Luton Rising
Our airport.
Our community.
Our planet.

January 2024

London Luton Airport Expansion

Planning Inspectorate Scheme Ref: TR020001

Volume 5 Environmental Statement and Related Documents

5.02 Appendix 4.1 Construction Method Statement and Programme Report

Application Document Ref: TR020001/APP/5.02
APFP Regulation 5(2)(a)

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

London Luton Airport Expansion Development Consent Order 202x

5.02 ENVIRONMENTAL STATEMENT APPENDIX 4.1 CONSTRUCTION METHOD STATEMENT AND PROGRAMME REPORT

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Revision 2	January 2024	Additional Submissions – Deadline 8

Contents

Insets

Tables

1 INTRODUCTION

1.1.1 Luton Rising (a trading name of London Luton Airport Ltd) (The Applicant), propose to increase the capacity of the airport to 32 million passengers per annum (mppa) (hereon referred to as the 'Proposed Development') as part of the Vision for Sustainable Growth 2020 to 2050 published in 2017[1].

1.1.2 This Construction Method Statement and Programme Report (CMS) sets out the proposed construction methodologies, works and machinery required for the Proposed Development. This document:

a. outlines the main proposed construction methods and phasing sequence to deliver the Proposed Development whilst minimising disruption to existing operations and the environment; and

b. outlines current thinking on construction logistics and construction techniques including demolition and enabling works.

1.1.3 In addition to the CMS the **Code of Construction Practice (CoCP) (Appendix 4.2 of the ES) [TR020001/APP/5.02]** outlines the environmental management and mitigation requirements to be implemented throughout the construction period for the delivery of the Proposed Development.

1.1.4 For works that take place on any premises owned or under the control of the operating airport, in addition to the **CoCP (Appendix 4.2 of the ES) [TR020001/APP/5.02]** they would also comply with construction works requirements as defined by the airport operator.

1.1.5 The proposed construction methodology set out in the CMS has been used in the **Environmental Statement (ES) [TR020001/APP/5.01]** to assess effects**.**

1.1.6 This CMS is not intended to describe the construction of all buildings and structures of the Proposed Development. The CMS provides proposed general construction methods that have been used for assessment purposes within the **ES [TR020001/APP/5.01]**. Reference is also made to the **Outline Remediation Strategy for the former Eaton Green Landfill (Appendix 17.5 of the ES) [TR020001/APP/5.02]**.

[1] London Luton Airport Limited (2017) London Luton Airport Vision for Sustainable Growth 2020-2050. LLAL, Luton.

2 CONSTRUCTION PHASES AND PROGRAMME

2.1 Introduction

2.1.1 This section identifies the key phases and elements of the construction of the Proposed Development.

2.1.2 The Proposed Development builds on the current operational airport with the construction of a new passenger terminal and additional aircraft stands to the northeast of the runway.

2.1.3 This would take the overall passenger capacity from 18 mppa to 32 mppa.

2.1.4 In addition to the above, and to support the initial increase in demand, the existing infrastructure and supporting facilities will be improved in line with the short-term requirements for additional capacity.

2.1.5 Key elements of the Proposed Development include:

a. Extension and remodelling of the existing passenger terminal (Terminal 1) to increase the capacity;
b. New passenger terminal building and boarding piers (Terminal 2);
c. Earthworks to create an extension to the current airfield platform; the vast majority of material for these earthworks would be generated on site;
d. Airside facilities including new taxiways and aprons, together with relocated engine run-up bay and fire training facility;
e. Landside facilities, including buildings which support the operational, energy and servicing needs of the airport;
f. Enhancement of the existing surface access network, including a new dual carriageway road accessed via a new junction on the existing New Airport Way (A1081) to the new passenger terminal along with the provision of forecourt and car parking facilities;
g. Extension of the Luton Direct Air to Rail Transit (Luton DART) with a station serving the new passenger terminal;
h. Landscape and ecological improvements, including the replacement of existing open space; and
i. Further infrastructure enhancements and initiatives to support the target of achieving zero emission ground operations by 2040[2], with interventions to support carbon neutrality being delivered sooner including facilities for greater public transport usage, improved thermal efficiency, electric vehicle charging, on-site energy generation and storage, new aircraft fuel pipeline connection and storage facilities and sustainable surface and foul water management installations.

[2] This is a Government target, for which the precise definition will be subject to further consultation following the *Jet Zero Strategy*, and which will require further mitigations beyond those secured under the DCO.

2.2 Assessment Phases

2.2.1 For the purpose of the CMS delivery is to be considered as three assessment phases, as follows:

a. Assessment Phase 1: Expansion of existing Terminal 1 (T1) to increase capacity from 18 to 21.5 mppa by 2027.

b. Assessment Phase 2a: Construction of new Terminal 2 (T2) and associated facilities to increase capacity to 27 mppa by 2039.

c. Assessment Phase 2b: Expansion of T2 and associated facilities to increase capacity to 32 mppa by 2043.

2.3 Assessment Phase 1

2.3.1 Assessment Phase 1 would be primarily centred around the expansion of the existing Terminal 1 (T1) and additional aircraft stands and is shown on the scheme layout plans [**TR020001/APP/4.02**]. The elements of Assessment Phase 1 would include the following:

a. Airfield:
   i. Additional four stands to be constructed east of Foxtrot Taxiway as first element of the T2 apron;
   ii. SMR Tower;
   iii. Alteration of Engine Run Up Bay (ERUB) and 1no additional temporary stand adjacent to this area; and
   iv. Extension of Foxtrot taxiway to north.

b. Earthworks Platform:
   i. Localised earthworks to form 4no additional stands;

c. T1 Enhancements which may be adapted for future operational needs:
   i. Pier C providing access to new aircraft stands;
   ii. T1 North Extension: 300sqm extension at ground floor to increase immigration queuing area;
   iii. T1 South Extension: 400sqm ground floor extension to increase check-in and security and an additional 1,200sqm of departure lounge space at first floor level;
   iv. Departures lounge extension (north); and
   v. Baggage hall extension.

d. Car Parking:
   i. Construction of new surface car park (P7);
   ii. Construction of new surface car park (P6);
   iii. Reduction of long stay car park (P5); and
   iv. Reconfiguration of car park P9.

e. Landside:
   i. Green Horizons warehouse; and
   ii. Extension of existing coach station.

f. Highways:
   iii. Off-site highways works.

g. Demolition:
   i. Demolition of existing structures [as detailed on Site Clearance plan within Appendix D].

h. Utilities:
   i. New 33kV substation; and
   ii. Various service diversions including but not limited to: water, waste, gas, electricity, and telecommunications.

i. Parkland / Landscaping:

i. Replacement open space;
ii. Habitat creation measures;
iii. Offsite visual impact mitigation; and
iv. Landscaping.

2.4 Assessment Phase 2a

2.4.1 Assessment Phase 2a increases the airport’s capacity as shown on the **Scheme Layout Plans** [**TR020001/APP/4.02**] and would include the following:

a. Airfield:
   i. Expansion of the apron and construction of aircraft stands (12 stands to bring the total to 16no. stands);
   ii. Rapid exit taxiways (RETs);
   iii. Realignment of the Alpha taxiway and provision of a second parallel taxiway;
   iv. Refurbish existing aircraft stands;
   v. Relocation of the ERUB;
   vi. Vehicle control post;
   vii. Drainage attenuation below the stands;
   viii. Airfield utility connections; and
   ix. Navaid improvements.

b. Earthworks Platform:
   i. Extension to the earthwork platform; and
   ii. Remediation of the effected landfill areas (plus decontamination).

c. T2:
   i. Construction of new passenger terminal;
   ii. West pier; and
   iii. Associated airport support facilities.

d. Landside:
   i. Emergency assembly area;
   ii. Forecourt drop-off;
   iii. Technical building (Hangar 24);
   iv. Coach station; and
   v. Hotel.

e. Luton DART:
   i. Extension of the Luton DART tunnels and Luton DART station serving T2.

f. Car Parking:
   i. Multi storey staff car park (P1);
   ii. Staff car park (P2);
   iii. Decked mid / long stay car park (P5);
   iv. Reduction of long stay car park (P6);
   v. Alteration to surface mid stay car park (P7);
   vi. Surface car park (P8);
   vii. Decking to staff car park (P9);
   viii. Construction of surface mid and long stay car park (P10); and
   ix. Construction of long stay car park (P11).

g. Highways:
   i. Demolition of various buildings and hangars for the Airport Access Road (AAR) (formerly known as CPAR);
   ii. Construct of the AAR; and
   iii. Off-site highways works.
h. Utilities and Infrastructure:
   i. Substation;
   ii. Energy centre;
   iii. Fuel storage facility and pipeline;
   iv. Water / power / drainage connections;
   v. Surface water drainage;
   vi. Water Treatment Plant (WTP);
   vii. Temporary sewer; and
   viii. Off-site soakaway (infiltration basin).
i. Landscaping
   i. Replacement Open Space Assessment Phase 2a;
   ii. Landscape restoration works Assessment Phase 1; and
   iii. Public realm landscaping to T2 entrance area.

2.5 Assessment Phase 2b

2.5.1 The final phase of construction (Assessment Phase 2b) would increase the airport's capacity to 32 mppa as shown on the scheme layout plans [**TR020001/APP/4.02**]. The elements of Assessment Phase 2b would include the following:

a. Airfield:
   i. Stands (additional 10 stands);
   ii. Taxiway connection to East;
   iii. ERUB is relocated into final location;
   iv. Drainage attenuation below the stands;
   v. Airfield utility connections;
   vi. Navaid improvements;
   vii. Airfield operations /security base;
   viii. Fire training ground relocation; and
   ix. Vehicle control post relocation.

b. Earthworks Platform:
   i. Extension to earthworks platform.

c. T2:
   i. Extension of T2 and
   ii. Pier.

d. Car Parking:
   i. Replacement of T2 forecourt short / long stay car park with short stay multi storey car park (P6);
   ii. Long stay car park (P7); and
   iii. Multi-storey car park.

e. Highways:
   i. Off-site highways works.

f. Landside:
   i. Expansion of forecourt drop-off;
   ii. New Century Park hotel;
   iii. New police station;
   iv. Catering / cargo warehouses;
   v. Hangars;
   vi. Expansion of coach station; and
   vii. PV battery storage centre.

a. Utilities and Infrastructure:
   i. Water / Power / Drainage connection; and
   ii. Drainage – surface water and foul water connection.

g. Landscaping:
   i. Replacement open space Assessment Phase 2b;
   ii. Landscape restoration works Assessment Phase 2b; and

iii. Public realm landscaping to T2 entrance area and approach roads

3 CONSTRUCTION PROGRAMME

Key Dates

3.1.1 The key indicative dates for the Project would be as follows:

a. Development Consent Order received, and preconstruction conditions discharged in 2024;
b. Assessment Phase 1 construction starts: Q1-2025;
c. Assessment Phase 1 complete: Q4-2027;
d. Assessment Phase 2a construction starts: Q1-2033;
e. Assessment Phase 2a complete: Q4-2036;
f. Assessment Phase 2b construction starts: Q1-2037; and
g. Assessment Phase 2b complete: Q4-2040.

3.1.2 Dates taken from the outline schedule contained in **Appendix A**.

Outline Programme

3.1.3 The outline programme provides an indication of the overall construction programme. Construction activities are anticipated to be phased over a 16-year period and are subject the forecast passenger demand. A high-level summary programme is contained in **Appendix A**.

3.1.4 The period of significant construction is Assessment Phase 2a which includes the construction of T2.

3.1.5 Assessment Phase 1 would involve the reconfiguration and improvement of the existing T1 and the construction of new aircraft stands to support the forecast passenger growth. This work is likely to be undertaken by the existing airport operator.

3.1.6 The Assessment Phase 2a works are assessed as commencing in year 9. It is during this phase that most of the proposed construction would take place with the construction of T2 and aircraft stands.

3.1.7 The delivery of Assessment Phase 2b is planned to take place from year 13 but is dependent on the forecast passenger demand. The phase expands on the completed Assessment Phase 2a by increasing the capacity of T2 and the construction of additional aircraft stands to provide for incremental growth in capacity as required.

Critical Path

Assessment Phase 1

3.1.8 In Assessment Phase 1 the critical path would run through the environmental mitigation and the creation of the replacement open space. This is required to allow the construction of the new surface car parks P6 and P7 (refer to inset 2.2). This in turn allows the existing long stay car park P5 (refer to inset 2.2) to be truncated providing space for the earthworks and construction of the last three aircraft stands.

Assessment Phase 2a

3.1.9 In Assessment Phase 2a the critical path runs through construction of T2, its fitout and commissioning.

3.1.10 Running in parallel is the construction of the earthworks platform required for the new airfield and pier. Completion of the earthworks releases the landside construction and construction of the associated new infrastructure such as the fuel storage facility and the water treatment plant.

3.1.11 Early construction of the new AAR is advantageous due to the scale and complexity of the works. This requires vacant possession of the existing structures to be demolished. Construction of the new Hanger 24 is required to allow the existing hanger to be demolished.

Assessment Phase 2b

3.1.12 In Assessment Phase 2b, the critical path would run through the extension of the earthwork platform. To enable the earthworks to commence the existing fire training ground needs to relocate to south of the runway.

3.1.13 Construction of the new earthwork platform is required to extend the airfield and construction of the new aircraft stands, construction of the new passage pier and for the relocation of the ERUB into its final position.

4 ASSESSMENT PHASE 1

4.1 Key Construction Constraints & Interfaces

4.1.1 The objective of Assessment Phase 1 would be to maximise the capacity of the existing T1, provision of additional aircraft stands, undertake environmental mitigation and the re-provision of public open space. The first objective would be met by enhancing T1, increasing the number of aircraft stands and increasing the number of parking spaces. The second objective would be met by extending the existing Wigmore Valley Park.

4.1.2 The key construction constraints and interfaces for Assessment Phase 1 would include:

a. Granting of the Development Consent Order;
b. Discharging planning conditions;
c. Interface with operational airport;
d. Interface with users of the existing public open space;
e. Interface with local residents and businesses; and
f. Interface with landowners.

4.2 Construction Programme & Phasing

4.2.1 The main construction activities in Assessment Phase 1 would be:

a. Site establishment;
b. Replacement of open space (Wigmore Valley Park), habitat creation, offsite visual impact mitigation and landscaping;
c. Utility diversions;
d. Construction of 33kV electrical substation;
e. Bulk earthworks associated with the construction stands;
f. Construction of new aircraft stands alteration of engine ground running bay and 1 no additional temporary stand adjacent to this area and taxiways;
g. SMR tower;
h. T1 enhancements;
i. T1 south pier and canopy;
j. Provision of new car parking facilities; and
k. Off-site highways improvements including works to Junction 10 (M1).

4.2.2 The phasing diagrams, contained in Appendix B, are indicative and illustrate how the key construction stages of Assessment Phase 1 could be delivered.

4.3 Construction Methodology

4.3.1 The construction methods and materials described below are suggested methods that could be used by the contractor. However, alternative methods and material could be explored and adopted as the design matures.

Site Establishment

4.3.2 It is anticipated that during this assessment phase there would be several stand-alone site establishments and construction compounds because of the dispersed nature of the proposed works.

4.3.3 The potential satellite site locations are shown in the phasing diagrams in **Appendix B** and would include the following:

a. Construction Compound 1 (Replacement Open Space Wigmore Valley Park): Self-contained site compound area (approx.1500sqm) located close to the proposed replacement open space works. Providing welfare facilities for site operatives, material and equipment storage and operative car parking;

b. Construction Compound 2 (Earthworks and Airfield): A self-contained construction compound of approx. 2,000sqm already exists as it was used for the construction of Foxtrot taxiway. The compound is located to the south of the existing long stay car park (P5) to support the construction of the new aircraft stands and airfield works. The compound would provide welfare facilities for site operatives, materials receiving, equipment storage and operative car parking;

c. Construction Compound 3 (New Surface Car Parks P6 & P7): A self-contained construction compound (approx. 1,500sqm) located within the proposed new surface car parks (P6 & P7). Providing welfare facilities for site operatives, materials receiving, equipment storage and operative car parking;

d. Construction Compound 4 (Green Horizons Warehouse): A self-contained site compound located within car parking area of the proposed NCP warehouse (Area 12). Compound area would be approximately 1,000sqm and would provide welfare facilities for site operatives, materials receiving and equipment storage and operative car parking;

e. Construction Compound 5 (33kV substation): A self-contained construction compound (approx. 100sqm) located close to the proposed substation;

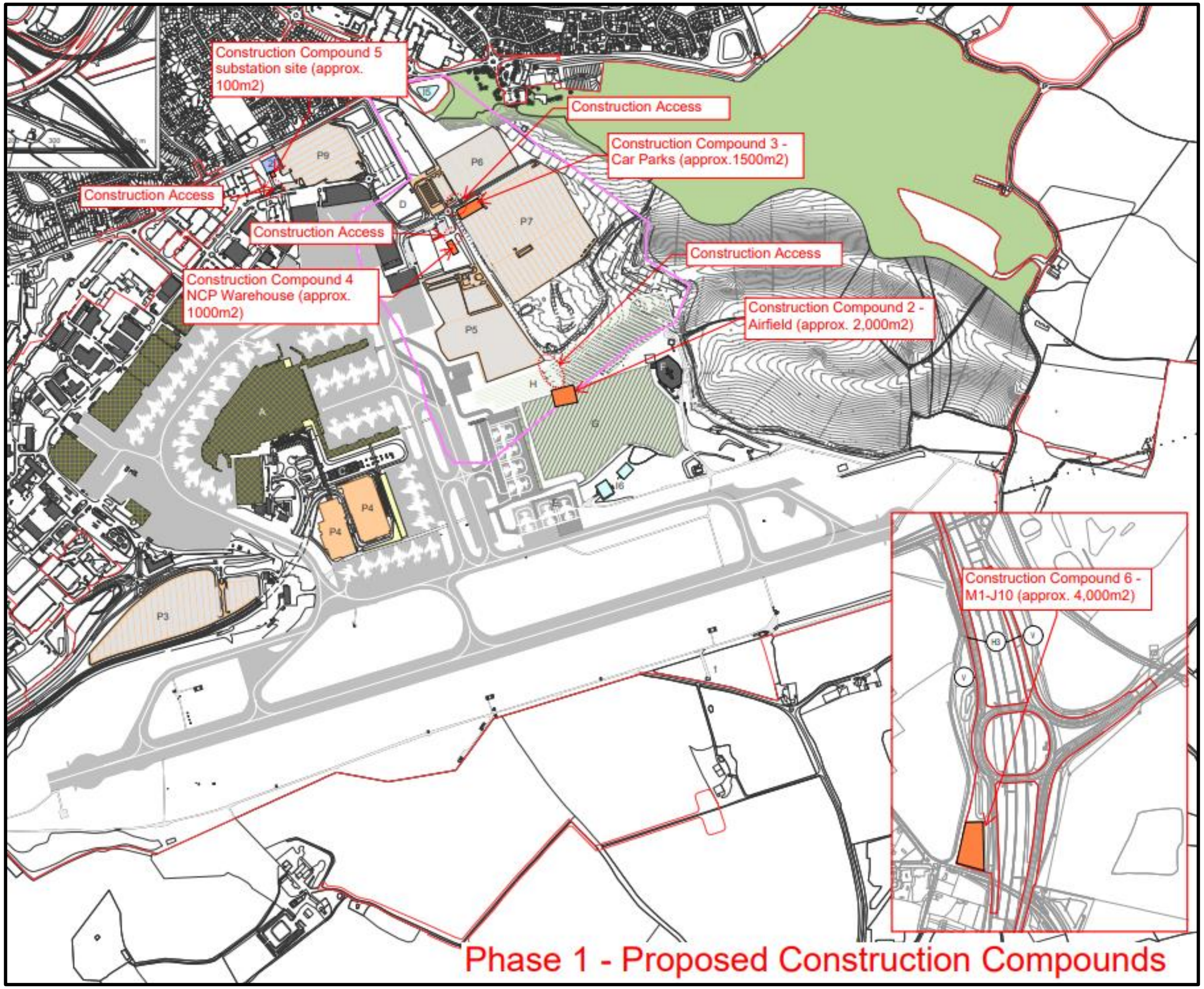
f. Construction Compound 6 (J10/M1): A self-contained construction compound that would be used over different phases to carry out highways works to Junction 10; and

g. T1 Enhancement: Located within the existing central terminal area (approx.1,000sqm) to support the terminal upgrade works. Providing welfare facilities for site operatives, materials receiving and equipment storage. It is assumed there would be no work car parking provided.

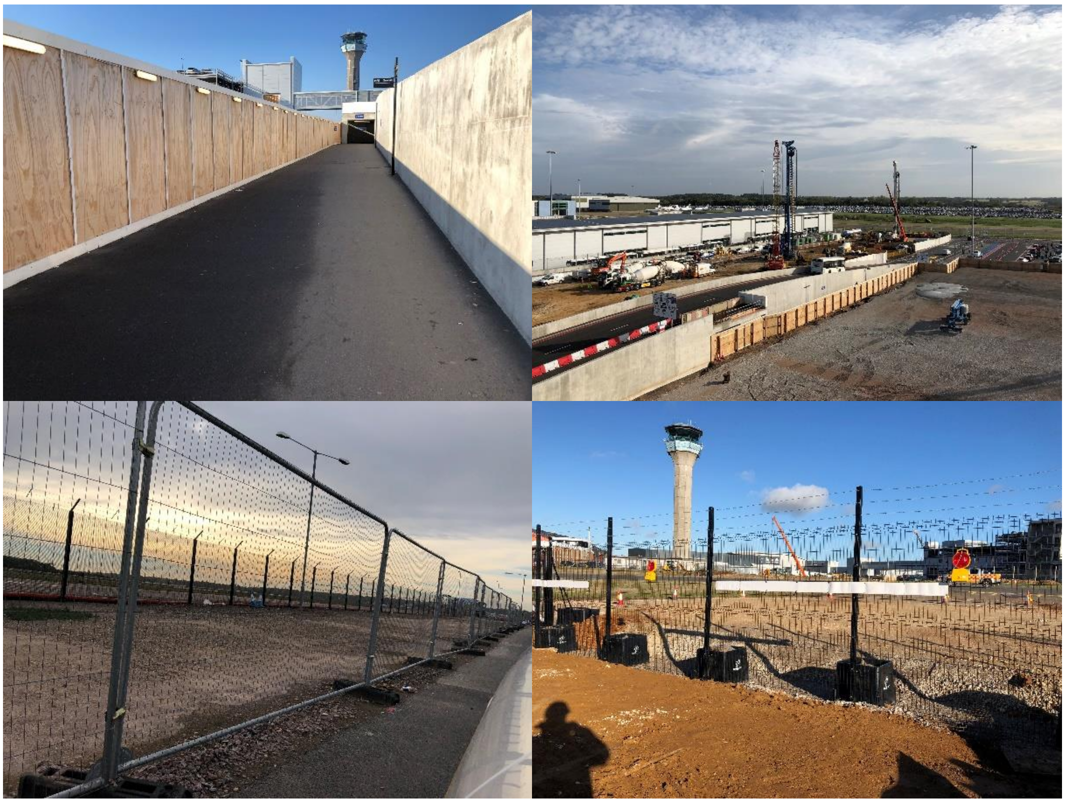
Table 4.1 Assessment Phase 1 Construction Compounds (Approximated Size and Estimated Time Operational)

Assessment Phase 1: Construction Compounds			
Name	**Location**	**Approx. Size (sqm)**	**Estimated Time Operational**
Compound 1	Wigmore Valley Replacement open space	1,500	24 months
Compound 2	Airfield	2,000	30 months
Compound 3	Car Parks P6 & P7	1,500	24 months
Compound 4	NCP Warehouse	1,000	18 months
Compound 5	33kV substation	100	12 months
Compound 6	Junction 10 (M1)	4,000	12 months

Inset 4.1: Assessment Phase 1 Construction Compounds Potential Locations



Inset 4.2: Typical Examples of Security Fencing and Site Hoarding from the Luton DART Project



Replacement Open Space (Wigmore Valley Park)

4.3.4 A key enabler for much of the Proposed Development is the re-provisioning of public open space to the east of the airport **Figure 14.11** in Volume 5 of the ES **[TR020001/APP/5.03].**

4.3.5 This releases some of the existing public open space and the current Wigmore Valley Park.

4.3.6 The replacement open space would be developed in Assessment Phase 1 ahead of any earthworks taking place in Wigmore Valley Park. The replacement open space would retain the existing main entrance into Wigmore Valley Park, adjoining Wigmore Hall / Wigmore Pavilion, and would incorporate several of the enhanced facilities proposed in this area as part of Green Horizons (formerly known as New Century Park).

4.3.7 A key part of the construction strategy would be ensuring that access to high quality open space is maintained throughout the Proposed Development.

4.3.8 Most of the proposed works would involve turning current farmland into a park with environmental mitigation, vegetation clearance, landscaping and planting activities.

4.3.9 This work would be performed using a mix of civil construction and agricultural practices depending on the feature being created.

4.3.10 Typical agricultural works would include:

a. Ploughing fields for reseeding;
b. Hedging – planting and removing;
c. Tree – pruning, felling, and planting; and
d. Ditching – forming and cleaning.

4.3.11 Typical civil construction works would include:

a. Forming hard features such as paths and car parking;
b. Construction of new structures and street furniture;
c. Placement of earthworks materials to form landscaping bunds;
d. Play areas; and
e. Installation of new drainage and utilities.

Utility Diversions

4.3.12 Utility diversions would be required during this and subsequent assessment phases, this section sets out a standard methodology.

Interface Schedule

4.3.13 An interface schedule would be developed to identify all existing and future services. For each service an owner would be identified to take that service from design, through construction, connection, commissioning, and handover. A representative from the airport operator would be allocated to each service, who along with the design engineer and interface owner would create an interface team.

4.3.14 The team would then plan and agree timing and method statements including any temporary measures to maintain services continuity for the airport operations along with contingency plans in case of any issues arising.

Underground Services

4.3.15 Before any work starts and in conjunction with the Applicant airfield engineering team and operations, the routing of existing services would be clearly identified and recorded using techniques such as cable detection tools, radar, signal generation tools or cameras. If there were any doubt, then trial holes or slip trenches would be dug by hand.

4.3.16 For works that take place on any premises owned or under the control of the operating airport, in addition to the **CoCP (Appendix 4.2 of the ES) [TR020001/APP/5.02]** they would comply with construction works requirements as defined by the airport operator.

4.3.17 Permits to work would be issued by airfield operations to the Lead Contractor and their subcontractors. A permit team would be established, who via the interface schedule, would plan and manage all permit to work activities.

4.3.18 Dependent upon airfield operational requirements and the proximity of work to aircraft and airfield operations, work may be required to be carried out during quiet periods or at night as described in **CoCP (Appendix 4.2 of the ES) [TR020001/APP/5.02].**

4.3.19 The work could involve trenching works, installation of pipework or ducts in the case of electrical, communications and control cables followed by back filling.

4.3.20 For water or fuel services, pipelines could be made up on-site and lifted into position in long lengths minimising making joints in the ground. This would enable testing of lengths before installation. Whilst trenches would have to be dug in long lengths, the pipelines could be preassembled at the same time and the overall installation could be more efficient.

4.3.21 Section of the existing Thames Water drain passing through the landfill site is to be grouted up.

Inset 4.3: Example fuel line and drainage installation

4.3.22 Boring techniques could be considered for services passing under existing taxiways, runways or apron to reduce the impact on airfield operations.

4.3.23 The requirement for earthwork support to the excavated service trenches would be dependent upon the ground conditions and depth. It could either be provided by trench boxes, trench sheeting or the battering back of the excavation. The proximity of trenches and hence available working space to the airfield operations would be a factor in deciding on the preferred system.

33kV Electrical Substation

4.3.24 The design and construction of the 33kV substation is specialist work carried out by the local energy network supplier.

4.3.25 It is expected that the construction would consist of:

a. substation civils works (foundations and bases);
b. substation structures to house specialist equipment such as transformers, switch gear and control panels; and
c. excavation for cable trenches for incoming and outgoing cables.

Bulk Earthworks

4.3.26 The existing local site topography means the Proposed Development requires significant earthworks (cut and fill) activities to form a level construction platform. The intention would be to 'win' this material from areas of the estate and to avoid the importation of new fill material. This would significantly reduce the quantity of material needing to be transported to the Application Site.

4.3.27 The 'won' material could be a mix of existing earth stockpiles, sorted material from the landfill areas and clean excavated material. Combined with the use of ground improvement techniques and potentially novel soil improvers this would reduce the reliance on the use of cement.

4.3.28 Geotechnically unsuitable material would be retained on site and used in landscaping areas and to form landside platforms. Contaminated material would be removed from the proposed construction area to an appropriately licenced facility.

4.3.29 Good quality excavated material would be transported using an all-terrain articulated dumper, to the proposed construction area where the material is deposited.

Inset 4.4: Typical Bulk Earth Working Plant: Clockwise from top left: a 40-tonne ejection dumper, specialist self-propelled soil stabilising machine, typical roller, and a GPS controlled bulldozer.

4.3.30 The deposited material would be spread using a GPS controlled dozer to achieve the grades and crossfalls. Where required a cement binder could then be spread over the area using a specialist self-propelled soil stabilising machine. The mixed material would then be compacted using heavy soil compaction plant.

4.3.31 The material would be placed in controlled engineered layers and this process would continue until the correct level is achieved.

4.3.32 Bulk earthworks are a weather dependant operation and is normally carried out during the summer months. A typical earthworks season runs from March to October.

4.3.33 For this reason, the earthworks are one of the longest duration activities within the schedule. The quantity of material that can be moved and placed in one season depends on the type of material and the distance travelled. By assessing the amount and type of plant that would be involved it has been estimated that the amount of material that can be moved in a single earthwork season (March to October) is 1,000,000m^3.

4.3.34 Given the proximity of the cut and fill areas, two main systems are presently envisaged to be feasible to transport the excavated material to the fill area. These comprise:

a. traditional trucks/dump trucks; or
b. a conveyor system, with a feed screening plant.

4.3.35 The first construction method, using all terrain articulated dumper trucks, is easier to deploy but requires careful management to ensure segregation of vehicles and other site operatives. A network of construction haul roads would be established on site to enable plant to travel between ‘cut’ and ‘fill’ locations.

4.3.36 Haul roads would be a temporary construction and would require regular spraying with water to prevent dust during summer months.

4.3.37 Autonomous/self-driving trucks could also be considered for this option. The use of hybrid electric vehicles could also be considered.

4.3.38 Alternatively, the use of several static conveyor belt system could be used within the cut area. This system is ideal for transporting large quantities of material between two fixed points.The advantages of a conveyor system are:

a. safer transportation methodology;
b. reduced noise as conveyor units driven by electric motors;
c. reduced pollution from exhaust emissions;
d. less operatives on site; and
e. trucks not exposed to bad weather or night works.

4.3.39 A conveyor system could be used in this assessment phase. It would reduce the overall number of truck movements; the system still requires machines to both load and transport un-loaded material. Machines would still be required to spread and compact material.

4.3.40 A feed hopper and screening plant is generally placed ahead of the conveyors near where the material is excavated. Hoppers can be placed within reach of the conveyor /screen-operating radius or, alternatively dump trucks can feed a dedicated stockpile at the screen, using a different machine to load the hopper /screen.

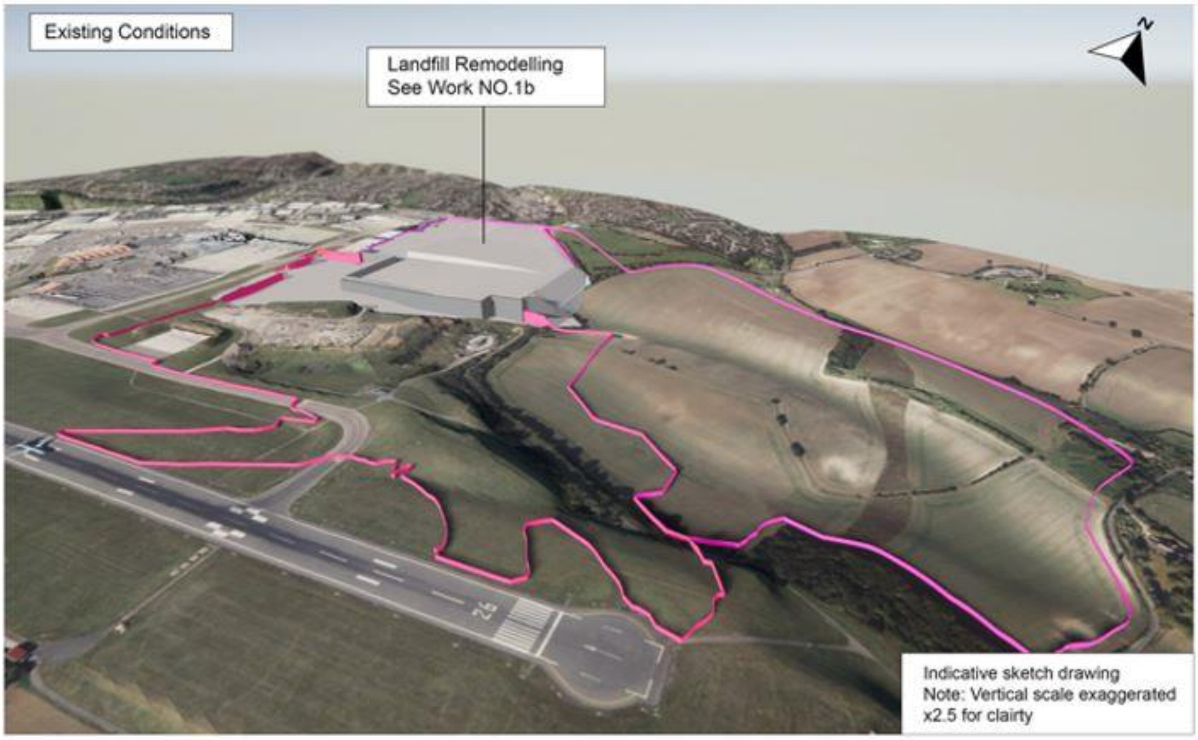
4.3.41 Once an area has been fully excavated, the conveyor belts need to be dismantled and re-located.

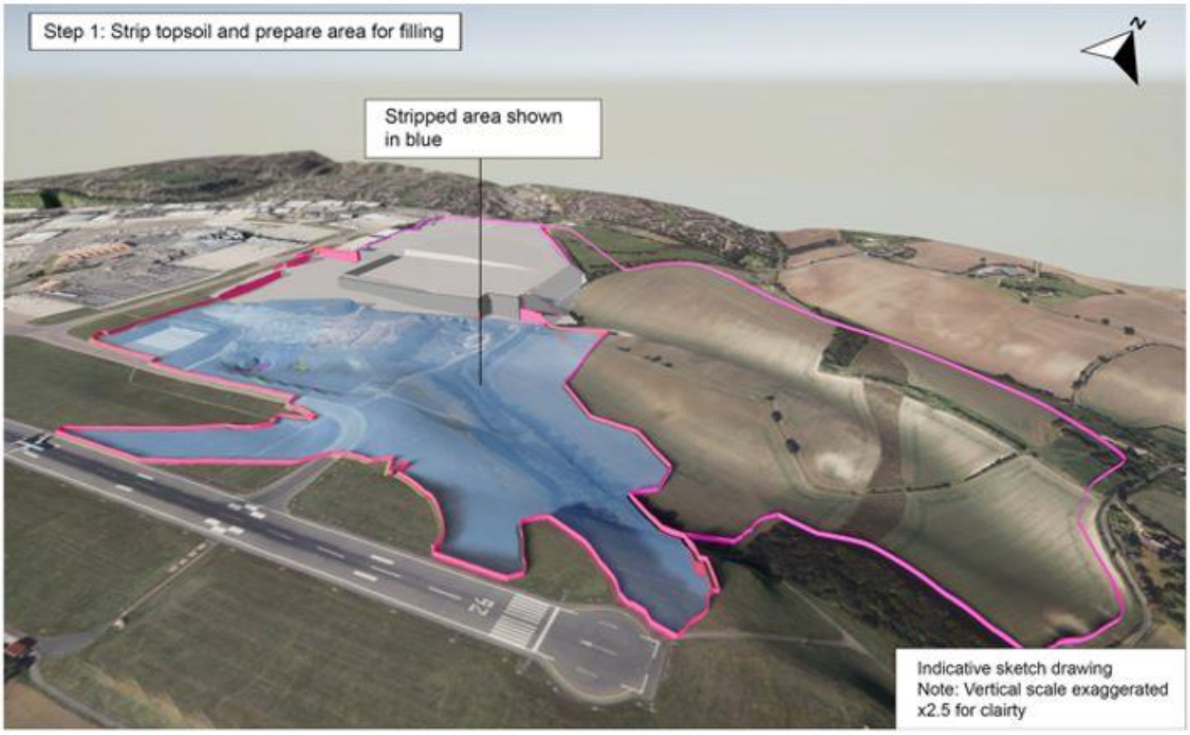
4.3.42 A water spray system is likely to be required during the screening phase, particularly during summer months, before excavated materials are placed on conveyor belts to suppress dust production. Additional water spray points may be required along the conveyor system to reduce dust further.

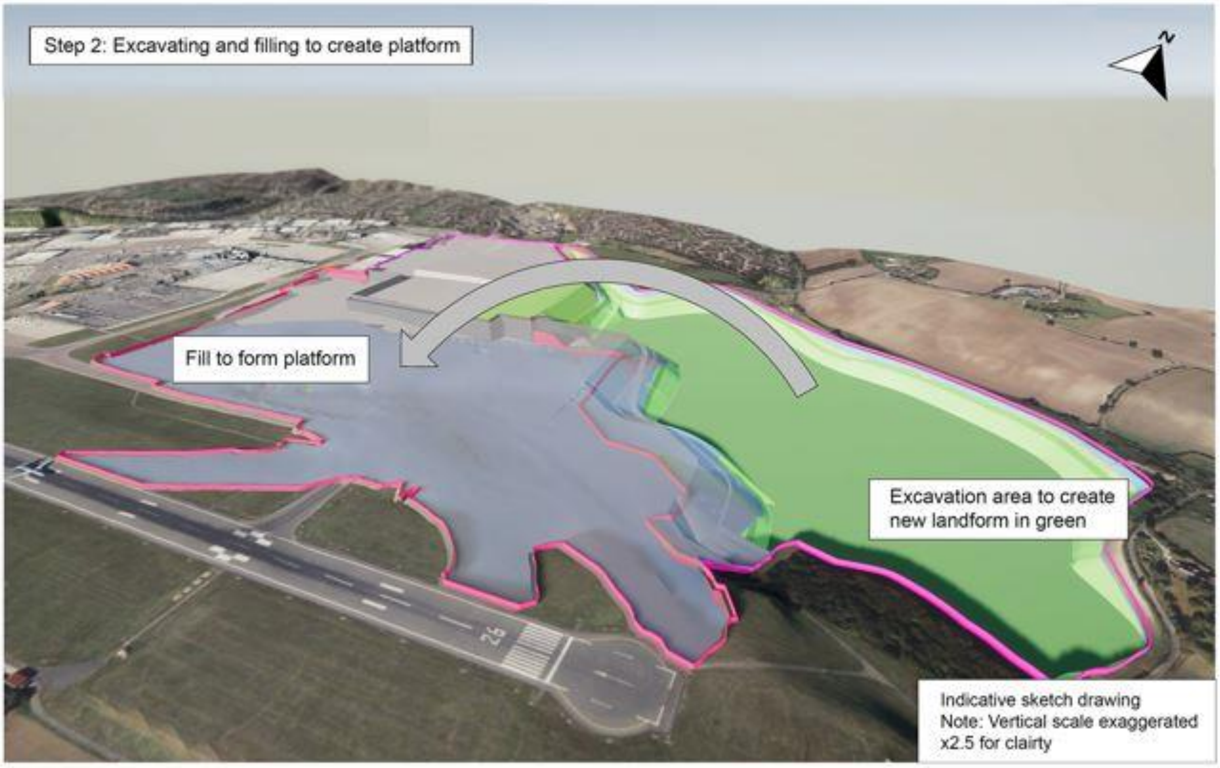
4.3.43 The bulk earthworks enable:

a. sufficient material to be won on site and to create a new landscape;
b. construction of a suitable platform so that the expanded airport would be level with the runway; and
c. the remodelled Eaton Green landfill to be suitable for development.

Inset 4.5: Illustrative earthworks sequence




Step 1: Strip topsoil and prepare area for filling
Stripped area shown in blue
Indicative sketch drawing
Note: Vertical scale exaggerated x2.5 for clairty


Step 2: Excavating and filling to create platform
Fill to form platform
Excavation area to create new landform in green
Indicative sketch drawing
Note: Vertical scale exaggerated x2.5 for clairty

4.3.44 The table below indicates the total estimated earthwork quantities, by assessment phase and provides an estimate as to how the material would be re-used.

Table 4.2 Estimated Bulk Earthworks Volumes by Assessment Phase

	Assessment Phase 1	Assessment Phase 2a	Assessment Phase 2b	Total Estimate Volume
Materials (excavated)	**(Rounded to nearest 1,000m3)**			**Cu M**
Topsoil		39,000	89,000	128,000
Clay		109,000	306,000	415,000
Chalk		239,000	908,000	1,147,000
Landfill	31,000	335,000	21,000	387,000
Other made ground	82,000	595,000	168,000	845,000
Excavation of suitable stockpile		35,000	110,000	145,000
Excavation of landscape stockpile		2,000	87,000	89,000
Materials (imported)				
Starter layer	6,000	67,000	49,000	122,000

Base drain	10,000	112,000	81,000	203,000
Gravel for gas collection layer	27,000	110,000	81,000	218,000
	156,000	1,643,000	1,900,000	3,699,000
How material is re-used				
Construction of Airside platform	64,000	743,000	1,398,000	2,205,000
Construction of Landside platform	16,000	234,000	10,000	260,000
Construction of Landside Cap	8,000	115,000	33,000	156,000
Landscaping	20,000	150,000	275,000	445,000
Stockpiled material for future use	2,000	87,000		89,000
Taken off site for disposal or recycling	3,000	34,000	3,000	40,000
Lost into formation	6,000	67,000	49,000	122,000
Lost on compaction chalk		22,000	82,000	104,000
Lost on compaction landfill	2,000	17,000	2,000	21,000
Fill base of valley for carpark		51,000		51,000
Topsoil		13,000	30,000	43,000
Contingency (suitable stockpile)	35,000	110,000	18,000	163,000
	156,000	**1,643,000**	**1,900,000**	**3,699,000**

4.3.45 The earthworks in Assessment Phase 1 are limited to the construction of the 4no. additional aircraft stands adjacent to Foxtrot taxiway.

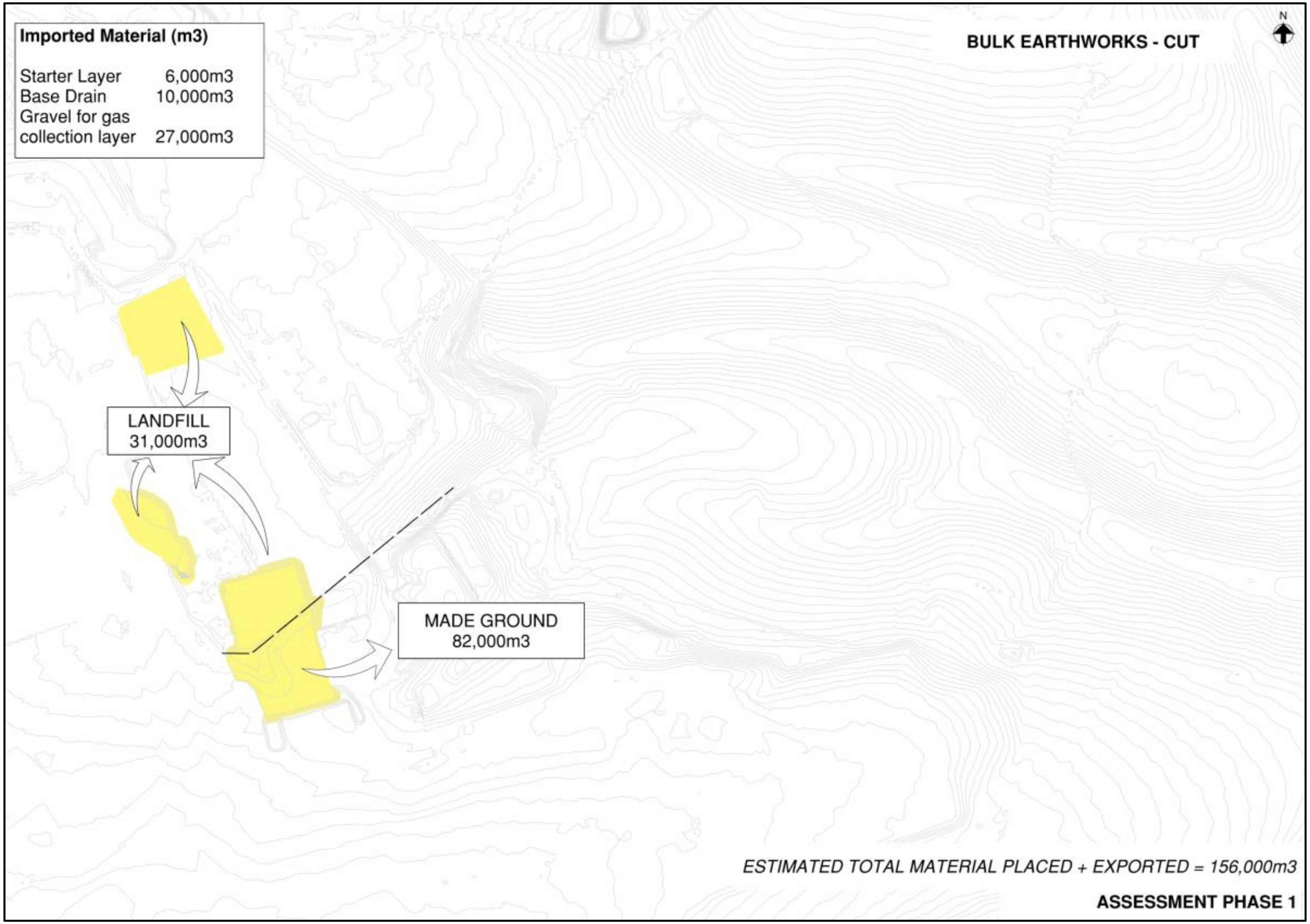
4.3.46 The estimated volume of earthworks in Assessment Phase 1 is as follows:

Table 4.3 Estimated Earthwork Volumes

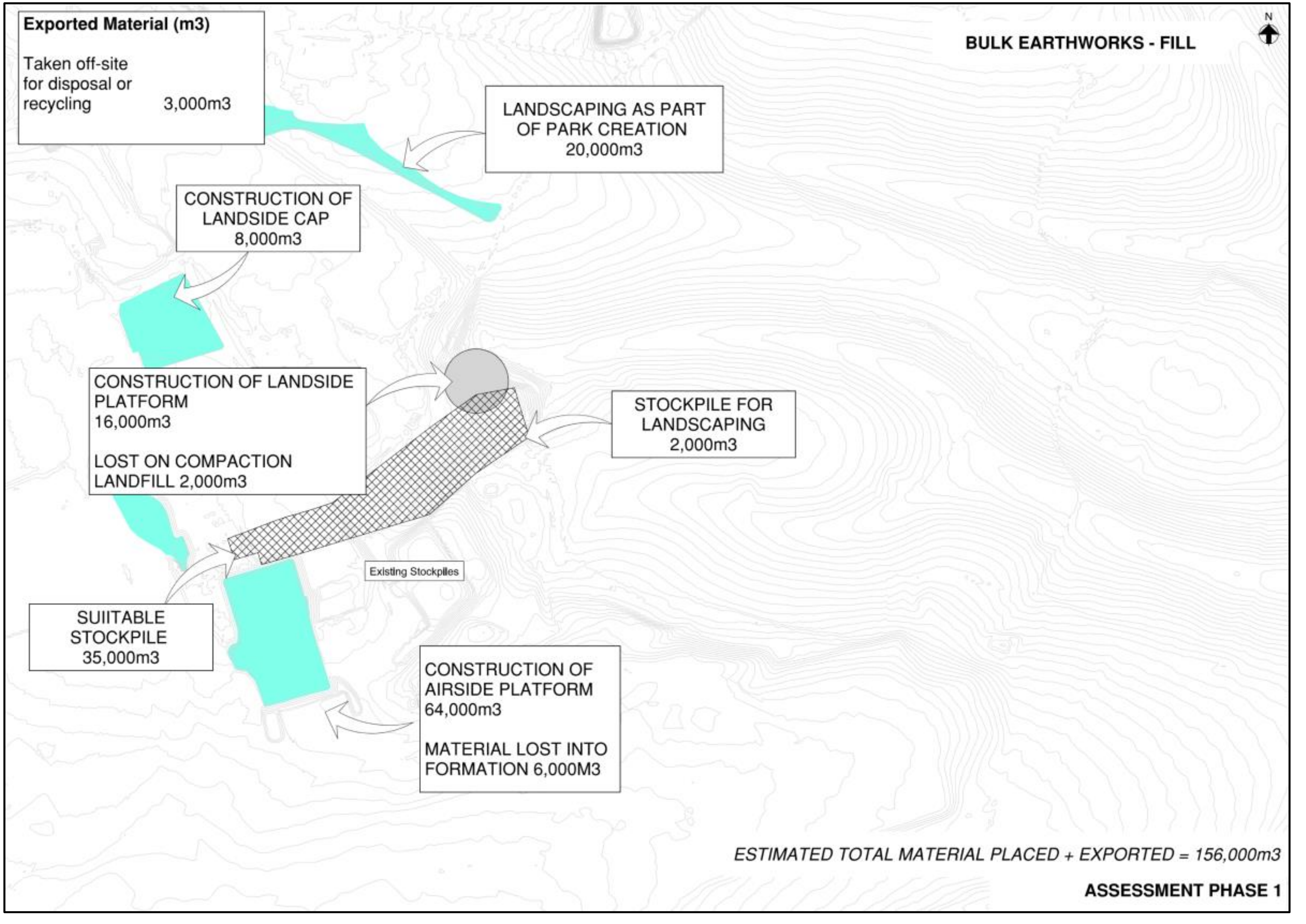
Earthworks Material	Estimated Volume (Cu M)
Excavated (material)	82,000
Excavated (landfill)	31,000
Imported material	43,000
Material removed from site	3,000
Placed material	156,000

4.3.47 The diagrams below show the areas affected by the earthworks planned for Assessment Phase 1. The ground would be excavated down to stable strata and the material would be deposited into temporary stockpiles.

Inset 4.6: Assessment Phase 1 Earthworks (proposed area of cut)



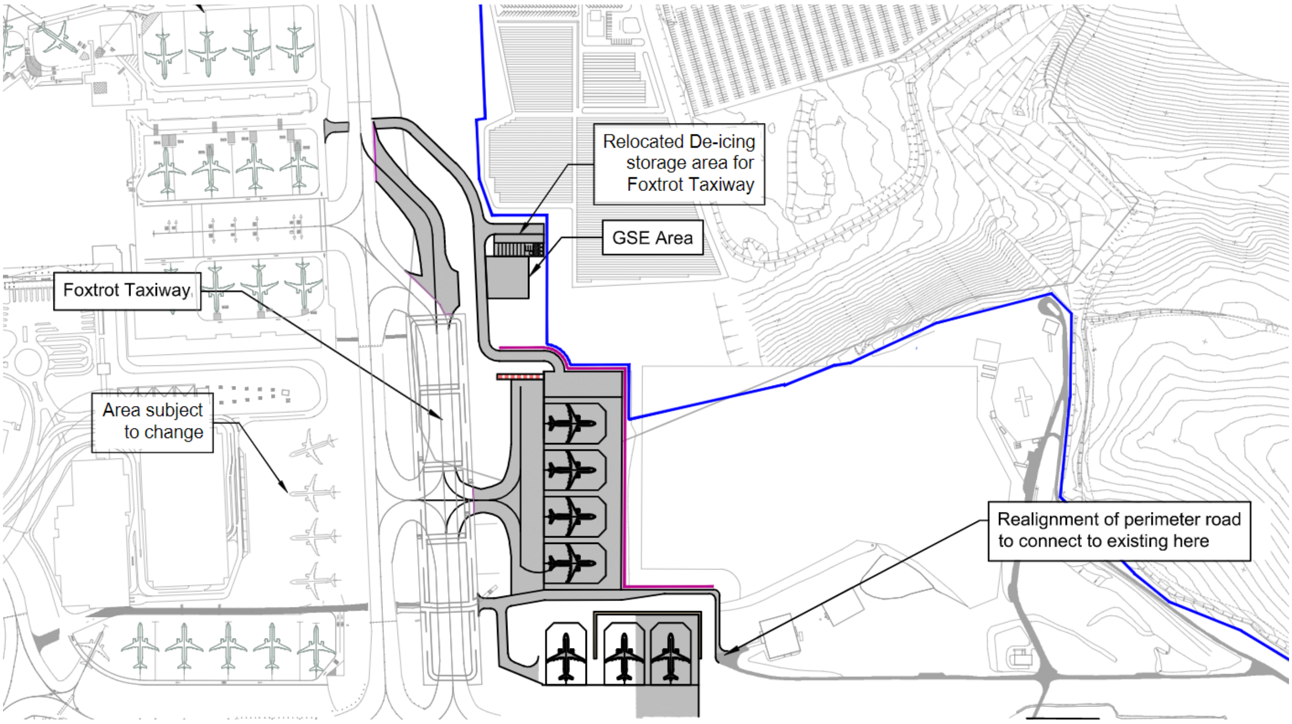
Inset 4.7: Assessment Phase 1 Earthworks (proposed area of fill)



New aircraft stands, apron and taxiways

4.3.48 In Assessment Phase 1, four new stands would be built on the new earthwork platform plus one additional stand east of the existing engine run-up bay.

Inset 4.8: Assessment Phase 1 New taxiway and stand locations



4.3.49 Standard construction methods would be adopted for the construction of the new aircraft stands. The pavement construction types would typically be a flexible pavement for taxiways and rigid pavements (typically pavement quality concrete) for aircraft stands.

4.3.50 The ground would be prepared as part of the earthworks phase. Once complete installation of drainage runs, and other airfield utilities would be incorporated into this work using similar methodologies to those described at 4.3.15.

4.3.51 In locations where hard pavement is provided within the location of the landfill site control of landfill gas would be achieved using an active gas protection system.

4.3.52 Construction of the concrete pavement areas are likely to be formed using slipped form paver machines. The concrete is spread, compacted and finished in a continuous operation.

Inset 4.9: Airfield concrete pavement and new temporary asphalt installation on Luton DART scheme

Terminal 1 Enhancements

4.3.53 T1 would be extended and reconfigured to provide additional passenger capacity. A set of potential solutions, which may be adapted for future operational needs, have been assessed in order to accommodate the future demand in T1 with the works including:

a. Check in: additional 30 kiosks;
b. Security: additional 2 lanes and relocation of staff offices;
c. Departure lounge: extension of the airside departure lounge in the southern/eastern corner and base of Pier B link (approx. 1,170sqm);
d. Outbound baggage: minimal upgrades to baggage system;
e. Immigration: extension of queue area and partial refurbishment of the hall; and
f. South pier and canopy.

4.3.54 This work would be done in a sensitive manner in and around the existing terminal operations. Works may be phased to be carried during non-peak passenger periods and through the use of out-of-hours working (e.g., night-time).

4.3.55 The scope and nature of the works means a variety of construction techniques would be used. Much of the work would be self-contained within the terminal.

4.3.56 Construction activities would be planned and coordinated with the existing airport operator.

4.3.57 Construction of the new south passenger pier.

4.3.58 All construction activities would comply with the requirements as defined by the airport operator in addition to the **CoCP (Appendix 4.2 of the ES) [TR020001/APP/5.02]**.

Car Parks

4.3.59 In Assessment Phase 1, as shown in the phasing diagrams, several new car parks are provided, and existing car park modified:

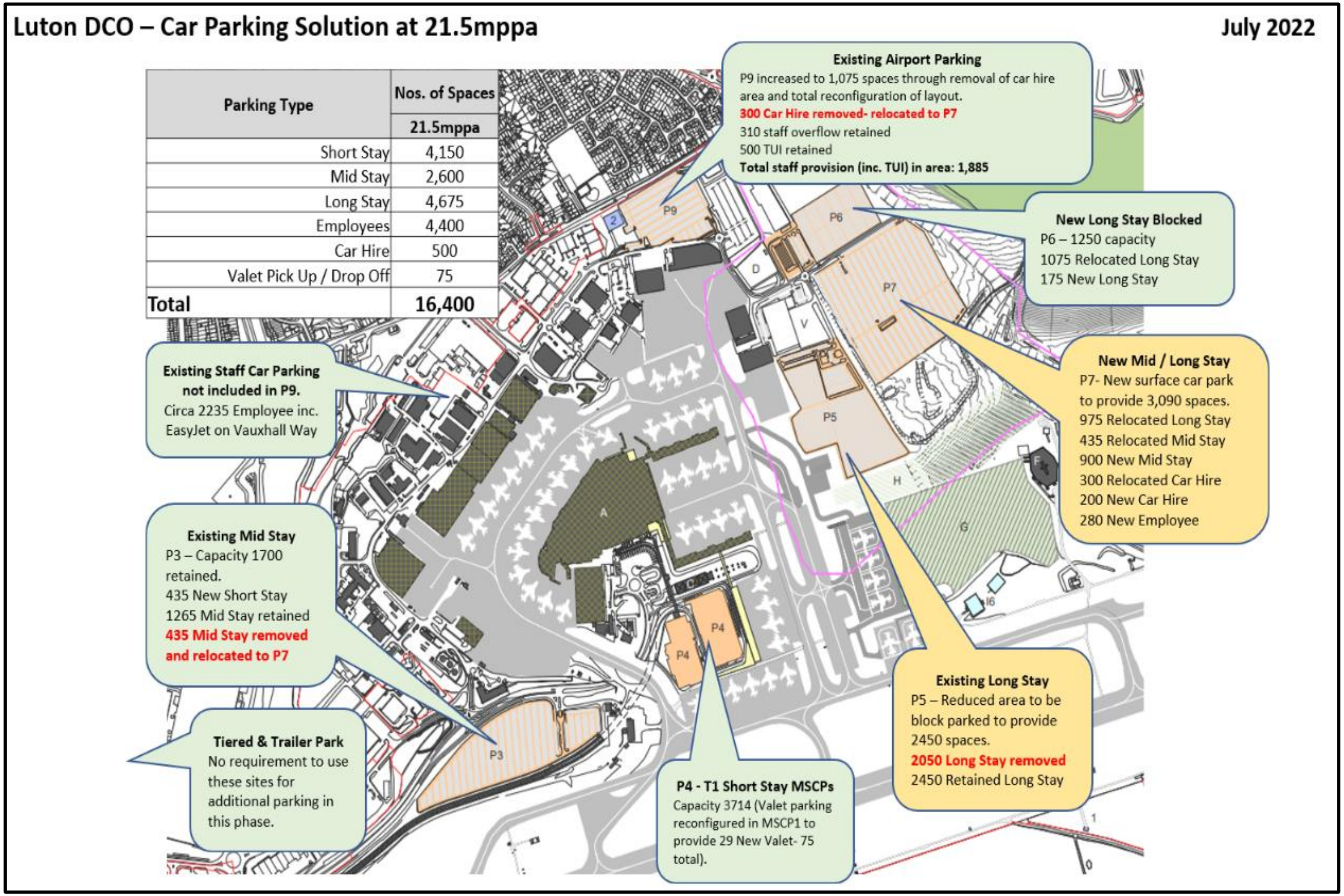
4.3.60 New car parks:

a. P6 (New long stay (blocked) car park); and
b. P7 (New mid/long stay car park).

4.3.61 Existing car parks:

a. P9 (Existing airport car park) – capacity increased by relocation of car hire to P7.

Inset 4.10: Assessment Phase 1 Car Park Locations



4.3.62 P6 and P7 are new surface car parks and construction would be similar to the construction methodology adopted for roads.

4.3.63 Works would commence with earthworks to form a level sub-surface allowing placement of a sub-base material. Granular sub-base material would be delivered using the appropriate HGV.

4.3.64 The project has an opportunity to re-use existing materials on site (e.g., demolition and landfill) to form hydraulically bound materials (HBMs) which would reduce the volume of traditional granular sub-base material coming to site.

4.3.65 It is likely that the material would be placed using 360-excavator and compacted using a vibrating roller. Localised tranches would be excavated for installation of drainage and utilities. At the same time kerbs would be placed.

4.3.66 It is likely that a second layer of granular material known as road base is then placed which is followed by a bituminous primer coat and an asphaltic concrete binder course.

4.3.67 It is likely that the final asphaltic concrete wearing course is laid using a paving machine and immediately rolled.

M1 (Junction 10)

4.3.68 The existing Junction 10 is to be upgraded with widening of the northbound off-slip to provide a third lane. The widening is accommodated in the existing verge. Works also include the widening of the western circulatory carriageway to provide four circulating lanes.

4.3.69 The exit from the roundabout on to the A1081 is also amended to allow for a third lane, the works being accommodated within the existing verge.

4.3.70 Works to be carried out in a phased approach utilising the construction compound to the west of the northern off-slip road.

5 ASSESSMENT PHASE 2A

5.1 Key Construction Constraints & Interfaces

5.1.1 The objective of Assessment Phase 2a is to increase the capacity of the airport by bringing a second terminal into operation.

5.1.2 The key construction constraints and interfaces for Assessment Phase 2 would include:

a. Interface with operational airport;
b. Interface with local residents and businesses; and
c. Interface with landowners.

5.2 Construction Programme & Phasing

5.2.1 The main construction activities in Assessment Phase 2a would be:

a. Bulk earthworks and landfill treatment;
b. Luton DART extension;
c. New passenger terminal building plus boarding pier;
d. New stands and apron / realignment of alpha taxiway;
e. Drainage and water treatment facilities;
f. New fuel storage facility;
g. New car parking provision;
h. Ground handling;
i. Security posts;
j. Landside – forecourt drop-off, coach station and energy centre;
k. Landscaping;
l. Demolition to clear route for access roads; and
m. Off-site highways (including AAR and upgrade to Junction 10 (M1)).

5.2.2 Assessment Phase 2a would commence with the bulk earthwork operation along with the drainage, underground utilities including water storage tanks, electrical services, fibre optics, and the Luton DART tunnel. In parallel construction of the new terminal would commence.

5.2.3 Other works would include the pier, concrete pavements, taxiways, aprons, and other associated airfield facilities including perimeter roads, signage, and markings.

5.2.4 The more complex construction areas such as the construction of the new Luton DART station and tunnel and the new terminal building are likely to be among the early construction sites.

5.2.5 The construction of the new ancillary buildings, long and short stay car parks, and associated airport landscaping, roads, pavements, would follow.

5.2.6 The phasing diagrams, contained in **Appendix B** of this report, illustrate the key construction phases of Assessment Phase 2a.

5.3 Construction Methodology

5.3.1 The construction methods described below are suggested methods that could be used by the contractor. However, alternative methods could be explored and adopted as the design matures.

Site Establishment

5.3.2 It is anticipated that during this assessment phase, as in Assessment Phase 1, there would be a main works compound and several smaller stand-alone satellite site establishments/ construction compounds both because of the dispersed nature of the proposed works and due to works taking place over a long timescale.

5.3.3 The potential satellite site locations are shown in the phasing diagrams in Appendix B and would include the following:

a. Construction Compound 1 (Main Works Compound for the airfield and terminal): Self-contained site compound area (approx. 25,000sqm) located adjacent to the new terminal to support the construction of the terminal, new aircraft stands, and airfield works. The compound would provide welfare facilities for site operatives, materials receiving, equipment storage and operative parking;

b. Construction Compound 2 (AAR): Self-contained site compound area (approx. 8,000sqm) located in the former TUI staff car park to support construction of the eastern end of the new AAR.

c. Construction Compound 3 (Water Treatment Facilities and Fuel Farm): Located close to the proposed water treatment facilities and fuel farm. Self-contained site compound area (approx. 2,000sqm) Providing welfare facilities for site operatives, materials receiving and equipment storage;

d. Construction Compound 4 (Earthworks): Self-contained site compound area (approx. 10,000sqm). Providing welfare facilities for site operatives, materials receiving and equipment storage. On completion of the earthworks the compound would be reduced in size and used for the construction of the car park P11;

e. Construction Compound 5 (Car Park): Self-contained site compound area (approx. 1,000sqm). Providing welfare facilities for site operatives, materials receiving and equipment storage. On completion of the earthworks the compound would be reduced in size and used for the construction of the car park P10;

f. Construction Compound 6 (Luton DART Extension): Self-contained site compound area (approx. 3,000sqm) located close to the proposed Luton DART station construction. Providing welfare facilities for site operatives, material and equipment storage and car parking;

g. Construction Compound 7 (Luton DART Extension): An airside construction compound (approx. 2,000sqm) located close to the proposed Luton DART tunnel construction. Providing welfare facilities for site operatives, material and equipment storage and car parking;

h. Construction Compounds 8, 9, 10, 11 (AAR): Self-contained construction compound along the length of the proposed road;

i. Construction Compounds 12 & 13 (Trailer and Tiered Car Parks): Construction compound located adjacent to the proposed trailer and / or tiered car parks. Providing welfare facilities for site operatives, materials receiving and equipment storage.

j. Construction Compounds 14 & 15 (Junction 10 M1): Construction compound from Assessment Phase 1 re-used in Assessment Phase 2a and a new self-contained compound to east side of roundabout is provided.

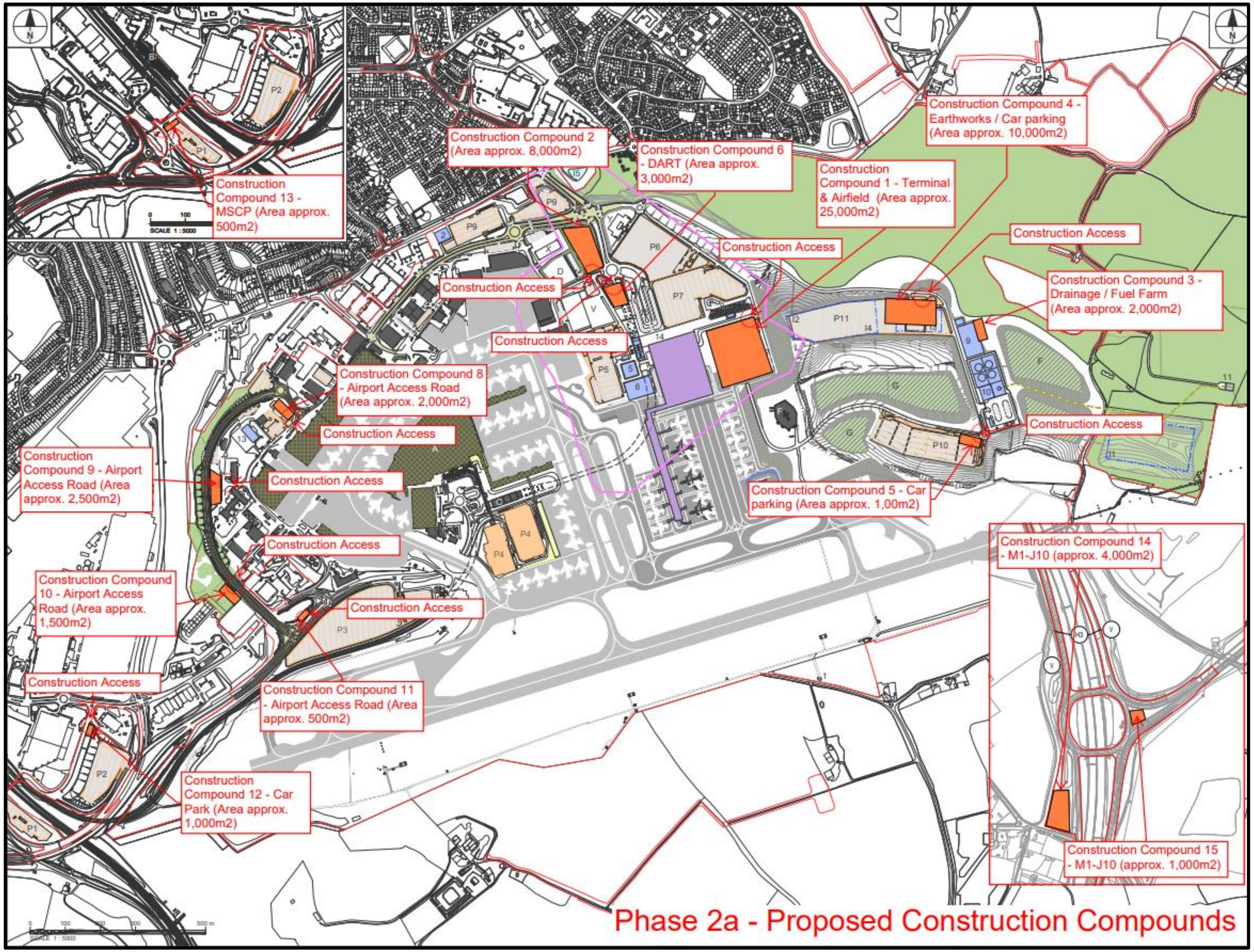
5.3.4 The main works compound would be constructed on part of the existing long stay car park, and would include some temporary buildings, areas of hard standing and a temporary processing facility to support the future landfill remediation works.

Table 5.1 Assessment Phase 2a Construction Compounds (Approximate Size and Estimated Time Operational)

Assessment Phase 2a: Construction Compounds			
Name	**Location**	**Approx. Size (m^2)**	**Estimated Time Operational**
Compound 1	Terminal & Airfield	25,000	48 months
Compound 2	Airport Access Road (East)	8,000	24 months
Compound 3	STP/ETP / Fuel Farm	2,000	24 months
Compound 4	Earthworks	10,000	24 months
Compound 5	Car park P10	1,000	12 months
Compound 6	Luton DART Extension	3,000	36 months
Compound 7	Luton DART Extension (Airside)	2,000	24 months
Compound 8	Airport Access Road (West)	2,000	24 months

Assessment Phase 2a: Construction Compounds			
Name	**Location**	**Approx. Size (m^2)**	**Estimated Time Operational**
Compound 9	Airport Access Road (West)	2,500	36 months
Compound 10	Airport Access Road (West)	1,500	24 months
Compound 11	Airport Access Road (West)	500	12 months
Compound 12	Car park P2	1,000	12 months
Compound 13	MSCP P1	500	18 months
Compound 14	Junction 10 (M1)	4,000	24 months
Compound 15	Junction 10 (M1)	1,000	24 months

Inset 5.1: Assessment Phase 2a Construction Compounds Potential Locations



5.3.5 A security fence and temporary haul roads would be installed around the initial works areas, segregating them from the public open space.

Demolition

5.3.6 This section sets out a potential demolition methodology but site surveys by a specialist demolition will be required to confirm the actual demolition method that is adopted which may be different to that described below. In this assessment phase much of the demolition work would be associated with the construction of the new AAR.

5.3.7 Refer to Appendix D for the schedule of buildings to be demolished in each assessment phase.

5.3.8 Where possible demolition arisings would be retained on site and would be reused, recycled, and incorporated into the permanent works.

Pre-Demolition

5.3.9 The works site would be enclosed using a close boarded hoarding with separate access gates for personnel and for vehicles. All works would comply with the management plans and strategies identified in the **Code of Construction Practice (CoCP) (Appendix 4.2 of the ES) [TR020001/APP/5.02].**

5.3.10 All incoming utilities would be identified, terminated, and removed to outside the building plot boundary. Cables, water, and gas pipes would be permanently isolated from their source of supply. Once area has been made safe, the soft strip operations would commence.

Soft Strip

5.3.11 Typical soft strip activities would involve the following:

a. removing building services and fittings;
b. removal of any internal doors, windows, fixtures, and fittings;
c. removing internal partitions (masonry or plasterboard) typically by hand or via mechanical means for masonry; and
d. lifting and removing away any internal non-manufacturing process fixed plant and equipment, for example dock levellers, lifts, and hoists (it is expected that any process plant and equipment would have been removed by the previous occupants.)

5.3.12 All soft strip material would be sorted into waste streams for removal for the construction area. If removed off-site this would be via by covered skips or lorry. The expected waste streams could include timber, plasterboard, brick and masonry, metals, glass, and contaminated items.

External Building Envelope

5.3.13 If elements of the external building are to be salvaged, then the external building envelope would be dismantled with access being provided by mechanical access equipment. If not, then demolition would take place using 360-degree long reach excavator with hydraulic shears and pulveriser.

5.3.14 All items would be loaded and secured to skip or wagon for transport to off-site specialist recycling facility.

Building Structure

5.3.15 For this example, it is assumed that the building is of steel frame construction. However, the activities would be similar for masonry or reinforced concrete structures with an increased use of mechanical breaking methods.

5.3.16 If elements of the building structure are to be salvaged, then the building would be dismantled with elementals being taken down in a piece-meal process. If the building is not being salvaged, then standard demolition techniques would be used. This normally involves the use of mechanical equipment such as 360-degree long-reach excavator with hydraulic shears and pulveriser. Elements of the structure would be cut or crushed and pulled to the ground in a controlled manner.

Inset 5.2: Typical Building Demolition

5.3.17 How intermediate floors are removed would be dependent upon their structure. It is assumed that they are not pre-stressed. It is preferable to lift sections of floor structure to the ground or waiting vehicle, if possible, otherwise they would have to be demolished by mechanical methods.

5.3.18 Water damping would be used to suppress the dust produced during demolition by mechanical methods. The water would be delivered by a hose or spray cannon.

5.3.19 All items would be loaded and secured to skip or wagon for transport to off-site specialist recycling facility.

Ground Floor Slab and Foundations

5.3.20 It is assumed that existing ground floor slab would be a simple reinforced ground-bearing slab. This would be demolished by a 360-degree excavator with a hydraulic breaker. A mechanical excavator would collect the demolition arisings into a stockpile for loading into wagons for offsite disposal.

5.3.21 The foundations would be broken up and excavated to a set level in a similar manner to the ground floor slab. Consideration would be given to processing the demolition arisings and re-using them in the bulk earthworks.

Underground Utilities and Services

5.3.22 Any remaining underground utilities and services would be permanently isolated as required from under the ground floor slab and external areas to leave the site clear.

Demolition Schedule and Demolition Drawings

5.3.23 Refer to Appendix D for the schedule of building to be demolished and for the demolition drawings.

Bulk Earthworks

5.3.24 The bulk earthworks create the earth platform required to support the physical infrastructure. This work would be both airside and landside.

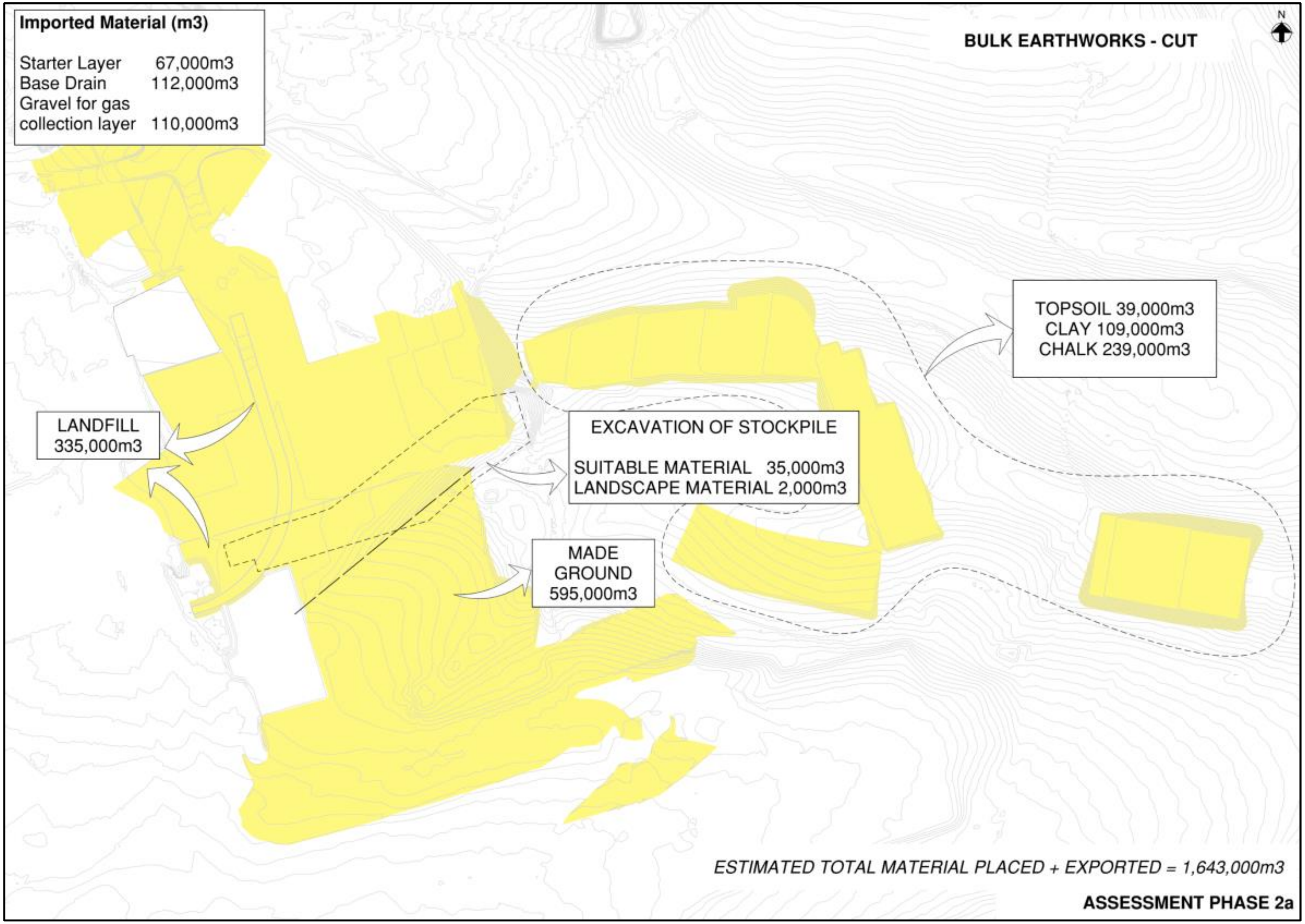
5.3.25 The estimated volume of the excavated earthwork in Assessment Phase 2a would be 1,354,000 m^3, this is more than can be handled in a single earth working season of work, so two seasons have been shown in the schedule.

Table 5.2 Estimate Earthwork Volume (Assessment Phase 2a)

Earthworks Material	Estimated Volume (Cu M)
Excavated (material)	1,019,000
Excavated (landfill)	335,000
Imported material	289,000
Material removed from site	34,000
Placed material	1,643,000

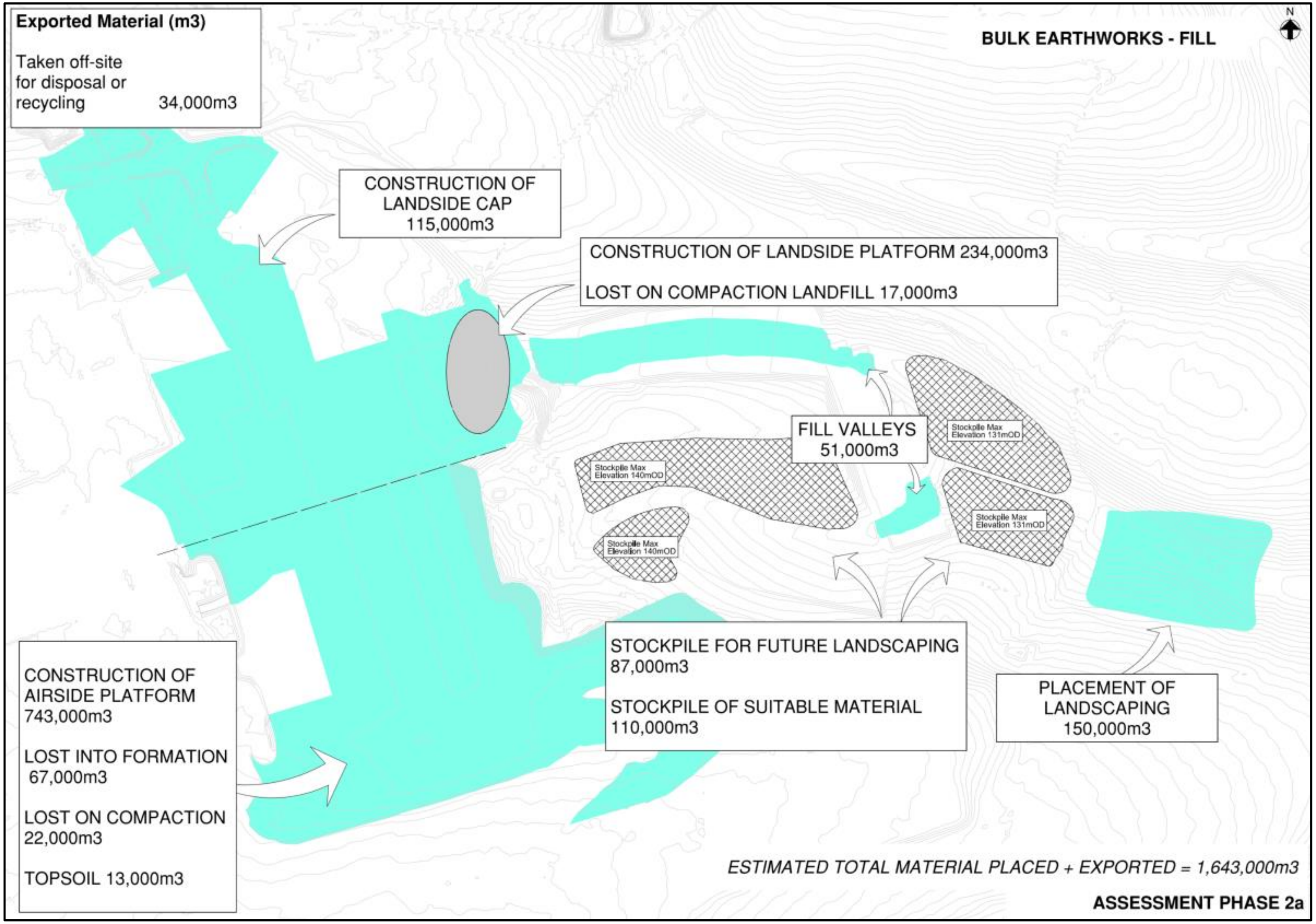
5.3.26 Inset 5.3: Assessment Phase 2a Earthworks (proposed areas of cut) below illustrate where material would be excavated from (cut) and deposited and where new material would be excavated from and used to fill the areas of cut.

Inset 5.3: Assessment Phase 2a Earthworks (proposed areas of cut)



5.3.27 The inset below shows areas of existing ground that excavated material would be deposited.

Inset 5.4: Assessment Phase 2a Earthworks (proposed areas of fill)



Eaton Green Landfill Site

5.3.28 A significant feature of the site is the former Eaton Green landfill site and efforts have been made to retain, as much as practical, the excavated landfill material on site. Parts of the landfill will be recycled to provide engineering materials for the development. The remainder will be capped minimising any potential future risk to the environment.

5.3.29 The **Outline Remediation Strategy for the former Eaton Green Landfill (Appendix 17.5 of the ES) [TR020001/APP/5.02]** has been produced describing the following:

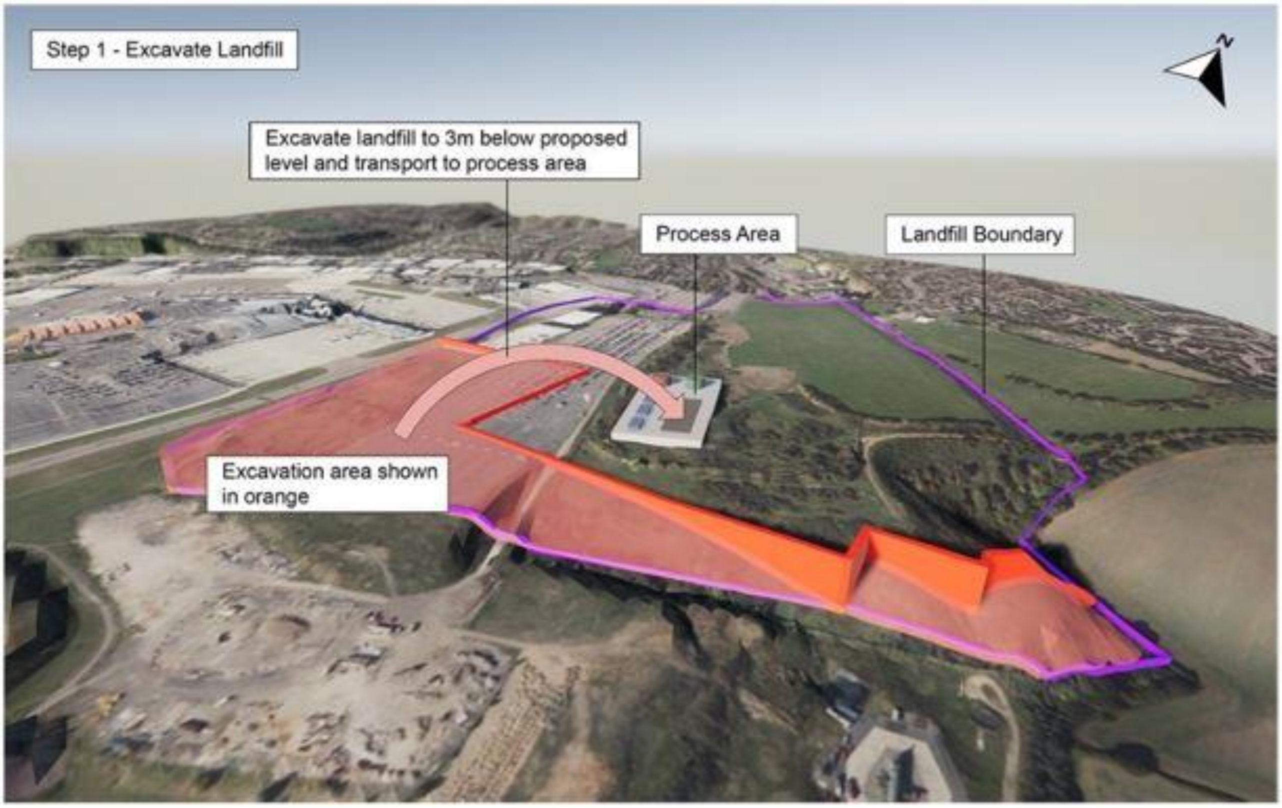
a. the approach and guidance adopted in developing the strategy;
b. remediation process;
c. remediation methods;
d. management of landfill earthworks; and
e. monitoring requirements.

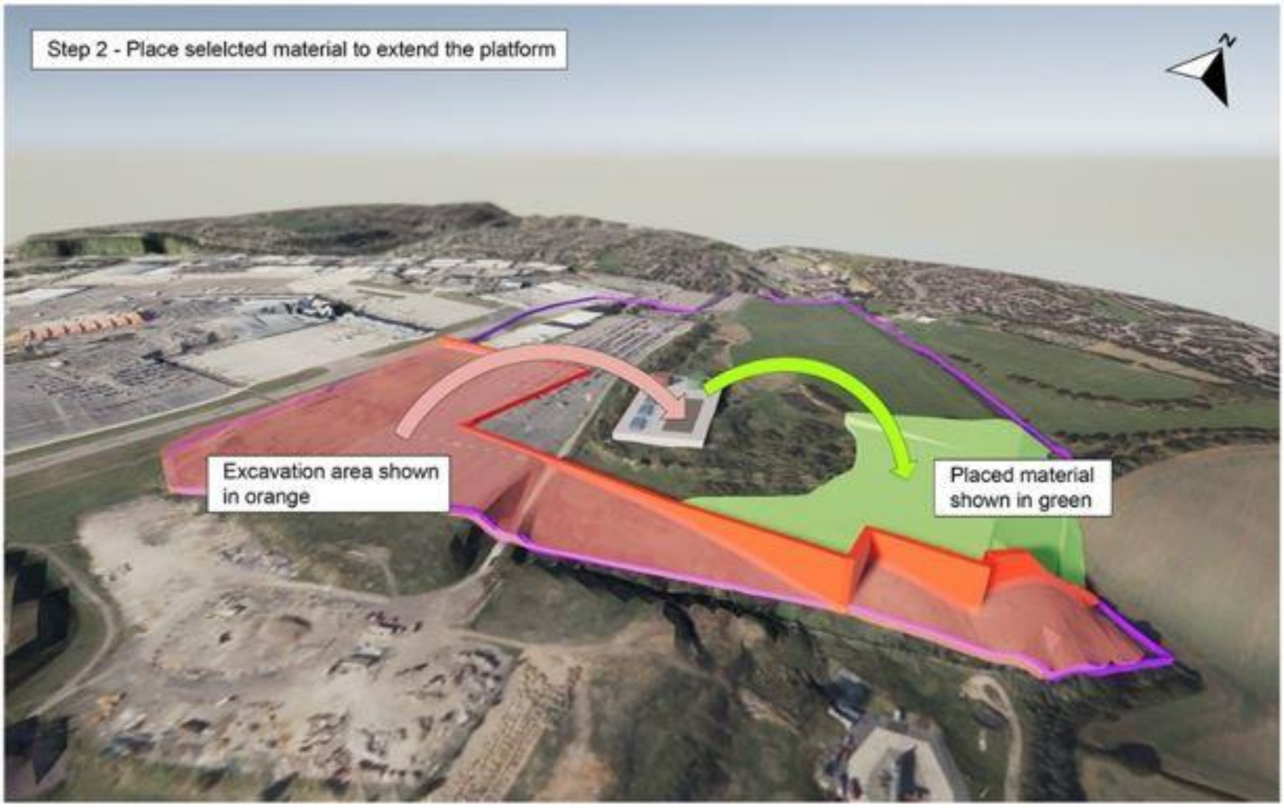
Remediation of Landfill Material

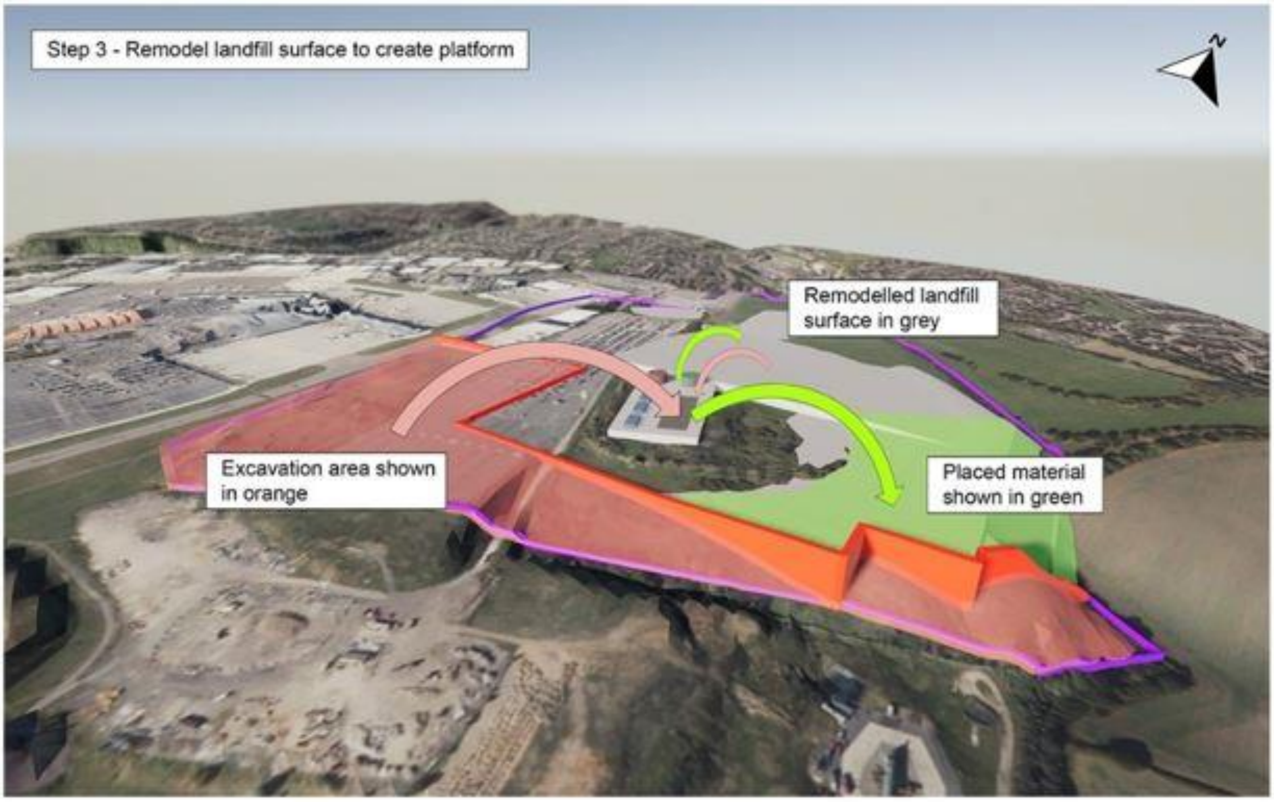
5.3.30 The illustration below shows the sequence of works to the landfill.

Inset 5.5: Illustrative sequence of works to the landfill


Existing Conditions - Edge of Proposed Aviation Platform
N
Edge of Proposed Platform


Step 1 - Excavate Landfill
N
Excavate landfill to 3m below proposed level and transport to process area
Process Area
Landfill Boundary
Excavation area shown in orange


Step 2 - Place selelcted material to extend the platform
Excavation area shown in orange
Placed material shown in green


Step 3 - Remodel landfill surface to create platform
Remodelled landfill surface in grey
Excavation area shown in orange
Placed material shown in green


Completion
Compacted landfill surface to form formation for landside development
Compacted landfill surface to form formation for aviation platform

Terminal 2

5.3.31 The proposed T2 building is approximately 61,500sqm in area. In Assessment Phase 2a, approximately 50,000sqm would be built with the remaining 11,500sqm being constructed in Assessment Phase 2b.

5.3.32 Construction and fitout of the new passenger terminal building is on the critical path for Assessment Phase 2a.

5.3.33 Construction of T2 is anticipated to take four years including commissioning and operational readiness activation and transition (ORAT).

5.3.34 T2 is to be constructed over the existing landfill area. The building would require gas protection measures that could comprise:

a. a gas resistant membrane installed across the full building footprint; and
b. active pressure relief pathways or a passive gas dispersal layer.

5.3.35 As the existing landfill material lacks structural stability, a portion of the landfill would be removed and replaced with granular fill. The excavated landfill material would be processed and retained on site for re-use.

5.3.36 Due to the structural instability of the area, it is likely that a piled foundation solution would be used. Any construction work to the perimeter of the building would aim to minimise the footprint of the construction area.

5.3.37 The use of off-site fabrication and modularisation construction methods would be encouraged to minimise construction interfaces and to reduce the generation of construction waste. Off-site manufacturing could:

a. reduce deliveries to site;
b. reduce generation of construction waste;
c. reduce the number of operatives on-site;
d. improve speed of construction;
e. reduce health and safety risks; and
f. improve quality, as work would be undertaken in a factory environment.

Site Establishment

5.3.38 Close board hoarding would be erected around the proposed T2 building area. Access gates for vehicles would include a vehicle wheel wash and security arrangements. Whilst site accommodation would be provided in the contractors' compound, it is likely that local office and welfare facilities would be provided within the T2 site area. These local facilities would avoid the need for people to leave the terminal area for incidental requirements.

Ground and Substructure Work

5.3.39 All buildings constructed in the existing landfill would require a foundation solution that is able to deal with the inconsistent ground conditions. These foundations could be piled, pad or raft solutions and could be used in the new terminal building, offices, hotels and multi-storey car park.

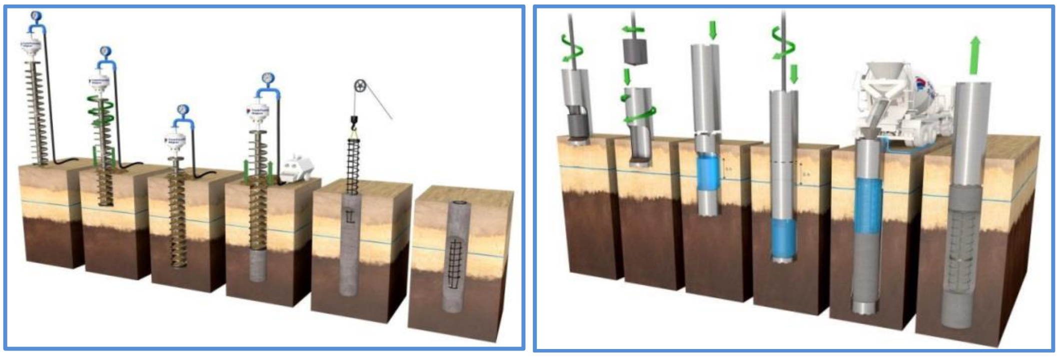
5.3.40 Percussion driven sheet piles are required to form ground support or cut-off walls. A typical setup is shown in Inset 5.6: Typical sheet piling operation (right photo using silent piler). Sheet piles would be delivered by HGV straight to the work face. A mobile crane would be used to off load the wagon and feed the piling machine.

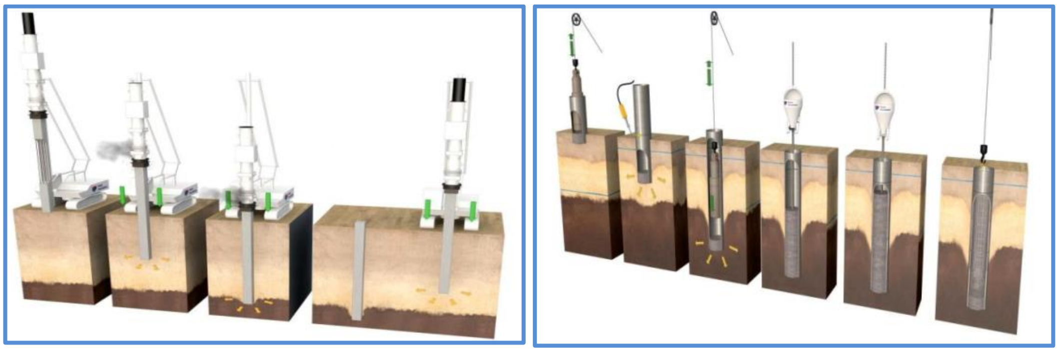
Inset 5.6: Typical sheet piling operation (right photo using silent piler)

5.3.41 Piling for the substructure could either be continuous flight augured (CFA), rotary bored, driven precast or tubular steel piles. All have advantages and disadvantages. The method chosen would be based upon the ground conditions, noise restrictions, logistics and restrictions on working with the existing landfill site (reference is made to the **CoCP (Appendix 4.2 of the ES) [TR020001/APP/5.02]** and the **Outline Remediation Strategy for Former Eaton Green Landfill (Appendix 17.5** of the **ES) [TR020001/APP/5.02]).**

5.3.42 In situ concrete is required for CFA, rotary bored and tubular steel piles requiring individual deliveries.

Inset 5.7: Clockwise from top left: CFA, rotary bored, driven precast and driven steel tube piling techniques





Inset 5.8: Typical CFA piling operations

5.3.43 Pile cap and ground beams installation would follow the piling once enough piles had been installed and sampled randomised pile testing had proved positive. This sequence of working would then substantially dictate the sequence of substructure works and hence the sequences of the superstructure build. It is expected that the build would commence at and work away from the aircraft apron.

5.3.44 Typically, insitu concrete is poured within shutters containing reinforcement especially when large structural loads are involved. However, opportunities to use precast concrete pile caps and ground beams could be explored. Either for the whole substructure or in designated lighter loaded areas, as loads may be prohibitive resulting in precast units being excessively large to transport and crane efficiently in some areas.

5.3.45 The principal advantage for precast ground beams is reduced schedule on-site, reduced labour effort, less trades on-site, and generally a cleaner activity reducing waste and promoting a clean and safe working environment.

5.3.46 Precast beams could be delivered direct from the factory to the work face avoiding multiple handling and lifted by crane directly into position. Some on-site storage could be permitted for sorting and stacking, though with planning the vehicle could be loaded to suit the build sequence, again reducing handling and storage.

Inset 5.9: Example of precast ground beams

5.3.47 Precast ground beams and/or pile caps are also well suited to the lighter loaded buildings for example the New Century Park buildings and the business aviation hangars.

Structural Frame (steel)

5.3.48 It is assumed that the terminal building would have a steel frame (Inset 5.10: Steel frame erection of new car park at the airport), alternatives could include a timber frame, or a concrete frame used in whole or in part, however the methods and techniques discussed below could be applied to these methods.

5.3.49 The structural steel frame would be manufactured off site and delivered to site by articulated low loader vehicle. The steel work deliveries would be planned for just in time delivery to avoid storage on-site. The preference would be to erect the steel direct from the wagon to avoid double handling and storage with associated congestion on-site. Steel erection would be carried out by crane.

Inset 5.10: Steel frame erection of new car park at the airport

5.3.50 The piers would be erected after the aprons had been built. Consideration for preassembled modules would be explored. They could be lifted into position much like bridge trusses on motorways.

5.3.51 The steel work would be assembled in a prefabrication area on-site or alternatively, size permitting, off site at the structural steel fabricators factory. The steel modules would be lifted into place by mobile cranes, tower cranes may be impractical due to reach and weight limits.

5.3.52 The modules could be installed much quicker than erecting steel on-site and therefore coordination with the operations of the apron could be better managed to suit fewer active periods at the airport including night works. The modular solution could extend to include floor decks, roof decks and cladding with primary mechanical systems and electrical containment pre-installed.

5.3.53 A similar method was used for the South Gates passenger boarding area at Dublin Airport delivering 2,200sqm from 77 steel frame modules in 16 days.

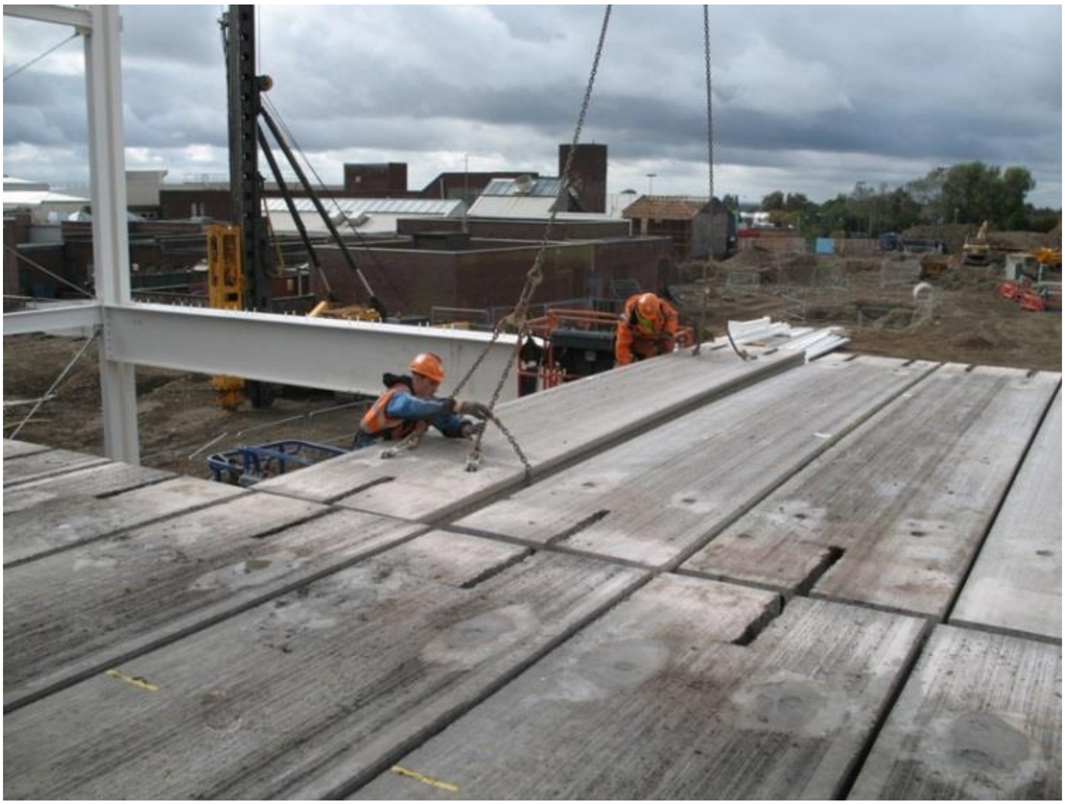
Basement, Ground, and Intermediate Floors

5.3.54 The choice of intermediate concrete floor type would inform the erection method. There are two principal types, precast and insitu concrete floors.

5.3.55 Precast concrete floors would be made of precast planks. These would be lifted onto the steel frame following the steel frame erection sequence. The steel frame and concrete floor sequence would need to be planned together to avoid future lifting and erection problems by ‘boxing oneself into a corner’.

5.3.56 As the floors were erected, edge protection handrails and kick boards would be installed to avoid any unprotected edges. Handrail and edge protection systems could be preinstalled prior to lifting the planks to reduce the working at height risks. There are industry standard proprietary systems for this technique. During the erection stage, operatives would use harnesses and/or work from a mobile elevating working platform (MEWP) until the edge protection was in place.

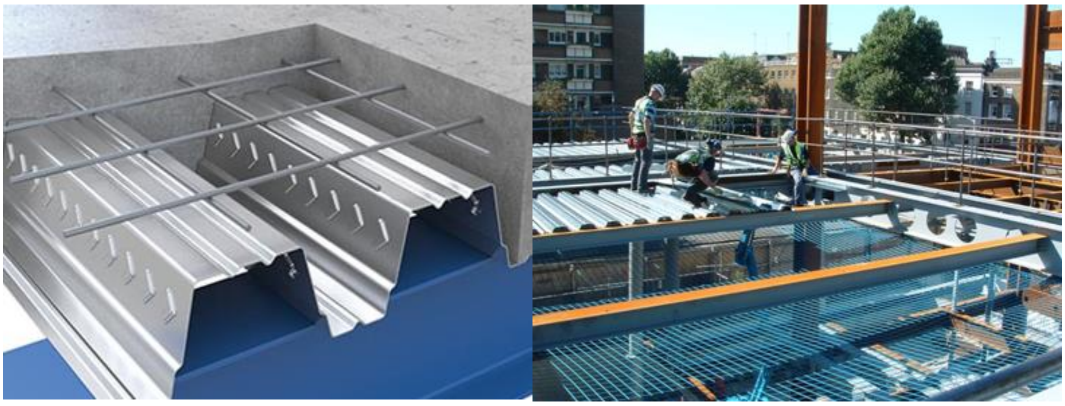
Inset 5.11: Typical installation method for precast concrete floor planks



5.3.57 Precast floors would typically have a screed finish installed once the building was weather tight as part of the building finishing trades. The screed finish would be coordinated with the fit out and finishes and installed as late as possible to avoid accidental damage. The screed would be pumped from the ground to the work area in a similar fashion to pumped concrete described below.

5.3.58 In situ, concrete floors could also be an option where the concrete is poured onto hollow rib metal decking (Inset 5.12: Typical composite floor construction). The hollow rib metal decking would be installed by crane coordinated with the steel frame erection sequence. Ready installed edge details to retain the concrete during pouring could be used to reduce the need for working at height. Good practice is to install netting below the hollow rib floor installation to provide a fall arrest system, similarly for the roof installation.

Inset 5.12: Typical composite floor construction



5.3.59 The steel reinforcement bars would also be lifted by crane onto the hollow rib decking. The steel reinforcement fixing would commence once the risk of falling objects from overhead crane lifts was avoided by work sequencing. It would typically commence once the decking above had been installed to act as primary protection from falling objects. Concrete would be pumped from the ground and poured onto the hollow rib decking.

Inset 5.13:Typical concrete pump setup

5.3.60 The basement floor would be in situ cast concrete, again installed once the precast concrete floor or hollow rib deck has been installed above. If the concrete is to be substantially self-finished, the pouring of concrete would be coordinated with the building becoming weatherproof with wall and roof cladding.

Roof and Wall Cladding

5.3.61 The roof cladding system, roof lights, smoke vents and other roof fittings would be installed in a similar manner to the installation of hollow rib decking described above. A crane would lift the cladding system into place. Netting fall arrest systems would have been installed below the roof cladding with edge protection handrails and kick boards erected to the roof perimeter.

5.3.62 Again, consideration could be given to preassembling the handrail system with the steel frame erection to avoid operatives having to erect the system after the frame thereby managing working at height risks. Roof installation would be sequenced with the progressive erection of the steel frame and intermediate floor component lifting to both minimise weather ingress and the risk of falling objects to enable the commencement of work faces below.

5.3.63 Wall cladding and curtain walling would be lifted by crane, particularly adjacent to airside operations and public areas, to minimise mechanical ground transportation of materials. This vertical transportation would also minimise the land take from the airport for construction operations in comparison to delivering materials by ground vehicle.

Inset 5.14: Crane lifting curtain walling and installation of glazing from inside

Mechanical and Electrical Systems

5.3.64 The modular installation of prefabricated mechanical and electrical services systems would be encouraged. Modules would be manufactured in a factory environment to minimise working at height, particularly in the departures and arrivals hall, and baggage reclaim. These systems would typically be installed onto a steel racking structure and installed by tower crane as the structural frame and floors are progressed. Joints would be prepared in advance at the factory for ready connection on-site.

5.3.65 Factory prefabrication would reduce work on site, allowing manufacture to be timed in parallel with the frame installation to reduce schedule and quality control risks. Testing could be carried out in the factory. This methodology was used on other new airport pier projects at Luton and Heathrow. Alternatively, the mechanical and electrical systems would be installed from a MEWP.

Inset 5.15: Off-site Fabricated Mechanical Systems

5.3.66 Consideration would also be given to prefabricated and precast lift shafts.

Internal Fit Out

5.3.67 Internal fit out of the building would proceed once the building was suitably weatherproof and would follow normal construction industry methods. Opportunities for modularisation and prefabrication could be explored, for example, washroom pods, have been successfully used on other projects.

Inset 5.16 Prefabricated washroom module exterior and interior

5.3.68 Similarly, check in desks, baggage conveyors, passport and security checking desk and kiosks etc. could all be delivered to site preassembled and lifted in place by forklift trucks, hoists or tele handlers. Concessionaires' shops and kiosks could similarly be substantially modularised and fitted out in a typical shop fitting methodology as used in shopping centres.

Luton DART Extension

5.3.69 The Luton DART extension (Work no. 3g) would be a 500m long cut and cover tunnel running under the existing taxiway Delta and Foxtrot with a new passenger station outside of the new proposed passenger terminal. It would connect T1 to T2.

5.3.70 To ensure the new Luton DART structures are protected from landfill gas ingress, it should be protected by a combination of:

a. appropriate structural detailing of the tunnel (to resist gas ingress);
b. an external gas membrane tanking of the tunnel; and
c. high level of internal ventilation would be provided.

5.3.71 In order to meet the current passenger demand at the airport, there is a requirement for two taxiways to always be open for aircraft movement. To maintain this requirement, the construction of the Luton DART extension would require careful planning as set out below:

5.3.72 Part of the Luton DART extension would pass through the landfill and therefore would need to control leachate and gas management.

Construct cut & cover tunnel (Chainage 2+300m to 2+400m).

5.3.73 Start construction of temporary taxiway at the same time. The taxiway would be built on top of the new cut & cover tunnel section.

5.3.74 Once the sheet piling of chainage 2+300m to 2+400m has finished, the chainage 2+400m to 2+500m tunnel construction would begin.

5.3.75 After the sheet piling of chainage 2+400m to 2+500m has finished, the construction of chainage 2+500m to 2+600m would begin.

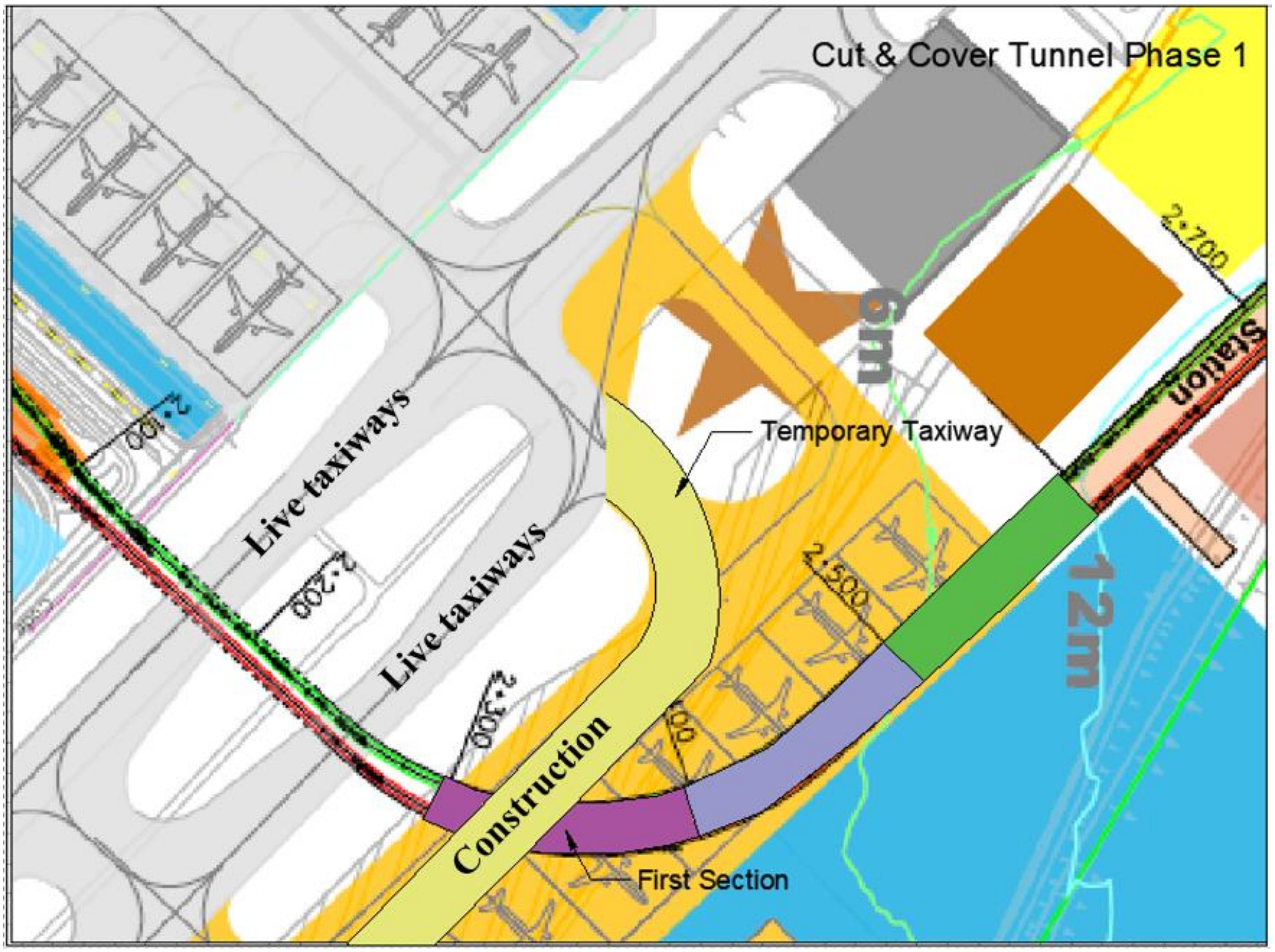
5.3.76 The construction of chainage 2+200m to 2+300m tunnel would begin once the temporary taxiway is operational.

5.3.77 The demolished taxiway section would be rebuilt over the new tunnel.

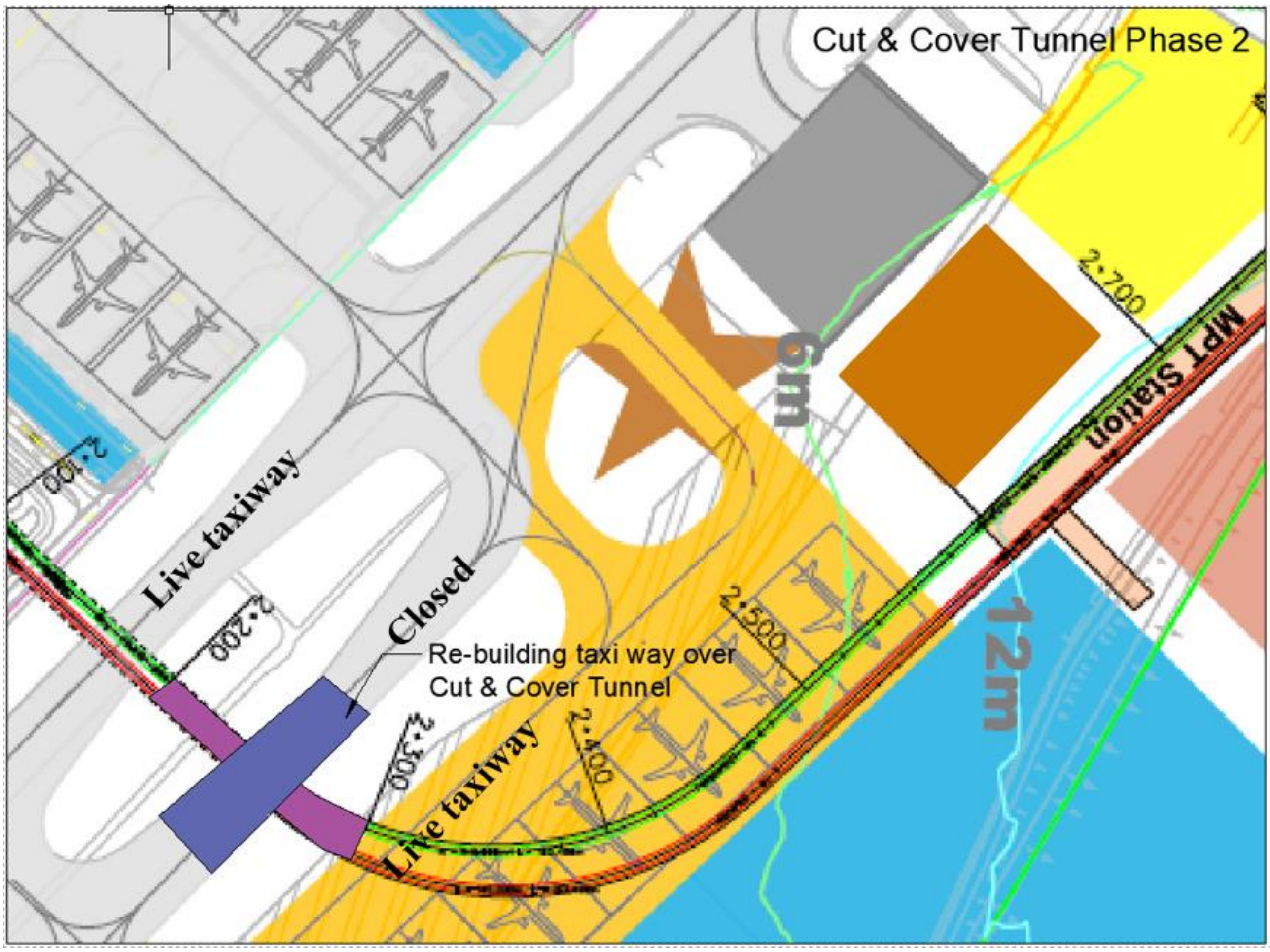
5.3.78 The construction of the final section of the tunnel (chainage 2+100m to 2+200m) would begin once the taxiway over the chainage 2+300m to 2+400m section of tunnel had been rebuilt.

5.3.79 Finally, the demolished Taxiway section over the final section would be rebuilt.

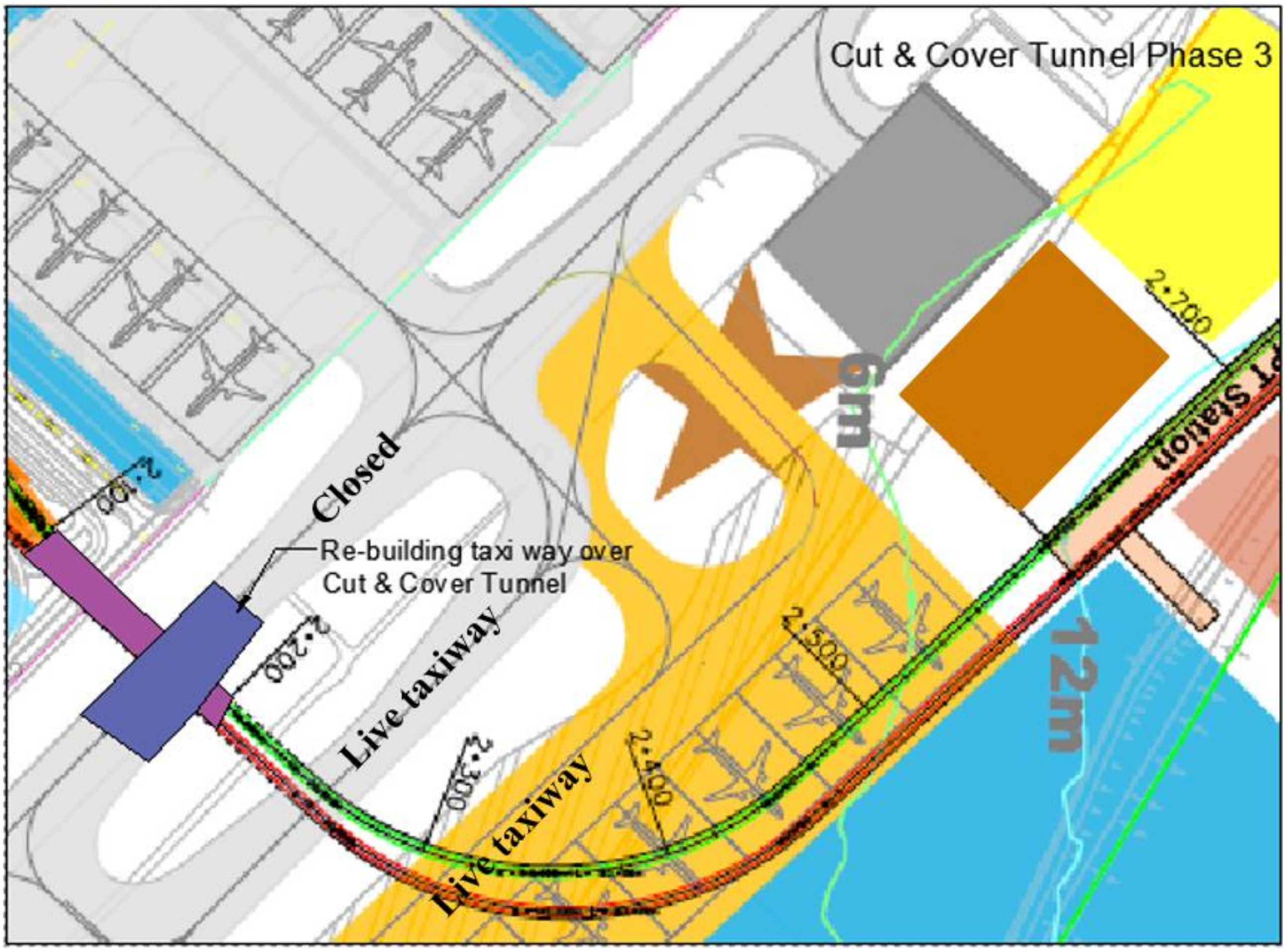
Inset 5.17: Luton DART Extension Phase 1 (chainage 2+300m to 2+400m)



Inset 5.18: Luton DART Extension Phase 2 (chainage 2+200m to 2+300m)



Inset 5.19: Luton DART Extension Phase 3 (chainage 2+100m to 2+200m)



5.3.80 Construction methods and techniques could follow one of two general methods;

a. open box construction; or
b. top-down construction.

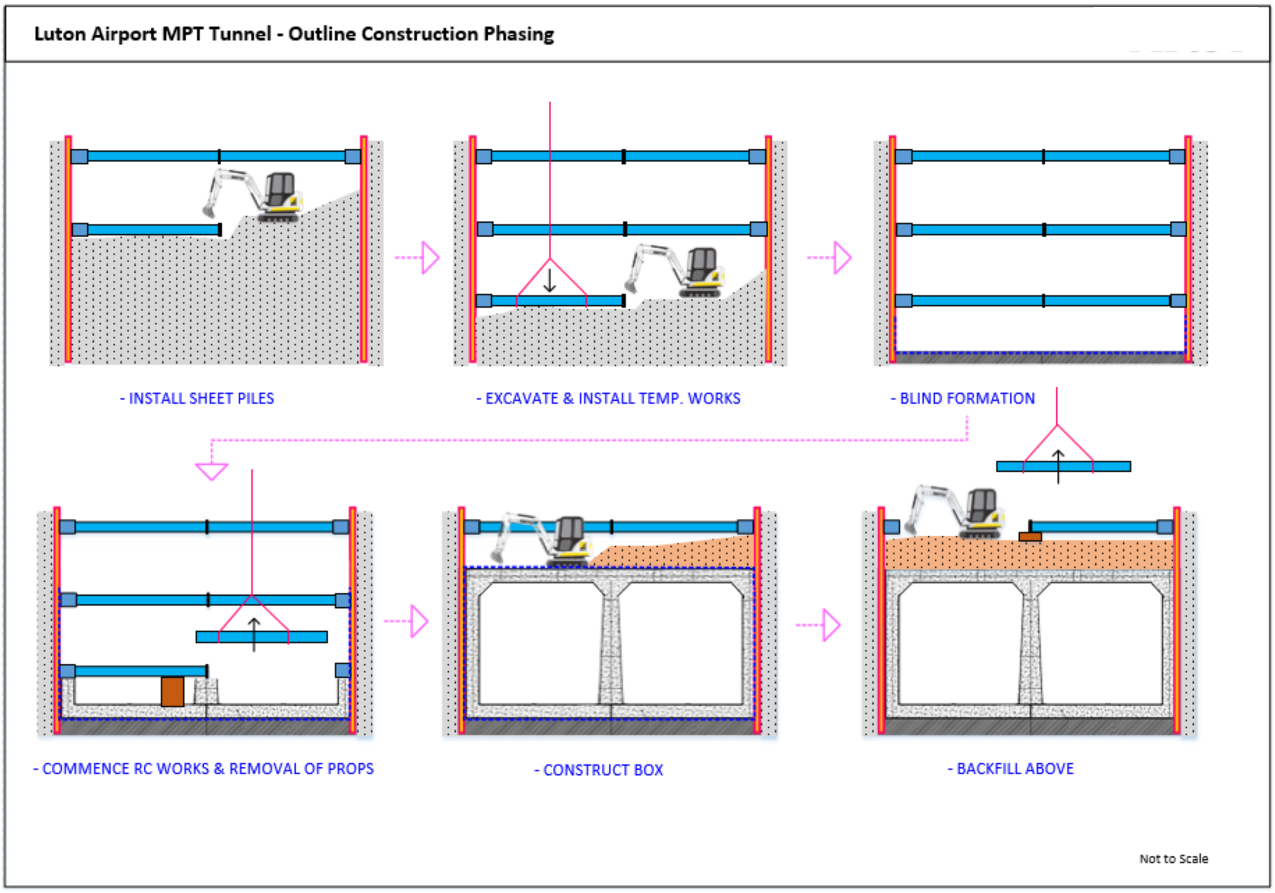
5.3.81 Both could use excavation techniques to minimise the need for over excavation and batters to maintain excavated slope stability, such as secant piling or sheet piling.

Inset 5.20: Open box and top-down construction on Luton DART scheme

Open Box Construction

5.3.82 The open box method would involve the driving of sheet piles to form the earthwork support during the tunnel excavation followed by progressive excavation with a propping system. The tunnel would be built from in situ concrete using the sheet piling as part of the shuttering system. The sheet piling would therefore be left in place as construction progressed with wall, floor and roof construction in conjunction with the removal of the props. The methodology is graphically depicted in Inset 5.21: Graphic of open box construction methodology.

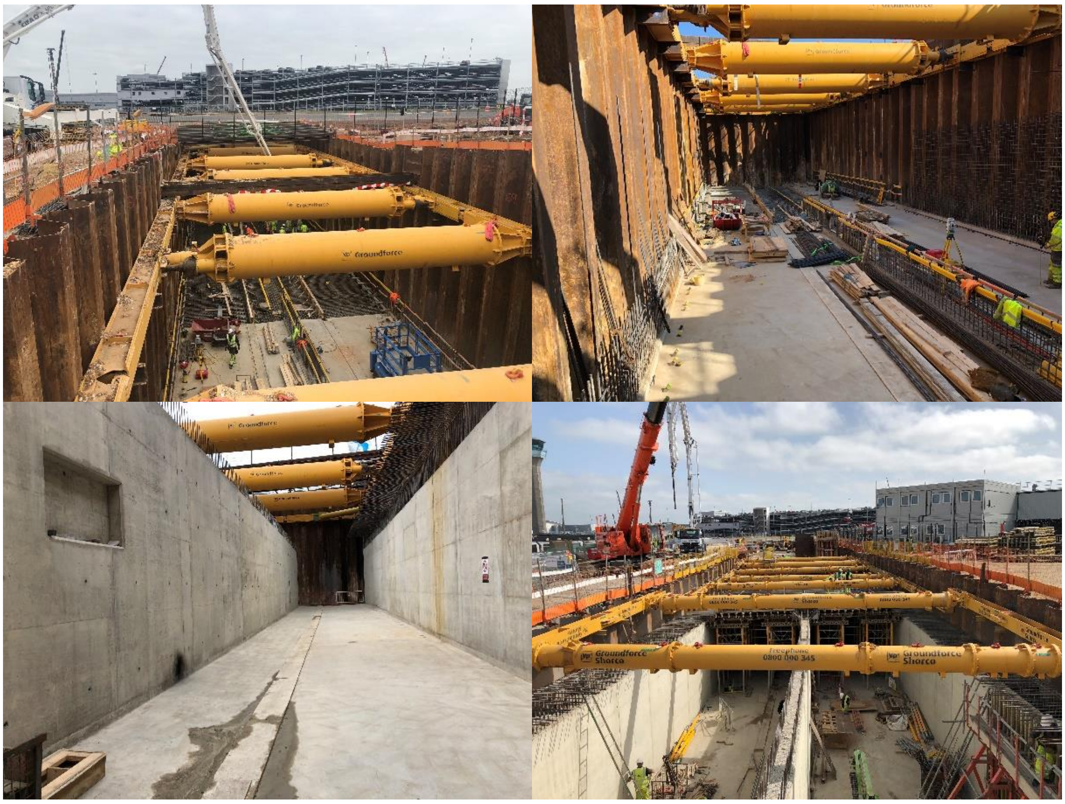
Inset 5.21: Graphic of open box construction methodology



5.3.83 Bored concrete secant piling could be considered in lieu of the sheet piling. The secant piling would provide both the earthwork support system and the external structure of the tunnel. The secant piling could be designed to be structurally self-supporting and therefore obviate the need for the installation of, and working around, the shoring system. The secant piling would require a surface finish such as sprayed applied concrete and could be further faced in public areas with architectural treatments.

5.3.84 Once the reinforced concrete structure was finished, the tunnel roof structure formwork and reinforcement would be erected and cast. Alternatively, precast roof sections could be lowered onto the secant piles. The roof would then be waterproofed and protected, and drainage systems installed. The backfill operation would then be carried out in layers to ensure proper compaction.

Inset 5.22: Sheet pile open box construction on first Luton DART scheme



5.3.85 A precast solution could be feasible. Sheet piling would be proposed to support the tunnel excavation, if necessary, before precast wall panels, and pre-stressed pre-cast roof deck panels. Amongst the advantages of this technique could be reduced site works, less working at height to fix shutter and reinforcement bar, less wet trades including large numbers of concrete wagons to and from site and a cleaner construction technique, which is important when interfacing closely with aircraft operations.

Inset 5.23: Precast sections on first Luton DART scheme

Top-Down Construction

5.3.86 A top-down construction technique could be considered recognising the management of the interface between the Luton DART extension tunnel and the live airfield. Top-down construction is used successfully in congested areas including London. The principal advantage of this technique would be the ability to quickly reinstate the airfield.

5.3.87 A secant piled diaphragm wall would be installed with connection points installed for the roof and/or intermediate floors. A diaphragm secant pile wall could also be installed to act as intermediate support to manage the floor and roof spans.

5.3.88 The ground would be excavated below the soffit of the tunnel roof structure including an allowance for blinding for the in situ concrete slab. Alternatively, precast concrete slabs could be lowered onto the diaphragm wall to provide the roof structure. An access shaft would need to be allowed in the slab for machinery and materials.

5.3.89 Once the roof slab was installed, the ground could be backfilled, and taxiways or above ground structures could then be constructed whilst excavation of the tunnel commenced. Alternatively, an access ramp into the tunnel could be formed to enable the bulldozing of excavated material to an excavator to load wagons for disposal. Fume extract and fresh air systems would need to be considered to maintain a breathable environment.

Taxiway demolition

5.3.90 As part of the construction of the Luton DART extension, several sections of the existing taxiway would have to be demolished.

Inset 5.24: Taxiway demolition and reconstruction for first Luton DART scheme

5.3.91 The taxiway lighting would be decommissioned, ensuring continued operation of adjacent taxiway lighting in close coordination with the airport operator. Underground services would be identified from record drawings, surveys and trial holes and a strategy for their continued operation agreed, either by diversion or by protection works. Vehicle and machinery access routes would be agreed with the airport and red & white barriers would be erected to demark the construction areas.

5.3.92 Demolition work would mainly be ‘excavation’ in this case and would be carried out by 360-degree excavators with hydraulic breakers. Consideration would also be given to sawing the concrete with a diamond saw and prising/lifting the slabs from the ground. The material would be loaded by another machine into covered tipper wagons to minimise dust from stockpiles. Dust damping techniques may need to be considered to minimise dust in dry conditions.

5.3.93 Consideration would be given to crushing and recycling suitable materials to use in backfilling operations. Road sweepers and a housekeeping gang would be in constant operation to ensure the construction area and access routes were always kept clean to avoid the risk of debris entering the airfield.

Tunnel and station fit out

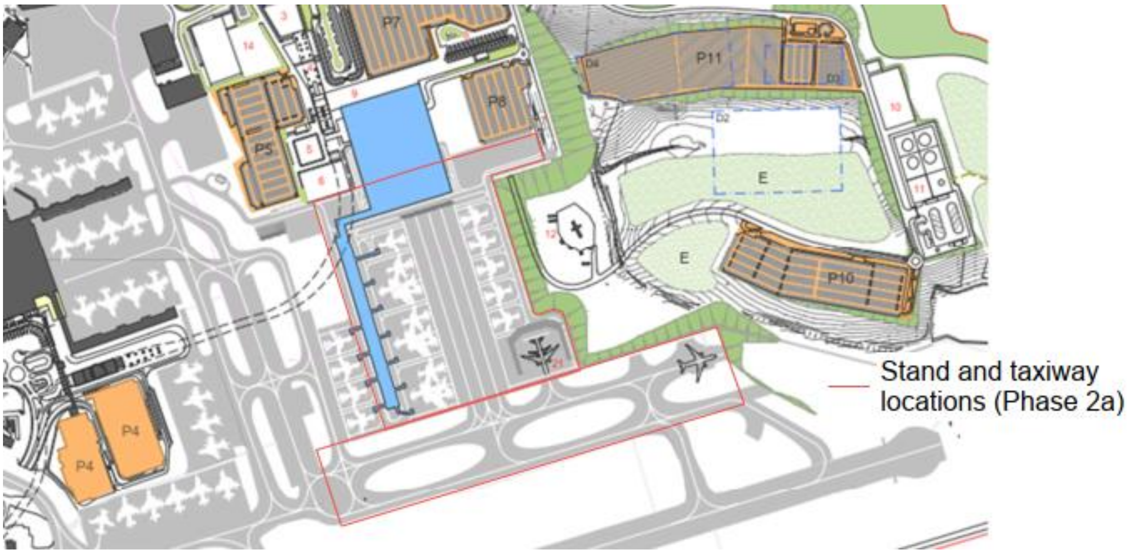
5.3.94 Once the tunnel was complete, the significant interface activities with the airfield would be substantially reduced. Mechanical and electrical works, rail and signalling works and architectural fit out works would commence inside the tunnel from dedicated access and egress points previously agreed and coordinated with airport operations.

5.3.95 Prefabrication and modularisation opportunities would be explored to minimise construction interfaces with the existing airfield operations. The benefits and forms this might take have been covered in previous sections.

New Apron and Stands

5.3.96 In Assessment Phase 2a, 12 no. additional stands and engine run up bay are to be built on the new extended earthworks platform. The existing Taxiway Alpha would also be realigned and duelled.

Inset 5.25: New taxiway and stand locations



5.3.97 Standard construction methods would be used for the construction of the airfield hardstanding areas.

5.3.98 Careful consideration is to be given to the prevention of foreign object debris (FOD) which is any material that could cause damage to equipment, aircraft or injure personnel. FOD can include loose hardware, pavement fragment, building materials, rock, sand, and wildlife. Further information can be found in the airport operator’s current procedures for controlling construction within the airfield.

5.3.99 The ground would be prepared as part of the earthworks phase. The installation of drainage runs, fuel lines and other utilities would be incorporated into this work using similar methodologies as previously described.

Drainage and Water Treatment Facilities

Attenuation Tanks

5.3.100 The attenuation tanks would be a proprietary attenuation system installed in the ground, as shown in the image below.

Inset 5.26: Proprietary cylindrical attenuation system prior to backfill

5.3.101 The attenuation tanks would be excavated by 360-degree excavator with the excavation sides battered back to angles that would stabilise the slope to ensure safe construction. The excavated material could be treated if required for re-use elsewhere on the Proposed Development; the proprietary attenuation components would be backfilled with granular material.

5.3.102 The attenuation components would be delivered by articulated wagon and either stored on-site or deliveries coordinated to enable lifting straight from the vehicle thus avoiding double handling. They would, dependent upon the final build sequence and access, be lifted into position by an excavator, tele-handler or crane. After inspection, they would either be back filled as work progressed or, with suitable reach from excavator or crane, be backfilled once all the elements are installed.

Inset 5.27: Backfilling of proprietary attenuation system

Water treatment facilities

5.3.103 These facilities would be above ground located sufficiently far away from the runway to avoid conflict with airfield operations. However, to minimise construction time and hence associated risks to operations, modularisation and prefabrication opportunities should be examined.

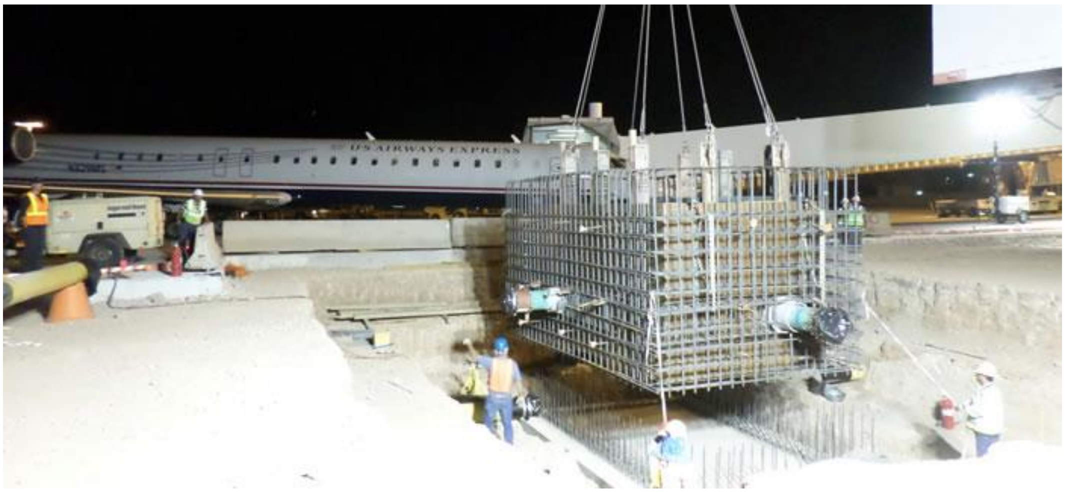
5.3.104 Modular buildings could be used for offices and control rooms, substantially fitted out prior to delivery and craned into position, with modules bolted together to form larger buildings. Pipework, valve sets, and manifolds could be made in an offsite factory and brought to site and lifted into place.

Fuel Storage Facility

5.3.105 Like the water treatment facilities, it is recommended that modularisation and prefabrications opportunities should be examined for the mechanical and electrical elements of the fuel storage facility. Some examples, of previously prefabricated fuel storage modules on airport projects are shown below.

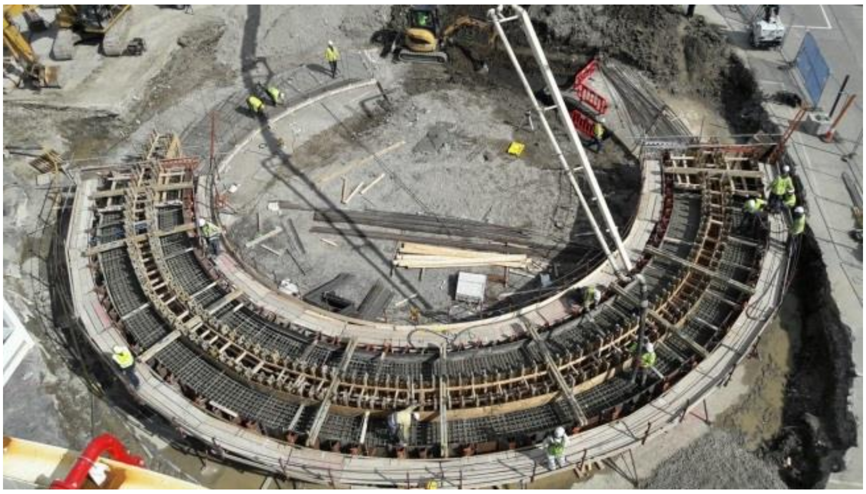
Inset 5.28: Example prefabricated fuel skid with valve chamber

Inset 5.29: Example installation of a prefabricated fuel skid with valve chamber



5.3.106 If a piled foundation is required this could be continuous flight auger piling rig with insitu concrete for the foundation, ring beams and plinths. Opportunities for precast elements can be explored. An example of the ring beam construction is shown below.

Inset 5.30: Example ring beam construction for storage tank



5.3.107 The material type for the tanks should be considered to enable the tanks to be delivered in segments bolted together with gaskets and sealed on-site, similarly, the bund walls could be precast sections with gaskets and sealing on-site.

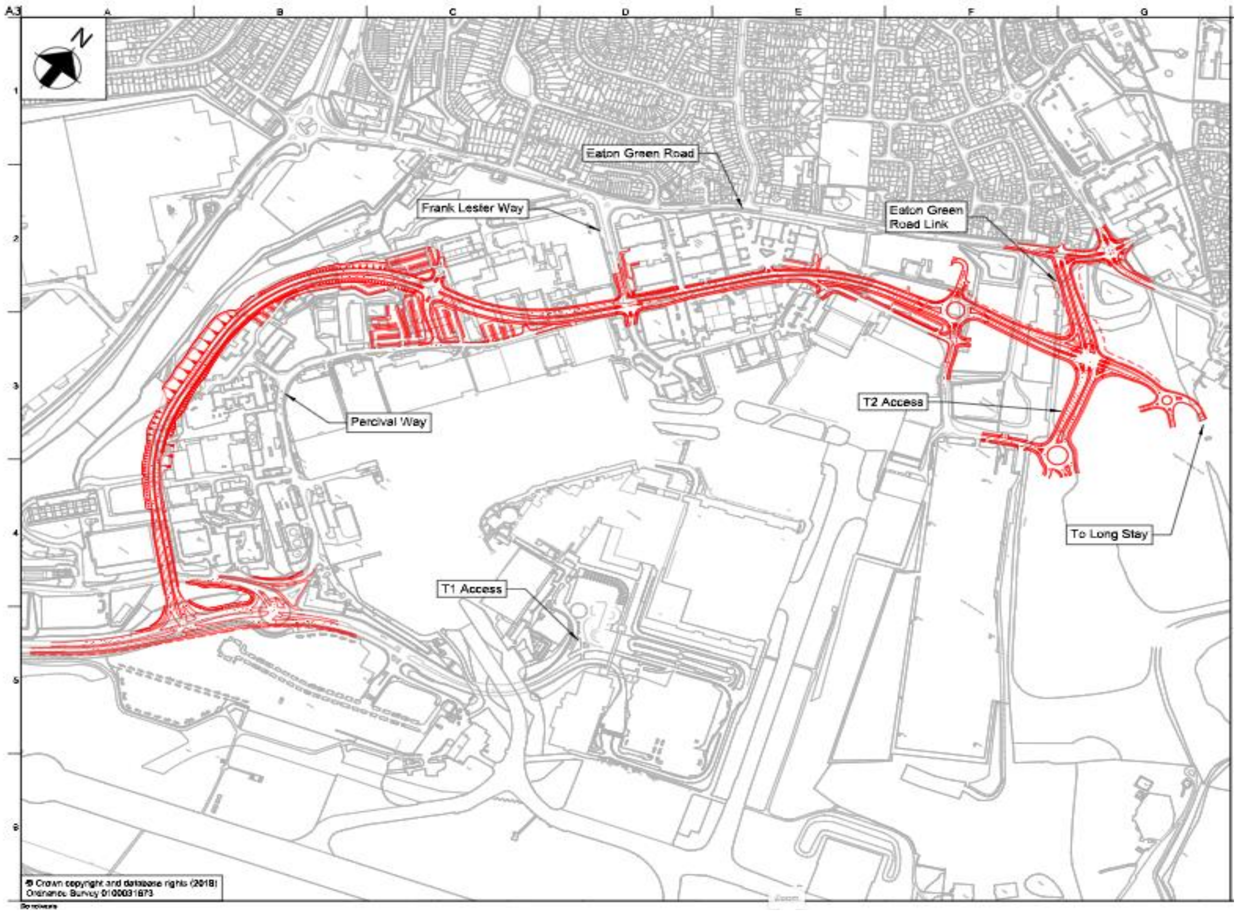
5.3.108 The aim of prefabrication, apart from improved schedule, is reducing construction activities and associated housekeeping, dust, noise, and vibration risks close to the airfield operations and aircraft.

Inset 5.31: Example storage tank under construction (larger than the proposed)

Airport Access Road

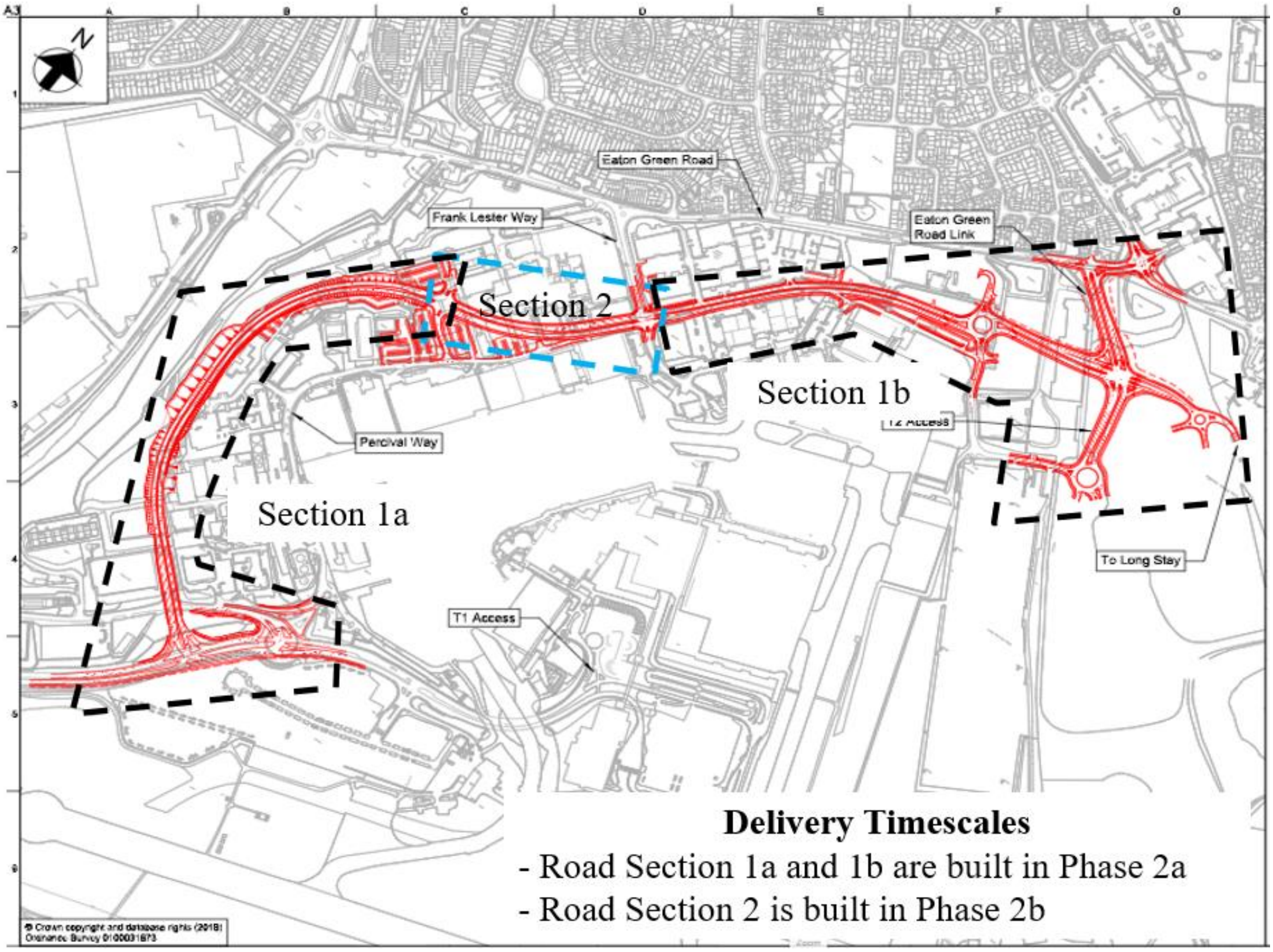
5.3.109 The AAR is a new access road linking the A1081 (Airport Way) to T2 and is planned to be built in two sections. The drawing below indicates the proposed road alignment (refer to inset 4.33 and 4.34).

Inset 5.32: Airport Access Road (proposed alignment)



5.3.110 The AAR would be constructed in two sections with the majority being constructed during Assessment Phase 2a, as shown below. The last section of the AAR is built in Assessment Phase 2b.

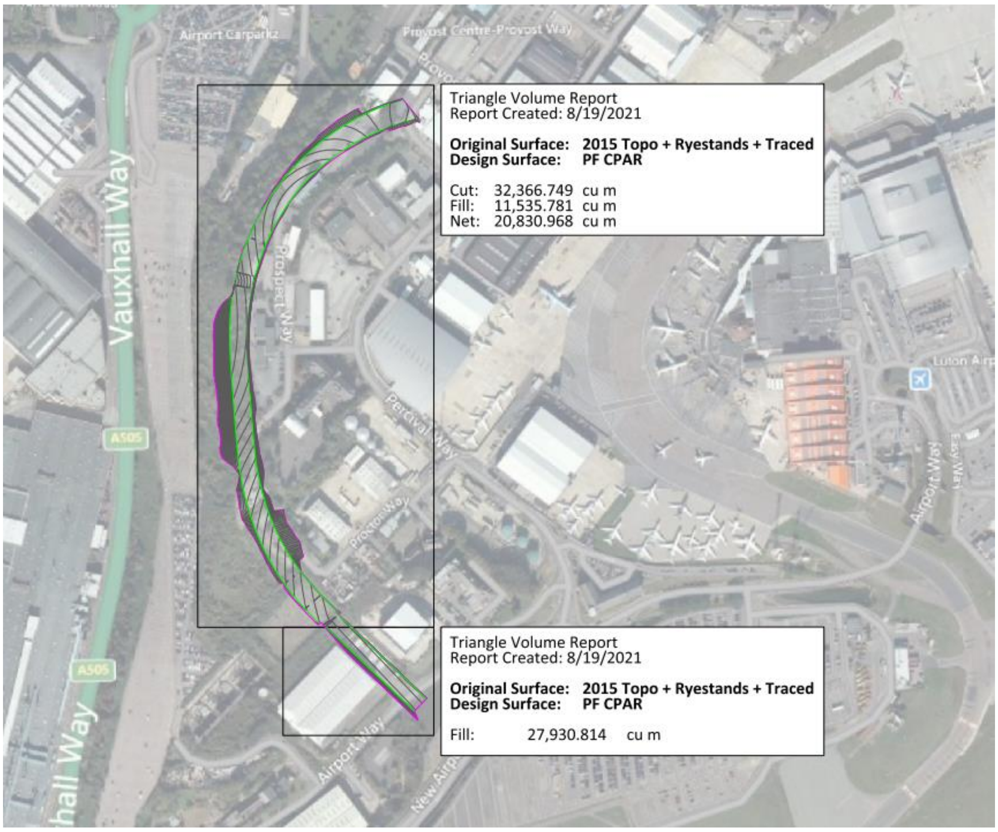
Inset 5.33: Airport Access Road (Construction Phases)



5.3.111 The extent of the existing structures that need to be demolished to enable construction of the new road is contained within Appendix D. The typical demolition methodologies are set out in the demolition section.

5.3.112 The estimated volume of earthworks in Section 1a, as shown in inset 4.37, of the AAR is 32,000m3 of cut and 11,500m3 of fill. While 28,000m3 of fill material would be required to construct the new embankment structure.

Inset 5.34: Airport Access Road (estimated cut & fill) Section 1a



5.3.113 Following removal of the existing structures any remaining utilities or services would be removed, diverted, or protected. This allows preparation of the road formation to commence using 360-excavator.

5.3.114 A granular sub-base material would then be placed, spread, and compacted. The road formation would be trimmed for cambers, gradient, and cross falls.

5.3.115 A second layer of granular material known as road base is then placed in a similar method to the sub-base. This is followed by a bituminous primer coat and an asphaltic concrete binder course.

5.3.116 The project has an opportunity to re-use existing materials on site (e.g., demolition and landfill) to form HBMs which would reduce the volume of traditional granular sub-base material coming to site.

5.3.117 The asphaltic binder and wearing course are normally supplied by specialist supplier and delivered to site in tipper trucks. The tipper tricks are covered with tarpaulin to prevent heat loss.

5.3.118 The asphaltic concrete binder and wearing course is laid using a paving machine and immediately rolled.

Inset 5.35:Typical Road Paving Machine

Primary Infrastructure and Roads

5.3.119 Following removal of the existing structures any remaining utilities or services would be removed, diverted, or protected. This allows preparation of the road formation to commence using 360-excavator.

5.3.120 A granular sub-base material would then be placed, spread, and compacted. The road formation would be trimmed for cambers, gradient and cross falls.

5.3.121 A second layer of granular material known as road base is then placed in a similar method to the sub-base. This is followed by a bituminous primer coat and an asphaltic concrete binder course.

5.3.122 The project has an opportunity to re-use existing materials on site (e.g., demolition and landfill) to form HBMs which would reduce the volume of traditional granular sub-base material coming to site.

5.3.123 The asphaltic binder and wearing course are normally supplied by specialist supplier and delivered to site in tipper trucks. The tipper tricks are covered with tarpaulin to prevent heat loss.

5.3.124 The asphaltic concrete binder and wearing course is laid using a paving machine and immediately rolled.

Car Parks

5.3.125 In Assessment Phase 2a, as shown in the phasing diagrams, the car parking capacity is increased through the construction of new car parks and existing car park modified:

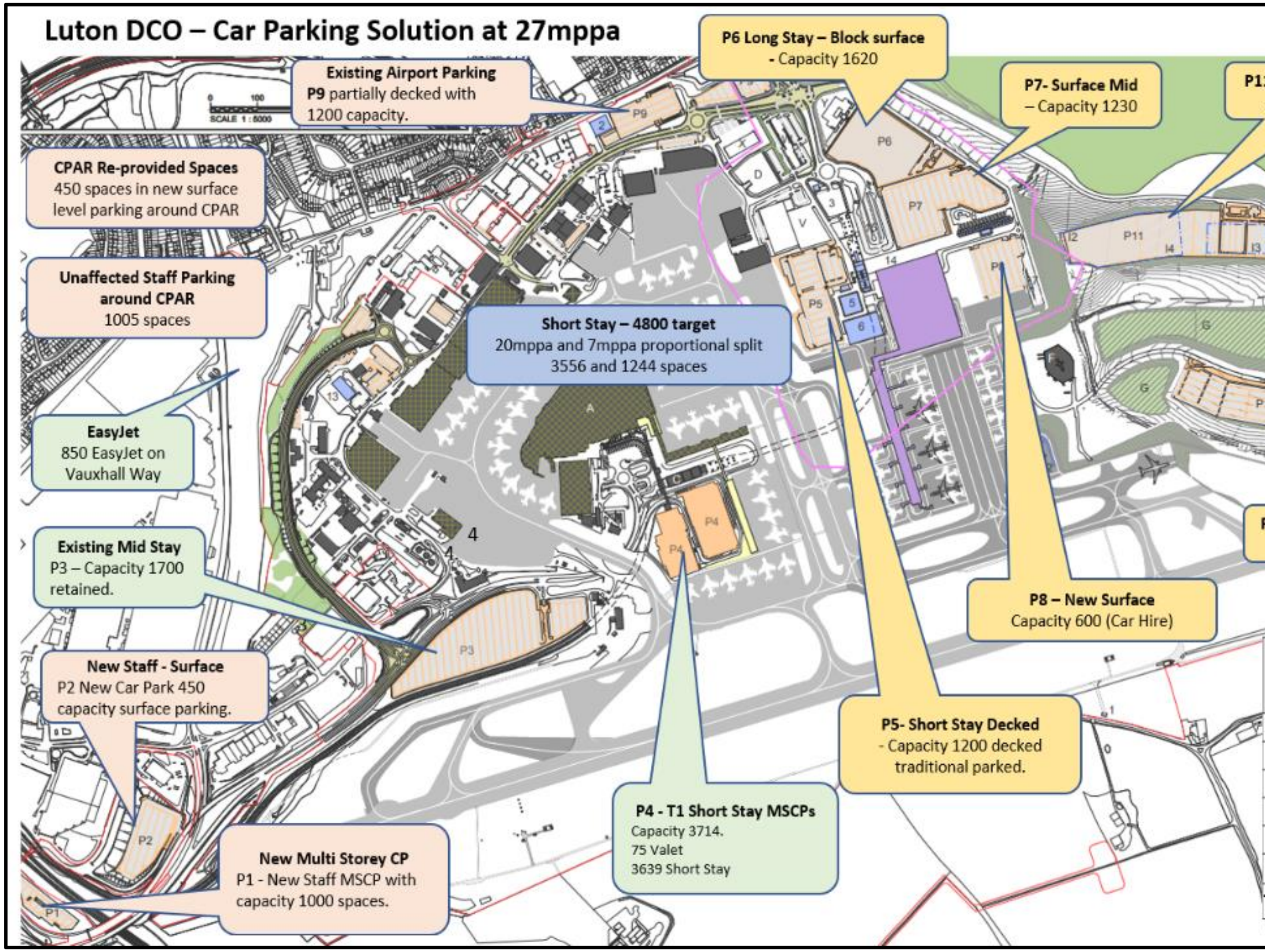
5.3.126 New car parks:

a. P1 (New multi-storey car park (MSCP);
b. P2 (New surface staff car park);
c. P8 (New surface car park);
d. P10 (New surface mid/long stay car park); and
e. P11 (New surface long stay car park).

5.3.127 Existing car parks:

a. P5 (Block parking) – car park reconfigured and decked;
b. P6 (Long stay car park) – car park reconfigured;
c. P7 (Mid stay car park) – car park reconfigured; and
d. P9 (Existing airport parking) reconfigured and decked.

Inset 5.36: Assessment Phase 2a Car Park Locations



Parking Type	Nos. of Spaces 27mppa
Short Stay	4,800
Mid Stay	3,000
Long Stay	5,400
Employee	4,900
Car Hire	600
Valet Pick Up / Drop Off	100
Total	**18,800**

5.3.128 Typical car park construction methodologies would be used for a multi storey or deck car park which would involve a steel or concrete frame. For the block and surface parking a sub-base, drainage and finished surface would be installed.

5.3.129 Several car parks would also require the addition of some small buildings to allow for hire car companies and security.

M1 (Junction 10)

5.3.130 The existing Junction 10 is to be upgraded with widening of the junction and its connection to the A1081 westbound carriageway and the southbound slip road.

5.3.131 Works to be carried out in a phased approach utilising the construction compounds (14 & 15) on the west and east.

6 ASSESSMENT PHASE 2B

6.1 Key Construction Constraints & Interfaces

6.1.1 The objective of Assessment Phase 2b would be to increase the capacity of the airport to 32 mppa. This would primarily be achieved by expanding T2.

6.1.2 The key construction constraints and interfaces for Assessment Phase 2b would include:

a. interface with operational airport;
b. interface with local residents and businesses; and
c. interface with landowners.

6.2 Construction Programme & Phasing

6.2.1 The main construction activities in Assessment Phase 2b are:

a. expansion of T2;
b. relocation of the fire training ground;
c. new aircraft stands and apron;
d. relocation of ERUB;
e. new car parking provision;
f. new airside facilities including fire station, security centre and hangars; and
g. new landside facilities.

6.2.2 The construction methodologies used would be like the previous two Assessment Phases.

6.2.3 The phasing diagrams, contained in **Appendix B**, illustrate the key construction sequencing of Assessment Phase 2b.

6.3 Construction Methodology

6.3.1 The construction methods described below are suggested methods that could be used by the contractor. However, alternative methods could be explored and adopted as the design matures.

Site Establishment

6.3.2 During this assessment phase, as in Assessment Phases 1 and 2a, there would need to be main works compound and several smaller stand-alone satellite site establishments/construction compounds both because of the dispersed nature of the proposed works.

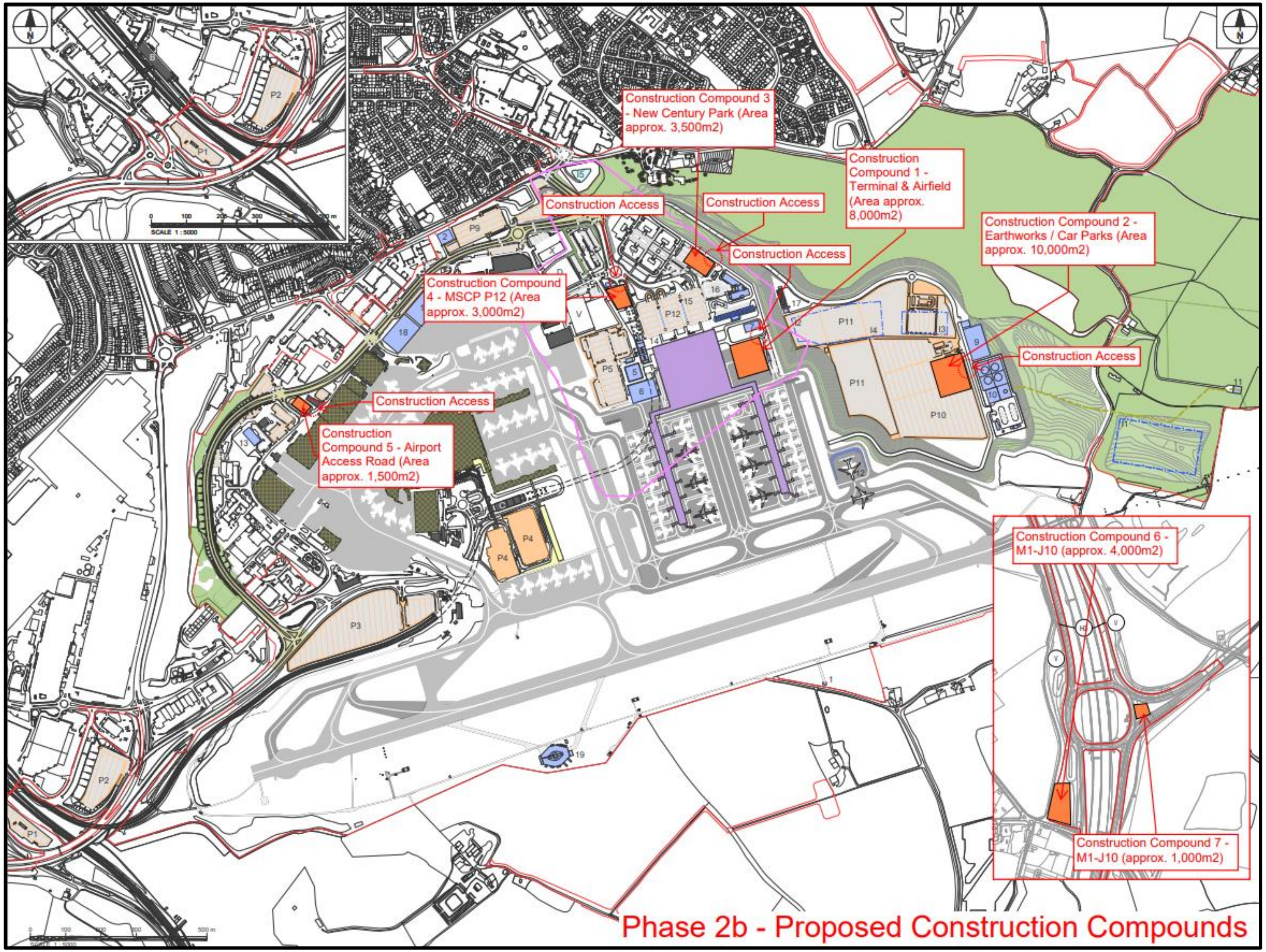
6.3.3 The potential satellite site locations are shown in the phasing diagrams contained in **Appendix B**, and would include the following:

a. Construction Compound 1 (Main Works Compound): Construction compound located adjacent to the existing T2 to support the construction of the new aircraft stands and airfield works. The compound is approx. 8,000sqm and would provide welfare facilities for site operatives, materials receiving, equipment storage and operative parking;
b. Construction Compound 2 (Earthworks); Located adjacent to the water treatment are with an approximate area of 10,000sqm.
c. Construction Compound 3 (NCP Developments): Located within the former P7 car park. The compound is approx. 3,500sqm and would provide welfare facilities for site operatives, materials receiving, equipment storage;
d. Construction Compound 4 (MSCP P12): Self-contained site compound area (approx. 3,000sqm) located close to the proposed Luton DART station construction providing welfare facilities for site operatives, material and equipment storage;
e. Construction Compounds 5 (Airport Access Road): A self-contained construction compound to the central section of the AAR; and
f. Construction Compounds 6 & 7 (Junction 10 M1): Construction compounds from Assessment Phase 2a are re-used in Assessment Phase 2b.

Table 6.1 Assessment Phase 2b Construction Compounds (Approximate Size and Estimated Time Operational)

Assessment Phase 2b: Construction Compounds			
Name	**Location**	**Approx. Size (m2)**	**Estimated Time Operational**
Compound 1	Terminal & Airfield	8,000	24 months
Compound 2	Earthworks	10,000	24 months
Compound 3	NCP Developments	3,500	24 months
Compound 4	MSCP P12	3,000	18 months
Compound 5	Airport Access Road (Central)	1,500	18 months
Compound 6	Junction 10 (M10)	4,000	24 months
Compound 7	Junction 10 (M10)	1,000	24 months

Inset 6.1: Assessment Phase 2b Construction Compounds Potential Locations



Bulk Earthworks

6.3.4 The bulk earthworks in Assessment Phase 2b extends the earth platform formed in the previous assessment phase. This work would be both airside and landside.

6.3.5 As can be seen in the Insets, most earthworks in Assessment Phase 2b would be in expanding the airside platform further and preparing the ground for the car parks to the east.

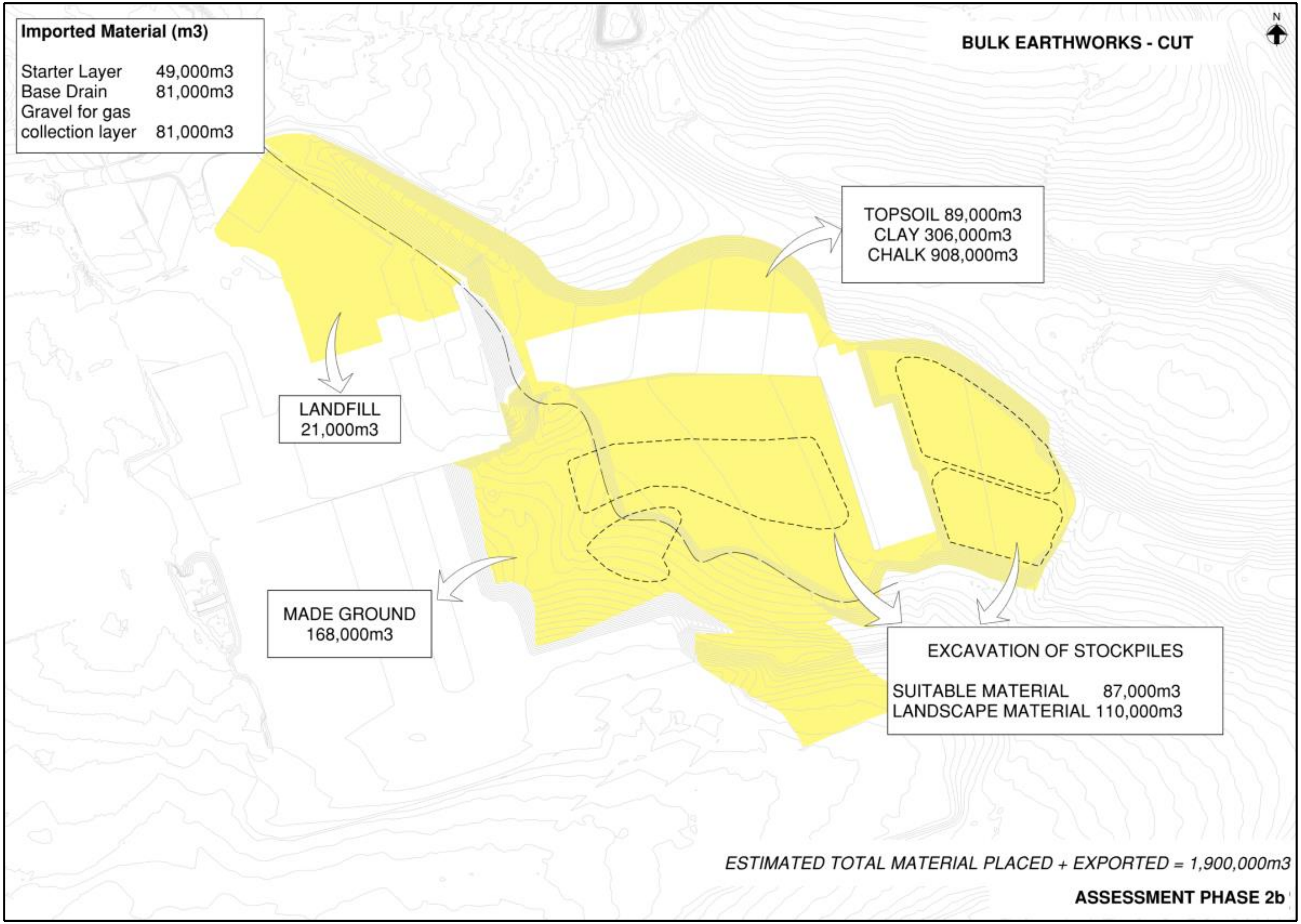
6.3.6 The volume of excavated earthworks in Assessment Phase 2b would be approximately 1,689,000m^3 and this would take two seasons of work to complete. This is reflected in the schedule.

Table 6.2 Estimated Earthwork Volumes (Assessment Phase 2b)

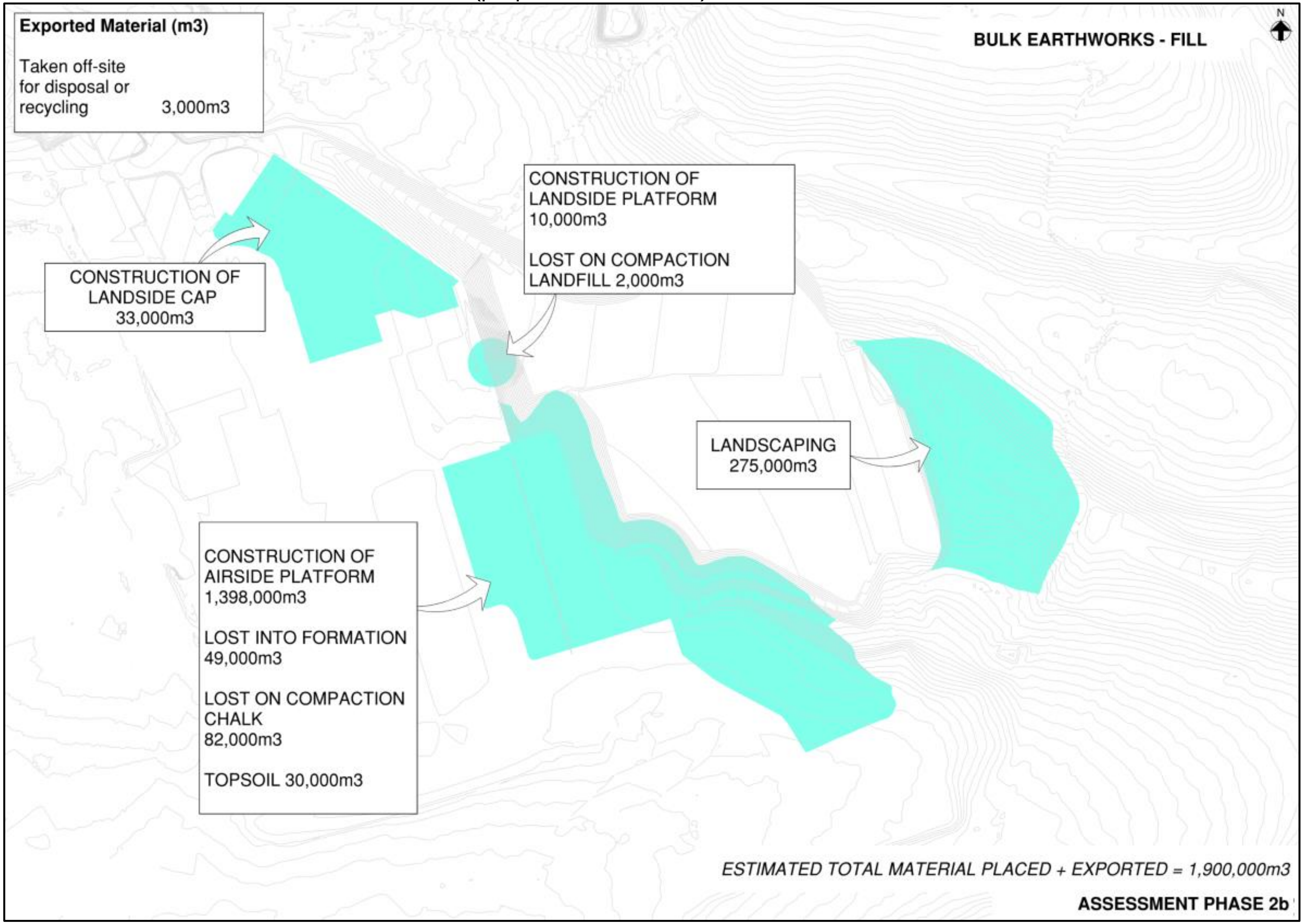
Earthworks Material	Estimated Volume (Cu M)
Excavated (material)	1,668,000
Excavated (landfill)	21,000
Imported material	211,000
Material removed from site	3,000
Placed material	1,900,000

6.3.7 A similar methodology would be adopted in Assessment Phase 2b as described in Assessment Phase 1.

Inset 6.2: Assessment Phase 2b Earthworks (proposed areas of cut)



Inset 6.3: Assessment Phase 2b Earthworks (proposed areas of fill)



New Apron and Stands

Inset 6.4: New taxiway and stand locations

6.3.8 In Assessment Phase 2b, several new stands would be built on the new earthworks' platform.

6.3.9 Standard construction methods would be used for the construction of the airfield hardstanding areas.

6.3.10 The ground would be prepared as part of the earthworks phase. The installation of drainage runs, fuel lines and other utilities would be incorporated into this work using similar methodologies to those described in Assessment Phase 1

Fire Training Ground (relocation)

6.3.11 The existing fire training ground would remain operational until the new fire training ground has been constructed. The existing specialist fire training ground facilities and fuselage would then be relocated.

Inset 6.5: Existing fire training ground

6.3.12 The time whilst the fuselage is out of use would need to be agreed with the airport fire service.

6.3.13 The equipment would be disconnected from any utilities and the utilities permanently isolated. The equipment would be lifted by crane and transported to the designated storage location. Other equipment could also be re-used at the new fire training ground and stored. If this were not feasible, it would be transported off site for disposal.

6.3.14 It would be recommended to contact specialist aircraft salvage companies to dispose of the fuselage. The fuselage would be either removed from site or broken up on-site as agreed with the aircraft salvage companies.

6.3.15 Demolition work would comprise of ‘breaking up and excavation’ work and would be carried out by 360-degree excavators with hydraulic breakers. Consideration would also be given to sawing the concrete with a diamond saw and prising / lifting the slabs from the ground. The material would be loaded by another machine into covered tipper wagons to minimise dust from stockpiles. Dust damping techniques may need to be considered to reduce dust in dry conditions.

6.3.16 Consideration would be given to crushing and recycling suitable materials to reuse in backfilling operations. Road sweepers and a housekeeping gang would be in constant operation to ensure the construction area and access routes were always kept clean.

6.3.17 It is not expected that the area would need close boarded hoarding, but it would be demarked by red & white barriers and access routes would be agreed with the airport operator ahead of work commencing on-site.

Car Parking

6.3.18 As shown in the phasing diagrams, three car parks would be constructed in Assessment Phase 2b.

6.3.19 New car parks:

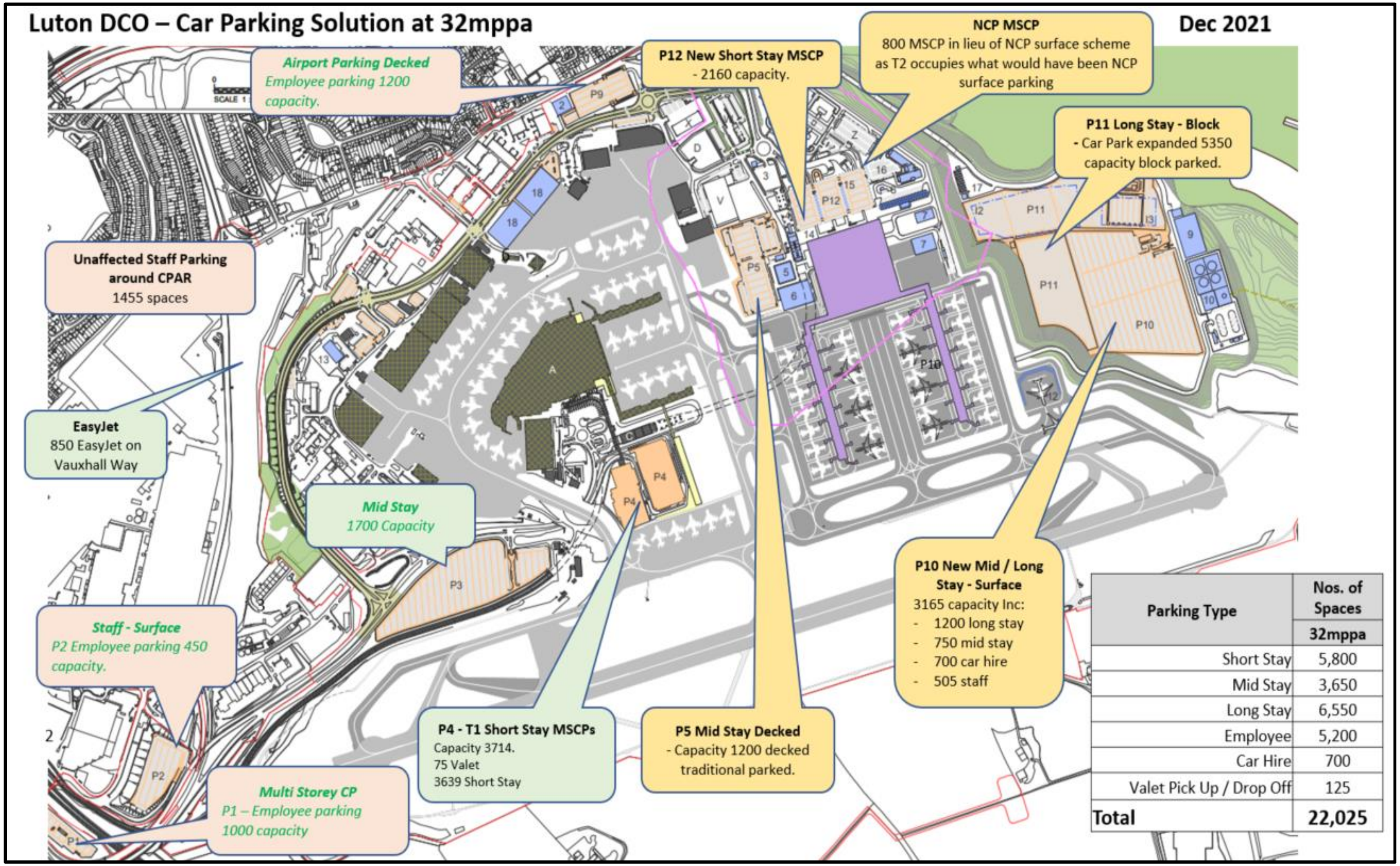
a. P12 - Multi-storey car park;

6.3.20 Existing car parks:

a. P6 – the old P6 long stay car park is removed, and the area is used for the New Century Park development and a new multi-storey car park (P12);
b. P7 – existing car park is removed;
c. P10 (Mid/long stay surface) – car park expanded; and
d. P11 (Long stay car park) - car park expanded.

6.3.21 Typical car park construction methodologies would be used for a multi storey or deck car park which would involve a steel or concrete frame. For the block and surface parking a sub-base, drainage and finished surface would be installed.

Inset 6.6: Assessment Phase 2b Car Park Locations



Parking Type	Nos. of Spaces
	32mppa
Short Stay	5,800
Mid Stay	3,650
Long Stay	6,550
Employee	5,200
Car Hire	700
Valet Pick Up / Drop Off	125
Total	**22,025**

M1 (Junction 10)

6.3.22 The works in Assessment Phase 2b include the widening of the western circulatory carriageway to provide five lanes. The realignment of the A1081 exit to enable three lanes to exit roundabout onto A1081, with the segregated left turn lane removed and junction of southbound off-slip signalised.

6.3.23 The provision of two southbound merging lanes onto M1 through All-Lane Running.

6.3.24 Works to be carried out in a phased approach utilising the existing construction compounds (6 & 7) on the west and east.

7 PROJECT LOGISTICS

7.1 Construction Management

7.1.1 This CMS forms part of a suite of documents which support the application for development consent. In addition to the CMS, the **Code of Construction Practice (CoCP) (Appendix 4.2 of the ES) [TR020001/APP/5.02]**] sets out the requirements for managing the environmental effects of the construction works which are described in the CMS. Those requirements are not repeated in the CMS.

7.1.2 The **CoCP (Appendix 4.2 of the ES) [TR020001/APP/5.02]** details the control measures and standards to be implemented throughout the construction of the Proposed Development. Whilst multiple construction works would run concurrently throughout the Proposed Development, the **CoCP (Appendix 4.2 of the ES) [TR020001/APP/5.02]** would act as the overarching document for all construction related activity.

7.1.3 The **CoCP (Appendix 4.2 of the ES) [TR020001/APP/5.02]** presents a consistent approach to the environmental management of construction activities for the entire Proposed Development.

7.1.4 It is likely that a Lead Contractor would be appointed to provide overall construction oversight and management of the works. The Lead Contractor may not be the same for each assessment phase.

7.1.5 The Lead Contractor would be responsible for finalising the construction phasing for each Assessment Phase and for producing the construction schedule.

7.1.6 The Lead Contractor would coordinate the project delivery with multiple design teams and various construction oversight teams.

7.1.7 Arrangements would be agreed with the local planning authorities, client representatives, airport operator, regulators and the stakeholders including residential and commercial communities.

7.2 Health and Safety

Construction Arrangements

7.2.1 The Proposed Development would adopt a zero-harm policy that would seek to reduce and minimise the risk or death or injury, ill health or incident to airport passengers, the local communities, airport employees and construction workers. This is a central thread in all construction and phasing planning of the works. All contractors shall comply with all relevant health and safety legislation such as the Health and Safety at Work Act 1974.

7.2.2 Health and safety requirements would be defined and cascaded down to its suppliers within the contractual arrangements, and they would adhere to these throughout the life of programme.

7.2.3 The Applicant would require its supply chain to deliver their works to an exemplary standard for health, safety, and welfare performance.

7.2.4 The Applicant intend to develop a behavioural safety programme in collaboration with their supply chain. In addition, the Applicant would develop a set of health and safety performance indicators to measure and manage health and safety performance on the Proposed Development.

7.2.5 The Applicant intend to establish a Safety Leadership Group consisting of senior executives and health and safety personnel from the Applicant, the airport operator and key suppliers, that would meet quarterly to set the strategic health and safety direction and review performance.

7.2.6 The Safety Leadership Group would develop a health, safety, and welfare strategy to deliver key initiatives, including:

a. occupational health programme;
b. fair culture model;
c. positive reporting;
d. frontline leadership programme; and
e. setting lead and lag measures and performance metrics.

Construction (Design & Management) Regulations 2015

7.2.7 The Applicant or the airport operator would act as the Construction (Design & Management) Regulations 2015 (CDM) Client as defined by CDM and would discharge its duties through its organisational arrangements.

7.2.8 The Applicant or the airport operator would appoint its supply chain to deliver Principal Designer services for the Proposed Development.

7.2.9 The Principal Designer would manage and co-ordinate the design activities at the pre-construction phase. They would develop management arrangements which describe how they would deliver compliance with CDM.

7.2.10 The Applicant or the airport operator would appoint is supply chain to deliver the Principal Contractor role.

7.2.11 The Applicant or the airport operator would test these arrangements as part of delivering it CDM client duties.

Airport Operator Contractors' Code of Practice

7.2.12 For works that take place on any premises owned or under the control of the operating airport, in addition to the **CoCP (Appendix 4.2 of the ES) [TR020001/APP/5.02],** they would comply with construction works requirements as defined by the airport operator who has a responsibility for construction activities that take place on any premises owned or under their control (e.g., operational areas of the airport). This includes the predesign, design, preconstruction, construction, and inspection phases.

7.2.13 The airport operator would have their own requirements which have been drawn up in line with British Standard guidance notes, manufacturers and suppliers recommended procedures, good working practices, and all relevant legislation and regulations in force at the time the contract works would be undertaken. The purpose of these requirements is to detail the minimum Health and Safety standards and procedures that a contractor must adopt, whilst carrying out work, on any premises owned or under the control of the airport operator.

7.2.14 Apart from the Lead Contractors safety management system, a works specific health & safety plan is necessary, stating the procedures to be applied to the works within the airport operator premises. Details would include:

a. an appointed person and responsibilities together with airport contacts;
b. site and works organisations and arrangements; and
c. safe operation and maintenance of equipment; and emergency procedures and contingency plans where appropriate.

7.2.15 The detail of the plan would be determined by the level of risk and should ensure that the Lead Contractor complied with statutes and the airport operator standards. The plan should be written for and used as a site document. On completion of any work involving new or altered services or structures inside or outside of buildings, full “as built drawings” details should be passed from the Lead Contractor to the airport operator Company Representative to enable airport record systems to be updated.

7.2.16 It would be the responsibility of all parties to:

a. develop internally or approve a construction safety plan that is compatible with the safety guidelines of the airport operator, which is in line with the safety plans of the airport and is in line with airport construction safety planning;
b. submit plans indicating how they intend to comply with the safety requirements of the Proposed Development;
c. convene at meetings with the Lead Contractor, consultant, airport employees to review and discuss project safety before beginning construction activity;
d. ensure contact information is accurate for each representative or point of contact identified in the safety plan;
e. hold weekly or, if necessary, daily safety meetings to coordinate activities;
f. notify users, especially aircraft rescue and fire-fighting personnel, of construction activity and conditions that may have the potential to impact operational safety of the airport or other methods, as appropriate. Convene a meeting for review and discussion if necessary;
g. ensure that construction personnel know the applicable airport procedures and of changes to those procedures that may affect their work;
h. ensure that Lead Contractors and subcontractors undergo training required by the safety plan;

i. develop and/or coordinate a construction vehicle plan with the airport operator, the airport traffic control tower and Lead Contractors, include the vehicle plan in the safety plan;
j. ensure the airport operator and Lead Contractors comply with standards and procedures for vehicle lighting, marking, access, operation, and communication;
k. conduct frequent inspections to ensure Lead Contractors comply with the safety plan and that altered construction activities do not create potential safety hazards;
l. resolve safety deficiencies immediately;
m. ensure construction access complies with the security requirements; and
n. notify appropriate parties when conditions exist that invoke provisions of the safety plan (e.g., implementation of low-visibility operations).

7.2.17 In addition to the above, the Lead Contractor's responsibilities also include to:

a. submit plans to the airport operator on how to comply with the safety requirements of the project;
b. have available a copy of the project safety plan;
c. comply with the safety plan associated with the construction project and ensure that construction personnel are familiar with safety procedures and regulations on the airport;
d. provide a point of contact who would coordinate an immediate response to correct any Construction-related activity that may adversely affect the operational safety of the airport;
e. provide a safety officer/construction inspector familiar with airport safety to monitor Construction activities;
f. restrict movement of construction vehicles to construction areas by flagging and barricading, erecting temporary fencing, or providing escorts, as appropriate; and
g. ensure that no construction employees, employees of subcontractors or suppliers, or other persons enter any part of the air operations areas from the construction site unless authorised.

7.3 Number of Operatives

Estimated Number of Operatives on Site

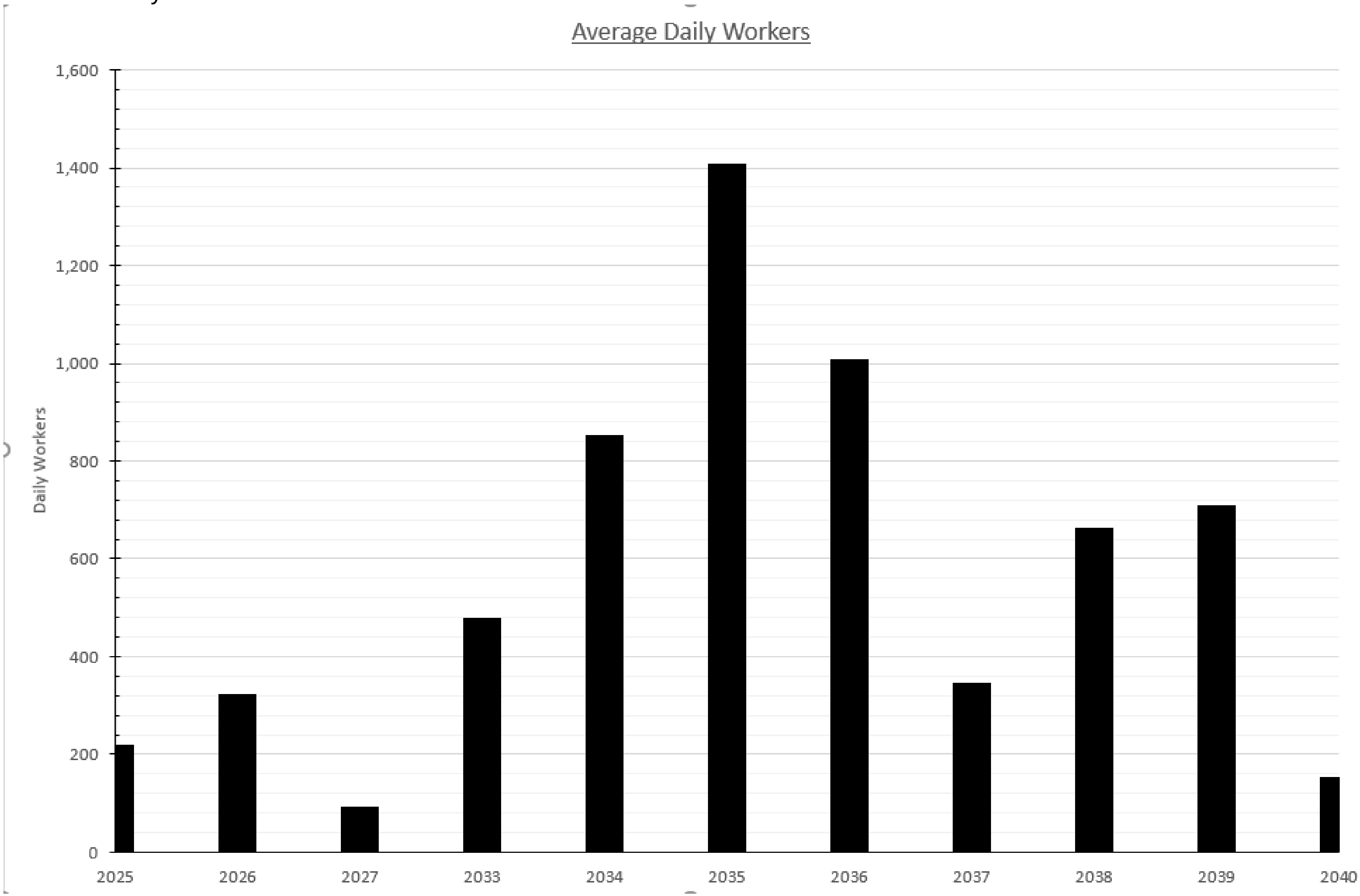
7.3.1 The number of site operative has been estimated against each of the assessment phases with the peak number of operatives being estimated as follows:

a. Assessment Phase 1: approx. 325 site operatives;
b. Assessment Phase 2a: approx. 1,400 site operatives; and
c. Assessment Phase 2b: approx. 700 site operatives.

7.3.2 The number of operatives on site would vary with each assessment phase of the project, but it would be expected to peak in Assessment Phase 2a during the construction of the terminal and ancillary buildings concurrently with the construction of the new airport apron and taxiways.

7.3.3 During this period, it is estimated that there would be a construction workforce of up to 1,400 as can be seen in the graph below. The workforce would then reduce following the completion of the taxiways and would be largely localised during Assessment Phase 2b.

Inset 7.1: Daily workforce numbers over time



7.3.4 The construction works would be managed by a management team of approximately 200 (included in the above Insets), this includes project and construction management, engineering and design consultants, security and marshals.

7.3.5 A significant project such as this would attract construction operatives from around the UK. The distances travelled and modes of transport that they use has not been specifically addressed at this stage, other than the allowance for on-site car parking. Further work would be required to establish numbers with the supply chain, which would be dependent upon the contracting strategy.

7.3.6 We would expect that a large proportion of operatives would be from London and the Home Counties area and thus anticipate an average 70-mile round trip using a car or van. We also anticipate that there would also be specialist contractors that could be based further away within the UK or mainland Europe.

7.3.7 A Construction Workforce Travel Plan (CWTP) would be submitted as part of the application. There would be a need to provide on-site car parking for the contractors working on the project. Parking would not be allowed on any other part of the site and all Lead Contractors and sub-contractors on-site would be advised through their contract documentation that designated parking is available and that where possible site personnel and visitors should use public transport.

Car Parking & Travel Distances

7.3.8 The table below shows a breakdown of operatives coming to site by car and by public transport and the distance travelled.

7.3.9 It is assumed that 60% of operatives would arrive to site by car and the majority live within 40 miles of Luton.

Table 7.1 Estimated Car Parking Numbers and Travel Distances

Assessment Phase	Assessment Phase 1			Assessment Phase 2a				Assessment Phase 2b			
Year	**2025**	**2026**	**2027**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Total No works days per year	57,200	84,500	24,050	127,400	221,650	366,600	262,600	90,350	172,250	184,600	40,300
Ave. No of site operatives per day	220	325	93	490	853	1,410	1,010	348	663	710	155
Car Parking Assumptions											
Parking on Site (60%)	132	195	56	294	512	846	606	209	398	426	93
Public Transport (40%)	88	130	37	196	341	564	404	139	265	284	62
Distance travelled to Site											
Distance <40 miles (80%)	106	156	44	235	409	677	485	167	318	341	74
Distance 40 to 80 miles (15%)	20	29	8	44	77	127	91	31	60	64	14
Distance 80 to 100 miles (5%)	7	10	3	15	26	42	30	10	20	21	5
Total Car Miles (single journey)											
Distance <40 miles (80%)	4,224	6,240	1,776	9,408	16,368	27,072	19,392	6,672	12,720	13,632	2,976
Distance 40 to 80 miles (15%)	1,584	2,340	666	3,528	6,138	10,152	7,272	2,502	4,770	5,112	1,116
Distance 80 to 100 miles (5%)	660	975	278	1,470	2,558	4,230	3,030	1,043	1,988	2,130	465
TOTAL car miles (Conservative assuming max value for each category and is a return journey) per day	**12,936**	**19,110**	**5,439**	**28,812**	**50,127**	**82,908**	**59,388**	**20,433**	**38,955**	**41,748**	**9,114**

7.4 Construction Logistics

7.4.1 The Proposed Development is a large multi-faceted construction project with unique construction logistical challenges. The project has multiple construction sites that would become more constrained over time as new facilities are built. This means that the management of construction logistics should respond to this changing environment. A primary challenge would be to balance the flow of construction vehicles and construction operatives while reducing the impact on airport operations and local residents. Construction logistics needs to consider traffic, people and logistics.

7.4.2 The management of the construction logistics would require further development as the design matures. It would need to be aligned with **Construction Traffic Management Plan (CTMP) (Appendix 18.3 of the ES) [TR020001/APP/5.02]** and the **CoCP (Appendix 4.2 of the ES) [TR020001/APP/5.02]**.

7.5 Concrete Batching Plant

7.5.1 A project of this size would normally require significant volumes of concrete, often being supplied by several off-site concrete plants and resulting in very high volumes of concrete mixer wagons to site.

7.5.2 Quality control of the concrete from the use of several off-site batching plants could be problematic risking the return of concrete and the slowing or stopping of critical concrete operations further risking quality problems.

7.5.3 An on-site batching plant would be considered given the high volumes of concrete for the project, especially for the Luton DART extension, Terminal 2 building and its piers, airfield aprons and the other airport buildings.

7.5.4 The batching plant could be located within the main construction compound. This would enable both vehicles using the public highway to access the plant for deliveries (cement and aggregate) and by on-site concrete plant using the local site haul roads.

Inset 7.2: Typical Concrete Batching Plant

7.5.5 Bulk deliveries of aggregate and cement would be delivered using the current road network.

7.5.6 Sand and aggregates are to be stored in a method that prevents discharge into surface water drains and local waterways.

7.5.7 The concrete batching plant is to be designed and operated to prevent dust and aggregates from being blown, swept or washed into gutters or surface water system.

7.5.8 Sand and aggregates should be delivered in a dampened state, using covered trucks. If the materials have dried out during transit, they would be dampened again before being dumped into the storage bin to minimise dust emissions during unloading.

7.5.9 The truck loading bay is a potential source of dust and water pollution. Raw materials would be loaded into the truck agitators by either a telescopic chute (preferred) or a flexible sleeve to prevent spillage.

7.5.10 Wash down bays are to be connected to the local water management system to prevent contaminants such as cement, aggregate or concrete slurry from entering surface water drains.

7.5.11 The concrete batching plant water management and collection system should be able to recycle water.

7.6 Construction Traffic and Transport

Construction Traffic Management Plan

7.6.1 Construction related traffic movements would be managed by a **Construction Traffic Management Plan (CTMP) (Appendix 18.3 of the ES) [TR020001/APP/5.02]** and a **Construction Workers Travel Plan (CWTP) (Appendix 18.4 of the ES) [TR020001/APP/5.02]**.

Construction Traffic Access Routes

7.6.2 Vehicles making deliveries to the Site or removing spoil or demolition material will travel by designated routes which will be confirmed in the approved **Construction Traffic Management Plan (CTMP) (Appendix 18.3 of the ES) [TR020001/APP/5.02].**

Construction Deliveries

7.6.3 The peak level of deliveries would occur in Assessment Phase 2a and is estimated that on average approximately 150 vehicles would be arriving at the site each day.

7.6.4 The lead contractor will set out details of managing construction deliveries in the approved **Construction Traffic Management Plan (CTMP) (Appendix 18.3 of the ES) [TR020001/APP/5.02].**

7.6.5 Only contractors who are Fleet Operator Recognition Scheme (FORS) Gold accredited would be employed for the delivery of materials to the works. The FORS is a voluntary accreditation scheme for fleet operators which aims to raise the level of quality within fleet operations, and to demonstrate which operators are achieving exemplary levels of best practice in safety, efficiency, and environmental protection. Accreditation is only awarded to exceptional operators who have met exacting targets and would actively promote the FORS Standard to their supply chain. This would ensure that the fleets of vehicles are ultra-low or zero emission, and are driven safely with respect to pedestrians, cyclists and other vulnerable road users.

Construction Traffic Monitoring

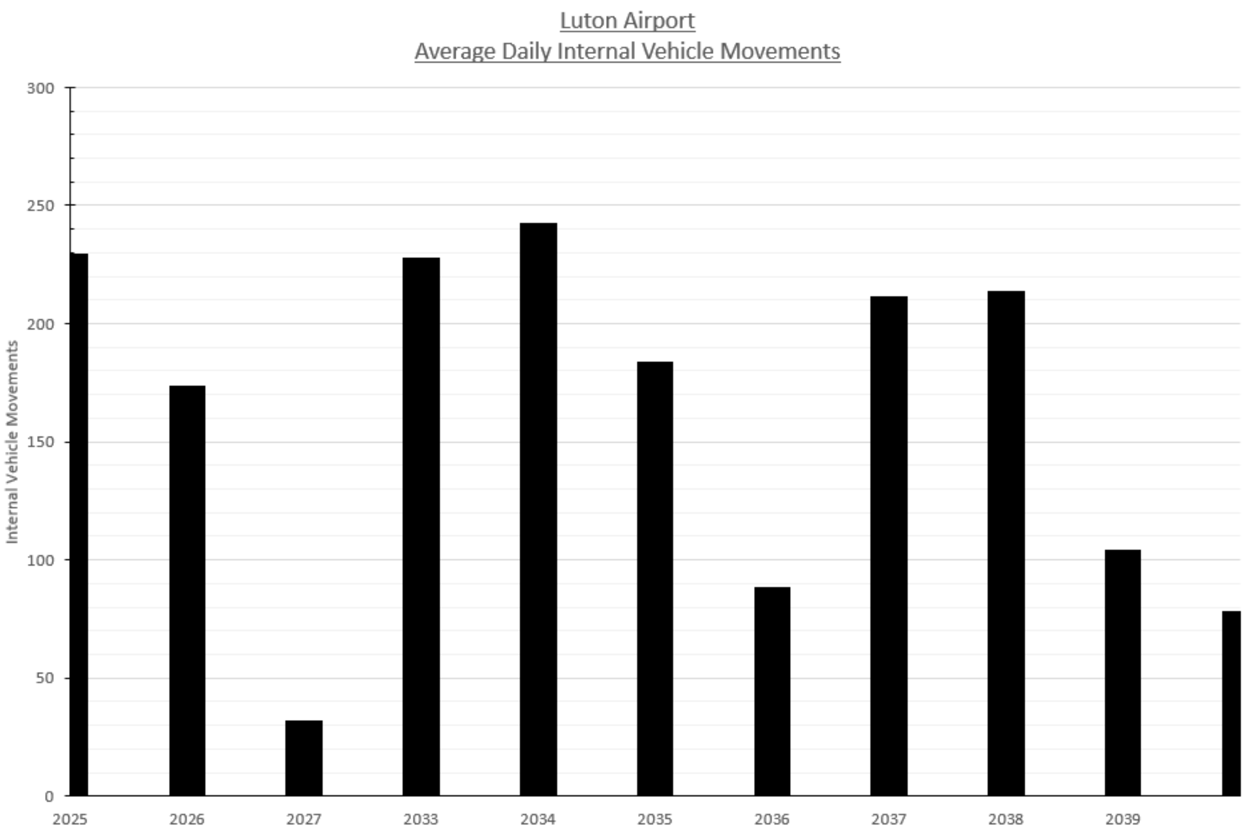
7.6.6 It will be a requirement the lead contractor would undertake regular monitor traffic management as set out in the approved **Construction Traffic Management Plan (CTMP) (Appendix 18.3 of the ES) [TR020001/APP/5.02].**

7.7 Construction Vehicle Numbers

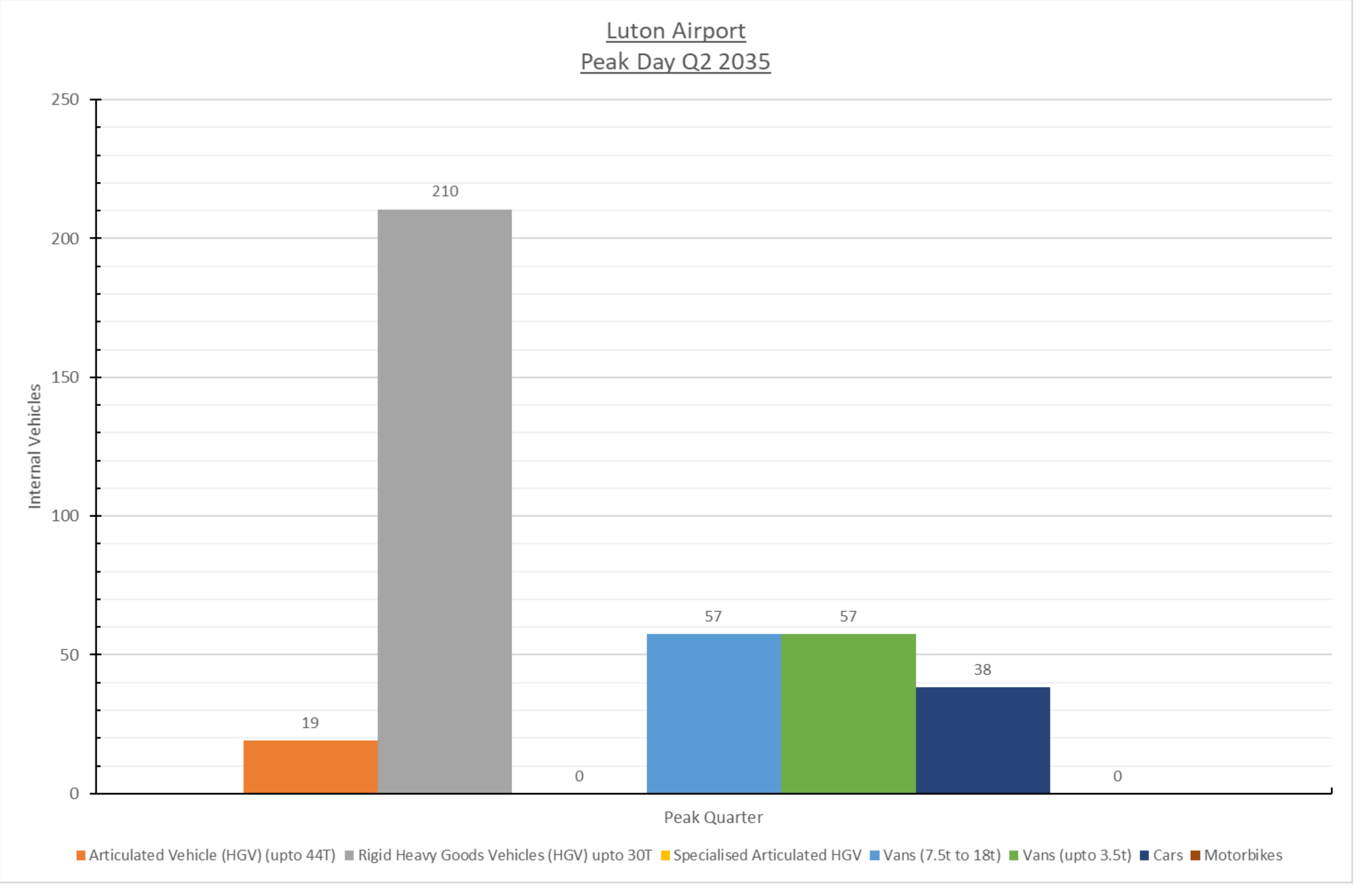
Internal Vehicle Movements

7.7.1 The number of vehicle movements within the site boundaries over time has been estimated. These vehicle movements include earthmoving vehicles, excavators, material-handling equipment and associated plant.

Inset 7.3: Internal vehicle movements profile over time



Inset 7.4: Internal Vehicle Movement (Peak Day Q2-2035)



7.8 Temporary Site Haul Roads

7.8.1 The project would involve a network of site-wide haul roads and where practicable would make use of any existing roads which have been closed off for public use.

7.8.2 Haul roads would be constructed using appropriate material and techniques.

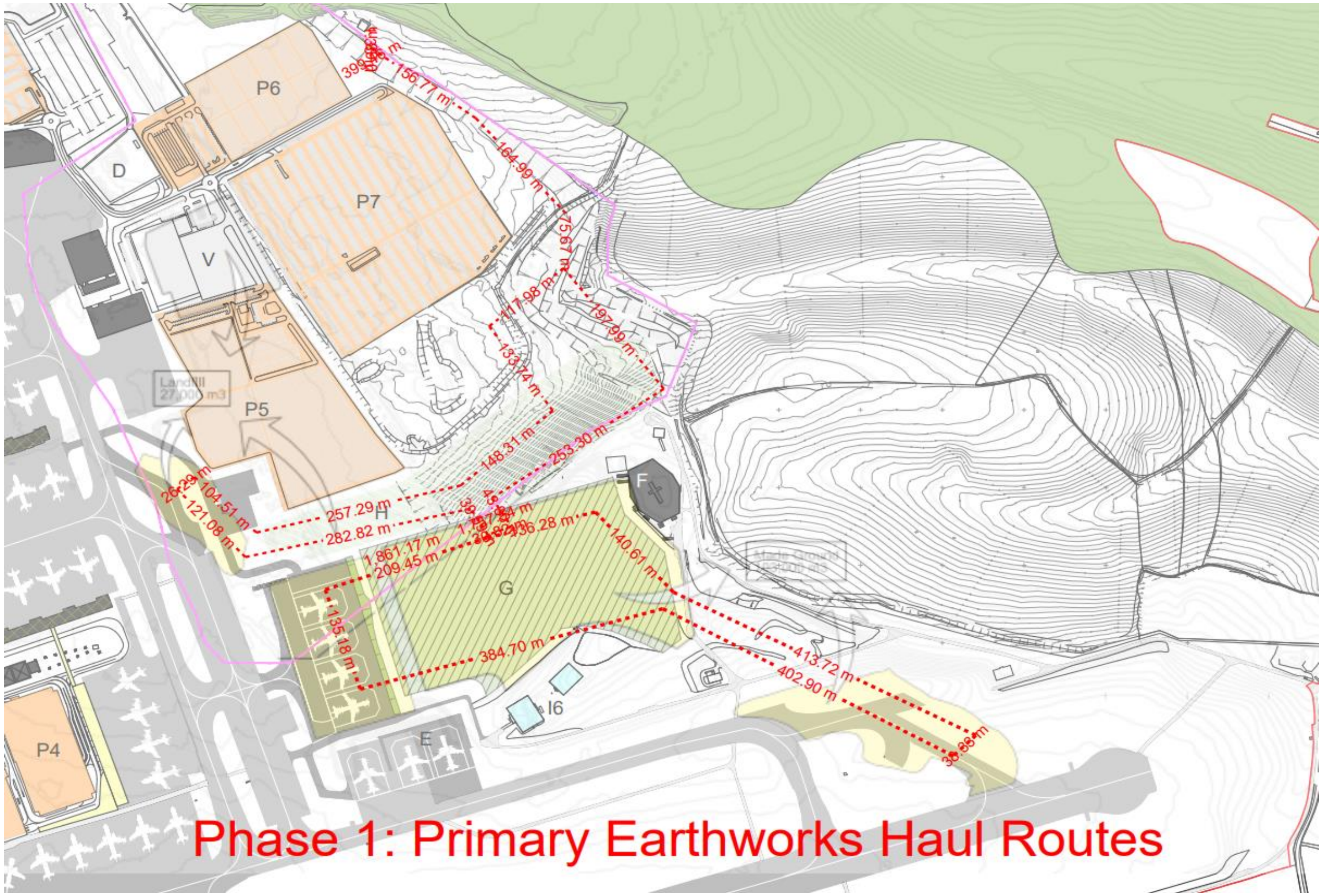
7.8.3 Haul road material would be laid using road construction techniques with mechanical earthmoving equipment such as bulldozers, graders and excavators.

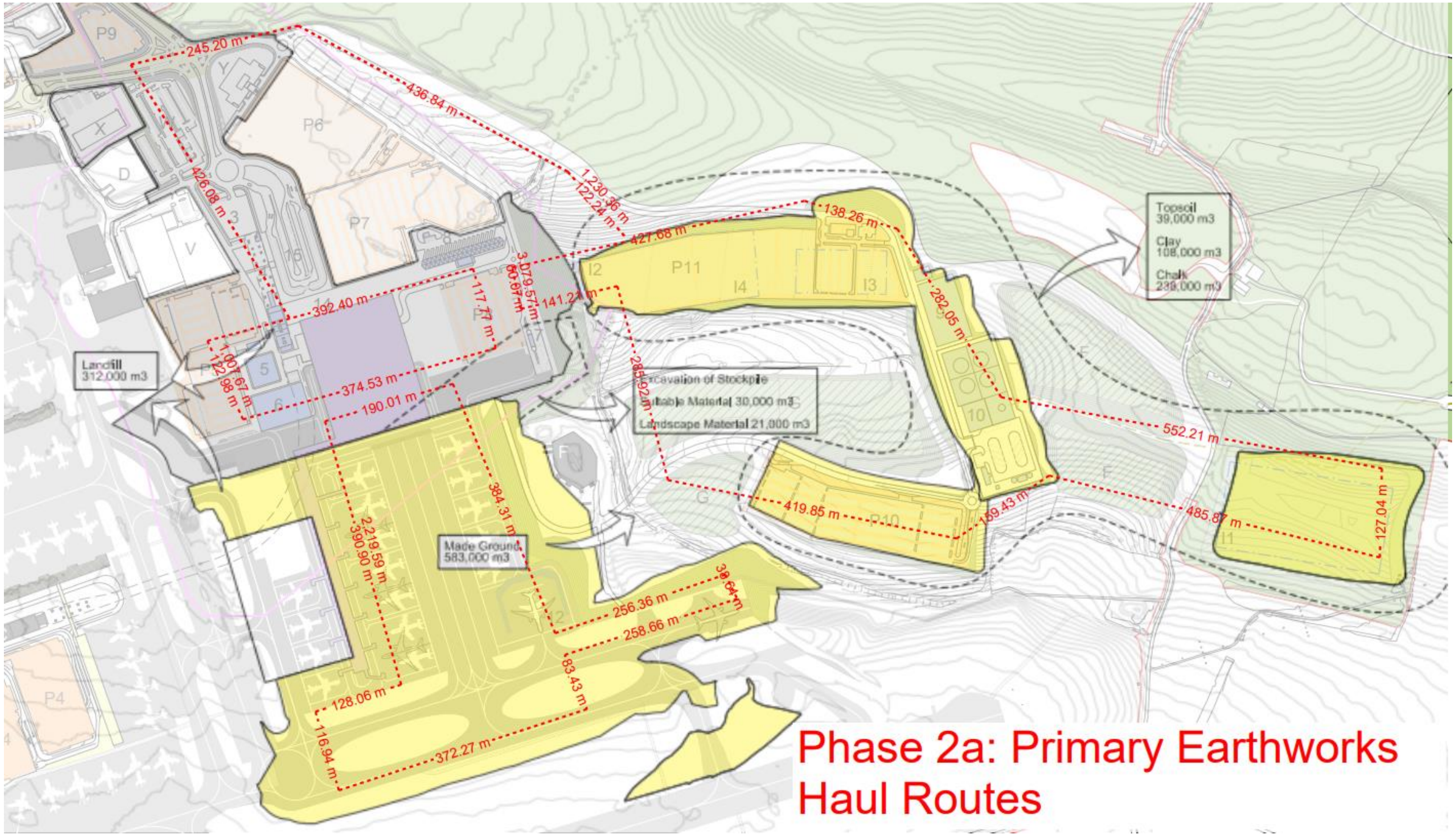
7.8.4 Road crossings would either be provided at grade or when required.

7.8.5 Any temporary bridge crossings would be constructed using either in situ concrete produced on-site at the concrete batching plant, precast concrete, steel or a combination of techniques.

7.8.6 A preliminary assessment has been made of the lengths of the temporary site haul roads.

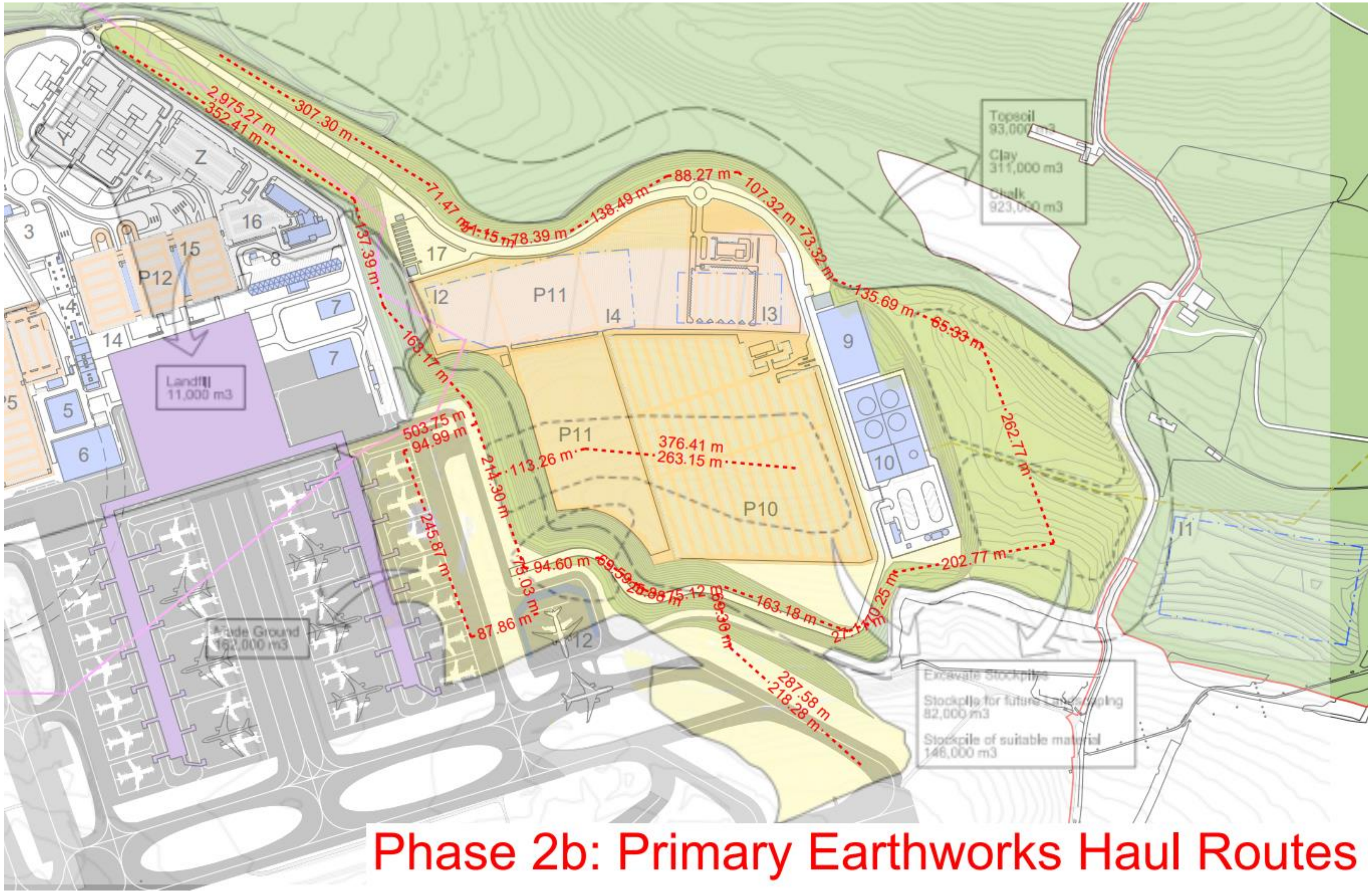
Table 7.2 Estimated Temporary Site Haul Road Lengths

Assessment Phase	Estimated Location and Distance
1	Total distance approx. 4.3km 

2a	Total distance approx.20km 

2b

Total distance approx. 12km



7.9 Construction Plant & Equipment

Non-road mobile machinery (NRMM)

7.9.1 Non-road mobile machinery is defined as any mobile machine or vehicle that is not solely intended for carrying passengers or good on the road and would typically include:

a. access platforms;
b. dumpers;
c. piling rigs;
d. excavators;
e. bulldozers;
f. forklifts;
g. compressors;
h. generators;
i. mobile cranes;
j. concrete pumps;
k. telehandlers;
l. mobile crushers; and
m. rollers.

Table 7.3 Summary of NRMM Equipment

Assessment Phase	Works / Use	Assess. Phase 1	Assess. Phase 2a	Assess. Phase 2b	Est. No of Machines on site
360-hydraulic excavators (40T)	Bulk excavation, car park, airfield, landfill, DART, AAR, landside buildings	✓	✓	✓	**8**
360-hydraulic excavators (20T)	Excavation	✓	✓	✓	**26**
360-hydraulic long reach excavators	Demolition	✓	✓		**4**
Crusher	Demolition		✓		**1**
Rigid Heavy Goods Vehicles (HGV)	Excavated material removal, bulk aggregates, concrete deliveries	✓	✓	✓	**60**

Assessment Phase	Works / Use	Assess. Phase 1	Assess. Phase 2a	Assess. Phase 2b	Est. No of Machines on site
All terrain articulated dumper (40T)	Bulk earth works	✓	✓	✓	**39**
Dumper (9T)	General earthworks	✓	✓	✓	**26**
GPS Bulldozer	Bulk earthworks		✓	✓	**10**
Piling rigs(sheet)	Sheet piling		✓	✓	**2**
Piling rigs(bored)	Bored piling		✓	✓	**4**
Soil stabiliser	Bulk earthworks		✓	✓	**3**
Roller	Bulk earthworks	✓	✓	✓	**10**
Compressors	Demolition, concrete works, road works	✓	✓	✓	**36**
Concrete Paving Machine	Airfield – concrete pavement	✓	✓	✓	**1**
Asphalt paving machine	Roads and car parks	✓	✓	✓	**5**
Roller	Roads and car parks	✓	✓	✓	**2**
Telehandler Forklift	Materials handling		✓	✓	**25**
Tower Cranes	General lifting – foundation and superstructure		✓		**6**
Mobile Truck Mounted concrete pump	Building superstructure, concrete works		✓	✓	**10**
Concrete mixer truck	Electric concrete mixer truck	✓	✓	✓	**26**
Mobile Cranes (100T)	Erection steel work, lifting plant and equipment (ETP/STP)	✓	✓	✓	**11**
General waste skips	Removal of site waste	✓	✓	✓	**53**
Vans	Site transport, plant service, materials, general deliveries, etc.	✓	✓	✓	**24**
Cars	Couriers / site transport	✓	✓	✓	**38**

Assessment Phase	Works / Use	Assess. Phase 1	Assess. Phase 2a	Assess. Phase 2b	Est. No of Machines on site
Access equipment (cherry pickers / MEWPs)	Personnel access for works at height	✓	✓	✓	**42**

Earthworks

7.9.2 The bulk earthworks are based upon 1,000,000m3 being the estimated maximum earth that can be moved in a single earthwork season, the following would be the expected earthmoving equipment requirement with an anticipated near 100% utilisation.

7.9.3 The earthwork moving equipment would include:

a. ten 40T dump trucks working on an estimated half hour turn around giving 16 truck movements per hour;
b. two GPS controlled dozers;
c. soil stabiliser machine;
d. two 40T excavator;
e. two 20T excavator;
f. two vibrating rollers; and
g. a series of spray cannons for dust control.

Primary Construction Plant

7.9.4 See **Appendix F** for breakdown of primary construction plant.

Craneage & Tall Equipment Plan

7.9.5 The project would require a range of different types of cranes such as tower cranes, crawler and mobile cranes. The size and duration of these cranes on site would vary with each assessment phase and location.

7.9.6 The lead contractor shall comply with all relevant legislation controlling the use of cranes and lifting equipment within the vicinity of an aerodrome, which includes:

a. Air Navigation Order;
b. CAP 168 Licensing of Aerodromes;
c. Code of Practice for the safe use of cranes (BS7121: Part 1, paragraph 9.3.3 Crane control in vicinity of Aerodromes); and
d. British Standard Institute Code of Practice for the safe use of cranes (BS 7121, Part 1).

7.9.7 Prior to works commencing on site, the lead contractor should develop a detailed craneage/tall construction equipment plan that as a minimum contains the following details:

a. exact location of cranes (as OS grid references);
b. maximum operation heights in meters Above Ordnance Datum (AOD), or the height of crane Above Ground Level (AGL);
c. type of crane or equipment to be used;
d. radius of jib /boom and area of operation;
e. dates and times of operation; and
f. details of appointed person.

7.9.8 It may be necessary for a safety case to be developed and approved by CAA prior to works commencing.

7.10 Environmental Management

Environment Management System

7.10.1 The Lead Contractors would have an Environmental Management System (EMS) that is certified to BS EN ISO 14001 (refer to the CoCP **(Appendix 4.2** of the ES**) [TR020001/APP/5.02])**. The management systems would set out processes, practices, and plans that enable the Lead Contractors to manage environmental impacts and increase their operating efficiency.

Waste Management

7.10.2 The Proposed Development would aim to minimise the volume of waste generated by applying the waste hierarchy – avoid, reduce, reuse, recycle – and responsible disposal as set out in the CoCP **(Appendix 4.2** of the ES**) [TR020001/APP/5.02]**).

7.11 Estimated Water Usage in Construction

7.11.1 The Lead Contractors would implement appropriate water efficiency measures during construction such as:

a. implementation of good housekeeping measures on construction site;
b. monitoring and tracking of water usage including sub-metering key areas such as welfare water and any water used for hydro-demolition or commissioning. Tracking of water usage over time to show where water is being used and would help identify leaks or inefficiencies;
c. use abstracted water and rainwater harvesting to offset mains or tankered water supplies;
d. use of water saving toilets and taps within all temporary site accommodation; and
e. specify the use water efficient plant and equipment within the supply chain.

Table 7.4 Examples Water Saving within Construction

Plant	Saving	Considerations
Dust suppression (general)	~90%	Avoid - high capacity rain guns and hoses Choose - misting/atomising systems which use less water and are more effective Consider - consider using non-potable water (ideally rainwater harvested on site)
Dust suppression (vehicles)	~90%	Avoid – use of high-pressure water jets diffused by a splash plate

Plant	Saving	Considerations
		Choose – misting/atomising systems which use less water and are more effective
Road sweeping	~30%	Avoid - use of an open hose Ensure -operators are trained in water efficient practices, that vehicles have adjustable spray bars/nozzles and that any stand-alone washers are high pressure (low flow) with trigger controls Consider - water recirculation systems
Wheel washing	~40%	Avoid - manual wheel washing (except when the need is very limited) Choose - drive-on recirculating systems with a sensor-controlled shut off (where demand is ongoing) Ensure - Water top-up to settlement tank is controlled (e.g., a float valve), supply pressure reflects site conditions and that the filter in the settlement tank is kept clean to avoid overflows

Estimated Water Demand

7.11.2 An estimate of the potable demand and foul discharge (in m3) is contained in **Appendix E**. The tables below show the assumptions for calculating the potable water demand and the foul discharge.

Table 7.5 Assumption for Potable Water Demand

Estimated Potable Water								
Location / Operation	Unit / Rate	Litres	Quant	Total Litres		Working days per month	Total Litres per month	m^3 of water per month
Offices & Compounds								
Welfare Facilities (incl. canteen) & compound	l/per person per day	40	1200	48,000	per/d	22	1,056,000	1056
Wheel wash	l/per vehicle	40	50	2,000	per/d	22	44,000	44
Site Control posts	l/per person per day	40	10	400	per/d	30	12,000	12
Consolidation Centre	l/per vehicle	40	50	2,000	per/d	22	44,000	44
Waste Recovery Facility	l/per cycle	100	10	1,000	per/d	30	30,000	30
Concrete Batching								
Concrete batching plant	l/per m^3 of concrete	200	6,600	1,320,000				1320
Washdown	l/per cycle	50	50	2,500	per/d	22	55,000	55
Dust Suppression	l/per tanker	1,000	4 per day	8,000	per/d	22	176,000	176
Bulk Earthworks								
Dust Supp. (earthworks)-10 machines	20l/min per machine	20	9600	96,000	per/d	22	2,112,000	2112
Stockpiling and Landscaping	10l/min per machine	10	4800	48,000	per/d	23	1,104,000	1104
Internal roads and Landscaping mitigation								
Dust Supp.	l/per tanker	2,000	4 per day	16,000	per/d	22	352,000	352
Road Sweeping	l/per tanker	2,000	4 per day	8,000	per/d	22	176,000	176

Internal roads and Landscaping mitigation								
Terminal building	average site consumption (m^3)						200,000	200
Airfield	average site consumption (m^3)						100,000	100
Commercial Development	average site consumption (m^3)						200,000	200

Table 7.6 Assumption Foul Water Discharge

Foul Water Discharge		
Location / Operation	% Discharged	m^3 of water per month
Offices & Compounds		
Welfare Facilities (inc. canteen) & compound	100%	1056
Wheel wash	0%	0
Site Control posts	100%	12
Consolidation Centre	50%	22
Waste Recovery Facility	0%	0
Concrete Batching		
Concrete batching plant	0%	0
Washdown	50%	27.5
Dust Suppression	0%	0
Bulk Earthworks		
Dust Suppression (earthworks) - 10 machines	0%	0
Stockpiling and Landscaping	0%	0
Internal roads and Landscaping mitigation		
Dust Suppression	0%	0
Road Sweeping	0%	0
Internal roads and Landscaping mitigation		
Terminal building	50%	100
Airfield	50%	50
Commercial Development	50%	100
	Total	**1368**

7.12 Removal of temporary structures and buildings

7.12.1 Following construction, temporary structures would be dismantled and removed.

7.12.2 Dismantling and removal of temporary construction structures and buildings includes the removal of:

a. concrete batching plant;

b. offices;

c. worker welfare facilities;
d. workshops;
e. security facilities; and
f. construction compounds.

7.12.3 The method for dismantling would include the following items:

a. removal of modular buildings including concrete batching plant, offices, worker welfare facilities, workshops and some security facilities using mobile cranes and elevated working platforms;
b. concrete foundations would be removed using mechanical earthmoving and demolition equipment; and
c. removal of construction compounds using mechanical earthmoving machinery.

7.12.4 Where temporary buildings can be reused, these would be taken off-site.

7.12.5 It is intended that where possible any structures demolished that contain concrete or brick would be crushed for reuse on-site. All other material that can be recycled would be either reused on-site or removed to be appropriately recycled.

7.12.6 Any areas affected by the removal of temporary infrastructure would be restored to their former condition.

7.13 Removal of temporary infrastructure

7.13.1 Removal of temporary infrastructure as required includes the removal of:

a. laydown areas;
b. car parking;
c. temporary construction utilities; and
d. haul and access roads.

7.13.2 Removal of temporary infrastructure would involve various techniques, predominantly the use of mechanical earthmoving and demolition equipment.

7.13.3 Where temporary infrastructure elements can be reused, these would be taken off-site.

7.13.4 It is intended that where possible any infrastructure demolished that contains concrete or brick would be crushed for reuse on-site.

7.13.5 All other material that can be recycled would be either reused on-site or removed to be appropriately recycled.

7.13.6 Any areas affected by the removal of temporary infrastructure would be restored to their former condition.

7.14 Neighbours

7.14.1 It is recognised that there are several other projects both being planned and being delivered in and around the airport area, which may be impacted by the redevelopment works.

7.14.2 It is also recognised that there are other significant issues during the construction works that would need to be managed, including taxiway closures, access and security, low visibility closures, economic impacts, noise, dust, ecology, ground conditions, highway considerations and the local community.

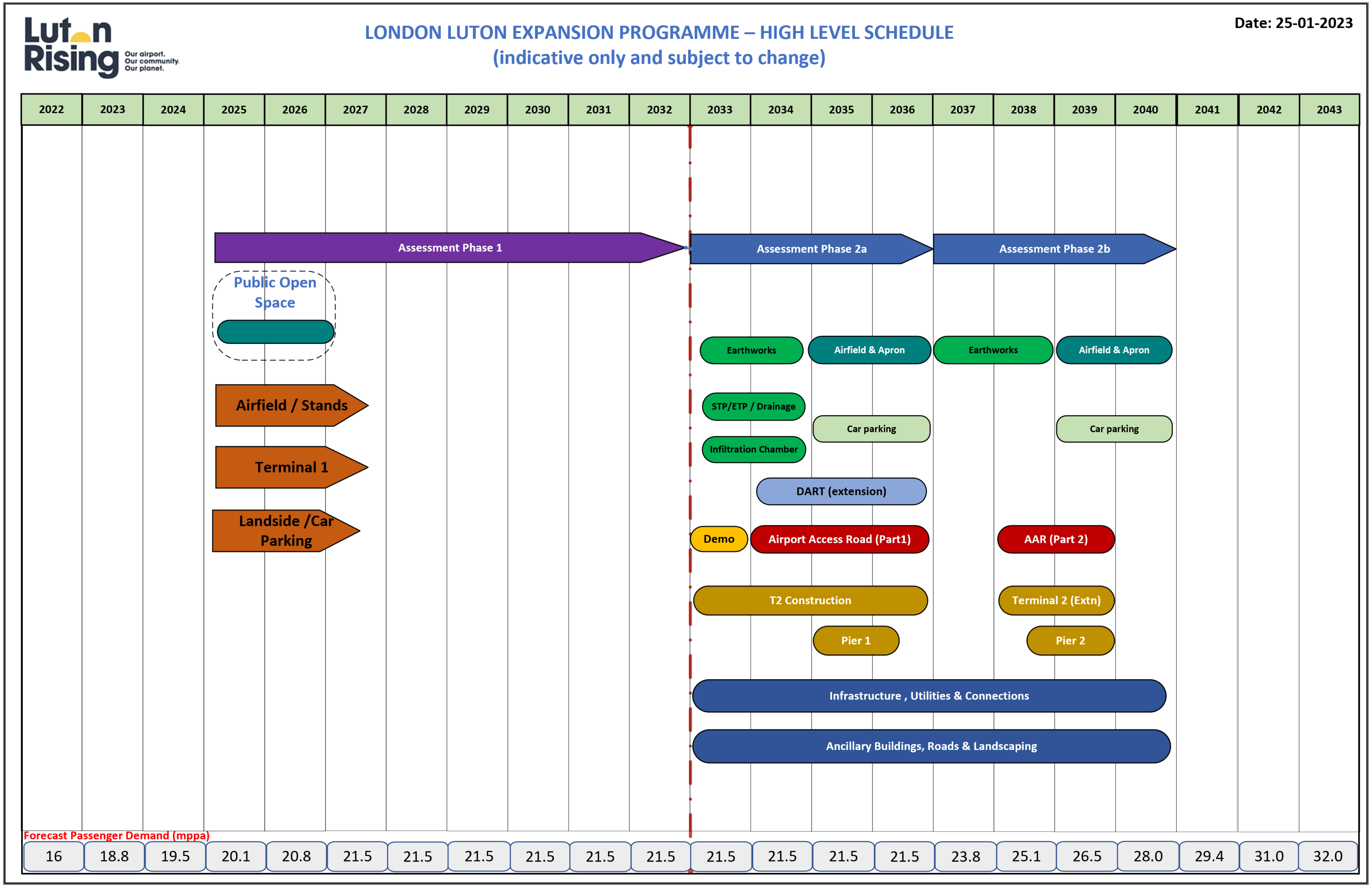
7.14.3 The community relations and stakeholder engagement are described in **Appendix 4.2** of the ES **[TR020001/APP/5.02**]

GLOSSARY AND ABBREVIATIONS

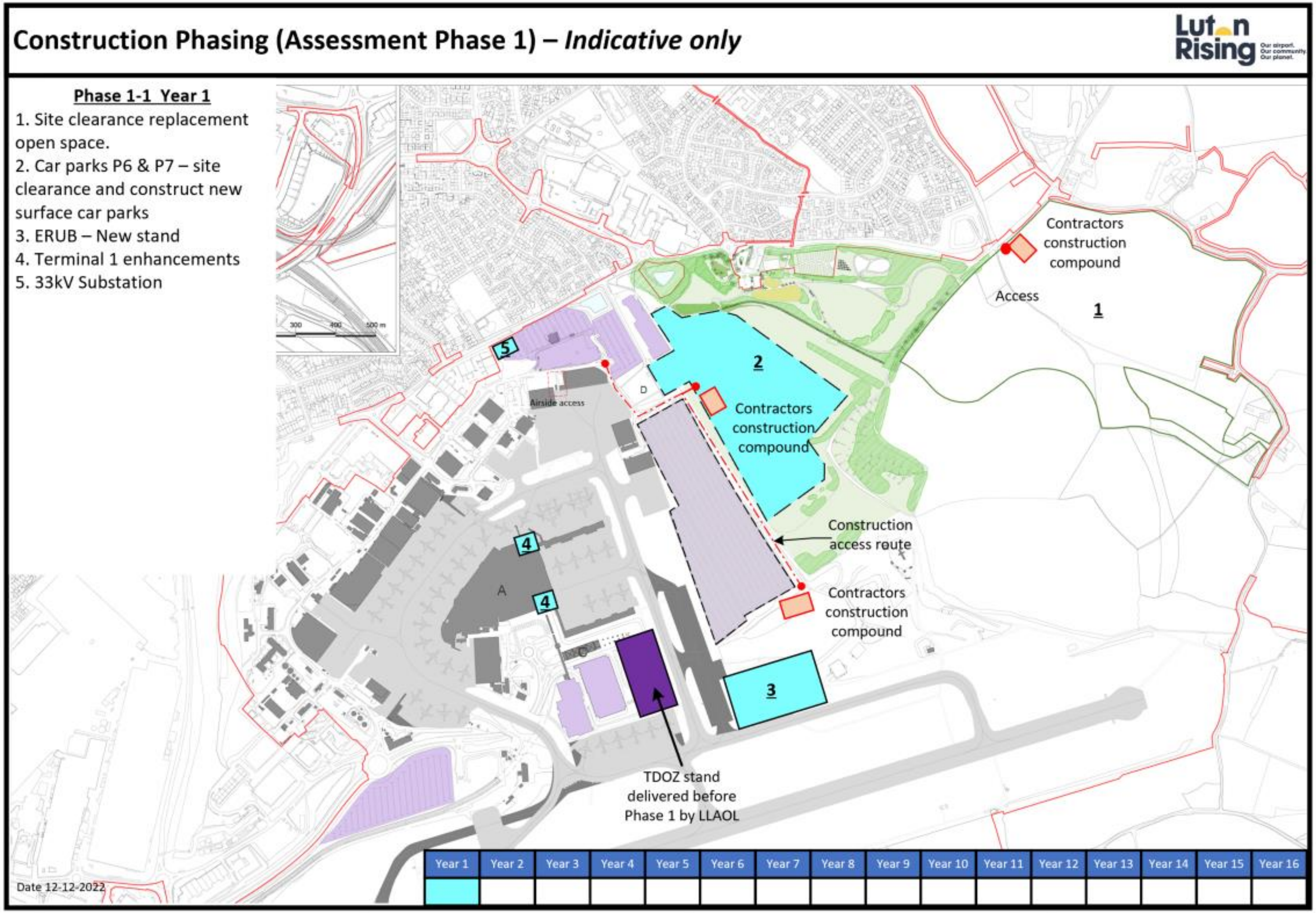
Term/Abbreviation	Description
AAR	Airport Access Road (was known as CPAR)
BS	British Standard
BSI	British Standards Institution
CCS	Considerate Constructors Scheme
CoCP	Code of Construction Practice
CMS	Construction Method Statement
CSWMS	Construction Surface Water Management Strategy
CTMP	Construction Traffic Management Plan
CWTP	Construction Workforce Travel Plan
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
DMS	Delivery Management System
EMS	Environmental Management System
ERUB	Engine Run-up Bay
FORS	Fleet Operator Recognition Scheme
HGV	Heavy goods vehicle
Highway Interventions	Junction and road improvement works included in the Proposed Development for which consent is being sought as part of the DCO Application
Home Counties	The home counties are the counties of England that surround London (although several of them do not border it). The counties generally included are Berkshire, Buckinghamshire, Essex, Hertfordshire, Kent, Surrey, and Sussex
Lead Contractors	A Lead Contractor on a construction/work site responsible for planning, managing and co-ordinating themselves and all other contractors working on site
Luton Rising	A trading name of London Luton Airport Limited
LLAOL	London Luton Airport Operations Limited, the operator of London Luton Airport
Luton DART	Luton Direct Air Rail Transit
Main Application Site	The area to the east of Luton Airport where main works for the Proposed Development would take place. Excludes the Off-site Car Park and Highway Interventions.

Term/Abbreviation	Description
Major accident	In the context of this assessment, means an uncontrolled event caused by a man-made activity or asset that may result in immediate or delayed serious damage to human health, welfare and/or environment and requires the use of resources beyond those of the Applicant or its contractors to manage. It should be noted that malicious intent is not accidental.
MMP	Materials Management Plan
MPPA	Million Passengers Per Annum
NRMM	Non-road mobile machinery
Off-site Car Parks	The two locations to the southwest of Luton Airport, outside of the airport boundary, where car parking is included in the Proposed Development
ORAT	Operational readiness activation and transition
PPG	Pollution Prevention Guideline These Environment Agency documents have been withdrawn, but still constitute relevant advice on good practice. Where stated, they should be referred to in the absence of alternative guidance documents.
PPE	Personal Protective Equipment
Proposed Development	All works for which consent is being sought as part of the DCO Application, including works at the Main Application Site; Off-site Car Parks and Highway Interventions.
PRoW	Public rights of way
RET's	Rapid Exit Taxiways
SWMP	Site Waste Management Plan
SWMS	Surface Water Management Strategy
T1	Terminal 1
T2	Terminal 2
TfL	Transport for London
TMWG	Traffic Management Working Group
WTP	Water Treatment Plant

Appendix A - Outline programme


Luton Rising
Our airport. Our community. Our planet.
LONDON LUTON EXPANSION PROGRAMME – HIGH LEVEL SCHEDULE
(indicative only and subject to change)
Date: 25-01-2023
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
2038
2039
2040
2041
2042
2043
Assessment Phase 1
Assessment Phase 2a
Assessment Phase 2b
Public Open Space
Earthworks
Airfield & Apron
Earthworks
Airfield & Apron
Airfield / Stands
STP/ETP / Drainage
Car parking
Car parking
Terminal 1
Infiltration Chamber
DART (extension)
Landside /Car Parking
Demo
Airport Access Road (Part1)
AAR (Part 2)
T2 Construction
Terminal 2 (Extn)
Pier 1
Pier 2
Infrastructure , Utilities & Connections
Ancillary Buildings, Roads & Landscaping
Forecast Passenger Demand (mppa)
16
18.8
19.5
20.1
20.8
21.5
21.5
21.5
21.5
21.5
21.5
21.5
21.5
21.5
21.5
23.8
25.1
26.5
28.0
29.4
31.0
32.0

Appendix B – Phasing diagrams


Construction Phasing (Assessment Phase 1) – Indicative only
Luton Rising
Our airport. Our community. Our planet.
Phase 1-1 Year 1
1. Site clearance replacement open space.
2. Car parks P6 & P7 – site clearance and construct new surface car parks
3. ERUB – New stand
4. Terminal 1 enhancements
5. 33kV Substation
Contractors construction compound
Access
1
2
Airside access
Contractors construction compound
Construction access route
Contractors construction compound
3
4
4
5
TDOZ stand delivered before Phase 1 by LLAOL
Year 1
Year 2
Year 3
Year 4
Year 5
Year 6
Year 7
Year 8
Year 9
Year 10
Year 11
Year 12
Year 13
Year 14
Year 15
Year 16
Date 12-12-2022

Construction Phasing (Assessment Phase 1) – *Indicative only*

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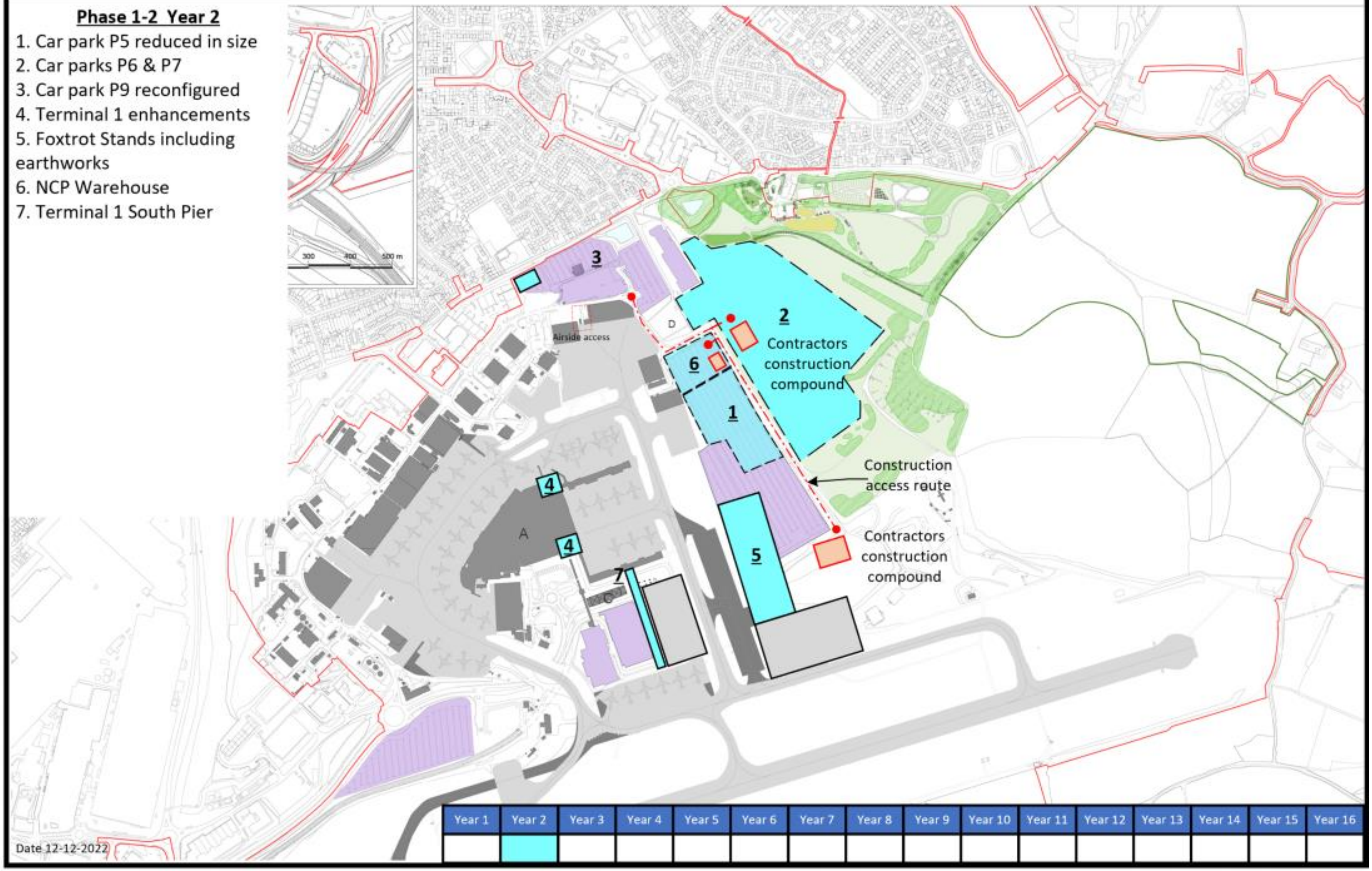
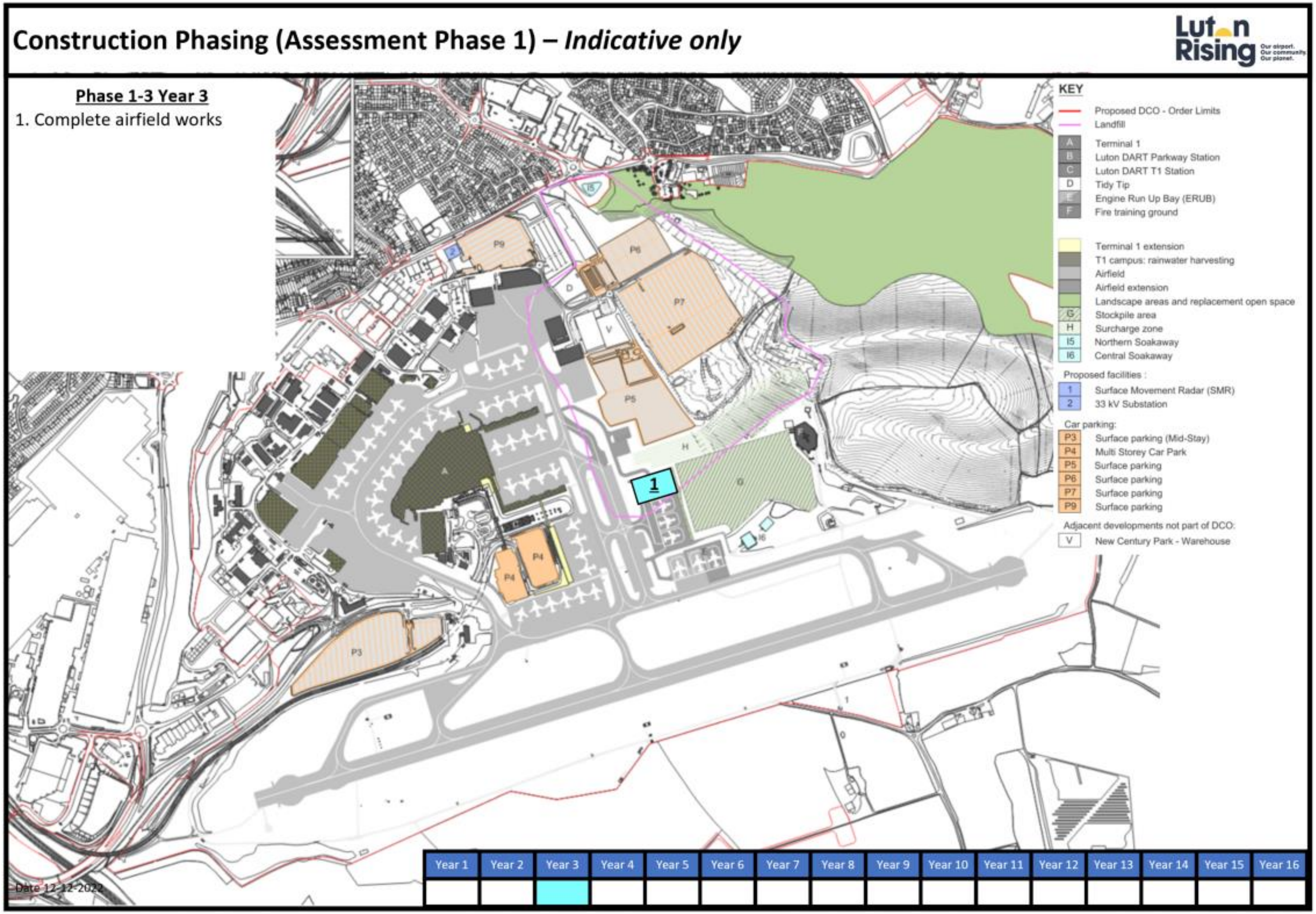
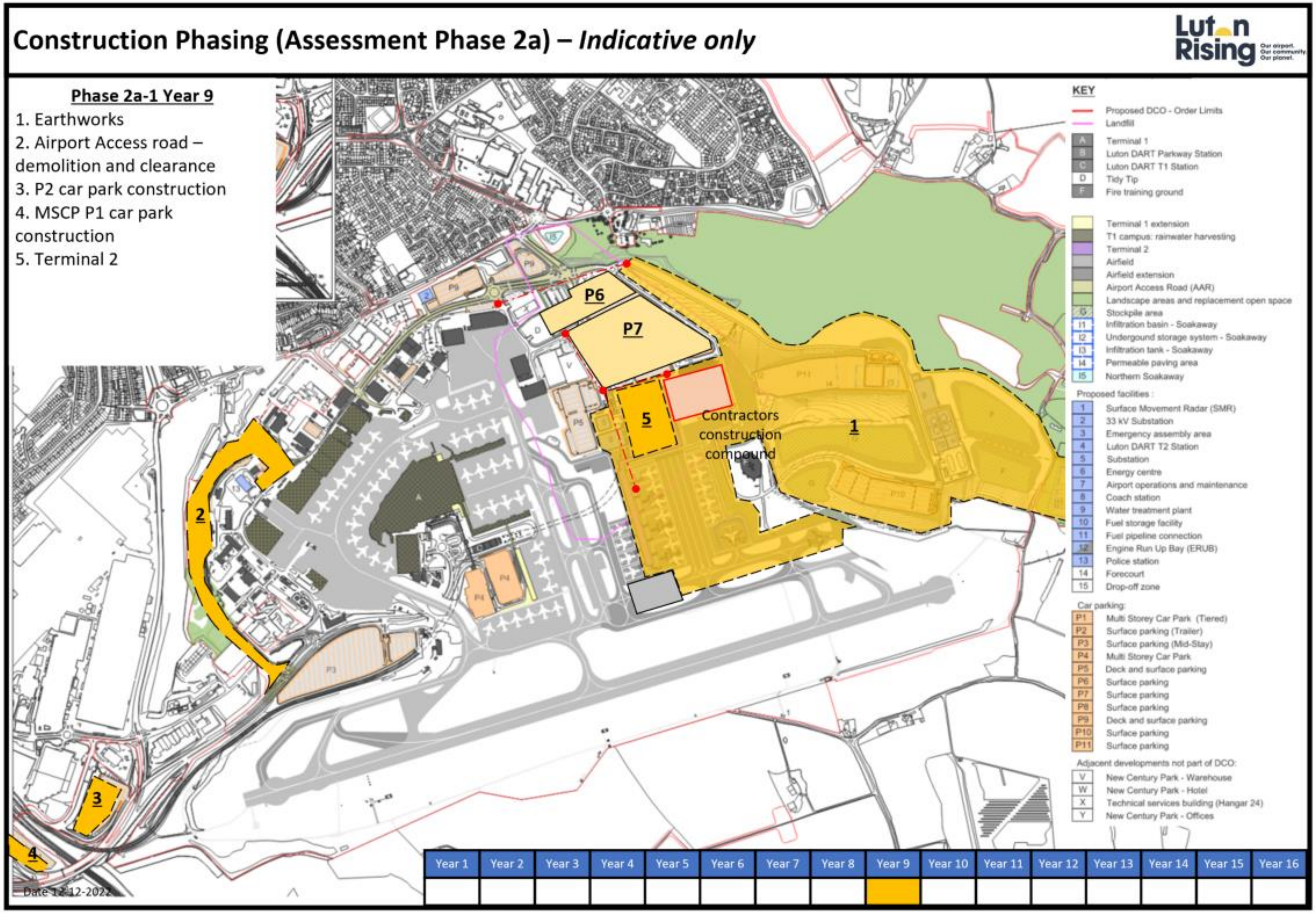
Phase 1-2 Year 2

1. Car park P5 reduced in size
2. Car parks P6 & P7
3. Car park P9 reconfigured
4. Terminal 1 enhancements
5. Foxtrot Stands including earthworks
6. NCP Warehouse
7. Terminal 1 South Pier



Construction Phasing (Assessment Phase 1) – *Indicative only*




Construction Phasing (Assessment Phase 2a) – *Indicative only*
Luton Rising
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Phase 2a-1 Year 9
1. Earthworks
2. Airport Access road – demolition and clearance
3. P2 car park construction
4. MSCP P1 car park construction
5. Terminal 2
P6
P7
5
Contractors construction compound
1
2
3
4
KEY
Proposed DCO - Order Limits
Landfill
A Terminal 1
B Luton DART Parkway Station
C Luton DART T1 Station
D Tidy Tip
F Fire training ground
Terminal 1 extension
T1 campus: rainwater harvesting
Terminal 2
Airfield
Airfield extension
Airport Access Road (AAR)
Landscape areas and replacement open space
G Stockpile area
I1 Infiltration basin - Soakaway
I2 Undergound storage system - Soakaway
I3 Infiltration tank - Soakaway
I4 Permeable paving area
I5 Northern Soakaway
Proposed facilities :
1 Surface Movement Radar (SMR)
2 33 kV Substation
3 Emergency assembly area
4 Luton DART T2 Station
5 Substation
6 Energy centre
7 Airport operations and maintenance
8 Coach station
9 Water treatment plant
10 Fuel storage facility
11 Fuel pipeline connection
12 Engine Run Up Bay (ERUB)
13 Police station
14 Forecourt
15 Drop-off zone
Car parking:
P1 Multi Storey Car Park (Tiered)
P2 Surface parking (Trailer)
P3 Surface parking (Mid-Stay)
P4 Multi Storey Car Park
P5 Deck and surface parking
P6 Surface parking
P7 Surface parking
P8 Surface parking
P9 Deck and surface parking
P10 Surface parking
P11 Surface parking
Adjacent developments not part of DCO:
V New Century Park - Warehouse
W New Century Park - Hotel
X Technical services building (Hangar 24)
Y New Century Park - Offices
Year 1
Year 2
Year 3
Year 4
Year 5
Year 6
Year 7
Year 8
Year 9
Year 10
Year 11
Year 12
Year 13
Year 14
Year 15
Year 16
Date 12-12-2022

Construction Phasing (Assessment Phase 2a) – *Indicative only*

Phase 2a-2 Year 10

1. Earthworks
2. Airport Access Road (W) – construction
3. Airport Access Road (E)
4. MSCP P1 car park
5. Terminal 2
6. DART Extension

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16

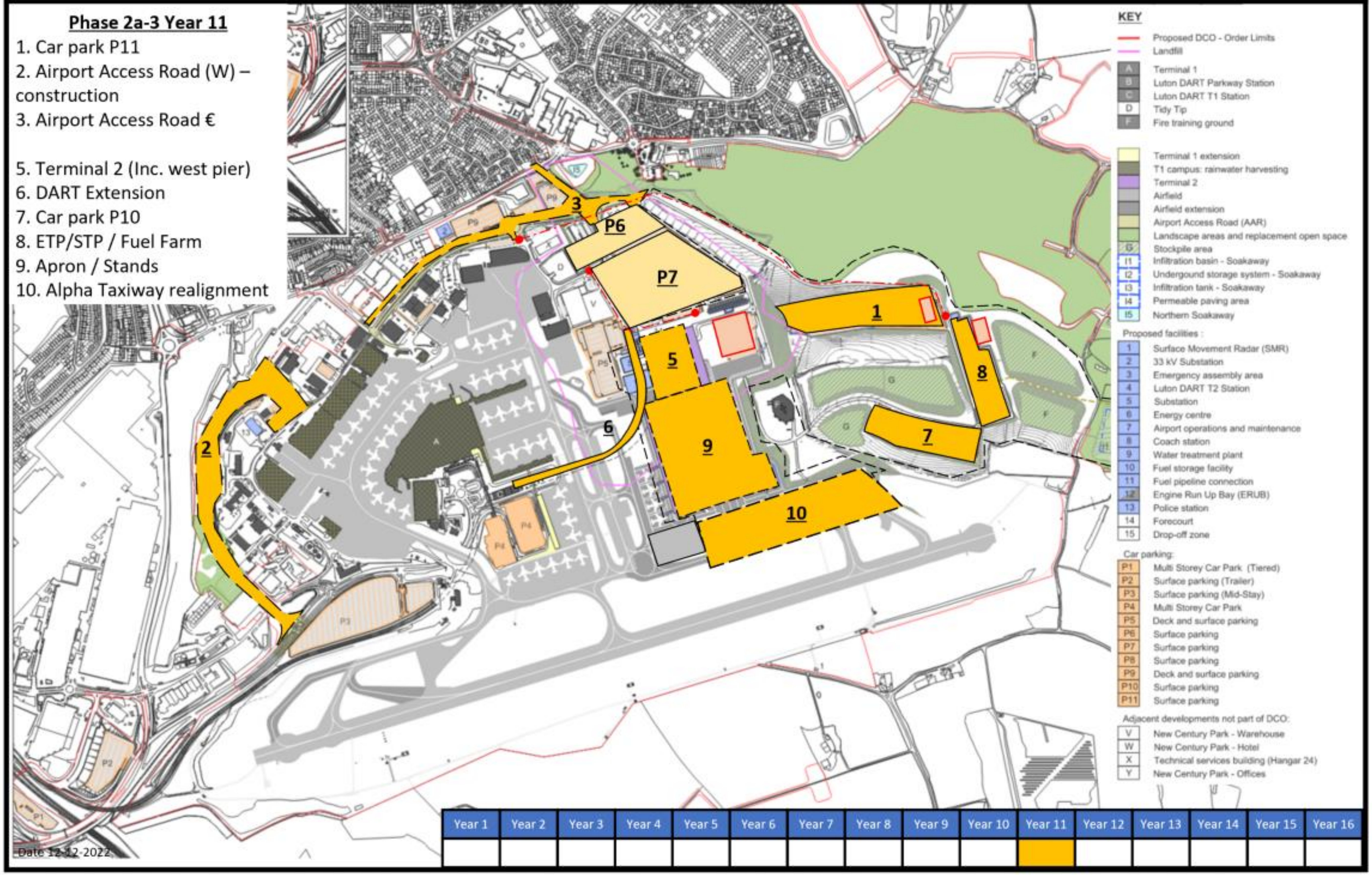
Date 12-12-2022

Construction Phasing (Assessment Phase 2a) – *Indicative only*

Phase 2a-3 Year 11

1. Car park P11
2. Airport Access Road (W) – construction
3. Airport Access Road €

5. Terminal 2 (Inc. west pier)
6. DART Extension
7. Car park P10
8. ETP/STP / Fuel Farm
9. Apron / Stands
10. Alpha Taxiway realignment

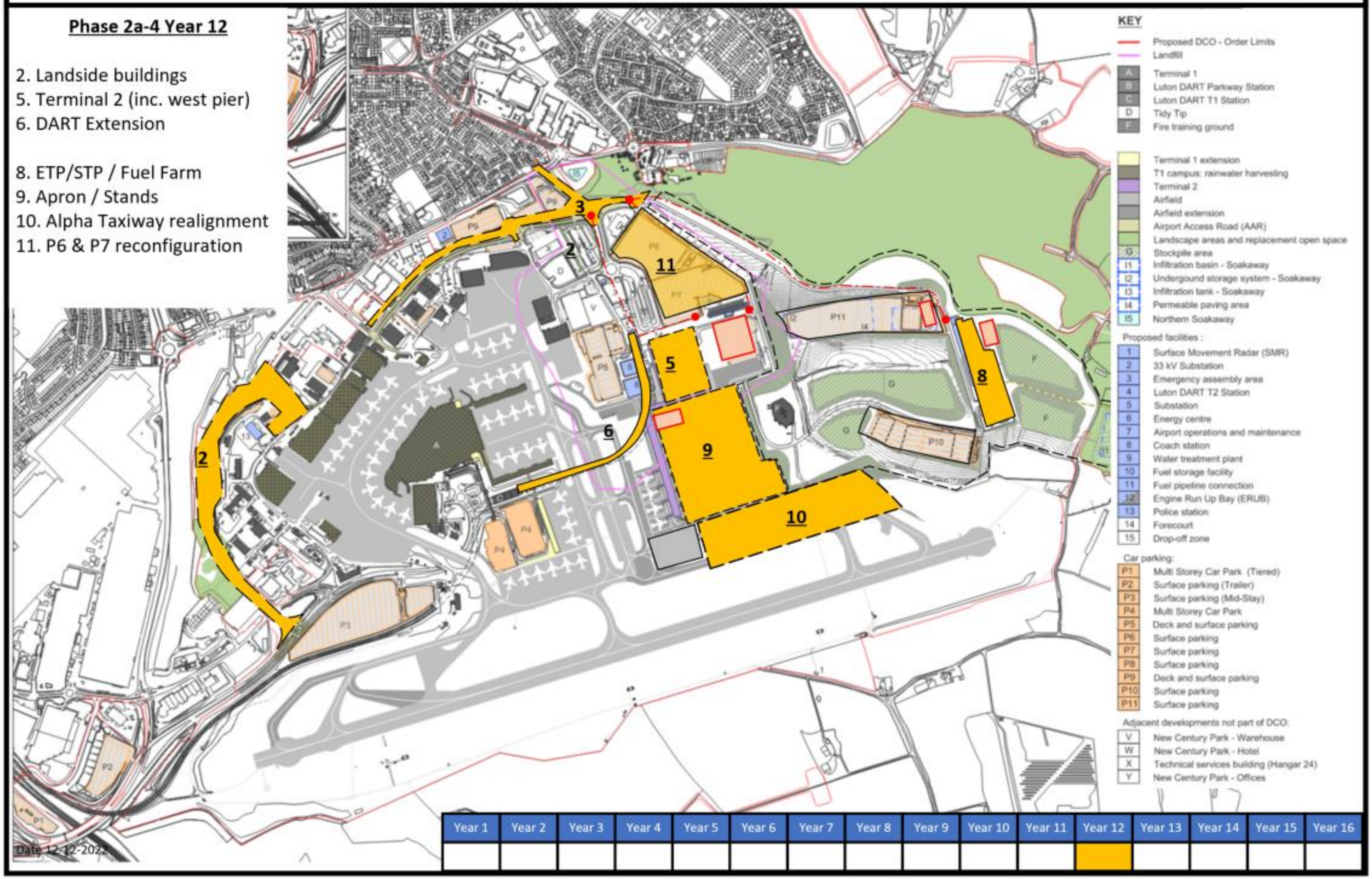


Construction Phasing (Assessment Phase 2a) – *Indicative only*

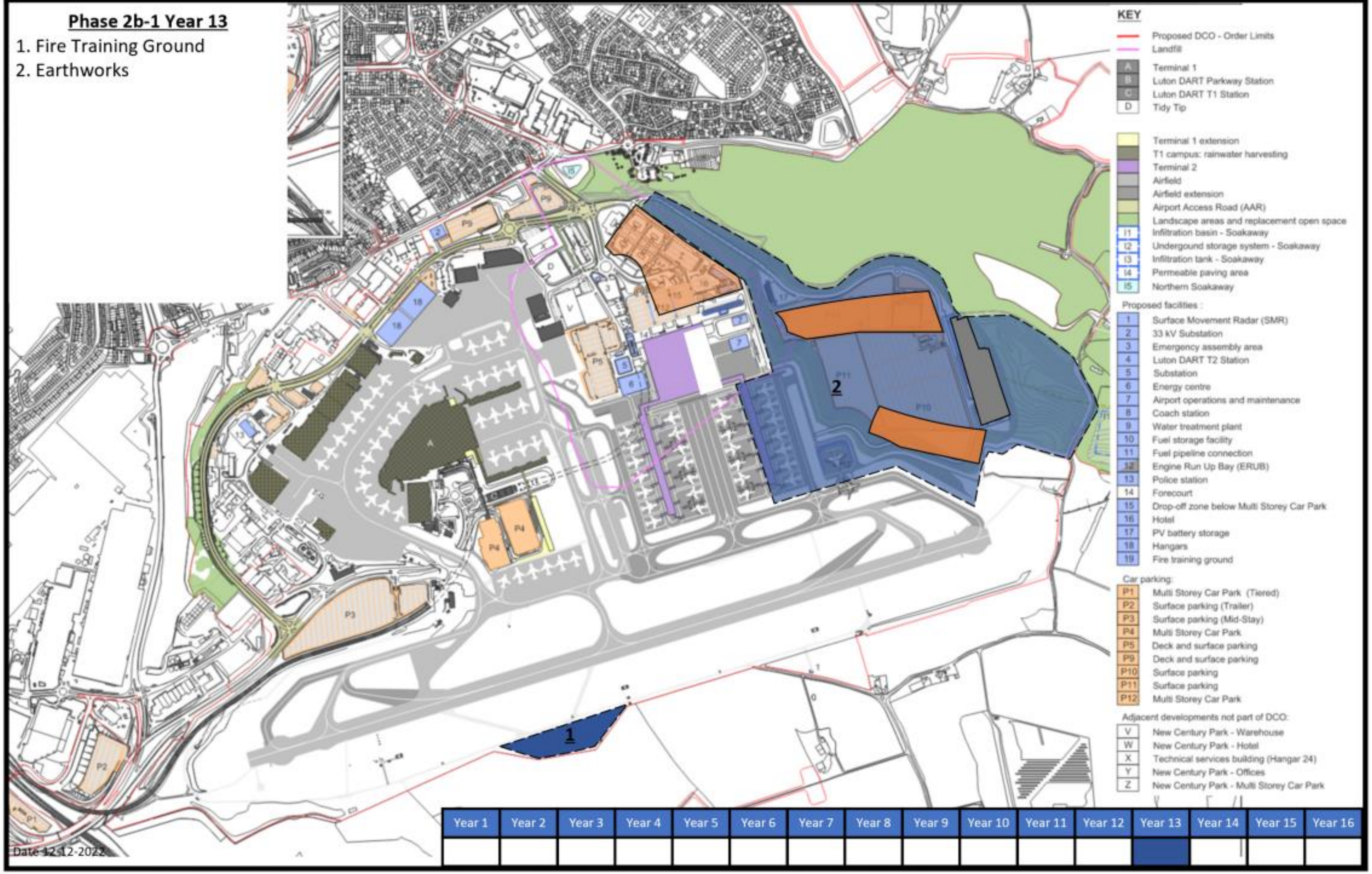
Phase 2a-4 Year 12

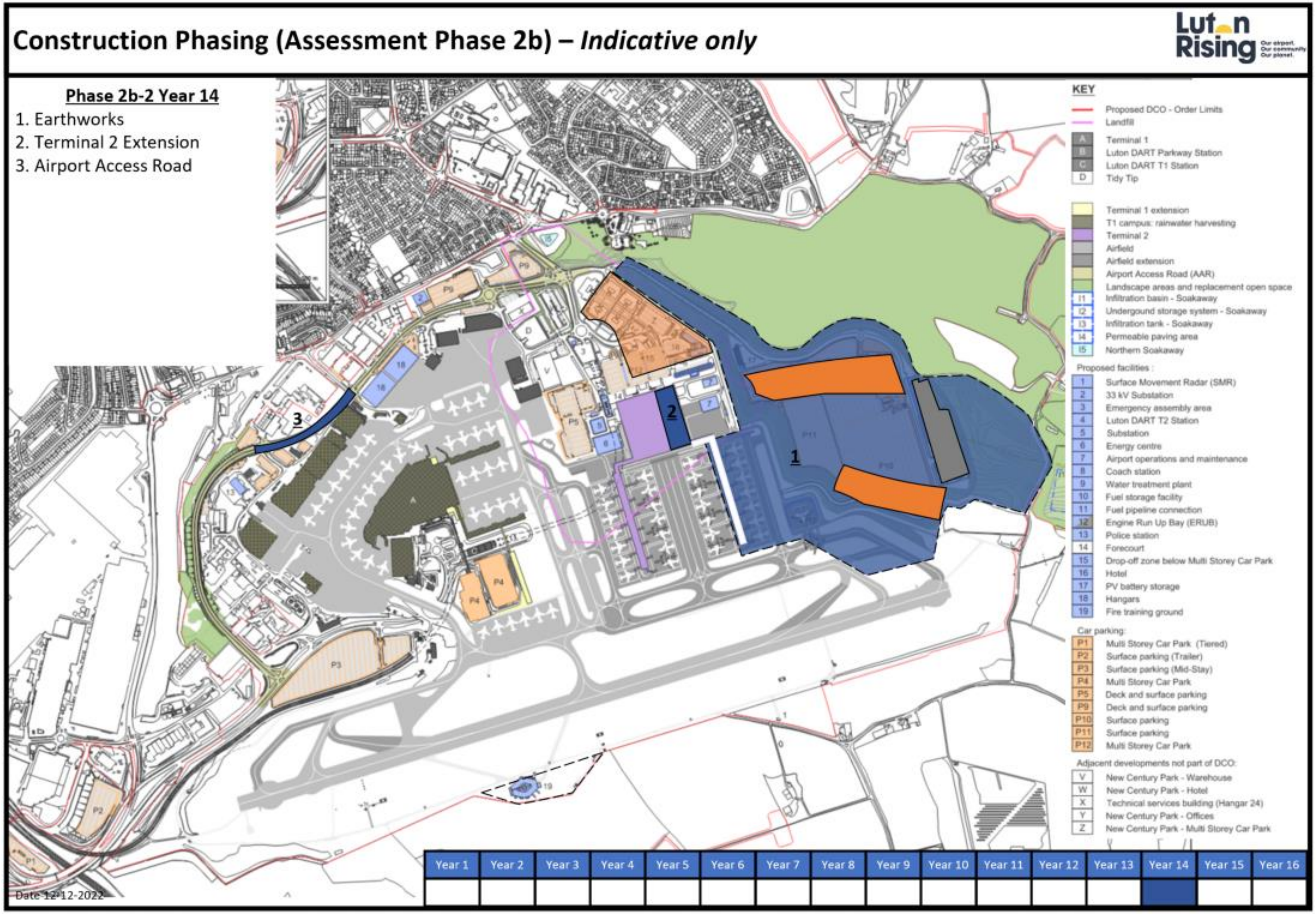
2. Landside buildings
5. Terminal 2 (inc. west pier)
6. DART Extension

8. ETP/STP / Fuel Farm
9. Apron / Stands
10. Alpha Taxiway realignment
11. P6 & P7 reconfiguration



Construction Phasing (Assessment Phase 2b) – *Indicative only*




Construction Phasing (Assessment Phase 2b) – Indicative only
Luton Rising
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Phase 2b-2 Year 14
1. Earthworks
2. Terminal 2 Extension
3. Airport Access Road
KEY
Proposed DCO - Order Limits
Landfill
A Terminal 1
B Luton DART Parkway Station
C Luton DART T1 Station
D Tidy Tip
Terminal 1 extension
T1 campus: rainwater harvesting
Terminal 2
Airfield
Airfield extension
Airport Access Road (AAR)
Landscape areas and replacement open space
I1 Infiltration basin - Soakaway
I2 Undergound storage system - Soakaway
I3 Infiltration tank - Soakaway
I4 Permeable paving area
I5 Northern Soakaway
Proposed facilities :
1 Surface Movement Radar (SMR)
2 33 kV Substation
3 Emergency assembly area
4 Luton DART T2 Station
5 Substation
6 Energy centre
7 Airport operations and maintenance
8 Coach station
9 Water treatment plant
10 Fuel storage facility
11 Fuel pipeline connection
12 Engine Run Up Bay (ERUB)
13 Police station
14 Forecourt
15 Drop-off zone below Multi Storey Car Park
16 Hotel
17 PV battery storage
18 Hangars
19 Fire training ground
Car parking:
P1 Multi Storey Car Park (Tiered)
P2 Surface parking (Trailer)
P3 Surface parking (Mid-Stay)
P4 Multi Storey Car Park
P5 Deck and surface parking
P9 Deck and surface parking
P10 Surface parking
P11 Surface parking
P12 Multi Storey Car Park
Adjacent developments not part of DCO:
V New Century Park - Warehouse
W New Century Park - Hotel
X Technical services building (Hangar 24)
Y New Century Park - Offices
Z New Century Park - Multi Storey Car Park
Year 1
Year 2
Year 3
Year 4
Year 5
Year 6
Year 7
Year 8
Year 9
Year 10
Year 11
Year 12
Year 13
Year 14
Year 15
Year 16
Date 12-12-2022

Construction Phasing (Assessment Phase 2b) – *Indicative only*

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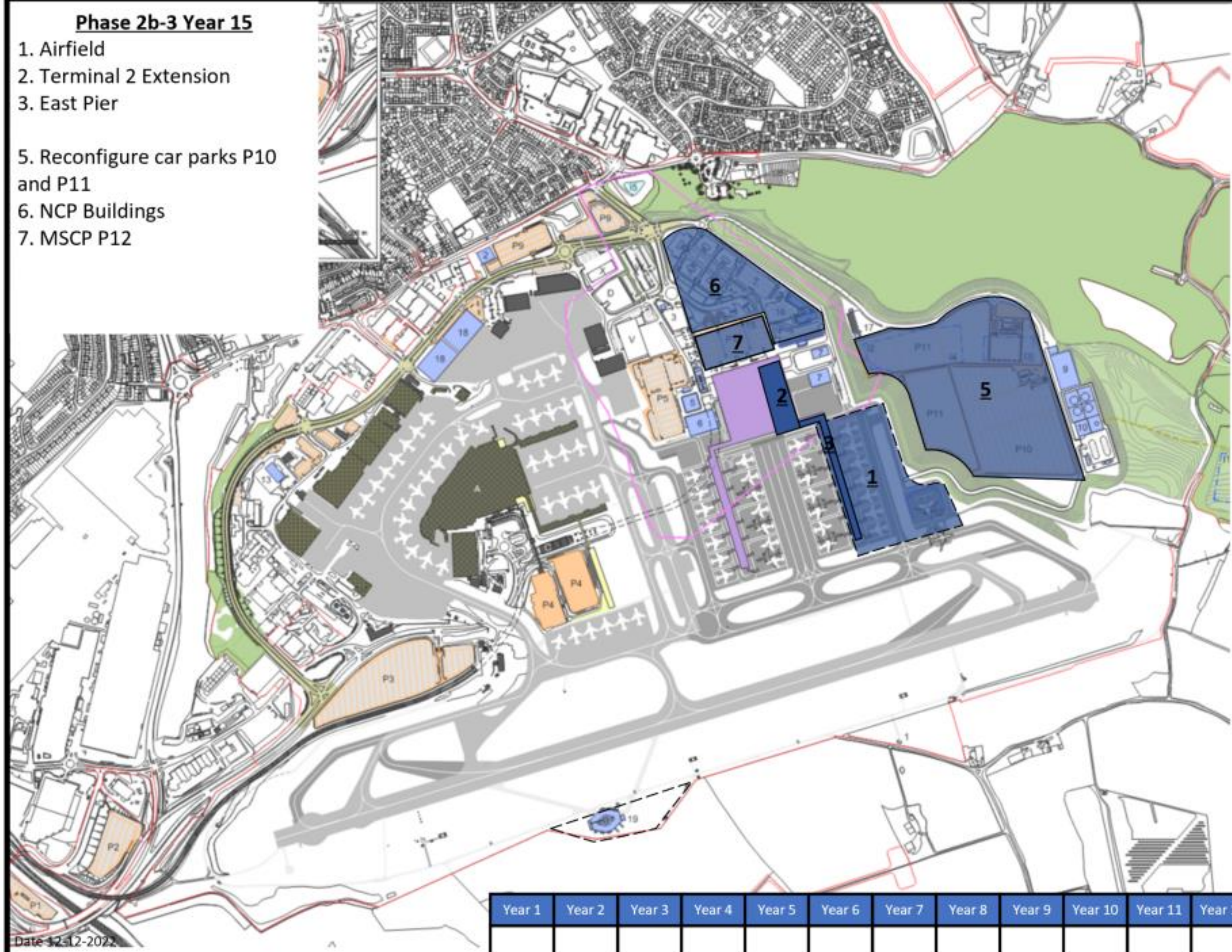
Phase 2b-3 Year 15

1. Airfield
2. Terminal 2 Extension
3. East Pier

5. Reconfigure car parks P10 and P11
6. NCP Buildings
7. MSCP P12



KEY

- Proposed DCO - Order Limits
- Landfill
- A – Terminal 1
- B – Luton DART Parkway Station
- C – Luton DART T1 Station
- D – Tidy Tip
- Terminal 1 extension
- T1 campus: rainwater harvesting
- Terminal 2
- Airfield
- Airfield extension
- Airport Access Road (AAR)
- Landscape areas and replacement open space
- I1 – Infiltration basin - Soakaway
- I2 – Undergound storage system - Soakaway
- I3 – Infiltration tank - Soakaway
- I4 – Permeable paving area
- I5 – Northern Soakaway

Proposed facilities :

1. Surface Movement Radar (SMR)
2. 33 kV Substation
3. Emergency assembly area
4. Luton DART T2 Station
5. Substation
6. Energy centre
7. Airport operations and maintenance
8. Coach station
9. Water treatment plant
10. Fuel storage facility
11. Fuel pipeline connection
12. Engine Run Up Bay (ERUB)
13. Police station
14. Forecourt
15. Drop-off zone below Multi Storey Car Park
16. Hotel
17. PV battery storage
18. Hangars
19. Fire training ground

Car parking:

- P1 – Multi Storey Car Park (Tiered)
- P2 – Surface parking (Trailer)
- P3 – Surface parking (Mid-Stay)
- P4 – Multi Storey Car Park
- P5 – Deck and surface parking
- P9 – Deck and surface parking
- P10 – Surface parking
- P11 – Surface parking
- P12 – Multi Storey Car Park

Adjacent developments not part of DCO:

- V – New Century Park - Warehouse
- W – New Century Park - Hotel
- X – Technical services building (Hangar 24)
- Y – New Century Park - Offices
- Z – New Century Park - Multi Storey Car Park

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16
														■	

Date 12-12-2022

Construction Phasing (Assessment Phase 2b) – *Indicative only*

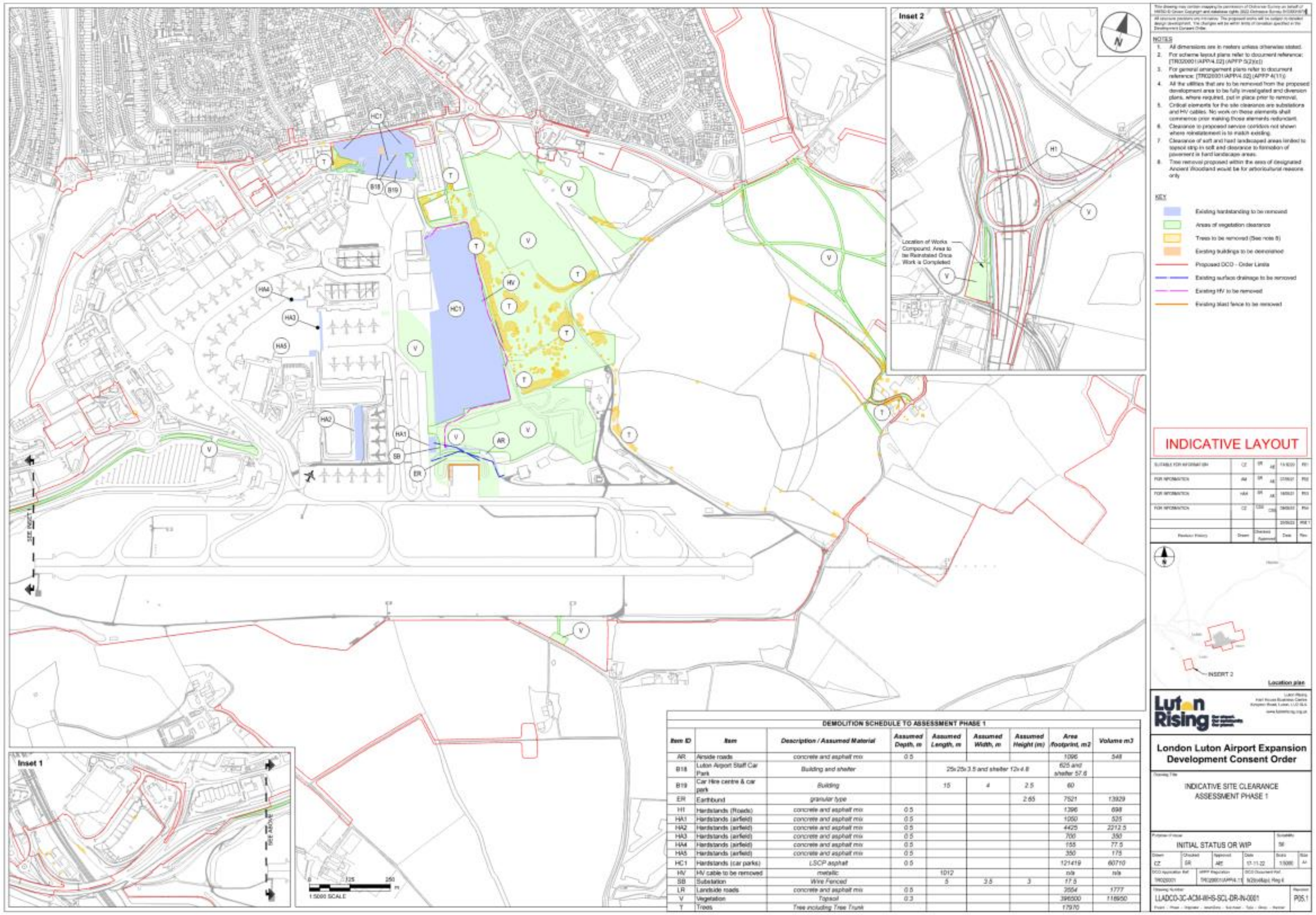
Appendix C – Estimated vehicle numbers

C1.1.1 Internal vehicle movement data

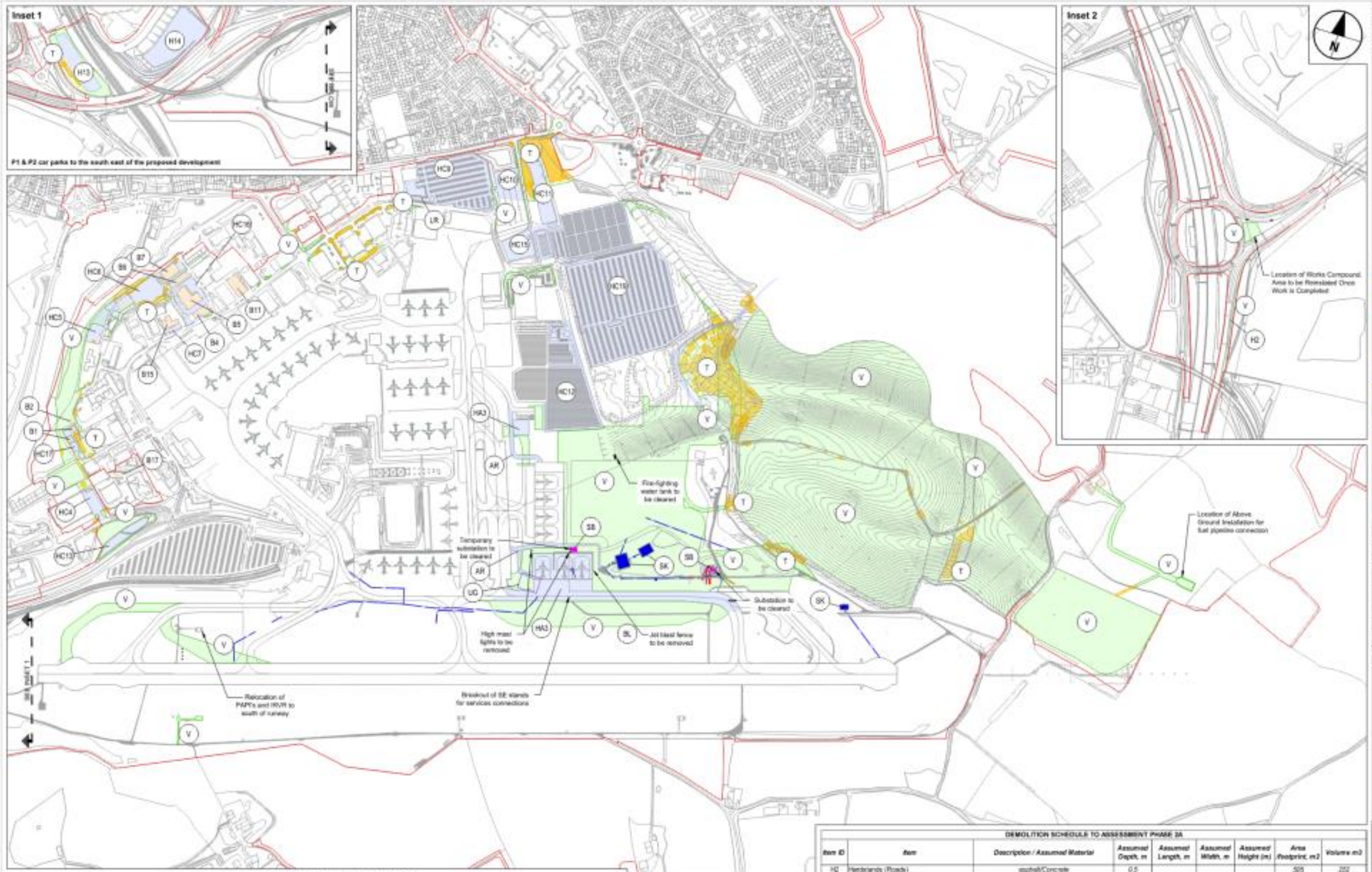
Annual Internal Vehicle Movements (Estimated)												
Year	2025	2026	2027	2033	2034	2035	2036	2037	2038	2039	2040	Peak Quarter
Total number of movements per year	59,752.00	17,359.67	1,885.00	59,225.00	63,089.08	47,869.92	22,980.71	55,050.00	55,585.00	27,046.00	20,414.00	26,007
Avg/day (based on 242 working days	230	67	7	228	243	184	88	212	214	104	79	400
Vehicle Type (%)												
Articulated Vehicle (HGV) (up to 44T)	10%	15%	15%	5%	5%	15%	20%	5%	5%	15%	20%	5%
Rigid Heavy Goods Vehicles (HGV) up to 30T	60%	30%	20%	60%	55%	40%	20%	60%	55%	40%	20%	55%
Specialised Low Loaders												0%
Vans (7.5t to 18t)	10%	25%	25%	15%	15%	15%	20%	15%	15%	15%	20%	15%
Vans (up to 3.5t)	10%	20%	30%	10%	15%	20%	30%	10%	15%	20%	30%	15%
Cars	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Breakdown by Vehicle Type												
Articulated Vehicle (HGV) (up to 44T)	23	10	1	11	12	28	18	11	11	16	16	20
Rigid Heavy Goods Vehicles (HGV) up to 30T	138	20	1	137	133	74	18	127	118	42	16	220
Specialised Low Loaders	0	0	0	0	0	0	0	0	0	0	0	0
Vans (7.5t to 18t)	23	17	2	34	36	28	18	32	32	16	16	60
Vans (up to 3.5t)	23	13	2	23	36	37	27	21	32	21	24	60
Cars	23	7	1	23	24	18	9	21	21	10	8	40

Appendix D – Site clearance drawings

D1.1.1 Site Clearance for Assessment Phase 1 (LLADCO-3C-ACM-WHS-SCL-DR-IN-0001)



D1.1.2 Site Clearance for Assessment Phase 2a (LLADCO-3C-ACM-WHS-SCL-DR-IN-0002)



NOTES

1. All dimensions are in meters unless otherwise stated.
2. For scheme layout plans refer to document reference: [TR020001/APP/4.02] (APFP 5(2)(o))
3. For general arrangement plans refer to document reference: [TR020001/APP/4.02] (APFP 4(11))
4. All the utilities that are to be removed from the proposed development area to be fully investigated and diversion plans, where required, put in place prior to removal.
5. Critical elements for the site clearance are substations and HV cables. No work on those elements shall commence prior making those elements redundant.
6. Clearance to proposed service corridors not shown where reinstatement is to match existing.
7. Clearance of soft and hard landscaped areas limited to topsoil strip in soft and clearance to formation of pavement in hard landscape areas.
8. Areas of existing airfield pavement should be tested and approved at detailed design stage before remaining in the permanent works.
9. Tree removal proposed within the area of designated Ancient Woodland would be for arboricultural reasons only.

KEY

- Existing hardstanding to be removed
- Existing substation to be removed
- Existing soakaways to be removed
- Areas of vegetation clearance
- Existing buildings to be demolished
- Trees to be removed (See note 9)
- Proposed DCO - Order Limits
- Existing HV to be removed
- Existing LV to be removed
- Existing comms to be removed
- Existing surface drainage to be removed
- Existing underground tank to be removed

INDICATIVE LAYOUT

DEMOLITION SCHEDULE TO ASSESSMENT PHASE 2A

Item ID	Item	Description / Assumed Material	Assumed Depth, m	Assumed Length, m	Assumed Width, m	Assumed Height (m)	Area footprint, m2	Volume m3
B1	Eaton House and Essex House	2 buildings – 2 storey brick clad		72	18	10		
B2	Proctor Way, unknown usage	2 small single storey structures		72	10			
B3	Prospect House Day Nursery	2-storey office metal panel clad		38	14			
B4	Office Percival Way	Single storey steel portal frame workshops with brick clad office annex		Building 38, Annex 20	Building 20, Annex 6	Building 6, Annex 6	Building 760, Annex 120	Building 4560, Annex 720
B5	Alpha LSG	Single storey brick clad office/workshop		Office 35, Workshop 16	Office 56, Workshop 25	Office 4, Workshop 4	Office 1960, Workshop 400	Office 7840, Workshop 1600
B6	Monarch	Single storey steel portal frame workshops with brick clad office annex		56	14	10		
B7	TUI	3-storey office		30	22	10		
B11	Hangar 24	Steel framed aircraft hangar with blockwork internal single storey office. Building has asbestos products		55	30	10	1650	16500
B15	Police building B			43 x 12 x 8 and 18 x 12 x 8			732	
B17	Shed north of Holiday Inn			19	8		152	

DEMOLITION SCHEDULE TO ASSESSMENT PHASE 2A

Item ID	Item	Description / Assumed Material	Assumed Depth, m	Assumed Length, m	Assumed Width, m	Assumed Height (m)	Area footprint, m2	Volume m3
H2	Hardstands (Roads)	asphalt/Concrete	0.5				505	252
HC4	Hardstands (car parks)	asphalt	0.5				2458	1229
HC5	Car park 22	asphalt	0.5				3283	1642
HC6	TUI car park between nursery and B100	asphalt	0.5				5790	2895
HC7	Car parks, Police buildings	asphalt	0.5				510	255
HC9	P9 Car Park	asphalt	0.5				26030	13016
HC10	TUI car park	asphalt	0.5				5229	2615
HC11	TUI overflow car park	asphalt	0.5				5835	2968
HC12	P5 Car Park	asphalt	0.5				20884	10442
HC13	Tiered car park	asphalt	0.5				6826	3413
HC14	Trailer car park	asphalt	0.5				14123	7062
HC15	Tidy Tip	asphalt	0.5				4685	2342
HC16	Alpha LSG car parks	asphalt	0.5				5818	2909
HC17	Eaton House and Essex House car parks	asphalt	0.5				1365	683
HC18	Car Park / Compound (Off Airport Way)	asphalt	0.5				3850	1925
HC19	P6 & P7 Car Park	asphalt	0.5				98505	49253
HA3	Hardstands (airfield)	concrete and asphalt mix	0.5				33684	16842
SK	Soakaways		n/a					
BL	Blast fence	steel		207	4.32	1.74		1556
SB	Substation	brick						208
AR	Airside roads	concrete and asphalt mix	0.5				14946	7473
UG	U/G tank	alloy metal tank	50,000 lt capacity, to be removed					
V	Vegetation	Topsoil	0.3				809000	242700
T	Tree	Tree including Tree Trunk					51978	

Location plan

Luton Rising

London Luton Airport Expansion Development Consent Order

Drawing Title: INDICATIVE SITE CLEARANCE ASSESSMENT PHASE 2A

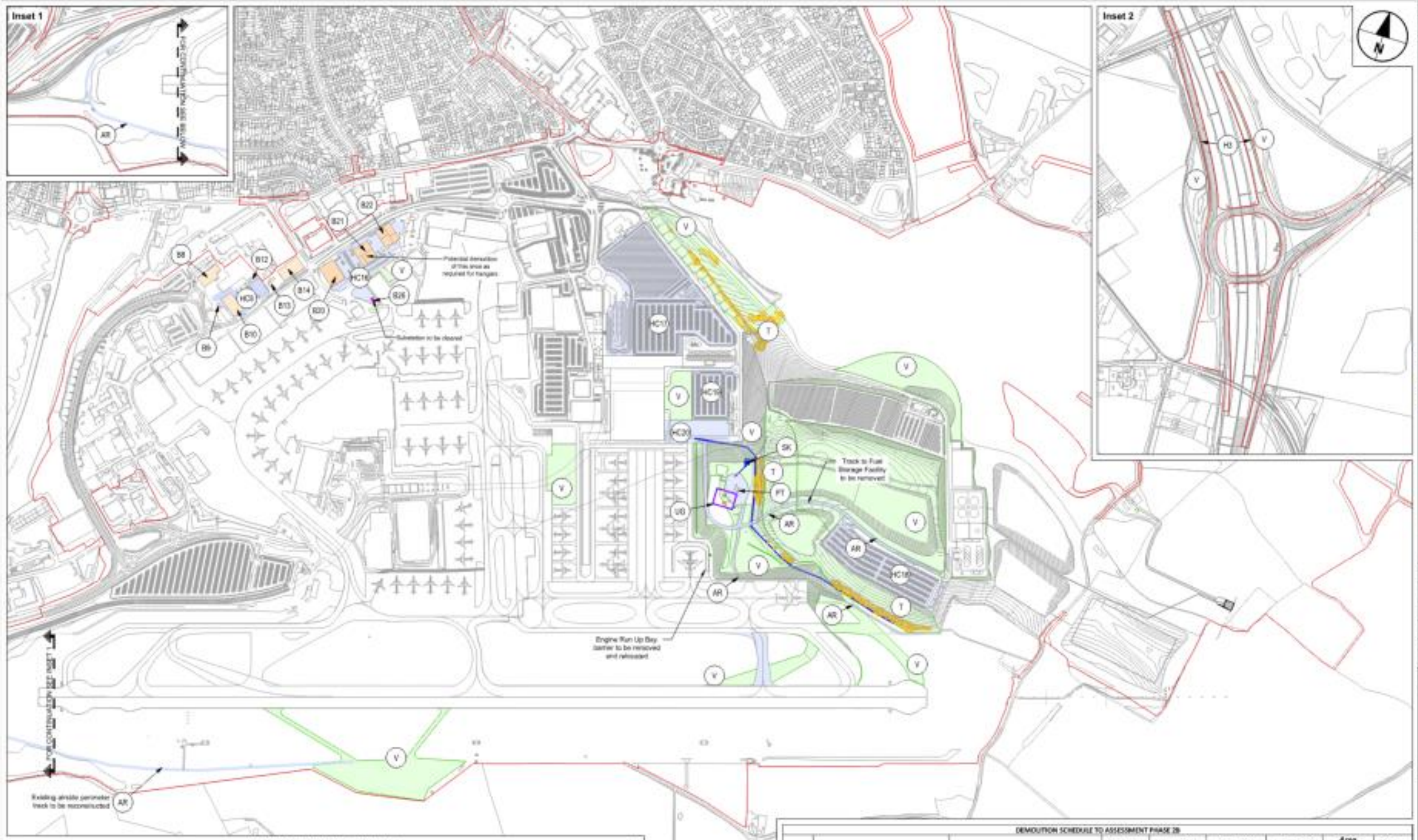
Purpose of issue	Suitability
INITIAL STATUS OR WIP	S0

Drawn	Checked	Approved	Date	Scale	Size
CJ	BR	AE	17-11-22	1:5000	A1

DCO Application Ref.	APFP Regulation	DCO Document Ref.
TR020001	5(2)(o)	TR020001/APP/5.02

Drawing Number	Revision
LLADCO-3C-ACM-WHS-SCL-DR-IN-0002	P06.1

D1.1.3 Site Clearance for Assessment Phase 2b (LLADCO-3C-ACM-WHS-SCL-DR-IN-0003)



DEMOLITION SCHEDULE TO 32MPPA

Item ID	Item	Description / Assumed Material	Assumed Depth, m	Assumed Length, m	Assumed Width, m	Assumed Height (m)	Area /footprint, m2	Volume m3
B8	Former City Net Catering	Single storey steel framed building with brick facades and annex		Building 47.5, Annex 22	Building 32, Annex 16	Building 4.6, Annex 4.6	Building 1472, Annex 352	Building 6773, Annex 1619
B9	Shed adjacent to Hangar 23	A steel framed light industrial building with elevations of corrugated bonded cement sheeting and asbestos products		13.5	10	4	135	540
B10	Hangar 26	Single storey steel portal framed with metal sheet cladding		55	30	10	1650	16500
B12	Electrical substation	One storey brick building, flat roof, adjacent to the GKN Reception		4.7	4.3	3	20	60
B13	GKN Reception	Various industrial sheds on this site, various heights (one storey) average height c.5m		12.4	7.5	3	93	279
B14	GKN 787 building	3-storey office		64	32		1890	8450
B20	De Havilland House	A two-storey building with brick /glaze facades		60	45	7.1	2700	19170
B21	Unit 1, 2, 3 and 4 President Way	Single-storey steel portal framed with metal sheet cladding		52	45	7.1	2340	16614
B22	EasyJet Academy	Two-storey steel framed building		52	45	7.1	2340	16614
B26	Airside support building/substation	Single storey pitched tile roof, brick walls and Annex		Building 13, Annex 6	Building 6.5, Annex 2.4	Building 3.4, Annex 2.6	Building 85, Annex 15	Building 287, Annex 34

1:5000 SCALE

DEMOLITION SCHEDULE TO ASSESSMENT PHASE 2B

Item ID	Item	Description / Assumed Material	Assumed Depth, m	Assumed Length, m	Assumed Width, m	Assumed Height (m)	Area /footprint, m2	Volume m3
H3	Hardstanding (Roads)	asphalt/Concrete	0.5				840	420
HC8	Car parks Hangars 24 and 26 and former city net catering	asphalt	0.5				3072	1536
HC16	Hardstands (car parks)	asphalt	0.5				11830	5915
HC17	Hardstands (car parks)	asphalt	0.5				67481	33740
HC18	Hardstands (car parks)	asphalt	0.5				25896	12948
HC19	Hardstands (car parks)	asphalt	0.5				12761	6380
HC20	Hardstands (Ground Support Equipment Parking)	asphalt	0.5				9730	4865
AR	Airside roads	concrete and asphalt m/r	0.5				12021	6010.5
FT	FTG Buildings including:							
FT	4 storage units	Metal	3				16.5	
FT	Bristol Britannia Fuselage	Aluminium	11.5				195.3	
FT	Dual Fuel Fire simulator	Metal	3				944	
FT	Drill Tower (3 storey)	Metal	10				40	
FT	Breathing apparatus chamber (2 storey)		6				180	
FT	CFBT simulator unit (2 no)		5				54	
FT	Classroom	Pre-fabricated	3				16.5	
FT	Simulator control hut	Pre-fabricated	3				40	
FT	Comfort facilities	Pre-fabricated	3				40	
FT	Bulk storage calor gas container	steel	2.5				150	
SK	Soakaways		n/a					
UG	UG tanks	alloy metal tank	25,000 lt capacity, to be relocated					
V	Vegetation	Topsoil	0.3				335800	100740
T	Trees	Tree including Tree Trunks					11870	

Appendix E – Estimated water demand

Assessment Phase 1										
	Potable Water								Foul Water Discharge	
	Unit / Rate	Litres	Quantity	Total Litres		working days per month	Total Litres per month	m3 of water per month	% discharged	m3 of water per month
Offices & Compounds										
Welfare Facilities (inc canteen) & compound	l/per person per day	40	400	16,000	per/d	22	352,000	352	100%	352
Wheel wash	l/per cycle	40	45	1,800	per/d	22	39,600	40	0%	0
Site Control posts	l/per cycle	40	10	400	per/d	30	12,000	12	100%	12
Logistics Centre	l/per cycle	40	45	1,800	per/d	22	39,600	40	100%	39.6
Concrete Batching										
Concrete batching plant	l/per m3	200	3,000	600,000				600	0%	0
Washdown	l/per cycle	50	45	2,250	per/d	22	49,500	50	80%	39.6
Dust Suppression	l/per tanker	1000	assume 1 per hour	8,000	per/d	22	176,000	176	0%	0
Bulk Earthworks										
Dust Suppression (earthworks)								250	0%	0
Stockpiling and Landscaping								100		0
Internal roads and Landscaping mitigation										
Dust Suppression	l/per tanker	2000	assume 1 per hour		per/d	22	0	0		0
Road Sweeping								100	20%	20
										0

Terminal building	average site consumption							50	25%	12.5
Airfield	average site consumption							100	25%	25
Commercial Development	average site consumption							50	25%	12.5
							Total	**1919**	**Total**	**513**

Assessment Phase 2a

	Potable Water								Foul Water Discharge	
	Unit / Rate	Litres	Quantity	Total Litres		working days per month	Total Litres per month	m3 of water per month	% Discharged	m3 of water per month
Offices & Compounds										
Welfare Facilities (inc canteen) & compound	l/per person per day	40	1,200	48,000	per/d	22	1,056,000	1056	100%	1056
Wheel wash	l/per cycle	40	90	3,600	per/d	22	79,200	79	0%	0
Site Control posts	l/per cycle	40	10	400	per/d	30	12,000	12	100%	12
Logistics Centre	l/per cycle	40	90	3,600	per/d	22	79,200	79	100%	79
Waste recovery centre	l/per cycle	40	10	400	per/d	30	12,000	12		
Concrete Batching										
Concrete batching plant	l/per m3	200	8,900	1,780,000				1780	0%	0
Washdown	l/per cycle	50	90	4,500	per/d	22	99,000	99	80%	79.2
Dust Suppression	l/per tanker	1000	assume 1 per hour	8,000	per/d	22	176,000	176	0%	0
Bulk Earthworks										
Dust Suppression (earthworks)								250	0%	0
Stockpiling and Landscaping								100		0

Dust Suppression	l/per tanker	2000	assume 1 per hour	16,000	per/d	22	353,000	352		0
Road Sweeping								100	20%	20
										0
Terminal building	average site consumption							200	25%	50
Airfield	average site consumption							100	25%	25
Commercial Development	average site consumption							200	25%	50
							Total	**4,595**	**Total**	**1371**

Assessment Phase 2b

	Potable Water								Foul Water Discharge	
	Unit / Rate	Litres	Quantity	Total Litres		Working days per month	Total Litres per month	m3 of water per month	% Discharged	m3 of water per month
Offices & Compounds										
Welfare Facilities (inc canteen) & compound	l/per person per day	40	600	24,000	per/d	22	528,000	528	100%	528
Wheel wash	l/per cycle	40	65	2,600	per/d	22	57,200	57	0%	0
Site Control posts	l/per cycle	40	10	400	per/d	30	12,000	12	100%	12
Logistics Centre	l/per cycle	40	65	2,600	per/d	22	57,200	57	100%	57
Waste recovery centre	l/per cycle	40	10	400	per/d	30	12,000	12		
Concrete Batching										
Concrete batching plant	l/per m3	200	6,600	1,320,000				1320	0%	0
Washdown	l/per cycle	50	90	3,250	per/d	22	71,500	72	80%	57.2

Dust Suppression	l/per tanker	1000	assume 1 per hour	8,000	per/d	22	176,000	176	0%	0
Bulk Earthworks										
Dust Suppression (earthworks)								250	0%	0
Stockpiling and Landscaping								100		0
Internal roads and Landscaping mitigation										
Dust Suppression	l/per tanker	2000	assume 1 per hour	16,000	per/d	22	352,000	352		0
Road Sweeping								100	20%	20
										0
Terminal building	average site consumption							200	25%	50
Airfield	average site consumption							100	25%	25
Commercial Development	average site consumption							200	25%	50
							Total	**3,536**	**Total**	**799**

Appendix F – Primary construction plant

NRMM Vehicle Type	Works / Use	Assessment Phase 1	Assessment Phase 2a	Assessment Phase 2b	Total Number	Fuel Type	Power Output (kW)	Total Number of Machine Days on Site (per assessment phase)			Operating Hrs Per Day
								Assess.Ph. 1	Assess.Ph. 2a	Assess. Ph.2b	
360-hydraulic excavators (40T)	Bulk excavation, car park, airfield, landfill, DART, CPAR, landside buildings	✓	✓	✓	**8**	diesel	235	400	5356	2582	8
360-hydraulic excavators (20T)		✓	✓	✓	**26**	diesel	234	5038	13659	12429	8
360-hydraulic long reach excavators	Demolition	✓	✓		**4**	diesel	234	258	1162	516	8
Crusher	Demolition		✓		**1**	diesel	315	0	387	0	9
Rigid Heavy Goods Vehicles (HGV)	Excavated material removal, bulk aggregates, concrete deliveries.	✓	✓	✓	**60**	diesel	239	10338	35040	24860	8

All terrain articulated dumper (40T)	Bulk earth works	✓	✓	✓	**39**	diesel	350	9701	21555	20463	8
Dumper (9T)	General earthworks	✓	✓	✓	**26**	diesel	55	9701	21555	10576	9
GPS Bulldozer	Bulk earthworks		✓	✓	**10**	diesel	126	2075	5043	4901	8
Soil stabiliser	Bulk earthworks		✓	✓	**3**	diesel	*126*	329	968	903	8
Roller	Bulk earthworks	✓	✓	✓	**10**	diesel	95	2264	4871	4600	8
Compressor s	Demolition, concrete works, road works	✓	✓	✓	**36**	diesel	*95*	6064	18758	15398	8
Concrete Paving Machine	Airfield – concrete pavement	✓	✓	✓	**1**	diesel	*140*	589	516	989	8
Asphalt paving machine	Roads and car parks	✓	✓	✓	**5**	diesel	*140*	1776	2860	2449	8

Roller	Roads and car parks	✓	✓	✓	**2**	diesel	95	520	774	516	8
Telehandler Forklift	Materials handling		✓	✓	**25**	diesel	129	5118	14928	10492	8
Tower Cranes	General lifting – foundation and superstructure		✓		**6**	electric		520	4950	1808	8
Mobile Truck Mounted concrete pump	Building superstructure, concrete works		✓	✓	**10**	diesel	129	1040	7444	3616	8
Concrete mixer truck	Electric concrete mixer truck	✓	✓	✓	**26**	diesel	125	5560	15378	13504	8
Mobile Cranes (100T)	Erection steel work, lifting plant and equipment (ETP/STP)	✓	✓	✓	**11**	diesel	370	1103	7444	4777	8
General waste skips	Removal of site waste	✓	✓	✓	**53**	diesel	238	9251	33157	21075	8
Vans	Site transport, plant service, materials, general deliveries, etc.	✓	✓	✓	**24**	diesel	142	4520	11700	9718	8

Cars	Couriers / site transport	✓	✓	✓	**38**	petrol	142	8652	19892	17112	8
Access equipment (cherry pickers / MEWPs)	Personnel access for works at height	✓	✓	✓	**42**	diesel	53	2600	34124	15500	8

Appendix G – Waste quantities (estimate)

Material Category	Material density	Quantity to be used in construction		Wastage rate	Wastage		Potential recycled content (% by weight)	Potential recycled content (tonnes)
	(tonnes/m3)	m3	tonnes	%	m3	tonnes		
Assessment Phase 1								
Concrete (m3)	2.4	46,373	111,295	5	2,319	5,565	16	17,807
Asphalt (m3)	2.4	57,505	138,013	2.5	1,438	3,450	25	34,503
Steel - Structural (tonnes)	7.85	-	301	0	-	-	60	181
Steel - Rebar (tonnes)	7.85	123	966	2	2	19	100	966
Aggregate (m3)	1.9	33,708	64,046	5	1,685	3,202	50	32,023
Earthworks material (granular) - imported (m3)	1.9	72,000	136,800	5	3,600	6,840	50	68,400
TOTAL		**209,280**	**449,419**				**Total aggregate potential recycled content (tonnes)**	**153,880**
							%	**34**

Assessment Phase 2a								
Concrete	2.4	393,509	944,421	5	19,675	47,221	16	151,107
Asphalt	2.4	104,866	251,678	2.5	2,622	6,292	25	62,919
Steel - Structural	7.85	-	8,941	0	-	-	60	5,365
Steel - Rebar	7.85	789	6,197	2	16	124	100	6,197
Aggregate	1.9	461,384	876,629	5	23,069	43,831	50	438,315
Earthworks material - imported	1.9	72,000	136,800	5	3,600	6,840	50	68,400
TOTAL		**1,032,548**	**2,224,666**				**Total aggregate potential recycled content (tonnes)**	**720,742**
							%	**33**

Assessment Phase 2b								
Concrete	2.4	85,882	206,117	5	4,294	10,306	16	32,979
Asphalt	2.4	63,126	151,503	2.5	1,578	3,788	25	37,876
Steel - Structural	7.85	-	4,585		-	-	60	2,751
Steel - Rebar	7.85	296	2,324	2	6	46	100	2,324
Aggregate	1.9	137,087	260,466	5	6,854	13,023	50	130,233
Earthworks material - imported	1.9	179,000	340,100	5	8,950	17,005	50	170,050
TOTAL		**465,391**	**965,094**				**Total aggregate potential recycled content (tonnes)**	**371,137**
							%	**39**

Appendix H – Primary material quantities (estimate)

Primary Materials Quantities Estimate

Total (Estimate)	Assessment Phase 1 - 21.5mppa	Assessment Phase 2a - 27mppa	Assessment Phase 2b - 32mppa	Total
Concrete (m3)	46,373	393,509	85,882	525,457
Asphalt (m3)	57,505	104,866	63,126	225,497
Steel - Structural (tonnes)	301	8,941	4,585	13,526
Steel - Rebar (tonnes)	123	6,197	2,324	8,521
Aggregate (m3)	33,708	461,384	137,087	632,179
Earthworks material - excavated (m3)	113,000	1,354,000	1,689,000	3,156,000
Earthworks material (granular) - imported (m3)	43,000	289,000	211,000	543,000
Earthworks material - exported (m3)	3,000	34,000	3,000	40,000
Airfield				**Total**
Asphalt	10,577	47,374	21,448	79,399
Concrete Pavement	7,562	28,720	26,402	62,684
Lean concrete	14,452	70,457	29,520	114,428
Granular	22,972	88,191	52,409	163,573