Luton Rising
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Our community.
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February 2023

London Luton Airport Expansion

Planning Inspectorate Scheme Ref: TR020001

Volume 5 Environmental Statement and Related Documents

5.02 Appendix 20.4 Drainage Design Statement

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 20.4 DRAINAGE DESIGN STATEMENT

Regulation number:	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference:	TR020001
Document Reference:	TR020001/APP/5.02
Author:	Luton Rising

Version	Date	Status of Version
Issue 01	February 2023	Application issue

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1 INTRODUCTION

1.1 Purpose of the Report

1.1.1 This Drainage Design Statement (DDS) forms part of the Development Consent Order (DCO) application for the proposed expansion of London Luton Airport (the airport) from 18 million passengers per annum (mppa) to 32 mppa, (hereafter referred to as 'the Proposed Development'). This application is made by London Luton Airport Limited (trading as Luton Rising and hereafter referred to as the Applicant), owners of London Luton Airport (the airport).

1.1.2 The airport is operated by London Luton Airport Operations Limited (LLAOL).

1.1.3 The DDS combines value driven and sustainable solutions to deliver the infrastructure required, having regard to stakeholder requirements.

1.1.4 The DDS includes 'design principles' that relate to the surface and foul water drainage infrastructure that will be designed after the DCO is granted and such designs must reflect the principles set out in this document.

1.2 Report Structure

1.2.1 Following this section, the report is structured in seven sections. The content of these is summarised as follows.

1.2.2 Section 2 provides an overview of the existing site conditions and the existing drainage layout.

1.2.3 Section 3 provides an overview of the key considerations taken into account in developing the drainage statement for the Proposed Development.

1.2.4 Sections 4 and 5 then describe the approach to drainage for the purposes of assessment first providing an overview of the preliminary surface water and foul water drainage designs assumed for the purposes of assessment Phase 1 and then for assessment Phases 2a and 2b.

1.2.5 Section 6 describes the concept design for the proposed Water Treatment Plan.

1.2.6 Section 7 describes the concept design of surface water drainage for the highways proposals, including the Airport Access Road and the Off-site Highway Interventions.

1.2.7 Section 8 then outlines the design principles that will inform the detailed drainage design, capturing key requirements identified through design, assessment and stakeholder engagement at preliminary design stage. The detailed drainage design will be developed following grant of the Development Consent Order (DCO), pursuant to the relevant Requirement in Schedule 2 of the **draft DCO [TR020001/APP/2.01]**.

1.2.8 The design proposals incorporate limitations/requirements that have been set out by relevant stakeholders, following extensive engagement including two statutory public consultations. The conceptual model includes design assumptions and data collected from the stakeholders. Detailed design will also

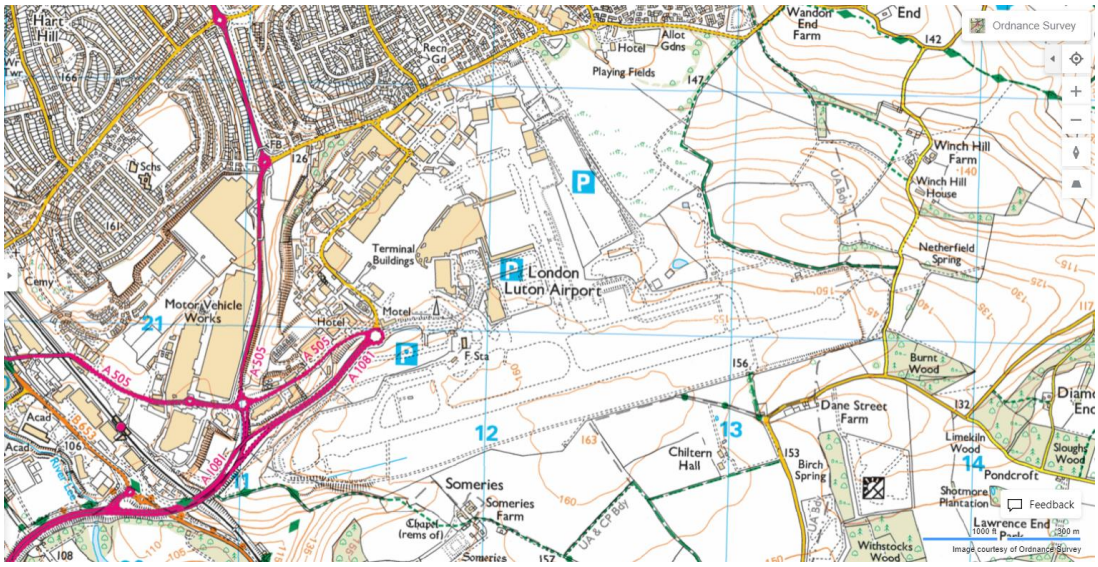
include continued engagement with stakeholders, in particular with respect to permits and approvals.

2 EXISTING SITE DETAILS

2.1 Location

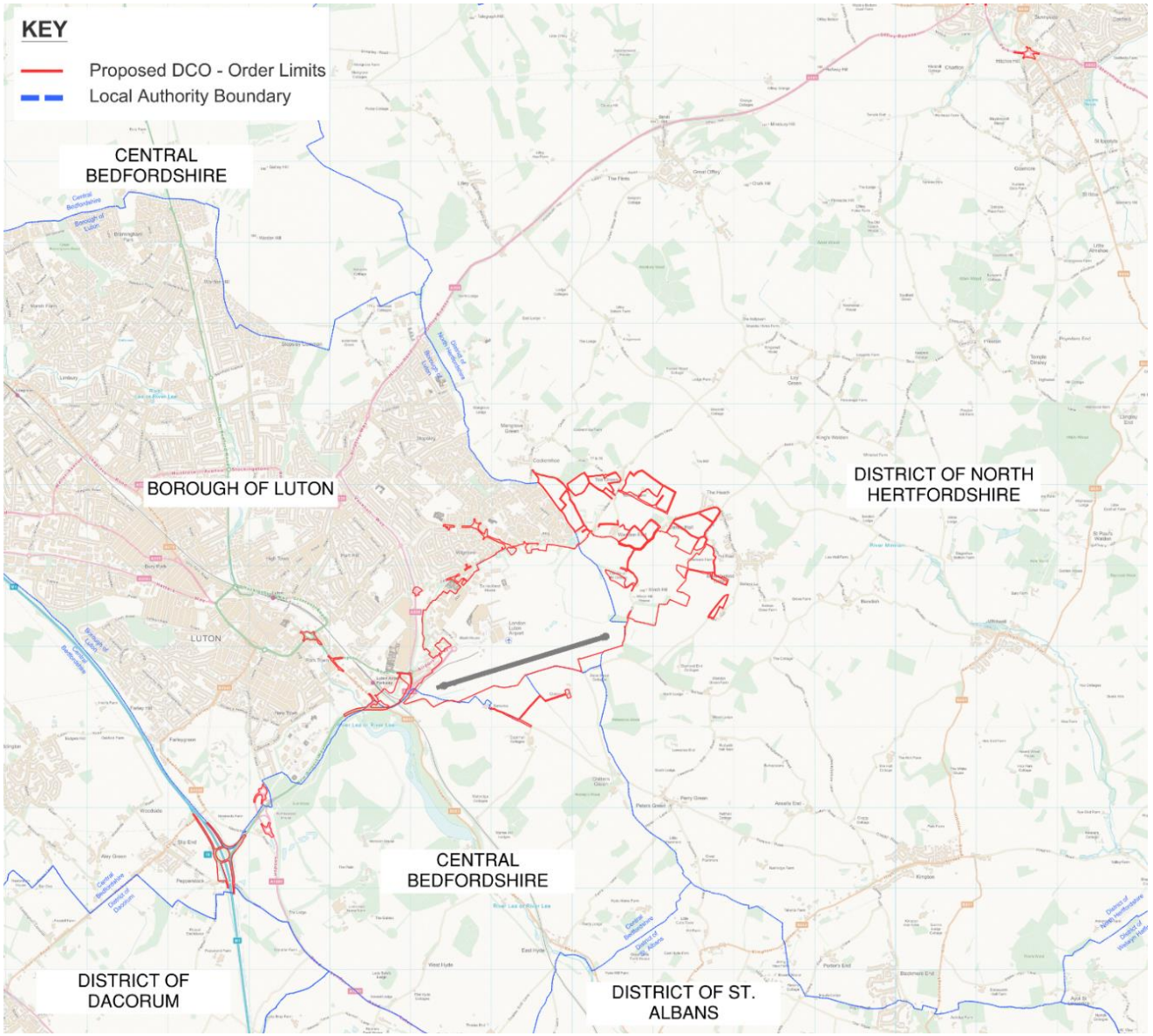
2.1.1 The Main Application Site is located on the south eastern outskirts of Luton, about 3km east of the town centre. It is bound to the north by Eaton Green Road and Darley Road with largely open land to the south and east. The topography is relatively undulating, with falls of 30m in elevation towards the east.

Inset 2.1: Ordnance Survey plan of the airport



2.1.2 The Application Site is located within the administrative areas of Luton Borough Council (LBC), North Hertfordshire District Council, Central Bedfordshire Council, Dacorum Borough Council and Hertfordshire County Council. The Lead Local Flood Authority (LLFAs) are LBC, Central Bedfordshire Council and Hertfordshire County Council. A map of the local authority boundaries and Order Limits proposed for the DCO can be found in **Inset 2.2.**

Inset 2.2: Local Authorities Boundaries and Order Limits



2.2 Site Geology

2.2.1 The Main Application Site is generally underlain by superficial deposits of Clay-with-Flints (clay containing flint gravel) on the plateau areas, Head on the valley sides (clay), and Dry Valley Deposits (silty clay and gravel) at the base of the valley areas. These superficial deposits are in turn underlain by the solid geology which comprises the Lewes Nodular Chalk Formation.

2.2.2 The main water bearing strata in the region is Chalk, which is designated by the EA as a Principal aquifer. The majority of the Main Application Site is located within groundwater Source Protection Zone (SPZ) 3.

2.2.3 Superficial deposits comprising gravelly clay soil overlie the Chalk locally.

2.2.4 The former Eaton Green Landfill lies to the east of the existing airport. This feature fills part of the head of a dry valley extending across an area of approximately 40ha. The thickness of landfill waste varies from approximately 4m on the valley sides up to 20m at the centre and comprises mixed domestic, commercial and construction/demolition waste. Refer to **Chapter 17** of the **Environmental Statement (the ES) [TR020001/APP/5.01]** and appendices **[TR020001/APP/5.02]**.

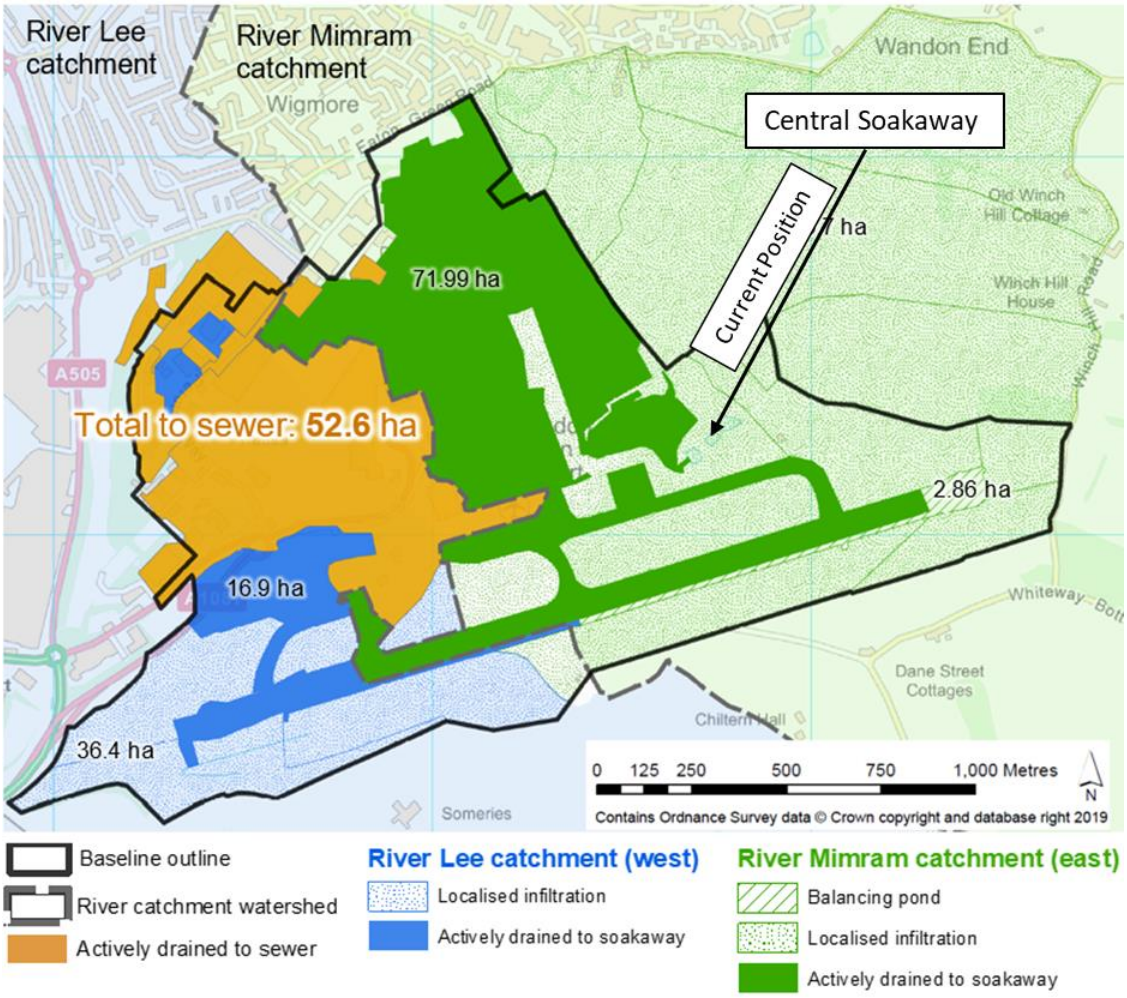
2.2.5 The Chalk aquifer is a designated Water Framework Directive (WFD) (Ref. 2.1) groundwater body: ‘the Upper Lea Chalk’. For groundwater bodies there are two separate classifications, quantitative status, and chemical status that in combination provide an overall water body status. Both the quantitative and chemical status are classed as poor for the Upper Lea Chalk due to over-abstraction and contamination, respectively. The contamination is present across the wider catchment area with elevated levels of nitrate, pesticides, solvents due to industrial and agricultural land uses in the area.

2.3 Hydrology and Existing Catchments

2.3.1 Two main water body catchments split the Main Application Site - the Lea catchment to the west, and the Mimram catchment to the east. The exact positioning of the groundwater divide at the site is uncertain. Groundwater flow direction in the Lea catchment is influenced by local abstractions west of the airport and flows in a westerly direction. The groundwater flow in the Mimram catchment is affected by the potable abstraction near Kings Walden, 1.5km north east of the Main Application Site boundary (2.8km north east of the landfill) and a second potable water abstraction (Nine Wells) at Whitwell, 5.3km east of the former landfill. Both may create a more easterly flow direction than the expected south easterly regional flow.

2.3.2 **Inset 2.3** illustrates the existing river catchment areas and indicative watershed line at the airport, dividing the airport into two distinct catchments.

Inset 2.3: London Luton Airport River Catchment Areas



2.3.3 The river Lea (referred to as River Lee in Inset 2.3) is located about 600m west of the airport and is divided over two WFD waterbodies: Lea (from Luton to Luton Hoo Lakes, WFD ID GB106038033391) and Lea (from Luton Hoo Lakes to Hertford, WFD ID GB106038033392). These two waterbodies are considered to be in “Bad” and “Moderate” condition respectively. The Lea from Luton to Luton Hoo Lakes is expected to meet “Good” status by 2027. There is no objective for the Lea from Luton Hoo Lakes to Hertford.

2.4 Stakeholders

2.4.1 Statutory Undertakers with assets and direct interest in the drainage within the Main Application Site have been a part of stakeholder engagements to date. Listed below are the named stakeholders:

a. LBC;

b. Thames Water (TW);

c. Affinity Water (AW);

d. Hertfordshire County Council;

e. Central Bedfordshire Council;

f. Environment Agency (EA); and

g. LLAOL.

It is anticipated that permits will be required in respect of drainage from a number of stakeholders. These are described in the Consents and Agreements Position Statement **[TR020001/APP/2.03]** included with the application for development consent.

2.5 Existing Airport Drainage Assets

2.5.1 Veolia manage the airport's potable and foul drainage systems on behalf of the operator, LLAOL (refer to section 3.2).

2.5.2 AW supply the airport with potable water. Their existing network has been outlined in a survey undertaken by Veolia which can be found in **Appendix E**.

2.5.3 TW existing surface and foul assets located across the Main Application Site have been outlined in a Veolia Survey, and can be found in **Appendix F** and **Appendix G** respectively.

2.5.4 Within the TW network north of the Application Site, there is a balancing pond south of Eaton Green Road.

2.5.5 Two existing soakaway units, managed by the airport, are located north-east of the eastern taxiway. The rectangular soakaways were constructed using brickwork and filled with free draining material, each with unconfirmed depths. The combined capacity of the soakaways has been estimated. This is based on an assumed porosity range due to sedimentation, with an upper bound of 25% and lower bound of 5%. The estimated volume is between a minimum of 351m^3 and maximum 1755m^3 respectively. It should be noted the assumptions made in these calculations including the assumed depth and porosity are based on sedimentation observed prior to planned maintenance and are therefore conservative assumptions.

3 DESIGN CONSIDERATIONS

3.1 Potable Water Scarcity

3.1.1 Potable water at the airport is supplied by AW. During early stakeholder engagement, AW identified the area suffers from groundwater scarcity.

3.1.2 LLAOL advised that the total potable water consumption for the entire airport during 2019/2020 (illustrated in **Appendix E**), was 236,756m^3. An average AW supply was calculated accordingly at 7.5l/s.

3.1.3 An objective of this Drainage Design Statement is to reduce reliance on potable water from the network.

3.2 Existing Management of Potable Water and Drainage Networks

3.2.1 Veolia are appointed by LLAOL to manage:

a. the potable water network (**Appendix E**); and

b. the foul water network (**Appendix G**).

3.2.2 The surface water network (**Appendix F**) however is directly managed by LLAOL.

3.3 Existing Sewerage Capacity/Limitations

3.3.1 The East Hyde Treatment Works (EHTW) is located to the south of the airport and is owned by TW. The EHTW treats the existing foul discharge from the airport.

3.3.2 TW has indicated that the EHTW site is very constrained with no opportunity for expansion and that additional treatment facilities would be required.

3.3.3 The EHTW treats only foul water, therefore surface water runoff discharging from the airport is not treated at EHTW.

3.3.4 Veolia confirmed that 95% of the potable water supply was used as the basis to determine the foul water discharge to the TW network. In this statement it is assumed in forecasts that 100% of the potable water supply will be discharged as foul water i.e. a worst case assumption. Therefore, the annual foul water load is assumed to be 236,756m^3.

3.4 Water Flow Balance

3.4.1 This Drainage Design Statement includes a number of concepts which would make best use of existing water resources by reducing rate of discharge to sewers and soakaways whilst also minimising potable water demand. These consist of balancing flows using rainwater harvesting, attenuation below aprons, landside storage as well as water efficiency measures.

3.4.2 The balancing of flows will be critical to optimise the use of the existing infrastructure. Further details are outlined in Sections 4 and 5.

3.5 Rainfall Data

3.5.1 The rainfall data has been provided in a form of intensity (i.e., medium, or high) and not in a form of quantity in millimetres, therefore the relevant caveats have been included in the calculations. Detailed design will be based on updated data to include intensities in mm/hour and a conservative approach adopted.

3.6 Drainage Hierarchy

3.6.1 The SuDS Manual (Ref. 3.1) identifies that surface water runoff from a development should be disposed of as high up the following hierarchy as reasonably practicable:

a. into the ground (infiltration);

b. to a surface water body;

c. to a surface water sewer, highway drain, or another drainage system; and then

d. to a combined sewer.

3.6.2 The aim of this approach is to manage surface water runoff close to where it falls and to mimic natural drainage pathways as closely as possible.

3.7 Potential Infiltration

3.7.1 The Chalk bedrock is relatively permeable and ground investigation indicated a characteristic infiltration rate of about 0.085m/hr. This Statement is therefore based on the use of suitably sized infiltration basins – ‘soakaway’ – and attenuation tanks as the preferred SuDS technique for the management of runoff. The actual infiltration rates will be confirmed at detailed design stage.

3.8 Airside Pollution

3.8.1 Pollutants expected to be found on the airfield include, but are not limited to, those associated with aircraft and ground vehicle operations, aircraft washing, de-icing agents both for aircraft and paved surfaced, fuel spillages from aircraft and vehicles, and mechanical oil from both aircraft and vehicles.

3.8.2 During the winter period (typically November to April), in line with Civil Aviation Authority (CAA) regulatory requirements, it is necessary to prevent the build-up of ice on aircraft and hard surfaces (anti-icing) or remove any ice already present (de-icing). The type of chemicals used for this are typically organic (e.g., glycol, formate or acetate based). These substances require removal from surface water runoff to prevent contamination of the aquifers which are discussed in section 6.3.

3.8.3 De-icing operations at the airport are increasing in effectiveness, and latest de-icing consumption figures show a sustained year by year reduction. It is anticipated that the trend of reduced consumptions, increased re-cycling and decreased discharge, will continue.

3.8.4 Outside of the winter period surface water runoff is not affected by de-icing chemicals. Sediments and hydrocarbons spillages would be managed through good practice including silt traps and oil separators. Fuel spillage management includes booms to contain flow and rubber mats to cover gully gratings. In the event of larger fuel spills other mitigation would be deployed, for example temporary bunds and vacuum pumps to cylinders tanks that are then exported from site and re-cycled.

3.9 Limit of Design

3.9.1 This Drainage Design Statement is based on an outline concept design. Detailed design will progress following approval of the DCO and will include continued engagement with stakeholders. The detailed surface and foul water design will reflect the design principles set out in Section 8 of this Statement, in accordance with the relevant Requirement in Schedule 2 of the **draft DCO [TR020001/APP/2.01]**.

4 ASSESSMENT PHASE 1 DRAINAGE DESIGN STRATEGY

4.1 Introduction

4.1.1 Assessment Phase 1 anticipates an increase in the number of passengers using the airport, from its current consented capacity of 18 mppa to 21.5 mppa.

4.1.2 Surveys will be required to determine the full details of the current drainage arrangements to support detailed design.

4.1.3 Assessment Phase 1 includes the following changes of relevance to drainage:

a. expansion of the existing Terminal 1 (T1);

b. introduction of the rainwater harvesting strategy for existing buildings;

c. the existing long stay car park (LSCP), Zone G on **Inset 4.1**, is to be reduced to approximately 64,400m^2, reducing the amount of discharge into the Central Soakaway;

d. new temporary car park proposed north east of existing LSCP, Zone F on **Inset 4.1**, comprising an area of 68,500m^2 to discharge into the TW network north east of the airport; and

e. new apron south east of the airport, Zone C on **Inset 4.1**, encompassing an area of 44,250m^2 to be attenuated and discharged into the Central Soakaway.

4.1.4 The drainage consideration for the Airport Access Road and Off-site Highway Interventions are considered in section 7 of this report, rather than as a part of this section 4.

4.2 Existing Network

4.2.1 The airport currently drains via a combination of discharges to surface water and foul water public sewers and a number of infiltration-based systems.

4.2.2 An assessment has been made of the existing airport catchment likely to require replacement drainage infrastructure as a function of the Proposed Development.

4.2.3 The extent of proposed hard surfacing requiring engineered drainage has been determined from reference designs, and allowance has been made for a degree of runoff from new areas of managed soft landscaping. Drawings in **Appendix A** illustrate the total catchment assumed for the preliminary design.

4.3 Drainage Strategy

4.3.1 The proposed drainage strategy aims to expand the existing T1 infrastructure through the introduction of a rainwater harvesting system along with a series of diversions. The strategy includes the installation of storage tanks below proposed aprons to attenuate discharge rates and to monitor contaminants to safeguard the existing soakaways. Combined with the incorporation of landside storage, the strategy aims to enhance the water efficiency measures to reduce the total water consumption.

4.4 Preliminary Surface Water Drainage Design

4.4.1 The runway and T1 paved areas are referenced as ‘Airside Drainage’. T1, hangars and other buildings, and corresponding parking zones are referenced as ‘Landside Drainage’.

Airside Drainage

4.4.2 The proposed apron catchment area of 44,250m^2, Zone C on **Inset 4.1**, would discharge into the existing Central Soakaway.

4.4.3 Class 1 Oil Interceptors will be included as part of the surface water drainage system to safeguard for any spillages or pollutants entering the system and subsequently the Central Soakaway.

4.4.4 The discharge rate of the airfield surface water has been calculated to the green field run-off rate (GRR) and to achieve this, an attenuation tank of approximately 4,000m^3 would be constructed below the apron to manage the discharge rate to the soakaway. Real time monitoring of surface water runoff would divert contaminated flow to a polluted water holding tank. The proposed system would include Total Organic Compound (TOC) monitoring levels installed in an inspection chamber downstream of the attenuation tank. A subsequent chamber, fitted with an automated butterfly valve would divert flows to the polluted tank should pollutants be detected. Detection levels will be confirmed at detailed design stage.

4.4.5 The proposed layout for the polluted water holding tanks and their connections is shown on the drawing in **Appendix B**. The monitored airside area will be limited to the stands where de-icing agents will be used. These are highlighted in **Inset 4.4** below. De-icing of aircraft would only be allowed on five of the proposed stands, as the other two stands are restricted to engine testing. Contaminated water stored under the apron will be discharged back into the TW foul water main at a discharge rate of 2l/s as agreed with TW, via a rising main.

4.4.6 Both the attenuation and polluted water holding tanks would be located below the apron. These would be designed to latest industry standards, including but not limited to the requirements of the Building Regulations ‘Part H’ (Ref. 4.1) and Sewerage Sector Guidance ‘Design & Construction Guidance’ 2019 (Ref. 4.2), or equivalent at the time.

Landside Drainage

4.4.7 The proposed car park (P7) north east of the airport, referred to as Zone F in **Inset 4.1**, will discharge to the TW network at President and Frank Lester Way to the north of the airport. To help eliminate the increased discharge rate into the TW network, an attenuation tank is proposed, below the car park, to reduce the risk of flooding and release water at a controlled rate. The estimated capacity of the tank is 8,750m^3. This tank would be constructed above the landfill and would need to be suitably designed to avoid risks of contamination. The sitewide strategy is to restrict the runoff from the car parks to GRR. A discharge rate of 5.0l/s, from the attenuation tank, has been agreed with TW.

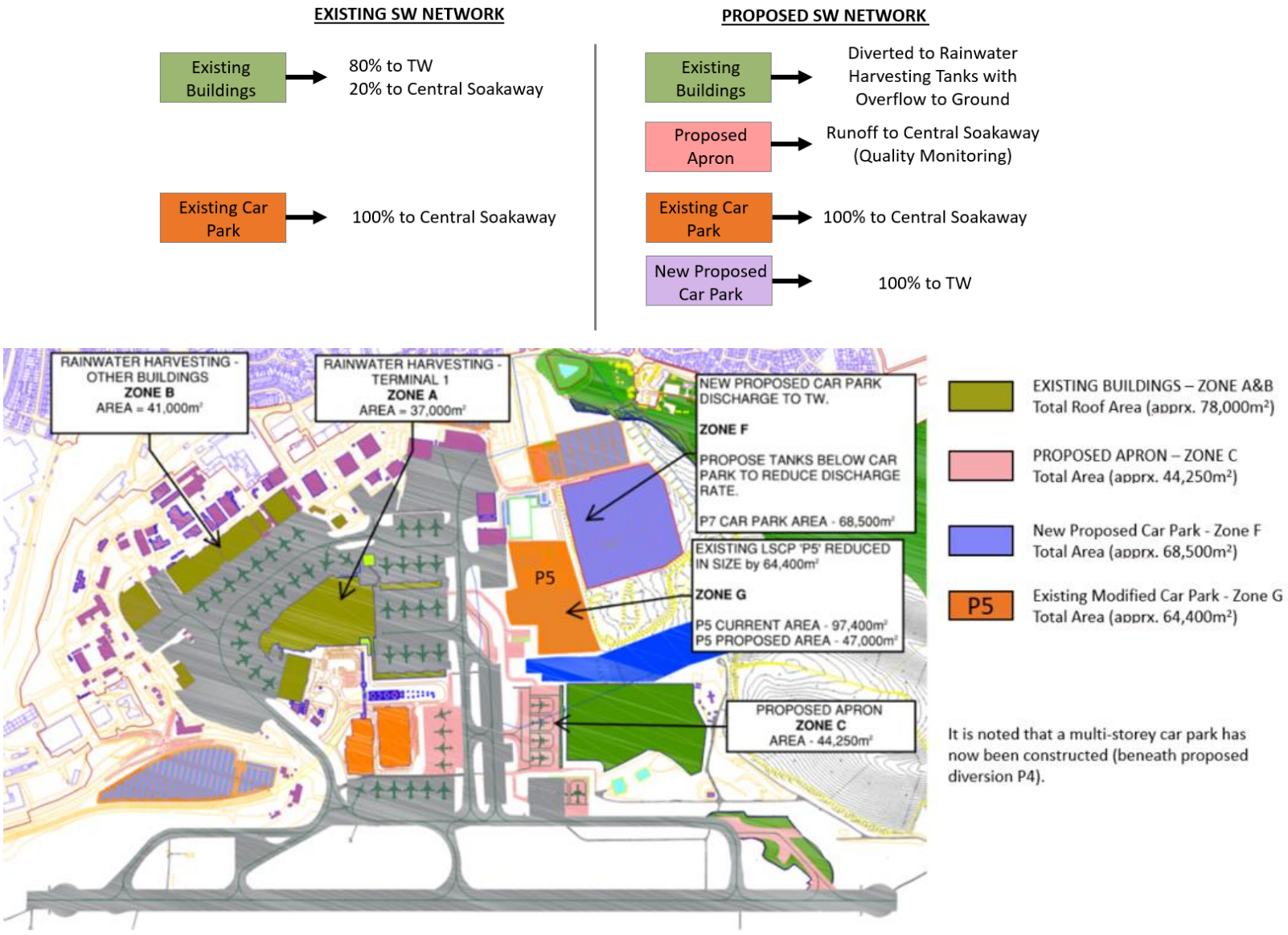
4.4.8 Class 1 Oil Interceptors will be included as part of the surface water drainage system to safeguard for any spillages or pollutants entering the system.

Rainwater Harvesting

4.4.9 The rainwater harvesting strategy is outlined to reduce the demand for potable water supplied by AW as well as minimising the increase in discharge into the TW network and Central Soakaway. Zone A including T1 (37,000m^2), and Zone B other existing airport buildings (41,000m^2), as shown in **Inset 4.1**.

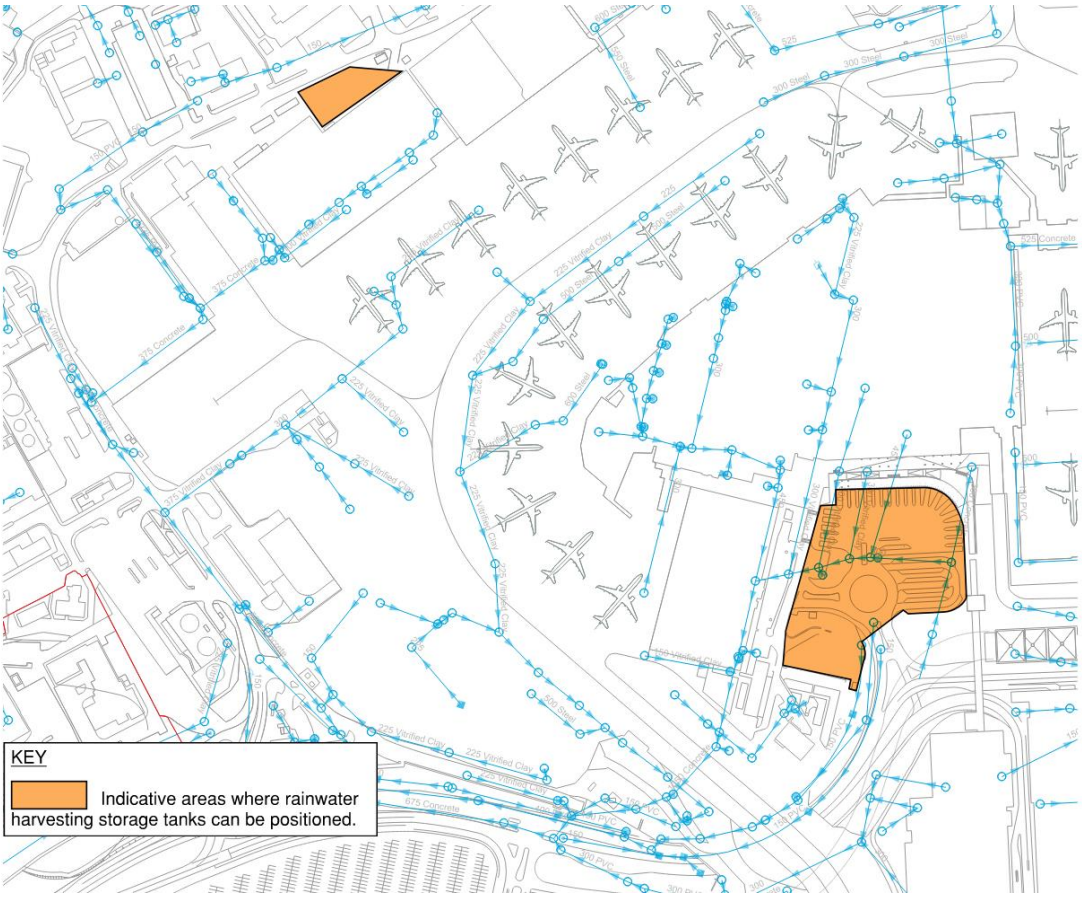
4.4.10 Based on a conservative approach to obtain the rainfall data in the Luton area, a total volume required for the storage tanks is approximately 3,000m^3 to maintain a constant monthly supply of approximately 3,400m^3 to the airport throughout the year. It is important to note that surface area calculations assume that all rainwater from existing buildings highlighted in **Inset 4.1** can be collected and stored. This will need to be confirmed at detailed design stage.

Inset 4.1: Balancing flows to maximise sustainability (Assessment Phase 1)



4.4.11 Potential locations of rainwater harvesting tanks are highlighted in **Inset 4.2**. Exact locations would be determined at detailed design stage.

Inset 4.2: Potential locations of rainwater harvesting tanks



4.4.12 Harvested rainwater would require treatment so that the quality is fit for the intended non-potable use. Preliminary treatment would include a series of filters and separators whereby the system shall be designed and located upstream of the storage tanks, noting that several systems may be needed to satisfy the number of tanks required. The treatment process will remove coarse solids and organic matter from the network such that the maximum particle size is equal or less than 1mm. The systems must also be accessible for maintenance and adhere to the requirements set by BS EN 16941-1:2018 (Ref. 4.3) (or equivalent at time of implementation.

4.5 Water Balance

4.5.1 Consideration has been given to reducing the volume of potable water used in the Proposed Development.

4.5.2 The existing LSCP (P5) east of T1, referred to as Zone G in **Inset 4.1**, will reduce in size by approximately 64,400m^2 to accommodate the proposed aprons to the south.

4.5.3 A review of the surface water network indicates that this car park is currently discharging into the Central Soakaway. Therefore, the reduction in impermeable catchment area will reduce the discharge into the Central Soakaway.

4.5.4 Capturing roof rainwater harvesting and the reduction in car park area will result in a reduction of surface water discharging to the Central Soakaway. The net decrease would be equivalent to a reduction in 34,750m^2 of paved area.

4.5.5 The reduction in the TW discharge from the airport due to rainwater harvesting and offset against the additional impermeable area from car park P7 (referred to as Zone F in **Inset 4.1**), provides a net contributing area increase to the TW network of 11,500m^2. The rainwater harvesting system will reduce discharge into TW through collecting and re-cycling roof rainwater from T1 (Zone A) and other buildings (Zone B).

4.5.6 Therefore, the balancing of flows is expected to yield a net increase in discharge into the TW network while reducing the current levels of discharge into the Central Soakaway.

4.6 Water Efficiency Measures

4.6.1 The airport operator is committed to introducing water efficiency measures to reduce consumption, including:

a. Reduction in water consumption per passenger – reduced demand, and foul water discharge. This aligns with LLAOL's objectives to reduce total water consumption to less than 6.98 litres/pax by the end of 2023, representing a 10% reduction from the 2018 baseline.

b. Reduction in use of potable water in applications where non-potable water can be used.

c. Water efficient appliances and equipment to be used within the terminal.

4.7 Preliminary Foul Water Strategy

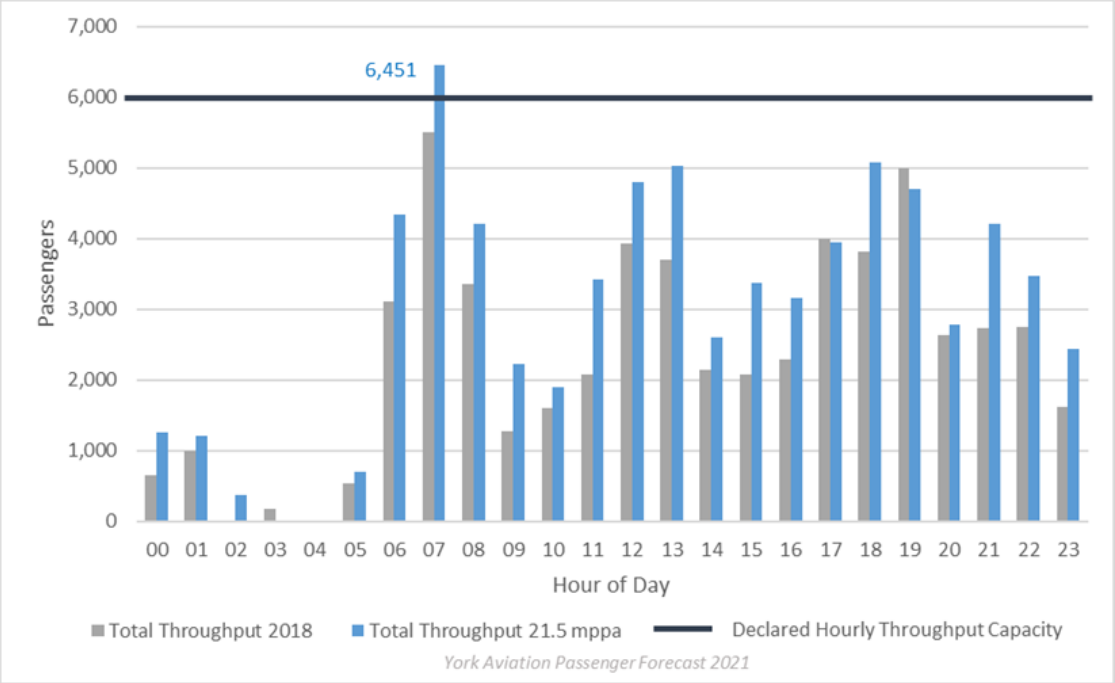
4.7.1 This strategy is based on the passenger forecasts set out in the **Need Case [TR020001/APP/7.04].**

Terminal 1 Foul Water Drainage

4.7.2 The LLAOL 19 mppa Drainage and Water Supply Infrastructure Appraisal (Ref. 4.4) indicates that the existing foul network can accommodate a maximum capacity throughput of 6000 passengers per hour.

4.7.3 The uplift in passenger throughput in T1 will increase the foul water discharge to the TW network. The passenger forecast shown in **Inset 4.3**, indicates a net peak increase in passenger throughput at 07:00, which results in an increase of 451 passengers above the declared airport throughput capacity of 6,000 passengers per hour. The foul water drainage strategy includes a 6m^3 storage tank to attenuate this peak, allowing discharge at later hours of the day when the network is not at capacity. The requirement for this attenuation would be confirmed at detailed design stage.

Inset 4.3: Passenger daily forecast

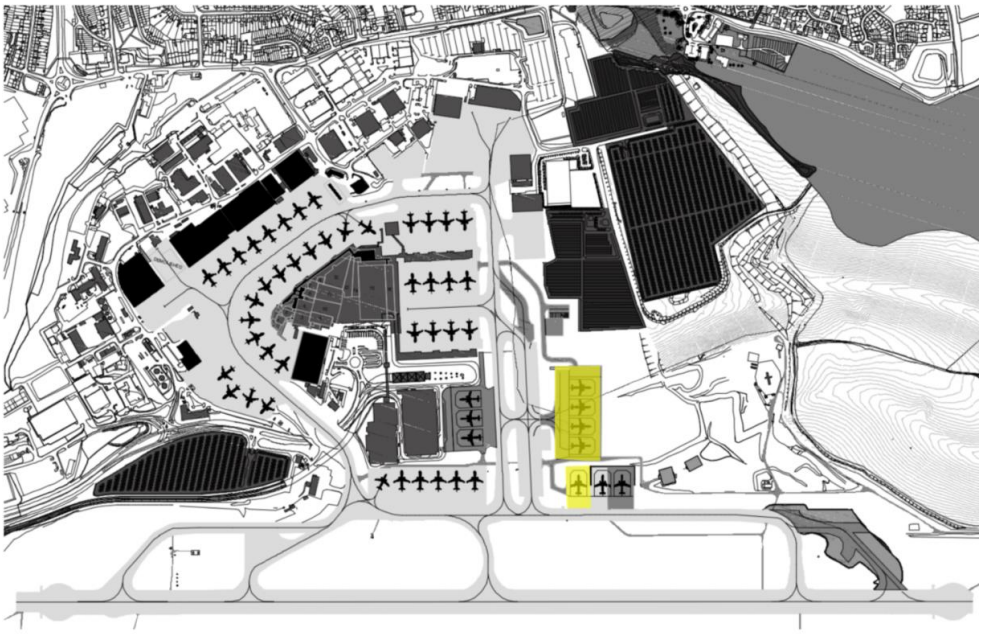


Polluted Surface Water Runoff

4.7.4 In the event of surface runoff from the new aircraft stands shown in **Inset 4.4**, being polluted (as indicated by the proposed monitoring system) (refer to section 4.4.4), it would be diverted from the surface water system and attenuated in a central polluted holding tank with an approximate capacity of 1,080m^3.

4.7.5 The polluted water from the tank will then be pumped by a rising main which will connect to the existing TW foul network infrastructure to the north of the aircraft stands.

Inset 4.4: Aircraft de-icing stands (indicated in yellow)



5 ASSESSMENT PHASES 2A AND 2B DRAINAGE DESIGN STRATEGY

5.1 Introduction

5.1.1 Assessment Phases 2a and 2b would comprise construction of an additional terminal (Terminal 2 (T2)) to the north of the runway and to the east of the existing terminal (T1).

5.1.2 Assessment Phase 2a and 2b includes the following changes of relevance to drainage:

a. construction of T2;
b. installation of a new infiltration basin (Tank 2) at the east of the site, diverting existing discharge from existing Central Soakaway to proposed infiltration basin (Tank 2) as highlighted in **Inset 5.1**;
c. apron and taxiway expansion, comprising approximately 324,000m^2 of additional surface area discharging to the proposed infiltration basin (Tank 2);
d. rainwater harvesting strategy for proposed T2 buildings, and surface water attenuation from Tank 2. Storage tank installed during assessment Phase 1 to be converted to rainwater harvesting attenuation tank;
e. the existing long stay car park (LSCP), P5 on **Inset 5.3**, is to be reduced to approximately 19,250m^2, diverting the discharge from the existing Central Soakaway;
f. the temporary car parks proposed in assessment Phase 1 labelled as P6 and P7 on **Inset 4.1** will be built over in assessment Phases 2a and 2b, in part with T2 and associated development and also elements of Green Horizons Park (formerly New Century Park) ;
g. proposed car parks and block parking labelled P10 and P11 respectively on **Inset 5.3**, which would contribute to approximately 122,200m^2 of area, of which a proportion is permeable paving; and
h. construction of a water treatment plant to treat foul drainage from T2 and contaminated airside run-off to discharge to ground via infiltration tank 3 (refer to **Inset 5.2**), and tanker sludge off-site for treatment. The WTP will also treat harvested surface water run-off to greywater standards and discharge to T2.

5.1.3 Note that drainage considerations for the Airport Access Road and Off-site Highway Interventions are considered in Section 7 of this report, rather than as a part of this Section 5.

5.2 Existing Network

5.2.1 The existing surface water network discharges into a combination of soakaways and the TW sewage network.

5.2.2 No further discharges are proposed to be connected to the TW network due to the constraints on the existing TW system as described in section 3.3 and to comply with the SuDS hierarchy.

5.3 Drainage Strategy

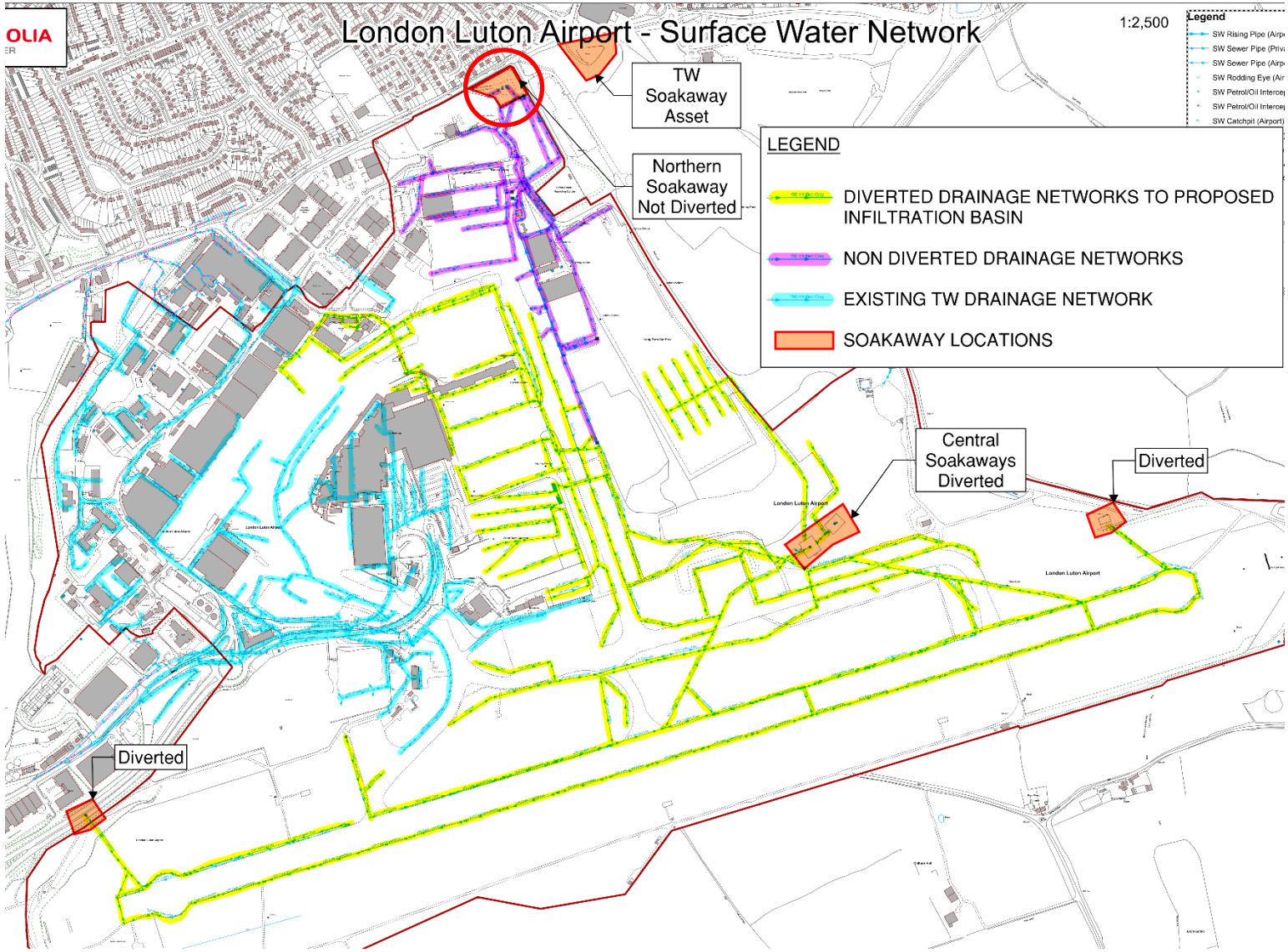
5.3.1 The main drainage infrastructure would include the installation of the new WTP (discussed further in section 6), attenuation tanks and infiltration basins. The Proposed Development would replace the existing Central Soakaway with new infiltration tanks.

5.3.2 The proposed drainage system would divert the existing drainage runs away from the existing Central Soakaway to control the pathway of the contaminated runoff, continuously monitor the water quality and to treat where pollutants are present before final discharge into the new infiltration tanks. The highlighted drainage runs in pink and yellow shown below on **Inset 5.1** currently discharge into soakaways.

5.3.3 The extension of the apron for the T2 expansion will retain the attenuation tanks installed below the apron constructed in assessment Phase 1 and will continue to restrict the discharge to GRR. As such, there is an opportunity to further utilise this attenuation tank to control the discharge to the WTP.

5.3.4 The network discharging to the Northern Soakaway (circled in red on **Inset 5.1**) is not to be diverted in the Proposed Development. The existing connections to the TW network from the existing T1 and aprons would continue to discharge into the TW network.

Inset 5.1: Location of existing soakaways.



5.3.5 As a result of the proposed airside drainage infrastructure approximately 9ha currently discharging into the river Lea catchment will be diverted to the proposed drainage systems which would ultimately discharge into the river Mimram catchment.

5.4 Catchment Areas

5.4.1 The indicative catchment areas for the surface water volume calculations and discharge rates have been investigated and these are shown in **Appendix A**. The catchment has provisionally been split as follows:

Landside (shown in Inset 5.2)

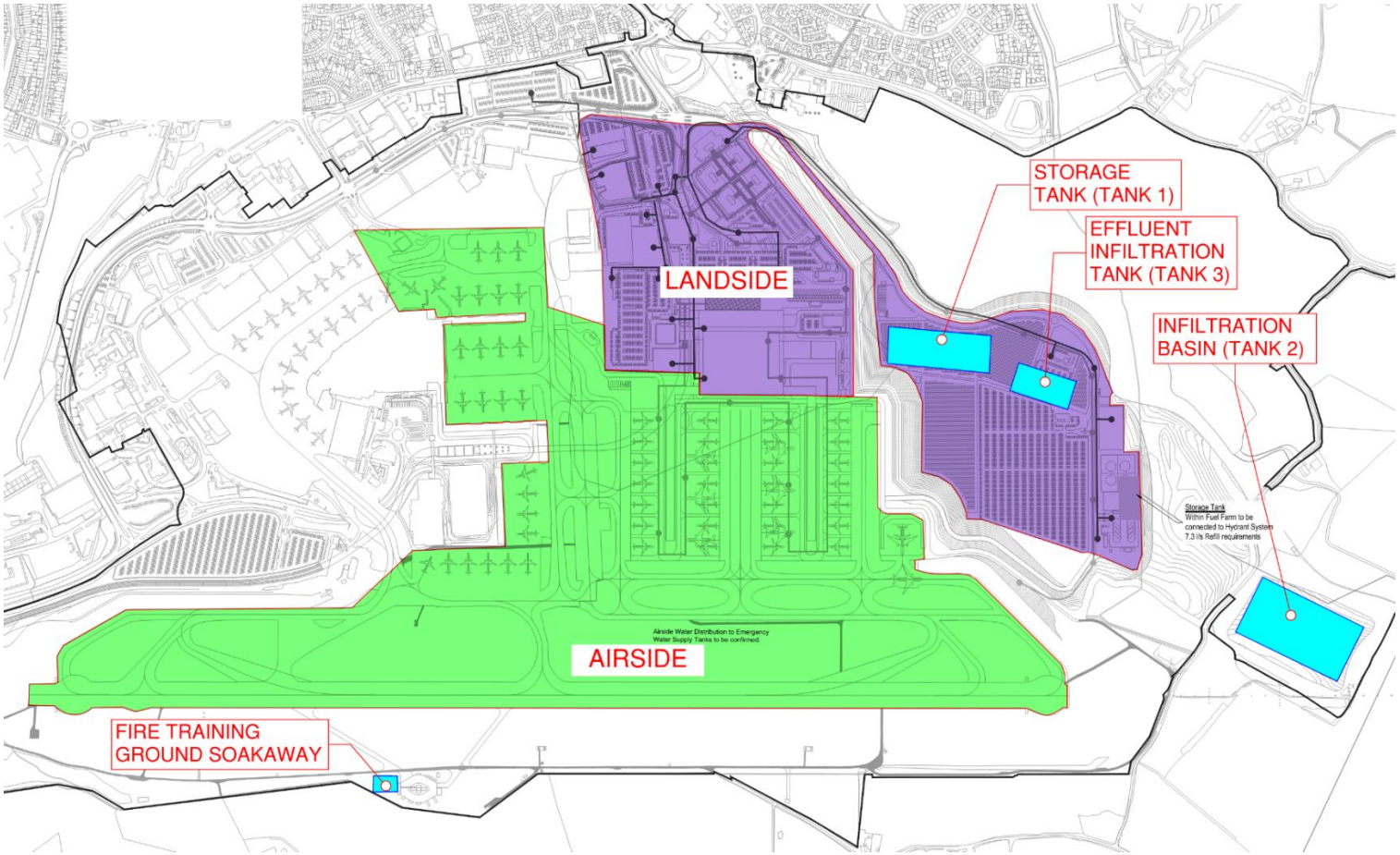
5.4.2 Surface water runoff from the T2 building, plus that from the new car parks to the north of T2, will be directed into the untreated infiltration basin (Tank 2) or permeable paving. This water will not be contaminated by the airside de-icing agents and oil separators will be provided locally as required. The infiltration basin will be underground to reduce the risk of bird attraction. The Proposed Development does not include diversion of the existing Northern Soakaway. The areas of Green Horizons Park (formerly New Century Park) which under assessment Phase 1 discharge into the TW network will be diverted and will discharge into the new infiltration basin (Tank 2). Any spillage from car parking such as oils can pass through a passive treatment train which will start with surface run-off through an oil interceptor before entering the attenuation tank prior to infiltration.

5.4.3 Permeable paving for car park P11 shown in **Appendix B** is proposed to treat any spillage on the car park through a series of filter beds before fully infiltrating. Longevity and maintenance of the assets will be based on manufacturer/product specification. This will be further developed during the detailed design stages.

Airside (shown in Inset 5.2)

5.4.4 Surface water runoff will also be directed towards the infiltration basin (Tank 2), however, the water quality will be continuously monitored and diverted to a holding tank (Tank 1) for treatment when de-icing trigger levels are reached. Contaminated water will then be treated by the water treatment plant and would be discharged to the treated effluent infiltration basin (Tank 3) north of the water treatment plant. If uncontaminated, the valve to the storage tanks will be closed and the water will bypass the water treatment plant and will discharge directly to the infiltration basin (Tank 2).

Inset 5.2: Airside and landside drainage catchments



Fire Training Ground

5.4.5 The drainage associated with the proposed Fire Training Ground, shown in **Appendix B** (drawing 5507), will be self-contained. When the Fire Training Ground is not in use surface water run-off will discharge to adjacent proposed soakaway, unless real time monitoring determines otherwise. During fire training operations, surface water run-off 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.

Fuel Storage Facility

5.4.6 The fuel storage facility will be surrounded by a bund. Surface water will drain through oil separators with sensors to measure water quality. If contamination reaches high enough levels to trigger the actuated inlets valves, the water will be diverted away from the infiltration basin (Tank 2) and towards the water treatment plant. If a significant leak occurred from the fuel storage facility, the actuated inlet valves would close the drainage completely and the fuel spill would be tankered away for treatment off-site

5.5 Preliminary Surface Water Drainage Design

5.5.1 The preliminary drainage strategy assumed to be in place for this assessment phase is illustrated in **Appendix B**.

5.5.2 The key design considerations are intended to reflect a sustainable approach to water management, and include the following criteria:

a. The surface water drainage will be designed, where possible, as a gravity system. The drainage system is to be designed in accordance with Design and Construction Guidance v2-1 (Ref. 4.2) namely no surcharging during a critical storm event of 1 in 2 years return period and no exceedance flooding during a critical storm event of 1 in 30 years return period. All surface water drainage is to be assessed for a 1 in 100 year return period with 40% added for climate change, so that any flooding is contained on site and does not impact surrounding areas.
b. Suitable upstream management consisting of source control and continuous quality monitoring and end-of-pipe treatment to maximise the use of SuDS.
c. Improved methodologies for applying the de-icing agents such as bunds and vacuum systems will limit the volume entering the drainage system and increase the re-cycled volume of de-icing agents.

Tank 1

5.5.3 Tank 1 shown in **Inset 5.2** is to be located below car park P11. Further checks have been carried out to determine the sizing of Tank 1, which is calculated based on several factors, including meteorological data to determine the

number of de-icing events but most importantly on the allowable discharge rate to the water treatment plant.

5.5.4 Tank 1 will provide a degree of redundancy in the system to cater for a range of factors that will be considered further at detailed design, including:

a. flooding at the infiltration tanks due to extreme events – the preliminary analysis suggests that for an extreme storm event of 1:100 return period + 40% climate change design, the tank will fill by approximately 14,000m^3;
b. water treatment plant part-closure due to maintenance;
c. allowable discharge rate from Tank 1 into the water treatment plant;
d. the chemical composition of the contaminated airside influent and hazardous substances;
e. infiltration basin/tank (Tank 2 and Tank 3) part-closure due to maintenance;
f. seasonal variations in the re-cycled water demand (e.g. due to irrigation); and
g. variations in the actual infiltration rates at the infiltration basin/tank (Tank 2 and 3), pending local geotechnical investigations.

5.5.5 Access to Tank 1 will be required for periodic maintenance.

Tank 2

5.5.6 The infiltration basin (Tank 2) provides 75,000m^3 of water storage and will be positioned at the lower levels of the Main Application Site. It has been sized such that it should remain mostly dry in all but the most severe storms.

5.5.7 Tank 2 drains into the chalk layer which is highly porous and therefore offers good infiltration properties.

5.5.8 Access to Tank 2 will be required for periodic maintenance.

5.5.9 Water stored in Tank 2 will be recycled for greywater use. Water will gravitate to a relift pumping station located at ground level within the water treatment plant.

a. The relift pumping station will supply water to a grit removal plant which will include 75% duty/assist grit centrifugal separators. From the centrifugal separators the treated water will then gravitate to the final rainwater harvesting storage tank in the vicinity of the T2 building for use as grey water in the terminal.
b. The grit removed will be transferred to skip to be combined with the grit removed from the water treatment plant for removal.

Rainwater Harvesting

5.5.10 The rainwater harvesting strategy is outlined to reduce the demand for potable water supplied by AW, as well as minimising the increase in discharge via infiltration. **Inset 5.3** highlights proposed infiltration basin/tanks with corresponding uses as well as roof catchment areas.

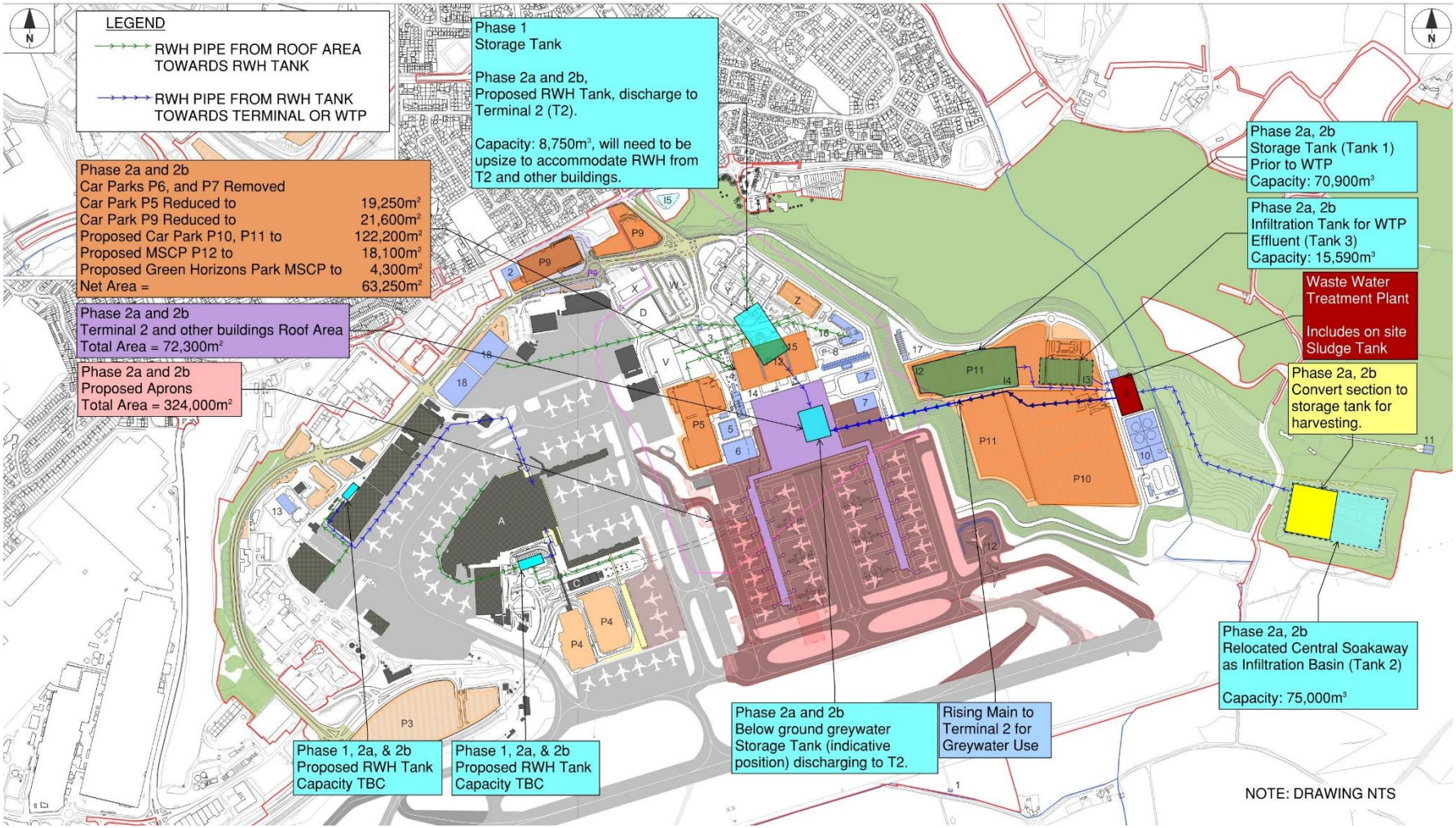
5.5.11 Based on rainfall data in the Luton area, a total volume required for the storage tank attenuating rainfall from the T2 buildings is approximately 3,100m^3, to

maintain a constant monthly supply of approximately 3,100m^3 to the airport throughout the year. It is important to note that surface area calculations assume that all rainwater from existing buildings highlighted in **Inset 5.3** can be collected and stored. This will need to be confirmed at detailed design stage.

5.5.12 Potential locations of rainwater harvesting tanks for assessment Phases 2a and 2b are highlighted in **Inset 5.3**. Exact locations would be determined at detailed design stage.

5.5.13 Harvested rainwater would require treatment so that the quality is fit for the intended non-potable use. Preliminary treatment would include a series of filters and separators whereby the system shall be designed and located upstream of the storage tanks, noting that several systems may be needed to satisfy the number of tanks required. The treatment process will remove coarse solids and organic matter from the network such that the maximum particle size is equal or less than 1mm. The systems must also be accessible for maintenance and adhere to the requirements set by BS EN 16941-1:2018 (or equivalent at time of implementation).

Inset 5.3: Rainwater harvesting for assessment Phases 2a and 2b



5.6 Water Balance

5.6.1 The existing surface car park (P5) west of T2, will further reduce in size to approximately 19,250m^2 to accommodate an energy centre and substation.

5.6.2 The proposed surface car parks constructed in assessment Phase 1 labelled as P6 and P7 will be demolished to construct Green Horizons Park (formerly New Century Park), access roads and two multi storey car parks (P12) and (P19) indicated in **Inset 5.3**.

5.6.3 The proposed surface car park constructed in assessment Phase 1 labelled as P9, will reduce in it's current footprint and extend to the south east of the Northern Soakaway. Overall, this will provide a net reduction in the impermeable surface to 21,600m^2.

5.6.4 The proposed surface car parks for assessment Phases 2a and 2b are located west of the water treatment plant, labelled as P10 and P11 in **Inset 5.3**. Approximately 22,950m^2 of P11 above Tank 1 will be permeable paving.

5.6.5 Following the relocation of the Central Soakaway to the far east of the Main Application Site, car park P5 will be diverted to discharge into the proposed infiltration basin (Tank 2).

5.6.6 The impermeable surface area for assessment Phases 2a and 2b will discharge to the proposed infiltration tank has a net increase catchment area of 509,450m^2.

5.6.7 The reduction in the TW discharge from the airport due to rainwater harvesting and offset against the additional impermeable area from car park P10 and P11, provides a net contributing area decrease to the TW network due to diverted runs to the proposed infiltration tank. The rainwater harvesting system will reduce discharge into the TW network through collecting and re-cycling roof rainwater from T2 and other buildings.

5.6.8 Therefore, the balancing of flows is expected to yield a net decrease in discharge into the TW network whilst diverting the current levels of discharge away from the Central Soakaway.

Inset 5.4: Summary of water balance for assessment Phases 1, 2a and 2b

PROPOSED SW NETWORK (Assessment Phase 1)		PROPOSED SW NETWORK (Assessment Phase 2a and 2b)	
Existing Buildings	Diverted to RWH tanks with overflow to ground	Existing Buildings	Diverted to RWH tanks with overflow to ground
Proposed Apron	Runoff to Central Soakaway	Proposed Apron	Runoff to Infiltration Basin (Tank 2). Diverted to Tank 1 if contamination triggered.
P5 Car Park	100% to Central Soakaway	P5 Car Park	100% to Infiltration Basin (Tank 2)
Proposed Car Parks	100% to TW after attenuation of 5l/s	Proposed Car Parks	100% to Infiltration Basin (Tank 2)

5.7 Pollution Control

5.7.1 Given the sensitivity of the Chalk aquifer, a series of proposed treatment processes have been incorporated into the preliminary design. These include:

a. Full hydrocarbon/oil retention separators for runoff from aprons. This is to facilitate limiting the spread of fuel and oils. Bypass separators would only be used in areas for short term parking or roadways that receive light contamination. The pollution prevention philosophy entails reduced use and re-cycling of the de-icing at source and pathway controls with continuous monitoring prior to end of pipe treatment. Points of application will be managed with perimeter bunds and vacuum pumps with increased agent re-cycling.

b. De-icing will typically be required annually from November to April. The activity will take place at runway, taxiways, aprons, and at aircraft on stand. De-icing chemicals are applied to the ground and aircraft. The pollution prevention strategy will include:

   i. improved controls and management of the application of ground de-icers (e.g., bunds, vacuum pumps to tankers and off-site re-cycling);
   ii. improved controls and management for dosing for application of de-icers to aircraft; and
   iii. no products used for de-icing will be classified as hazardous.

c. 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. Monitoring inspection chambers within the drainage system are activated by pollutants and subsequently the flow is diverted to the polluted storage tanks or water treatment plant.

d. All refuelling vehicles will carry spill kits to limit the amount from spills reaching the drainage system. There will be continuous improvements to controls and spill reporting.

5.8 Existing Landfill

5.8.1 A former landfill site extends to the north of the airport and any potential leachate from the landfill will need to be controlled by capping the layer. The area occupied by the former landfill will therefore be impermeable with surface water being channelled towards infiltration basins/tanks outside the landfill area.

5.8.2 Site investigations to-date indicate that the historic landfill is still producing gas and therefore gas protection measures are required. The extent of the landfill is shown on the drainage drawings in **Appendix B**.

5.8.3 All drainage systems (e.g., pipes and tanks) will need to be lined with a waterproof membrane.

5.8.4 In addition, the geotechnical site investigations indicate that the landfill will continue to settle with time and, therefore, any below ground installations will need to include flexible jointing to allow for differential settlement across the

site. Settlement will need to be monitored and localised repairs may be required.

5.9 Emergency Water Supply

5.9.1 The airport's Rescue and Firefighting Service operates through CAA Category 7 with Category 9 on request (Ref. 5.1). These categories define the volume of firefighting media required at all times. The Proposed Development does not necessitate a change in the category; therefore, no additional water storage is required for firefighting purposes. Whilst the new apron design will include additional hydrants for firefighting purposes, the runway and taxiways do not have a hydrant system in place and rely on underground and static tanks.

5.9.2 The total water storage inside the static water supply is 353m^3 with a further 49m^3 on wheels. The total water available (static emergency and on wheels) is therefore 402,000 litres (or 402m^3). Engagement with LLAOL, the airport operator, indicated that the current static emergency water supply has sufficient capacity to cater for the Proposed Development.

5.10 Preliminary Foul Water Strategy

5.10.1 The proposals with respect to treatment of both T2 waste water and the polluted aprons/runway/taxiways runoff are conceptually detailed below. Furthermore, influent parameters and final effluent consent levels would be fine-tuned based on a programme of sampling at detailed design stage.

5.10.2 Two options were considered for treating the foul water – discharging to the TW network that connects to the EHTW or providing a water treatment plant facility on-site with an independent drainage network.

5.10.3 The Proposed Development adopted provision of water treatment plant facilities on site. This will avoid overloading the drainage network in volume as well as overloading the EHTW in terms of chemical loads (refer to section 3.3).

5.10.4 The water treatment plant located at the east of the Main Application Site, north of the fuel farm would treat contaminated airside discharge and foul wastewater. The chemical composition of the influent and hazardous substances list will need to be finalised during detailed design and the treatment process potentially adjusted in accordance with design principles listed in Section 8.

5.10.5 A technical description of the water treatment plant processes and monitoring systems is provided in the following section and will be further developed during detailed design stage.

6 PROPOSED WATER TREATMENT PLANT

6.1 Conceptual Design – Layout

6.1.1 A new water treatment plant will be designed and constructed to handle the outflow from the following catchments:

a. polluted airfield drainage (surface water);
b. proposed foul drainage from T2; and
c. proposed attenuated surface water from Tank 2.

6.1.2 The water treatment plant would be separated into three interconnected streams – the effluent treatment process (ETP), the sewage treatment process (STP) and the surface water treatment. There will be by-products produced from the various proposed processes which will include screenings, fats, oils and grease (FOG), grit, and surplus sludges that will require some on-site management in terms of treatment, consolidation, storage, and then subsequent disposal off-site.

6.2 Conceptual Design – Treatment

6.2.1 The conceptual design of the water treatment plant is as follows:

a. Primary treatment using rake screens, grit centrifugal separators and FOG tank. Screenings, grit, and FOG shall be removed from site in skips for disposal off site.
b. Biological treatment through use of Moving Biological Bed Reactors; (MBBRs).
c. Secondary treatment through multi streamed Dissolved Air Floatation (DAF) plant,
d. Final treatment via ultrafiltration (UF).
e. Disinfection with UV or chlorination.
f. Sludge produced on site from MBBRs and DAFs would be thickened and stored for 31inkering off site.
g. Odour control plant will feed all parts of the building and consist of twin stage chemical scrubbers and granular activated carbon (GAC) polishing plant. This would include localised areas requiring odour canopies as well as air quality control within the main building. All malodourous air would be treated through both a chemical treatment stage using Sodium Hypochlorite and Sodium Hydroxide followed by a final polishing stage through dual 60% GAC scrubbers prior to be being discharged to atmosphere through the exhaust stack.

6.3 Influent Characteristics

6.3.1 The influent characteristics from run-off are indicated in **Table 6.1**.

Table 6.1: Assumed run-off influent characteristics

Influent characteristics	
Total Suspended Solids (TSS)	9 mg/l
Biological Oxygen Demand (BOD)	116 mg/l
Ammonium (NH4-N)	8 mg/l
Ammoniacal Nitrogen (NH3-N)	0.13 mg/l
Total Organic Compound (TOC)	200 mg/l

6.3.2 Anticipated sewage influent characteristics are shown in **Table 6.2** below.

Table 6.2: Assumed sewage influent characteristics (Ref. 6.1)

Influent characteristics	
TSS	400 mg/l
BOD	350 mg/l
NH4-N	45 mg/l

6.3.3 The combined peak inflow to the water treatment plant has been determined to be as follows.

Table 6.3: Water treatment plant maximum combine inflow

Inflow figures	
Max sewage Inflow	41.07 l/s
Max runoff inflow	205 l/s
Total combined inflow	246.07 l/s

6.4 Water Quality Monitoring

6.4.1 A key aspect of the strategy is the live monitoring of the water quality based on the following:

a. Monitoring of TOC will be automated and continuous.

b. The monitoring is upstream of the water treatment plant, and the inlet storage tanks so that if levels of contaminants are below the trigger level the influent will flow directly to the infiltration basin (Tank 2).

c. If, however, TOC is higher than the trigger level then the contaminated water will be automatically diverted to the inlet storage tank to be treated in the water treatment plant.

It is anticipated that technology will evolve prior to construction of the Proposed Development and the following points are based on currently available technology.

6.4.2 It is intended that trigger levels with respect to TOC will be refined during detailed design. The TOC trigger level will be site dependent, and it is anticipated that it would follow a period of site background testing as recommended within the Environmental Protection Agency guidance documentation (Ref. 6.2), in the absence of UK equivalent guidance. This is to allow for seasonal variance in 'normal' background levels of contamination to be catered for. It is intended that samples would be taken frequently and in different environmental conditions to maintain a tight standard deviation.

6.4.3 Following this data gathering exercise, the warning and trigger percentiles will be developed and confirmed in discussion with relevant stakeholders. Commonly, the 90th percentile is used for warning and 95th percentile for action/trigger. In this case action/trigger would result in the actuated valve diverting water to the water treatment plant instead of Tank 2. An example of warning and action/trigger levels is detailed in **Table 6.4**, taken from the Environmental Protection Agency guidance document.

Table 6.4: Examples of Action/Warning Limits used at the Environmental Protection Agency sites

Parameter	Action (Upper) Limit (mg/l)	Warning (Lower) Limit (mg/l)
COD	80	50
TOC	40	30
SS	50	25
pH	6 to 9	6 to 8

6.4.4 The use of MBBR, DAF, UF and disinfection would provide a more stringent final effluent level than would be typically expected from a standard water treatment works. The calibration of equipment is a maintenance schedule activity with the instrumentation to be checked against lab results.

6.4.5 The final effluent would contain organics in the form of BOD, COD and nitrogen compounds.

6.4.6 The acceptability of discharge to ground from the proposed infiltration tanks in terms of the potential impact on groundwater quality is discussed in the **Chapter 17** of the **ES [TR020001/APP/5.01]** and its appended Hydrogeological Risk Assessment **[TR020001/APP/5.02]**.

6.5 Final Effluent Quality

6.5.1 **Table 6.5** has been compiled using a number of typical final effluent discharge consents in England including watercourse and ground water discharges. The characteristics have been further tightened based on experience and with the

knowledge that there are public water supplies in the local area (site within SPZ3). Noting this is an outline design, the parameters stipulated below would be refined during detailed design with the development of the process solution.

Table 6.5: Proposed conceptual final effluent discharge consent levels

Parameter	Units	Prescribed Concentration or Value (PCV)	Sample Basis
TSS	mg/l	<20	Composite daily sample – 95%ile
$CBOD_5$	mg/l	<10	5 day sample – 95%ile
NH4-H ammonium	mg/l	<5	Composite daily sample – 95%ile
COD	mg/l	<20	Composite daily sample – 95%ile
pH	pH units	5-9.5	Composite daily sample
TKN (Total Nitrogen)	mg/l	<20	Composite daily sample – 95%ile
Turbidity	NTU	<10	Composite daily sample
pH	pH units	5-9.5	Spot
Residual Chlorine	mg/l	<2.0	Spot
Residual Bromine	mg/l	<5.0	Spot
Escherchia coli	number/100ml	250	Spot
Intestinal enterocci	number/100ml	100	Spot
Legionella pneumophilia	number/100ml	N/A	Spot
Total coliforms	number/100ml	1000	Spot

Parameter	Units	Prescribed Concentration or Value (PCV)	Sample Basis
Cadmium	µgCa/l	4	Composite daily sample – 95%ile
Chromium	µgCr/l	20	Composite daily sample – 95%ile
Copper	µgCu/l	50	Composite daily sample – 95%ile
Iron	mgFe/l	10	Composite daily sample – 95%ile

6.5.2 The list of chemicals in **Table 6.5** are the assumed contaminants expected to be in the effluent from the water treatment plant, which will be monitored to maintain the prescribed concentration levels.

6.5.3 The list of hazardous chemicals, monitoring systems, and treatment processes will need to be confirmed during detailed design. Within the wastewater treatment process, glycols, hydrocarbons and Perfluoroalkoxy alkanes (PFAs) are broken down, therefore, they are not listed in **Table 6.5** but would be checked in sample monitoring. The monitoring regime for the final effluent is prescribed in **Table 6.5** which includes organics, hydrocarbons, and BODs. **Table 6.5** forms the basis of the water treatment plant design at this stage.

6.5.4 Tests for chemicals highlighted in green in **Table 6.5** are collected and monitored continuously to ensure prescribed levels at discharge are maintained, and are fully automated. Calibration would be checked against lab tests periodically.

6.5.5 For detecting heavy metals in the water treatment plant effluent shown in **Table 6.5**, to ensure prescribed levels at discharge are maintained, testing kiosks circa 2x2m per unit will be required. This would involve automated systems with submerged pumping to extract test samples to local kiosks. The samples will need to be onsite lab tested by an operative with immediate result.

6.5.6 Tests for residual bromine to ensure prescribed levels at discharge are maintained would involve auto samplers across the Main Application Site, triggered by flow. The testing would be on-site lab tests with immediate results.

6.5.7 Testing to ensure prescribed levels at discharge are maintained for chemicals highlighted in orange in **Table 6.5** would take several days before results can be checked, as the bacteria needs to be grown.

6.5.8 Testing for $CBOD_5$ levels at the water treatment plant effluent, to ensure levels at discharge correspond with prescribed concentration levels, would take at least five days before results can be checked as the bacteria needs to be grown.

6.6 Protection of Chalk Aquifer

6.6.1 Given the sensitivity of the Chalk aquifer, a series of treatment steps has been incorporated into the concept preliminary design. Within the pollution prevention philosophy source and pathway controls capture the pollution event and limit spread prior to end of pipe treatment. These include:

a. A single combined water treatment plant will consist of two processes: one process for the sewage load from the T2 building - the sewage treatment process (STP) - and a second process for the surface run-off - the effluent treatment process (ETP. As the de-icing agents will be seasonal (typically November - April), the ETP stream of the water treatment plant will likely be maintained out of season artificially by feeding it with the de-icing agents to maintain a small level of 'glycol' digesting biomass whereas the STP stream of the water treatment plant will be active all year. The STP will be designed to effectively treat the influent flows from T2 to the levels denoted in **Table 6.5**.

b. The ETP portion of the water treatment plant is for the de-icing agents. The plant is primarily to treat glycol de-icers and very small amounts of aviation fuel, diesel, petrol, and other hydrocarbon based compounds as well as salt, which may escape the upstream separators. Any additional inflow from hydrocarbons (assumed to be petrol/diesel), standard road de-icers (sodium chloride) and/or potassium acetate (assumed to be a de-icer) would need to be identified and the quantity of inflow determined during detailed design of the water treatment plant.

6.7 Disposal of Final Effluent

6.7.1 All excess treated final effluent from the water treatment plant will be channelled to a separate 15,600m^3 infiltration tank (Tank 3) located north of the water treatment plant, acting as an overflow.

6.7.2 The treated final effluent from the water treatment plant will be recycled for irrigation with the remainder suitable for discharge to the ground. The re-cycled water will be pumped by rising main to a tank with location to be confirmed during detailed design. Current projections for irrigation are estimated at 6l/s.

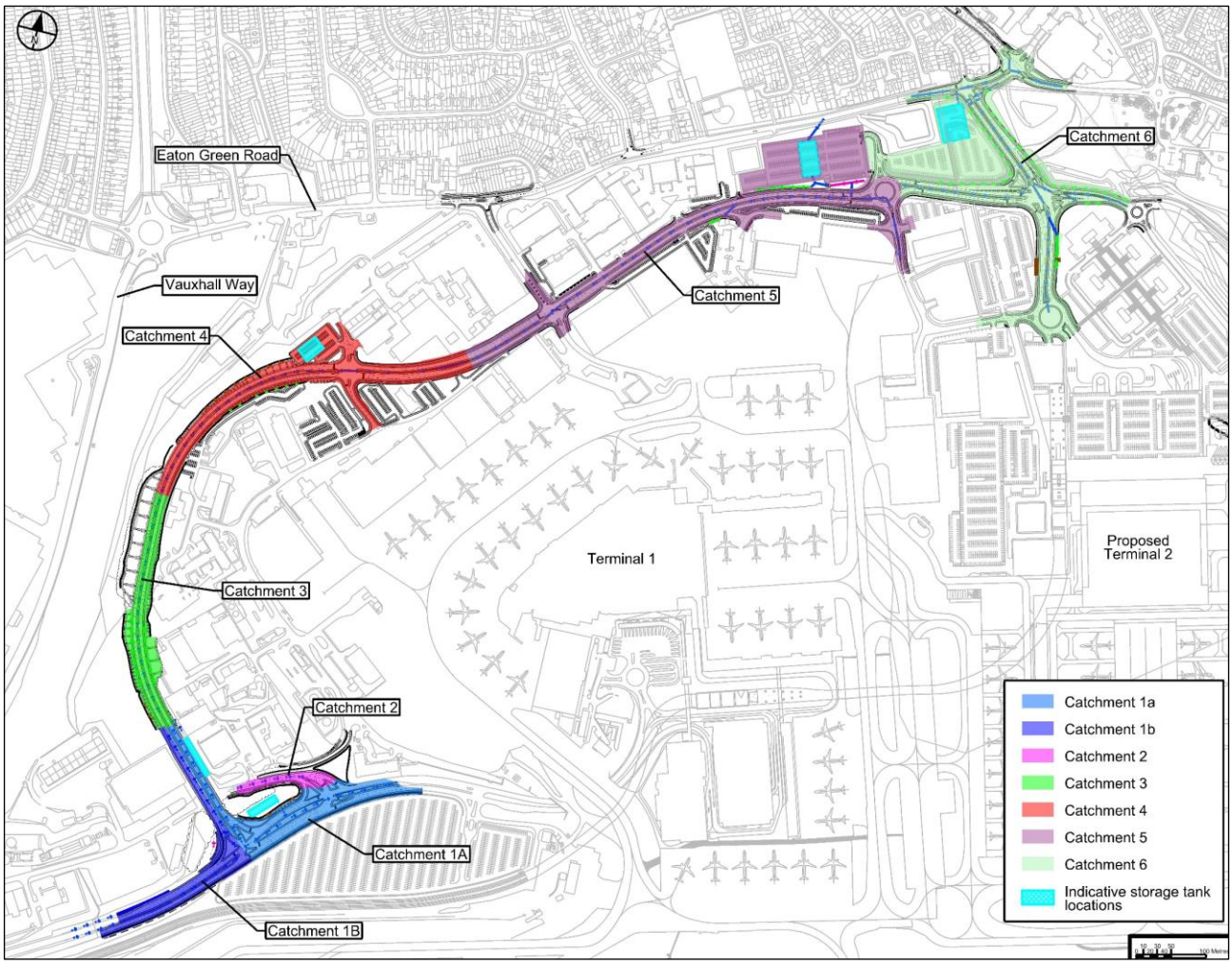
6.7.3 It is proposed to re-use some of the attenuated surface water from Tank 2 which is pumped to the water treatment plant for the removal of grit using centrifugal separators. After this process, the greywater will be returned to the terminals via a holding tank.

7 AIRPORT ACCESS ROAD AND OFF-SITE HIGHWAY MITIGATION

7.1 Airport Access Road Drainage

7.1.1 Six overall catchment areas are proposed to cater for drainage requirements associated with the Airport Access Road (AAR), as shown below in **Inset 7.1**.

Inset 7.1: AAR catchment areas



7.1.2 **Table 7.1** is shown below, which summarises the impermeable and gross permeable areas of the proposed catchments with proposed outfalls. Proposed catchment 1 was split into two sub-catchments, to enable the proposed attenuation storages to be split and therefore provide additional flexibility in their placement and design.

Table 7.1: AAR Catchment Areas

Catchment Ref.	Catchments (ha)		Outfall to:
	Impermeable	Gross Permeable	
Catchment 1A	1.14	0.12	Highway drain – LBC
Catchment 1B	0.79	0.05	Highway drain - LBC
Catchment 2	0.20	0.04	Highway drain - LBC
Catchment 3	0.65	0.30	Highways drain - LBC
Catchment 4	1.56	0.34	Highway drain - Veolia
Catchment 5	3.20	0.30	Surface Water Sewer – TW
Catchment 6	3.76	0.67	Surface Water Sewer – TW

Proposed Attenuation Storage

7.1.3 Indicative storage proposals have been designed for 1 in 100-year storm event, plus climate change allowance.

7.1.4 The following climate change allowances were adopted based on Environment Agency Climate Change Allowance, 2022 (Ref. 7.1):

a. 35% for 1 in 30 storm events; and
b. 40% for 1 in 100 storm events.

7.1.5 A 10% additional storage has been added for urban creep (for expected changes over the lifetime of the Proposed Development). Surface water is to be managed within the site (no flooding beyond highway boundaries for 1 in 30 and 1 in 100-year rainfall events, plus climate change allowance). Micro Drainage – Source Control software, which is an industry standard modelling methodology, was used to model the storage requirements for each catchment.

7.1.6 **Table 7.2** summarises the proposed discharge rates and storage with levels, for each of the catchment areas.

Table 7.2: Proposed Discharge Rates and Storage

Catchment Ref.	Brownfield / Greenfield	Proposed Discharge Rates (l/s)	Indicative Proposed Storage
Catchment 1A	Brownfield	5.7	Proposed tank - 10m x 45m x 2m (900m^3 capacity) Cover Level – 148.0 mAOD Invert Level – 144.5mAOD
Catchment 1B	Brownfield	4.0	Proposed box culverts (x2) - 2m x 2m x 80m (640m^3 capacity) Cover Level – 139.6 mAOD Invert Level – 136.1 mAOD
Catchment 2	Brownfield	Existing	None
Catchment 3	Greenfield	2.0	Proposed tank - 5m x 60m x 2m (600m^3 capacity) Cover Level – 140.0 mAOD Invert Level – 136.5 mAOD
Catchment 4	Brownfield	7.8	Proposed tank - 20m x 30m x 2m (1200m^3 capacity) Cover Level – 154.5 mAOD Invert Level – 151.0 mAOD
Catchment 5	Brownfield	16.0	Proposed tank - 25m x 50m x 2m (2500m^3 capacity) Cover Level – 148.0 mAOD Invert Level – 144.5 mAOD
Catchment 6	Greenfield	7.5	Proposed tank - 38m x 50m x 2m (3800m^3 capacity) Cover Level – 142.4 mAOD Invert Level – 136.4 mAOD

Proposed Highway Drainage Criteria

7.1.7 Road drainage design will be carried out based on the Design Manual for Roads and Bridges (DMRB) (Ref. 7.2) standards (CG 501) unless agreed otherwise with LBC.

7.1.8 DMRB CG 501 states: *"For road runoff within drainage systems the following overall design criteria shall apply:*

a. *1 in 1 year – no surcharge of the drainage system; and*
b. *1 in 5 years – no flooding from the drainage system"*

7.1.9 DMRB CG 501 states: *"All drainage systems shall be designed so that highway surface water flooding does not extend beyond the highway boundary up to the 1-in-100 year rainfall event, including an allowance for climate change."*

7.1.10 Surface runoff collection systems and pipe networks are to be designed at later design stages. Open surface drainage systems, such as ditches, shall be adopted where practical for ease of maintenance at future design stage.

7.1.11 SuDS have been proposed for water quantity (proposed attenuation storages) and water quality (vegetated ditches, filter drains and swales) to a certain extent at this design stage. Further SuDS (e.g. bioremediation system etc.) shall be considered to improve water quality, amenity and biodiversity where possible by coordinating with the landscape and environment disciplines at the next design stage.

7.1.12 Ditches are proposed at the toe of proposed embankments where spaces permit. Filter drains are proposed where the road is in deep cuttings and at the toe of embankments where there is not enough space to accommodate ditches.

7.1.13 Notably, calculations indicate that there is an opportunity to propose a 50% betterment in discharge rates for brownfield sites. This is based on the LBC requirement for a reduction in brownfield redevelopment discharge rates by 50%, for events up to and including the 1 in 100-year return period event plus climate change (LBC – Surface Water Management Plan, 2012 – cl. 4.7.2 Policy 2), as opposed to a discharge of 5 l/s/ha which was the figure previously agreed by LBC in relation to the Green Horizons Park (formerly New Century Park) planning permission (17/02300/EIA). This will reduce the storage required for attenuation and may create enough space to accommodate an attenuation basin/swale to replace the current proposal of attenuation underground structures.

7.1.14 The outfall levels of existing highway drains/TW sewers for each catchment have been taken from the information available at this design stage (existing drainage model). Where the information was not available, the connection level has been assumed based on the existing surface with a 1.2m cover to soffit (using topographical survey information). This is a standard level used in highway construction and final outfall levels will be confirmed during detailed design.

7.1.15 The following section provides details on potential drainage designs for the individual catchment areas. These are outline designs and subject to detailed design in the future.

Proposed Drainage Layout – Catchment 1A

7.1.16 A bridge kerb drain is proposed to drain the length along the proposed southbound retaining wall.

7.1.17 The proposed attenuation tank is located in what appears to be an abandoned car park (car park decommissioned in recent years as shown in Google Earth history). The proposed tank has been located with a clearance of 5m from existing land slopes. Structural and geotechnical disciplines will be consulted at a later design stage to validate that the proposed attenuation tank will have no impact on the existing slope.

7.1.18 Proposed catchment 1A is to outfall to the catchment 1B.

Proposed Drainage Layout - Catchment 1B

7.1.19 A bridge kerb drain shall be proposed to drain the length along proposed northbound retaining wall. Box culverts are proposed within the central reserve and verge of A1081 New Airport Way. There is flexibility to vary the position of the box culverts within the Order limits for the Proposed Development..

7.1.20 Box culverts will require interval chambers, as part of the design, with backdrops due to the steep surface gradients. A proposed swale is located near an existing land slope risking percolation. Further assessment is to be carried out during detailed design stage.

7.1.21 The Invert level (IL) of the proposed outfall to existing highway drain has been assumed based on a 1.2m cover to soffit and 300mm assumed pipe diameter, again based on standard levels used in highway construction.

Proposed Drainage Layout – Catchment 2

7.1.22 The proposed work involves only a re-alignment of existing carriageway which results in no increase in paved areas, therefore no attenuation is proposed.

Proposed Drainage Layout - Catchment 3

7.1.23 The proposed large earthwork along the northbound carriageway is to be drained naturally, as per the existing earthworks slope. A proposed attenuation tank is shown to the immediate east of the proposed AAR alignment, at the foot of the proposed AAR retaining wall.

7.1.24 The proposed attenuation tank is placed within an area of land which is subject to changes in level. Regrading of the land in this area would be required to accommodate the tank, in conjunction with potential amendments to the existing retaining structure, and a maintenance access will be proposed. The cover level of this area post-regrading has been assumed to be 140m AOD.

Proposed Drainage Layout - Catchment 4

7.1.25 Filter drains are proposed at certain locations along the toe of northbound embankment. This solution is proposed due to the narrow (1m) space being insufficient width to accommodate a ditch. The adjacent car park catchment has been included as impermeable to adopt a conservative approach. There is an opportunity to propose permeable pavement for the replacement areas of car parking located within this catchment.

Proposed Drainage Layout - Catchment 5

7.1.26 Filter drains are proposed at certain locations along the toe of northbound embankment. This proposal , which provides an appropriate solution, is proposed due to the narrow (1m) space being insufficient width to accommodate a ditch. The highway drain is to discharge at a proposed swale prior to connection to the proposed attenuation tank beneath the western (decked) section of car park P9.

7.1.27 The car park P9 catchment has been included as impermeable to adopt a conservative approach. There is an opportunity to propose permeable pavement for the external (non-decked) sections of the car park.

Proposed Drainage Layout - Catchment 6

7.1.28 Filter drains are also proposed within the verge areas due to the road being partially constructed in a deep cutting. The adjacent car park P9 catchment has been included as impermeable to adopt a conservative approach. There is an opportunity to propose permeable pavement for car park. An attenuation tank is proposed to be located within an area of the former landfill, beneath the eastern section of the proposed Car Park P9.

7.2 Off-site Highway Interventions Drainage

7.2.1 As part of the Proposed Development, a series of highway improvements are proposed at various locations in line with the incremental approach to the airport expansion. These are referred to as 'Off-site Highway Interventions' within the application documentation and include:

a. Vauxhall Way / Eaton Green Road
b. Windmill Road / Manor Road
c. A1081 New Airport Way / B653 / Gipsy Lane
d. A1081 New Airport Way / Percival Way
e. Windmill Road / Kimpton Road
f. Vauxhall Way / Kimpton Road
g. A1081 New Airport Way / London Road (North)
h. A1081 New Airport Way / London Road (South)
i. M1 Junction 10
j. Eaton Green Road / Lalleford Road
k. Wigmore Lane / Crawley Green Road
l. Wigmore Lane / Eaton Green Road
m. A602 Park Way / Stevenage Road / Hitchin Hill
n. A505 Upper Tilehouse Street / A602 Park Way
o. A505 Upper Tilehouse Street
p. Crawley Green Road / Lalleford Road
q. Windmill Road / Saint Mary's Road / Crawley Green Road
r. Eaton Green Road / Frank Lester Way.

7.2.2 The Off-site Highway Interventions generally consist of widening and converting existing at-grade roundabouts to signalised junctions, together with minor scale works including realignment of kerblines and local widening. The following sections summarise the proposed works at each of the locations, where a high level drainage assessment of the proposed highway has been conducted.

7.2.3 **Table 7.3** provides a summary of the drainage mitigation required at each of the off-site locations, together with a high-level commentary on the scope of the works. The mitigation proposals noted in the table will need to be assessed

against HEWRAT assessments at the detailed design stage, to ensure that no increases in pollutant loading occur.

Table 7.3: Off-site Highway Interventions Drainage Strategy

Off-site Junction Location	Extent of Proposed Works	Drainage / Mitigation Proposals
Vauxhall Way / Eaton Green Road	Provision of signals on roundabout- no change in impermeable area.	No mitigation or attenuation required.
A1081 New Airport Way / B653 / Gipsy Lane	Kerb realignment and carriageway widening.	Oversized pipework is assumed capable of attenuating the increased impermeable areas, due to limited changes in overall impermeable area.
A1081 New Airport Way / Percival Way	Roundabout replaced with signalised junction, kerb realignment and carriageway widening.	
Windmill Road / Kimpton Road	Roundabout replaced with signalised junction, minor kerb realignment.	
Vauxhall Way / Kimpton Road	Minor widening to junction, kerb realignment.	
A1081 New Airport Way / London Road (North)	Signalisation of roundabout, kerb realignment and minor widening.	
A1081 New Airport Way / London Road (South)	Signalisation of roundabout, no change to impermeable area.	No mitigation or attenuation required.
M1 Junction 10	Signalisation of roundabout, kerb realignment and carriageway widening.	Oversized pipework is assumed capable of attenuating the increased impermeable areas, due to limited changes in overall impermeable area.
Eaton Green Road / Lalleford Road	Mini roundabout replaced with signalised junction, minor kerb realignment.	No mitigation or attenuation required.
Wigmore Lane / Crawley Green Road	Roundabout replaced with signalised junction, kerb realignment. Reduction in impermeable area.	Oversized pipework is assumed capable of attenuating the increased impermeable areas, due to

Wigmore Lane / Eaton Green Road	Roundabout replaced with signalised junction, kerb realignment and carriageway widening.	limited changes in overall impermeable area.
A602 Park Way / Stevenage Road / Hitchin Hill	Kerb realignment and widening to various arms of roundabout.	
A505 Upper Tilehouse Street / A602 Park Way	Kerb realignment and widening to various arms of roundabout.	
A505 Upper Tilehouse Street / Pirton Road	Kerb realignment and minor widening.	No mitigation or attenuation required.
Crawley Green Road / Lalleford Road	Mini roundabout replaced with signalised junction, minor kerb realignment.	
Windmill Road / Saint Mary's Road / Crawley Green Road	Signalisation of roundabout, kerb realignment and carriageway widening.	Oversized pipework is assumed capable of attenuating the increased impermeable areas, due to limited changes in overall impermeable area.
Eaton Green Road / Frank Lester Way	Roundabout replaced with signalised junction, minor kerb realignment.	No mitigation or attenuation required.

8 DESIGN PRINCIPLES FOR DETAILED DESIGN

8.1.1 This section sets out the design principles that will be followed at the detailed design stage post DCO consent. These design principles will be secured by Requirement through the DCO and will provide certainty as to the principles that will be applied in designing the final surface and foul water drainage scheme for the Proposed Development. The section provides stakeholders with assurance on how the design of these elements will be developed following the grant of consent.

Table 8.1: Design Principles for Detailed Design Reference

Drainage design principles	
	General
DDS.001	The detailed design of drainage will be in accordance with Design and Construction Guidance (Ref. 4.2) or equivalent at the time, unless otherwise agreed with the relevant planning authority.
DDS.002	The detailed design of inspection chambers deeper than 3m will be in accordance with the Highway Construction Details (HCD) F series (Ref. 8.1) or equivalent at the time, unless otherwise agreed with the relevant planning authority.
	Rainwater Harvesting/Water Balance
DDS.003	The detailed design will incorporate water efficiency measures with the aim of minimising any net increase in Affinity Water's supply requirements to the Terminals resulting from the operation of the expanded airport.
DDS.004	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 **[TR020001/APP/5.02])** to be completed with reference to guidance from LBC.
DDS.005	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.006	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.007	Harvested rainwater will be treated as required, so that the quality is fit for the intended non-potable use.
DDS.008	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 AW as the regulatory local water supplier.
	Tanks

Drainage design principles	
DDS.009	The detailed design will adopt tanks. Open waters shall be avoided to reduce the risk of bird attraction.
DDS.010	Tanks will be designed to latest industry standards, including but not limited to the requirements of the Building Regulations 'Part H' (Ref. 4.1) and Sewerage Sector Guidance 'Design & Construction Guidance' 2019, (Ref. 4.2) or equivalent at the time.
DDS.011	The detailed design of underground tanks will adopt material specifications to provide chemical resistance and leak prevention.
DDS.012	The detailed design for the installation, and the specification of operation and maintenance, of the infiltration tanks at the Main Application Site will comply with bespoke environmental permits.
DDS.013	If surface water contamination is detected via high levels of TOC on airside aprons, the flow will be diverted to the attenuation tank (Tank 1), to be tankered away for off-site treatment. Access into the attenuation tank will be required to pump out the contaminated surface water. The chamber will also allow for future maintenance of the tank.
DDS.014	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.015	The detailed design of individual tanks will prioritise maintenance strategies which remove the need for humans to enter the tanks wherever reasonably practicable.
DDS.016	The design of storage tanks below the airfield shall 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 are to be agreed with the Applicant and airport operator.
DDS.017	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 is to consider the impacts of groundwater mounding, to ensure that the infiltration tanks do not result in groundwater flooding downstream.
DDS.018	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.
	Drainage installation in Landfill
DDS.019	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.020	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.

Drainage design principles	
	Surface Water – General
DDS.021	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.
DDS.022	The detailed design of surface water drainage collector systems will be based on appropriate rainfall intensities.
DDS.023	The detailed design will apply the SuDS hierarchy following the guidance in CIRIA SuDS Manual C753 (Ref. 3.1), or equivalent at the time.
DDS.024	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. 8.2) or equivalent at the time
DDS.025	The detailed design will consider the interface of the existing overflow pipe from the TW 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 TW details and specifications and the relevant authorisations are to be obtained.
DDS.026	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 Total Organic Compound (TOC) monitoring (as a minimum standard).
DDS.027	The detailed design will incorporate emergency isolation valves positioned strategically for use in the event of severe pollutant spillages throughout the site.
DDS.028	The design of storage vessels (for example in the fuel storage facility) will include bunded storage in accordance with Environment Agency requirements.
	Surface Water - Airfield Drainage
DDS.029	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. 8.3) (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.030	The design of airfield surface water shall adopt a discharge rate equivalent to the green field run-off rate (GRR).
DDS.031	Airside inspection chambers shall be designed to withstand aircraft loading and adopt class F900 covers and frames.
	Surface Water – Landside Drainage
DDS.032	The site-wide strategy will be to restrict the runoff from car parks to GRR.

Drainage design principles	
DDS.033	The design of drainage assets in landside areas shall be in accordance with the DMRB (Ref. 7.2) or other relevant and appropriate standards that are in place when the detailed design is being carried out.
DDS.034	Landside inspection chambers shall be designed to withstand vehicle loading and adopt class D400 covers and frames.
DDS.035	Bespoke environmental permits will be obtained for the proposed infiltration tanks at the Main Application Site.
	Surface Water - Highway Drainage
DDS.036	The design of drainage assets in highway areas shall be in accordance with the DMRB (Ref. 7.2) or other relevant and appropriate standards that are in place when the detailed design is being carried out.
DDS.037	The drainage works for the AAR 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.038	The detailed design for the above ground surface shall adopt positive drainage based on the recommended crossfalls between 1:40 and 1:60.
DDS.039	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.040	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 to be developed in consultation with the relevant local authority and Environment Agency.
	Foul Drainage
DDS.041	The detailed design to accommodate increased capacity through T1 will provide attenuation, as required, to prevent peak hour foul load exceeding TW system capacity.
DDS.042	The drainage and water treatment systems will be designed so that all discharges to ground do not intentionally contain hazardous substances, as defined in WFD (Ref. 2.1), and are non-polluting, due to the underlying chalk being a Principal Aquifer and the infiltration tanks being proposed within a SPZ3.
DDS.043	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).
	Water Treatment Plant

Drainage design principles	
DDS.044	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 (e.g. the effluent would be tankered away or temporarily attenuated).
DDS.045	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.046	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 **[TR020001/APP/5.01]**.
DDS.047	The detailed design will include specification of baseline monitoring of the wastewater produced by the airport (the eventual water treatment plan influent) which is to be undertaken to ascertain the composition of the foul water and inform the treatment requirements at the proposed water treatment plant. This influent monitoring regime is to be developed with the Environment Agency and will inform future bespoke environmental permits for infiltration basins.
	Water Treatment Plant
DDS.048	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.049	The detailed design will include specification of real-time continuous monitoring of contaminants which would be undertaken throughout the lifecycle of the installation to ensure that any contaminated runoff would be treated to an appropriate level prior to discharging to the underlying aquifer via the infiltration tanks.
DDS.050	The water treatment plant will be designed to accommodate the anticipated volumes and loads to meet the total demand of Terminal 2 with the design including provisions for modular construction to accommodate incremental demand.
DDS.051	Access points will be designed into storage vessels to allow for maintenance.
DDS.052	The detailed design will incorporate the use of Class 1 oil separators down stream of surface runoff drainage collection systems where there is risk of fuel spills.
	Fire Training Ground

Drainage design principles	
DDS.053	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.

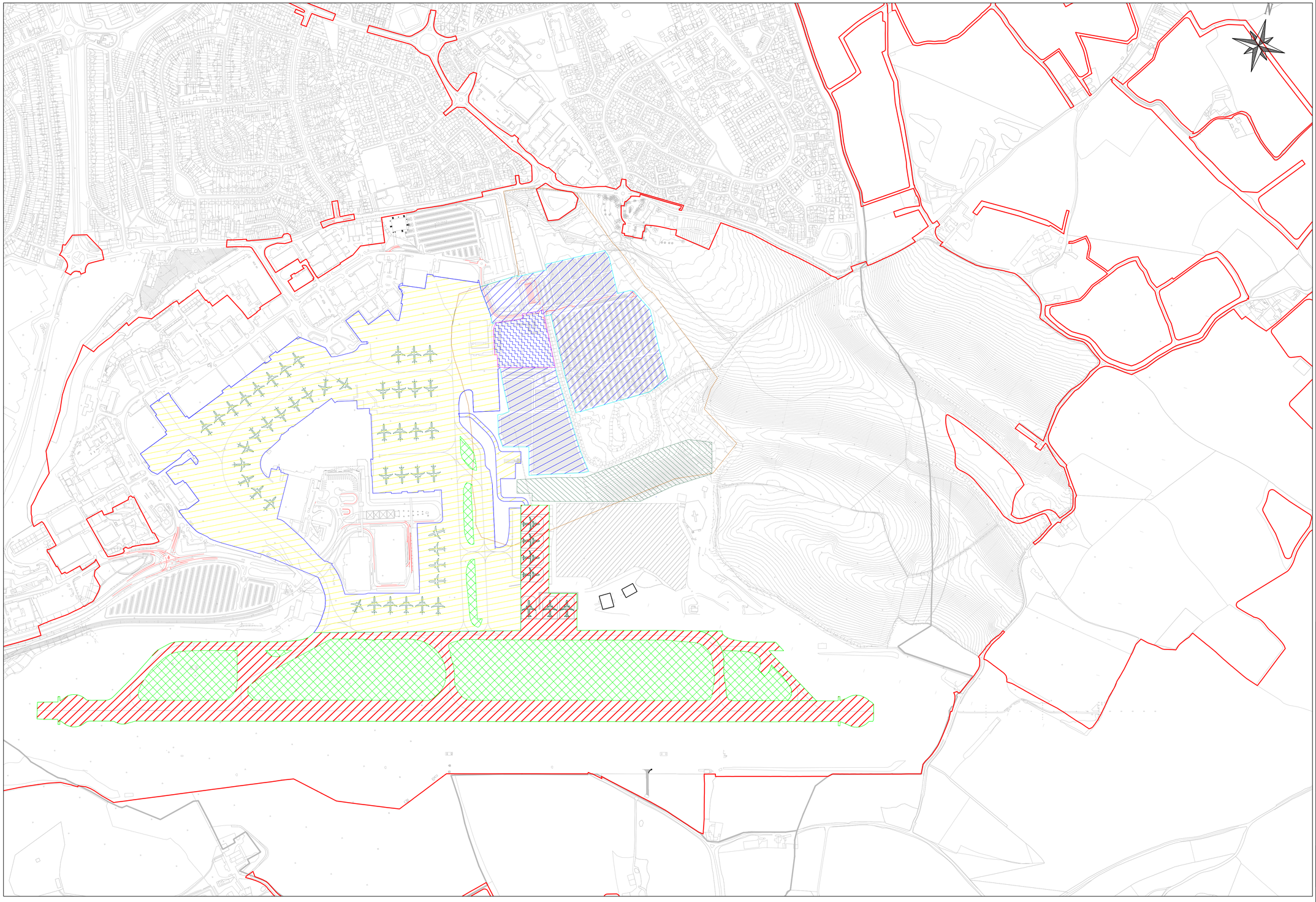
GLOSSARY AND ABBREVIATIONS

Acronym	Description
AW	Affinity Water
BOD	Biological Oxygen Demand
DAF	Dissolved Air Floatation
Luton DART	Luton Direct Air-Rail Transit
DCO	Development Consent Order
EA	Environmental Agency
ETP	Effluent treatment process
EHTW	East Hyde Treatment Works
FW	Foul Water
GRR	Greenfield Runoff Rate
LLAOL	London Luton Airport Operations Limited
LLFA	Lead Local Flood Authority
LSCP	Long Stay Car Park
MBBR	Moving Biological Bed Reactors
M&E	Mechanical and Electrical
mppa	Million passengers per annum
NH3-N	NH3 (ammonia) - N (nitrogen)
NH4-N	NH4 (ammonium) - N (nitrogen)
STP	Sewage treatment process
SW	Surface Water
TOC	Total Organic Compound
TSS	Total Suspended Solids
TW	Thames Water
WFD	Water Framework Directive
WTP	Water Treatment Plant
UF	Ultrafiltration

REFERENCES

Ref. 2.1 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (SI 2017/407).
Ref. 3.1 Construction Industry Research and Information Association. The SuDS Manual (C753). London. CIRIA. 2015.
Ref. 4.1 HM Government. The Building Regulations. Approved Document H. Drainage and waste disposal: NBS. 2010.
Ref. 4.2 Water UK. Design and Construction Guidance for foul and surface water sewers offered for adoption under the Code for adoption agreements for water and sewerage companies operating wholly or mainly in England ("the Code") 2021. Version 2.1. Water UK
Ref. 4.3 BS EN 16941-1:2018 On-site non-potable water systems. Systems for the use of rainwater
Ref. 4.4 London Luton Airport Operatons Ltd. 19mppa Application. Drainage and Water Supply Infrastructure Appraisal (41431JG22V2); Wood Group UK Ltd. 2021.
Ref. 5.1 Civil Aviation Authority. CAP 168: Licensing of Aerodromes. Edition 12. London. CAA. 2022.
Ref. 6.1 Metcalf and Eddy. Wastewater Engineering Treatment and Reuse. 4th Edition. New York: McGraw Hill, 2013.
Ref. 6.2 EPA Office of Environmental (2012). Guidance on the setting of trigger values for storm water discharges to off-site surface waters at epa ippc and waste licensed facilities. Issue No. 1. Ireland.
Ref. 7.1 Environment Agency. Flood Risk Assessments: Climate Change Allowances, 2022.
Ref. 7.2 National Highways. Design Manual for Roads and Bridges. National Highways.
Ref. 8.1 Standards for Highways. Highway Construction Details.
Ref. 8.2 Department for Environment, Food and Rural Affairs. Sustainable Drainage Systems Non-statutory technical standards for sustainable drainage systems. March 2015.
Ref. 8.3 International Civil Aviation Organisation, International Standards and Recommended Practices, Annex 14 to the Convention on International Civil Aviation, Volume 1 Aerodrome Design and Operation, Ninth Edition, July 2022.

Appendix A – Catchment drawings



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SCALE 1 : 5000

All structure positions are indicative. The proposed works will be subject to detailed design development. The changes will be within limits of deviation specified in the Development Consent Order.

NOTES:

- ALL CATCHMENT AREAS SHOWN ARE INDICATIVE AND SUBJECT TO DETAILED MASTERPLAN DESIGN.
- ALL DIMENSIONS SHOWN ARE IN METRES UNLESS SHOWN OTHERWISE.
- DRAWING LLADCO-3C-CAP-WHS-GEN-DR-AR-1220 HAS BEEN USED AS A BACKGROUND.
- ALL PROPOSALS SHOWN ARE INDICATIVE FOR THE PURPOSES OF ASSESSMENT ONLY.
- THE PROPOSALS SHOWN RELATE TO THE MAIN APPLICATION SITE ONLY.

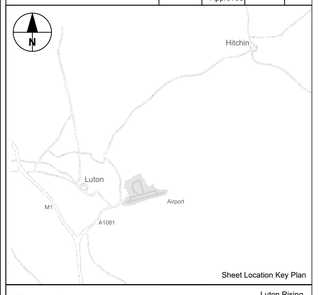
KEY:

- ORDER LIMITS
- RUNWAY / HARD STANDING PROPOSED WORKS AIRSIDE (235,199M^2, 23.52ha)
- HARD STANDING EXISTING AIRSIDE (454,748M^2, 45.47ha)
- HARD STANDING EXISTING AND PROPOSED LANDSIDE (157,135M^2, 15.71ha)
- HARD STANDING LANDSIDE PROPOSED GREEN HORIZONS PARK (19,606M^2, 1.96ha)
- PROPOSED AIRFIELD GRASSLAND (237,099M^2, 23.71ha)

TOTAL IMPERMEABLE AREA:
866,688M^2
86.67ha

ILLUSTRATIVE ONLY

Revision History	Drawn	Checked / Approved	Date	Rev.
DCO SUBMISSION	SK	ZC / MS	27/02/23	P01



Sheet Location Key Plan

Luton Rising
Hart House Business Centre
Kimpton Road, Luton, LU2 0LA
www.lutonrising.org.uk

Luton Rising — Our airport. Our community. Our planet.

London Luton Airport Expansion Development Consent Order

Drawing Title

OVERVIEW LAYOUT
HARDSTANDING LAYOUT PLAN
ASSESSMENT PHASE 1

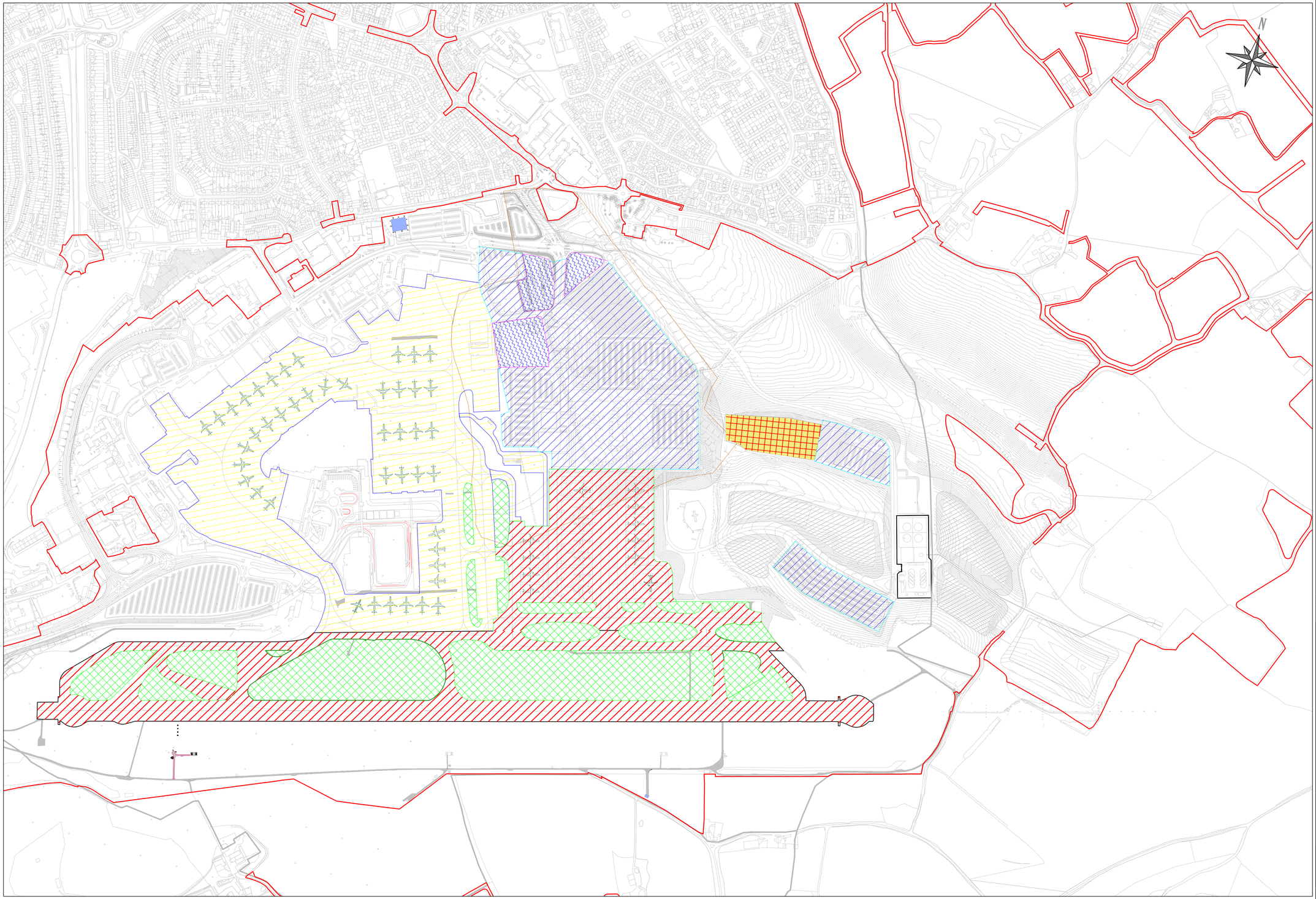
Purpose of issue	Suitability
DCO SUBMISSION	S6

Drawn	Checked	Approved	Date	Scale	Size
SK	ZC	MS	27/02/23	1:5000	A1

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

Drawing Number	Revision
LLADCO-3C-CAP-INF-DRN-DR-CE-5514	P01

Project – Phase – Originator – Asset/Zone – Sub Asset – Type – Discp. – Number



All structure positions are indicative. The proposed works will be subject to detailed design development. The changes will be within limits of deviation specified in the Development Consent Order.

NOTES:

- ALL CATCHMENT AREAS SHOWN ARE INDICATIVE AND SUBJECT TO DETAILED MASTERPLAN DESIGN.
- ALL DIMENSIONS SHOWN ARE IN METRES UNLESS SHOWN OTHERWISE.
- DRAWING LLADCO-3C-CAP-WHS-GEN-DR-AR-1240 HAS BEEN USED AS A BACKGROUND.
- ALL PROPOSALS SHOWN ARE INDICATIVE FOR THE PURPOSES OF ASSESSMENT ONLY.
- THE PROPOSALS SHOWN RELATE TO THE MAIN APPLICATION SITE ONLY.

KEY:

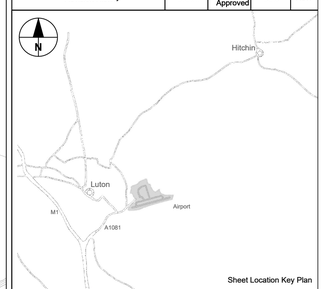
- ORDER LIMITS
- RUNWAY / HARD STANDING PROPOSED WORKS AIRSIDE (381,845M^2, 38.18ha)
- HARD STANDING EXISTING AIRSIDE (432,742M^2, 43.27ha)
- HARD STANDING EXISTING AND PROPOSED LANDSIDE (277430M^2, 27.74ha)
- HARD STANDING LANDSIDE PROPOSED GREEN HORIZONS PARK (34,982M^2, 3.50ha)
- PROPOSED AIRFIELD GRASSLAND (275,179M^2, 27.52ha)
- PROPOSED PERMEABLE PAVING (22,672M^2, 2.27ha)

TOTAL IMPERMEABLE AREA:
1,126,999M^2
112.70ha

TOTAL PERMEABLE AREA:
22,672M^2
2.27ha

ILLUSTRATIVE ONLY

Revision History	Drawn	Checked / Approved	Date	Rev.
DCO SUBMISSION	SK	ZC / MS	27/02/23	P01



Sheet Location Key Plan

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Luton Rising
Our airport. Our community. Our planet.

London Luton Airport Expansion Development Consent Order

Drawing Title

OVERVIEW LAYOUT
HARDSTANDING LAYOUT PLAN
ASSESSMENT PHASE 2A

Purpose of issue	Suitability
DCO SUBMISSION	S6

Drawn	Checked	Approved	Date	Scale	Size
SK	ZC	MS	27/02/23	1:5000	A1

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

Drawing Number	Revision
LLADCO-3C-CAP-INF-DRN-DR-CE-5515	P01

Project – Phase – Originator – Asset/Zone – Sub Asset – Type – Discp. – Number

All structure positions are indicative. The proposed works will be subject to detailed design development. The changes will be within limits of deviation specified in the Development Consent Order.

NOTES:

- ALL CATCHMENT AREAS SHOWN ARE INDICATIVE AND SUBJECT TO DETAILED MASTERPLAN DESIGN.
- ALL DIMENSIONS SHOWN ARE IN METRES UNLESS SHOWN OTHERWISE.
- DRAWING LLADCO-3C-CAP-WHS-GEN-DR-AR-1260 HAS BEEN USED AS A BACKGROUND.
- ALL PROPOSALS SHOWN ARE INDICATIVE FOR THE PURPOSES OF ASSESSMENT ONLY.
- THE PROPOSALS SHOWN RELATE TO THE MAIN APPLICATION SITE ONLY.

KEY:

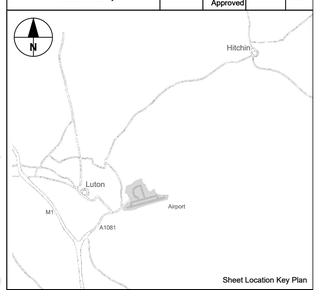
- ORDER LIMITS
- RUNWAY / HARD STANDING PROPOSED WORKS AIRSIDE (491,348M^2, 49.13ha)
- HARD STANDING EXISTING AIRSIDE (476,289M^2, 47.63ha)
- HARD STANDING EXISTING AND PROPOSED LANDSIDE (315,285M^2, 31.53ha)
- HARD STANDING LANDSIDE PROPOSED GREEN HORIZONS PARK (66,027M^2, 6.60ha)
- PROPOSED AIRFIELD GRASSLAND (293,571M^2, 29.36ha)
- PROPOSED PERMEABLE PAVING (22,672M^2, 2.27ha)

TOTAL IMPERMEABLE AREA:
1,348,949M^2
134.89ha

TOTAL PERMEABLE AREA:
22,672M^2
2.27ha

ILLUSTRATIVE ONLY

Revision History	Drawn	Checked / Approved	Date	Rev.
DCO SUBMISSION	SK	ZC / MS	27/02/23	P01



Sheet Location Key Plan

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Drawing Title

OVERVIEW LAYOUT
HARDSTANDING LAYOUT PLAN
ASSESSMENT PHASE 2B

Purpose of issue	Suitability
DCO SUBMISSION	S6

Drawn	Checked	Approved	Date	Scale	Size
SK	ZC	MS	27/02/23	1:5000	A1

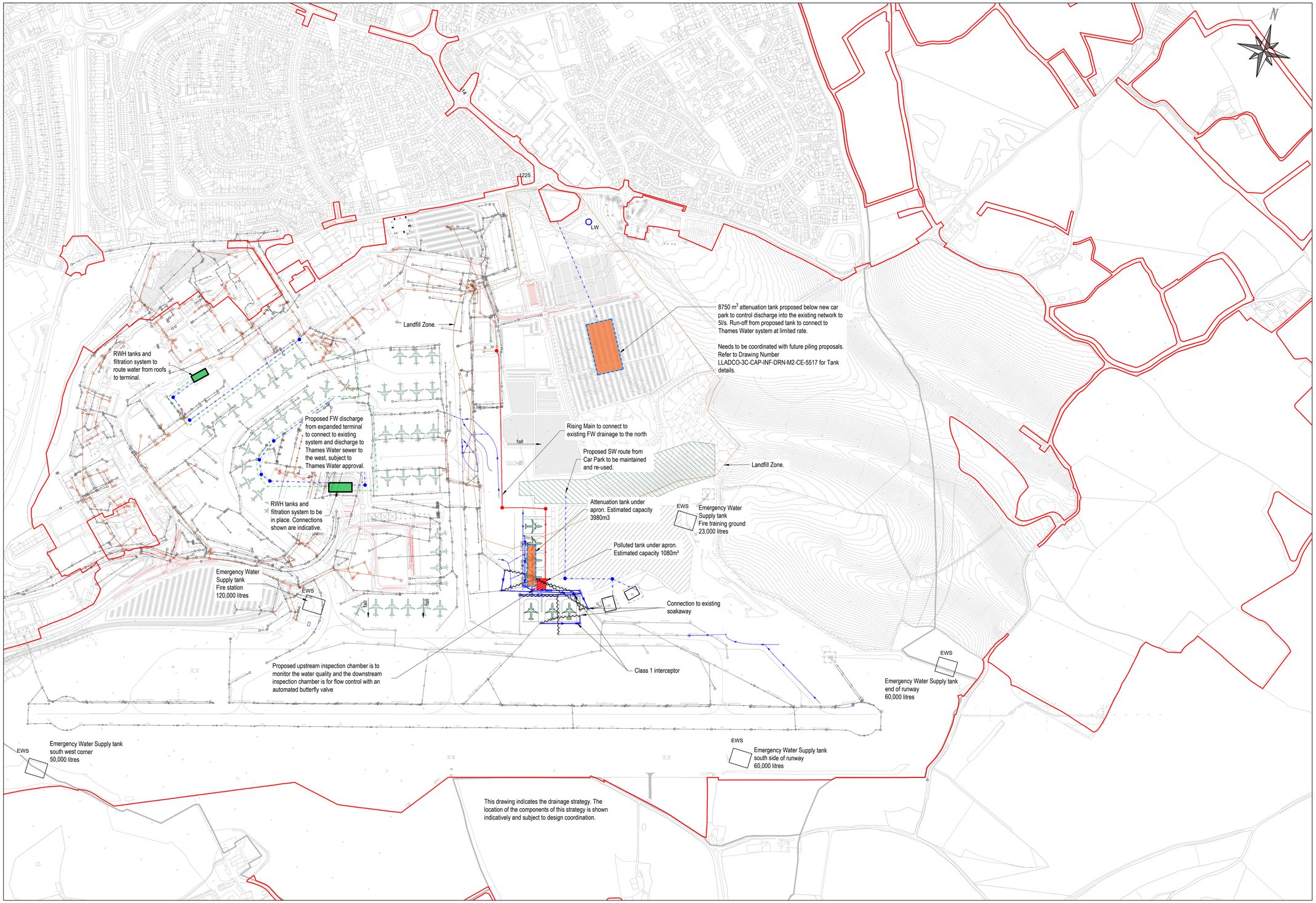
DCO Application Ref.	APFP Regulation	DCO Document Ref.
TR020001	5(2)(o)	TR020001/APP/5.02

Drawing Number	Revision
LLADCO-3C-CAP-INF-DRN-DR-CE-5516	P01

Project – Phase – Originator – Asset/Zone – Sub Asset – Type – Discp. – Number

0 100 200 300 400 500 m
SCALE 1 : 5000

Appendix B – Drainage statement drawings



0 100 200 300 400 500 m

SCALE 1 : 5000

LEGEND

- Existing surface water drain with inspection chamber
- Existing foul water drain with inspection chamber
- Redundant pipe
- Proposed RWH surface water drain
- Proposed surface water drain with inspection chamber
- Large proposed surface water linear drainage conduit/ channel with inspection chamber
- Proposed foul water drain with inspection chamber
- Proposed airside drainage network
- 162.095 Proposed spot level
- 162.095 Existing spot level
- EWS Approx. position of existing Emergency Water Supply tanks
- PS Proposed pumping station
- Proposed rising mains
- LW Proposed landfill sealed Leachate wells
- PI Proposed petrol interceptor
- DIV Proposed surface water diversion location
- Order Limits
- Existing Landfill Zone
- Proposed Permeable Paving
- Proposed Underground Storage System
- Proposed Infiltration Basin
- Proposed Rain Water Harvesting Tank
- Proposed Attenuation Tank
- Proposed Polluted Tank

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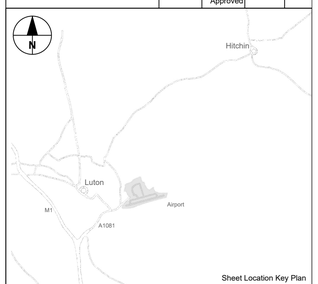
- UPDATED SIZE AND CAPACITY OF WATER TREATMENT PLANT (WTP) SUBJECT TO DETAIL DESIGN.
- CONNECTION TO THAMES WATER SYSTEM OUTLINED IN DRAINAGE DESIGN STATEMENT.
- POTABLE WATER SUPPLY FROM AFFINITY WATER.
- UPDATED TANK SIZES SUBJECT TO DETAIL DESIGN.
- SIZE AND LOCATION OF PUMPS TO BE DETERMINED AT DETAILED DESIGN STAGE.

Abbreviations:

AW	-	Affinity Water
DIV	-	Diversion Location
EWS	-	Emergency Water Supply
FW	-	Foul Water
LW	-	Leachate Wells
PI	-	Petrol Interceptor
PS	-	Pumping Station
PVC	-	Polyvinyl Chloride
RWH	-	Rainwater Harvesting
SW	-	Surface Water
TW	-	Thames Water

ILLUSTRATIVE ONLY

Revision History	Drawn	Checked / Approved	Date	Rev.
DCO SUBMISSION	SK	ZC / MS	27/02/23	P01



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Drawing Title

OVERVIEW LAYOUT
FOUL/SURFACE WATER DRAINAGE ASSESSMENT PHASE 1

Purpose of issue	Suitability
DCO SUBMISSION	S6

Drawn	Checked	Approved	Date	Scale	Size
SK	ZC	MS	27/02/23	1:5000	A1

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

Drawing Number	Revision
LLADCO-3C-CAP-INF-DRN-DR-CE-5501	P01

Project – Phase – Originator – Asset/Zone – Sub Asset – Type – Discp. – Number

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PI	-	Petrol Interceptor
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PVC	-	Polyvinyl Chloride
RWH	-	Rainwater Harvesting
SW	-	Surface Water
TW	-	Thames Water

8750 m³ attenuation tank proposed below new car park to control discharge into the existing network to 5l/s. Run-off from proposed tank to connect to Thames Water system at limited rate.

Needs to be coordinated with future piling proposals.
Refer to Drawing Number LLADCO-3C-CAP-INF-DRN-M2-CE-5517 for Tank details.

Landfill Zone.

Landfill Zone.

Rising Main to connect to existing FW drainage to the north

Proposed SW route from Car Park to be maintained and re-used.

EWS

Emergency Water Supply tank Fire training ground 23,000 litres

Attenuation tank under apron. Estimated capacity 3980m3

Polluted tank under apron. Estimated capacity 1080m³

Connection to existing soakaway

Class 1 interceptor

Emergency Water Supply tank end of runway 60,000 litres

EWS

Emergency Water Supply tank Fire station 120,000 litres

Proposed upstream inspection chamber is to monitor the water quality and the downstream inspection chamber is for flow control with an automated butterfly valve

fall

terminal to
e to
ct to

0 50 100 150 200 250 m

SCALE 1 : 2500

LEGEND

- Existing surface water drain with inspection chamber
- Existing foul water drain with inspection chamber
- Redundant pipe
- Proposed RWH surface water drain
- Proposed surface water drain with inspection chamber
- Large proposed surface water linear drainage conduit/ channel with inspection chamber
- Proposed foul water drain with inspection chamber
- Proposed airside drainage network

- 162.095 Proposed spot level
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- EWS Approx. position of existing Emergency Water Supply tanks
- PS Proposed pumping station
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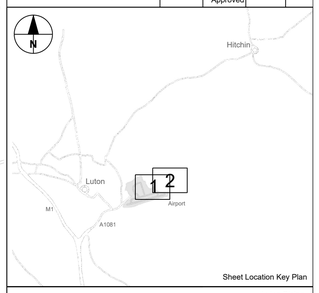
- LW Proposed landfill sealed Leachate wells
- PI Proposed petrol interceptor
- DIV Proposed surface water diversion location

- Order Limits
- Existing Landfill Zone
- Proposed Permeable Paving
- Proposed Underground Storage System
- Proposed Infiltration Basin
- Proposed Rain Water Harvesting Tank
- Proposed Attenuation Tank
- Proposed Polluted Tank

ILLUSTRATIVE ONLY

Revision History	Drawn	Checked / Approved	Date	Rev.
DCO SUBMISSION	SK	ZC / MS	31/03/20	P01



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Drawing Title

OVERVIEW LAYOUT
FOUL/SURFACE WATER DRAINAGE
ASSESSMENT PHASE 1
SHEET 1 OF 2

Purpose of issue				Suitability	
DCO SUBMISSION				S6	
Drawn	Checked	Approved	Date	Scale	Size
SK	ZC	MS	27/02/23	1:2500	A1
DCO Application Ref.	APFP Regulation		DCO Document Ref.		
TR020001	5(2)(o)		TR020001/APP/5.02		
Drawing Number				Revision	
LLADCO-3C-CAP-INF-DRN-DR-CE-5502				P01	

Project – Phase – Originator – Asset/Zone – Sub Asset – Type – Disc. – Number

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NOTES:

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- CONNECTION TO THAMES WATER SYSTEM OUTLINED IN DRAINAGE DESIGN STATEMENT.
- POTABLE WATER SUPPLY FROM AFFINITY WATER.
- UPDATED TANK SIZES SUBJECT TO DETAIL DESIGN.
- SIZE AND LOCATION OF PUMPS TO BE DETERMINED AT DETAILED DESIGN STAGE.

Abbreviations:

AW	-	Affinity Water
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FW	-	Foul Water
LW	-	Leachate Wells
PI	-	Petrol Interceptor
PS	-	Pumping Station
PVC	-	Polyvinyl Chloride
RWH	-	Rainwater Harvesting
SW	-	Surface Water
TW	-	Thames Water

ILLUSTRATIVE ONLY

Revision History	Drawn	Checked / Approved	Date	Rev.
DCO SUBMISSION	SK	ZC / MS	27/02/23	P01

scharge into the existing network to
m at limited rate.

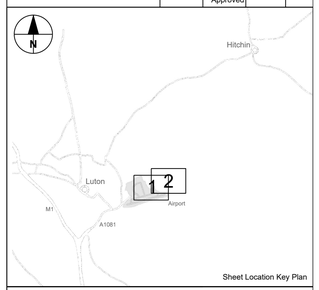
' for Tank details.

Landfill Zone.

Emergency Water Supply tank
end of runway
60,000 litres
EWS

ray

0 50 100 150 200 250 m
SCALE 1 : 2500



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Drawing Title

OVERVIEW LAYOUT
FOUL/SURFACE WATER DRAINAGE
ASSESSMENT PHASE 1
SHEET 2 OF 2

Purpose of issue	Suitability
DCO SUBMISSION	S6

Drawn	Checked	Approved	Date	Scale	Size
SK	ZC	MS	27/02/23	1:2500	A1

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

Drawing Number: LLADCO-3C-CAP-INF-DRN-DR-CE-5503
Project – Phase – Originator – Asset/Zone – Sub Asset – Type – Discp. – Number

Revision: P01

LEGEND

- Existing surface water drain with inspection chamber
- Existing foul water drain with inspection chamber
- Redundant pipe
- Proposed RWH surface water drain
- Proposed surface water drain with inspection chamber
- Large proposed surface water linear drainage conduit/ channel with inspection chamber
- Proposed foul water drain with inspection chamber
- Proposed airside drainage network

- 162.095 Proposed spot level
- 162.095 Existing spot level
- EWS Approx. position of existing Emergency Water Supply tanks
- PS Proposed pumping station
- Proposed rising mains
- LW Proposed landfill sealed Leachate wells
- PI Proposed petrol interceptor
- DIV Proposed surface water diversion location

- Order Limits
- Existing Landfill Zone
- Proposed Permeable Paving
- Proposed Underground Storage System
- Proposed Infiltration Basin
- Proposed Rain Water Harvesting Tank
- Proposed Attenuation Tank
- Proposed Polluted Tank

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- POTABLE WATER SUPPLY FROM AFFINITY WATER.
- UPDATED TANK SIZES SUBJECT TO DETAIL DESIGN.
- SIZE AND LOCATION OF PUMPS TO BE DETERMINED AT DETAILED DESIGN STAGE.
- AIRFIELD DRAINAGE ROUTES SUBJECT TO DETAIL DESIGN.
- DRAINAGE LAYOUT IN DARK GREY REFERS TO PREVIOUS ASSESSMENT PHASE INSTALLATION. REFER TO DRAWING LLADCO-3C-CAP-INF-DRN-DR-CE-5501.

Abbreviations:

AW	-	Affinity Water
DIV	-	Diversion Location
EWS	-	Emergency Water Supply
FW	-	Foul Water
LW	-	Leachate Wells
PI	-	Petrol Interceptor
PS	-	Pumping Station
PVC	-	Polyvinyl Chloride
RWH	-	Rainwater Harvesting
SW	-	Surface Water
TW	-	Thames Water

Interface with Green Horizons Park SW drainage to be coordinated

Rain water harvesting tank (formerly attenuation tank installed in assessment Phase 1) to take runoff from terminal 2 roof and other buildings

Greywater Storage Tank below Terminal 2. Capacity TBC.

Landfill Zone.

RWH tanks installed in assessment Phase 1. Refer to drawing LLADCO-3C-CAP-INF-DRN-DR-CE-5501.

Foul disposal point for aircraft - connection to landside

Gatic Ultraslot channels and adjacent piped drainage - typical for apron drainage.

fall

Diverted existing drainage (approximately 26 ha)

Emergency Water Supply tank Fire Station 120,000 litres

EWS

New monitoring chamber built over existing drain with telemetry link to valve chamber CD1C21. Existing drain diverted to monitoring chamber

Estimated catchment area to monitoring chamber is 3.25 ha.

Full retention interceptor ref GC15oi, serves 3.50ha Spel model P800/1CSC or equal approved.

Valve chamber CD1C21 with automated penstock valves over outlets. Surface water run-off with registered pollutant levels to be channeled east to the water treatment plant. Otherwise flows directed to the existing soakaway.

Emergency Water Supply tank end of runway 60,000 litres

Impermeable lined below ground storage crates to accept off-line flow in excess of downstream pipe capacity.

Underground storage system (TANK 1)
3m diameter Helibore pipes by Tubosider Ltd. Estimated storage to capture airside first flush event and to provide a degree of redundancy in the system and flooding at the infiltration tanks. Approx 70,900m³.
(Refer to drawing LLADCO-3C-CAP-INF-DRN-M2-CE-5510)

Surface water (SW) network in these car parks is omitted for clarity. SW network will discharge to the infiltration basin.This water will remain uncontaminated with the airside de-icing agents and petrol interceptors will be provided locally as required.

Landfill Zone.

Permeable Paving Area = 23000m²

Treated effluent infiltration tank (TANK 3):
2.5m diameter Twinstore perforated pipes with 41% surround void ratio by Tubosider Ltd. required storage volume approximately 15,590m³) based on a constant flow of approximately 250 l/s for 4 days from WTP with an infiltration rate of 0.085 m/hr to base only.
(Refer to drawing LLADCO-3C-CAP-INF-DRN-M2-CE-5510)

Water treatment plant (WTP)
Water treatment plant used for sewage treatment and during deicing months. Compound to accommodate parking spaces and vehicle manoeuvring for required maintenance.

Full retention interceptor ref GC3oi, serves 2.890ha Spel model P550/1CSC or equal approved.

Full retention oil interceptor prior to discharge to the infiltration basin. (Spel model P100/1CSC or equal approved)

Penstock inspection chamber to divert contaminated run-off to the Water Treatment Plant. Potential requirement for package pumping station, depending on final levels within the treatment works.

Fuel Storage Facility delivery area drained by conventional road gullies discharging to below ground retention tank. Adjacent roads drained via parallel swale and filter under-drain before discharge to the infiltration basin.

Connection point for airside drainage.

Infiltration Basin (TANK 2)
(Below ground infiltration tank):
3.0m diameter perforated corrugated galvanised pipe by Tubosider Ltd. Required storage volume approximately 75,000m³ based on 0.085m/hr (2.37 x 10^{-5}m/sec) infiltration rate. Partly attenuated to harvest surface water for treatement into WTP and used in T2. Design based on 1:100 year return period +40%CC.
(Refer to drawing 5510).

Twin full retention interceptors ref GC4oi, serves 5.708ha Spel model P550/1CSC (x2) or equal approved.

Twin full retention interceptors ref GC1oi, serves 4.764ha Spel model P500/1CSC (x2) or equal approved.

Twin full retention interceptors ref GC5oi, serves 5.095ha Spel model P500/1CSC (x2) or equal approved.

Emergency Water Supply tank end of runway 60,000 litres

Existing surface water sewer system to be connected to proposed surface water sewer system. Existing soakaway to become redundant.

Flow control valve set to divert surface water runoff into storage and treatment plant only during deicing months, during any accidental oil spillage and any emergency fire situation.

Carrier drain collects drainage from west stand area via full retention interceptor serving approximately 3.50ha, Spel model P800/CSC. Carrier drain also separately receives diversion of existing drainage from north west area of the site, comprising approx. 26ha. Upstream pollution control measures assumed to be in place TBC by survey.

Carrier drain collects drainage from south taxiways and runway. Comprising existing runway and taxiway drainage, new taxiways and allowance for soft areas. Drained area approximately 40.40ha. Pollution control measures tbc.

Edge slot or filter drain shown adjacent to runway that is unaffected by new taxi-way link construction is assumed to connect to the existing drainage system. Possible existing filter drain in these locations may be used if found to be appropriate. (Further information / survey of existing drainage is required).

This drawing indicates the drainage strategy. The location of the components of this strategy is shown indicatively and subject to design coordination.

0 100 200 300 400 500 m

SCALE 1 : 5000

LEGEND

- Existing surface water drain with inspection chamber
- Existing foul water drain with inspection chamber
- Redundant pipe
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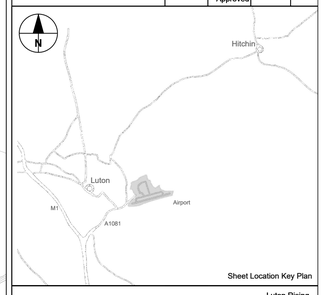
ILLUSTRATIVE ONLY

Revision History	Drawn	Checked Approved	Date	Rev.
DCO SUBMISSION	SK	ZC MS	27/02/23	P01



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Drawing Title

OVERVIEW LAYOUT
FOUL/SURFACE WATER DRAINAGE ASSESSMENT PHASE 2A

Purpose of issue				Suitability	
DCO SUBMISSION				S6	
Drawn	Checked	Approved	Date	Scale	Size
SK	ZC	MS	27/02/23	1:5000	A1
DCO Application Ref.	APFP Regulation		DCO Document Ref.		
TR020001	5(2)(o)		TR020001/APP/5.02		

Drawing Number: LLADCO-3C-CAP-INF-DRN-DR-CE-5504 — Revision: P01

Project – Phase – Originator – Asset/Zone – Sub Asset – Type – Discp. – Number

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N

NOTES:

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- AIRFIELD DRAINAGE ROUTES SUBJECT TO DETAIL DESIGN.
- DRAINAGE LAYOUT IN DARK GREY REFERS TO PREVIOUS ASSESSMENT PHASE INSTALLATION. REFER TO DRAWING LLADCO-3C-CAP-INF-DRN-DR-CE-5501.

Abbreviations:

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PS	-	Pumping Station
PVC	-	Polyvinyl Chloride
RWH	-	Rainwater Harvesting
SW	-	Surface Water
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Interface with Green Horizons Park SW drainage to be coordinated

Foul disposal point for aircraft - connection to landside

Gatic Ultraslot channels and adjacent piped drainage - typical for apron drainage.

Diverted existing drainage (approximately 26 ha)

Surface water (SW) network in these car parks is omitted for clarity. SW network will discharge to the infiltration basin.This water will remain uncontaminated with the airside de-icing agents and petrol interceptors will be provided locally as required.

Permeable Paving Area = 23000m²

Landfill Zone.

IL out=120.750

Treated effluent infiltration tank (TANK 3):
2.5m diameter Twinstore perforated pipes with 41% surround void ratio by Tubosider Ltd. require storage volume approximately 15,590m³ based on a constant flow of approximately 250 l/s for 4 days from WTP with an infiltration rate of 0.085 m/hr to base only.
(Refer to drawing LLADCO-3C-CAP-INF-DRN-M2-CE-5510)

Water treatment plant (WTP)
Water treatment plant used for sewage treatment and during deicing months. Compound to accommodate parking spaces and vehicle manoeuvring for required maintenance.

Full retention oil interceptor prior to discharge to the infiltration basin. (Spel model P100/1CSC or equal approved)

Penstock inspection chamber to div package pumping station, dependin

Fuel Storage Facility

Fuel Storage Facility delivery area retention tank. Adjacent roads drained via parallel

Twin full retention interceptors ref GC5oi, serves 5.095ha Spel model P500/1CSC (x2) or equal approved.

Flow control valve set to divert surface water runoff into storage and treatment plant only during deicing months, during any accidental oil spillage and any emergency fire situation.

Connection point for airside drainage.

Twin full retention interceptors ref GC1oi, serves 4.764ha Spel model P500/1CSC (x2) or equal approved.

Full retention interceptor ref GC3oi, serves 2.890ha Spel model P550/1CSC or equal approved.

Twin full retention interceptors ref GC4oi, serves 5.708ha Spel model P550/1CSC (x2) or equal approved.

Existing surface water sewer system to be connected to proposed surface water sewer system. Existing soakaway to become redundant.

Emergency Water Supply tank end of runway 60,000 litres

Full retention interceptor ref GC15oi, serves 3.50ha Spel model P800/1CSC or equal approved.

Carrier drain collects drainage from south taxiways and runway. Comprising existing runway and taxiway drainage, new taxiways and allowance for soft areas. Drained area approximately 40.40ha. Pollution control measures tbc.

Carrier drain collects drainage from west stand area via full retention interceptor serving approximately 3.50ha, Spel model P800/CSC.
Carrier drain also separately receives diversion of existing drainage from north west area of the site, comprising approx. 26ha. Upstream pollution control measures assumed to be in place TBC by survey.

Edge slot or filter drain shown adjacent to runway that is unaffected by new taxi-way link construction assumed to connect to the existing drainage system. Possible existing filter drain in these locations used if found to be appropriate. (Further information / survey of existing drainage is required).

Emergency Water Supply tank end of runway

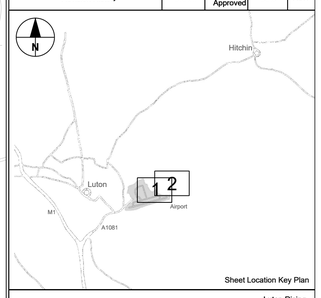
0 50 100 150 200 250 m
SCALE 1 : 2500

LEGEND

- Existing surface water drain with inspection chamber
- Existing foul water drain with inspection chamber
- Redundant pipe
- Proposed RWH surface water drain
- Proposed surface water drain with inspection chamber
- Large proposed surface water linear drainage conduit/ channel with inspection chamber
- Proposed foul water drain with inspection chamber
- Proposed airside drainage network
- 162.095 Proposed spot level
- 162.095 Existing spot level
- EWS Approx. position of existing Emergency Water Supply tanks
- PS Proposed pumping station
- Proposed rising mains
- LW Proposed landfill sealed Leachate wells
- PI Proposed petrol interceptor
- DIV Proposed surface water diversion location
- Order Limits
- Existing Landfill Zone
- Proposed Permeable Paving
- Proposed Underground Storage System
- Proposed Infiltration Basin
- Proposed Rain Water Harvesting Tank
- Proposed Attenuation Tank
- Proposed Polluted Tank

ILLUSTRATIVE ONLY

Revision History	Drawn	Checked Approved	Date	Rev.
DCO SUBMISSION	SK	ZC MS	27/02/23	P01



Sheet Location Key Plan

Luton Rising
Our airport. Our community. Our planet.
Luton Rising
Hart House Business Centre
Kimpton Road, Luton, LU2 0LA
www.lutonrising.org.uk

London Luton Airport Expansion Development Consent Order

Drawing Title

OVERVIEW LAYOUT
FOUL/SURFACE WATER DRAINAGE ASSESSMENT PHASE 2A
SHEET 1 OF 2

Purpose of issue	Suitability
DCO SUBMISSION	S6

Drawn	Checked	Approved	Date	Scale	Size
SK	ZC	MS	27/02/23	1:2500	A1

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

Drawing Number: LLADCO-3C-CAP-INF-DRN-DR-CE-5505 — Revision: P01

Project – Phase – Originator – Asset/Zone – Sub Asset – Type – Discp. – Number

All structure positions are indicative. The proposed works will be subject to detailed design development. The changes will be within limits of deviation specified in the Development Consent Order.

NOTES:

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- ALL FLOW RATES TO BE CALCULATED AND CONFIRMED.
- UPDATED SIZE AND CAPACITY OF WATER TREATMENT PLANT (WTP) SUBJECT TO DETAIL DESIGN.
- CONNECTION TO THAMES WATER SYSTEM OUTLINED IN DRAINAGE DESIGN STATEMENT.
- POTABLE WATER SUPPLY FROM AFFINITY WATER.
- UPDATED TANK SIZES SUBJECT TO DETAIL DESIGN.
- SIZE AND LOCATION OF PUMPS TO BE DETERMINED AT DETAILED DESIGN STAGE.
- AIRFIELD DRAINAGE ROUTES SUBJECT TO DETAIL DESIGN.
- DRAINAGE LAYOUT IN DARK GREY REFERS TO PREVIOUS ASSESSMENT PHASE INSTALLATION. REFER TO DRAWING LLADCO-3C-CAP-INF-DRN-DR-CE-5501.

Abbreviations:

AW	-	Affinity Water
DIV	-	Diversion Location
EWS	-	Emergency Water Supply
FW	-	Foul Water
LW	-	Leachate Wells
PI	-	Petrol Interceptor
PS	-	Pumping Station
PVC	-	Polyvinyl Chloride
RWH	-	Rainwater Harvesting
SW	-	Surface Water
TW	-	Thames Water

Underground storage system (TANK 1)
3m diameter Hellbore pipes by Tubosider Ltd. Estimated storage to capture airside first flush event and to provide a degree of redundancy in the system and flooding at the infiltration tanks.
Approx 70,900m³.
(Refer to drawing LLADCO-3C-CAP-INF-DRN-M2-CE-5510)

2. Capacity TBC.

Surface water (SW) network in these car parks is omitted for clarity. SW network will discharge to the infiltration basin.This water will remain uncontaminated with the airside de-icing agents and petrol interceptors will be provided locally as required.

Treated effluent infiltration tank (TANK 3):
2.5m diameter Twinstore perforated pipes with 41% surround void ratio by Tubosider Ltd. required storage volume approximately 15,590m³ based on a constant flow of approximately 250 l/s for 4 days from WTP with an infiltration rate of 0.085 m/hr to base only.
(Refer to drawing LLADCO-3C-CAP-INF-DRN-M2-CE-5510)

Permeable Paving
Area = 23000m²

Landfill Zone.

Water treatment plant (WTP)
Water treatment plant used for sewage treatment and during deicing months. Compound to accommodate parking spaces and vehicle manoeuvring for required maintenance.

IL out=120.750

PS

LW

PI

Full retention oil interceptor prior to discharge to the infiltration basin. (Spel model P100/1CSC or equal approved)

Penstock inspection chamber to divert contaminated run-off to the Water Treatment Plant. Potential requirement for package pumping station, depending on final levels within the treatment works.

Fuel Storage Facility

Fuel Storage Facility delivery area drained by conventiona… …h drains to below ground retention tank.
Adjacent roads drained via parallel swale and filter under… …on basin.

Twin full retention interceptors ref GC5oi, serves 5.095ha
Spel model P500/1CSC (x2) or equal approved.

Flow control valve set to divert surface water runoff into storage and treatment plant only during deicing months, during any accidental oil spillage and any emergency fire situation.

Connection point for airside drainage.

Infiltration Basin (TANK 2)
(Below ground infiltration tank):
3.0m diameter perforated corrugated galvanised pipe by Tubosider Ltd. Required storage volume approximately 75,000m³ based on 0.085m/hr (2.37 x 10^{-5}m/sec) infiltration rate.
Partly attenuated to harvest surface water for treatement into WTP and used in T2.
Design based on 1:100 year return period +40%CC.
(Refer to drawing 5510).

EWS

Emergency Water Supply tank end of runway 60,000 litres

CD5C2

Existing surface water sewer system to be connected to proposed surface water sewer system. Existing soakaway to become redundant.

CD1C5 2700Ø
CD3C1 2700Ø
CD2C2 2700Ø
CD2C1 1500Ø
1500Ø
2700Ø
2700Ø
225 PVC
225 PVC

0 50 100 150 200 250 m
SCALE 1 : 2500

LEGEND

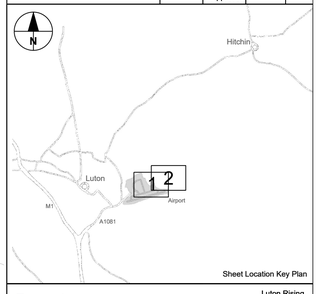
- Existing surface water drain with inspection chamber
- Existing foul water drain with inspection chamber
- Redundant pipe
- Proposed RWH surface water drain
- Proposed surface water drain with inspection chamber
- Large proposed surface water linear drainage conduit/ channel with inspection chamber
- Proposed foul water drain with inspection chamber
- Proposed airside drainage network

- 162.095 Proposed spot level
- 162.095 Existing spot level
- EWS Approx. position of existing Emergency Water Supply tanks
- PS Proposed pumping station
- Proposed rising mains
- LW Proposed landfill sealed Leachate wells
- PI Proposed petrol interceptor
- DIV Proposed surface water diversion location

- Order Limits
- Existing Landfill Zone
- Proposed Permeable Paving
- Proposed Underground Storage System
- Proposed Infiltration Basin
- Proposed Rain Water Harvesting Tank
- Proposed Attenuation Tank
- Proposed Polluted Tank

ILLUSTRATIVE ONLY

Revision History	Drawn	Checked / Approved	Date	Rev.
DCO SUBMISSION	SK	ZC / MS	27/02/23	P01



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London Luton Airport Expansion Development Consent Order

Drawing Title

OVERVIEW LAYOUT FOUL/SURFACE WATER DRAINAGE ASSESSMENT PHASE 2A SHEET 2 OF 2

Purpose of issue				Suitability
DCO SUBMISSION				S6
Drawn	Checked	Approved	Date	Scale	Size
SK	ZC	MS	27/02/23	1:2500	A1
DCO Application Ref.	APFP Regulation	DCO Document Ref.			
TR020001	5(2)(o)	TR020001/APP/5.02			

Drawing Number	Revision
LLADCO-3C-CAP-INF-DRN-DR-CE-5506	P01

Project – Phase – Originator – Asset/Zone – Sub Asset – Type – Discp. – Number

All structure positions are indicative. The proposed works will be subject to detailed design development. The changes will be within limits of deviation specified in the Development Consent Order.

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- ALL FLOW RATES TO BE CALCULATED AND CONFIRMED.
- UPDATED SIZE AND CAPACITY OF WATER TREATMENT PLANT (WTP) SUBJECT TO DETAIL DESIGN.
- CONNECTION TO THAMES WATER SYSTEM OUTLINED IN DRAINAGE DESIGN STATEMENT.
- POTABLE WATER SUPPLY FROM AFFINITY WATER.
- UPDATED TANK SIZES SUBJECT TO DETAIL DESIGN.
- SIZE AND LOCATION OF PUMPS TO BE DETERMINED AT DETAILED DESIGN STAGE.
- AIRFIELD DRAINAGE ROUTES SUBJECT TO DETAIL DESIGN.
- DRAINAGE LAYOUT IN DARK GREY REFERS TO PREVIOUS ASSESSMENT PHASE INSTALLATION. REFER TO DRAWING LLADCO-3C-CAP-INF-DRN-DR-CE-5504.

Abbreviations:

AW	-	Affinity Water
DIV	-	Diversion Location
EWS	-	Emergency Water Supply
FW	-	Foul Water
LW	-	Leachate Wells
PI	-	Petrol Interceptor
PS	-	Pumping Station
PVC	-	Polyvinyl Chloride
RWH	-	Rainwater Harvesting
SW	-	Surface Water
TW	-	Thames Water

ILLUSTRATIVE ONLY

Revision History	Drawn	Checked / Approved	Date	Rev.
DCO SUBMISSION	SK	ZC / MS	27/02/23	P01

Sheet Location Key Plan

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London Luton Airport Expansion Development Consent Order

Drawing Title

OVERVIEW LAYOUT
FOUL/SURFACE WATER DRAINAGE
ASSESSMENT PHASE 2B

Purpose of issue				Suitability	
DCO SUBMISSION				S6	
Drawn	Checked	Approved	Date	Scale	Size
SK	ZC	MS	27/02/23	1:5000	A1

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

Drawing Number	Revision
LLADCO-3C-CAP-INF-DRN-DR-CE-5507	P01

Project – Phase – Originator – Asset/Zone – Sub Asset – Type – Discp. – Number

0 100 200 300 400 500 m
SCALE 1 : 5000

LEGEND

- Existing surface water drain with inspection chamber
- Existing foul water drain with inspection chamber
- Redundant pipe
- Proposed RWH surface water drain
- Proposed surface water drain with inspection chamber
- Large proposed surface water linear drainage conduit/ channel with inspection chamber
- Proposed foul water drain with inspection chamber
- Proposed airside drainage network
- 162.095 Proposed spot level
- 162.095 Existing spot level
- EWS Approx. position of existing Emergency Water Supply tanks
- PS Proposed pumping station
- Proposed rising mains
- LW Proposed landfill sealed Leachate wells
- PI Proposed petrol Interceptor
- DIV Proposed surface water diversion location
- Order Limits
- Existing Landfill Zone
- Proposed Permeable Paving
- Proposed Underground Storage System
- Proposed Infiltration Basin
- Proposed Rain Water Harvesting Tank
- Proposed Attenuation Tank
- Proposed Polluted Tank

Interface with Green Horizons Park SW drainage to be coordinated

Rain water harvesting tank (formerly attenuation tank installed in assessment Phase 1) to take runoff from terminal 2 roof and other buildings

Greywater Storage Tank below Terminal 2. Capacity TBC.

Underground storage system (TANK 1)
3m diameter Helibore pipes by Tubosider Ltd. Estimated storage to capture airside first flush event and to provide a degree of redundancy in the system and flooding at the infiltration tanks. Approx 70,900m³.
(Refer to drawing LLADCO-3C-CAP-INF-DRN-M2-CE-5510)

Surface water (SW) network in these car parks is omitted for clarity. SW network will discharge to the infiltration basin.This water will remain uncontaminated with the airside de-icing agents and petrol interceptors will be provided locally as required.

Treated effluent infiltration tank (TANK 3):
2.5m diameter Twinstore perforated pipes with 41% surround void ratio by Tubosider Ltd. required storage volume approximately 15,590m³ based on a constant flow of approximately 250 l/s for 4 days from WTP with an infiltration rate of 0.085 m/hr to base only.
(Refer to drawing LLADCO-3C-CAP-INF-DRN-M2-CE-5510)

Water treatment plant (WTP)
Water treatment plant used for sewage treatment and during deicing months. Compound to accommodate parking spaces and vehicle manoeuvring for required maintenance.

Landfill Zone.

Permeable Paving Area = 23000m²

RWH tanks installed in assessment Phase 1. Refer to drawing LLADCO-3C-CAP-INF-DRN-DR-CE-5501.

Foul disposal point for aircraft - connection to landside

Gatic Ultraslot channels and adjacent piped drainage - typical for apron drainage.

Full retention interceptor ref GC3oi, serves 2.890ha Spel model P550/1CSC or equal approved.

Diverted existing drainage (approximately 26 ha)

Full retention oil interceptor prior to discharge to the infiltration basin. (Spel model P100/1CSC or equal approved)

Penstock inspection chamber to divert contaminated run-off to the Water Treatment Plant. Potential requirement for package pumping station, depending on final levels within the treatment works.

Fuel Storage Facility delivery area drained by conventional road gullies discharging to below ground retention tank. Adjacent roads drained via parallel swale and filter under-drain before discharge to the infiltration basin.

Connection point for airside drainage.

Infiltration Basin (TANK 2)
(Below ground infiltration tank):
3.0m diameter perforated corrugated galvanised pipe by Tubosider Ltd. Required storage volume approximately 75,000m³ based on 0.085m/hr (2.37 x 10^{-5}m/sec) infiltration rate. Partly attenuated to harvest surface water for treatement into WTP and used in T2. Design based on 1:100 year return period +40%CC.
(Refer to drawing 5510).

Flow control valve set to divert surface water runoff into storage and treatment plant only during deicing months, during any accidental oil spillage and any emergency fire situation.

Emergency Water Supply tank Fire Station 120,000 litres

New monitoring chamber built over existing drain with telemetry link to valve chamber CD1C21. Existing drain diverted to monitoring chamber

Estimated catchment area to monitoring chamber is 3.25 ha.

Full retention interceptor ref GC15oi, serves 3.50ha Spel model P800/1CSC or equal approved.

Twin full retention interceptors ref GC4oi, serves 5.708ha Spel model P550/1CSC (x2) or equal approved.

Emergency Water Supply tank end of runway 60,000 litres

Valve chamber CD1C21 with automated penstock valves over outlets. Surface water run-off with registered pollutant levels to be channeled east to the water treatment plant. Otherwise flows directed to the existing soakaway.

Contaminated water collection and holding tank

Twin full retention interceptors ref GC1oi, serves 4.764ha Spel model P500/1CSC (x2) or equal approved.

Existing surface water sewer system to be connected to proposed surface water sewer system. Existing soakaway to become redundant.

Soakaway

Full retention oil interceptor

Carrier drain collects drainage from west stand area via full retention interceptor serving approximately 3.50ha, Spel model P800/CSC. Carrier drain also separately receives diversion of existing drainage from north west area of the site, comprising approx. 26ha. Upstream pollution control measures assumed to be in place TBC by survey.

Twin full retention interceptors ref GC5oi, serves 5.095ha Spel model P500/1CSC (x2) or equal approved.

Carrier drain collects drainage from south taxiways and runway. Comprising existing runway and taxiway drainage, new taxiways and allowance for soft areas. Drained area approximately 40.40ha. Pollution control measures tbc.

Edge slot or filter drain shown adjacent to runway that is unaffected by new taxi-way link construction is assumed to connect to the existing drainage system. Possible existing filter drain in these locations may be used if found to be appropriate. (Further information / survey of existing drainage is required).

Impermeable lined below ground storage crates to accept off-line flow in excess of downstream pipe capacity.

'Clean' surface water run-off from the Fire Training Ground to discharge to local soakaway via a full retention oil interceptor (Spel model P150/1CSC or equal approved). Training ground run-off otherwise contaminated by fire fighting and training operations to be diverted to a local holding tank. Contaminated water to be tankered away for treatment and disposal or pumped directly from the collection tank to discharge to the on-site water treatement plant - details tbc.

This drawing indicates the drainage strategy. The location of the components of this strategy is shown indicatively and subject to design coordination.

All structure positions are indicative. The proposed works will be subject to detailed design development. The changes will be within limits of deviation specified in the Development Consent Order.

N

NOTES:

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- POTABLE WATER SUPPLY FROM AFFINITY WATER.
- UPDATED TANK SIZES SUBJECT TO DETAIL DESIGN.
- SIZE AND LOCATION OF PUMPS TO BE DETERMINED AT DETAILED DESIGN STAGE.
- AIRFIELD DRAINAGE ROUTES SUBJECT TO DETAIL DESIGN.
- DRAINAGE LAYOUT IN DARK GREY REFERS TO PREVIOUS ASSESSMENT PHASE INSTALLATION. REFER TO DRAWING LLADCO-3C-CAP-INF-DRN-DR-CE-5504.

Abbreviations:

AW	-	Affinity Water
DIV	-	Diversion Location
EWS	-	Emergency Water Supply
FW	-	Foul Water
LW	-	Leachate Wells
PI	-	Petrol Interceptor
PS	-	Pumping Station
PVC	-	Polyvinyl Chloride
RWH	-	Rainwater Harvesting
SW	-	Surface Water
TW	-	Thames Water

Interface with Green Horizons Park SW drainage to be coordinated

Rain water harvesting tank installed in assessment Phase 1) to be terminal 2 roof and other buildings .

Greywater Storage Tank below Terminal 2. Capacity TBC.

(Refer to drawing LLADCO-3C-CAP-INF-DRN-M2-CE-5510)

Surface water (SW) network in these car parks is omitted for clarity. SW network will discharge to the infiltration basin.This water will remain uncontaminated with the airside de-icing agents and petrol interceptors will be provided locally as required.

Treated effluent infiltration tank (TANK 3):
2.5m diameter Twinstore perforated pipes with 41% surround void ratio by Tubosider Ltd. require storage volume approximately 15,590m³ based on a constant flow of approximately 250 l/s for 4 days from WTP with an infiltration rate of 0.085 m/hr to base only.
(Refer to drawing LLADCO-3C-CAP-INF-DRN-M2-CE-5510)

Permeable Paving Area = 23000m²

Water treatment plant (WTP)
Water treatment plant used for sewage treatment and during deicing months. Compound to accommodate parking spaces and vehicle manoeuvring for required maintenance.

IL out=120.750

PS

Landfill Zone.

Full retention oil interceptor prior to discharge to the infiltration basin. (Spel model P100/1CSC or equal approved)

Penstock inspection chamber to div package pumping station, dependin

Fuel Storage Facility

Fuel Storage Facility delivery area retention tank.
Adjacent roads drained via parallel

Connection point for airside drainage.

Flow control valve set to divert surface water runoff into storage and treatment plant only during deicing months, during any accidental oil spillage and any emergency fire situation.

Twin full retention interceptors ref GC5oi, serves 5.095ha Spel model P500/1CSC (x2) or equal approved.

Twin full retention interceptors ref GC4oi, serves 5.708ha Spel model P550/1CSC (x2) or equal approved.

Full retention interceptor ref GC3oi, serves 2.890ha Spel model P550/1CSC or equal approved.

Twin full retention interceptors ref GC1oi, serves 4.764ha Spel model P500/1CSC (x2) or equal approved.

Diverted existing drainage (approximately 26 ha)

Gatic Ultraslot channels and adjacent piped drainage - typical for apron drainage

Foul disposal point for aircraft - connection to landside

Full retention interceptor ref GC15oi, serves 3.50ha Spel model P800/1CSC or equal approved.

Carrier drain collects drainage from south taxiways and runway. Comprising existing runway and taxiway drainage, new taxiways and allowance for soft areas. Drained area approximately 40.40ha. Pollution control measures tbc.

Carrier drain collects drainage from west stand area via full retention interceptor serving approximately 3.50ha, Spel model P800/CSC.
Carrier drain also separately receives diversion of existing drainage from north west area of the site, comprising approx. 26ha. Upstream pollution control measures assumed to be in place TBC by survey.

Existing surface water sewer system to be connected to proposed surface water sewer system. Existing soakaway to become redundant.

Emergency Water Supply tank end of runway 60,000 litres

Edge slot or filter drain shown adjacent to runway that is unaffected by new taxi-way link constructio assumed to connect to the existing drainage system. Possible existing filter drain in these locations used if found to be appropriate. (Further information / survey of existing drainage is required).

Emergency Water Supply tank end of runway

EWS

0 50 100 150 200 250 m
SCALE 1 : 2500

LEGEND

- Existing surface water drain with inspection chamber
- Existing foul water drain with inspection chamber
- Redundant pipe
- Proposed RWH surface water drain
- Proposed surface water drain with inspection chamber
- Large proposed surface water linear drainage conduit/ channel with inspection chamber
- Proposed foul water drain with inspection chamber
- Proposed airside drainage network
- 162.095 Proposed spot level
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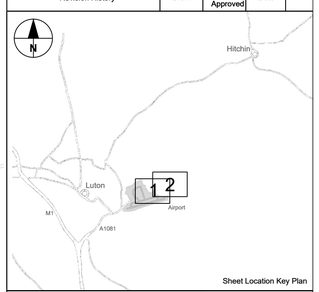
- EWS Approx. position of existing Emergency Water Supply tanks
- PS Proposed pumping station
- Proposed rising mains
- LW Proposed landfill sealed Leachate wells
- PI Proposed petrol Interceptor
- DIV Proposed surface water diversion location
- Order Limits
- Existing Landfill Zone
- Proposed Permeable Paving
- Proposed Underground Storage System
- Proposed Infiltration Basin
- Proposed Rain Water Harvesting Tank
- Proposed Attenuation Tank
- Proposed Polluted Tank

ILLUSTRATIVE ONLY

Revision History	Drawn	Checked / Approved	Date	Rev.
DCO SUBMISSION	SK	ZC / MS	27/02/23	P01



Sheet Location Key Plan

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London Luton Airport Expansion Development Consent Order

Drawing Title

OVERVIEW LAYOUT
FOUL/SURFACE WATER DRAINAGE
ASSESSMENT PHASE 2B
SHEET 1 OF 2

Purpose of issue				Suitability	
DCO SUBMISSION				S6	
Drawn	Checked	Approved	Date	Scale	Size
SK	ZC	MS	27/02/23	1:2500	A1
DCO Application Ref.	APFP Regulation		DCO Document Ref.		
TR020001	5(2)(o)		TR020001/APP/5.02		
Drawing Number				Revision	
LLADCO-3C-CAP-INF-DRN-DR-CE-5508				P01	

Project – Phase – Originator – Asset/Zone – Sub Asset – Type – Discp. – Number

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- ALL FLOW RATES TO BE CALCULATED AND CONFIRMED.
- UPDATED SIZE AND CAPACITY OF WATER TREATMENT PLANT (WTP) SUBJECT TO DETAIL DESIGN.
- CONNECTION TO THAMES WATER SYSTEM OUTLINED IN DRAINAGE DESIGN STATEMENT.
- POTABLE WATER SUPPLY FROM AFFINITY WATER.
- UPDATED TANK SIZES SUBJECT TO DETAIL DESIGN.
- SIZE AND LOCATION OF PUMPS TO BE DETERMINED AT DETAILED DESIGN STAGE.
- AIRFIELD DRAINAGE ROUTES SUBJECT TO DETAIL DESIGN.
- DRAINAGE LAYOUT IN DARK GREY REFERS TO PREVIOUS ASSESSMENT PHASE INSTALLATION. REFER TO DRAWING LLADCO-3C-CAP-INF-DRN-DR-CE-5504.

Abbreviations:

AW	-	Affinity Water
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LW	-	Leachate Wells
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PS	-	Pumping Station
PVC	-	Polyvinyl Chloride
RWH	-	Rainwater Harvesting
SW	-	Surface Water
TW	-	Thames Water

Underground storage system (TANK 1)
3m diameter Heliborе pipes by Tubosider Ltd. Estimated storage to capture airside first flush event and to provide a degree of redundancy in the system and flooding at the infiltration tanks.
Approx 70,900m³.
(Refer to drawing LLADCO-3C-CAP-INF-DRN-M2-CE-5510)

Treated effluent infiltration tank (TANK 3):
2.5m diameter Twinstore perforated pipes with 41% surround void ratio by Tubosider Ltd. required storage volume approximately 15,590m³ based on a constant flow of approximately 250 l/s for 4 days from WTP with an infiltration rate of 0.085 m/hr to base only.
(Refer to drawing LLADCO-3C-CAP-INF-DRN-M2-CE-5510)

Surface water (SW) network in these car parks is omitted for clarity. SW network will discharge to the infiltration basin.This water will remain uncontaminated with the airside de-icing agents and petrol interceptors will be provided locally as required.

Permeable Paving
Area = 23000m²

Water treatment plant (WTP)
Water treatment plant used for sewage treatment and during deicing months. Compound to accommodate parking spaces and vehicle manoeuvring for required maintenance.

Landfill Zone.

IL out= 120.750

PS

LW

Full retention oil interceptor prior to discharge to the infiltration basin. (Spel model P100/1CSC or equal approved)

Penstock inspection chamber to divert contaminated run-off to the Water Treatment Plant. Potential requirement for package pumping station, depending on final levels within the treatment works.

Fuel Storage Facility

Fuel Storage Facility delivery area drained by conventional ... to below ground retention tank.
Adjacent roads drained via parallel swale and filter under... on basin.

Twin full retention interceptors ref GC5oi, serves 5.095ha
Spel model P500/1CSC (x2) or equal approved.

Flow control valve set to divert surface water runoff into storage and treatment plant only during deicing months, during any accidental oil spillage and any emergency fire situation.

Connection point for airside drainage.

Infiltration Basin (TANK 2)
(Below ground infiltration tank):
3.0m diameter perforated corrugated galvanised pipe by Tubosider Ltd. Required storage volume approximately 75,000m³ based on 0.085m/hr (2.37 x 10^{-5}m/sec) infiltration rate. Partly attenuated to harvest surface water for treatement into WTP and used in T2. Design based on 1:100 year return period +40%CC.
(Refer to drawing 5510).

EWS

Emergency Water Supply tank end of runway 60,000 litres

Existing surface water sewer system to be connected to proposed surface water sewer system. Existing soakaway to become redundant.

CD1C5 2700Ø
CD3C1 2700Ø
CD2C2 1500Ø
CD2C1 1500Ø
CD5C2 2700Ø
2700Ø
2700Ø
2700Ø
2700Ø
150 PVC
225 PVC

tion interceptors
ves 5.708ha
350/1CSC (x2)
wed.

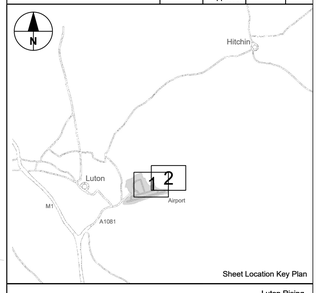
0 50 100 150 200 250 m
SCALE 1 : 2500

LEGEND

- Existing surface water drain with inspection chamber
- Existing foul water drain with inspection chamber
- Redundant pipe
- Proposed RWH surface water drain
- Proposed surface water drain with inspection chamber
- Large proposed surface water linear drainage conduit/ channel with inspection chamber
- Proposed foul water drain with inspection chamber
- Proposed airside drainage network
- 162.095 Proposed spot level
- 162.095 Existing spot level
- EWS Approx. position of existing Emergency Water Supply tanks
- PS Proposed pumping station
- Proposed rising mains
- LW Proposed landfill sealed Leachate wells
- PI Proposed petrol Interceptor
- DIV Proposed surface water diversion location
- Order Limits
- Existing Landfill Zone
- Proposed Permeable Paving
- Proposed Underground Storage System
- Proposed Infiltration Basin
- Proposed Rain Water Harvesting Tank
- Proposed Attenuation Tank
- Proposed Polluted Tank

ILLUSTRATIVE ONLY

Revision History	Drawn	Checked / Approved	Date	Rev.
DCO SUBMISSION	SK	ZC / MS	27/02/23	P01



Sheet Location Key Plan

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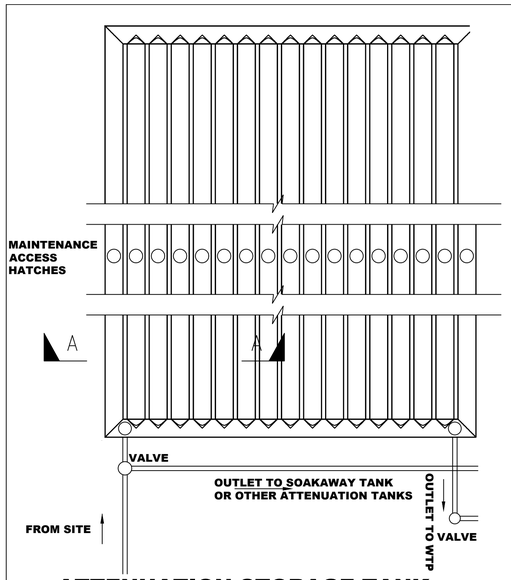
London Luton Airport Expansion Development Consent Order

Drawing Title

OVERVIEW LAYOUT
FOUL/SURFACE WATER DRAINAGE
ASSESSMENT PHASE 2B
SHEET 2 OF 2

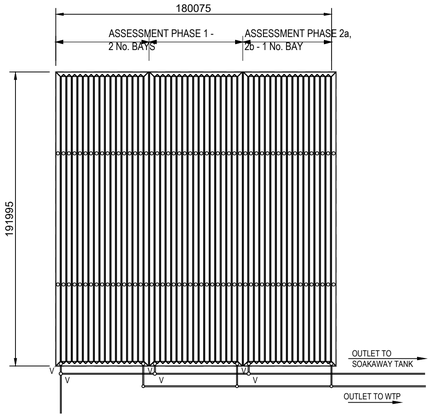
Purpose of issue				Suitability
DCO SUBMISSION				S6
Drawn	Checked	Approved	Date	Scale	Size
SK	ZC	MS	27/02/23	1:2500	A1
DCO Application Ref.	APFP Regulation	DCO Document Ref.		
TR020001	5(2)(o)	TR020001/APP/5.02		
Drawing Number				Revision
LLADCO-3C-CAP-INF-DRN-DR-CE-5509				P01

Project – Phase – Originator – Asset/Zone – Sub Asset – Type – Discp. – Number



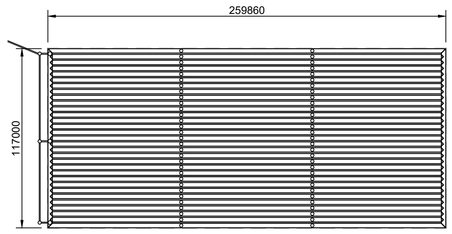
ATTENUATION STORAGE TANK (TANK 1) TYPICAL BAY

(1:500)



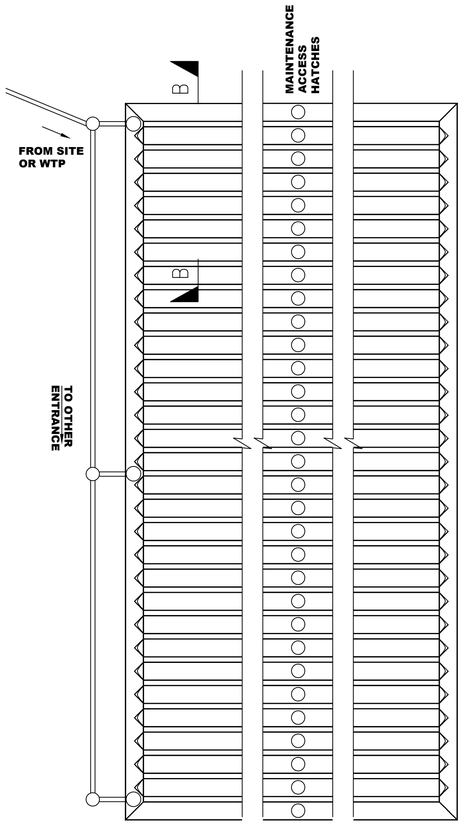
ATTENUATION STORAGE TANK (TANK 1)

(1:2000)



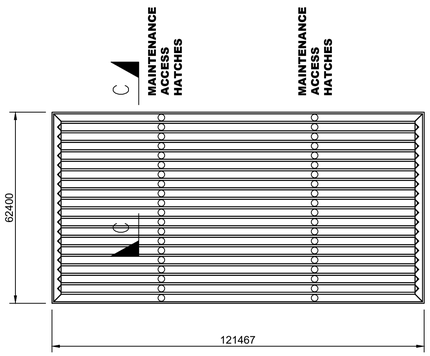
INFILTRATION BASIN (TANK 2) (SOAKAWAY TANK)

(1:2000)



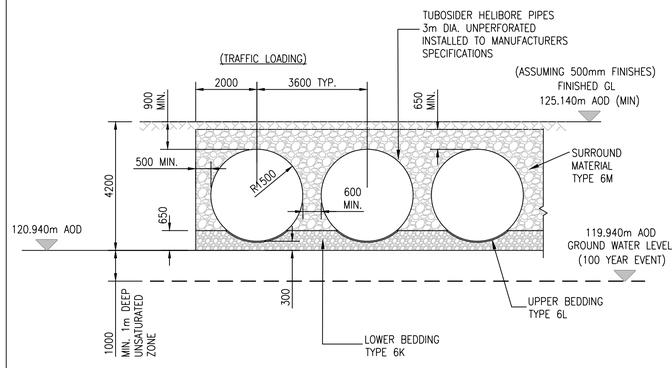
INFILTRATION BASIN (TANK 2) (SOAKAWAY TANK TYPICAL BAY)

(1:500)



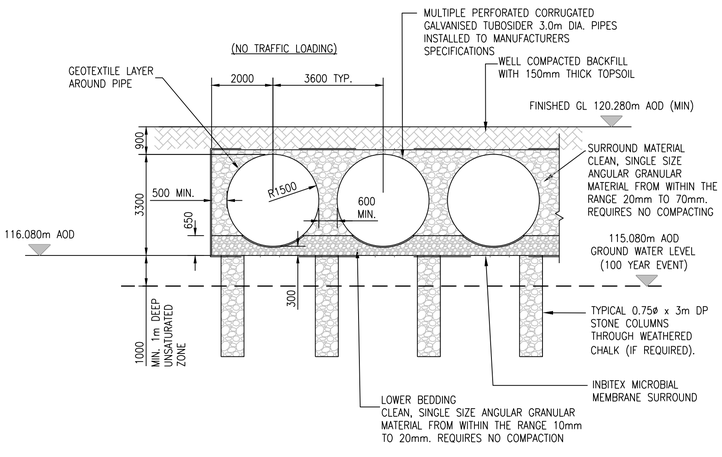
INFILTRATION BASIN (TANK 3) (SOAKAWAY TANK)

(1:2000)



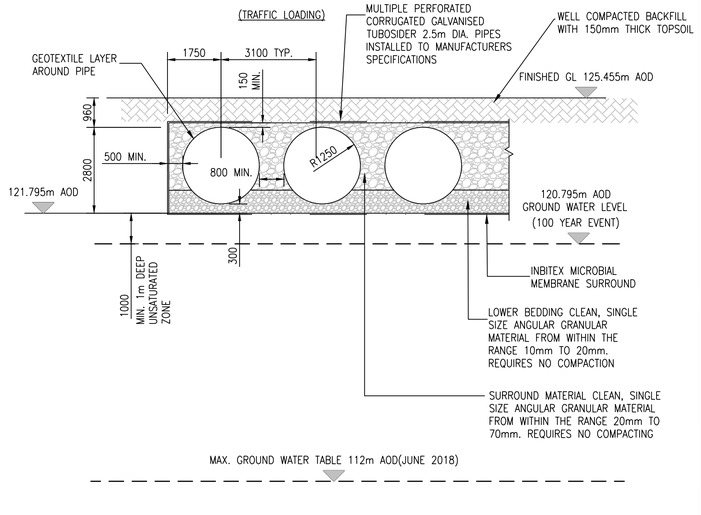
SECTION A-A ATTENUATION STORAGE TANKS (TANK 1)

(1:100)



SECTION B-B INFILTRATION BASIN (TANK 2) (SOAKAWAY TANK)

(1:100)



SECTION C-C INFILTRATION BASIN (TANK 3) (SOAKAWAY TANK)

(1:100)

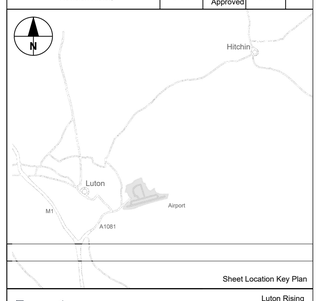
All structure positions are indicative. The proposed works will be subject to detailed design development. The changes will be within limits of deviation specified in the Development Consent Order.

NOTES:

- ALL ACCESS MAINTENANCE HATCHES AND TANK ARRANGEMENTS ARE SHOWN AS INDICATIVE AND TO BE CONFIRMED BY TANK MANUFACTURER.
- ALL LEVELS ARE BASED ON FUTURE ESTIMATED 1:100 YEAR GROUND WATER LEVELS. THIS GIVES 1M CLEARANCE ABOVE THE GROUND WATER LEVEL IN LINE WITH THE SUDS MANUAL.
- ALL DIMENSIONS SHOWN IN MILLIMETRES UNLESS SHOWN OTHERWISE.

ILLUSTRATIVE ONLY

Revision History	Drawn	Checked / Approved	Date	Rev.
DCO SUBMISSION	SK	ZC / MS	27/02/23	P01



Sheet Location Key Plan

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Drawing Title

TYPICAL SECTIONS INFILTRATION BASINS & ATTENUATION TANK

Purpose of issue	Suitability
DCO SUBMISSION	S6

Drawn	Checked	Approved	Date	Scale	Size
SK	ZC	MS	27/02/23	AS SHOWN	A1

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

Drawing Number	Revision
LLADCO-3C-CAP-INF-DRN-DR-CE-5510	P01

Project – Phase – Originator – AssetZone – Sub Asset – Type – Discp. – Number

Notes:
- Layout is to be confirmed following updated calculations and strategy at detailed design stage.

Fire Water Requirement worst case assumption is 4 simultaneous fires site wide based on assumed 4 different fire safety management organisations/owners covering various buildings. Total water required is 360,000L based on 90,000L for each fire scenario.

90,000L provides full fire fighting coverage for 60 minutes (equivalent to structural fire protection requirement for most buildings but subject to future fire strategy) at 1,500L/min. Water stored at primary tank and always available. Fire water to be replenished within 36 hours after a fire event.

Subject to fire strategy development and agreement for the terminal and wider site buildings, and detailed design of fire mains and tanks to ensure flow and pressures can be achieved.

Notes:
- Levels of all ground including roads and pavements, drainage including connections, and utilities TBC. Subsequent effect on drainage also TBC.
- All flow rates to be calculated and confirmed.
- Updated size and capacity of Water Treatment Plant (WTP) TBC.
- Connection to Thames Water (TW) system TBC.
- Potable water supply from Affinity Water (AW) TBC.
- Updated tank size.
- Pumping requirements to be outlined at detailed design stage following earthworks and finished levels design.

Indicative Storage Tank
Within Fuel Storage Facility to be connected to Hydrant System
7.3 l/s Refill requirements

0 100 200 300 400 500 m
SCALE 1 : 5000

All structure positions are indicative. The proposed works will be subject to detailed design development. The changes will be within limits of deviation specified in the Development Consent Order.

NOTES:

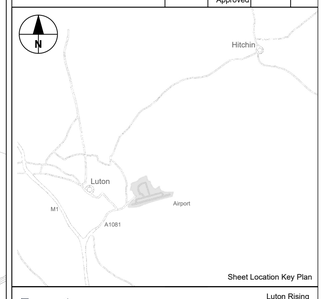
- NETWORK SHOWN IS INDICATIVE AND SUBJECT TO ADJUSTMENTS.
- PROPOSED POTABLE WATER NETWORK DOES NOT CONNECT TO THE EXISTING NETWORK AT THIS MOMENT. POINT OF CONNECTION REQUIREMENT TO BE CONFIRMED PENDING EXISTING NETWORK FINDINGS.
- ALL DIMENSIONS SHOWN ARE IN METRES UNLESS SHOWN OTHERWISE.
- DRAWING LLADCO-3C-CAP-WHS-GEN-DR-AR-1240 HAS BEEN USED AS A BACKGROUND.
- ALL PROPOSALS SHOWN ARE INDICATIVE FOR THE PURPOSES OF ASSESSMENT ONLY.
- THE PROPOSALS SHOWN RELATE TO THE MAIN APPLICATION SITE ONLY.

LEGEND

- Proposed Potable Water Mains (Indicative and subject to detailed design)
- Proposed New Fire Main (Indicative and subject to detailed design)
- Proposed indicative access points along the proposed potable water main.
- Indicative hydrant location (within 90m of building entrance or dry riser inlet (where provided)).
- Proposed Central Supply Tank
- Proposed Fuel Storage Facility Firefighting Main
- Order Limits
- Existing Landfill Zone

ILLUSTRATIVE ONLY

Revision History	Drawn	Checked / Approved	Date	Rev.
DCO SUBMISSION	SK	ZC / MS	27/02/23	P01



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Drawing Title

OVERVIEW LAYOUT
PROPOSED POTABLE AND FIRE WATER
ASSESSMENT PHASE 2A

Purpose of issue	Suitability
DCO SUBMISSION	S6

Drawn	Checked	Approved	Date	Scale	Size
SK	ZC	MS	27/02/23	1:5000	A1

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

Drawing Number	Revision
LLADCO-3C-CAP-INF-DRN-DR-CE-5512	P01

Project – Phase – Originator – Asset/Zone – Sub Asset – Type – Discp. – Number

Notes:

- Layout is to be confirmed following updated calculations and strategy at detailed design stage.

Fire Water Requirement worst case assumption is 4 simultaneous fires site wide based on assumed 4 different fire safety management organisations/owners covering various buildings. Total water required is 360,000L based on 90,000L for each fire scenario.

90,000L provides full fire fighting coverage for 60 minutes (equivalent to structural fire protection requirement for most buildings but subject to future fire strategy) at 1,500L/min. Water stored at primary tank and always available. Fire water to be replenished within 36 hours after a fire event.

Subject to fire strategy development and agreement for the terminal and wider site buildings, and detailed design of fire mains and tanks to ensure flow and pressures can be achieved.

Notes:

- Levels of all ground including roads and pavements, drainage including connections, and utilities TBC. Subsequent effect on drainage also TBC.
- All flow rates to be calculated and confirmed.
- Updated size and capacity of Water Treatment Plant (WTP) TBC.
- Connection to Thames Water (TW) system TBC.
- Potable water supply from Affinity Water (AW) TBC.
- Updated tank size TBC.
- Pumping requirements to be outlined at detailed design stage following earthworks and finished levels design.

N

0 100 200 300 400 500 m

SCALE 1 : 5000

All structure positions are indicative. The proposed works will be subject to detailed design development. The changes will be within limits of deviation specified in the Development Consent Order.

NOTES:

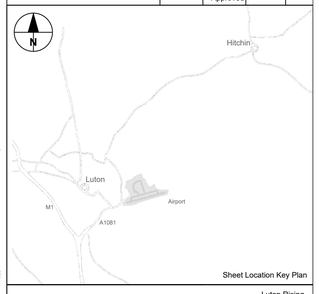
- NETWORK SHOWN IS INDICATIVE AND SUBJECT TO ADJUSTMENTS.
- PROPOSED POTABLE WATER NETWORK DOES NOT CONNECT TO THE EXISTING NETWORK AT THIS MOMENT. POINT OF CONNECTION REQUIREMENT TO BE CONFIRMED PENDING EXISTING NETWORK FINDINGS.
- ALL DIMENSIONS SHOWN ARE IN METRES UNLESS SHOWN OTHERWISE.
- DRAWING LLADCO-3C-CAP-WHS-GEN-DR-AR-1260 HAS BEEN USED AS A BACKGROUND.
- ALL PROPOSALS SHOWN ARE INDICATIVE FOR THE PURPOSES OF ASSESSMENT ONLY.
- THE PROPOSALS SHOWN RELATE TO THE MAIN APPLICATION SITE ONLY.

LEGEND

- Proposed Potable Water Mains Extension (Indicative and subject to detailed design)
- Previously installed network, refer to latest drawing number LLADCO-3C-CAP-INF-DRN-DR-CE-5512
- Proposed indicative access points along the proposed potable water main.
- Previously installed network, refer to latest drawing number LLADCO-3C-CAP-INF-DRN-DR-CE-5512
- Previously Installed Central Supply Tank
- Previously Installed Fuel Storage Facility Firefighting Main
- Order Limits
- Existing Landfill Zone
- Proposed New Fire Main (Indicative and subject to detailed design)

ILLUSTRATIVE ONLY

Revision History	Drawn	Checked / Approved	Date	Rev.
DCO SUBMISSION	SK	ZC / MS	27/02/23	P01



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Drawing Title

OVERVIEW LAYOUT
PROPOSED POTABLE AND FIRE WATER
ASSESSMENT PHASE 2B

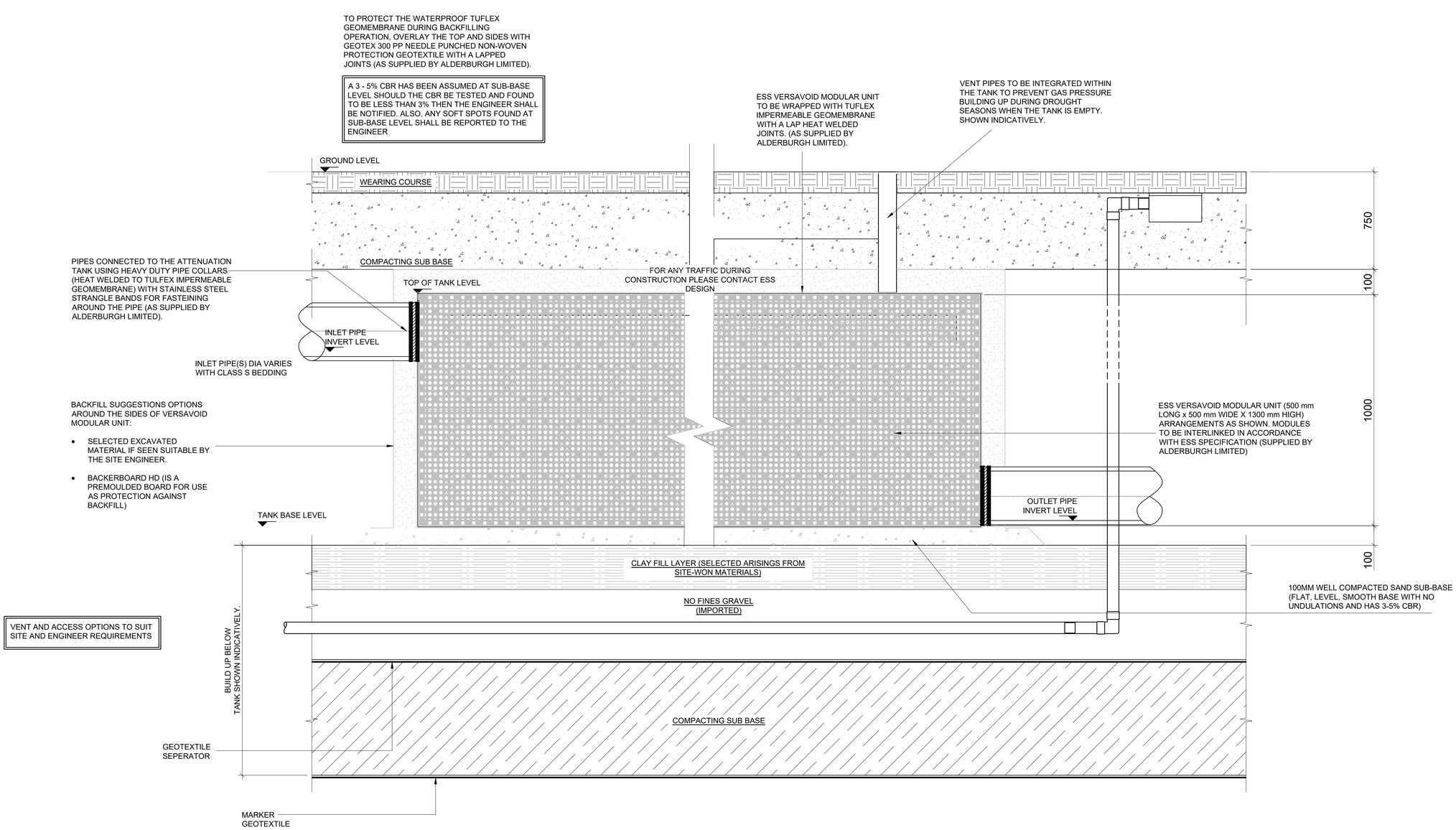
Purpose of issue	Suitability
DCO SUBMISSION	S6

Drawn	Checked	Approved	Date	Scale	Size
SK	ZC	MS	27/02/23	1:5000	A1

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

Drawing Number	Revision
LLADCO-3C-CAP-INF-DRN-DR-CE-5513	P01

Project – Phase – Originator – AssetZone – Sub Asset – Type – Discp. – Number



TANK LOCATION TO BE COORDINATED WITH FUTURE PILE WORKS AND PROPOSED VENT BOX LOCATIONS. VENT BOX OMITTED FOR CLARITY.

TYPICAL DETAILS OF STORAGE TANK USING VERSAVOID MODULAR UNITS

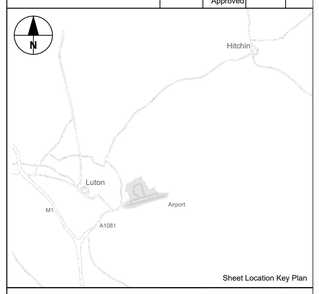
All structure positions are indicative. The proposed works will be subject to detailed design development. The changes will be within limits of deviation specified in the Development Consent Order.

NOTES:

1. REFER TO 21.5MPPA PLAN ON DWG LLADCO-3C-CAP-INF-DRN-M2-CE-5501 FOR LOCATION OF TANK.
2. THIS DRAWING IS TO BE READ ALONGSIDE ALL ENGINEERS AND ARCHITECT DRAWINGS.
3. ALL DRAINAGE ELEMENTS SHOWN ARE INDICATIVE AND SUBJECT TO ADJUSTMENTS.
4. ALL DIMENSIONS SHOWN ARE IN METRES UNLESS SHOWN OTHERWISE.
5. DURING DETAILED DESIGN, SETTLEMENT WILL NEED TO BE CONSIDERED IF SIGNIFICANT MAINTENANCE REGIME WILL NEED TO BE ESTABLISHED TO MONITOR SURFACE MOVEMENT AND UNDERTAKE UNDERGROUND REPAIRS TO MAINTAIN THE INTEGRITY OF THE WATERPROOFING AND GAS PROOFING SYSTEMS SHOWN BELOW.

ILLUSTRATIVE ONLY

Revision History	Drawn	Checked / Approved	Date	Rev.
DCO SUBMISSION	SK	ZC / MS	27/02/23	P01



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London Luton Airport Expansion Development Consent Order

Drawing Title

CAR PARK P7
TANK UNDER CAR PARK
TYPICAL DETAIL

Purpose of issue	Suitability
DCO SUBMISSION	S6

Drawn	Checked	Approved	Date	Scale	Size
SK	ZC	MS	27/02/23	N.T.S	A1

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

Drawing Number	Revision
LLADCO-3C-CAP-INF-DRN-DR-CE-5517	P01

Project – Phase – Originator – Asset/Zone – Sub Asset – Type – Discp. – Number

Appendix C – Thames Water Connection Points

LONDON LUTON AIRPORT - FOUL WATER NETWORK

1:2,500

Connection 1:
North East of the Airport
(ehy0105a - MH7802 along President Way)

Discharge rate 10l/s.

Connection 2:
South West of the airport (ehy00012 - Along Airport Way (A505) Pipe DN225)

Discharge rate 10l/s.

Note:
Connections indicated are preliminary and subject to confirmation by Veolia, upon receipt of updated network drawings at detailed design stage.

London Luton Airport - Surface Water Network

VEOLIA WATER

1:2,500

Legend

- SW Rising Pipe (Airport)
- SW Sewer Pipe (Private)
- SW Sewer Pipe (Airport)
- SW Rodding Eye (Airport)
- SW Petrol/Oil Interceptor (Airport)
- SW Petrol/Oil Interceptor (Private)
- SW Catchpit (Airport)
- SW Manhole (Airport)
- SW Manhole (Private)
- SW Soakaways (Airport)
- SW Undefined End (Airport)
- SW Outfall (Airport)
- SW Pumping Station
- Luton Airport Boundary
- Buildings

Connection 1:
North East of the Airport
Connection to Northern Soakaway

Note:
Connections indicated are preliminary and subject to confirmation by Veolia, upon receipt of updated network drawings at detailed design stage.

Appendix D – Thames Water foul water consents

Thames Water Utilities

The Water Industry Act 1991

CONSENT

to discharge trade effluent into a public sewer

T.E. Case No: EHY00012

THAMES WATER UTILITIES LTD.

Water Industry Act 1991

CONSENT TO THE DISCHARGE OF TRADE EFFLUENT

WHEREAS

1. London Luton Airport Ltd
of Percival House, Percival Way, Luton, LU2 9LY is/are the occupier(s)/owner(s) of the trade premises known as London Luton Airport Ltd and situate at Percival House, Percival Way, Luton, LU2 9LY

(hereinafter called "the said premises") and by notice dated the ninth day of October One thousand nine hundred and ninety five has/have made application to Thames Water Utilities Ltd. (hereinafter called "the Company") to consent to the discharge of trade effluent by him/her/them from the said premises into the Company's public sewers.

2. NOW THEREFORE in exercise of the powers conferred upon it in that behalf as a sewerage undertaker by the Water Industry Act 1991, the Company

HEREBY CONSENT to the discharge of trade effluent from the said premises into the public sewers subject to the following conditions:

Nature and Composition	1.	The nature and composition of the trade effluent (hereinafter called "the trade effluent") to be discharged under this Consent is: Waste liquids arising from aviation industry related processes and contaminated surface waters.
Sewer(s) affected	2.	The sewer(s) into which the trade effluent may be discharged is/are the foul sewers situate in New Access Road and more particularly shown by a line(s) on the plan annexed hereto and thereon coloured RED. The point(s) at or through which the trade effluent is to be discharged is (are) shown on the said plan and thereon marked GREEN. No change shall be made in such point(s) of discharge without prior consent in writing of the Company.
Maximum quantity to be discharged	3.	The maximum quantity of the trade effluent which may be discharged on any one day of twenty-four hours determined from midnight to midnight shall not exceed 264m^3.
Maximum rate of discharge	4.	The maximum rate at which the trade effluent may be discharged shall not exceed 200m^3 per hour.

Matter to be eliminated prior to discharge to the sewer(s) 5. (a) There shall be eliminated from the trade effluent before it is discharged into the sewer(s) any matter, which, either alone or in combination with any matter with which it is likely to come into contact while passing through any sewers, would injure or obstruct any such sewers or cause injury to and/or damage to the health of any person lawfully present in such sewers, pumping stations or sewage treatment works or would make specially difficult or expensive the treatment or disposal of their contents and in particular but without prejudice to the generality of the foregoing words the following matters :-

(i) Petroleum spirit
(ii) Calcium carbide
(iii) Thiourea and thiourea derivatives
(iv) Non biodegradable detergents

(b) The trade effluent shall not contain substances listed in Schedule 1 of the Trade Effluents (Prescribed Processes and Substances) Regulations 1989, as amended, at a concentration greater than background concentration as defined in such regulations.

(c) The trade effluent shall not contain any of the substances listed below at a concentration expressed in milligrams per litre greater than that stated:

(i)	Settleable Solids	1000
(ii)	COD	1000
(iii)	Unsaponifiable Oil and or Grease	50
(iv)	Ammoniacal Nitrogen (as N)	35
(v)	Available Chlorine (as Cl)	50

Temperature 6. No trade effluent shall be discharged which has a temperature higher than 43.3 degrees Celsius (110 degrees Fahrenheit).

Acidity or alkalinity 7. No trade effluent shall be discharged the pH value of which is less than 6.0 or greater than 11.0.

Condensing water 8. No condensing water shall be discharged.

Changes in occupier or process 9. The occupier(s) of the said premises shall forthwith give to the Company notice in writing of any changes or proposed changes in the company name, address, occupier, or processes of manufacture or the nature of the raw materials used or of any other circumstances which may alter the nature and composition of the trade effluent or may result in the permanent cessation of the discharge.

Payment 10. The occupier(s) of the said premises shall pay to the Company for the trade effluent discharged into the sewer (a) a sum calculated in accordance with the provisions contained in the Company's Charges Scheme together with (b) the amount of any additional expenses additional thereto which the Company may from time to time incur with the reception and disposal of the trade effluent. All sums payable to the Company under this condition shall become due and payable on demand.

Entry and samples 11. The owner(s) and occupier(s) of the said premises shall permit duly authorised representatives of the Company to inspect, examine and test at all reasonable times any works and apparatus installed in connection with the trade effluent and to take samples of the trade effluent.

Inspection 12. (i) An inspection chamber or manhole shall be provided and maintained by the owner(s) and occupier(s) of the said premises in a suitable position defined as point 'X' on the attached plan in connection with each pipe through which the trade effluent is being discharged and such inspection chamber or manhole shall be so constructed and maintained by the owner(s) or occupier(s) as to enable duly authorised representatives of the Company to take samples at any time of the matter passing into the sewer(s) from the said premises.

Measurement and determination of discharge (ii) A notch gauge and continuous recorder or some other apparatus suitable and adequate for measuring and automatically recording the volume, nature, composition and rate of discharge of the trade effluent being discharged into the sewer(s) shall, if required by the Company be provided and maintained by the owner(s) or occupiers of the said premises to the satisfaction of the Company in connection with every pipe through which the trade effluent is being discharged.

Records (iii) Records in such form as the Company may require shall be kept of the volume, rate of discharge, nature and composition of the trade effluent discharged into the sewer(s) and shall be available at all reasonable times for inspection by duly authorised representatives of the Company and copies of such records shall be sent to the Company on demand.

(iv) If the notch gauge and continuous recorder or other apparatus aforesaid ceases to register or measure correctly then, unless otherwise agreed, the quantity of the trade effluent discharged into the sewer(s) during the period from the date on which the records of the volume of trade effluent discharged into the sewer(s) were last accepted by the Company as being correct up to the date when the notch gauge and continuous recorder or other apparatus aforesaid again registers correctly shall, for the purpose of any payment to be made to the Company, be based on the average daily volume of the trade effluent discharged during the period of one month preceding the date on which the said records were last accepted as aforesaid or during the month immediately after the notch gauge and continuous recorder or other apparatus aforesaid has been corrected, whichever is the higher.

(v) The foregoing provisions of this condition shall be of no effect so long as there is available to the satisfaction of the Company some other method approved by the Company of sampling the trade effluent or of determining measuring and recording the volume and rate of discharge and the nature and composition of the trade effluent discharged.

Signed [redacted]

Dr. M. McEvoy
Process Strategy Manager
Operations
Duly authorised to sign on behalf of the Company

DATED this 15th day of November 1995

1000A

(Address to which all communications should be sent)

Thames Water Utilities
Trade Effluent Control
Rye Meads STW
Stanstead Abbotts
Nr. Ware
Herts SG12 8JY

NOTE:

(a) Your attention is drawn to the right of appeal to the Director General of Water Services conferred by Section 122 of the Water Industry Act 1991 if you are aggrieved by any condition attached to this Consent.

(b) A standing charge for all sewerage services plus a domestic sewerage charge is payable in addition to charges for trade effluent flows.

(c) A copy of the Thames Water Utilities Ltd. Charges Scheme is obtainable from the Thames Water Customer Centre.

(d) If you discharge trade effluent in contravention of a condition of this Consent you will be guilty of a criminal offence and may be subject to prosecution.

op. Manhole

cn Manhole (Type G)

Channel Access Point

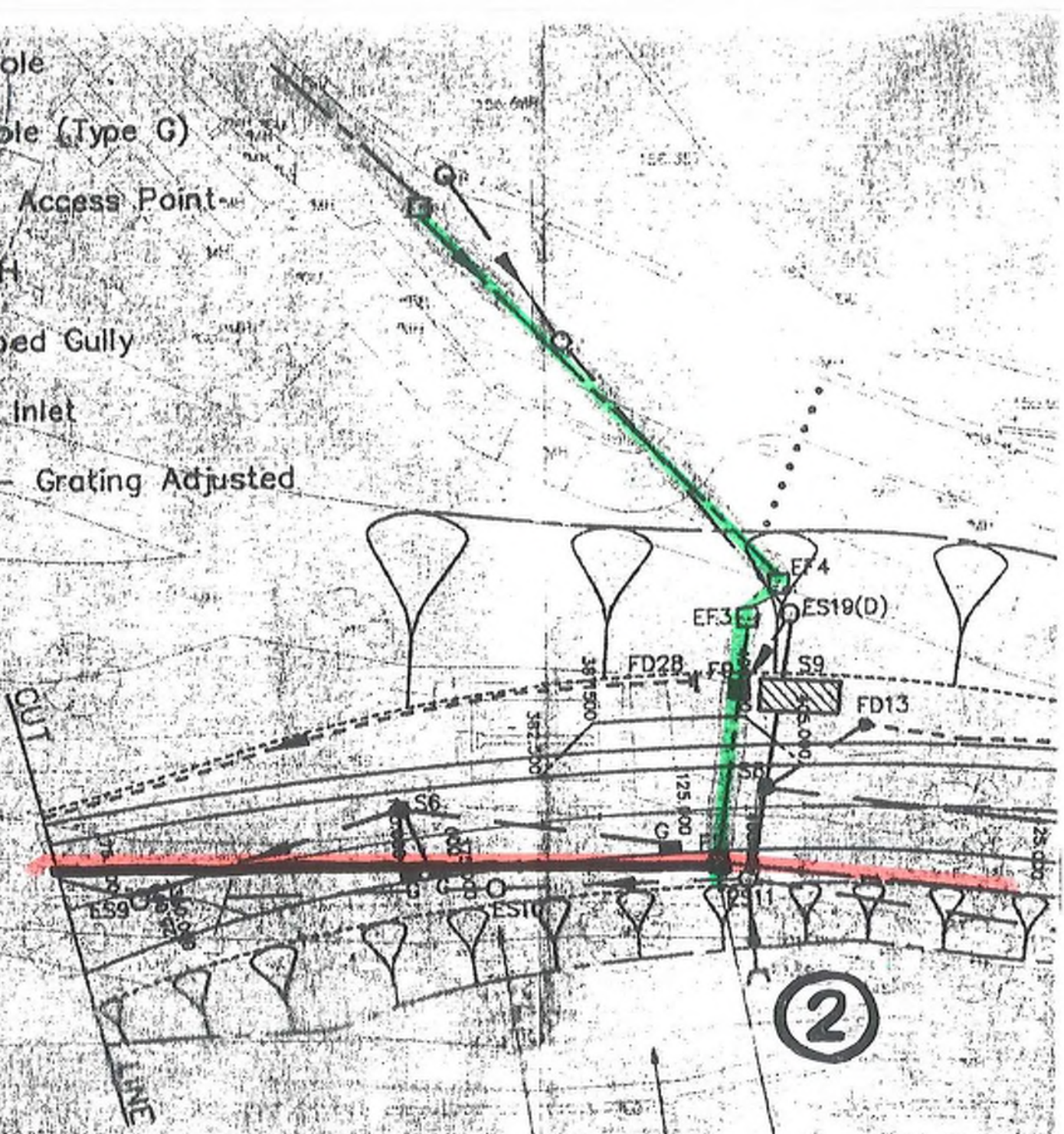
lt Type H

sed Trapped Gully

sed Kerb Inlet

g Gully – Grating Adjusted

g Eye



LTU Thames

Thames Water Utilities

Crossness Sewage Treatment Works
Abbey Wood London SE2 9AQ
Telephone 0181 507 4805
Telefax 0181 507 4880

Our Ref : WWS/CQC/TEHY.0105A

02/02/1998

Please Contact :
N. Shah 01993 771171

London Luton Airport Ltd
Percival House
Percival Way
Luton LU2 9LY

Dear Sir,

WATER INDUSTRY ACT 1991

NAME : London Luton Airport Ltd

PREMISES : Percival House
Percival Way
Luton LU2 9LY

I enclose a Consent dealing with the discharge of trade effluent from the above-mentioned premises.

Yours faithfully

[redacted]

Mrs D. MOSE
TRADE EFFLUENT CO-ORDINATOR

T.E. Case No: TEHY.0105A

THAMES WATER UTILITIES LTD.

Water Industry Act 1991

CONSENT TO THE DISCHARGE OF TRADE EFFLUENT

WHEREAS

1. London Luton Airport Ltd of
Percival House
Percival Way
Luton LU2 9LY
is/are the occupier(s)/owner(s) of the trade premises known as
London Luton Airport Ltd and situated at
Percival House
Percival Way
Luton LU2 9LY

(hereinafter called "the said premises") and by notice dated 12th December 1997 has/have made application to Thames Water Utilities Ltd. (hereinafter called "the Company") to consent to the discharge of trade effluent by him/her/them from the said premises into the Company's public sewers.

2. NOW THEREFORE in exercise of the powers conferred upon it in that behalf as a sewerage undertaker by the Water Industry Act 1991, the Company

HEREBY CONSENT to the discharge of trade effluent from the said premises into the public sewers subject to the following conditions:

Nature and Composition

1. The nature and composition of the trade effluent (hereinafter called "the trade effluent") to be discharged under this Consent is : Waste Liquids arising from pavement and aircraft de-icing processes

Sewer(s) affected

2. The sewer(s) into which the trade effluent may be discharged is/are the foul sewer(s) detailed below

within the Borough of Luton

No change shall be made in such point(s) of discharge without prior consent in writing of the Company.

Maximum quantity to be discharged

3. The maximum quantity of the trade effluent which may be discharged on any one day of twenty-four hours determined from midnight to midnight shall not exceed 40 m^3.

Maximum rate of discharge

4. The maximum rate at which the trade effluent may be discharged shall not exceed 72 m^3 per hour.

Matter to be eliminated prior to discharge to the sewer(s) 5. (a) There shall be eliminated from the trade effluent before it is discharged into the sewer(s) any matter, which, either alone or in combination with any matter with which it is likely to come into contact while passing through any sewers, would injure or obstruct any such sewers or cause injury to and/or damage to the health of any person lawfully present in such sewers, pumping stations or sewage treatment works or would make specially difficult or expensive the treatment or disposal of their contents and in particular but without prejudice to the generality of the the foregoing words the following matters :-

(i) Petroleum spirit
(ii) Calcium carbide
(iii) Thiourea and thiourea derivatives
(iv) Non biodegradable detergents

(b) The trade effluent shall not contain substances listed in Schedule 1 of the Trade Effluents (Prescribed Processes and Substances) Regulations 1989, as amended, at a concentration greater than background concentration as defined in such regulations.

(c) The trade effluent shall not contain any of the substances listed in APPENDIX 1 at a concentration expressed in milligrams per litre greater than that stated.

SEE APPENDIX 1

Temperature 6. No trade effluent shall be discharged which has a temperature higher than 43.3 degrees Celsius (110 degrees Fahrenheit).

Acidity or alkalinity 7. No trade effluent shall be discharged the pH value of which is less than 6.0 or greater than 11.0.

Condensing Water 8. No condensing water shall be discharged.

Changes in occupier or process 9. The occupier(s) of the said premises shall forthwith give to the Company notice in writing of any changes or proposed changes in the company name, address, occupier, or processes of manufacture or the nature of the raw materials used or any other circumstances which may alter the nature and composition of the trade effluent or may result in the the permanent cessation of the discharge.

Payment 10. The occupier(s) of the said premises shall pay to the Company for the trade effluent discharged into the sewer (a) a sum calculated in accordance with the provisions contained in the Company's Charges Scheme together with (b) the amount of any additional expenses which the Company may from time to time incur with respect to the monitoring, analysis, reception, treatment and disposal of the trade effluent. All sums payable to the Company under this condition shall become due and payable on demand.

Entry and Samples

11. The Owner(s) and occupier(s) of the said premises shall permit duly authorised representatives of the company to inspect, examine and test at all reasonable times any works and apparatus installed in connection with the trade and to take samples of the trade effluent.

Inspection

12. (i) An inspection chamber or manhole shall be provided and maintained by the owner(s) and occupier(s) of the said premises in a suitable position defined in connection with each pipe through which the trade effluent being discharged and such inspection chamber or manhole shall be so constructed and maintained by the owner(s) or occupier(s) as to enable duly authorised representatives of the Company to take samples at any time of the matter passing into the sewer(s) from the said premises.

Measurement and determination of discharge

(ii) A notch gauge and continuous recorder or some other apparatus suitable and adequate for measuring and automatically recording the volume, nature, composition and rate of discharge of the trade effluent being discharged into the sewer(s) shall, if required by the Company be provided and maintained by the owner(s) occupier(s) of the said premises to the satisfaction of the Company in connection with every pipe through which the trade effluent is being discharged.

Records

(iii) Records in such form as the Company may require shall be kept of the volume, rate of discharge, nature and composition of the trade effluent discharged into the sewer(s) and shall be available at all reasonable times for inspection by duly authorised representatives of the Company and copies of such records shall be sent to the Company on demand.

(iv) If the notch gauge and continuous recorder or other apparatus aforesaid ceases to register or measure correctly then, unless otherwise agreed, the quantity of the trade effluent discharged into the sewer(s) during the period from the date on which the records of the volume of the trade effluent discharged into the sewer(s) were last accepted by the Company as being correct up to the date when the notch gauge and continuous recorder or other apparatus aforesaid again registers correctly shall, for the purpose of any payment to be made to the Company, be based on the average daily volume of the trade effluent discharged during the period of one month preceding the date on which the said records were last accepted as aforesaid or during the month immediately after the notch gauge and continuous recorder or other apparatus aforesaid has been corrected, whichever is the higher.

(v) The foregoing provisions of this condition shall be of no effect so long as there is available to the satisfaction of the Company some other method approved by the Company of sampling the trade effluent or of determining, measuring and recording the volume and rate of discharge and the nature and composition of the trade effluent discharged.

Signed [redacted]

General Manager, Waste Water Services
Duly authorised to sign on behalf of the Company

Dated this 28 day of January 1998

NOTES :

(a) All communications should be sent to the following address

Catchment Quality Control Manager
Thames Water Utilities Ltd.
Crossness Sewage Treatment Works
Belvedere Road
Abbey Wood
London
SE2 9AQ

(b) Your attention is drawn to the right of appeal to the Director General of Water Services conferred by Section 122 of the Water Industry Act 1991 if you are aggrieved by any condition attached to this Consent.

(c) A standing charge for all sewerage services plus a domestic sewerage charge is payable in addition to charges for trade effluent flows.

(d) A copy of the Thames Water Utilities Ltd. Charges Scheme is obtainable from the Thames Water Customer Centre.

(e) If you discharge trade effluent in contravention of a condition of this Consent you will be guilty of a criminal offence and may be subject to prosecution.

APPENDIX 1

The trade effluent shall not contain any of the substances listed below at a concentration expressed in milligrams per litre greater than that stated :

Settleable Solids	1000
Chemical Oxygen Demand	1000
Unsaponifiable Oil and or Grease	50
Sulphate (as SO4)	1800

THERE ARE NO FURTHER LIMITS IN THIS APPENDIX

Thames Water

URGENT TELEFAX MESSAGE

To: J.T. Appleby.	**Date:** 18-02-98
Address: London Luton Airport	
Telephone: 01582-395313	**Fax:**

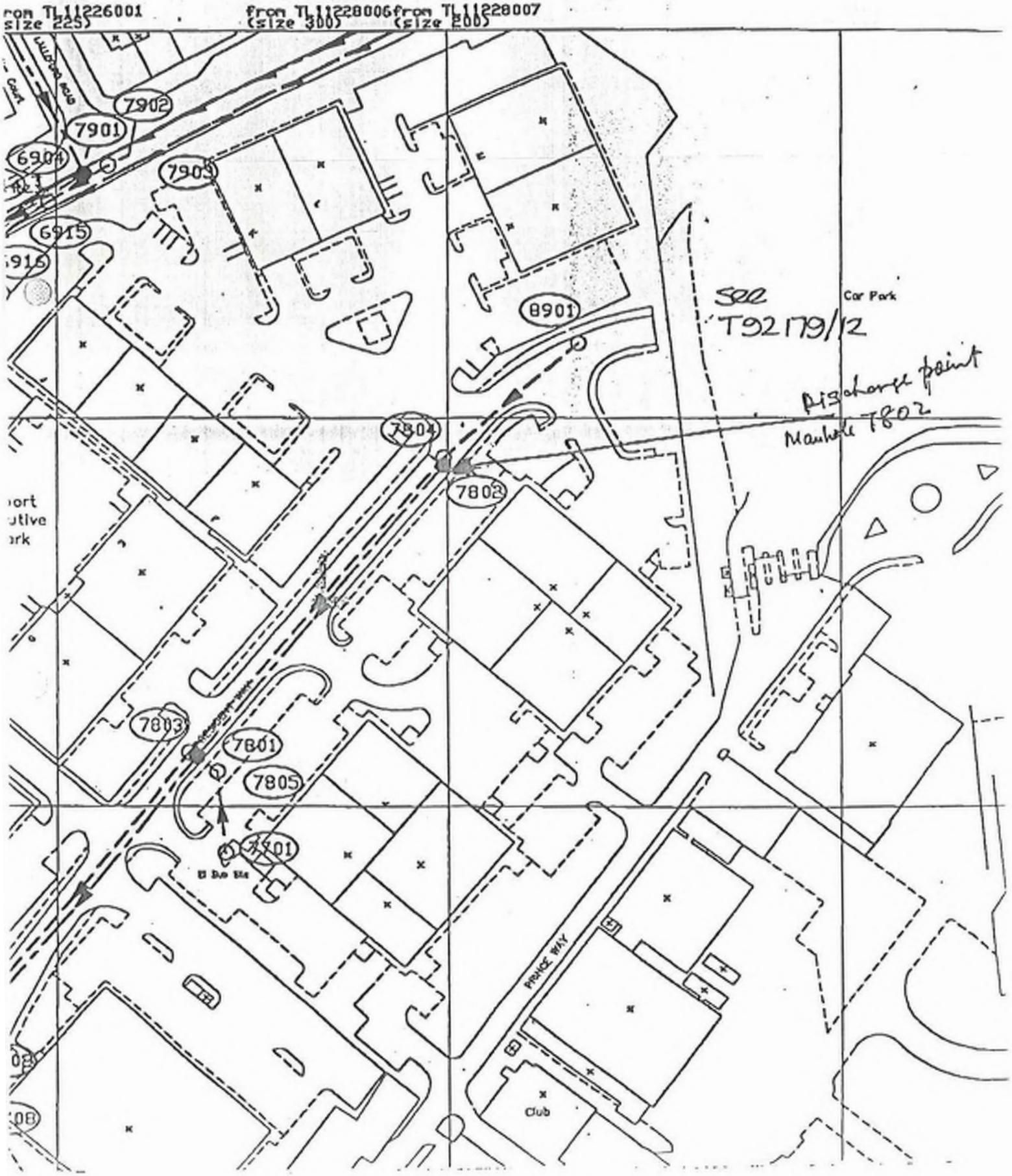
From:	Nem Shah Catchment Quality Control Aylesbury STW Rabans Lane Aylesbury Bucks. HP19 3RY	
Telephone:	01296 435914	Int: 30125
Fax:	01296 431857	Int. 30130

Message:

The accompanying plan shows the discharge point for consent CTH 0105A.

Total number of pages sent (including this page) 2

If you have not received any of the accompanying pages or find that any of them are illegible, please call the sender on the above telephone number.


from TL11226001 (size 225)
from TL11228006 (size 300)
from TL11228007 (size 200)
7902
7901
6904
7905
6915
8901
See T92179/2
Car Park
Discharge point Manhole T802
7804
7802
7803
7801
7805
7701
PRINCE WAY
Club

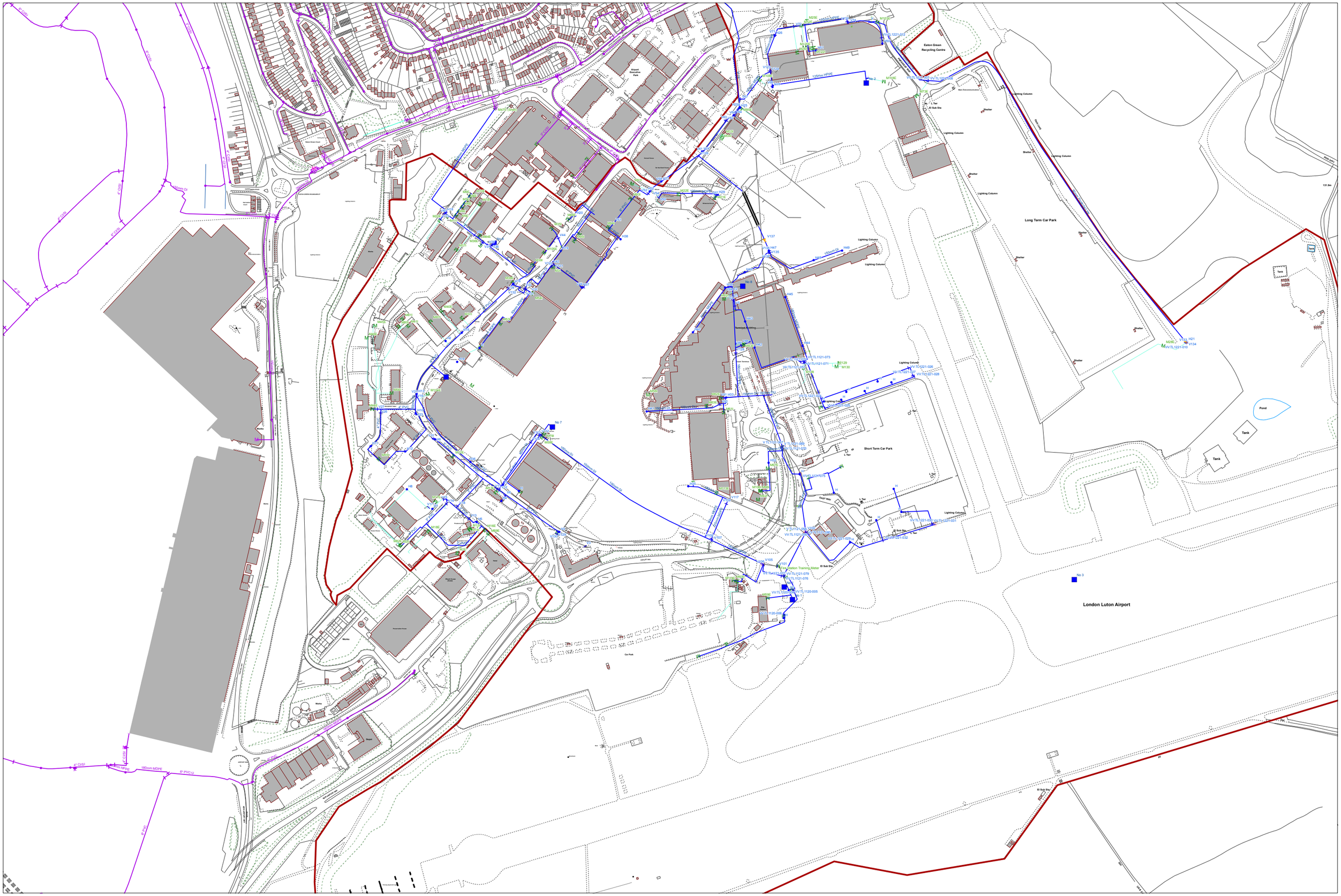
Appendix E – Veolia potable water network

VEOLIA

POTABLE NETWORK

N

1:2,000



(16/07/2020)

Appendix F – Veolia surface water network

London Luton Airport - Surface Water Network

VEOLIA WATER

1:2,500

Legend

- SW Rising Pipe (Airport)
- SW Sewer Pipe (Private)
- SW Sewer Pipe (Airport)
- SW Rodding Eye (Airport)
- SW Petrol/Oil Interceptor (Airport)
- SW Petrol/Oil Interceptor (Private)
- SW Catchpit (Airport)
- SW Manhole (Airport)
- SW Manhole (Private)
- SW Soakaways (Airport)
- SW Undefined End (Airport)
- SW Outfall (Airport)
- SW Pumping Station
- Luton Airport Boundary
- Buildings

N

Eaton Green Recycling Centre
Wigmore Valley Park
Long Term Car Park
Short Term Car Park
London Luton Airport
Chiltern Hall
Burnt Wood
Birch Spring
Bute Street Farm

Appendix G – Veolia foul water network

London Luton Airport - Foul Water Network

VEOLIA WATER

1:2,500

Legend

- FW Airport Sewer
- FW Airport Rising Main
- FW Private Sewer
- FW In Use Manhole
- FW Missing/Buried Manhole
- FW Private In Use Manhole
- FW Private Missing/Buried Manhole
- FW Pumping Station
- FW Pumping Apparatus
- FW Septic Tank
- FW Access Points
- Luton Airport Boundary
- Buildings

N

London Luton Airport

Long Term Car Park

Short Term Car Park

Wigmore Valley Park

Eaton Green Recycling Centre

Chiltern Hall

Burnt Wood

Birch Spring