Table 2-3 Draft London Plan Maximum Office Parking Standards

Location	Maximum Parking Provision
Central Activities Zone and inner London	Car-free
Outer London Opportunity Areas	Up to 1 space per 600 sqm gross internal area (GIA)
Outer London	Up to 1 space per 100 sqm (GIA)
Outer London locations identified through a Development Plan Document where more generous standards apply	Up to 1 space per 50 sqm (GIA)

Maximum retail parking is shown in Table 2-4.

Table 2-4 Draft London Plan Retail Parking Standards

Location	Maximum Parking Provision
Central Activities Zone and all areas of PTAL 5-6	Car-free
Inner London, Outer London Opportunity Areas, Outer London retail below 500sqm	Up to 1 space per 75 sqm (GIA)
Rest of London	Up to 1 space per 50 sqm (GIA)

2.2.6 Hotel parking for locations with a PTAL of 0-3 are to be assessed on a case by case basis but consistent with the healthy streets approach.

Disabled Parking

2.2.7 Disabled parking standards have improved from the current London Plan to the Draft London Plan. Within the current London Plan it is stated that for residential developments "adequate parking spaces for disabled people must be provided preferably on-site." In comparison, within the Draft London Plan, it is stated that residential development proposals delivering ten or more units must, as a minimum, ensure that at least one designated disabled parking bay per dwelling for three per cent of dwellings is available from the outset. For future provision, it must be demonstrated how the remaining bays (to a total of one per dwelling for ten per cent of dwellings) can be requested to be altered to a designated disabled parking space in the future.

2.2.8 For non-residential developments, Table 2.5 shows the adopted London Plan's provision for office and retail workers from the outset and future provision.

2.2.9 Table 2.6 shows the Draft London Plan's provision for designated and enlarged disabled bays for office, retail and school developments.

Table 2-5 Current London Plan Non-Residential Disabled Parking

Building Type	Provision from the outset		Future Provision
	Number of spaces for employee who is a disabled motorist	Number of spaces for visiting disabled motorist	Number of enlarged standard spaces
Office	1 space	5% of the total capacity	A further 5% of the total capacity
Retail	1 space	6% of the total capacity	A further 4% of the total capacity

Table 2-6 Draft London Plan Non-Residential Disabled Parking

Building Type	Designated Bays (% of total parking provision)	Enlarged bays (% of total parking provision)
Office	5%	5%
Retail	6%	4%
School	5%	5%

Electric Vehicle Parking

2.2.10 Both the current and draft London Plan states that developments must provide infrastructure for electric or Ultra-Low Emission vehicles. At least 20 per cent of residential car parking spaces should have active charging facilities, with passive provision for all remaining spaces.

2.2.11 Within the current London plan it is also stated that for retail developments, 10 per cent of all spaces must be for electric vehicles with an additional 10 per cent passive provision for electric vehicles in the future. For employment, 20 per cent of all spaces must be for electric vehicles with an additional 10 per cent passive provision for electric vehicles in the future.

Minimum Cycle Parking Standards

2.2.12 With regards to short-stay cycle parking for residential units, the parking provision standards are the same. However, with regards to long-stay parking a higher provision of spaces is required.

2.2.13 Table 2.7 below displays the required number of cycle parking spaces for both the current and Draft New London Plan.

Table 2-7 Cycle Parking Standards Comparison

Length of Stay	Current London Plan	Draft New London Plan
Long Stay	1 space per studio and 1 bedroom unit 2 spaces per all other dwellings	1 space per studio, 1.5 spaces per 1 bedroom unit, 2 spaces per all other dwellings
Short Stay	1 space per 40 units	1 space per 40 units

2.3 The Mayor's Transport Strategy 2018

2.3.1 Within the previous TA, the Mayor's Transport strategy was under consultation, the strategy was adopted in 2018. The strategy places an emphasis on healthy streets and promoting sustainable travel.

2.3.2 The three main themes include:

- 'Healthy streets and healthy people' is about creating streets and routes that encourage walking, cycling and public transport. Local streets and neighbourhoods will be designed to make them pleasant places for people to walk, cycle, and use public transport. Reducing road danger will make people feel safer and more comfortable walking and cycling. A shift away from car use will help London's streets work more efficiently and reduce congestion.
- 'A good public transport experience' ensures that public transport is the most efficient way for people to travel distances that are too long to walk or cycle.
- 'New homes and jobs' ensuring that people live and work in well-connected places and transport plays a key role in delivering this. 'Good growth' will provide more opportunities, deliver affordable homes and improve the quality of life. People should be able to live in areas where many of the places they want to go to are within walking and cycling distance, and good public transport connections are available for longer trips.

2.3.3 The development has been designed with this policy document in mind. Cycle parking has been provided in line with standards, the development is to be mostly car free at surface level, particularly in the eastern portion of the site. Additionally, off site works are focusing on providing for pedestrians and cyclists through additional crossings and a 20mph zone. Healthy Streets Audits have also been completed for Chalkers Corner and Lower Richmond Road.

2.4 Local Plan

LBRuT Local Plan 2018

2.4.1 Within the previous TA, the policy section referred to the emerging local plan 2018. Since then the Local Plan has been adopted. The plan sets out a strategic vision in shaping the borough's future. The plan recognises that cars will still be significant within the borough's future, however improvements to the public transport network and interchanges will aim to encourage residents and visitors to use more sustainable transport modes.

2.4.2 Within the plan, Policy LP 44 - Sustainable Travel Choices states that the Council will work in partnership to promote safe, sustainable and accessible transport solutions. In terms of walking and Cycling the Council "will ensure that new development is designed to maximise permeability within and to the immediate vicinity of the development site through the of provision of safe and convenient walking and cycling routes, and to provide opportunities for

walking and cycling, including through the provision of links and enhancements to existing networks"

2.4.3 Paragraph 11.14 states that developments should "encourage the use of modes other than the car by making it as easy as possible through provision of good pedestrian facilities, clear layout and signage, provision of cycling facilities and improving access to public transport interchanges".

2.4.4 The document also provides updated parking standards. These no longer identify CPZ's as a differentiator but instead relate parking requirements to the PTAL. For areas such as Mortlake, with a PTAL of less than 3, the proposed maximum residential parking is for 1 space for 1 and 2 bed units and for 2 spaces for units with 3 or more beds. For non-residential uses the parking standards generally defer to the London Plan rather than a specific LBRuT standard.

2.5 Summary

2.5.1 The above summarises any change in policy documented since the previous submission. It highlights how the development may be impacted by this and sets out any standards that this application will now be subject to. The key implications of this are the increase in the number of cycle parking spaces and a new focus on London Plan non-residential standards for car parking as opposed to LBRuT standards.

3 Key Stakeholder Update

3.1 Overview

3.1.1 This chapter sets out the correspondence and comments provided by key stakeholders since the planning applications were submitted in February 2018. The chapter includes correspondence between LBRuT, TfL and Network Rail.

3.2 LBRuT

3.2.1 Clarifications were sought by LBRuT over a number of issues. These have been addressed through a series of emails and a meeting with LBRuT. The Borough had sought clarification and raised comments on several issues including:

- Chalkers Corner
- Sheen Lane level crossing
- School drop off
- School buses
- Trip Generation
- Adoption
- Car parking
- Construction management

3.2.2 The application for Chalkers Corner has since been deemed acceptable to TfL and to LBRuT as successfully mitigating the impact of the junction, but it has been noted that further modelling work will be required as part of the detailed design process.

3.2.3 Level crossing safety improvements have been agreed with Network Rail and these are deemed to provide sufficient benefit to improve the crossing.

3.2.4 Clarification was sought over where school drop off would take place and to ensure that school buses would be able to access the site, should the safeguarded land for a bus stand not be taken up. Drop off is to be accommodated where appropriate within the site. Drawing 38262/5501/69H in Appendix A demonstrates how buses can travel through the site without the need for the bus stand.

3.3 TfL

3.3.1 TfL provided comments to the application on the 21st May 2018, which were responded to on 13th July 2018. Since the application TfL correspondence has related to:

- Chalkers Corner
- Healthy Streets Assessments
- Strategic Modelling
- Cycle Parking

- Bus Strategy

3.3.2 Through this communication, TfL have supported the Chalkers Corner scheme and approved the Healthy Streets Assessment carried out on the existing and proposed junction. This includes sign off on both the strategic models and local Linsig models.

3.3.3 TfL also requested that cycle parking be provided in line with the Draft London Plan standards which has been achieved. In addition, the bus strategy for the site including costs were agreed, including the safeguarding of the area to the southwest of the site for a bus turnaround/stand facility.

3.4 Network Rail

3.4.1 A series of potential measures have been agreed with Network Rail in relation to the improvement of Mortlake Level Crossing on Sheen Lane. These potential measures were agreed subsequent to several meetings including with LBRuT, Network Rail and the local MP. Whilst it was not found that the development would have an adverse effect on the level crossing, a series of proposed measures were agreed in order to improve the existing problems at the crossing. These proposed measures are shown on Drawing 38262/5501/95B in Appendix B and included:

- Additional bridge signage
- General improvements to the pedestrian bridge
- Moving bollards back on both North and South Worple Way
- Setting back vehicle stop lines
- Improvements to Sheen Lane (as per the original development proposals).

3.4.2 Other improvements were discussed, including the widening of footways and the possibility of countdown timers to aid vehicles with route decision making. Both of these measures were designed with reducing conflict with pedestrians and vehicles in mind but were both dismissed by Network Rail and have been removed from the proposed measures.

4 Scheme Update

4.1 Overview

4.1.1 This chapter sets out the details of any changes made to the development proposals since the submission of the original Transport Assessment dated February 2018 as a result of policy changes and comments from the relevant stakeholders as suggested in Chapter 3.

4.2 Key Changes

4.2.1 Whilst the overall design of the development and the key principles have remained the same there have been changes to the land use schedule. Access to the development has remained the same with basement car parks providing both vehicle and long stay cycle parking. The eastern or detailed section of the development remains car free at the surface level with only refuse and delivery and servicing vehicles permitted.

4.2.2 The school is still accessed via Lower Richmond Road with coach parking bays provided outside the school. No formal drop off parking spaces are provided but delivery and servicing vehicles are permitted to use the school bus parking areas outside of the school drop off and pick up periods.

Land Use Schedule

4.2.3 Changes have been made to the land use schedule with a reduction of residential units and a change in the mix within the detailed application section of the site from that reported in the original TA. There is a reduction of 4 residential units and a change in the make up of number of bedrooms within each unit.

4.2.4 The table below demonstrates the change in number of units.

Table 4-1 Changes to Residential Unit Numbers (detailed application only)

Total Residential units	1 Bed	2 Bed	3 Bed	4 Bed	Total
Original TA	65	232	138	8	**443**
TA Addendum	50	244	130	15	**439**

4.2.5 As there has been a reduction in the number of units, no changes are to be made to the external road network assessment work within the original Transport Assessment. As the number of units has decreased it is considered that the existing assessment work now reflects a worst-case assessment and that the existing conclusions still stand.

4.2.6 The changes in the land use schedule have also resulted in minor changes to the non-residential floor areas, including an increase of 22sqm GIA in relation to the flexible uses and a decrease of 40sqm in relation to the office use. The total flexible use floor area despite increasing remains smaller than the 4,819sqm used in the original trip generation assessment. A larger figure was used to build in some resilience for the fact the land use is a flexible use. The office space, as stated decreases, and is also smaller than the floor areas assessed within the trip generation assessment. As such the assessment included in the previous TA

are still valid and represent a worst-case scenario, with no need for any further analysis to be undertaken.

Cycle Parking

4.2.7 This change in residential unit numbers results in the following number of cycle parking numbers now required by the development. These are also altered by the need to comply with the draft London Plan standards as opposed to the current London Plan. The new proposed cycle parking numbers are shown in Table 4-2. This is an increase from the previous TA mainly attributed to changes in the number of bedrooms within the residential units.

Table 4-2 Updated Cycle Parking Numbers

Land Use	Floor Area (GIA) / No. of Units	GEA	New Parking Numbers	
			Long Stay	Short Stay
Detailed Application				
Residential				
Residential	443 units		853	11
Non-Residential				
Office	2417	2634	35	5
Cinema	370 seats and 14 staff	2548	2	12
Gym	740m2 and 11 staff	932	2	9
Hotel	16 rooms	1863	1	1
Totals		**7441**	**40**	**27**
Flexible Uses				
Retail	1259	1438	8	38
Office	2000	2284	27	5
Restaurant	959	1095	5	48
Community Space	468	534	1	6
Totals	4686	5351	41	97
Total Detailed Application			**934**	**134**
Outline Application				
Residential	225 Units		433	6

Land Use	Floor Area (GIA) / No. of Units	GEA	New Parking Numbers	
			Long Stay	Short Stay
Residential/Assisted Living	150 units		225	4
Care Home	70 beds and 24 staff		5	4
Total			**663**	**14**
School				
School	1260 pupils 60 staff		165	13
Overall Total			**1762**	**162**

Vehicle Parking

4.2.8 As a result of the changes to the land use schedule, there are not anticipated to be any changes to the number of parking spaces, and they remain in line with both current and draft London Plan standards. There is however now a 20% active provision of electric charging points to be provided, with 100% passive provision. Disabled parking spaces are also provided in line with the draft London Plan.

4.3 Summary

4.3.1 In summary there has been an overall reduction in the number of residential units within the site as a result of design changes. All access and vehicle parking numbers remain as they were proposed in the submitted TA, dated February 2018 (planning refs: 18/0547/FUL,18/0548/FUL, 18/0549/FUL). Cycle parking numbers have been increased in order to meet Draft London Plan standards. As such there is no material change to the development from a transport perspective and therefore no changes to the assessment is proposed.

5 Summary and Conclusion

5.1 Summary

5.1.1 In summary of this Transport Assessment Addendum, there have been several changes made to policies and development proposals since the submission of the three applications which have been detailed above.

5.1.2 Policy changes are as a result of the move to adopt standards from the Draft London Plan. The emerging local plan for Richmond described in the original Transport Assessment has also since been adopted.

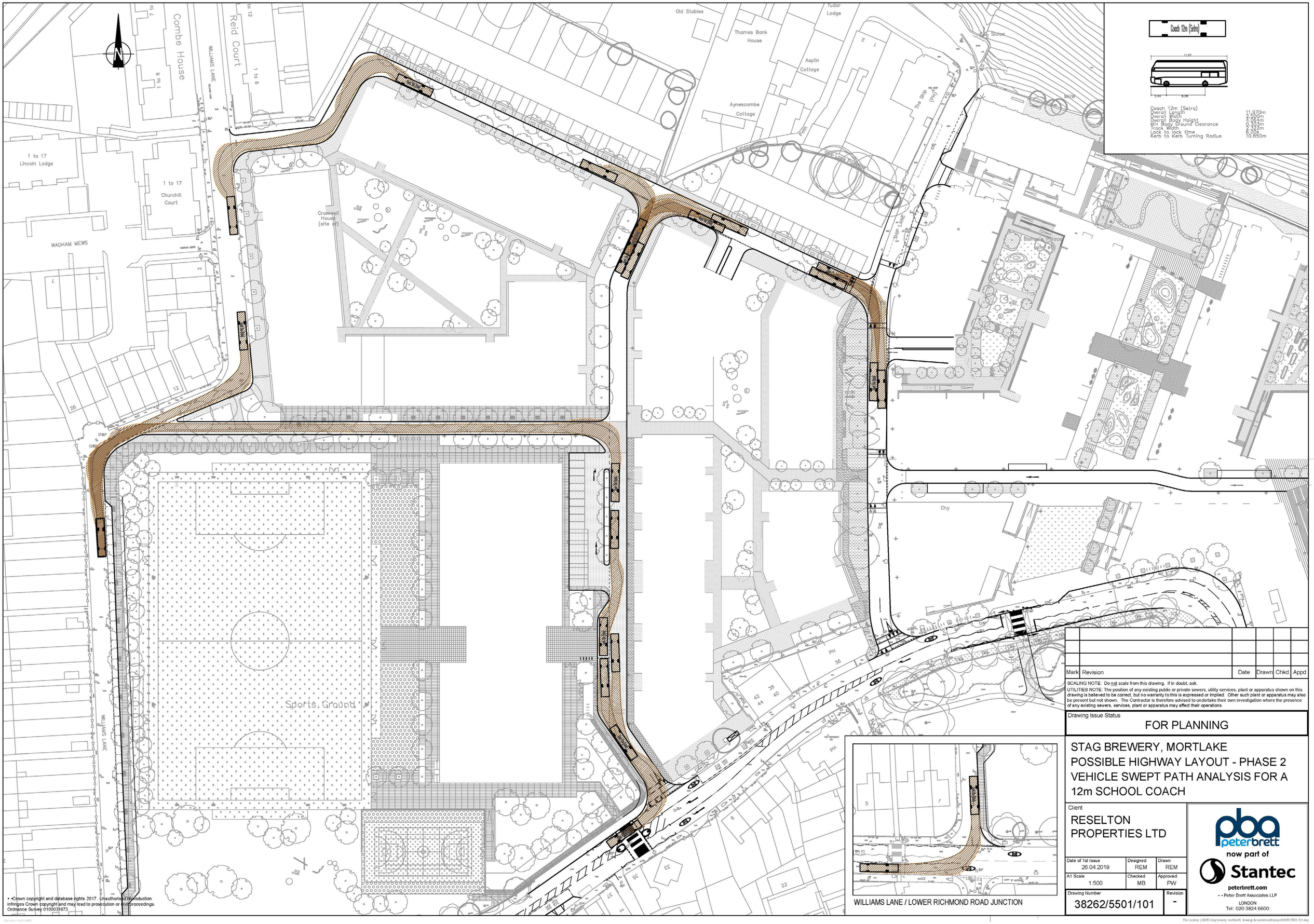
5.1.3 The development proposals have changed, with the number of residential units reducing by four. As a result of this, all assessment work has been retained as the original assessment now represents a worst case.

5.1.4 Several stakeholders have been consulted since the application has been submitted with responses provided to queries from TfL and LBRuT. Further dialogue has also taken place with Network Rail.

5.2 Conclusion

5.2.1 Based on the above summary it is concluded that there is no material change to the development under planning applications refs: 18/0547/FUL,18/0548/FUL, 18/0549/FUL, from a transport perspective and that any assessments carried out present a worst-case assessment. Therefore, any conclusions drawn in the original TA dated February 2018 still stand within this addendum.

Appendix A 38262/5501/101 – Bus Access & Circulation



Mark	Revision	Date	Drawn	Chkd	Appd

SCALING NOTE: Do not scale from this drawing. If in doubt, ask.

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Drawing Issue Status

FOR PLANNING

STAG BREWERY, MORTLAKE
POSSIBLE HIGHWAY LAYOUT - PHASE 2
VEHICLE SWEPT PATH ANALYSIS FOR A 12m SCHOOL COACH

Client

RESELTON PROPERTIES LTD

Date of 1st Issue	Designed	Drawn
26.04.2019	REM	REM
A1 Scale	Checked	Approved
1:500	MB	PW

Drawing Number: 38262/5501/101

Revision: -

pba peterbrett now part of Stantec

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Peter Brett Associates LLP

LONDON

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Appendix B 38262/5501/95B – Level Crossing Improvements

Existing Zebra crossing to have surface raised

Additional bridge signage to indicate alternative route for pedestrians to use footbridge rather than wait for barriers

General improvements to pedestrian bridge

Possible option to set back stop lines to create advance areas for cyclists

Move bollards back to provide an increased area for pedestrians to wait whilst the barriers are down. Widen footways over the level crossing and provide enhanced paving

Sea Scouts Centre

Girl Guides Centre

Scout Hut

Information Bureau

Nursery

Garage

Timber Yard

Mark	Revision	Date	Drawn	Chkd	Appd
B	Revised following Gillespies comments of 26.09.2018	27.09.18	REM	RAP	RAP
A	Extent of improvements revised	20.09.18	REM	RAP	RAP

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Drawing Issue Status

DRAFT FOR COMMENT

STAG BREWERY, MORTLAKE POSSIBLE SHEEN LANE AND LEVEL CROSSING IMPROVEMENTS

Client

RESELTON PROPERTIES LTD

Date of 1st Issue	Designed	Drawn
19.09.2018	REM	REM
A3 Scale	Checked	Approved
1:500	RAP	RAP
Drawing Number		Revision
38262/5501/095		B

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B. Noise Summary Note – Additional Information

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Stag Brewery - Chalkers Corner

Noise Summary Note - Additional Information

Date: 30 August 2018

Client Name: Reselton Properties Ltd

Document Reference: WIE10667-103-TN-1.1.1-Noise Summary Note

This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015 and BS OHSAS 18001:2007)

Issue	Prepared by	Checked & Approved by
001	Innes Urbanski Associate	Mark Maclagan Technical Director

1. Introduction

This Technical Note presents the additional information requested by Environmental Health of LBRuT at the Environmental Matters Meeting held at LBRuT offices on Friday 15th June 2018. This is additional information to that contained within the EHO Clarification Response Document, reference WIE10667-103-R.1.2.2 EHO Clarification Response, dated June 2018.

In summary, the points covered are:

- Breakdown of noise calculations for change in Road Traffic Noise at Chalkers corner as a result of the proposed junction changes;
- Predicted change in the L_{Amax} value; and
- Generic mitigation options to reduce noise impact from MUGA usage.

2. Road Traffic Noise Chalkers Corner

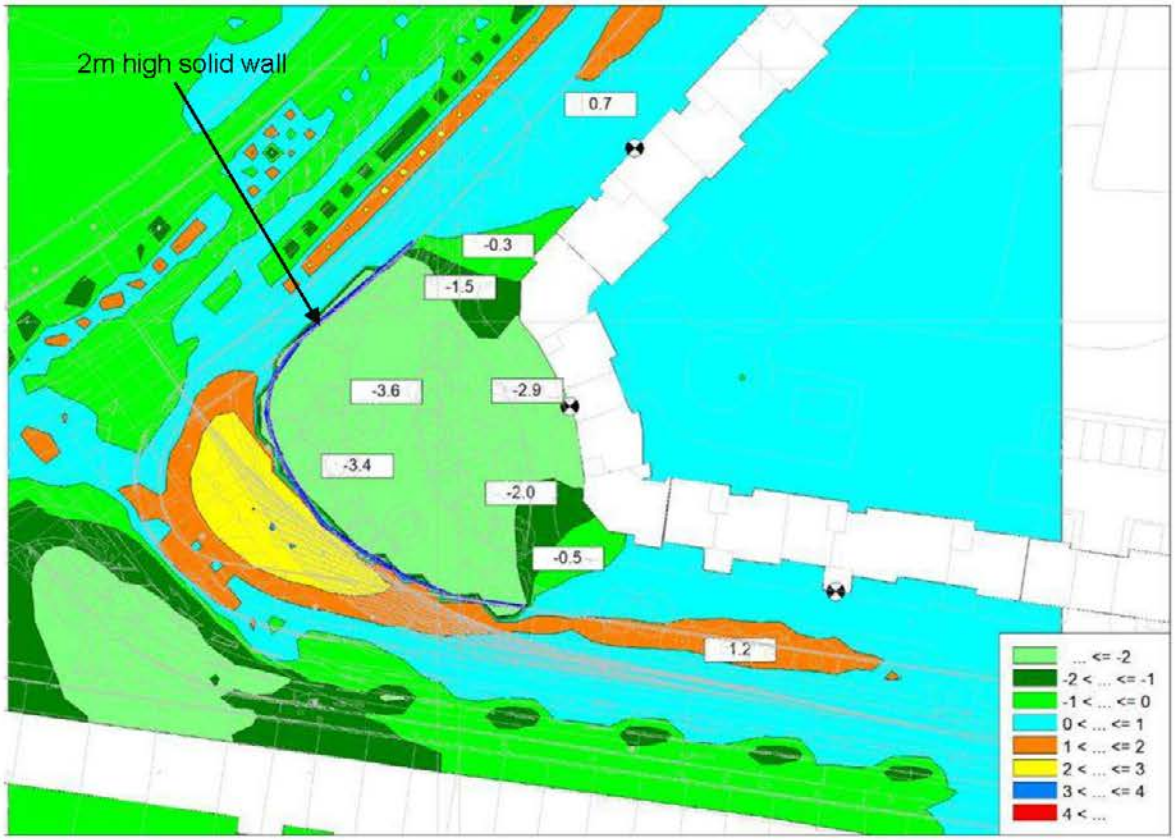
The Road Traffic Noise Assessment of Chalkers Corner presented within the ES was undertaken using the calculation methodology of The Calculation of Road Traffic Noise[1] and significance criteria of DMRB[2], which is the industry standard approach. The calculations use the 18-hr Average Annual Weekday Traffic (AAWT) flow, % HGV composition and average or speed limit vehicle speed for each road link. The calculation parameters are as presented in Appendix 9.4 of the ES. The predicted change in Road Traffic Noise at Chalkers Corner was less than +1dB and therefore in accordance with the industry standard is insignificant. The proposed landscaping which includes a 2m solid wall at Chalkers Corner was not included within the calculations presented in the ES.

Subsequent to the Environmental Matters Meeting Cadna-A noise modelling software has been used to develop two 3-dimentional noise models of Chalkers Corner, one without Development and one with the Development including proposed junction changes, and the proposed 2m high solid wall, to provide a more detailed assessment of the predicted change in Road Traffic Noise as a result of the Development. The road alignment and traffic data input parameters for the year 2027, are as provided by Peter Brett and Associates, the transport engineers and are appended to this Briefing Note. Figure 1 presents the predicted change in noise level contour plot at 1.5m above ground level

[1] DoT. (1988). The Calculation of Road Traffic Noise. HMSO.
[2] The Highways Agency. (Nov 2011). Design Manual for Roads and Bridges, Vol 11, Section 2, Part 7 Noise and Vibration.

(with Development RTN minus no Development RTN). A negative number indicates a predicted decrease in noise level (green colour). A predicted change in RTN of between zero and less than 1dB is illustrated in light blue. Predicted increase in noise levels are illustrated by orange, yellow and dark blue.

Figure 1: Predicted Change in Road Traffic Noise Level Chalkers Corner (1.5m agl)



A change in environmental noise of 3dB is generally accepted as being just perceptible. On this basis the predicted results indicate that although a decrease in noise is predicted at Chalkers Corner façade as a result of the Development, it is only likely to be just discernerible at some locations.

The predicted change in RTN façade noise levels at Chertsey Court are presented in Table 1.

Table 1: Predicted Change in Road Traffic Noise Level With Development (including 2m high wall)

Chertsey Court Façade Location	Predicted RTN dB 2027 – no development (dB $L_{A10, 18\ hour}$)			Predicted Change in RTN proposed development (including 2m wall)		
	CC	LRR	CA	CC	LRR	CC
Ground	65.4	68.2	70.2	-3.5	+0.6	+0.4
1st Floor	66.7	69.0	71.2	-2.6	+0.7	+0.4
2nd Floor	67.2	69.4	71.5	-1.2	+0.6	+0.4
3rd Floor	67.5	69.2	71.5	-0.3	+0.6	+0.3

Note: CC – Chalkers Corner Façade; LRR – Lower Richmond Road Façade; CA – Clifford Avenue Facade

The predicted change in RTN levels presented as Table 1 as a result of the Development when compared to the without Development are predominantly insignificant with some beneficial effects on the CC façade.

3. L_{Amax} Levels

Although not normally considered when undertaking a road traffic noise assessment, LBRuT have requested information on how L_{Amax} levels would change with reduction in distance of roads to Chertsey Court.

The L_{Amax} parameter is treated as a point source, hence the noise level would decrease by 6dB per doubling of distance, compared with 3dB for road traffic noise, which is treated as a line source. On this basis, reduction in distance of Lower Richmond Road to Chertsey Court at Chalkers Corner from 16.2m to 14.0m is predicted to result in a 1.3dB increase in the L_{Amax} noise level. Reduction in distance of Clifford Avenue to Chertsey Court at Chalkers Corner from 18.3m to 16.2m is predicted to result in a 1.1dB increase in the L_{Amax} noise level. A change in noise of this level is not normally discernible.

With provision of mitigation in the form of the 2m high solid wall, the predicted increase would be off-set / reduced.

4. Generic Mitigation Options MUGA/AGP

The predicted noise impact from usage of MUGA/AGP ranged from insignificant to intermittent moderate adverse. The assessment assumed both would be used continuously and simultaneously with no account taken of screening provided by intervening structures or topography. On this basis the predicted noise levels and potential impacts are expected be lower than reported within the ES. Furthermore, noise impacts would be controlled through careful management of their use together with restriction in operational hours.

Notwithstanding the conclusions above, there are a number of engineered solutions as well as operational solutions, that could be considered to further reduce the potential impact from MUGA/AGP usage. With regard to engineered solutions the following could be considered:

- Perforated sheet metal or weld mesh to reduce rattle and ball impact noise;
- Inclusion of anti-vibration (AV) bushing for fixing fence panels to supports, to acoustically dampen the panels and reduce structure borne noise transmission;
- Acoustic grade timber fence with sufficient mass (15kg/m^2) or barrier made from transparent/opaque plastic material where visual amenity is an important consideration.

Implementation of a maintenance scheme would prevent deterioration in performance that could result from damaged panels, loose brackets, worn AV bushing and squeaky gates.

The following examples or comparable systems are provided for information only and are not a direct recommendation:

https://www.externalworksindex.co.uk/entry/33542/Gramm-Barrier-Systems/NaturalSoundBlok-Timber-soundreflective-barriers/

https://www.externalworksindex.co.uk/entry/33548/Gramm-Barrier-Systems/GRAMM-transparent-noise-barriers/#

PBA Traffic Data Used In Noise Model of Chalkers Corner

				2027 DM			2027 DS	
Road Link		mph	kph	AAWT	%HGVs		AAWT	%HGVs
A316 Clifford Ave	NB	40.4	64.6	19320	10.8		19492	10.8
	SB	39.7	63.5	17480	9.3		17807	9.2
A316 Lower Richmond Road	WB	30	48.0	19154	5.5		19459	5.5
	EB	30	48.0	21171	6.5		21458	6.4
A3003 Lower Richmond Road (Watney's Sports Ground)	WB	27.1	43.3	9781	8.8		10450	8.5
	EB	29.8	47.7	10496	9.1		11253	8.8

C. Air Quality Monitoring Data

Stag Brewery

Air Quality Monitoring Report

January 2019

Waterman Infrastructure & Environment Limited
Pickfords Wharf, Clink Street, London SE1 9DG, United Kingdom
www.watermangroup.com

Client Name:	Reselton Properties Limited
Document Reference:	WIE10667-104-AQMR-1-1-1
Project Number:	WIE10667-104

Quality Assurance – Approval Status

This document has been prepared and checked in accordance with Waterman Group's IMS (BS EN ISO 9001: 2008, BS EN ISO 14001: 2004 and BS OHSAS 18001:2007)

Issue	Date	Prepared by	Checked by	Approved by
Issue	January 2019	Andy Fowler Senior Consultant	Guido Pellizzaro Associate Director	Guido Pellizzaro Associate Director

Comments

Comments

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Contents

Figures

Tables

Appendices

1. Introduction

1.1. A short-term air quality monitoring study for nitrogen dioxide (NO_2) was undertaken around Chertsey Court, Chalkers Corner in the London Borough of Richmond Upon Thames (LBRuT) (hereafter referred to as the 'Site').

1.2. The NO_2 diffusion tube monitoring study was undertaken by Waterman Infrastructure & Environment Limited ('Waterman IE') for a 6-month period, from July 2018 to January 2019. NO_2 monitoring was completed at eight locations around the Site, and at a further two monitoring locations at the approximate location of the proposed school to be introduced as part of the redevelopment proposals of the Stag Brewery development. The 10 monitoring locations are shown on **Figure 1**.

1.3. The monitoring locations were chosen to:

- Determine NO_2 concentrations at the façade of Chertsey Court to determine relevant residential exposure to traffic emissions;
- Ascertain whether NO_2 concentrations fall-off with distance from the roadside to the façade of Chertsey Court;
- Evaluate the effect of the existing landscaping at Chertsey Court on traffic emissions and thus NO_2 concentrations; and
- Ascertain the baseline conditions for the proposed school.

2. Methodology

2.1. In May 2016, Defra published the London Local Air Quality Management Technical Guidance (LLAQM.TG(16))[1] which sets out the approach to reviewing and assessing local air quality in the UK. The methodology, and processing of the results, of this monitoring are in accordance with LLAQM.TG(16).

2.2. The air quality monitoring study was undertaken for a six-month period from 9th July 2018 to 3rd January 2019 and consisted of deploying two NO_2 diffusion tubes at each of the 10 locations as shown in **Figure 1**.

2.3. At Chalkers Corner, the monitors were located on existing street furniture away from the road to form three transects (see **Figure 1**). This included:

- Three monitors at the kerbside of Chalkers Corner, located on traffic signage (IDs DT1; DT4 and DT6);
- Two monitors at the roadside of Chalkers Corner, located on the existing metal railings of Chertsey Court and facing the road (IDs DT2 and DT7);
- One monitor located in the carpark of Chertsey Court (ID DT5), located on existing signage; and
- Two monitors located on the façade of Chertsey Court on drain pipes, representative of concentrations residential users of Chertsey Court would be exposed to (ID DT3 and DT8).

2.4. The two school diffusion tubes were located on traffic signage in the carpark of the Stag Brewery Sports Club and are classified as roadside monitoring locations.

2.5. In addition to the monitoring at the Site, three tubes were deployed at the London Borough of Wandsworth (LBW) Putney automatic monitor (Grid Reference 524035, 175519) to evaluate the accuracy of the diffusion tubes (discussed further below under sub-heading 'Diffusion Tube Co-Location'). All diffusion tubes were changed monthly throughout the monitoring period, as per the guidance in LLAQM.TG(16).

2.6. The diffusion tubes were mounted approximately 2.0 metres (m) above ground level around the Site.

Diffusion Tubes

2.7. Diffusion tube monitoring is a method for screening the air quality in an area to give an indication of average air pollutant concentrations. The method consists of a tube with an appropriate absorbent material at one end, mounted on to street furniture. The preparation method used is 20% TEA (triethanolamine) in water and the tubes are exposed by removing the bottom cap to allow sampling.

2.8. Following the relevant exposure period, the cap is replaced, and the tube sent to a laboratory for analysis. For this study, the tubes were obtained from Gradko International Ltd (a UKAS Accredited laboratory) and, following exposure, were returned to Gradko for analysis.

Diffusion Tube Co-location

2.9. Diffusion tubes may systematically under or over-read NO_2 concentrations when compared to an automatic analyser. To improve accuracy, it is best practice to deploy duplicate / triplicate tubes specifically co-located with an automatic monitor to enable inter-comparison of monitored results

1 Defra, 2016, London Local Air Quality Management Technical Guidance LLAQM.(TG16)

and determine the 'bias' in diffusion tube results. This bias can then be corrected to improve the accuracy of the diffusion tube results, using a suitable bias-adjustment factor.

2.10. As part of the monitoring study, triplicate diffusion tubes were located at the LBW Putney automatic monitor to derive a local bias adjustment factor. This was the closest monitor to the Site with historic good data capture. A locally derived bias adjustment factor is more appropriate than using a national factor available from Defra[2] for the following reasons:

- The survey has not been carried out over a calendar year (the national factors have been determined on a calendar year basis); and
- NO_2 concentrations at the diffusion tube sites are significantly influenced by emissions from nearby roads. In accordance with existing diffusion tube guidance[3], the bias adjustment factors should be determined from co-location studies at similar monitoring locations.

2.11. The local bias spreadsheet tool, developed by Defra to help Local Authorities calculating precision, accuracy and bias adjustment factors[4], has been used to check the accuracy of the triplicate diffusion tubes with the Putney automatic monitor.

2.12. The spreadsheet provides a Coefficient of Variation (CV) of the diffusion tube results, which represents their precision and is an indicator of the overall performance of the diffusion tubes. Tube precision is separated into two categories, 'good' or 'poor'. Tubes are considered to have 'good' precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%, and the average CV of all monitoring periods is less than 10%. Tubes are considered to have 'poor' precision where the CV of four or more periods is greater than 20% and/or the average CV is greater than 10%.

2.13. A summary of the data from the co-location study is presented in **Table 1** and a copy of the precision and accuracy spreadsheet presented in **Appendix A.**

Table 1: Co-location Data at Putney

Site	Diffusion Tubes		Automatic Monitor	Bias Adjustment
	Period Mean	Tube Mean CV (% Precision)	Period Mean	
Putney	33	2	32	0.97

2.14. The average CV for the co-location is less than 10%, and as such shows 'good' precision, and therefore the bias adjustment factor of **0.97** been applied to the monitoring results.

Diffusion Tube Annualisation

2.15. The short-term (6-month) sampling period is sufficient to provide a reasonable assessment of existing air quality in an area, and is a recommended monitoring duration set out in LLAQM.TG(16). However, the 6-month monitoring period is not an exact equivalent of an annual (12-month) mean, which relates to the NO_2 annual mean Air Quality Strategy (AQS) objective for the protection of human health at sensitive locations (including residential properties).

2 http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html
3 Laxen and Marner for Defra, 2006. The relationship between diffusion tube bias and distance from the road.
4 www.airquality.co.uk/archive/laqm/tools.php

2.16. Following guidance in Defra's LLAQM.TG(16) (Box 4.8), a long-term (12-month) correlation can be calculated by using the relationship between the short-term (6-month) period against the long-term (12-month) period for other local monitors. This adjustment process is known as 'annualisation'.

2.17. According to LLAQM.TG(16), to derive an annual mean concentration for the Site; data from two to four nearby long-term monitoring sites, located at urban background locations are required. It is estimated that the distance between sites should not be larger than 50 miles (80km).

2.18. There are a number of urban background automatic monitoring stations in central London, from which the following four urban background monitoring locations were selected:

- North Kensington – Kensington & Chelsea, approximately 7.2km from the Site;
- Bloomsbury - Camden, approximately 11.9km from the Site;
- Norbury Manor – Croydon, approximately 12.2km from the Site; and
- Elephant and Castle - Southwark, approximately 12.4km from the Site.

2.19. The above automatic monitors form part of the London Air Quality Network (LAQN) and monitoring data is available for all monitors for the latest full year to January 2019.

2.20. The ratio of the short-term monitoring period mean for NO_2 (9th July 2018 to 3rd January 2019) and the latest NO_2 annual mean concentration (available for 2018) at the four sites was obtained, as shown in **Table 2**.

Table 2: Adjustment Process to Estimate Annual Mean NO_2 Concentrations at the Site

Site	Annual Mean 2018	Period Mean	Ratio (AM/PM)
North Kensington, Kensington & Chelsea	27.6	26.1	1.056
Bloomsbury, Camden	36.5	32.6	1.117
Norbury Manor, Croydon	48.7	44.0	1.107
Elephant and Castle, Southwark	31.4	30.3	1.035
Average			**1.079**

2.21. The average of the four ratios between the sampling period and annual mean NO_2 concentrations was calculated as 1.079 (**Table 2**), and this was then applied to the short-term NO_2 diffusion tube results set out in **Table 3**. Following guidance in LLAQM.TG(16), given that the calculation is carried out using the ratio of the short-term monitoring period to the 2018 annual mean, the equivalent/estimated annual mean is for 2018.

3. Results

3.1. Box 1.1 of LLAQM.TG(16) set outs where the AQS objectives should apply. The following objectives and concentrations relevant to the monitoring locations are as follows:

- NO_2 annual mean of 40µg/m³ – relevant for locations where members of the public might be regularly exposed, such as building façades of residential properties, schools, hospitals, care homes etc. For this study the annual mean AQS objective of 40µg/m³ is relevant for the monitored concentrations at the façade of Chertsey Court and the proposed school sites only; and
- NO_2 hourly mean of 200µg/m³ not to be exceeded more than 18 times a year. LLAQM.TG(16) states the hourly mean limit value and objective for NO_2 is unlikely to be exceeded at a roadside location where the annual-mean NO_2 concentration is less than 60µg/m³. Relevant locations include pavements; car parks; bus stations, railway stations and any outdoor locations where members of the public might reasonably expect to spend one hour or longer. For this study the annual mean AQS objective of 60µg/m³ (to be compared to the hourly objective) is relevant for the monitored concentrations at the kerbside, roadside and carpark sites only.

3.2. The results of the NO_2 diffusion tube monitoring are presented in **Table 3**, which shows the unadjusted collected NO_2 results; the co-location adjusted results; and the annualised results, (which are the results for consideration against the relevant AQS Objectives, as discussed above). The results in **Table 3** show:

- The monitors located on the façade of Chertsey Court (as 34.2µg/m³ at DT3 and 32.8µg/m³ at DT8) are below the annual mean NO_2 AQS objective of 40µg/m³ and as such existing conditions at Chertsey Court are considered to be good;
- The highest concentrations are measured at the diffusion tubes located on the kerbside (as 43.0µg/m³ at DT1; 42.7µg/m³ at DT4; and 49.1µg/m³ at DT6) due to these monitors being located directly above vehicle tailpipe emissions at Chalkers Corner. All kerbside locations are below the hourly equivalent annual mean NO_2 concentration of 60µg/m³ and therefore the AQS objective is met at these monitoring locations;
- Similar, to the kerbside locations, monitored concentrations at the diffusion tubes located on the roadside at Chalkers Corner (as 36.9µg/m³ at DT2; 42.1µg/m³ at DT7; and 49.1µg/m³ at DT6) and in the carpark of Chertsey Court (as 40.4µg/m³) are below the hourly equivalent annual mean NO_2 concentration of 60µg/m³ and as such the AQS objective is met at these monitoring locations;
- From the kerbside to the roadside there is an average decrease (across the three transects: DT1/DT2/DT3, DT4/DT5, DT6/DT7/DT8) in annual mean NO_2 concentrations of 5.1µg/m³. This shows that with distance away from the road and away from direct tailpipe emissions, NO_2 concentrations rapidly improve at Chalkers Corner;
- In addition, the results show there is an average decrease in annual mean NO_2 concentrations of 12.5µg/m³ from the kerbside to the façade of Chertsey Court (difference between DT1/DT3 and DT6/DT8) and a decrease of 6µg/m³ from the metal railings at the roadside locations to the façade of Chertsey Court (difference between DT2/ DT3 and DT7/8). The average decrease from the kerbside and roadside monitors (DT1, DT2, DT6, DT7) to the Chertsey Court façade (DT3/ DT8) is therefore 9.3µg/m³. The results suggest the existing landscaping is acting as a barrier to traffic emissions at Chertsey Court; and
- The monitors located at the likely façade of the school within the Stag Brewery Development (as 30.2µg/m³ at School 1 and 30.1µg/m³ at School 2) are below the annual mean NO_2 AQS

objective of 40µg/m³ and as such existing conditions are good and are not a constraint for the proposed school use in this location.

Table 3: NO_2 Monitoring Results at the Site

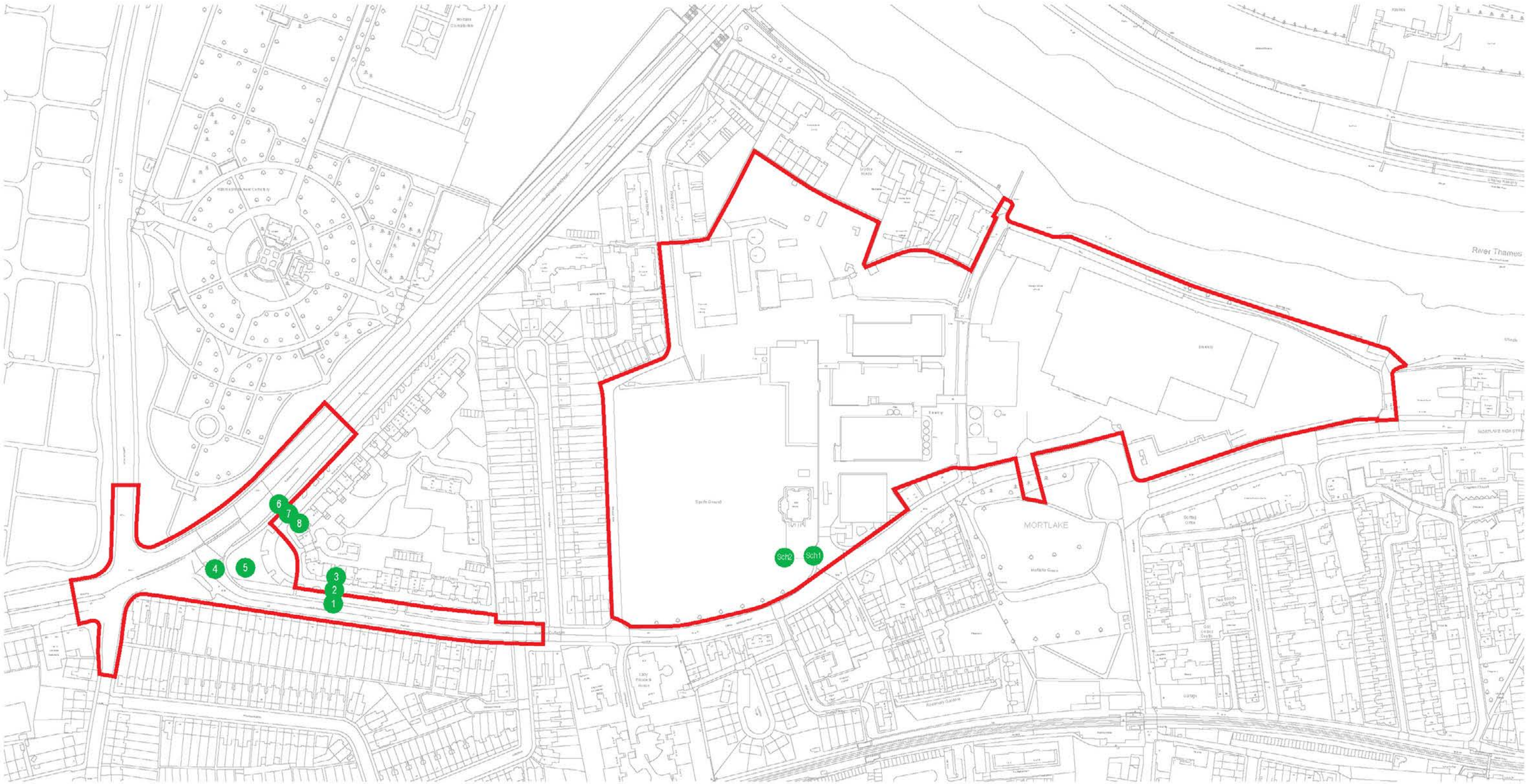
ID	Site Description	Monitor Classification[(a)]	9th July – 10th Aug 2018	10th Aug – 11th Sept 2018	11th Sept – 9th Oct 2018	9th Oct – 9th Nov 2018	9th Nov – 7th Dec 2018	7th Dec 2018 – 3rd Jan 2019	Unadjusted Average	Adjusted/Co-location Annual Mean*	Adjusted Estimated 2018 Annual Mean**
			µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
DT1	Lower Richmond Road	Kerbside	37.4	38.8	45.0	45.4	38.2	45.6	41.1	39.8	43.0
			35.4	39.4	40.3	45.0	37.1	45.4			
DT2	Chertsey Court metal railings	Roadside	34.8	31.6	34.9	38.0	37.9	43.7	35.3	34.2	36.9
			35.9	34.2	31.1	36.2	33.7	44.2			
DT3	Chertsey Court Lower Richmond Road	Façade	29.9	27.6	28.6	33.0	32.8	36.3	32.7	31.7	34.2
			27.9	26.5	31.2	35.9	31.5	38.1			
DT4	Chalkers Corner Junction	Kerbside	46.5	42.9	39.5	41.2	40.9	52.4	40.8	39.6	42.7
			46.8	40.5	44.2	42.0	41.7	49.3			
DT5	Chertsey Court	Carpark	25.1	34.5	37.4	37.7	35.1	40.1	38.6	37.4	40.4
			30.0	33.2	37.1	37.9	34.9	41.6			
DT6	Clifford Avenue	Kerbside	40.6	46.7	50.1	45.8	47.7	49.9	46.9	45.5	49.1
			39.3	43.9	44.3	50.8	49.6	54.3			
DT7	Clifford Avenue metal railings	Roadside	29.1	38.2	46.0	40.2	43.3	48.9	40.3	39.1	42.1
			27.6	35.3	32.9	46.6	48.0	47.1			
DT8	Chertsey Court Clifford Avenue	Façade	24.2	30.3	32.9	32.9	31.9	36.3	31.4	30.4	32.8
			23.7	31.1	31.8	33.9	33.1	34.4			
School 1	Stag Brewery Sports Club	Roadside	21.7	21.6	27.1	32.7	37.3	35.1	28.9	28.0	30.2
			21.9	22.3	25.0	32.3	34.3	35.4			
School 2	Stag Brewery Sports Club	Roadside	No Data	21.1	26.1	32.0	29.9	34.3	28.7	27.9	30.1
			No Data	20.4	27.4	21.8	37.4	36.8			

*Multiply previous column by 0.97 **Multiply previous column by 1.079 Exceedance of the AQS Objective shown in **BOLD**

(a) Classification as defined by LLAQM.TG (16) : Kerbside = monitor 1m from kerb of a road; Roadside = monitoring within 1-5m from kerb of a road; Façade = monitor on residential property and at a location of relevant residential exposure; Carpark = monitor located within am open air car park

FIGURES

Figure A1: Diffusion Tube Monitoring Locations



N

Site Boundary

Diffusion Tube Monitoring Locations

Project Details	WIE10667-104: Stag Brewery, Mortlake
Figure Title	Figure A1: Diffusion Tube Monitoring Locations
Figure Ref	WIE10667-104_GR_AQMR_A1A
Date	January 2019
File Location	\\s-lncs\wiel\projects\wie10667\104\graphics\aqmr\issued figures

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APPENDICES

Appendix A Precision and Accuracy Spreadsheet

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements									
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	09/07/2018	10/08/2018	25.7	25.7		26	0.0	0	0.3
2	10/08/2018	11/09/2018	25.1	24.7	23.5	24	0.9	3	2.1
3	11/09/2018	09/10/2018	30.0	30.3	30.9	30	0.5	2	1.2
4	09/10/2018	09/11/2018	40.0	36.4	38.4	38	1.8	5	4.4
5	09/11/2018	07/12/2018	40.7	41.3	40.0	41	0.7	2	1.6
6	07/12/2018	03/01/2018	37.5	37.5	39.7	38	1.3	3	3.2
7									
8									
9									
10									
11									
12									
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method	
Period Mean	Data Capture (% DC)
25.76364	100
18.95152	100
28.95517	100
37.10938	100
44	100
38	100

Data Quality Check	
Tubes Precision Check	Automatic Monitor Data
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good

Overall survey --> Good precision | Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

Precision 6 out of 6 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%

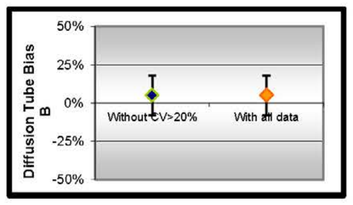
Bias calculated using 6 periods of data

Bias factor A	0.97 (0.87 - 1.12)
Bias B	3% (-10% - 16%)
Diffusion Tubes Mean:	33 μgm^{-3}
Mean CV (**Precision**):	2
Automatic Mean:	32 μgm^{-3}
Data Capture for periods used:	100%
Adjusted Tubes Mean:	32 (29 - 37) μgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA

Bias calculated using 6 periods of data

Bias factor A	0.97 (0.87 - 1.12)
Bias B	3% (-10% - 16%)
Diffusion Tubes Mean:	33 μgm^{-3}
Mean CV (**Precision**):	2
Automatic Mean:	32 μgm^{-3}
Data Capture for periods used:	100%
Adjusted Tubes Mean:	32 (29 - 37) μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

UK and Ireland Office Locations

D. Air Quality Model Verification

Appendix D: Air Quality Model Verification

Introduction

1.1.1 Model verification is the process of comparing monitored and modelled pollutant concentrations and, if necessary, adjusting the modelled results to reflect actual measured concentrations, to improve the accuracy of the modelling results.

1.1.2 The dispersion model used for the 2018 ES was re-run to predict annual mean NO_x concentrations at the project specific kerbside and roadside diffusion tube monitoring locations (discussed below) to determine the accuracy of the 2018 ES model with the new monitoring data. The methodology used for the model verification is the same as that presented in Appendix 10.2 of Chapter 10: Air Quality of the 2018 ES.

1.1.3 The following roadside and kerbside diffusion tubes were modelled:

- Diffusion Tube 1: Lower Richmond Road;
- Diffusion Tube 2: Chertsey Court metal railings;
- Diffusion Tube 4: Chalkers Corner Junction;
- Diffusion Tube 6: Clifford Avenue;
- Diffusion Tube 7: Clifford Avenue metal railings;
- School 1: Stag Brewery Sports Club;
- School 2: Stag Brewery Sports Club.

1.1.4 Table A1 compares the modelled and equivalent measured roadside NO_2 concentrations at the diffusion tube sites.

Table A1: Annual Mean NO_2 Modelled and Monitored Concentrations

Site ID	Monitored Annual Mean NO_2 ($\mu g/m^3$)	Modelled Total Annual Mean NO_2 ($\mu g/m^3$)	% Difference
Diffusion Tube 1	43.0	43.3	0.75
Diffusion Tube 2	36.9	39.0	5.61
Diffusion Tube 4	42.7	51.3	20.20
Diffusion Tube 6	49.1	46.8	-4.77
Diffusion Tube 7	42.1	42.9	1.80
School 1	30.2	29.7	-1.61
School 2	30.1	29.3	-2.67

1.1.5 Table A1 show the model is:

- over predicting at four out of seven sites and slightly under predicting at three out of the seven sites;
- the greatest % difference is related to an over-prediction by the model at Diffusion Tube 4, with an over-prediction by 20.2%;
- predictions at sites where the monitored concentrations are above the annual mean objective of $40\mu g/m^3$ (Diffusion Tube 1, 4, 6, 7) show good comparison (i.e. they also predict exceedance of $40\mu g/m^3$);
- the majority of results are within 10% of monitored concentrations, with Diffusion Tube 4 being within 25%.

1.1.6 LAQM.TG(16) suggests that where there is no systematic over or under prediction at the diffusion tube results and where the majority of modelled results are within 10% of the monitored concentrations that the model verification is appropriate and no further adjustment factor is required.

Conclusion

1.1.7 On re-running, the model is performing well, and no adjustment factor needs to be applied to the modelled results. This is the same process as detailed in Appendix 10.2 of Chapter 10: Air Quality of the 2018 ES, whereby no adjustment factor was applied as the model was considered to be performing well. Consequently, the results of the detailed dispersion modelling of the air quality assessment as presented in Chapter 10: Air Quality of the 2018 ES remain applicable and valid.

E. Air Quality Neutral Assessment

Appendix E: Air Quality Neutral Calculations

Introduction

1.1.1 This Appendix presents the calculations undertaken by Waterman Infrastructure and Environment (WIE) to demonstrate how the Development performs against relevant 'air quality neutral' benchmarks.

Description of the Development

1.1.2 The Development is located within the Outer London Activity Zone and would provide a mixed-use scheme (see **Table 1**).

1.1.3 The total amount of floorspace proposed by the Development, relevant to the Air Quality Neutral Assessment criteria is set out below in **Table 1**.

Table 1: 'Air Quality Neutral' Emissions Benchmarks for Buildings

Land Use (Use Class)	Proposed Floorspace Areas (GIA) (m^2)
Residential (Use Class C3, excluding assisted living)	75,079
Office (Use Class B1)	2,417
Cinema (Use Class D2)	2,120
Gym (Use Class D2)	740
Flexible Uses - Restaurant / bar / retail / community / leisure (Use Classes A1 / A2 / A3 / A4 / B1 / D1 / Boathouse)	4,686
Hotel (Use Class C1)	1,668
Assisted Living (Use Class C2)	14,738
Nursing and Care Home (Use Class C2)	9,472
School (Use Class D1)	9,319
Total	**120,239**

Note: Table 1 is not the Total Floor Space provided within the Development and excludes non-habitable uses such as plant and storage areas, play space, private amenity space, car park space, which are not used within the Air Quality Neutral Assessment calculations.

The AQNA assessment requires the comparison of Development against relevant benchmarks for each use class and therefore it is necessary for them to be included in Table 1.

1.1.4 It is noted the proposed land uses of Assisted Living are submitted as flexible use and have the potential to become residential. For the purposes of the Air Quality Neutral Assessment Assisted Living have been calculated separately as either Use Class C2 or Use Class C3.

Planning Policy

Draft New London Plan, 2017

1.1.5 Policy SI1 'Improving air quality' of the Draft London Plan[1] states that:

"…the development of large-scale redevelopment areas, such as Opportunity Areas and those subject to an Environmental Impact Assessment should propose methods of achieving an Air Quality Positive approach through the new development. All other developments should be at least Air Quality Neutral…"

The London Plan - The Spatial Development Strategy for Greater London; consolidated with alterations since 2011, March 2015

1.1.6 Policy 7.14 'Improving air quality' of the London Plan[2] states that development proposals should:

"…be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as AQMAs);…"

The Mayor's Air Quality Strategy 'Clearing the Air' 2010

1.1.7 The Mayor's Air Quality Strategy states that:

"New developments in London shall as a minimum be 'air quality neutral' through the adoption of best practice in the management and mitigation of emissions".

Sustainable Design and Construction - Supplementary Planning Guidance, 2014

1.1.8 To enable the implementation of the London Plan the GLA have produced a Sustainable Design and Construction Supplementary Planning Guidance (SPG). Section 4.3 focusses on air pollution and the effects from the operation of new developments to ensure that they are 'air quality neutral'.

1.1.9 Paragraph 4.3.17 and Appendix 5 of the SPG note that Building Emission Benchmarks (BEBs) have been defined for a series of land-use classes for both NO_x and PM_{10}. **Table 2** outlines the relevant emissions benchmarks for the Development. It is considered that where a Development does not exceed these benchmarks then they are considered to be 'air quality neutral' and would not increase NO_x and PM_{10} emissions across London as a whole.

Table 2: 'Air Quality Neutral' Emissions Benchmarks for Buildings

Land Use Class	NO_x (g/m^2)	PM_{10} (g/m^2)
Class A1	22.6	1.29
Class A3 - A5	75.2	4.32
Class A2 and Class B1	30.8	1.77
Class B2 – B7	36.6	2.95
Class B8	23.6	1.90
Class C1	70.9	4.07
Class C2	68.5	5.97
Class C3	26.2	2.28
Class D1(a)	43.0	2.47
Class D1(b)	75.0	4.30
Class D1(c-h)	31.0	1.78
Class D2(a-d)	90.3	5.18
Class D2(e)	284	16.3

1.1.10 As well as defining a series of benchmarks for a buildings' operation, Appendix 6 of the SPG also defines benchmarks for the transport emissions related to the Development. **Table 3** details the emissions benchmarks for transport relevant to the Development. Section 4.3.18 of the SPG notes that the design of a development should encourage and facilitate walking, cycling and the use of public transport, thereby minimising the generation of air pollutants.

Table 3: 'Air Quality Neutral' Emissions Benchmarks for Transport

Land Use	London Central Activity Zone	Inner	Outer
NO_x (g/m²/annum)			
Retail (A1)	169	219	249
Office (B1)	1.27	11.4	68.5
NO_x (g/dwelling/annum)			
Residential (C3)	234	558	1553
PM_{10} (g/m²/annum)			
Retail (A1)	29.3	39.3	42.9
Office (B1)	0.22	2.05	11.8
PM_{10} (g/dwelling/annum)			
Residential (C3, C4)	40.7	100	267

1.1.11 For both the Building and Transport Emissions Benchmarks, where a development does not exceed these benchmarks then the development is considered to be 'air quality neutral' and would not increase NO_x and PM_{10} emissions across London as a whole.

1.1.12 As well as providing benchmarks the SPG also recommends emission standards for combustion plant to comply with, in addition to meeting the overall 'air quality neutral' benchmark.

Air Quality Neutral Planning Support: GLA 80371, April 2014

1.1.13 In April 2014, the GLA published a report to provide support to the development of the Mayor's policy related to 'air quality neutral' developments. The report provides a method to enable a development to be assessed against the air quality neutral benchmarks set out in the Sustainable Design and Construction SPG.

1.1.14 The report provides a methodology required to apply the air quality neutral policy. It requires the transport and building emissions for the development to be identified and then compared to the benchmark emissions. The report notes that the building and transport emissions should be calculated separately and not combined.

Calculation of the Emissions Benchmarks

Building Emissions

1.1.15 The Development heating and energy strategy would provide two Energy Centres to serve the eastern and western parts of Development, split by Ship Lane. In addition, a separate heating and energy strategy would be provided for the school. The details of the Energy Centres are presented in **Table 4**.

Table 4: Calculation of the Total Building Emission

Energy Centre	Unit	Number	Release Rate (m/s)	Total NO_x Emissions (g/s)	Hours of Operation (hrs./annum)	Total NO_x (kg/annum)
Building 02	Boiler (2400kW)	5	15	0.1300	4380	2049.8
	CHP (560kW)	2	10	0.0204	8760	643.3
	CHP (610kW)	1	10	0.0111	8760	350.0
Building 17	Boiler (2500kW)	4	15	0.1027	4380	1619.4
	CHP (560kW)	2	10	0.0204	8760	643.3
	CHP (610kW)	1	10	0.0111	8760	350.0
School	Boiler (750kW)	2	15	0.0154	4380	242.8
	CHP (226kW)	1	10	0.0041	8760	129.3
	Total Building NO_x Emission					**6028.1**

Note: For gas-fired plants PM_{10} emission factors are not provided because gas-fired plants do not emit any significant level of particulates

1.1.16 The Building Emission Benchmarks (BEB) for each land use category are presented in **Table 5** (as Assisted Living being Use Class C2) and **Table 6** (as Assisted Living being Use Class C3). These are calculated by multiplying the floor area for each land use category with the Building Emission Benchmark presented in **Table 2**.

Table 5: Calculation of the Benchmarked NO_x Building Emissions for each Land-Use Category (Assisted Living being Use Class C2)

Land Use	GIA	Building Emissions Benchmark (gNO_x/m^2/annum)	Benchmarked Emissions ($kgNO_x$/annum)
C3	75,079	26.2	1967.1
B1	2,417	30.8	74.4
D2*	2,880	187.15	535.2
A1	4,686	22.6	105.9
C1	1,668	70.9	118.3
D1*	9,319	49.7	463.2
C2	24,210	68.5	1658.4
Total Benchmarked Building Emissions			**4922.5**

Note: *The average benchmark of these use-class has been taken as presented in Table 2.

Table 6: Calculation of the Benchmarked NO_x Building Emissions for each Land-Use Category (Assisted Living Use Class C3)

Land Use	GIA	Building Emissions Benchmark (gNO_x/m^2/annum)	Benchmarked Emissions ($kgNO_x$/annum)
C3	89,817	26.2	2353.2
B1	2,417	30.8	74.4
D2*	2,860	187.15	5395.2
A1	4,686	22.6	105.9
C1	1,668	70.9	118.6
D1*	9,319	49.7	463.2
C2	9,472	68.5	648.8
Total Benchmarked Building Emissions			**4299.0**

Note: *The average benchmark of these use-class has been taken as presented in Table 2.

1.1.17 As shown in **Table 4**, the Total Building NOx Emission of 6,028.1kg/annum are above the benchmarks calculated in **Table 5** (Assisted Living Use Class C2) of 4,922.5.0kg/annum and **Table 6** (Assisted Living being Use Class C3) of 4,299.0kg/annum and the Development is therefore not considered to be 'Air Quality Neutral', with respect to building emissions.

1.1.18 However, **Table 4** does not represent the final parameters for each plant to be used once the Development is complete and operational. As such it is considered that a suitably wording planning condition requesting an air quality neutral assessment of the final plant would be provided by LBRuT with the granting of any planning permission.

Transport Emissions

1.1.19 Details of the trip generation per day for each land-use class have been provided by Peter Brett Associates (the Applicant's transport consultant).

Assisted Living being Use Class C2

1.1.20 The calculation of the Transport Emission for each component of the Development, assuming Assisted Living and Care Home being Use Class C2 is presented in **Table 7**.

Table 7: Calculation of the Benchmarked Transport Emissions for each Land-Use Category (Assisted Living Use Class C2)

Land Use	Trips per annum	Average Distance per trip*	Distance travelled km/annum	Emission Factors (g/vehicle-km)	Transport Emission (kg/annum)	
					NO_x	PM_{10}
C3	442,782	11.4	5,047,715	NO_x: 0.353 PM_{10}: 0.0606	1781.8	108.0
B1	81,997	10.8	885,567.6		312.6	18.9
D2	87,928	10.8	949,622.4		335.2	20.3
A1	144,105	5.4	778,167		274.7	16.6
C1	4,885	10.8	52,758		18.6	1.1
D1	186,324	10.8	2,012,299.2		710.3	43.0
C2	61,758	10.8	666,986.4		235.4	14.3
Total Transport Emissions					**3,668.8**	**222.3**

Note: * Average distance travelled by car per trip for sites within Outer London Activity Zone

1.1.21 The Transport Benchmark for the Development, as shown in **Table 8**, can be calculated by multiplying the benchmark in **Table 3** by the number of properties within the Development.

Table 8: Calculation of the Benchmarked Transport Emissions for each Land-Use Category (Assisted Living Use Class C2)

Land Use	Units	GIA	Transport Emission Benchmark		Benchmarked Emissions	
			gNO_x/m^2/annum or gNO_x/dwelling/ annum	gPM_{10}/m^2/annum or gPM_{10}/dwelling/ annum	$kgNO_x$/ annum)	$kgPM_{10}$/ annum
C3	663	-	1553	267	1029.7	177.0
B1	-	2,417	68.5	11.8	165.6	28.5
D2	-	2,880	68.5	11.8	197.3	34.0
A1	-	4,686	249	42.9	1166.8	201.0
C1	-	1,668	68.5	11.8	114.3	19.7
D1	-	9,319	68.5	11.8	638.4	110.0
C2	-	24,210	68.5	11.8	1658.4	285.7
Total Transport Emissions					**4970.03**	**855.9**

1.1.22 Assuming the Assisted Living is Use Class C2, the Total Transport NOx Emission of 3,668.8kg/annum (as shown in **Table 7**) is below the benchmark of 4,970.03kg/annum (as shown in **Table 8**) and the Total Transport PM_{10} Emission of 222.3kg/annum (as shown in **Table 7**) is below the benchmark of 855.9kg/annum (as shown in **Table 8**).

1.1.23 The Development is therefore considered to be 'Air Quality Neutral', with respect to transport emissions and no further mitigation measures are required.

Assisted Living being Use Class C3

1.1.24 The calculation of the Transport Emission for each component of the Development, assuming Assisted Living being Use Class C3 is presented in **Table 9**.

Table 9: Calculation of the Benchmarked Transport Emissions for each Land-Use Category (Assisted Living being Use Class C3)

Land Use	Trips per annum	Average Distance per trip*	Distance travelled km/annum	Emission Factors (g/vehicle-km)	Transport Emission (kg/annum)	
					NO_x	PM_{10}
C3	454,645	11.4	5,182,953	NO_x: 0.353 PM_{10}: 0.0606	1829.6	110.9
B1	81,997	10.8	885,567.6		312.6	18.9
D2	87,928	10.8	949,622.4		335.2	20.3
A1	144,105	5.4	778,167		274.7	16.6
C1	4,885	10.8	52,758		18.6	1.1
D1	186,324	10.8	2,012,299.2		710.3	43.0
C2	49,895	10.8	538,866		190.2	11.5
Total Transport Emissions					**3671.3**	**222.5**

Note: * Average distance travelled by car per trip for sites within Outer London Activity Zone

1.1.25 The Transport Benchmark for the Development, as shown in **Table 10**, can be calculated by multiplying the benchmark in **Table 3** by the number of properties within the Development.

Table 10: Calculation of the Benchmarked Transport Emissions for each Land-Use Category (Assisted Living Use Class C3)

Land Use	Units	GIA	Transport Emission Benchmark		Benchmarked Emissions	
			gNO_x/m^2/annum or gNO_x/dwelling/ annum	gPM_{10}/m^2/annum or gPM_{10}/dwelling/ annum	$kgNO_x$/ annum)	$kgPM_{10}$/ annum
C3	813	-	1553	267	1262.6	217.1
B1	-	2,417	68.5	11.8	165.6	28.5
D2	-	2,880	68.5	11.8	197.3	34.0
A1	-	4,686	249	42.9	1166.8	201.0
C1	-	1,668	68.5	11.8	114.3	19.7
D1	-	9,319	68.5	11.8	638.4	110.0
C2	-	9,472	68.5	11.8	648.8	111.8
Total Transport Emissions					**4193.7**	**722.0**

1.1.26 Assuming the Assisted Living and Care Home elements are Use Class C3, the Total Transport NOx Emission of 3,671.3kg/annum (as shown in **Table 9**) is below the benchmark of 4,193.7kg/annum (as shown in **Table 10**) and the Total Transport PM_{10} Emission of 222.5kg/annum (as shown in **Table 9**) is below the benchmark of 722.0kg/annum (as shown in **Table 10**).

1.1.27 The Development is therefore considered to be 'Air Quality Neutral', with respect to transport emissions and no further mitigation measures are required.

References

[1] Greater London Authority (2017); 'Draft New London Plan', Draft for Public Consultation, GLA, London.
[2] Greater London Authority (2015); 'The London Plan -- The Spatial Development Strategy for London consolidated with alterations since 2011', GLA, London.

F. River Wall Environment Agency Briefing Note

Waterman Infrastructure & Environment Limited
Pickfords Wharf, Clink Street, London, SE1 9DG
www.watermangroup.com

River Wall Environment Agency Comments

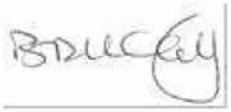
Stag Brewery

Date: 11th January 2019

Client Name: Reselton Properties

Document Reference: WIE10667-103-BN-7-2-1-EA

This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015 and BS OHSAS 18001:2007)

Issue	Prepared by	Checked & Approved by
	Donal O'Donovan	Brendan McCarthy
Second		

1. Introduction

1.1. Waterman Infrastructure and Environment (WIE) was commissioned by Reselton Properties in relation to the river wall works for the redevelopment of the former Stag Brewery Site in Mortlake (hereafter referred to as the 'Site'). Following planning submission in February 2018, the Environment Agency (EA) provided comments on planning application A (reference: 18/0547/FUL) regarding the River Thames Defences (Appendix A).

1.2. The EA's initial comments were dated 11th May 2018 (Appendix A) and WIE provided a response dated 27th June 2018 (Appendix B). The EA provided their second set of comments dated 18th September 2018 (Appendix A) which accepted Items 1 and 2 but with other items requiring further work. In response to this WIE provided a letter dated 30th October 2018 (Appendix C). In order to ensure the resolution of the outstanding items a Site walkover and meeting was held with the EA on the 3rd December 2018 (Appendix D).

1.3. At the meeting it was agreed that further work was required in relation to A) the Ship Lane and Bulls Alley flood defences and B) how the flood defence would work around the proposed Boat House adjacent to Bulls Alley. These items are therefore covered within this Briefing Note.

2. Ship Lane

2.1. As requested by the EA, the team has investigated how a permanent passive flood defence could be incorporated into Ship Lane. As a result, we confirm that in the future it would be possible to raise ground levels on Ship Lane to 6.70m AOD in line with the future requirements of the TE2100 Plan. Drawings provided in Appendix E show how the required ramping would be at a maximum of a 1 in 12 gradient and would not be inhibited by the proposed development (i.e. access would remain achievable with the development in place).

2.2. It should be noted that the future inclusion of a passive defence would have impacts on third parties (i.e. the Ship Pub) and disabled access along Ship Lane, however it is understood from the meeting with the EA that their priority would be the protection of the wider area and not individual properties. Disabled access to the river would also still be available via other routes including through the Site itself.

2.3. It is therefore considered that the development proposals would not restrict the flood defence options on Ship Lane and that a permanent passive defence could be incorporated, if required.

3. Bulls Alley and the Boat House

3.1. At the meeting on the 3rd December 2018 the EA reiterated their desire to avoid active defences and insisted that permanent passive defences should be incorporated. As agreed with the EA at the meeting, the team have since revisited the proposals regarding the Boat House and Bulls Alley and have found a solution that ensures a permanent passive line of defence to 6.70m AOD (Appendix F).

3.2. Due to the requirement for the River Thames to be easily accessible to users of the Boat House it is necessary for the Boat House to have a direct relationship with the River Thames. Previous options of for the design of this building proposed a line of defence running through the building itself. The EA were not satisfied with this as a long-term solution and therefore the building has been re-designed to use the external walls of the building instead as a means of flood defence. This will ensure that inspections can be made easily from public areas, at the same time providing access from the Boat House to the river.

3.3. The revised proposals also have the benefit of ensuring disabled access from Mortlake High Street, which was raised at the meeting with the EA, and also allowing users of the Boat House to be able to see the River Thames from inside on the raised section (previously they would have been at a lower level with a large wall/gate obscuring the view of the Thames). The team is very pleased with the input from the EA in this respect and believes the design has been improved as a result.

3.4. In relation to the Bulls Alley defence it was agreed with the EA at the meeting that no works would need to be undertaken to it in the present day, however the proposed development would need to ensure options for raising the Bulls Alley defence would not be limited as a result of the proposals. In order to ensure this, the team have not provided any access routes that front onto Bulls Alley and therefore a ramp, wall or gate could be installed in the future without affecting the proposed Boat House.

4. Conclusion

4.1. Following the meeting with the EA on the 3rd December 2018 the team have revisited the design, ensuring that the proposed development does not limit the potential for passive flood defence options on both Ship Lane and Bulls Alley. Furthermore, the revised layout of the Boat House ensures a permanent passive protection to 6.70m AOD as well as improving access to the defence for inspections. It is considered that the additional work set out within this Briefing Note and clarifications previously provided are sufficient to satisfy the EA's requirements.

4.2. In light of the two previous written responses provided to the EA (Appendices B and C), the meeting on the 3rd December 2018 (Appendix D) and this Briefing Note it is now considered that all EA matters in respect of planning application reference 18/0547/FUL have been thoroughly reviewed and satisfactorily resolved.

APPENDICES

A. Environment Agency Letters

creating a better place

Environment Agency

Ms Lucy Thatcher
London Borough of Richmond upon Thames
Planning Department
Civic Centre (44) York Street
Twickenham
Middlesex
TW1 3BZ

Our ref: SL/2018/118128/01-L01
Your ref: 18/0547/FUL
Date: 11 May 2018

Dear Ms Thatcher

APPLICATION A: Hybrid application to include 1. The demolition of existing buildings and structures, except The Maltings and the façade of the Bottling Plant and former Hotel; Site clearance and groundworks, to allow for the comprehensive phased redevelopment of the site: 2. Detailed application for works to the east side of Ship Lane which comprise: a. Alterations and extensions to existing buildings; erection of buildings (3 to 8 storeys) plus basements to allow for 443 residential apartments; Flexible use floorspace for various commercial uses, community and leisure; and hotel, cinema, gym and office floorspace b. New pedestrian, vehicle and cycle accesses and associated highway works c. Provision of on-site cycle, vehicle and service parking at surface and basement level d. Provision of public open space, amenity and play space and landscaping e. Flood defence and towpath works f. Installation of plant and energy centres 3. Outline application, with all matters reserved for works to the west of Ship Lane which comprise: a) Single storey basement and buildings varying in height from 3 to 7 storeys b) Residential development of up to 224 units c) Nursing and care home (up to 80 ensuite rooms) with associated facilities d) Up to 150 units of flexible use living accommodation for either assisted living or residential use e) New pedestrian, vehicle and cycle accesses and internal routes, and associated highway works f) Provision of on-site cycle, vehicle and service parking g) Provision of public open space, amenity and play space and landscaping.

The Stag Brewery, Lower Richmond Road, Mortlake, London.

Thank you for consulting us on application 18/0547/FUL. We have reviewed the information submitted and in the absence of an acceptable Flood Risk Assessment (FRA) we **object** to the grant of planning permission and recommend refusal on this basis for the following reasons:

Reason

Environment Agency
3rd Floor, Seacole Building, 2 Marsham Street, London, SW1P 4DF
Telephone: 03708 506 506
Email: enquiries@environment-agency.gov.uk
Website: www.gov.uk/environment-agency

INVESTOR IN PEOPLE

The Flood Risk Assessment (FRA) Report reference number K0685/2 dated February 2018 by Hydro-Logic Services included as Appendix 12.1 of the Environmental Statement Volume 1 by Waterman Infrastructure & Environment Limited submitted with this application does not comply with the requirements set out in the Planning Practice Guidance to the National Planning Policy Framework. The submitted FRA does not therefore, provide a suitable basis for assessment to be made of the flood risks arising from the proposed development.

We support the aims of the application to deliver a new flood defence wall in line with the Thames Estuary 2100 Plan and the London Borough of Richmond's local plan policies LP 18 and LP 21. However we still require additional information to demonstrate the exact location, setback, construction type and methodology of the wall before we can recommended approval subject to planning conditions.

Thames Tidal Flood Defences

The development will incorporate a new flood defence in line with the TE2100 Plan. However, further information is required demonstrating that it will be fit for purpose for the lifetime of the development. We request the applicant submit/clarify

- Details of how a fit for purpose flood defence line at the statutory level will be maintained during the construction phase (as previously conveyed at the meeting on 26 September 2016) and outlined in the FRA. Detailed method statements and sequence drawings for both temporary and permanent flood defences can be provided at the Flood Risk Activity Permit stage but we would like an outline Method of Work.

- Details of how the new flood defences will be commensurate with the 100 year lifetime of the development.

- We note that the new flood defence walls will have a crest level of 6.13 mAOD and "topped by a 1.1m high glass balustrade, with effective crest at 7.23 mAOD". The applicant should demonstrate how TE2100 level can be achieved in future; if this additional raising is effectively the glass balustrade, then it must be demonstrated that this element is structurally sound as a flood defence component (i.e. will it be made from toughened glass to sufficiently withstand the calculated hydrostatic pressure as well as being watertight?).

- A vehicle tracking plan should be produced to ensure the offset between the defences and built development is sufficient to allow plant unrestricted access for future works on the flood defences. The applicant should also note that vertical unrestricted access is also required, i.e. consider positions of balconies.

- The FRA includes reference to a minimum of 4m clear access route. Is the 4m between the new flood defences and development? Site Plans are also required clearly outlining the exact location of the new defence line including access arrangements and distances. It is also not clear what is being proposed

for Ship Lane and Bull Lane. Details of the proposed flood gate barriers should be provided.

- The drainage strategy states that surface water runoff would be discharged to the River Thames via 3 outfalls; depending on the position and location of the outfalls, the applicant should consider whether scour protection may be necessary to minimise scour which could adversely impact the structural stability of flood defences. The drainage scheme and outfalls should be designed to minimise the likelihood of scour protection being needed.

- We request clarification about whether any enhancement works will be taking place to the Thames Path and river bank. Previous discussions with the applicant have indicated that subject to the ownership issues being resolved enhancement may be possible. However from the information submitted this is unclear.

Overcoming our objection
You can overcome our objection by submitting an FRA which covers the deficiencies highlighted above and demonstrates that the development will not increase flood risk elsewhere and where possible reduces flood risk overall. If this cannot be achieved we are likely to maintain our objection to the application. Production of an FRA will not in itself result in the removal of an objection.

We ask to be re-consulted with the results of the FRA. We will provide you with bespoke comments within 21 days of receiving formal reconsultation. Our objection will be maintained until an adequate FRA has been submitted.

I hope our comments are helpful, if you have any questions please contact me.

Yours sincerely

Joe Martyn
Planning Specialist

Direct dial 020 3025 5546
Direct e-mail kslplanning@environment-agency.gov.uk

cc Gerald Eve LLP

creating a better place

Environment Agency

Ms Lucy Thatcher
London Borough of Richmond upon Thames
Planning Department
Civic Centre (44) York Street
Twickenham
Middlesex
TW1 3BZ

Our ref: SL/2018/118128/02-L01
Your ref: 18/0547/FUL

Date: 18 September 2018

Dear Ms Thatcher

APPLICATION A: Hybrid application to include 1. The demolition of existing buildings and structures, except The Maltings and the façade of the Bottling Plant and former Hotel; Site clearance and groundworks, to allow for the comprehensive phased redevelopment of the site: 2. Detailed application for works to the east side of Ship Lane which comprise: a. Alterations and extensions to existing buildings; erection of buildings (3 to 8 storeys) plus basements to allow for 443 residential apartments; Flexible use floorspace for various commercial uses, community and leisure; and hotel, cinema, gym and office floorspace b. New pedestrian, vehicle and cycle accesses and associated highway works c. Provision of on-site cycle, vehicle and service parking at surface and basement level d. Provision of public open space, amenity and play space and landscaping e. Flood defence and towpath works f. Installation of plant and energy centres 3. Outline application, with all matters reserved for works to the west of Ship Lane which comprise: a) Single storey basement and buildings varying in height from 3 to 7 storeys b) Residential development of up to 224 units c) Nursing and care home (up to 80 ensuite rooms) with associated facilities d) Up to 150 units of flexible use living accommodation for either assisted living or residential use e) New pedestrian, vehicle and cycle accesses and internal routes, and associated highway works f) Provision of on-site cycle, vehicle and service parking g) Provision of public open space, amenity and play space and landscaping.

The Stag Brewery Lower Richmond Road, Mortlake, London.

Thank you for reconsulting us on the above application. We have reviewed the letter by Waterman Infrastructure & Environment Limited, dated 27 June 2018, ref: WIE10667-103-180627-SM-RiverWall. Based on this information we are **unable to remove our objection** on flood risk ground at this time.

We require further information is required to make an adequate judgement on whether the development will be safe from flood risk and if future defence raising and maintenance is achievable.

Our main concern is that we need further clarification around the boat house proposals and the flood defences located on Ship Lane and Bull Alley. We have responded to the points raised in the letter below.

Environment Agency
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Email: enquiries@environment-agency.gov.uk
Website: www.gov.uk/environment-agency

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