

Chapter 5: Demolition and Construction

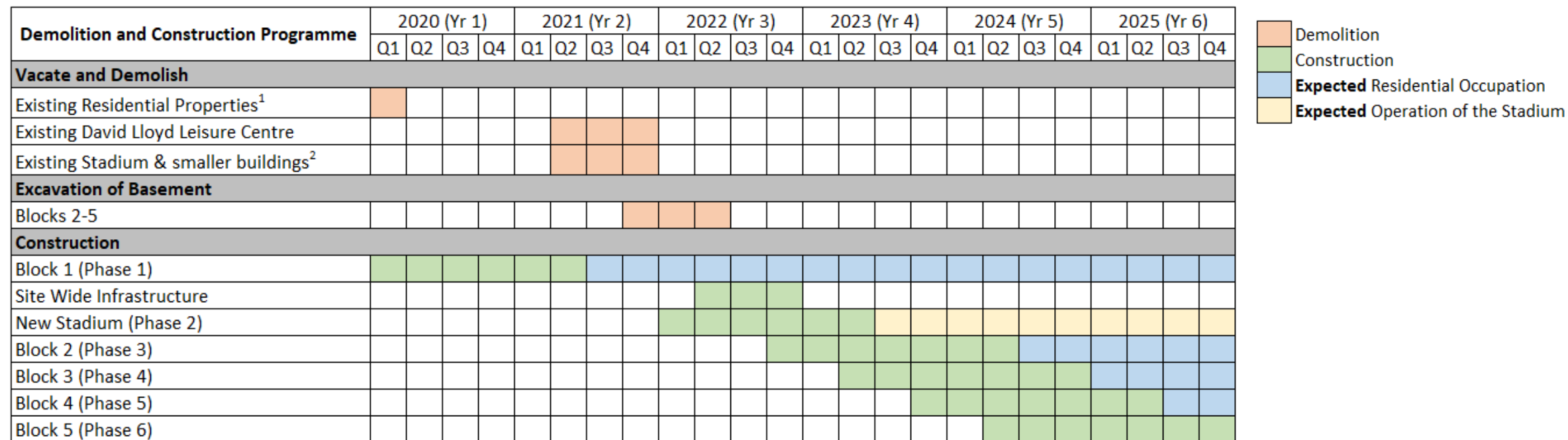
INTRODUCTION

- 5.1 This chapter of the Environmental Statement (ES) describes the principal activities relating to the enabling and demolition works across the site and the subsequent construction of the Proposed Development. For the purposes of this ES, enabling, demolition and construction works are referred to as the demolition and construction works, unless specified otherwise or with enabling works being specifically referred to if necessary.
- 5.2 Planning for demolition and construction is broad at this stage in the planning process and may be subject to modification during the detailed planning of these works. The information presented within this ES chapter is based on reasonable assumptions made by the Applicant and is suited to this stage of planning. It is anticipated that further detailed information on demolition, enabling works and construction logistics will be submitted to Woking Borough Council (WBC) pursuant to relevant planning conditions attached to the permission relating to the preparation of a Construction Environmental Management Plan (CEMP) for the different phases of work.
- 5.3 Subject to successful tender process, a Principal Contractor shall be appointed. The Principal Contractor will manage the demolition and construction works themselves. The selection process shall ensure they have sufficient experience of working on projects such as the Proposed Development, including projects which have involved consideration and management of complex issues such as working near to existing residential properties, busy main roads, transport networks and utilities infrastructure.
- 5.4 This chapter does not assess the magnitude of potential impacts, nor the scale and so significance of likely effects during the demolition and construction works, as this is addressed within individual technical assessments presented within **ES Volume 1 (Chapters 6 - 12)** and **ES Volume 2: Townscape and Visual Impact Assessment (TVIA)**. An outline of the environmental measures to be included in the CEMP, Construction Logistics Plan (CLP) and Site Waste Management Plan (SWMP) are included in **ES Volume 1, Chapter 15: Mitigation and Monitoring**. These measures have been considered within each technical assessment whether as standard control measures, or as mitigation, to enable the assessment of potential and residual demolition and construction effects within a particular technical assessment.
- 5.5 This chapter has been prepared by Trium, Tier Consult Ltd and Quartz project Services (on behalf of the Applicant). **ES Volume 1, Chapter 4: The Proposed Development** includes a description of the Proposed Development, which should be referenced as appropriate.

PROGRAMME OF WORKS

- 5.6 Figure 5.1 presents an outline of the enabling works, demolition and construction programme for the redevelopment of the site and delivery of the Proposed Development. It is currently envisaged that the enabling works, demolition and construction will take approximately 6 years to complete.
- 5.7 The Proposed Development will be constructed in six main phases, with each block of the stadium representing a phase of works, commencing with Block 1 and proceeding sequentially to Block 5. Construction of the stadium will commence in Quarter 1 of 2022 (year 3), upon completion of Block 1, and will likely be operational in Quarter 3 of 2023 (year 4). The phasing of the various buildings will in part run concurrently, as shown in Figure 5.1.
- 5.8 Works will commence with Block 1 and first occupation is expected in Quarter 3 of 2021 (year 2). Works will commence on Blocks 2 to 5 from Quarter 4 of 2022 (year 3), with the start of each block staggered at 6-month intervals. The demolition and construction works for each phase are expected to comprise of the following main stages:
 - Enabling works and site establishment – including demolition of the existing buildings;
 - Excavation and piling;
 - Construction of the substructure;
 - Construction of the superstructure;
 - External envelope; and
 - Fit out and landscaping.
- 5.9 As the superstructure and fit-out stages progress for each block, first occupation of the preceding blocks (i.e. Blocks 2 to 5) will be from Quarter 3 of 2024 (year 5) through to Quarter 4 of 2025 (year 6). First commercial occupation is scheduled for Quarter 3 of 2023 (year 4). First occupation is expected in Quarter 3 of 2021 (year 2).

Figure 5.1 Summary Demolition and Construction Programme



¹ Located in the north of the site, including 81 Westfield Avenue, Hoe View, Park View and 1-6 Kingfield Road

² Woking Gymnastics Club and Woking Snooker Centre

- 5.10** Whilst the Proposed Development has been divided into six phases, the works will largely be undertaken concurrently. The phases have been defined to allow the EIA to adequately consider whether any new receptors will be introduced onto the site whilst demolition and construction works are ongoing. This is indeed the case, as the intention is that the Proposed Development becomes progressively occupied as the phases are completed; Block 1 is expected to be occupied first, whilst the stadium and remaining blocks undergo substructure works, superstructure works and fit-out. Thereafter, Blocks 2 to 5 etc. will be progressively occupied, whilst the subsequent blocks undergo fit-out and have landscaping / public realm works completed.
- 5.11** Whilst the outline programme reflects a continuous construction period of 6 years, there will be some points across the programme where there will be reduced construction activities ongoing; for example, 2022 (year 3) which will primarily involve site wide infrastructure and stadium works only, and 2025 (year 6) in which there will only be superstructure, fit-out and landscaping / public realm works associated with Blocks 4 and 5). There will also be other points in time where there is a peak in construction activity due to multiple works occurring across the stadium and Blocks 2, 3 and 4 during 2023 (year 4). It is anticipated that there will not be a period of time when there are works occurring across all phases (i.e. all blocks and the stadium).

Interfaces

- 5.12** The main interfaces are as described below:

- Residential: There will be no direct interfaces relevant to the Proposed Development, apart from the existing football stadium and existing David Lloyd Leisure Centre, which are to remain in operation during the construction of Block 1. Within close proximity of the site (namely to the east and south of the site) there are residential houses, together with further residential houses to the west of Westfield Avenue; however, there will be no direct interface with the residential properties other than shared use of the public highway.
- Commercial: The existing David Lloyd Leisure Centre and existing football stadium are to be demolished contemporaneously as part of the Proposed Development's overall strategy and, therefore, their interface with the Proposed Development will be automatically expunged.
- Public Transport: Whilst the adjacent public highway is serviced with local bus routes and the nearest train station is located approximately 1km to the north of the site, there will be no direct interfaces with the local transport infrastructure.
- Statutory Services: Services distribute around the site on Westfield Avenue and Kingfield Road, with local transformers on Westfield Avenue. Service spurs feed the site but, from reviewing the statutory drawings received to date, they are noted to feed the site alone. Current feeds will be cut back during demolition and a builders' supply provided. A significant 5-6MVA connection will be required on-site, spread over approximately 7 substations; this will be formally discussed and agreed with the local utility authority.

Pre-Commencement Surveys, Investigations, Consents, Licences

- 5.13** Several surveys and investigations will need to be undertaken prior to the commencement of works on-site. In addition, various consents and licences will need to be granted. The following pre-commencement surveys and investigations are envisaged:
- Asbestos surveys;
 - Clearance of any vegetation supervised by a suitably qualified ecologist;
 - Condition survey of any adjoining party walls, boundary walls, and public highways;
 - Structural surveys (pre-demolition appraisal) of existing construction;
 - Utility surveys to determine the position of any assets;
 - Buried services ground penetration survey to determine existing service routes and validate the above utility survey information;
 - CCTV survey of the surface water and foul water drainage to confirm size and condition;
 - Condition survey of perimeter roads; and
 - Archaeological watching brief for all substructure works.

- 5.14** All necessary consents and licences required to commence any on-site activity will be obtained ahead of the works commencing, giving the appropriate notice period. These will include:
- Communication with the various parties regarding the use tower cranes (particularly oversailing rights), as the site is located adjacent to public and private third-party land. Construction activities that have the potential to generate a direct impact on the land under public and private ownership will be agreed with the owners, including (but not limited to) hoarding positions, temporary footpath diversions, connections / diversions of any private drainage or utilities, and temporary unloading on the roads. The Applicant and Principal Contractor will develop a good working relationship with WBC and the community through the planning stages; this relationship will be maintained;
 - Connections to existing statutory services and main sewers;
 - Licenses for the discharge of water from the site into the public sewer, if required;
 - Party Wall Act notices and agreements, if required;
 - Approval of a CEMP, including any specific agreements relating to the control and monitoring of construction logistics and aspects such as demolition and construction noise; and
 - Section 80 Demolition Notice application(s) to the Local Authority Building Control, triggered following planning consent with the works being undertaken under a Section 81 Counter Notice.

Description of Works

Enabling Works and Site Establishment

Hoarding

- 5.15** The boundary of each phase's construction area (as set out in paragraph 5.7) will be established, and the minimum of 2.4m high, solid perimeter hoarding will be erected around the site, along the boundary line. The hoarding will remain fixed in position until handover and occupation of each phase. Safe site access routes onto Kingfield Road and Westfield Avenue will be established.

Site Office and Welfare Facility

- 5.16** A welfare office will be established prior to the commencement of works, which will include a canteen and office facility. It will be located in a position that will be appropriate to the demolition, construction and handover of all phases. As far as reasonably practicable, it is envisaged that the office will stay in the same location through all phases.
- 5.17** Safe walking routes will be established as required and, at all times, vehicles and pedestrians will be separated with a fixed barrier.

Utility Diversions / Removals

- 5.18** All existing services to the site will be stripped back as redundant and significant new supplies will be brought to site. Water and existing electrical services will be cut back, capped or enhanced for builders' supplies.
- 5.19** The existing communications provision on the site (e.g. for mobile data etc.) will require repositioning during the works to maintain the services; the Applicant will organise this with the utility provider.

Demolition and Enabling Works

- 5.20** Prior to commencement of demolition works, the area of works will be encapsulated with 2.4m high, solid perimeter hoarding.
- 5.21** All hazardous materials (such as fluorescent tubes, fridges and air conditioning units) will be identified and removed, and any live services will be terminated, before the soft stripping of the buildings and subsequent removal of internal debris commences.
- 5.22** The demolition of the existing structures will be undertaken using a controlled top down approach, with the structures being dismantled, materials suitably sorted on-site for recycling, and then removed to suitable licensed waste receivers.
- 5.23** Following the demolition of the main structure / building in question, the initial site strip will entail the removal of a combination of tarmac and concrete hardstanding, with some sporadic areas of paving, together with soft landscaping.

Excavation, Substructure and Infrastructure Works

5.24 Excavation and substructure works will be undertaken in the order set out below.

Excavation and Substructure

Residential

5.25 Following the soft strip, retaining walls to the perimeter edge of the residential elements of the site (where bounded by neighbouring properties located off-site) will be created by way of the installation of contiguous bored piles, designed to support the retained ground and allow for the basement car park construction. Those retaining walls within the site will be formed using traditional L-shaped retaining walls tied into the substructure foundations of each residential building.

5.26 On completion of the perimeter wall construction to the various boundary interfaces, the bulk excavation of the basement areas shall commence under a Materials Management Plan. Prior to this exercise commencing, the waste classification of all the soils will have been established. Approximately 7,500 tonnes of excavated material shall be reused in the construction of the stadium, as the pitch area is to be lifted yet retained in order to generate the space for the retail units beneath it.

5.27 Building foundations will comprise of a stiff reinforced concrete raft seated within the dense gravels, offering a bearing pressure in the order of 250 kilonewtons per square metre (kN/m²). This method will negate the use of piled foundations which will make the construction of the substructures less intrusive and simpler. The depth of the raft foundation shall be in the order of 750mm deep with the potential for localised thickenings.

Stadium

5.28 Ground floor slabs will comprise reinforced concrete and will be primarily laid to earth upon insulation and a damp-proof membrane. The construction of the pitch (which will be retained from the existing stadium) will be elevated above road level by 2.25m, adopting precast concrete wall sections, which will be fabricated off-site and lifted into place. This exercise will need to be undertaken prior to implementing the bulk earth filling, which is required to elevate the playing area.

Infrastructure

5.29 The drainage and services installations that will serve the site will be installed as an enabling works package immediately after the demolition works. This will ensure that sufficient access facilities, drainage and power supplies can be provided to the Principal Contractor during the construction of the Proposed Development. Roads and hard standing areas will be brought up to base course level to a sufficient construction to accommodate vehicles and crane requirements. Upon substantial completion of the residential substructure, the surface finishes will be applied.

Construction

Tower Crane Strategy

Residential

5.30 Blocks 1 to 5 will be served using 8 to 10 tower cranes, subject to their reach and over-sailing provision. All cranes will be fitted with electronic clash detection, enabling them to interact safely. Cranes to be used will be Liebherr 542 HC-L L12/24 Litronic, or similar, and will stand at a maximum height of 55m above current ground levels, with operating jib lengths of 45m.

5.31 Mobile cranes will be used to erect and dismantle the tower cranes, and this will be undertaken in accordance with strict method statements. Crane capacities for undertaking this operation will be dependent on detailed method statements and position; however, owing to the size of the tower cranes, the mobile cranes will each have an approximate 40 tonne capacity.

Stadium

5.32 The 9,026-seater stadium will be erected using 4 to 6 mobile cranes, each with a capacity ranging between 20 and 40 tonnes. These will be situated around the perimeter of the proposed stadium footprint and will source the fabricated steel direct from flatbed vehicles entering the site at strategic times. No steel will be stored on-site, unless in exceptional circumstances. Mobile cranes to be used will be Demag AC -40 Mobile Cranes or similar.

Superstructure

Residential

5.33 The concrete frames of the residential superstructure will be constructed using in situ reinforced concrete, adopting predominantly flat slab construction techniques, which will be facilitated with either post tensioned slabs or traditionally, by way of traditional reinforcement fixing. All columns and beam members will be constructed using traditional techniques using formers and reinforcement.

Stadium

5.34 The 9,026-seater stadium incorporating the medical centre, retail units and office space will be predominantly formed using hot rolled steel members, which will be cut and fabricated off-site, and fitted together using bolted connections. Site welding will not be permitted.

5.35 Suspended floors and seated areas of the stadium will be formed using a combination of precast concrete steps and profiled metal permanent formwork, all supported by hot rolled steelwork. Concrete placed into the formers will be reinforced using mesh sheeting.

Building Envelope / Façade

Residential

5.36 The construction of the external wall envelope construction will predominantly use a combination of multiple glazed window units, curtain walling and a structural frame system, adopting cold formed steel members with cement particle board, insulation and standard format clay bricks. This will be constructed via scaffolding or mast climbers. It is possible that the outer leaf will be replaced with a rain screen cladding system, incorporating brick slips clipped into a structural frame tied back into the inner structural frame system.

5.37 Roof finishes will be green or brown roofs laid onto in situ cast concrete slabs, with the appropriate level of insulation. Where such roof styles are not provided, single ply membranes will be adopted.

Stadium

5.38 The roof and side walls of the stadium will be constructed using either a composite insulated cladding panel or a built-up system using insulation sandwiched between an external and internal profiled steel sheet. All cladding will be supported by lightweight cold rolled steel members, designed to span between the primary hot rolled frames.

General

5.39 As the façade progresses, hoists will be installed which will service the progressive apartment fit out. Once the major façade works are completed for each residential building, the associated tower cranes will be removed. Scaffolding will remain in place, adjacent to the façade, until all final works to the building fabric are complete and the structure is weathertight.

Fit-Out

5.40 Complete new utilities will be required and installed on-site, to accommodate the increase in demand across all services. Multiple substations will be required for the residential blocks and stadium, totalling approximately 7 substations.

5.41 A new water ring main will be required and installed, to service all the buildings (individually) and associated fire equipment.

5.42 Gas supplies of a new trunk main will also be required, to enable supplies to each residential building and the stadium (including any potentially retail units).

5.43 Surface water and drainage connections will be made to the local sewers.

5.44 Once the building is watertight, fit out will commence.

5.45 The fit-out of the Proposed Development will be completed core by core, with handovers to the occupying residents upon completion. Safe walking and access routes will be in place at all times.

5.46 The typical sequence of fit out works will comprise the following:

- Construction of party walls;
- Fireproof and soundproof screed;
- Construction of internal walls;

- Installation of:
 - Mechanical and electrical services;
 - Installation of kitchens and bathrooms;
 - Flooring and doors;
 - Decorations;
- Implementation of air tightness and noise test;
- Construction of corridors and communal areas;
- Testing and commissioning of services;
- Quality inspection and snagging;
- Provision of warranties and user manuals; and
- Handover.

Landscaping / Public Realm

5.47 The areas of landscaping across the site will comprise of:

- Podium waterproofing, then followed progressively with trees, raised beds and grass areas.
- Walkways and paving along with associated tree pits along the main access road, and playable elements (e.g. boulders, logs) and raised beds will be constructed prior to planting within the pedestrian routes.

5.48 The following elements will be implemented in accordance with the proposed demolition and construction sequencing, including the completion and handover of:

- The podium garden on Block 1; associated frontage planting; and the pedestrian route (above the car park) along the south of the Block 1, including raised bed, trees, shrub and grass planting;
- The podium garden on Block 2; associated frontage planting; and the pedestrian route (above the car park) along the south of Block 2, including raised bed, trees, shrub and grass planting;
- The podium garden on Block 3 and associated frontage, including raised bed, trees, shrub and grass planting;
- The pocket park to the south of Block 3 and west of Block 4; and street planting along the main access road and stadium car park, including raised bed, trees, shrub and grass planting;
- The podium garden on Block 4; associated frontage planting; the pedestrian route (above car park) along the east of Block 4; and street planting along the service access road, to the south of Block 4, including raised bed, trees, shrub and grass planting; and
- The podium garden on Block 5; associated frontage planting; and street planting along the pedestrian route to the east and south of Block 5, including raised bed, trees, shrub and grass planting.

Demolition Volumes and Construction Materials Quantities

Demolition

5.49 Table 5.1 provides an estimate of the quantities of material likely to be generated as a result of the demolition of the existing buildings and associated structures on-site.

Table 5.1 Estimated Demolition Quantities

Material Type	Quantities
Crush	10,000t
Soft Waste	400t
Excavation	76,935m ³

Excavation

5.50 It is estimated that there will be approximately 90,400m³ of material excavated in association with the proposed basement, of which approximately 13,400m³ of material will be re-used on-site, in the build up of the proposed stadium's pitch levels.

5.51 The excavated material is anticipated to primarily comprise of natural sand and gravel deposits, with very little made ground.

Construction

5.52 Estimates of material quantities for key construction components are provided in Table 5.2.

Table 5.2 Estimated Construction Material Quantities

Component of Proposed Development	Residential Blocks		Stadium	
	Quantities	Loads	Quantities	Loads
Concrete to Secant Piled Wall	700m ³	60	N/A	
Capping Beams	418m ³	60	N/A	
Concrete to Foundations and Substructures	Included in Superstructure		2,650m ³	365
Concrete in Superstructures	54,500m ³	7,500	2,470m ³	350
Steel	N/A		775t	45
Reinforcement	10,200t	500	870t	45
Façade Cladding	46,410m ²	390	-	-
Roof Finished	9,675m ²	120	483t	25
Blockwork Walls	109,010m ²	650	-	-
Internal Walls	90,170m ²	540	-	-
Ceilings	88,110m ²	150	-	-
Wall Finishes	211,465m ²	180	-	-
Floor Finishes	88,110m ²	150	-	-
Hard Landscaping	10,125m ²	125	5,400m ²	-
Construction Waste	21,720m ³	2,715	2,420m ³	302

Construction Waste Generation

5.53 Construction waste volumes have been estimated using Building Research Establishment (BRE) Waste Benchmarking data¹, which outlines likely construction waste arisings in tonnes for new build construction projects, based on real-life data. The BRE Benchmark data identified the average tonnes of construction waste per 100m² of floor area to be 18.1m³ per 100m² for residential projects.

5.54 Based on the benchmarking data and a total proposed floorspace of approximately 92,200m² Gross External Area (GEA), the Proposed Development will likely generate approximately 13,800m³ construction waste, which equates to an approximate total of 12,000 tonnes when applying standing construction factors.

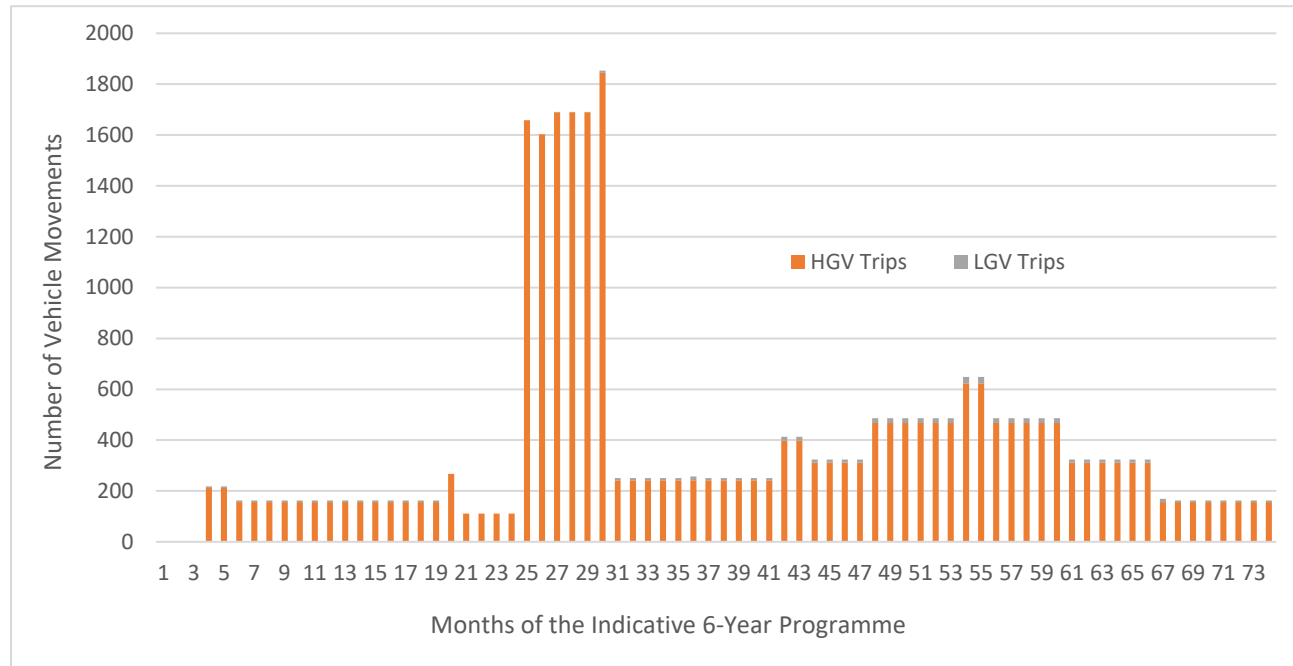
Vehicle Movements

5.55 The estimates of demolition and excavation volumes, and construction material quantities, together with the outline demolition and construction programme, have been used to estimate the number of vehicle movements associated with the 6-year demolition and construction programme.

5.56 Figure 5.2 presents the data relating to vehicle movements, in terms of the estimated number of movements per month (movements are 2-way, meaning one vehicle in and one out is equal to 2 movements).

¹ Building Research Establishment, (2012); BRE Waste Benchmark Data by Project Type. Accessed Online 20.03.2018 [URL: http://www.smartwaste.co.uk/filelibrary/benchmarks%20data/Waste_Benchmarks_for_new_build_projects_by_project_type_31_May_2012.pdf]

Figure 5.2 Estimated Number of Two-Way Vehicle Movements (HGVs and LGVs) per Month



- 5.57 The peak vehicle movements are anticipated to occur during months 25 to 30, associated with the excavation of the basement, installation of site-wide infrastructure and the construction of the new stadium.
- 5.58 Excluding months 25 to 30, there is also a high number of vehicle movements anticipated for months 54 to 55, which are associated with the construction of Blocks 2 to 5, which would contribute to the construction of approximately 82% of the Proposed Development’s residential provision.

Site Access and Egress

- 5.59 For the majority of the works, there will be two site access and egress points for vehicles onto Kingfield Road and Westfield Avenue, located to the north and west of the site respectively. These access and egress points will remain in place for the duration of the enabling, demolition and construction works.

Plant and Equipment

- 5.60 Consideration has been given to the types of plant that will likely be used during the demolition and construction works. The plant and equipment associated with the various stages of work are set out in Table 5.3 to Table 5.6.
- 5.61 The temporary use of tower cranes for the demolition / construction works would not exceed a height of 55m above current ground level and would not infringe any safeguarding obstacle limitation surface. If necessary, fixed red aeronautical obstacle lighting to the jibs of the tower cranes will be provided.

Table 5.3 Plant and Equipment Schedule – Demolition

Equipment	Example Model	Power Rating	Equipment Size
Mobile Crane	Liebherr LTM 1000-5.2	370kW	100t
Tracked Crusher	Trakpactor 320SR	257kW	49t
Tracked Excavator	Komatsu PC600-8	323kW	58t
Articulated Dump Truck	Volvo A25G	235kW	25t

Table 5.4 Plant and Equipment Schedule – Substructure / Excavation

Equipment	Example Model	Power Rating	Equipment Size
Tracked Excavator	Komatsu PC600-8	323kW	58t
Piling Rig	Geax EK75 CFA Piling Rig	93kW	-
Tipper Truck	GVW Muckaway Tipper	250kW	32t

Equipment	Example Model	Power Rating	Equipment Size
Mobile Crane	Demag AC-40	300kW	40t
Articulated Dump Truck	Volvo A25G	235kW	25t
Flatbed Lorry	MAN TGS 26.440	350kW	26t

Table 5.5 Plant and Equipment Schedule – Superstructure

Equipment	Example Model	Power Rating	Equipment Size
Mobile Crane	Demag AC-40	300kW	40t
Mobile Crane	RK250-7	209kW	20t
Mast Climbers	Alba EDC-1700/2000	25kW	1700kg
Flatbed Lorry	MAN TGS 26.440	350kW	26t
Concrete Wagons	Liebherr HTM 805	250kW	8m3
Articulated Dump Truck	Volvo A25G	235kW	25t
Tipper Truck	GVW Muckaway Tipper	250kW	32t
Tower Crane	Liebherr 542 HC-L L12/24 Litronic	-	55m

Table 5.6 Plant and Equipment Schedule – Fit Out

Equipment	Example Model	Power Rating	Equipment Size
Mast Climbers	Alba EDC-1700/2000	25kW	1700kg
Hand/Power Tools	Various	110kW	-
Forklift Trucks	LPG TFG 540s-S50s	59kW	4-5000kg
Skip Trucks	DAF LF 290	150kW	18t

Hours of Work

- 5.62 The anticipated core working hours for demolition and construction works are:
 - 08:00 – 18:00 hours on weekdays;
 - 08:00 – 13:00 hours on Saturdays; and
 - No working on Sundays, Bank or Public Holidays.
- 5.63 In order to maintain the above working hours, the Main Contractor may require, at certain times, a period of up to one hour before and after normal working hours to start and close down activities (this will not include works that are likely to exceed any agreed maximum construction works noise levels). Specialist construction operations and deliveries may also be required to be undertaken outside these core hours, in agreement with WBC and other relevant parties.

Environmental Management and Monitoring

- 5.64 *ES Volume 1, Chapter 15: Mitigation and Monitoring* presents the environmental management and mitigation measures that the Applicant is committed to implementing throughout the demolition and construction works, to either eliminate, or reduce, the significance of any likely environmental effects.