames for residential superstructures;
- um for façade curtain walling; and
- or some internal walls.

# CTION ENVIRONMENTAL **INT PLAN (CEMP)**

# se of a CEMP

be undertaken in accordance with Best Practice and CEMP, which it is anticipated will be secured by planning permission. This document will provide the ork required for the planning and implementation of construction activities in accordance with the environmental commitments

# AND RESOURCE USE

#### n and Site Preparation

e following types of materials would arise from

perstructures including columns, floor slabs and

- rnal walls and partitions;
- ws, plant, balustrades etc.; and
- cavation and piling.

on of the worst-case effects with respect to traffic, air g the demolition and construction phase, it assumed be transported off site for re-use, recycling and/or

aterials will be recycled and re-used. Measures will to minimise the quantity of materials used and

identified within this ES. It will also address the requirements of any subsequent planning conditions imposed by LCC. Its purpose is to avoid or minimise the risks of adverse impacts on environmental resources and local residents and businesses.

#### 4.8.2 Measures to be included in the CEMP

This section summarises the measures to be included within the CEMP, as per the recommendations made within the technical chapters of this ES and within its technical appendices.

#### 4.8.2.1 Transport

The following Best Practice measures are proposed to minimise transport impacts during the construction phase:

- Preparation of a Construction Travel Plan
- Construction workers to be encouraged to use public transport, walking and cycling wherever possible, staff private vehicles to be discouraged from parking in nearby streets.
- Remote car parks to be used by construction workers who choose to drive.
- Designated HGV access routes so that HGVs do not adversely impact the most sensitive areas.
- Where appropriate, temporary traffic management measures will be implemented on the local road network to mitigate potential impacts. This could include temporary signalised pedestrian crossing points.

#### 4.8.2.2 Air Quality

The following Best Practice measures are proposed to minimise air quality impacts during the construction phase:

#### **Dust Management**

- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in the Air Quality Assessment. The desirable measures should be included as appropriate for the site.
- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook.
- Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important

to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100m of site boundary, with cleaning to be provided if necessary.
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover should be used as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.
- Planning and controlling the orientation, shape and locations of stockpiles, to minimise the risk of dust rising through wind action.
- Ensure all vehicles switch off engines when stationary no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on un-surfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

- water where possible and appropriate.
- to dampen down the site.
- equipment wherever appropriate.
- event using wet cleaning methods.
- be used.
- less emissions and are regularly serviced).
- not directly in use.

# <u>Demolition</u>

- to the ground.
- stacked prior to being removed from site.
- alternatives.
- before demolition.

• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.

Control measures and dust suppression techniques including reuse of site won water to minimise resource use on the project.

Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable

Ensure a dampening water bowser will be utilised to keep the dust on the site to a minimum. This can be towed behind various site vehicles

Use enclosed chutes and conveyors and covered skips

Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such

Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the

Avoid bonfires and burning of waste materials.

Internally to the building, we will utilise vacs of different sizes to remove any dust that is generated by the construction works, brushes will not

Skips will be emptied regularly and all skips that are removed from site will be sheeted over prior to leaving the site boundary.

Ensuring appropriate selection and maintenance of construction vehicles, plant and equipment (i.e. vehicle and plant which produce

Ensuring plant and equipment is not left running for long periods when

Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles

Ensure water suppression will be used on the demolition machines to give dampening down at the point of source. This will also be enhanced with mist cannons dampening down areas where the materials are

Avoid explosive blasting, using appropriate manual or mechanical

Bag and remove any biological debris or damp down such material

### **Earthworks**

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or trackifiers where it is not possible to revegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.

### Construction

- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.

### Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site logbook.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- A jet wash pull along bowser will be used to clean the wheels of vehicles as they exit site, this will minimise and reduce the risk of dust emissions and deposition of material on the public highway.
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10m from receptors where possible.

#### 4.8.2.3 **Noise and Vibration**

The following Best Practice measures are proposed to minimise Noise and Vibration impacts during the construction phase:

- Source Noise Control
  - Wherever possible noise will be controlled at source.
    - a) avoid unnecessary revving of engines and switch off equipment when not required;
    - b) keep internal haul routes well maintained and avoid steep gradients;
    - use rubber linings in, for example, chutes and dumpers to c) reduce impact noise;
    - minimize drop height of materials; d)
    - e) start up plant and vehicles sequentially rather than all together.
  - As far as reasonably practicable, sources of significant noise will be enclosed or screened. The extent to which this can be done depends on the nature of the machine or process to be enclosed and their ventilation requirements. For maximum benefit, screens will be close to the source of noise.
- Working Methods Where reasonably practicable, quiet working methods will be employed, including use of the most suitable plant, reasonable hours of working for noisy operations, and economy and speed of operations.
- Scheduling of Works
  - It is proposed that the scheduling of any construction works at the site be within daytime hours. The following hours of construction working are proposed;
    - a) Monday to Friday: 07:00 19:00
    - b) Saturday: 07:00 13:00
    - c) Sundays and Bank Holidays: No Working
  - Where practicable, percussive piling activities will be scheduled to avoid migration/mating periods of sensitive ecological species as advised by the project ecologist.
- Maintenance Regular and effective maintenance by trained personnel is essential and will do much to reduce noise from plant and machinery. Increases in plant noise are often indicative of future mechanical failure.
- Training:
  - Operatives will be trained to employ appropriate techniques to keep site noise to a minimum, and will be effectively supervised to ensure that best working practice in respect of noise reduction is followed. All employees will be advised regularly of the following, as part of their training:
  - a) the proper use and maintenance of tools and equipment;
  - b) the positioning of machinery on site to reduce the emission of noise to the neighbourhood and to site personnel;

- personnel).

- Noise Monitoring

  - will be recorded:
  - periods;
  - data;

  - monitoring period(s);



c) the avoidance of unnecessary noise when carrying out manual operations and when operating plant and equipment;

d) the protection of persons against noise;

e) the operation of sound measuring equipment (selected

Special attention will be given to the use and maintenance of sound-reduction equipment fitted to power tools and machines.

Community Relations – Good relations with people living and working in the vicinity of site operations are of paramount importance. Early establishment and maintenance of these relations throughout the duration of site operations, will go some way towards allaying people's fears. It is suggested that good relations can be developed by keeping people informed of progress and by treating complaints fairly and expeditiously. The person, company or organization carrying out work on site will appoint a responsible person to liaise with the public. In general, the longer the duration of activities on a site, the more likely it is that noise from the site will prove to be an issue. In this context, good public relations and communication are important. The hours of working will be planned in advance and disseminated. There will be a need to adhere strictly to the stated schedule and ensure that the community is informed of their likely durations.

On-site noise levels will be monitored regularly, particularly if changes in machinery or project designs are introduced, by a suitably qualified person appointed specifically for the purpose. The following monitoring scheme is proposed.

Noise monitoring during the construction phase will be undertaken in accordance with the guidance presented in Annex G of BS 5228-1:2009 which states that the following information

a) the measured values of LAeq and, where appropriate, LpA(max) or LA01, together with details of the appropriate time

b) details of the instrumentation and measurement methods used, including details of any sampling techniques, position of microphone(s) in relation to the site and system calibration

c) any factors that might have adversely affected the reliability or accuracy of the measurements;

d) plans of the site and neighbourhood showing the position of plant, associated buildings and notes of site activities during

e) notes on weather conditions, including where relevant, wind speed/direction, temperature, presence of precipitation, etc.;

f) time, date and name of person carrying out the measurement.

- Proposed construction noise monitoring locations are shown in Appendix C of the Noise & Vibration Impact Assessment Report (Appendix 9.1, ES Volume III). It is proposed that noise levels will be routinely monitored and reported at these locations for 4 hours during construction activities on a monthly basis. Additional measurements will be undertaken to establish whether specific equipment or practices will be capable of achieving the Noise Emission Limits as set out below or in light of any complaints.
- Vibration Monitoring
  - Vibration monitoring will be undertaken during the construction phase; monitoring will record Peak Particle Velocity (PPV), max displacement, Vibration Dose Value (VDV) and acceleration. Measurement will generally be undertaken in accordance with the procedure described in BS ISO 4866:2010: Guidelines for the measurement of vibrations and evaluation of their effects on structures. Baseline monitoring to be undertaken prior to works starting on site to establish appropriate monitoring trigger levels for vibration and displacement.
  - Works will stop and alternative methods employed if vibration exceeds the established thresholds.
  - Records of the monitoring will be consistent with the requirements of BS7385:1990 and will include:
  - a) Description of the vibration source
  - b) Type and condition of the building
  - c) Purpose of the measurement
  - d) Reference to BS7385
  - e) Position of transducer and manner of coupling type and make of transducer
  - f) Frequency range and linearity
  - g) Assessment of the sources of error
  - h) PPV recorded and associated frequency

#### 4.8.2.4 Ground Conditions

Implementation of best practice construction and dust suppression measures, as follows:

- Contaminated soils to be stockpiled in suitable skips or bunded areas;
- Dampening down of material to be undertaken;
- Vehicle washing to be undertaken;
- Designated site haulage routes to be agreed;
- Dust monitoring and covering of exposed work faces to be undertaken;
- Runoff to be collected and disposed of appropriately;
- Stockpiling of materials to be minimised where possible. Materials to be placed in skips or bunded areas;

- Infiltration to be minimised where possible; and
- Contaminated material to be placed in segregated areas of site, within skips or bunds.

#### 4.8.2.5 Water Quality

 Standard measures will be incorporated into the construction phase to limit potable water demand, use and wastage wherever practicable (i.e. ensure water supply connections are not leaking etc.).

#### 4.8.2.6 Ecology

It is recommended that demolition, site clearance and the commencement of construction work should take place outside of the bird nesting season (generally considered to be March to September inclusive). If this is not possible, then it is strongly recommended that an Ecological Clerk of Works (ECoW) conducts a check of the whole site for active bird nesting immediately prior (no more than 24 hours) to the commencement of demolition, clearance, and construction activities. Once this check is complete, a 24 hour window will allow for site works to commence, should no active nests be identified. Should works cease for more than 24 hours, then an additional check for breeding birds may be required.

### 4.8.3 Securing the requirement for a CEMP

The CEMP can be secured by way of a suitably worded planning condition and should be in place before the start of construction works. The CEMP will have a full appreciation of UK environmental law (as appropriate to the scheme).

# **BIBLIOGRAPHY**

1. legislation.co.uk. Private Security Industry Act 2001. [Online] [Cited: 20 March 2018.] https://www.legislation.gov.uk/ukpga/2001/12/contents.

2. The Construction (Design and Management) Regulations 2015. [Online] [Cited: 20 March 2018.] http://www.legislation.gov.uk/uksi/2015/51/contents/made. CBRE | GOODISON PARK LEGACY PROJECT, LIVERPOOL

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