London Luton Airport Operations Ltd

London Luton Airport 19mppa Expansion

Drainage and Water Supply Infrastructure Appraisal

Report for

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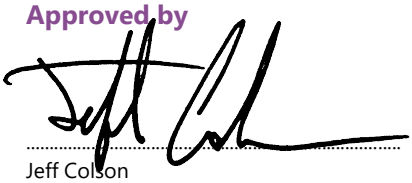

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Executive summary

This report has been produced for the purpose of assessing the potential effects on drainage and water supply infrastructure arising from London Luton Airport Operations Limited's (LLAOL) application to increase capacity at the airport from 18 million passengers per annum (mppa) to 19mppa. An assessment has been made of the existing surrounding public infrastructure conveying contaminated surface and foul water as well as the incoming water supply. This assessment has been undertaken using information provided by the airport and a site walkover in July 2019 which is still considered representative of the site.

The proposal to increase capacity to 19mppa is likely to cause an increase in volumetric discharge of foul water from the terminal building and incoming aircraft as well as volumetric demand on the incoming water supply.

During consultation with Thames Water it was notified to Wood that there is very limited processing capacity at the downstream East Hyde sewage treatment works, therefore, an increase in the peak discharge of foul effluent from the airport would not be acceptable. To ensure additional pressures are not placed on the existing facility, LLAOL have agreed to restrict the peak passenger throughput to the current levels permitted under 18mppa via a condition to be attached to the planning permission. The proposed condition will restrict the hourly and two hourly declared terminal passenger flow capacity of the airport to the levels declared to the independent statutory aircraft slot coordinator (Airport Coordination Limited (ACL)) as per previous assessments.

Contaminated surface water should not increase in volume or flow rate due to the increase in passengers as this is a direct product of rainfall. A small increase in de-icer concentration within contaminated surface water has been assessed as negligible given implementation of improved operational techniques and additional aircraft movements during non-winter months.

Assurances were sought from Thames Water and Affinity Water that the effect of the extra 1mppa could be accommodated in their local networks. Confirmation of consent, based on no additional infrastructure and no increase in peak flows (demand and discharge), was received and are included in the appended documents (Appendices F and G).

The reinforcements required in the Thames Water and Affinity water networks due by 2025 including works around the East Hyde sewage treatment works are part of the wider development plan. The capacity framework exercise should not be used as a means of identifying current performance problems caused by lack of network capacity but instead as an indication of the level of risk associated with the current capacity limitations. To understand these risks in detail, including how likely they are to materialise, their causes and the range of potential interventions available, the capacity assessment framework needs to be understood in conjunction with the Framework for Drainage and Wastewater Management (DWMPs) that Thames Water and Affinity water are currently developing.

Contents

1. Introduction

Wood Group UK Limited (hereafter referred to as Wood) have been commissioned to produce this appraisal by London Luton Airport Operations Ltd (LLAOL) in support of a planning application to increase its capacity from 18 million passengers per annum (mppa) to 19 mppa.

This proposed application will replace the "Original Permission" (defined as the 2014 planning permission ref: 12/01400/FUL, as amended by the Section 73 application: 15/00950/VARCON). The purpose of this document is to support the new planning application through a baseline review of the existing drainage and water supply infrastructure located within and surrounding London Luton Airport, Luton, Bedfordshire (hereafter referred to as 'the Site').

Data has been obtained from the following reports:

- Bickerdike Allen Partners (February 2019). A11060-N24-DR 19mppa Schedule Contours.
- IDOM (July 2019), London Luton Airport Masterplan 19mppa Draft Report.
- London Luton Airport Ltd. (November 2012), Future Luton: Making best use of our runway. Environmental Impact Assessment Scoping Report.
- Thames Water Ltd. (April 2016). SMG 1796: Sewer Impact Study.
- Mott MacDonald (February 2008). London Luton Airport Surface Water Drainage Asset Management Plan Report.
- London Luton Airport Operations Ltd. (November 2012). Environmental Statement: Non-technical Summary.
- Veolia Water (November 2015). Report on proposal for construction of additional terminal pier impact on foul sewer network.

This appraisal takes account of current legislation and technical guidance in order to best assess the likely effects of the increase in passenger numbers at the airport. Key local, national and international policy associated with the appraisal include:

- Environment Act 1995.
- Water Resources Act 1991.
- European Commission Water Framework Directive (2000/60/E);
- Planning Act 2008.
- European Commission Urban Wastewater Treatment Directive (1991/271/EEC);
- Flood and Water Management Act 2010.
- Defra National Policy Statement (NPS) for Wastewater.
- Environment Agency Pollution Prevention Guidance- PPG1: Understanding your environmental responsibilities - good environmental practices.

1.1 Methodology

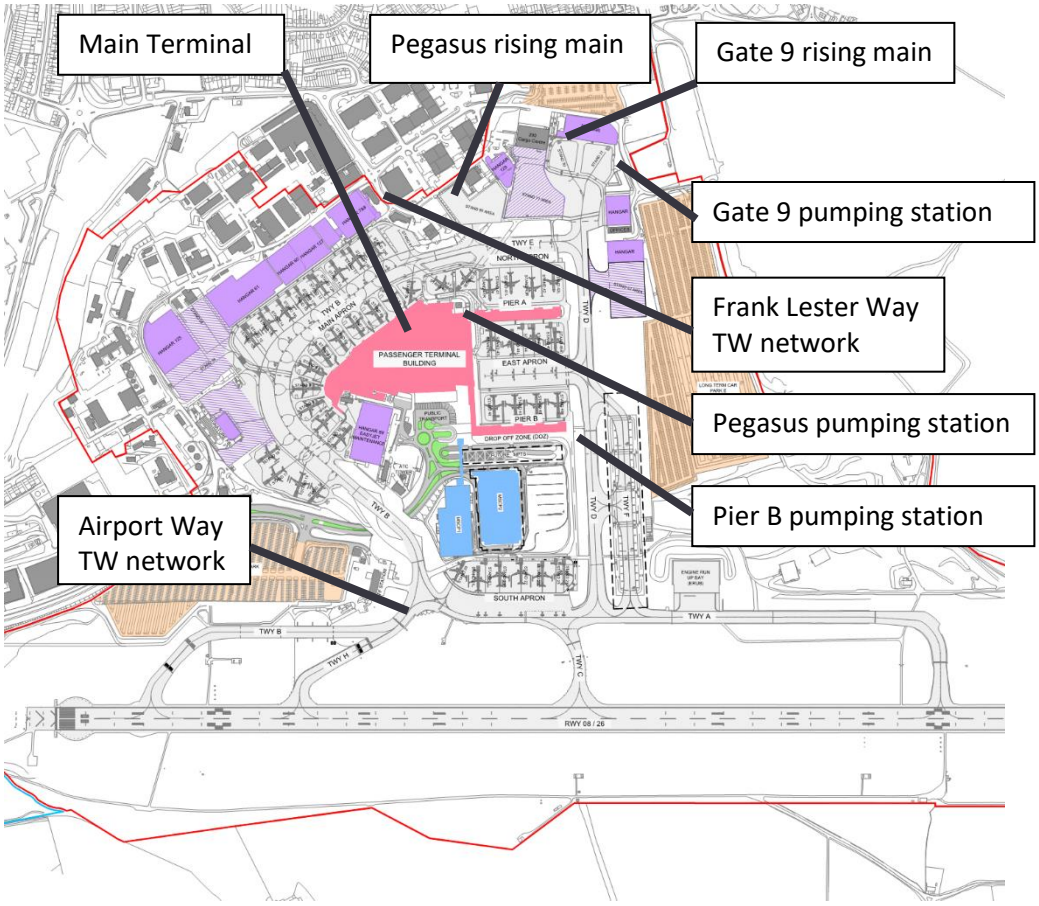
To assess the impact of the proposed 1mppa increase in passenger numbers, a walkover and desk-based survey of the existing drainage and water supply infrastructure was undertaken. This included assessment of on-site and local area infrastructure, associated with the main terminal building including that under the responsibility of the local statutory undertakers, namely, Thames Water (TW) and Affinity Water (AW). A survey was also undertaken by consultants from Wood, accompanied by the Veolia UK airport Operations Manager, on the 25th July 2019. Veolia are responsible for the operation and maintenance of the drainage and water supply infrastructure within Luton Airport's boundary.

Existing volumes and flow rates for foul and contaminated surface water discharge as well as water demand have been provided to Wood by LLAOL. This data has been analysed in accordance with the proposed increase in passenger numbers to identify any potential adverse effect on the on-site infrastructure and the local networks. This has been done in collaboration with Thames Water for the drainage network and Affinity Water for supply of water.

2. Review of Existing Networks

Wood has developed an understanding of the existing on-site and local networks through a review of reports, plans and a survey undertaken in July 2019. Based on feedback received from sewerage undertakers and surveys undertaken for the existing assets on site, it is reasonable to assume that an increase in capacity to 19mppa does not have an adverse effect to the existing infrastructure in the area and is representative of the current condition on site. An increase in passenger throughput is likely to be most significant on networks associated with the main airport terminal and the local networks they discharge to or receive potable water from. A plan for the drainage assets around the Main Terminal area is provided in Figure 2.1 below.

Figure 2.1 Existing Surface Water network around Main Terminal



2.1 Domestic Foul Water

The on-site foul network is operated and maintained by Veolia UK. It is split into two, similar-sized, networks which discharge effluent to either the north or the south of the Site, as seen in Appendix A. The system originating from the south of the main terminal building comprises a series of 225mm diameter vitrified clay (VC) pipes leaving the terminal at three outlets and flowing via gravity to a Thames Water discharge point along Airport Way, Manhole F1MH25 and TL11217007 as shown in Appendix A and B, respectively.

On the site visit of 25th July 2019, it was noted that there are a total of 8 No. fixed flow rate pumping stations across the Site. Two of these stations are contained within the terminal and operated by LLAOL; three are associated with non-terminal buildings and operated by Veolia; one discharges effluent tankered from passenger aircraft; and two originate from the terminal and are operated by Veolia. The two pumping stations discharging effluent from the terminal building are known as 'Pegasus pumping station' and a pumping station at the newly built southern pier B (not shown within the outdated Appendix A plan). The newly installed pumping station at pier B discharges via a rising main to the Pegasus pumping station.

The foul network originating from the stands at the north of the main terminal building is a pumped system discharging along a 125 HPPE rising main to a Thames Water discharge point, Manhole F4MH10 of Appendix B, on Frank Lester Way. The 'Pegasus' pumping station at the terminal comprises 2 No. Caprari pumps which act in a duty/standby arrangement. The forward pumping fixed flow rate is 14l/s with a significant tank capacity should inflow exceed the pumped outflow.

Foul effluent from passenger aircrafts is transported by tankers and deposited into the Gate 9 sullage point where a pumping station discharges foul effluent from passenger aircraft towards President Way along a 102mm diameter vitrified clay rising main. The forward pumping fixed flow rate is not known for Gate 9. A north-east pump system, known as 'Delta', also discharges contaminated surface water collected from the northern aprons to the Gate 9 pumping station and along the same foul system to President Way then Frank Lester Way and Eaton Green Road.

If the Pegasus pumping station is shut down for maintenance or a breakdown then effluent must be transferred via a tanker to the Gate 9 system. Assuming inflow at an average flow rate (8.9l/s from Table 2.1 below), the Pegasus tank can store effluent for a maximum period of 5 hours. The maximum feasible period of back up to the Gate 9 system with tanker transfer is 7 days. When the Gate 9 system is not operating the reverse operation takes place, however, this back up system can operate for much longer. Both stations have a duty/standby arrangement, therefore, shutdown is only caused by issues in the system downstream of the pumps.

External to the Site boundary, overflow of foul sewers was reported at the roundabouts on Eaton Green Road/Vauxhall Road/Wigmore Lane (associated with the northern foul network) more than two years ago with no subsequent issues. The endpoint for foul and first flush contaminated surface water discharge from the airport is the East Hyde sewage treatment works (STW), 3km to the south-east. During discussions with Thames Water (TW) it was reported that the processing capacity of the East Hyde STW was close to being reached, although this has not yet caused any issues.

A Sewer Impact Study carried out by Thames Water in April 2016 stated that the foul network does not have capacity downstream of the southern Airport Way connection point. However, it was reported by the Veolia representative that there had recent reinforcement works to the network along Airport Way with no issues reported to the airport by Thames Water for over two years.

Non-terminal, gravity-fed foul networks in the south-west of the Site and the pumped system from the south-east will not experience an increase in domestic foul flow due to increasing passenger numbers to 19mppa but do handle contaminated surface water, as discussed in the following section 2.1.

Table 2.1 below shows the current maximum foul flow rate to the north and south networks associated with the current 18mppa planning permission. These figures are based on average flow rates modelled for the airport, with the maximum rate assumed to be double the average. The data includes aircraft effluent and domestic foul from trade staff and passengers.

Table 2.1 Peak Domestic Foul Flow Rate (taken from Mott MacDonald modelling data-July 2019

Location	Downstream Thames Manhole Connection	Existing Peak 18mppa Flow (l/s)*
North of Terminal	TL11216702	8.9**
South of Terminal	TL11217007	8.9

*Based on total discharge evenly proportioned between Frank Lester Way and Airport Way.
**Discharge value prior to entering Pegasus pumping station.

2.2 Contaminated Surface Water

The surface water network is operated and maintained by Veolia UK. There are several independent surface water networks serving the Site. These all drain to on-site foul sewers, soakaways or to the Thames Water surface water network as shown in Appendix C. The largest catchment area, 48ha, discharges to the Central Soakaway system with a 40ha catchment discharging to the Airport Way Thames Water connection point, similar to the southern foul network in section 2.1. Various other smaller surface water systems exist discharging to soakaways and the Thames Water network at President and Frank Lester Way to the north of the Site.

Parts of the surface water network drain to a 'first flush' system which operates during high flows to take contaminated surface water such as that polluted by de-icing glycol chemical used on aircrafts during winter. As seen in Appendix D, the first flush system drains contaminated surface water from across the airport to the Thames Water foul networks whilst the Central and Northern Soakaways are also partially served by the first flush system.

The volume and flow rate of contaminated surface water via the first flush system is dependent on rainfall levels. The concentration level of glycol within the contaminated surface water is directly related to the number of aircrafts being subject to de-icing. The Mott MacDonald 2008 Surface Water Drainage Asset Management Report does not identify any problems relating directly to the first flush system and the system is assumed to be functionally operational as per current conditions on site.

A Thames Water study on the effect of additional contaminated water flow into the Thames Water foul system from the airport was commissioned in 2016. Within this study, the existing peak contaminated surface water flow rate to the foul network connection points on Frank Lester Way and Airport Way were recorded in Table 2.2 below.

Table 2.2 Peak Contaminated Surface Water Flow Rate (*Taken from Mott MacDonald 2008 Asset Management Report)*

Connection Location	Thames Manhole reference	Existing Peak 18mppa Flow (l/s)
President Way	TL11217802	34
Airport Way	TL11217007	14

2.3 Potable Water Supply

The local water supplier is Affinity Water who own and operate the local network. The water supply enters the Site from two 9-inch pipes on Eaton Green Road at Provost Way and President Way as seen in Appendix E. Both incoming pipes supply a ring main around the Site that covers all demands including potable, fire and trade uses.

The system does not rely on any holding tanks before water is utilised except for two large underground tanks at the fire station and various smaller tanks at logistical firefighting points across the Site. The ring main and most branches around the Site are 150mm diameter PVC pipe with the systems within the terminal and land side, mainly 75 or 100mm pipe.

There have been recent improvements in the water supply to the Airport due to Affinity water reinforcements that have taken place along Vauxhall Way.

Veolia Water, who operate and maintain the on-site potable water infrastructure, have provided the figures in table 2.3 relating to the water usage of the airport terminal during 2018, totalling 129,801.

Table 2.3 Terminal Water Usage in m3 during 2018 (Made available by Veolia Water Capital Delivery)

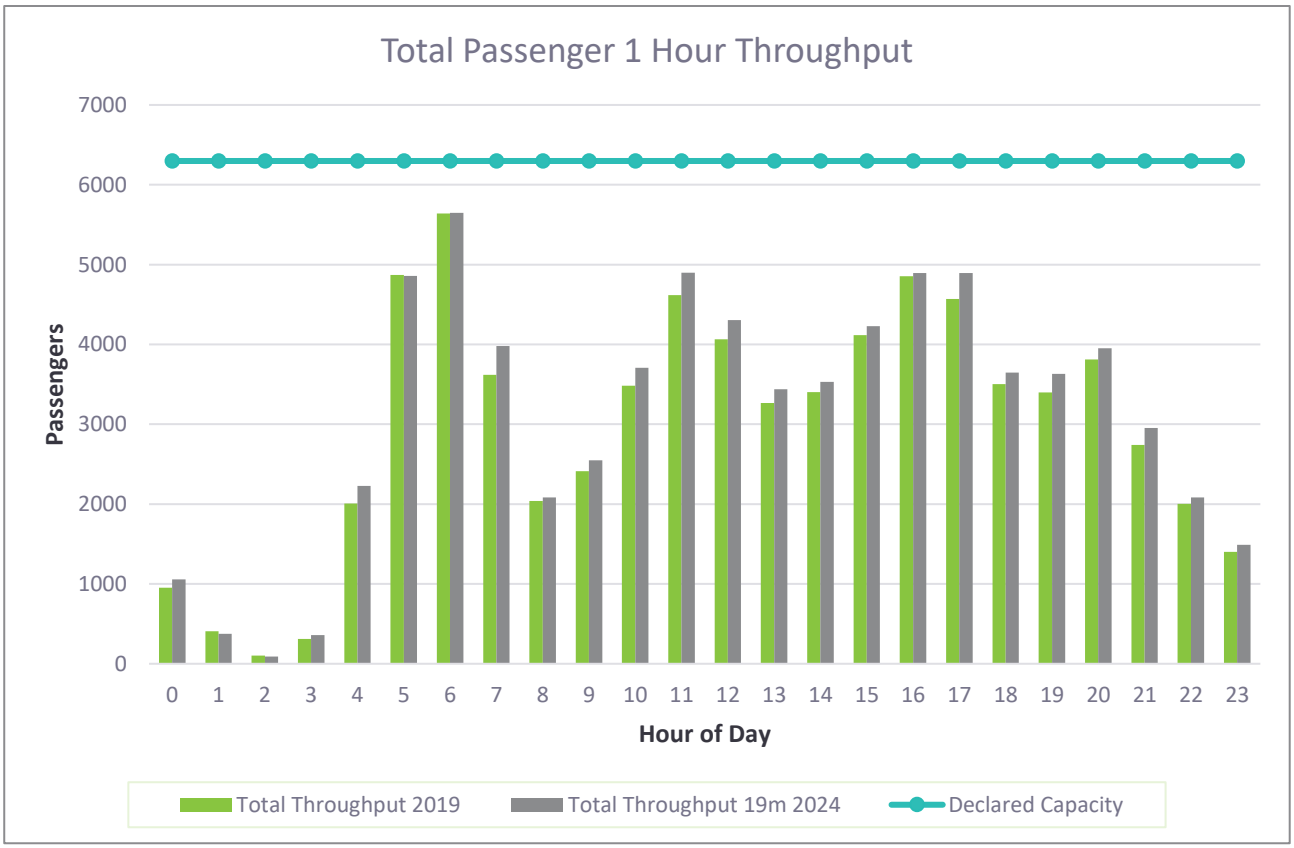
	Jan	Feb	Mar	Apr	May	June
New Terminal	4676	4629	5562	5562	6752	7575
Additional Terminal Feed (meter in staff smoking area)	1482	1378	1415	1410	970	1060
Old Terminal Arrivals	1597	1119	1538	1533	2168	2414
Old Departure Terminal	266	605	439	436	304	320
Pier B	0	0	15	15	0	303
Total Water Usage (Jan – June)	8022	7730	8969	8956	10193	11672

	July	Aug	Sept	Oct	Nov	Dec
New Terminal	8252	8413	7316	6582	4667	4756
Additional Terminal Feed (meter in staff smoking area)	867	754	1428	1284	1094	1591
Old Terminal Arrivals	2222	2343	2173	2176	1549	1584
Old Departure Terminal	281	526	293	251	456	543
Pier B	204	226	214	201	170	172
Total Water Usage (July – December)	11824	12262	11424	10493	7936	8646
Total Water Usage (2018)						129,801

3. 18mppa to 19mppa Discussion

The following section describes the potential effects of a 1mppa increase on the foul, contaminated surface water and water supply systems. The application to increase capacity at the airport from 18mppa to 19mppa will not include any additional infrastructure or result in an increase in the peak passenger throughput or staff numbers. LLAOL manage planning constraints relating to night quotas, noise contours and annual passenger numbers through a capacity declaration on slot usage which dictates maximum hourly runway movements, maximum hourly and multi-hourly terminal passenger throughput. Notwithstanding the increase in capacity to 19mppa, LLAOL will maintain the hourly and two hourly declared terminal passenger flow capacity that was submitted to Airport Coordination Limited (ACL) for 18mppa in Summer 2019. It is understood that LLAOL will only review and, therefore, potentially increase the declared terminal passenger flow capacity if there is a change in the physical infrastructure of the airport. An estimation of hourly passenger throughput for the busiest slot usage day during 2019 (approximately 18mppa) and 2024 (estimated 19mppa) has been provided by LLAOL within Figure 3.1 below.

Figure. 3.1 2018 (c.18mppa) and estimated 2024 (19mppa) hourly arrival and departure passenger throughput based on aircraft slot usage



As shown in figure 3.1, the hourly passenger throughput (arrivals and departures) for 6am is the maximum recorded on the busiest day in 2019. LLAOL will, therefore, restrict the maximum hourly passenger throughput for 19mppa to this figure. By virtue of this hourly figure being restricted for 19mppa, passenger throughput during alternative hours of the day may increase but will not be greater than the current 6am (maximum) throughput for 18mppa. Figure 3.1 also shows the maximum declared capacity for a combination of arrivals and departures. This has been calculated using the London Luton Airport Scheduling Declaration

for the two-hour average international arrivals and departures, the two-hour average domestic departures and one-hour average domestic arrivals are as follows:

Duration	Flight type	Figures
Two-hour average	Total (International + Domestic)	6845
Two-hour average	International Arrivals	4350
One-hour average	Domestic Arrivals	700
Total Declared Capacity	**(6845+4350)/2+700**	**6297.5**

This will remain the same when capacity is increased from 18mppa to 19mppa and, therefore, maximum passenger numbers will not be exceeded within either permission.

3.1 Domestic Foul Water

A volumetric increase in foul water discharge from the terminal is anticipated with the increase in capacity to 19mppa however there will not be any increase in peak flow rate. This will be implemented through the assurances from LLAOL to restrict the maximum hourly and two hourly declared terminal passenger flow capacity levels to Summer 2019 levels.

The expected flow to the newly installed Pier B pumping station is an average of 1.5l/s according to a Project Curium document No. 152017 provided by Veolia Water (Document is available on request if required.) The capacity of the station according to a November 2015 Veolia Impact Study is 5-8.0l/s. Assuming a peak dry weather flow of 2x average flow the peak flow in the system is 3.0l/s. Therefore, Pier B pumping station has the capacity for an increase of up to approximately 250%.

In addition, in the November 2015 Veolia Water impact study which considered the proposal for an additional terminal pier B and its effect on the foul sewer system, it was concluded that an additional maximum flow of 5-8l/s would not affect the adequacy of the Pegasus pumping station to forward the required flow. This flow is greater than the modelled maximum flow of 3.0l/s.

If it is conservatively assumed that all foul effluent from the north stand is discharged through the Pegasus pumping station, the modelled flow from the terminal to Pegasus is 8.9l/s as in table 2.1. This is much less than the forward flow rate of the Pegasus pumping station, calculated as a 14l/s centrifugal fixed flow rate. It can, therefore, be assumed that the Pegasus pumping station has the ability to discharge flow at upwards of 150% of the current rate. With regards to the 19mppa proposal, the main effect is likely to be an increase in operation time and frequency of the pump at its fixed flow rate.

The capacity of the rising main between the Pier B and Pegasus pumping station is 5-8l/s from the stated forward pumping capacity of Pier B. This is well above the maximum flow expected from the station and will also have been installed with a suitable factor of safety for surplus loading to avoid costly upgrades and refurbishment. Again, an increase in operational time and frequency of the pumping station can be expected due to the volumetric increase in domestic foul associated with 19mppa.

There is currently absence of information noted with regards to the capacity or forward pumping flow rate of the system at the Gate 9 pumping station and the 102mm diameter. It is however known that the system is fixed-rate flow and discharges to the Thames Water network along President Way. In the absence of further

information it is assumed that the main effect of increasing the capacity to 19mppa is likely to be an increase in operation time and frequency of the pump at its fixed flow rate.

It is currently assumed that no upgrades to the existing pumps are required even though an increase in operation time and frequency of the pumps is predicted due to the volumetric increase in foul flows with the capacity being increased to 19mppa.

Due to there being no increase in peak domestic foul discharge rate, the flow as shown in Table 3.2 remains the same for the 19mppa proposal.

Table 3.1 Peak Domestic Foul Flow Rate due to 19mppa (taken from Mott MacDonald modelling data July 2019)

Location	Downstream Thames Manhole Connection	Estimated Peak 19mppa Flow (l/s)*
North of Terminal	TL11216702	8.9
South of Terminal	TL11217007	8.9
	*Based on domestic discharge evenly proportioned between network south and north of terminal	

A meeting with Thames Water regarding domestic foul discharge took place on the 19th August 2019. During these discussions it was highlighted that there is currently zero capacity for an increase in peak flow rate to the systems on Airport Way and Frank Lester/President Way. This restriction can be met in the north by the continuation of the current fixed flow rate from Pier 9 and Pegasus pumping stations. However, discharge through the gravity flow system to Airport Way in the south will need to be kept at or below the peak flow rate permitted within the current planning permission for 18mppa. It is assumed that breach of this requirement will instigate the need for installation of a flow control and storage system by LLAOL to reduce peak flow rate to the rate allowed within current permissions.

After this meeting and having obtained assurances from LLAOL that peak hourly passenger throughput will not increase, Thames Water undertook an assessment of the impact on their network based on a 1mppa volumetric increase of foul water. The basis of Thames Water modelling is the contribution of one passenger amounting to a third of a domestic individual's daily foul discharge. The outcome of this enquiry is listed in Appendix F. In summary, Thames Water *'do not envisage concerns with the proposed development site based upon the following key assumptions; peak discharge rates, location and number of sewer connections remain as existing.'*

A subsequent meeting was held with Thames Water on 21st July 2020 to further discuss the matter, and it was re-iterated that no concerns are anticipated with the increase to 19 mppa, assuming the maximum peak flow is not exceeded.

3.2 Contaminated Surface Water

Stormwater runoff at airports is often dilute and cold, with inconsistent flows and contaminant loadings. the early stages of a rainfall event, accumulated contaminants in the catchment area (spilt fuels & lubricants, chemicals from cleaning operations, sewage leaks, oils and greases), especially those on impervious surfaces such as roads, parking areas, runways, aprons, and other paved areas, are washed off early in the storm (the "first flush").

Generally, the first flush involves the first couple of inches of rainfall and carries off 90 percent of the pollution load and will have the highest concentrations of contaminants. Additionally, the low-flow-rate

runoff in stormwater collection systems which flows between storm events can sometimes be more polluted than the more dilute streams flowing later during and after storms. Therefore, to achieve optimum contaminant removal from airport runoff, a stormwater treatment system must be able to deal year-round with these two flows (low rate flows and first flushes) as well as with the cold weather contamination by surface and aircraft De-icing/anti-icing chemicals.

On the Luton Airport site, the first flush is currently discharged into the foul sewers via a dedicated surface water network for these flows. Non contaminated surface water flow is discharged either via soakaways or into Thames Water surface pipe network.

Veolia Water undertook an assessment of the surface water network in 2007 which stated that the on-site existing network functions at full capacity. However, no up-to-date information on recent issues or improvement works has been made available.

Within the surface water network, no increase in volume or flow rate of contaminated surface water entering the foul network shall be noted. The flow rate of contaminated surface water is directly related to rainfall, therefore, other than an increase due to climate change (assumed to be included in current planning permission) there should be no increase in flow due to increasing the capacity from 18mppa to 19mppa and the flows remain as previously predicted as part of the 18mppa application shown here in Table 3.2.

Table 3.2 Peak Surface Water flow rate due to 19mppa (*Taken from Mott MacDonald 2008 Asset Management Report)*

Connection Location	Thames Manhole reference	Estimated Peak 18mppa Flow (l/s)*
President Way	TL11217802	34
Airport Way	TL11217007	14

However, an increase in glycol concentration attributed to additional air traffic movements (ATMs) needed to be investigated for the 19mppa scenario. Table 3.3 below shows the forecasted 19 mppa ATMs versus the forecasted 18 mmpa ATMs.

Table 3.3 Forecasted ATMs

Year	ATMs
Year 2019 (18 mppa) – baseline	141,481 ATMs (actual data)
Year 2024 (18 mppa) – future baseline	139,452 ATMs (forecast data)
Year 2024 (19 mppa)	142,144 ATMs (forecast data)
Year 2028 (18 mppa) – future baseline	139,167 ATMs (forecast data)
Year 2028 (19 mppa)	140,439 ATMs (forecast data)

As per figures in the table above, an increase in ATM's for 19mppa in year 2024 is noted as compared to the baseline scenario for 18mppa for the year 2019.

Currently, contaminated surface water glycol concentration levels are restricted by discharge consents to the Thames Water network at President Way, Frank Lester Way and Airport Way.

It is assumed that with the aircraft size being increased resulting in low utilisation of the de-icing chemicals as planned for future operations and with LLAOL's commitment to improvements being made with the use of de-icing pads, forced air and a reduction in chemical concentrations the small increase in ATM's to be realised by the year 2024 shall result in no increase in glycol concentrations.

This has been verbally agreed with Thames Water at the meeting held on the 25th July 2020 that glycol concentration within contaminated surface water run-off will not increase as compared to the current site conditions.

3.3 Potable Water Supply

There is likely to be an increase in the volumetric demand on the Affinity Water network from the airport due to bathroom use and potable water consumption by the additional passengers throughout the year. However, similar to the foul water discharge, there will not be an increase in the instantaneous peak flow demanded. This is, again, related to the restriction on maximum terminal flow capacity levels that will not lead to an increase in the peak hourly passenger number.

There are no condition or capacity issues reported by LLAOL or Veolia Water regarding the on-site water supply network. Therefore, the effect of accommodating an extra 1mppa will be focused on the Affinity Water network supplying the local area. Table 3.4 shows estimated water usage by the airport terminal for 19mppa. Estimates are based on the existing annual number of passengers being 16,581,850 in 2018 when the water usage records were taken. Therefore, assuming that there will be an increase in staff working at the airport across the year equivalent to the increase in passengers, the percentage increase in volumetric water demand is calculated as:

$$(19/16.581850) = 1.1458 = 14.58\%$$

Table 3.4 Estimated Terminal Water Usage in m3 for 19mppa*

	Jan	Feb	Mar	Apr	May	June
New Terminal	5358	5303	6373	6373	7736	8680
Additional Terminal Feed (meter in staff smoking area)	1698	1579	1621	1615	1111	1214
Old Terminal Arrivals	1830	1282	1762	1756	2484	2766
Old Departure Terminal	305	693	503	500	348	367
Pier B	0	0	17	17	0	347
Total Water Usage (Jan – June)	9191	8857	10277	10262	11680	13374

	July	Aug	Sept	Oct	Nov	Dec
New Terminal	9455	9640	8382	7541	5348	5450
Additional Terminal Feed (meter in staff smoking area)	993	864	1636	1471	1254	1823

	July	Aug	Sept	Oct	Nov	Dec
Old Terminal Arrivals	2546	2685	2490	2493	1775	1815
Old Departure Terminal	322	603	336	288	522	623
Pier B	233	258	246	230	195	197
Total Water Usage (July – December)	13548	14050	13090	12023	9093	9907
Total Water Usage (2018)						135,352

**19mppa water usage based on 2018 annual passenger throughput of 16,581,850 from Table 1.23 of IDOM Report (July 2019)*

The data in table 3.2 showing the estimated volumetric water consumption by the airport terminal due to 19mppa was sent to Affinity Water as a pre-development enquiry for modelling assessment of their supply capacity. Similar to the foul network, there will be no increase in the peak instantaneous flow provided maximum passenger throughput is capped. Affinity Water have confirmed their network will be able to deal with the increase in volume in an email dated 20th December 2019 which states that '*The model suggests that Luton Airport under the different scenarios will cause little impact in terms of pressures or Reservoir levels. Crescent Road sources do not exceed their abstraction license of 29 Ml/d.'* The email response can be found in Appendix G.

4. Conclusions

The Luton airport on-site drainage and water supply networks have been assessed as capable of accommodating the proposal to increase passenger numbers to 19mppa without the need for any further infrastructure or reinforcement.

There will be no increase in peak foul flow rate to the Thames Water network at Frank Lester Way as the forward fixed flow rate of Gate 9 and Pegasus pumping stations will not be altered. Assurances have been made by LLAOL that additional passengers will be accommodated during periods that will not cause an increase in the peak passenger throughput permitted for 18mppa and it is intended that this will be secured by way of a condition. Therefore, there should be no increase in the peak foul discharge via gravity flow south from the terminal to Airport Way Thames Water connection points.

There will, however, likely be an increase in the annual volume of foul effluent discharged to the Thames Water network. This larger volume will be discharged to the networks at Frank Lester Way and Airport Way, ultimately being treated at the East Hyde sewer treatment works (STW). Thames Water undertook a pre-development enquiry assessment of the increased volume which will be discharged to their network across a 19mppa year. A positive letter of acceptance was received by Wood plc on the 2nd October 2019 with the condition that there will be no increase in infrastructure, connection points or peak flow rate due to 19mppa.

Contaminated surface water volume and flow rates should not increase as a result of increasing the capacity to 19mppa as they are a direct product of rainfall rates. However, glycol concentration may increase by a nominal amount due to a small increase in air traffic movements. The effect of this, however, is expected to be minimal due to LLAOL's commitment to improvements being made with the use of de-icing pads, forced air and a reduction in chemical concentrations along with an effort to accommodate additional aircrafts during days when temperatures are likely to be above freezing. Currently plans are underway to reduce current BOD loads due to De-icing via various on-site/ off-site strategies including a detect & divert system to be put in place. This shall assist in reduction of current contaminant flows via more efficient segregation and only run-off from at-risk areas being intercepted and diverted to treatment, thereby creating capacity in the existing systems for the required demands. These operational improvements have been agreed with Thames Water during a meeting on the 25th July 2020.

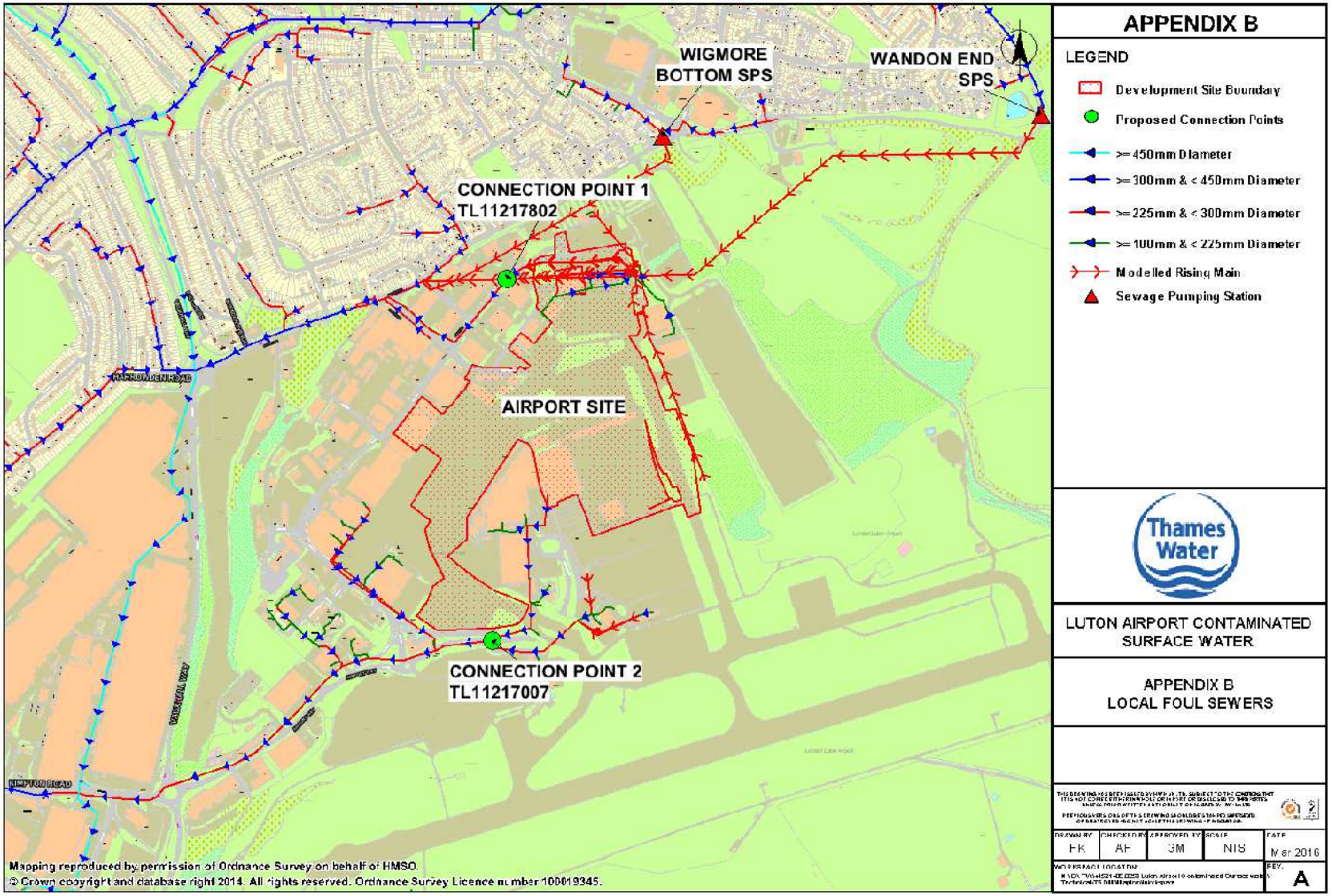
There is likely to be an increase in demand for volume of water from the network due to an additional 1mppa. However, there should not be any increase in the instantaneous peak flow required as LLAOL will restrict the peak passenger throughput to that permitted within 18mppa. The estimated volumetric water demand has been based on figures from 2018 for 16.58 million passengers increased by 14.5% to give estimated volume required across a year at 19mppa. These figures were submitted to Affinity Water for assessment relating to the three meters associated with supply of the terminal. Affinity Water confirmed their network will be able to deal with the increase in volume in on the 20th December 2019 (Appendix G) and no further concerns are noted.

Appendix A
Foul Water Network

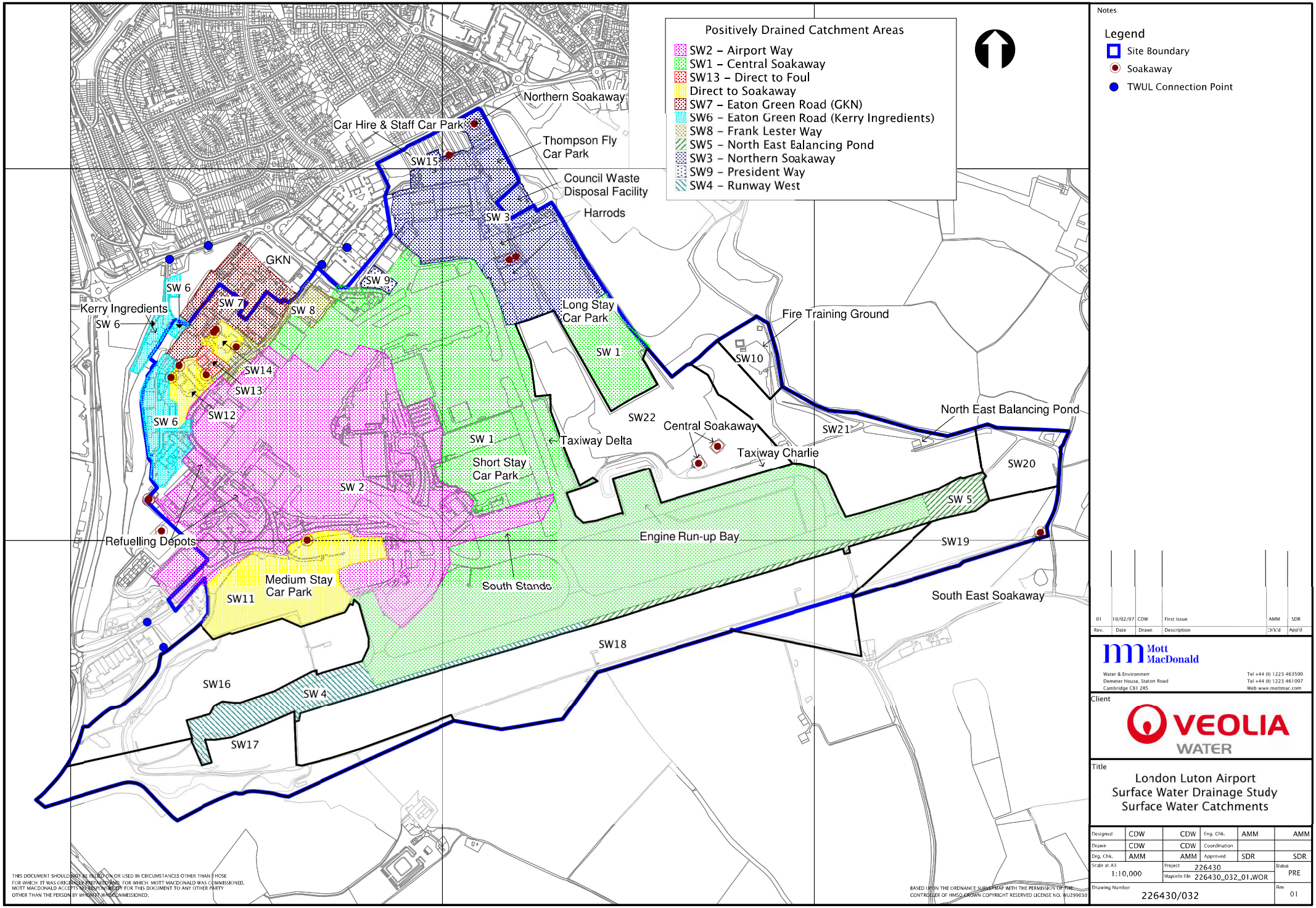
London Luton Airport - Foul Water Network

Appendix B
Local Foul Sewer Network

Appendix B – Local Sewers



Appendix C
Surface Water Catchment Areas



Notes

Legend

- Site Boundary
- Soakaway
- TWUL Connection Point

Rev.	Date	Drawn	Description	Ch'k'd	App'd
01	10/02/07	CDW	First Issue	AMM	SDR

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Demeter House, Staton Road
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Tel +44 (0) 1223 461007
Web www.mottmac.com

Client: VEOLIA WATER

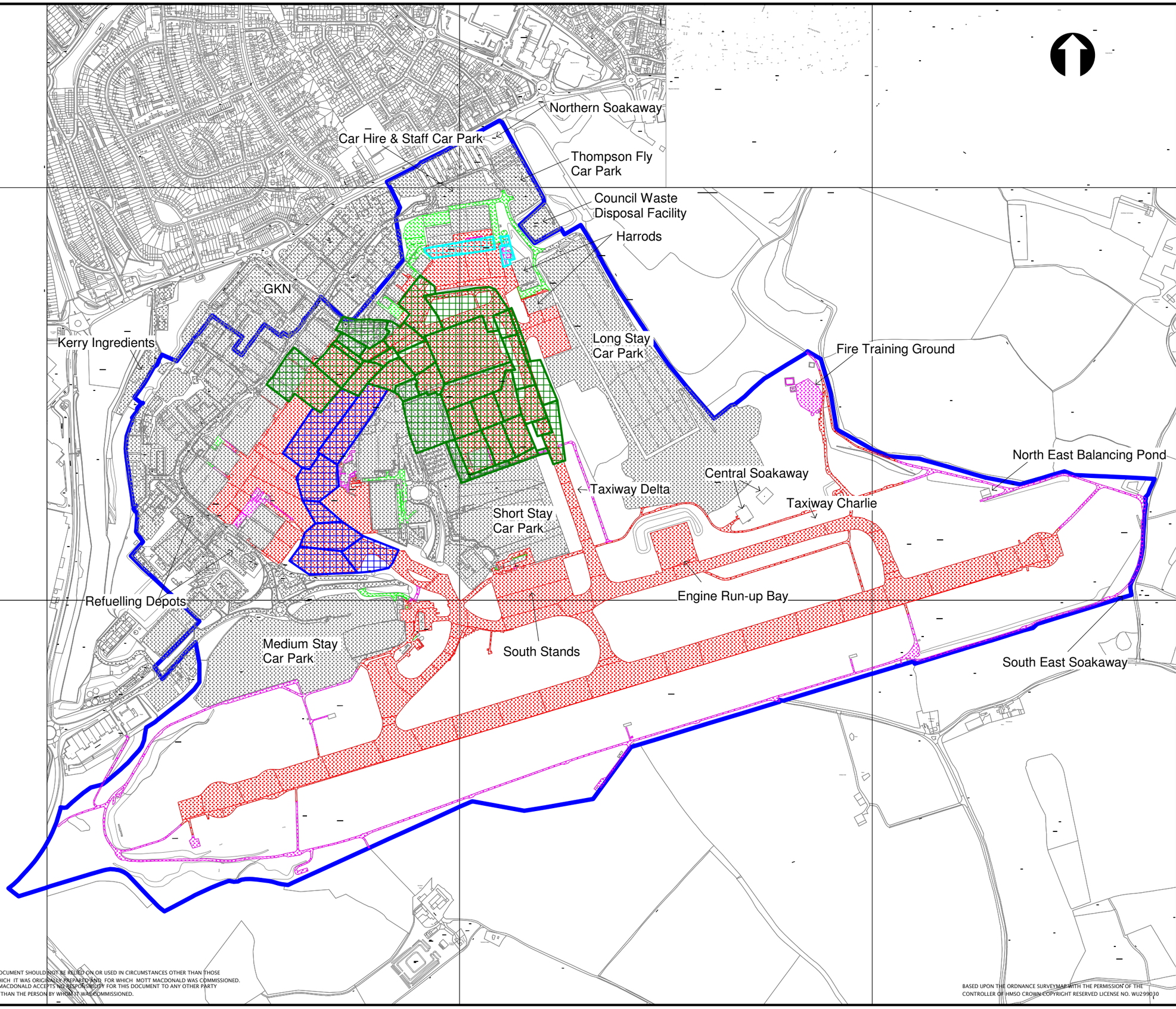
Title

London Luton Airport
Surface Water Drainage Study
Surface Water Catchments

Designed	CDW	CDW	Eng. Chk.	AMM	AMM
Drawn	CDW	CDW	Coordination		
Dsg. Chk.	AMM	AMM	Approved	SDR	SDR

Scale at A3: 1:10,000
Project: 226430
Mapinfo file: 226430_032_01.WOR
Status: PRE
Drawing Number: 226430/032
Rev: 01

Appendix D
First Flush Catchments



Notes

1. Harrods PS and storm tank may operate as first flush system. To be confirmed when PS is operational and fully surveyed.

Legend

Site Boundary

First Flush Systems

- Airport Way First Flush
- Central Soakaway First Flush
- Northern Soakaway First Flush

Risk of De-Icing Contamination

- High
- Low
- Medium
- None

FOR INFORMATION ONLY - TO BE USED IN CONJUNCTION WITH REPORT NR. 226430/OD/11

Rev.	Date	Drawn	Description	Ch'k'd	App'd
02	30/09/07	CDW	Third Issue	AMM	SR
01	30/08/07	CDW	Second Issue	AMM	SR
00	11/06/07	CDW	First Issue	AMM	IA

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Client

VEOLIA WATER

Title

London Luton Airport
Surface Water Drainage Study
First Flush Systems

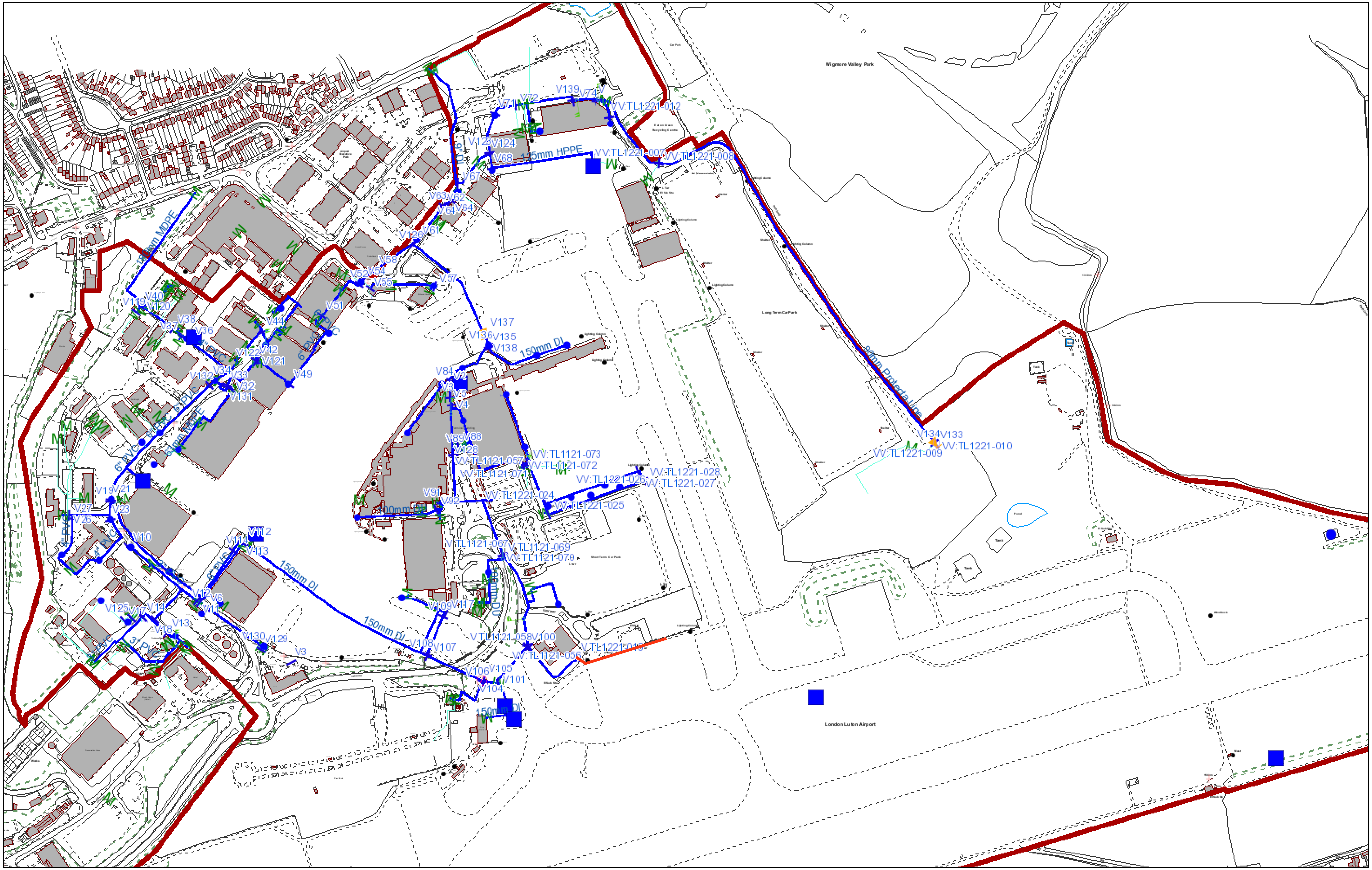
Designed	CDW	CDW	Eng. Chk.	AMM	AMM
Drawn	CDW	CDW	Coordination		
Drg. Chk.	AMM	AMM	Approved	IA	IA
Scale at A3 NTS		Project 226430			Status PRE
		Mapinfo file 226430_021_02.WOR			
Drawing Number 226430/021					Rev 02

Appendix E
Potable Water Network

LLA Potable Network August 2018

N

1:5,659



(24/08/2018)

Appendix F
Thames Water Foul Network Modelling Pre-Development Enquiry Response

Mr Sam Davy
WOOD PLC, REDCLIFF QUAY
120 REDCLIFF STREET
BRISTOL
BS1 6HU

Wastewater pre-planning
Our ref DS6064882

02 Oct. 19

Pre-planning enquiry: Confirmation of sufficient capacity

Dear Mr Davy

Thank you for providing information on your development at **London Luton Airport, Airport Way, Luton, LU2 9LY.**

Proposal for an extra 1 million passengers throughput per annum. No associated infrastructure development including drainage systems, buildings, facilities, impermeable surfaces, fixtures or fittings envisage.

We have completed the assessment of the foul water flows based on the information submitted in your application with the purpose of assessing sewer capacity within the existing Thames Water sewer network.

Thames Water do not envisage concerns with the proposed development site based upon the following key assumptions; peak discharge rates, location and number of sewer connections remain as existing.

Please note

Applicants should contact Trade Effluent, to discuss trade effluent consent and conditions of discharge. A Trade Effluent reference number should be obtained and included in the relevant box of the attached application form. The address for Trade Effluent is - Thames Water Utilities Limited, Waste Water Quality, Crossness Sewage Treatment Works, Belvedere Road, Abbeywood, London. SE2 9AQ. Alternatively you can telephone them on 0203 577 9200.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

You'll need to keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient capacity.

What happens next?

Please make sure you submit your connection application, giving us at least 21 days' notice of the date you wish to make your new connection/s.

If you've any further questions, please contact me on 0203 577 8082.

Yours sincerely

Artur Jaroma

Thames Water

Appendix G
Affinity Water Network Modelling Pre-Development Enquiry Response

Davy, Sam

From: Affinity Water Developer Services <aw_developerservices@affinitywater.co.uk>
Sent: 20 December 2019 08:25
To: Davy, Sam
Subject: Scheme - DS0028420

Dear Sam,

Please see below for the latest updates to Application DS0028420 - Pre-Planning Enquiry - London Luton Airport Ltd.

Response By E-mail (Luca.Smaldone) (20/12/2019 08:25)

Hi Sam,

Please see below the outcome of the model, it appears that our network will be able to deal with the increase in volume.

"This analysis considered the effect of the increase in volumetric demand at Luton Airport.

According to the developer's figures, it is anticipated that an increase to 19mppa (million passengers per annum) will give an increase of 14.45% in water usage (when compared to 2018 data), totalling 145,543m3 per year. These figures show that July 2018, had the highest demand of the year, 12,482m3 and due to increase to 14,303m3.

There were some discrepancies between the data that the developer has provided and the telemetry data. The developer states that 12.26 Ml was used in August 2018, however the telemetry data shows that, from both meters, in the same period, it was 21.9 Ml.

Due to the differing demand figures, different demand scenarios were tested to see if there were any significant impacts to the Hart Lane Reservoir hydraulic system.

The model suggests that Luton Airport under the different scenarios will cause little impact in terms of pressures or Reservoir levels. Crescent Road sources do not exceed their abstraction license of 29 Ml/d."

Many thanks,

Luca Smaldone