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7.09 Design Principles

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**London Luton Airport Expansion Development Consent
Order 202x**

7.09 DESIGN PRINCIPLES

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1 INTRODUCTION

1.1 Purpose of this document

- 1.1.1 This document sets out the design principles that will be followed at the detailed design stage (post Development Consent Order (DCO) consent). These design principles will be secured through the DCO and will provide certainty as to the principles that will be applied in designing the Proposed Development. The document provides stakeholders with assurance on how the design of the project will be developed following the grant of consent.
- 1.1.2 This document has been revised to collate the design principles into one document and address comments made at the Issue Specific Hearings (ISH) and take into account the responses to ISH 6, Action Point 31 issued at deadline 4 by the host local authorities.
- 1.1.3 In particular, the commitments in this document are secured in the following way:
- a. Requirement 5 (detailed design, phasing and implementation) in Schedule 2 of the Draft DCO **[TR020001/APP/2.01]** requires that the details of the buildings, structures and works must be approved by the relevant planning authority and that these details must be in accordance with this document, Design Principles.
 - b. Requirement 8 (Landscaping design) requires that the landscaping scheme approved under this requirement must also be in accordance with the principles set out in the Design Principles document.
 - c. Requirement 12 (surface and foul water drainage) requires that written details of a surface and foul water drainage plan be approved which are in accordance with the drainage principles set out in the Design Principles document.
- 1.1.4 This document should be read alongside the **Design and Access Statement (DAS) [AS-049, AS-124]** which was submitted as part of the application for development consent.
- 1.1.5 The design principles set out here do not seek to replicate the embedded design measures detailed within ES **Chapter 3** Alternatives and Design Evolution **[AS-026]** which have been specified in detail as part of the DCO application.
- 1.1.6 For construction related principles refer to the Code of Construction Practice (ES **Appendix 4.2** Code of Construction Practice **[REP4-011]**) which outlines the environmental management and mitigation requirements to be implemented throughout the construction period.
- 1.1.7 This document has drawn on a number of documents submitted as part of the application for development consent but, for the avoidance of doubt, this Design Principles document will take precedent, in respect of governing the detailed design of the Proposed Development, as a document that is secured through the DCO.

1.1.8 The design principles are grouped under four main headings and several subheadings as listed below:

Scheme wide design principles

- a. design quality;
- b. sustainability;
- c. biodiversity; and
- d. noise and vibration.

Landscape principles

Works design principles

- a. site wide works;
- b. airfield works;
- c. terminal works;
- d. airport support facilities works; and
- e. highways works.

Drainage principles

2 SCHEME WIDE DESIGN PRINCIPLES

2.1 Introduction

2.1.1 This section lists the scheme wide design principles that will apply to the whole of the Proposed Development.

2.2 Design quality

2.2.1 The design of the Proposed Development as detailed within the **Scheme Layout Plans [AS-072]** has responded to the context of the landscape, neighbouring land and property uses, and has considered the need to minimise impact. The following design principles will be followed at the detailed design stage.

2.2.2 The design principles set out in this document have been informed by a variety of national and local documents such as the National Model Design Code (Ref 2.1), Airports National Policy Statement (Ref 2.2); National Planning Policy Framework (NPPF) (Ref 2.9); Luton Local Plan (2011-31) (Ref 2.3); Central Bedfordshire Local Plan (2015 – 2035) (Ref 2.10); North Hertfordshire Local Plan (2011 – 2031) (Ref 2.11) and the Dacorum Local Plan (2006-2031) (Ref 2.12). They have been developed through the ongoing design development process and reflect responses to consultation and stakeholder engagement where appropriate.

Table 2-1: Design quality design principles

Reference	Design quality design principles
DQ.01	The detailed design of the Proposed Development will be: <ul style="list-style-type: none"> a. visually appropriate and sensitive to place, creating an appearance that demonstrates good aesthetics as far as possible; b. responsive to landscape and historical character and function, landscape permeability, landform, and vegetation; c. sustainable, durable, adaptable and resilient; d. efficient in the use of natural resources and energy used in construction; e. operationally fit for purpose and cost effective; and f. compliant with all relevant safety, fire and security standards.
DQ.02	The detailed design of public buildings, landscape areas, public realm and movement routes within the Proposed Development will: <ul style="list-style-type: none"> a. seek opportunities to respond to the local character and identity; local heritage; and culture where appropriate; b. create well-designed, good quality and attractive buildings and places; c. create accessible and well-connected places; d. achieve clear distinction between public and private spaces;

Reference	Design quality design principles
	<ul style="list-style-type: none"> e. implement a clear wayfinding system and seek opportunities for public art installations to enhance the identity of the airport; f. use good quality public realm materials, furniture, and lighting; and g. provide well-considered parking, servicing and utilities infrastructure for all users.
DQ.03	The detailed design will use good quality and robust building materials to limit the need for maintenance throughout its lifecycle.
DQ.04	The detailed design will provide safe and inclusive access for all users.
DQ.05	The detailed design will provide new public spaces and routes that are attractive, safe, uncluttered and work efficiently for all airport users.
DQ.06	The detailed design will specify the appearance of the Proposed Development. .
DQ.07	<p>The detailed design will consider provisions to account for groups with protected characteristic groups. This includes:</p> <ul style="list-style-type: none"> a. providing lifts; b. providing separate single-sex toilets for women and men and/or self-contained, private toilets where space allows; c. providing adequate space for prayer rooms; d. making provisions for faith and culture aware eating facilities; e. ensuring that the location of the taxi rank is in an adequate space; and f. ensuring that there is step-free access to bus stops and facilities.
DQ.08	Having regard to the setting of Luton Hoo and Someries Castle the detailed design of the Proposed Development will be visually appropriate, sensitive to place and responsive to the historic environment through the appropriate choice of materials, colour palette and finishes.
DQ.09	The detailed design of the Proposed Development will need to undergo a technical safeguarding assessment to ensure no unacceptable adverse impact upon navigational aids including NATS ATC equipment.
DQ.10	The detailed design of the Proposed Development will comply with the requirements of the Disability Discrimination Act (Ref: 2.6) (or equivalent legislation at the time detailed design is carried out).
DQ.11	The detailed design of Proposed Development will comply with Civil Aviation Authority CAP1228, Guidance on quality standards under regulation EC 1107/2006 (Ref 2.7) and European Civil Aviation Conference (ECAC) Document in consideration to the requirements for Persons of Restricted Mobility (or equivalent legislation at the time detailed design is carried out).

2.3 Sustainability

2.3.1 The sustainability design principles are derived from the five sustainability strategy objectives (**Sustainability Statement [APP-216]**):

- a. protecting and enhancing the natural environment;
- b. delivering climate resilience and business continuity;
- c. leading the transition to Carbon Net Zero;
- d. becoming a national hub for green technology, finance, and innovation; and
- e. creating a place to thrive.

Table 2-2: Sustainability design principles

Reference	Sustainability design principles
SUS.01	A low energy design will generally be adopted, based on the hierarchy of minimising use, reducing waste, recycling and on-site generation.
SUS.02	Electric charging will be provided in the passenger and staff car parks and dedicated electric charging points for taxis.
SUS.03	Zero emission electric equipment or heat pumps will replace fossil-fuel-powered fixed equipment by 2040 at the latest.
SUS.04	Detailed design will safeguard, where practicable, the ability to serve next generation (including zero emission) aircraft.
SUS.05	During design and construction, measures to reduce waste generated and resources used will be applied, including recycling of demolition waste on-site, recycling and use on-site of existing landfill material, balancing cut and fill and setting waste targets details of which can be found in Waste and Resources Chapter 20 of the ES [REP4-009] .
SUS.06	All buildings, surface access routes, taxiways, aprons and other airside and airfield assets will be designed for the climatic conditions forecast over the lifecycle of the building using appropriate design guidance where available; or adaptive capacity will be built into the designs.
SUS.07	Terminal 2 buildings will be designed to 'BREEAM Excellent' status' (or equivalent at the time of detailed design) to be energy efficient with appropriate installations and equipment together with thermally efficient materials and shading. Other new buildings will be designed to 'BREEAM 'Excellent' status' (or equivalent at the time of detailed design) except where the building typology dictates that it is not practical. This paragraph is subject to SUS.15
SUS.08	Terminal 2 will aim to balance natural daylight to enhance the internal environment, whilst minimising solar radiation across the building's façade.
SUS.09	Terminal 2 will be designed to reduce heat loss and minimise energy use, in accordance with Building Regulations Part L (or other relevant

Reference	Sustainability design principles
	and appropriate standards that are in place when the detailed design is being carried out).
SUS.10	Passive strategies for heating, cooling and lighting will be incorporated into building design for thermal efficiency, where appropriate, to reduce summer cooling including adequate Heating, Ventilation, and Air Conditioning (HVAC).
SUS.11	The Luton DART extension design will include a covered station (i.e. protected from the elements) to minimise possible heat loss.
SUS.12	Energy centre and new sub-stations will be in enclosed structures at ground level for ease of maintenance and equipment replacement.
SUS.13	Landscape design will take into consideration climate change in the selection of appropriate species for planting and habitat creation.
SUS.14	Shaded areas across surface access areas will be included in the design e.g. the car park, bus stops.
SUS.15	Detailed design will include such water efficiency measures as are necessary, so far as reasonably practicable, to maintain water demand (excluding construction water demand) at the 2019 consumption baseline. ¹ Rainwater harvesting solutions will be incorporated in detailed designs. Potable water efficiency measures will also be incorporated in the design of buildings, in order to minimise potable water demand from the statutory undertaker.
SUS.16	Existing infrastructure will be retained where feasible to minimise the need for the demolition of components and infrastructure and the associated generation of waste material.
SUS.17	Adequate provision for internal and external waste storage will be designed to allow waste segregation during operation.
SUS.18	Subject to engineering and technical requirements, new underground utilities will not be laid at shallow depths to avoid damage due to temperature extremes.
SUS.19	Above ground installations, where appropriate, will be in enclosed structures which will provide the opportunity for climate/temperature control.
SUS.20	When working in the vicinity or above the existing landfill site measures such as surcharging/ground improvement techniques, flexible pavements and modified service connections will be embedded through detailed design where practicable.

¹ '2019 consumption baseline' means 4.2 litres per second in respect of water demand for the airport terminals and 3.3 litres per second in respect of water demand for the airport non-terminals, as outlined in the Water Cycle Strategy (Appendix 20.5 of the ES [REP4-033]).

Reference	Sustainability design principles
SUS.21	Measures will be used during construction to prevent erosion such as compaction of soils, phased excavation, use of temporary capping and geotextile layers where feasible.
SUS.22	Sustainable Drainage Systems (SuDS) will be provided, where feasible, suitable for extreme rainfall events.
SUS.23	Where practicable, excavated material considered unsuitable for use under the aviation platform will be used elsewhere within the Proposed Development.

2.4 Biodiversity

- 2.4.1 The Proposed Development is designed to enhance biodiversity through the delivery of at least 10% biodiversity net gain (BNG) through construction and operation of the Proposed Development.
- 2.4.2 The biodiversity design principles set out below outline the measures to be undertaken to ensure that the BNG commitment is achieved through the delivery of the Proposed Development. These principles should be read in conjunction with **Appendix 8.2** Outline Landscape and Biodiversity Management Plan of the ES **[AS-029]**.

Table 2-3: Biodiversity design principles

Reference	Biodiversity design principles
BIODV.01	The landscape design for the Proposed Development will include large areas of habitat creation which will be designed and managed to ensure their target condition exceeds that of the habitats lost and delivers at least 10% BNG ² .
BIODV.02	The detailed design will incorporate a buffer of semi-natural habitats, at least 15m in width around areas of ancient woodland within or adjacent to the Proposed Development. No ground works will be permitted within this buffer so that trees within ancient woodland are protected from root damage and soil compaction.
BIODV.03	The detailed design of the Proposed Development will incorporate a root protection zone to protect the roots of retained veteran/ancient trees and potential veteran/ancient trees where such trees will be retained within or directly adjacent to the Proposed Development in accordance with BS 5837 (2012) – Trees in Relation to Design, Demolition and Construction (Ref 2.4).
BIODV.04	<p>The detailed lighting design shall include measures to avoid obtrusive light effects and adverse impacts on biodiversity. Best practice measures for consideration are outlined in Institution of Lighting Professionals (ILP) Guidance Note GN01 and GN08 (Ref. 2.8) shall include, but not be limited to the following:</p> <ol style="list-style-type: none"> a. Lighting design not to exceed design code recommendations for illuminance and glare and to consider best practice guidance for limiting light obtrusion effects. b. Use of horizontal cut-off luminaires with zero tilt to avoid direct upward light. c. Lighting designs to avoid spill light beyond the task area. d. Luminaire aiming (or main beam angle) not to exceed 70° from nadir. e. High-mast systems limited to 25m tall. f. Avoid placing luminaires at the perimeter of decked car parks or other elevated structures. g. Use of warm white light sources (with limited blue spectrum wavelengths) is preferred. h. Use of automatic lighting controls to manage the use of lighting according to usage. <p>The detailed design of external lighting will include directional lighting to limit light spill onto adjacent habitats and neighbourhoods. The design will include baffles, cowls and hoods in appropriate areas to further reduce light spill.</p>

2.5 Noise and Vibration

2.5.1 The noise and vibration design principles listed below are set out to mitigate the effects of the Proposed Development.

Table 2-4: Noise and vibration design principles

Reference	Noise and vibration design principles
NV.01	The new Engine Run-up Bay (ERUB) will be designed to reduce engine noise levels at sensitive receptors. The design will be a three-sided enclosure designed to attenuate engine noise and associated blast at full-power velocities. The design of deflectors will be aerodynamically efficient to reduce air turbulence, which can affect ground running aircraft engines.
NV.02	The detailed design of fixed plant (including any static sources of noise, such as mechanical electrical and public health plant for terminal building infrastructure associated with the Proposed Development) will be in accordance with the relevant provisions of the Fixed Plant Noise Management Plan [REP4-025] .
NV.03	The design will include acoustic barriers as set out in the Outline Ground Noise Management Plan [REP4-049] .
NV.04	The detailed design of buildings will prioritise piling methods which reduce noise and vibration during construction.

² The measures to establish, manage and monitor areas of habitat creation within the Proposed Development are detailed within the Outline Landscape and Biodiversity Management Plan Environmental Statement, Appendix 8.2 [AS-029].

3 LANDSCAPE

- 3.1.1 The Proposed Development will impact on the existing landscape character and on people's visual amenity during both construction and operation. The landscape design principles provide clear guidance for the future development of the Proposed Development's detailed design relating to landscape.
- 3.1.2 The landscape design principles listed below have guided the development of the **Strategic Landscape Masterplan [APP-172]** and **Appendix 8.2** Outline Landscape and Biodiversity Management Plan of the ES **[AS-029]** and should be read in conjunction with these documents.
- 3.1.3 These principles will continue to guide the future more detailed design to provide a cohesive and consistent approach.

Reference	Landscape design principles
LAND.01	The landscape proposals will retain, protect, and enhance valued landscape, heritage, and biodiversity features.
LAND.02	The existing connectivity between green infrastructure assets shall be improved within the landscape proposals, which will improve habitat connectivity and encourage a diversity of wild flora.
LAND.03	The Proposed Development will avoid or reduce adverse effects on valued features and in instances where features are lost or damaged, restore and enhance these features, including hedgerows and traditional field boundaries.
LAND.04	The landscape proposals will establish new areas of planting, including woodland, scrub, trees and grassland.
LAND.05	The Proposed Development will use landscaping and tree planting to provide visual screening to the airport.
LAND.06	The landscape proposals will encourage public access through the Replacement Open Space but dissuade access to the Habitat Creation area to encourage wildlife and biodiversity to thrive.
LAND.07	The landscape proposals for the Wigmore Valley Park Improvements and the Replacement Open Space will create a 'country park' character taking inspiration from the surrounding character of the area.
LAND.08	The landscape proposals will create a gradual transition from the formal park in the west towards the rural character in the east. The use of a cohesive palette of materials will link the two.
LAND.09	The landscape proposals will improve existing facilities within Wigmore Valley Park.
LAND.10	The landscape proposals will provide opportunities for unstructured or natural play and additional recreational facilities.
LAND.11	The landscape proposals will be designed and developed to minimise the risk of bird strike in accordance with the Bird Strike Risk Assessment [APP-066] .

Reference	Landscape design principles
LAND.12	The Proposed Development will provide public realm that is inclusive and unifying, incorporating formal hard and soft landscape as well as best practice on water management.
LAND.13	The landscape proposals will provide considered circular walks and include links into wider connections, including multi-user routes and ensuring accessibility for all.

4 WORKS DESIGN PRINCIPLES

4.1 Introduction

4.1.1 The Proposed Development has been divided into six main Work Numbers. These are described in more detail in **Chapter 4** of the ES **[TR020001/APP/5.01]**:

1. site wide major works to enable development;
2. airfield works;
3. terminal and associated works;
4. airport support facilities works;
5. landscape and mitigation works; and
6. highways works.

4.1.2 This section lists the design principles that will apply to the Works.

4.1.3 Landscape and mitigations work design principles are described in **Section 3** above.

4.2 Site wide works (Work No. 1)

4.2.1 The design principles listed below will guide the detailed design of elements which cover significant areas of Main Application Site.

Table 4-1: Site wide works design principles

Reference	Site wide works design principles
SW.01	The detailed design of earthworks will be in accordance with Design Manual for Roads and Bridges published by National Highways (Ref 4.1) or other relevant and appropriate standards that are in place when the detailed design is being carried out.
SW.02	Where fill material is required to create the landform needed to enable the development, wherever possible it will be from within the site.
SW.03	The detailed design of earthworks will provide a 5m offset between the design surface features and the top of any slope.

Reference	Site wide works design principles
SW.05	The detailed design of earthwork slopes in fill areas will be limited to 1 in 3, and where they exceed 20m will include a half height berm.
SW.06	The detailed design of earthworks will maintain the landform at least 2m above the maximum design groundwater level.
SW.07	The design of extensions and/or diversions of utilities will not include overhead services.
SW.08	The design of all new or diverted below ground Low Voltage (LV) and comms utilities will include containment for ease of installation, maintenance and replacement. Containment will include suitable access chambers at regular intervals as required by any relevant design standards.
SW.09	The detailed design of structures will be above the water table to minimise disturbance of the aquifer and flow paths.
SW.10	The detailed design of all buildings constructed over the former Eaton Green landfill will adopt gas protection measures in accordance with BS8485:2015+A1:2019 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings (Ref 4.2), or equivalent at the time.
SW.11	The detailed design will include lightning protection as per latest design standards on all buildings and sensitive electrical/navigation aids/communications equipment.

4.3 Airfield works (Work No. 2)

- 4.3.1 Airfield works include the expansion of the airfield for airside operations. The proposed works include the provision of the aprons and taxiways and the relocation of a number of essential airfield facilities, including the Fire Training Ground and ERUB.
- 4.3.2 The design principles listed below will support the objective of making best use of the runway (Ref 4.9) and guide the detailed design of elements of the airfield works.

Table 4-2: Airfield works design principles

Reference	Airfield works design principles
AF.01	The detailed design of the proposed airfield will comply with International Civil Aviation Organisation (ICAO) Annex 14 (Ref. 4.5) or equivalent UK standards (or other relevant and appropriate standards that are in place when the detailed design is being carried out).
AF.02	New taxiways will be designed for Code E aircraft (as defined in ICAO Annex 14).

Reference	Airfield works design principles
AF.03	Apron taxilanes will be designed for Code E or Code C (as defined in ICAO Annex 14) aircraft as necessary to provide aircraft routing to stands.
AF.04	All airfield pavements will be designed with Aeronautical Ground Lighting (AGL) appropriate for the operational requirements of the airport with respect to day and night operations, operations in low visibility, the promulgated instrument landing system category and in accordance with ICAO Annex 14 or equivalent UK standards (or other relevant and appropriate standards that are in place when the detailed design is being carried out).
AF.05	All taxiway and apron surface markings will be designed in accordance with Annex 14 or equivalent UK standards and Civil Aviation Authority publication CAP 637: Visual Aids Handbook (Ref 3.3) (or other relevant and appropriate standards that are in place when the detailed design is being carried out).
AF.06	New aircraft stands will be designed as rigid pavement construction (typically pavement quality concrete). Where new aircraft stands are constructed over the existing landfill a flexible pavement solution will be used to aid future maintenance due to anticipated settlement.
AF.07	New taxiways will be designed as flexible pavement construction.
AF.08	The design will include additional taxiways to provide additional runway capacity by reducing runway occupancy times. New taxiways will include apron taxilanes and rapid exit taxiways (RETs).
AF.09	All airfield pavements will be constructed with positive drainage solutions to prevent surface run-off draining to unpaved areas.
AF.10	The Terminal 2 apron will be designed to accommodate 28 Code C stands and six Code E aircraft (with Code E aircraft operating from Multiple Apron Ramp System (MARS) stands. All aircraft parking stands at Terminal 2 will be contact stands.
AF.12	Each aircraft parking stand to be used for boarding and disembarkation of passengers will be equipped with fixed electrical ground power, advanced docking guidance equipment and emergency telephone. MARS stands will be equipped for two Code C and one Code E aircraft. No equipment will be provided in the ERUB.
AF.13	Stands will be designed with a fuel hydrant system connecting to the fuel storage facility.
AF.14	Detailed design of Terminal 2 apron will include a hydrant system for fire-fighting purposes. The existing number of emergency water tanks around the runway will be retained.
AF.15	The airfield works detailed design will provide routes that provide rescue and firefighting service (RFFS) response times in compliance with ICAO Annex 14 (Ref 4.4) from the existing Fire Station, and the existing and proposed Fire Training Ground, to any part of the operational airfield.

Reference	Airfield works design principles
AF.16	The ERUB will be designed with acoustic barriers on three sides and a jet blast deflector to the rear of the aircraft when positioned for engine testing. Both the acoustic fencing and jet blast deflector will be designed to be demountable so as to facilitate relocation.
AF.17	The new Fire Training Ground will be designed with a simulator suitable for all fire categories promulgated by the airport at the time of detailed design.
AF.18	The facilities at the Fire Training Ground will be designed to avoid penetrating the obstacle limitation surfaces as defined in ICAO Annex 14 (Ref 4.4) or equivalent UK standards.
AF.19	The new Fire Training Ground will be designed with smoke reducing facilities.
AF.20	The drainage system at the Fire Training Ground will be self-contained and will not discharge to surface water sewers. Paved areas will be positively drained and be of sufficient scale to ensure fire-fighting media and products of combustion do not spill into unpaved areas.
AF.21	The facilities at the new Surface Movement Radar will be designed to avoid penetrating the obstacle limitation surfaces as defined in ICAO Annex 14 (Ref 4.4) or equivalent UK standards.
AF.22	The design will include new security fencing to demarcate the airfield boundary. Security fencing will be in accordance with BS 1722 Part 14 (Ref 4.5) and will comply with the requirements of Aviation Security in Airport Design (Ref 4.6) (or other relevant and appropriate standards that are in place when the detailed design is being carried out).
AF.23	The design will include jet blast deflectors to allow safe working and access at the end of apron cul-de-sacs and other locations as required.
AF.24	The detailed design will aim to minimise interference with existing airport operations and assets.
AF.25	The detailed design of external lighting will be in accordance with civil aviation requirements (ICAO Annex 14 (Ref 4.4) so as to minimise glare to pilots of aircraft in flight, or on the ground, such that they will not dazzle or confuse a pilot when approaching to land, taking off or taxiing.

4.4 Terminal works (Work No. 3)

4.4.1 Terminal works include proposed work to increase the capacity of the existing Terminal 1 and the development of Terminal 2 and all the facilities and assets required to support the operation of Terminal 2.

4.4.2 The design principles listed below will guide the detailed design of the terminal works.

Table 4-3: Terminal works design principles

Reference	Terminal works design principles
T.01	The detailed design of the terminal buildings, and associated structures and spaces will be developed with reference to relevant industry design standards and statutory security requirements including Building Regulations, the International Air Transport Association (IATA) Airport Development Reference Manual (Ref 4.7), and Aviation Security in Airport Design (Ref 4.6) (or other relevant and appropriate standards that are in place when the detailed design is being carried out).
T.02	The detailed design of the terminal will adopt appropriate architectural surface finishes on proposed elevations to reduce visual impact.
T.03	The detailed Terminal 2 building design will provide flexibility to allow for battery storage for electricity to be accommodated in the future.
T.04	The Terminal 2 piers will be designed to future proof addition of passenger boarding bridges (PBB).
T.05	Terminal 2 and the Terminal 2 piers will be designed with minimal change in levels or ramps on each floor level.
T.06	Terminal 2 and the Terminal 2 piers will be designed to ensure that arriving and departing passengers cannot mix in airside locations within the building or on the apron.
T.07	Piers will be designed to ensure sufficient vehicle routes at apron level for the efficient operation of the airfield.
T.08	The detailed design of internal finishes will be robust, durable and with a design life to first major refurbishment of at least 20 years.
T.09	The detailed design will include consistent and intelligible wayfinding using international standards for icons with font height and colour scheme to aid visually impaired passengers.
T.10	The Coach Station will be designed to include a roof/canopy structure to provide weather protection to passengers accessing the bays.
T.11	The Coach Station design will include a building structure for provision of services such as ticketing, waiting areas and concessions.
T.12	The detailed design of the Coach Station will adopt muted and subtle architectural surface finishes on proposed elevations to reduce visual impact.
T.13	Cycle parking will be integrated as part of the detail design of the Drop Off Zone.
T.14	Dedicated footpaths and crossings will be provided on the internal road network, to provide high quality pedestrian routes and to encourage walking.
T.15	The Drop Off Zone designs will comply with Aviation Security in Airport Design (Ref 4.6) or other relevant and appropriate standards that are in place when the detailed design is being carried out).
T.16	The Terminal 2 Plaza design will ensure that surface treatments are accessible to all users and that suitable shelter is provided along principal connecting routes. The positioning of signage will also be

Reference	Terminal works design principles
	coordinated to ensure information is clear and routes are clearly demarcated.
T.17	The Terminal 2 Plaza design will incorporate a hard and soft-landscape environment and seating areas.
T.18	The Luton DART T2 Station will provide lifts and escalators, as well as wide station platforms to provide access for passengers with reduced or impaired mobility.
T.19	The detailed design of the Luton DART Terminal 2 Station will adopt appropriate architectural surface finishes on proposed elevations to reduce visual impact.
T.20	The Energy Centre building will be positioned within the vicinity of the new terminal building and its geometry and façade will be detailed to align with the Terminal 2.

4.5 Airport support facilities works (Work No. 4)

4.5.1 Airport support facilities works include all the facilities and assets required to support the operation of the expanded airport, including facilities such as ground operations, hangars, car parks, water treatment and fuel storage.

4.5.2 The design principles listed below will guide the detailed design of the airport support facilities works.

Table 4-4: Airport support facilities works design principles

Reference	Airport support facilities works design principles
ASF.01	The detailed design of the airport support facilities buildings, structures and spaces will be developed with reference to relevant industry design standards and statutory security requirements including Building Regulations, IATA Airport Development Reference Manual (Ref 4.7) (where appropriate), and Aviation Security in Airport Design (Ref 4.6) (or other relevant standards in place at the time the detailed design is developed).
ASF.02	The detailed design of the hotel will adopt appropriate architectural surface finishes on proposed elevations to reduce visual impact.
ASF.03	The detailed design of the hangars will adopt appropriate architectural surface finishes on proposed elevations to reduce visual impact.
ASF.04	The new fuel storage facility will be designed in accordance with The Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) (Ref 4.8) and/or other relevant guidance in place at the time of the detailed design.
ASF.06	The design of the fuel storage facility will include enhanced security.

Reference	Airport support facilities works design principles
ASF.07	The new fuel pipeline spur will be buried below ground to suitable depth in accordance with relevant guidelines in place at the time of design.
ASF.08	The detailed design of the fuel spur will reinstate all landscaping finishes to the same condition as before any works take place, recognising the location within the Green Belt.
ASF.09	The detailed design of the fuel spur will include an above ground installation (AGI). The design of the AGI will include a perimeter security fence and a new access track from the public highway in accordance with end user requirements.
ASF.10	The detailed design of car parking bays in publicly accessible car parks will be a minimum of 4.8 x 2.4m wide. Disabled bays will be 6.0 x 3.6m minimum. Through roads will be a minimum of 6m wide.
ASF.11	The detailed design of the proposed solar panels will comply with relevant and appropriate standards in place when the detailed design is being carried out (as detailed within Section 2.3, Glint and Glare Assessment [REP4-040]) to avoid unacceptable visual impacts on both ground based and airborne sensitive receptors.

4.6 Highways works (Work No. 6)

- 4.6.1 The **Surface Access Strategy [APP-228]** for the Proposed Development sets out measures to enhance the quality of the travel experience, minimise traffic-related impacts, and encourage more sustainable forms of travel. A range of interventions are proposed to improve access to the airport for both passengers and people who work at the airport.
- 4.6.2 The design principles listed below will guide the detailed design of the highways works.

Table 4-5: Highways works design principles

Reference	Highways works design principles
HW.01	The detailed design of highways associated with the Proposed Development will be in accordance with the Design Manual for Roads and Bridges (DMRB) (Ref 4.1), and the Local Authority Highway Design requirements for: <ul style="list-style-type: none"> • Luton Borough Council; • Central Bedfordshire Council; and • Hertfordshire County Council.
HW.02	The detailed design of highways associated with the Proposed Development will include the completion of road safety audits.
HW.03	The off-site highways intervention areas will be restricted, as far as possible, to existing highway boundaries.
HW.04	The detailed design of the Airport Access Road will incorporate a low noise road surface.
HW.05	The detailed design of the Airport Access Road will include the provision of an acoustic barrier along the north-eastern side of Airport Access Road adjacent to the Holiday Inn hotel, with approximate dimensions of 132m (length) x 2m (height).

5 DRAINAGE WORKS

- 5.1.1 **Volume 5 Environmental Statement, 5.02 Appendix 20.4 Drainage Design Statement [REP4-031]** describes the surface and foul water drainage infrastructure that will be designed later if the DCO is granted and such designs must reflect the principles set out in this Design Principles document.
- 5.1.2 The design principles listed below will guide the detailed design of the drainage works and should be read in conjunction with the **Drainage Design Statement [REP4-031]**.

Table 5-1 Drainage works design principles

Reference	Drainage works design principles
	General
DDS.01	The detailed design of drainage will be in accordance with Design and Construction Guidance (Ref. 5.1) or equivalent at the time, unless otherwise agreed with the relevant planning authority.
DDS.02	The detailed design of inspection chambers deeper than 3m will be in accordance with the Highway Construction Details (HCD) F series (Ref. 5.2) or equivalent at the time, unless otherwise agreed with the relevant planning authority.
	Rainwater Harvesting/Water Balance
DDS.03	The detailed design will incorporate water efficiency measures as detailed in SUS.15.
DDS.04	The drainage design will include measures that maximise water reuse, such as greywater reuse and rainwater harvesting. The development of these measures would be informed by the Water Cycle Strategy (Appendix 20.5 of the ES [REP4-033]) to be revisited prior to construction with reference to guidance from LBC, Affinity Water and the Environment Agency.
DDS.05	The detailed design will include investigation of the T1 campus and development of solutions for rainwater harvesting for the existing terminal and hangar buildings. The rainwater harvesting system will be in addition to any attenuation required to meet the required runoff rates.
DDS.06	The detailed design of T2 will develop solutions for rainwater harvesting. The rainwater harvesting system will be in addition to any attenuation required to meet the required runoff rates.
DDS.07	Harvested rainwater will be treated as required, so that the quality is fit for the intended non-potable use.
DDS.08	The detailed design will include specification of operation and maintenance of drainage forming part of the Proposed Development, including the monitoring of water consumption during operation in agreement with Affinity Water as the regulatory local water supplier.
	Tanks

DDS.09	The detailed design will adopt tanks. Open waters will be avoided to reduce the risk of bird attraction.
DDS.10	Tanks will be designed to latest industry standards, including but not limited to the requirements of the Building Regulations 'Part H' (Ref. 5.3) and Sewerage Sector Guidance 'Design & Construction Guidance' 2019, (Ref. 5.1) or equivalent at the time.
DDS.11	The detailed design of underground tanks will adopt material specifications to provide chemical resistance and leak prevention.
DDS.12	The infiltration rates at the proposed infiltration tanks are to be confirmed by site specific testing at the infiltration tank locations. The detailed design for the installation, and the specification of operation and maintenance, of the infiltration tanks will comply with bespoke environmental permits.
DDS.13	Total Organic Compound (TOC) monitoring (refer to DDS. 26) will be undertaken to monitor for potential surface water contamination on airside aprons. Where this is detected, the flow will be diverted to the attenuation tank where it can be tested before being sent to the foul sewer or for treatment at the proposed Water Treatment Plant. Access into the attenuation tank will be required for future maintenance of the tank.
DDS.14	The underground tanks will be designed and built as separate modules to facilitate maintenance. This modular approach will allow for maintenance without full decommissioning.
DDS.15	The detailed design of individual tanks will prioritise maintenance strategies which remove the need for humans to enter the tanks wherever reasonably practicable.
DDS.16	The design of storage tanks below the airfield will prioritise locations below aircraft stands so as to avoid closure of taxiways during maintenance activities. The point load or group of point loads that the tank will need to accommodate as part of the structural design will be agreed with the airport operator.
DDS.17	The detailed design will provide at least 1m clearance between the highest water table and the underside of buried tanks and other underground structures. The drainage design will consider the impacts of groundwater mounding, to ensure that the infiltration tanks do not result in groundwater flooding downstream.
DDS.18	Any residual fluids resulting from the de-icing of aircraft and hard surfaces would be collected by vacuum sweeper and/or collected by the drainage system, stored in the polluted storage tank, and discharged to the proposed water treatment plant or foul network.
	Drainage installation in Landfill
DDS.19	All drainage systems (e.g., pipes and tanks) constructed within the area of the former Eaton Green Landfill will be lined with a waterproof membrane.

DDS.20	All below ground installations within the area of the former Eaton Green Landfill will include flexible jointing to allow for differential settlement across the site.
	Surface Water – General
DDS.21	The detailed design of all drainage attenuation systems shall be designed for a 1 in 100 year storm period plus an increase of 40% in capacity for climate change or as appropriate at the time.
DDS.22	The detailed design of surface water drainage collector systems will be based on appropriate rainfall intensities.
DDS.23	The detailed design will apply the SuDS hierarchy following the guidance in CIRIA SuDS Manual C753 (Ref. 5.4), or equivalent at the time.
DDS.24	The detailed design, operation and maintenance of the SuDS drainage elements will be in accordance with Sustainable Drainage Systems – Non-Statutory Technical Standards for Sustainable Drainage Systems (Ref. 4.5) or equivalent at the time
DDS.25	The detailed design will consider the interface of the existing overflow pipe from the Thames Water soakaway, adjacent to Eaton Green Road to ensure its continued performance in the context of the Proposed Development. Any alterations or amendments to the existing overflow will be in accordance with the relevant Thames Water details and specifications and the relevant authorisations are to be obtained.
DDS.26	The detailed design will incorporate automated systems (with manual backup/override) to divert contaminated surface water runoff from the airfield into the foul systems including real time monitoring of surface water runoff using TOC) monitoring (as a minimum standard). The travel time between the TOC monitor and the diversion chamber for contaminated surface water will be longer than the response time of the selected monitors. The monitoring systems will be confirmed with Environment Agency as part of bespoke permit application.
DDS.27	The detailed design will incorporate emergency isolation valves positioned strategically for use in the event of severe pollutant spillages throughout the site.
DDS.28	The design of storage vessels (for example in the fuel storage facility) will include bunded storage in accordance with Environment Agency requirements.
DDS.29	Active monitoring and discharge control will be implemented to ensure no discharge to the Thames Water foul network of attenuated contaminated surface water from Tank 1 during high flow conditions, i.e. when identified existing Combined Sewer Overflow's (CSO) on the drainage route are in operation.
	Surface Water - Airfield Drainage
DDS.30	The design of drainage assets within or adjacent to the runway, new or existing taxiways (including their associated clear and graded strips) and aprons will comply with ICAO Annex 14 (Ref. 5.3) (or other relevant and

	appropriate standards that are in place when the detailed design is being carried out) and will be designed to withstand aircraft loading.
DDS.31	The design of airfield surface water attenuation features which discharge directly to statutory sewers will discharge at a rate to be agreed with the statutory undertaker at detailed design stage.
DDS.32	The preferred solution for the discharge of contaminated surface water run-off from the airfield will be to the Thames Water foul network, as described in the revised Drainage Design Statement [REP4-031] . If that preferred option cannot be adopted, the reserve option, as detailed in the revised Drainage Design Statement [REP4-031] , will be adopted.
DDS.33	In the event it is necessary to progress the reserve option as detailed in the revised Drainage Design Statement [REP4-031] , the contaminated surface water will be diverted to the on-site water treatment plant. The water treatment systems will be designed so that all discharges to ground do not contain hazardous substances, as defined in Water Framework Directive (Ref. 5.8), and are non-polluting.
DDS.34	Airside inspection chambers will be designed to withstand aircraft loading and adopt class F900 covers and frames.
	Surface Water – Landside Drainage
DDS.35	The site-wide strategy will be to restrict the runoff from car parks to GRR.
DDS.36	The design of drainage assets in landside areas will be in accordance with the DMRB (Ref. 3.1), CIRIA SuDS Manual C753 (Ref. 5.4) or other relevant and appropriate standards that are in place when the detailed design is being carried out.
DDS.37	Landside inspection chambers will be designed to withstand vehicle loading and adopt class D400 covers and frames.
DDS.38	Bespoke environmental permits will be obtained for the proposed infiltration tanks at the Main Application Site.
DDS.39	The detailed design of the permeable paving will follow the approach set out in the CIRIA SuDS Manual C753 (Ref. 5.4) using the mitigation indices for discharges to groundwater combined with risk assessment. Relevant position statements (e.g. A3, A6, G13) in "The Environment Agency's approach to groundwater protection"(Ref. 5.7) will also be considered in detail design.
	Surface Water - Highway Drainage
DDS.40	The design of drainage assets in highway areas will be in accordance with the DMRB (Ref. 4.1) or other relevant and appropriate standards that are in place when the detailed design is being carried out.
DDS.41	The drainage works for the Airport Access Road and at each Off-site Highway Intervention site will be designed in line with accepted highway design standards to ensure no unacceptable increase in flood risk or potentially significant effect on local water quality.

DDS.42	The detailed design for the above ground surface will adopt positive drainage based on the recommended crossfalls between 1:40 and 1:60.
DDS.43	The detailed design will incorporate the use of grit traps, Class 1 oil separators and other best practice to prevent pollution of the underlying aquifer or local surface water receptors.
DDS.44	HEWRAT assessments are to be updated in line with the detailed designs as they are developed, with surface water and pollutant management measures implemented to prevent additional pollutant loading. Measures will be developed in consultation with the relevant local authority and EA.
	Foul Drainage
DDS.45	The foul drainage from the Proposed Development will, under the preferred option as detailed in the revised Drainage Design Statement [REP4-031], be routed to the Thames Water foul sewer. If that preferred option cannot be adopted, the reserve option, as detailed in the revised Drainage Design Strategy [REP4-031], will be adopted where foul water is treated on site.
DDS.46	The detailed design to accommodate increased capacity through T1 and T2 will under the preferred option as detailed in the revised Drainage Design Statement [REP4-031] provide attenuation, as required, to prevent peak hour foul load exceeding Thames Water system capacity.
	Water Treatment Plant
DDS.47	The detailed design of the proposed drainage infrastructure in the lower lying areas of the Proposed Development (specifically the water treatment plant and the fuel storage facility) will consider the potential for asset failure of these elements and other essential infrastructure. The design will safeguard the operability of essential infrastructure up to and including the design standard (1 in 100-year storm period plus an increase of 40% in capacity for climate change or as appropriate).
DDS.48	If the reserve option is adopted, the drainage and water treatment systems will be designed so that all discharges to ground do not contain hazardous substances, as defined in WFD (Ref. 5.6), and are non-polluting, due to the underlying chalk being a Principal Aquifer and the infiltration tanks being proposed within a SPZ3.
DDS.49	The detailed design of the water treatment plant will have built in redundancy but, in the extremely unlikely event of system failure the design shall include safeguards so that discharge to the aquifer will be halted until the water treatment plant is put back into operation.
DDS.50	The detailed design for the installation, and specification of operation and maintenance, of the infiltration tanks at the Main Application Site will comply with bespoke environmental permits that are applicable to the site.
DDS.51	The detailed design will include specification of operation and maintenance of the Proposed Development, including monitoring of groundwater levels and quality which would be undertaken throughout

	the operational lifecycle to prevent deterioration of the aquifer or significant flood risk in the area surrounding the infiltration basins; further details are provided in Chapter 17 Soils and Geology of the ES [APP-043] .
DDS.52	The detailed design will include specification of baseline monitoring of the contaminated surface water runoff arising at the airport which is to be undertaken to ascertain the composition of the runoff and inform the treatment requirements at the proposed water treatment plant. This influent monitoring regime is to be developed with the EA and will inform future bespoke environmental permits for infiltration tanks.
DDS.53	The detailed design will include specification of influent and effluent monitoring which will be continued post installation of the water treatment plant, in line with environmental permit requirements, to understand any long-term variations and to confirm the water treatment plant is operating in accordance with the design and relevant permits.
DDS.54	The detailed design will include specification of real-time continuous monitoring of contaminants to be undertaken throughout the lifecycle of the installation. This monitoring will ensure that any contaminated surface runoff is diverted to a storage tank before being sent to either public sewer (preferred option) or the onsite water treatment plant (reserved option) where it will be treated to an appropriate level before discharging to the underlying aquifer via the infiltration tanks.
DDS.55	The water treatment plant will be designed to accommodate the anticipated volumes and loads with the design including provisions for modular construction to accommodate incremental demand.
DDS.56	Access points will be designed into storage vessels to allow for maintenance.
DDS.57	The detailed design will incorporate the use of Class 1 oil separators (or equivalent) down stream of surface runoff drainage collection systems where there is risk of fuel spills.
	Fire Training Ground
DDS.58	During fire training operations, surface water run-off from fire training activities will be diverted to a holding tank and not drain to ground under any circumstance. Effluent generated from fire training activities (containing foam and hydrocarbon breakdown constituents) may, subject to securing the necessary consents, be directed into existing public foul sewerage systems or will otherwise be tankered away for treatment off-site.
DDS.59	The fire training ground drainage system will be designed, so that the fire training ground cannot be operated if the valves are not fully closed.
	Fuel Storage Facility
DDS.60	There is to be no passive surface water discharge to the aquifer in the area of the fuel storage tanks. Secondary containment around the fuel storage tanks is to be designed as per CIRIA C376 (including no passive discharge point from the secondary containment to soakaway). Relevant

	<p>position statements (e.g. D1) in "<i>The Environment Agency's approach to groundwater protection</i>" (Ref. 5.7) is also to be considered in the detailed design.</p> <p>The drainage within the secondary containment is to be managed via an active system linked to a quality monitoring or leak trigger system to avoid contamination of groundwater. Any water contaminated with fuel leak will be tankered offsite.</p>
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GLOSSARY AND ABBREVIATIONS

Term	Definition
AGI	Above Ground Installation
AGL	Aeronautical Ground Lighting
BNG	Biodiversity Net Gain
BREEAM	Building Research Establishment Environmental Assessment Method
BS	British Standard
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
Code C (aircraft)	Aircraft with wingspan of 24m up to but not including 36m.
Code E (aircraft)	Aircraft with wingspan of 52m up to but not including 65m.
Contact Stand	An aircraft parking stand that is suitable for walking passengers to and from an aircraft from an allocated, proximate boarding gate.
DAS	Design and Access Statement
DMRB	Design Manual for Roads and Bridges
DSEAR	Dangerous Substances and Explosive Atmospheres Regulations
EA	Environment Agency
ERUB	Engine Run-Up Bay
FAA	Federal Aviation Administration
GRR	Greenfield Runoff Rate

Term	Definition
GSE	Ground Support Equipment
HV	High Voltage
HVAC	Heating, Ventilation, and Air Conditioning
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
Luton DART	Luton Direct Air-Rail Transit
LV	Low Voltage
MARS	Multiple Apron Ramp System
RET	Rapid Exit Taxiway
RFFS	Rescue and Firefighting Service
SuDS	Sustainable Drainage Systems
T1	Terminal 1
T2	Terminal 2
TOC	Total Organic Compound
TW	Thames Water
WFD	Water Framework Directive
WTP	Water Treatment Plant

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