

The Former Stag Brewery, Mortlake

Environmental Statement Addendum

May 2019

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

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Issue	Date	Prepared by	Checked by	Approved by
03	May 2019	Ros Boalch Associate Director	Kirsty Rimondi Technical Director	Kirsty Rimondi Technical Director

Comments

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1. Introduction

1.1. In February 2018, Reselton Properties Limited (the 'Applicant') submitted three separate planning applications (the '2018 Planning Applications') to the London Borough of Richmond Upon Thames (LBRuT) to facilitate the redevelopment of land predominantly on the former Stag Brewery, along with predominantly highway land to the west.

1.2. The 2018 Planning Applications were accompanied by one Environmental Statement (the '2018 ES') which considered all three separate planning applications together as one comprehensive redevelopment proposal (the '2018 Development'). The 2018 ES reports the key findings of the Environmental Impact Assessment (EIA) process in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations, 2011 (as amended 2015)[1] (the '2011 EIA Regulations').

1.3. The Applicant now intends to submit amendments (the 'May 2019 Amendments') to the 2018 Planning Applications. The 2018 ES has been reviewed in light of the May 2019 Amendments, and the findings of this review reported herein this ES Addendum. This document, prepared by Waterman Infrastructure & Environment (Waterman IE), should be read in conjunction with the 2018 ES and collectively constitute the ES. A replacement ES Non-technical Summary (NTS) has been provided that supersedes the one submitted with the 2018 ES.

1.4. In addition to a review of the May 2019 Amendments, since the submission of the planning application in 2018 further work has been undertaken in relation to noise and vibration, air quality and ecology, and this is also reported within this ES Addendum. Furthermore, since submission Boat Race House, located to the east of the former Stag Brewery, has received and implemented planning consent to convert B1 (offices) to C3 (dwelling houses) and extend by one storey to provide additional residential units. The presence of this new residential property has been considered within this ES Addendum where relevant.

[1] HMSO (2015) Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (as amended 2015).

2. Summary of the May 2019 Amendments

Overview

2.1. The 2018 Planning Applications comprise three separate planning applications (Application A, Application B and Application C). **Figure 1** indicates the 2018 Planning Application boundaries and refers to two Development Areas (Development Area 1 and Development Area 2).

2.2. The 2018 Planning Applications are defined by planning application forms, detailed planning application drawings, Parameter Plans, relevant floor area schedules and accommodation schedules together with the Design and Access Statements (DAS) and Design Code. Some of these planning application materials have been substituted or an addendum prepared to reflect the May 2019 Amendments as follows, and are referenced as necessary within this ES Addendum:

- Revised Landscape Design and Access Statement: Application A;
- Revised DAS Volume 4 Secondary School Design 05 Landscape Proposals;
- Revised Landscape Design and Access Statement: Application C;
- Substitution landscape plans;
- Revised Design and Access Statement Volume 3: Design Code;
- Design Addendum;
- Substitution detailed planning application drawings;
- Substitution parameter plans;
- Unit Size Study;
- Compliance Schedules; and
- Transport Assessment Addendum.

2.3. The following sections describe the amendments to the 2018 Applications that are relevant in terms of the EIA and ES.

Floor Areas and Accommodation Schedules

2.4. As a result of the May 2019 Amendments the proposed collective floorspace and unit numbers of Application A, Application B and Application C (the 'Development') has changed, that now proposed is set out in **Table 1**. Changes are represented by a ~~strikethrough~~ of the information presented within the 2018 ES and the amended (May 2019) information presented in **bold**, <u>underlined</u>, *italic* text.

2.5. Overall the residential unit provision has been reduced by 4 units and the overall non-residential use floor area by 6m^2 GEA as a result of the May 2019 Amendments.

Table 1: Proposed Floorspace Application A, Application B and Application C*

Land Use	Floorspace Area (m^2)	
	Gross External Area (GEA)	Gross Internal Area (GIA)
Residential	~~Up to 84,639 (Up to 667 units)~~ ***Up to 84,621 (Up to 663 units)***	~~Up to 75,119 (Up to 667 units)~~ ***Up to 75,079 (Up to 663 units)***
Office (including site management office)	~~2,674~~ ***2,634***	~~2,457~~ ***2,417***
Cinema	2,565	2,120
Gym	~~912~~ ***932***	740
Flexible Uses - Restaurant / bar / retail / community / boathouse / financial & professional services / offices	~~5,308~~ ***5,360***	~~4,664~~ ***4,686***
Hotel	~~1,858~~ ***1,863***	1,668
Assisted Living	Up to 16,246	Up to 14,738
Nursing and Care Home	Up to 10,293	Up to 9,472
School	11,430	9,319
Plant and storage.	Up to 4,536 (+ plant and storage included in school)	Up to 4,244 (+ 249 included in school)
Car parking spaces.	Up to 708 spaces	Up to 708 spaces
Cycle parking spaces.	~~Up to 1,611 spaces~~ ***Up to 1,924 spaces***	~~Up to 1,611 spaces~~ ***Up to 1,924 spaces***
Basement residential access / circulation	1,868	1,810
Private amenity space.	~~Up to 5,912~~ ***Up to 6,000***	Not applicable
Public amenity space (including external and internal play space for residents and school play space).	~~Up to 38,943~~ ***Up to 38,900***	Not applicable
Play space (including external and internal play space for residents and school play space).	Up to 14,353	Not applicable

*Changes are represented by a ~~strikethrough~~ of the information presented within the 2018 ES and the amended (May 2019) information presented in **bold**, underlined, *italic* text.

2.6. With regard to flexible uses outlined in **Table 1**, the 2018 ES stated that the maximum floorspace per land use within the overall flexible use space would not exceed 2,500m^2 GIA for retail. The May 2019 Amendments change this maximum floorspace for retail within the overall flexible use space to not exceeding 2,000m^2 GIA. Furthermore, the permitted office floorspace within the overall flexible use space has changed from a maximum of 2,000m^2 GIA to a minimum of 2,000m^2 GIA and the community (Class D1 use) may now potentially have a minimum cap of 468m^2 GIA conditioned / obligated, subject to demand (previously there was no minimum).

Building Layout and Levels

2.7. The May 2019 Amendments comprise the following internal reconfiguration to building layouts and levels:

- Building 2:
  - Removal of 4 residential units.
  - Unit 2.G.6 inclusion of an additional a habitable room resulting in internal reconfiguration of units either side.
  - Units 2.TY.5, 2.TY.6, 2.TY.7, 2.TY.8, 2.TY.13, 2.TY.14 and 2.TY.15 reconfigured to improve amenity (balcony) provision.
  - Units 2.6.5, 2.6.6 and 2.6.10 reconfigured to improve amenity space.
- Building 3:
  - Units 3.TY.4 and 3.TY.5 reconfigured to introduce an extra habitable room.
  - Units 3.TY.1 and 3.TY.2 removal of projecting bays from north elevation.
- Bottling Building (Building 6):
  - Entrance lobby reconfigured to increase flexible use frontage facing Bottleworks Square.
- Building 8:
  - Unit 8.TY.10 inclusion of an additional a habitable room.
  - Unit 8.TY.5 reconfigured to serve as a M4(3) wheelchair accessible unit resulting in reconfiguration of Unit 8.TY.6.
- Building 9:
  - Increase of the ground floor level of the club room to 6.7m Above Ordnance Datum (AOD).
  - Increase of the ground floor level of the flexible use area to 4.9m AOD.
  - Increase of the ground floor level of the office to 6.7m AOD.
  - Inclusion of steps between the club room and flexible use area.
  - Reconfiguration of entrances, residential entrance lobby, accessible WC, changing rooms, office, training club room and flexible use area as a result of level changes.
  - Access from the club room to a new raised terrace on the northern elevation fronting the River Thames.

Flood Defence and Landscaping

2.8. Responding to the Environment Agency (EA) requirement to include permanent passive flood defence design at Ship Lane the May 2019 Amendments include the following:

- Extending the northern façade of Building 9 by including a raised ground floor terrace incorporated into the flood wall, replacing ground level landscaping in this location.
- Raising Building 9 internal ground floor levels (as previously reported).

2.9. Further details related to the flood defence design are set out within the Surface Water Drainage and Flood Risk part of Section 4 of this ES Addendum.

2.10. The May 2019 Amendments also include the following landscaping changes:

- Replacement climber planting is proposed at Chalkers Corner within Application C.
- With the increase of 313 cycle parking spaces as part of the May 2019 Amendments as shown in **Table 2.1**, landscaping has been amended to accommodate these with additional cycle racks provided.
- A minor increase of private amenity space of 88m^2.
- A minor decrease of public amenity space of 57m^2.

Materials, Façade Treatment and Finishes

2.11. The May 2019 Amendments comprise the following alterations related to building materials, façade treatments, including architectural detailing and finishes:

- Turret elements of Buildings 2, 7 and 8 amended to provide a hierarchy of window openings and more refined top to the buildings.
- Omission of the projecting bay window to the north façade of Building 3.
- Amendment to the gable elements of Buildings 2, 3, 7, 8, 11 and 12 to provide a varied parapet line.
- Changes to the to the façade of the Bottling building (Building 6), including the re-instatement of chimneys and windows. Replacement roof material to be made of slate.
- Placement of double-height windows on the Maltings building (Building 4). The decorative balustrades to Juliette balconies of the Maltings building have been omitted and the existing columns re-located within the ground floor entrance area to the community use space.
- Introduction of additional doors to access community use space and incorporation of historic columns on Maltings building (Building 4).
- Inclusion and re-location of existing historic columns in Bottling building (Building 6).
- Bottling building (Building 6) to have a timber infill instead of brick infill to the former hoist door.
- Selected intermediate piers at ground floor at Bottling building (Building 6) omitted to increase the amount of glazing.
- The Hotel (Building 5) windows that face Building 6 would be obscured.

2.12. The 2018 ES stated that existing memorial plaques and brewery gates associated with the Former Stag Brewery would be would be re-located within the Development. As part of the May 2019 Amendments the following additional details are provided:

- Two memorial plaques are to be positioned on the east wall of the Maltings building facing Maltings Plaza.
- The Stag sign is proposed to be positioned on the Bottling building.
- The Watney brewery gates to be positioned to the opposite end of Thames Street.
- The two Stag Brewery gates to Mortlake High Street (adjacent to the pedestrian crossing and entry to the Development between Buildings 5 and 10) and the northern end of the Green Link.

3. Assessment Methodology

3.1. A review was undertaken by Waterman IE and all technical specialists who contributed to the 2018 ES to determine whether the proposed May 2019 Amendments would result in any changes to the likely significant residual environmental effects reported in the 2018 ES, and whether any additional mitigation measures would be required. Furthermore, all technical specialists also considered changes to baseline conditions, policy and guidance, where relevant. The topics considered are:

- Socio-economics;
- Transport and Access;
- Noise and Vibration;
- Air Quality;
- Ground Conditions and Contamination;
- Surface Water Drainage and Flood Risk;
- Ecology;
- Archaeology;
- Built Heritage;
- Townscape and Visual Assessment;
- Wind Microclimate;
- Daylight, Sunlight, Overshadowing and Light Pollution; and
- Cumulative Effects.

3.2. The results of the review of the May 2019 Amendments and supplementary testing (where necessary) are described under the individual 2018 ES Chapter headings and have broadly been sub-divided into the following headings:

- **Introduction:** This describes the key design changes that have the potential to materially alter the environmental effect(s) as stated within the 2018 ES. Updates where relevant of any baseline data and changes in policy/guidance/assessment methods;
- **Assessment:** This includes any updated baseline information, describes any changes to the predicted environmental effects and the proposed mitigation measures as reported in the 2018 ES. Where the May 2019 Amendments are not considered to materially affect the results and conclusions of the 2018 ES, justification is provided; and
- **Conclusion:** This section confirms whether the May 2019 Amendments to the Development design have resulted in a material change to the impact assessment and conclusions of the 2018 ES.

3.3. Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction of the 2018 ES describes the anticipated programme of works and the key activities that would be undertaken to facilitate the Development (hereafter referred to as the 'Works'). As the programme of works and the key activities do not change as a result of the May 2019 Amendments this is not considered further within this ES Addendum, with the exception of Built Heritage. Built Heritage considers the alteration and refurbishment of existing built heritage assets as part of the Works as the alteration and refurbishment directly affects the built fabric of these assets. For all other

technical assessments, the conclusions of the 2018 ES in relation to demolition, alteration, refurbishment and construction remain unchanged.

3.4. It is acknowledged that new EIA Regulations came into force on 16 May 2017 (Town and Country Planning (Environmental Impact Assessment) Regulations 2017)[2] (the '2017 Regulations'). However, as a request for an EIA Scoping Opinion was made to the LBRuT on 30 March 2017 (refer to Appendix 2.1 of the 2018 ES), in accordance with the transitional arrangements set out in the 2017 Regulations which came into force on 16 May 2017, the EIA for the 2018 Development was undertaken in line with the 2011 EIA Regulations. As such, the 2011 EIA Regulations remain applicable for this ES Addendum.

[2] HMSO (2017); Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

4. Assessment Review

Socio-Economics

Introduction

4.1. This assessment review has been prepared by Hatch Regeneris who undertook the socio-economic assessment of the 2018 ES.

4.2. The methodology used within this assessment review is the same as Chapter 7: Socio-Economics of the 2018 ES. The housing Scenarios 1a, 1b, 2a and 2b have been updated to reflect the May 2019 Amendments.

4.3. The key changes of the May 2019 Amendments that are of relevance to the socio-economic assessment are as follows:

- A reduction in the overall total number of proposed residential units from 667 to 663. This excludes the Assisted Living units.
- A change in the indicative mix of units as set in **Table 2**.
- Minor changes to the design of the commercial floorspace as set out in **Table 3**.

Table 2: Changes to Proposed Mix of Units

Scheme	Flats				Houses		Total
	1 bed	2 bed	3 bed	4 bed	3 bed	4 bed	
2018 Planning Applications	97	319	212	15	12	12	**667**
May 2019 Amends	82	331	204	22	12	12	**663**

Table 3: Minor Changes to Commercial Space

Land Use	Change (SQM GIA)
Flexible use	+22
Hotel	+5
Management	-33
Gym	+20

4.4. In addition to the minor design amendments listed above, the changes to the flexible use minimums and maximums as outlined in **Section 2** have resulted in minor alterations to the worst-case scenario assessed as part of the 2018 ES (refer to **Table 4**).

Table 4: Flexible Floorspace Assumptions

Use	Maximum GIA/NIA	Worst case scenario (GIA/NIA)
Retail	2,000	1,000
Financial and Professional Services	200	0
Restaurant	2,200	0
Bar	1,600	0
Office (Minimum)	2,000	2,187
Community	1,148	1,148
Boathouse	351	351
Overall Maximum Flexible	**4,686**	**4,686**
High Street Zone (within overall max flexible):	2,000	
No < than 50% within high street zone to be flexible retail	1,000	

Assessment

Completed Development

Population and Labour Market

4.5. The reduction in 4 units from a total of 667 to 663, together with the changes to the indicative proposed mix of units (as set out in **Table 2**) results in an estimated population of between 1,750 (Under Scenario 1) and 1,850 (Under Scenario 2). The estimated population range is the same as that stated in the 2018 ES. No mitigation measures are considered necessary and therefore the likely residual effects of the Development on the population and labour market remain as stated in the 2018 ES, i.e. **direct, long-term, beneficial and of minor significance at the local and district level**.

Housing Supply

4.6. The provision of 663 new residential units represents an increase of around 1% to the Local Impact Area's (LIA) housing stock and less than 1% of LBRuT's housing stock. Contributions towards the draft London Plan (2017)[3] housing target for LBRuT (811 per annum) equate to around 10% under Scenario 1 and around 12.5% under Scenario 2.

4.7. These effects are in line with those stated in the 2018 ES. No mitigation measures are considered necessary and therefore the likely residual effects remain as stated in the 2018 ES under Scenario 1 and Scenario 2:

- **long-term, local, beneficial and of moderate significance**; and
- **long-term, district, beneficial and of minor significance**.

Employment and Local Spend

4.8. The changes in commercial floorspace set out in **Table 3** and **Table 4**, together with the changes in household expenditure as a result of the revised indicative mix of units set out in **Table 2**, culminate in a minor downward revision of circa 5 Full Time Equivalent (FTE) jobs to the overall FTE jobs supported by the Development under each Scenario.

[3] Greater London Authority (GLA) (2017). Draft New London Plan.

However, there is no material change to the impact assessment as stated in the 2018 ES. No mitigation measures are considered necessary and the likely residual effects of the Development remain as stated in the 2018 ES across all scenarios:

- **long-term**, **local**, **beneficial** and of **moderate significance**; and
- **long-term**, **district**, **beneficial** and of **minor significance**.

Capacity of Education Facilities

4.9. **Table 5** provides a summary of the child yield under each Scenario taking account of the revised number and mix of units as set out in **Table 2**. There is minimal variance from the child yield derived under each scenario within the 2018 ES and as such there is no material change to the impact assessment.

Table 5: Child Yield of the Development including May 2019 Amendments (Variance from 2018 ES Chapter in brackets)

Scenario	Under 5	5-11	12+
Scenario 1a	174 (+25)	147 (+13)	93 (+6)
Scenario 1b	69 (-1)	36 (0)	15 (0)
Scenario 2a	181 (-2)	159 (+2)	102 (+2)
Scenario 2b	98 (+14)	51 (+1)	22 (0)

Early Years Education Capacity

4.10. On the basis of the child yield estimates set out above, there is no material change to the assessment of the significance of effects for education capacity. As stated in the submitted 2018 ES, owing to the existing pressures on Early Years capacity within the LIA and District, mitigation in the form of financial contribution via a Section 106 agreement of Community Infrastructure level may be a matter for negotiation to off-set the potential pressures faced by existing providers in accommodating the additional demand arising from the Development. With mitigation, the residual effect from the Development on Early Years providers remains as stated in the 2018 ES, i.e. **insignificant** at both the **local** and **district** level.

Primary Education Capacity

4.11. On the basis of the child yield estimates set out previously, there is no material change to the assessment of the significance of effects for education capacity. As stated in the 2018 ES, owing to the existing pressures on primary school capacity within 2 miles of the Development and the within the District, mitigation in the form of financial contribution via a Section 106 agreement of Community Infrastructure level may be a matter for negotiation to off-set the potential pressures faced by existing providers in accommodating the additional demand arising from the Development. With mitigation, the residual effect from the Development on Early Years providers remains as stated in the 2018 ES i.e. **insignificant** at both the **local** and **district** level

Secondary Education Capacity

4.12. On the basis of the child yield estimates set out previously, there is no material change to the assessment of the significance of effects for education capacity.

As stated in the 2018 ES, the Development includes provision of a six form entry Secondary School with sixth form with capacity for up to 1,200 pupils. It is therefore considered the additional demand arising from the Development could be absorbed by the existing surpluses together with the new provision within the Development and the likely residual effect remains as **insignificant** as reported in the 2018 ES.

Primary Healthcare Capacity

4.13. The estimated population range resulting from the Development is the same as that stated in the 2018 ES. The likely effect of the Development on GP facilities under Scenarios 1 and 2 therefore also remains the same as that stated in the 2018 ES.

4.14. As stated in the 2018 ES, owing to existing pressures on the capacity of primary healthcare facilities within the LIA and District, mitigation in the form of Community Infrastructure Levy funds from the Development or via s106 planning obligations is likely to be required to off-set the potential pressures faced by existing providers. With mitigation, the likely residual effect from the Development on primary healthcare providers would be the same as stated in the 2018 ES, i.e. i**nsignificant** at both the **local** and **District** level.

Demand for Open and Play Space

4.15. The requirement for children's play space has been calculated using the GLA's SPG Play Space Calculator[4] and taking account of the updated child yield in **Table 5**. On this basis, **Table 6** sets out the expected requirement for play space. This suggests a resulting play space requirement of between 1,200m^2 (scenario 1b) and 4,430m^2 (scenario 2a).

Table 6: Play Space Requirements (m^2)

Scenario	Total
Scenario 1a	4,135
Scenario 1b	1,200
Scenario 2a	4,430
Scenario 2b	1,699

4.16. The revised Development includes provision of up to 4,084m^2 GEA of children's play space with a further 10,305m^2 GEA of play space provided as part of the 6FE Secondary School bringing total on-Site provision of up to 14,353m^2. This is more than sufficient to accommodate additional demand arising from the Development.

4.17. In terms of open space, the baseline analysis in the 2018 ES indicated the local area already has above average levels of provision per head of population when compared to the LBRuT average. The Development would result in the loss of 2.06 ha of private open space (Watney's Sports Ground playing fields) but would provide a total of 3.06 ha new green space and a total of 3.89 ha of total publicly accessible amenity space. When considering the additional population arising from the Development (up to 1,850) this level of provision (3.89 ha) amounts to around 2.0 ha per 1,000 population.

4.18. Taking into account the revised estimates of demand and provision, the significance of effects remains as stated in the 2018 ES. No mitigation measures are considered necessary and the likely residual effects of the Development on open space and play space capacity are considered to remain **direct**, **long-term**, **beneficial** at **local** to **district** level and of **minor significance**.

[4] Greater London Authority – SPG Child Yield and Play Space Calculator; https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/supplementary-planning-guidance/play-and-informal

Demand for Community Facilities

4.19. The May 2019 Amendments do not result in any changes to the assessment of demand for community facilities. The likely residual effects therefore remain the same as stated in the 2018 ES across all scenarios:

- **direct**, **long-term**, **beneficial**, **local** and of **minor significance**; and
- **insignificant** at the **district** level.

Community Safety and Wellbeing

4.20. The May 2019 Amendments do not result in any changes to the assessment of community safety and wellbeing. The likely residual effects of the Development on community safety and wellbeing therefore remain the same as stated in the 2018 ES across all scenarios:

- **direct**, **long-term**, **beneficial**, **local** and of **minor significance**; and
- **insignificant** at the **district** level.

Conclusion

4.21. A review of the May 2019 Amendments and an assessment of the socio-economic impacts of the Development (with the May 2019 Amendments) has been undertaken. In conclusion, there are no new likely significant effects compared to those identified in the 2018 ES. Similarly, there is no change to the nature and significance of the environmental effects reported. Therefore, the May 2019 Amendments would not alter the conclusions of the socio-economic assessment as reported in the 2018 ES. As such, no additional mitigation measures are required and those identified in the 2018 ES remain valid.

Transport and Access

Introduction

4.22. This assessment review has been prepared by Peter Brett Associates who undertook the transport and access assessment of the 2018 ES.

4.23. The May 2019 Amendments pertinent to the assessment of transport and access relate to the reduction of 4 residential units, very minor changes to floor areas for non-residential uses, changes to the minimum and maximum land use mix for the flexible land uses, and changes to the number of cycle parking spaces (the latter resulting from an emerging change in policy, which is not yet adopted). Notwithstanding this, the Applicant has sought to amend the Development in line with draft standards. There are no changes to the proposed car parking arrangements as part of the May 2019 Amendments.

4.24. Since the 2018 ES was submitted there have been a number of changes to transport policy. There have also been discussions held with Transport for London and with Network Rail regarding the potential impacts of the Development and proposed mitigation. The emerging changes to policy and the discussions with Transport for London (TfL) and Network Rail have been reported in full within a Transport Assessment (TA) Addendum to the February 2018 Transport Assessment (Appendix 8.1 of the 2018 ES) (refer to **Appendix A** of this ES Addendum).

4.25. As set out in the TA Addendum (**Appendix A**), the main emerging policy change is to the required cycle parking, as set out in the draft London Plan[5] (not yet adopted).

[5] Greater London Authority (GLA) (2017). Draft New London Plan.

Although this is still in draft, it has been agreed with TfL that the increased cycle parking requirements will be adhered to for the Development. As set out in the TA Addendum, this results in the May 2019 Amendments increasing the number of cycle parking spaces from 1,611 to 1,924.

4.26. The discussions with TfL have not resulted in any other changes to the Development or to the proposed mitigation.

4.27. As a result of discussions with Network Rail a package of potential improvements has been agreed in principle at the Mortlake level crossing to enhance the experience of pedestrians and cycles waiting to cross the level crossing. These are described in detail within the TA Addendum, however, they do not form part of the May 2019 Amendments to the planning applications and therefore are not considered further within this ES Addendum.

Assessment

4.28. The Chapter 9: Transport and Access of the 2018 ES assessed the following elements:

- Severance;
- Driver Delay;
- Pedestrian Delay;
- Pedestrian and Cycle Amenity;
- Fear and Intimidation; and
- Accidents and Road Safety.

4.29. The May 2019 Amendments include the reduction of 4 residential units, very minor changes to the floor areas of non-residential land uses and changes to the minimum and maximum land use mix for the flexible land uses. These changes would result in a very small reduction in the overall predicted trip generation for the Development and no material change in the mode share. These changes are within the limits of accuracy of the trip generation predictions and would not materially affect the assessed impacts of the Development on the transport networks.

Conclusion

4.30. A review of the May 2019 Amendments in relation to transport and access has been undertaken. In conclusion, there are no new likely significant effects compared to those identified in the 2018 ES. Similarly, there is no change to the nature and significance of the environmental effects reported. Therefore, the May 2019 Amendments would not alter the conclusions of the transport and access assessment as reported in the 2018 ES. As such, no additional mitigation measures are required and those identified in the 2018 ES remain valid.

Noise and Vibration

4.31. This assessment review has been prepared by Waterman IE who undertook the noise and vibration assessment reported in the 2018 ES.

4.32. As indicated in the Transport and Access section above, the May 2019 Amendments would have no material traffic impact and therefore the traffic data used in the noise and vibration assessment remain unchanged. Furthermore, there is no change to the location of land uses proposed by the Development, including residential uses or areas used for servicing. Given this, the May 2019 Amendments would not change the effects of the Development in relation to noise and vibration as reported in the 2018 ES.

4.33. Whilst the May 2019 Amendments do not change the predicted effects presented in Chapter 9: Noise and Vibration, further assessment modelling was undertaken to support the 2018 ES assessment as requested by the Environmental Health Officer (EHO) at LBRuT. This is presented within **Appendix B**. This further assessment modelling does not alter the conclusions of the noise and vibration assessment as reported in the 2018 ES. As such, no additional mitigation measures are required and those identified in the 2018 ES remain valid.

4.34. In conclusion, there are no new likely significant noise and vibration effects as a result of the May 2019 Amendments compared to those identified in the 2018 ES. Similarly, there is no change to the nature and significance of the environmental effects reported. Therefore, the May 2019 Amendments would not alter the conclusions of noise and vibration assessment as reported in the 2018 ES. As such, no additional mitigation measures are required and those identified in the 2018 ES remain valid.

Air Quality

Introduction

4.35. This assessment review has been prepared by Waterman IE who undertook the original air quality assessment reported in the 2018 ES.

4.36. As outlined in the Transport and Access section above, the May 2019 Amendments would have no material traffic impact and therefore the traffic data used in the air quality assessment remained unchanged. In addition, there is no change proposed to the location of and/or the type of plant to be included in the Energy Centre. Given this, there are no changes to the predicted emissions generated by the Development.

4.37. Furthermore, the location of the on-site air quality sensitive uses (including the location of the school and residential units) remains unchanged. Internal changes to the room layouts of the residential units included within Buildings 2, 3 and 8 do not impact the air quality assessment, which has focused on the façade of each building.

4.38. Given the above, the May 2019 Amendments would not change the effects of the Development in relation to air quality as reported in the 2018 ES.

4.39. Whilst the May 2019 Amendments do not change the predicted effects presented in Chapter 10: Air Quality of the 2018 ES; between July 2018 and January 2019 Waterman IE has undertaken project specific air quality monitoring at Chalkers Corner and on Lower Richmond Road (**Appendix C**). The purpose of the air quality monitoring was to supplement LBRuT's own monitoring and to determine existing baseline conditions at Chalkers Corner and at the proposed school site, as well as to further check the performance of the air quality model (referred to as model verification).

This ES Addendum presents the project specific air quality monitoring results, as well as the updated model verification (**Appendix D**).

4.40. In addition, as considered in Chapter 10: Air Quality of the 2018 ES, changes to Chalkers Corner are proposed as part of the Development, which include the introduction of a 2 metre high wall and two landscaping areas of new planting (including min 6 metres high semi-mature trees) outside Chertsey Court. Since the time of undertaking the air quality assessment new guidance and research has been published on green infrastructure. This guidance is considered under the 'Assessment' section below.

4.41. Included in **Appendix E** of this ES Addendum, the Air Quality Neutral Assessment has been updated to account for the changes in the area schedule of the Development as outlined in Section 2 above.

Assessment

Project Specific Air Quality Monitoring

4.42. A short-term air quality monitoring study for nitrogen dioxide (NO_2) was undertaken within boundary of Application C around Chalkers Corner and on Lower Richmond Road, for a 6-month period, from July 2018 to January 2019. The technical details of the monitoring are provided in **Appendix C** and the location of the monitors are shown on **Figure 4.1**.

4.43. The results from this monitoring are presented in **Table 7**.

Table 7: Project Specific NO_2 Monitoring Results ($\mu g/m^3$)

ID	Site Description	Monitor Classification[a]	Relevant AQS Objective[b]	Annual Average 2018 Result
DT1	Lower Richmond Road	Kerbside	60µg/m^3	43.0
DT2	Chertsey Court metal railings	Roadside	60µg/m^3	36.9
DT3	Chertsey Court Lower Richmond Road	Façade	40µg/m^3	34.2
DT4	Chalkers Corner Junction	Kerbside	60µg/m^3	42.7
DT5	Chertsey Court	Carpark	60µg/m^3	40.4
DT6	Clifford Avenue	Kerbside	60µg/m^3	49.1
DT7	Clifford Avenue metal railings	Roadside	60µg/m^3	42.1
DT8	Chertsey Court Clifford Avenue	Façade	40µg/m^3	32.8
School 1	Stag Brewery Sports Club (future school façade)	Roadside	40µg/m^3	30.2
School 2	Stag Brewery Sports Club (future school façade)	Roadside	40µg/m^3	30.1

Note: [a]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 and school exposure;
Carpark = monitor located within an open-air car park
[b]As set out in Box 1.1 of LAQM.TG(16)

Results for Kerbside and Roadside Monitoring

4.44. As shown in **Table 7**, the highest concentrations measured at all of the diffusion tubes in the study are located on the kerbside (monitored concentrations of 43.0µg/m^3, 42.7µg/m^3 and 49.1µg/m^3). The NO_2 results at these locations relate to these monitors being located directly above vehicle tailpipe emissions at Chalkers Corner.

4.45. As presented in Table 10.11 of Chapter 10: Air Quality of the 2018 ES, these kerbside results in **Table 7** are similar to LBRuT kerbside monitoring results at Chalkers Corner (ranging between 32µg/m^3 to 57µg/m^3, with an average concentration across all sites of 48.6µg/m^3). Consequently, both the LBRuT and the project specific monitoring show all kerbside locations are below the hourly equivalent annual mean NO_2 concentration of 60µg/m^3 and therefore the AQS objective is met at these monitoring locations.

4.46. Similar to the kerbside locations, as shown in **Table 7**, monitored concentrations at the diffusion tubes located on the roadside at Chalkers Corner (as 36.9µg/m^3 and 42.1µg/m^3) and in the carpark of Chertsey Court (as 40.4µg/m^3) are below the hourly equivalent annual mean NO_2 concentration of 60µg/m^3 and as such the AQS objective is also met at these monitoring locations. These roadside results are similar to LBRuT's roadside monitoring result on Lower Richmond Road (as 39µg/m^3) undertaken in 2016 and presented in Table 10.11 of Chapter 10: Air Quality of the 2018 ES.

4.47. Overall, the project specific monitoring is comparable with LBRuT's roadside and kerbside monitoring.

Results for Monitored Conditions at Chertsey Court

4.48. The results in Table 6 show monitored concentrations at the façade of Chertsey Court are below the relevant annual mean NO_2 AQS objective of 40µg/m^3, as 34.2µg/m^3 and 32.8µg/m^3, and as such existing conditions at Chertsey Court are considered to be good as the AQS objective is met.

4.49. The monitoring results in **Table 7** and **Figure 2** show there is an average decrease in NO_2 concentrations from the kerbside and roadside monitors (DT1, DT2, DT6, DT7) to the Chertsey Court façade (DT3, DT8) of 9.3µg/m^3. This is considered to relate to the existing wall/railings and vegetation located at the boundary of Chertsey Court which will restrict dispersion and act as a buffer to vehicle emissions.

4.50. This data differs to the baseline detailed dispersion modelling results presented in Appendix 10.4 of Chapter 10: Air Quality of the 2018 ES which shows 49 out of 150 modelled receptors at the façade of Chertsey Court are above the annual mean NO_2 AQS objective. However, the dispersion model assumes a flat terrain and cannot take account of different landforms such as the existing wall and vegetation acting as a buffer. In addition, the traffic data used in the air quality assessment assumes, at all times of the day, the traffic queue lengths at Chalkers Corner are those when the junction is congested and not operating effectively. In reality the queue lengths are only applicable to peak times, and not every hour of every day throughout the year.

4.51. Given the above, the modelled results used in the air quality assessment to determine impacts at Chertsey Court are considered to be worst-case and conservative. The monitoring results show existing conditions at Chertsey Court meet the AQS objective.

4.52. As part of the Development, the existing green screen is to be removed and a revised landscaping strategy proposed at Chertsey Court to include a 2m high brick wall and two landscaping areas of new mature planting, including min 6-metre high semi-mature trees. Comparing the existing green screen (which includes a low brick wall and iron railing; and intermittent planting) against the proposed landscape strategy; given the proposed 2m high brick wall is non- permeable and is denser than the existing porous green screen, the revised landscape strategy is likely to provide greater improvement to air quality at Chertsey Court as the ability of air and traffic emissions to travel to Chertsey Court will be reduced. As discussed below, the use and benefits of the green screen are promoted in relevant guidance. The improved green screen is likely to ensure future conditions at Chertsey Court are to remain below the AQS objective.

4.53. For the purposes of the air quality assessment, the worst-case / conservative results from the dispersion model are presented at receptor locations for Chertsey Court because the dispersion model is not able to take account of adjacent landforms i.e. the green screen. Therefore, the results presented in the AQA are worst case.

Results for Monitored Conditions at the Proposed School Site

4.54. As shown in **Table 7**, existing NO_2 concentrations at the location of the proposed school are below the annual mean NO_2 AQS objective of 40µg/m^3, as 30.1µg/m^3 and 30.2µg/m^3, and as such existing conditions at the school site are considered to be good.

4.55. The monitoring results at the proposed school are similar to the modelled result for sensitivity NO_x and NO_2 sensitivity analysis of the location of the school (as 28.2µg/m^3) presented in Table 10.15 of Chapter 10: Air Quality of the 2018 ES. On comparing the results of the modelling against the project specific monitoring, it is considered the modelled results are applicable and valid and future users of the school are unlikely to be exposed to poor air quality.

Model Verification

4.56. 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.

4.57. 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 (as presented in **Table 7**) to determine the accuracy of the 2018 ES model with the new monitoring data. The results of this are presented in **Appendix C**. 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.

4.58. As identified in **Appendix D**, 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.

Green Infrastructure

4.59. As considered in Chapter 10: Air Quality of the 2018 ES, changes to Chalkers Corner are proposed, which includes the introduction of a 2 metre high wall and two landscaping areas of new planting (including min 6 metre high semi-mature trees) outside Chertsey Court.

4.60. Since the time of the air quality assessment in the 2018 ES the guidance documents presented in **Table 8** have been published on the use of green infrastructure to protect human health from traffic emissions. The guidance along with relevant details which support the landscape proposals included as part of the Development at Chertsey Court are presented in **Table 8**.

Table 8: Green Infrastructure Guidance Documentation

Guidance	Supporting Evidence
Ministry of Housing, Communities and Local Government, 2019, National Planning Policy Framework	• 'Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications.'
Mayor of London, 2019, Using Green Infrastructure to Protect People from Air Pollution	• 'Where priority is to protect people immediately at the roadside - a hedge or green wall between vehicles and people can as much as halve exposure in their immediate wake'; • 'Where priority is to protect people further away (e.g. children in a school playground bordering the street) - a combination of hedge and dense line of trees can provide a taller vegetation barrier, offering protection over a greater distance downwind' • 'Vegetation barriers, hedges and green walls should: extend from ground level to a height of at least 2m; and be as thick and dense as possible to ensure effective blocking of air flow from vehicles to people. Green walls must also be suitably maintained to remain effective at blocking the flow of air'.
Air Quality Expert Group (AQEG), 2018, Impacts of Vegetation on Urban Air Pollution	• 'main value of green infrastructure for urban air quality does not lie in its ability to remove pollutants, but in its ability to control their distribution'; • 'urban vegetation can greatly reduce the amount of emissions people are exposed to. It does this by changing the distance they must travel from the source to reach people, and the extent to which they are diluted with cleaner air along the way' • 'a vegetation barrier can as much as halve the levels of pollutants just behind the barrier. The benefit largely comes from forcing the main flow of air over and around the barrier.'
Kings College, 2018, The Impact of a Green Screen on Concentration of Nitrogen Dioxide at Bowes Primary School, Enfield	• 23% improvement in NO_2 identified when a green wall was placed between a busy road and a school playground
University of Birmingham and Lancaster University, 2018, First Steps in Urban Air Quality for Built Environment Practitioners	• 'As part of the urban infrastructure, Green Infrastructure influences pollution dispersal and deposition. If strategically designed, Green Infrastructure can mitigate poor air quality on a local-scale.'

4.61. Whilst the monitoring in **Table 7** shows existing conditions at Chertsey Court are below the NO_2 AQS objective, the guidance documents presented in **Table 8** provide evidence that the introduction of a 2 metre high wall and two landscaping areas of new mature planting (including 6 metres high mature trees) outside Chertsey Court as part of the Development will protect users of Chertsey Court against changes in vehicle emissions.

4.62. Further to this, the May 2019 Amendments include the introduction of climber planting on the street frontage at Chalkers Corner. The use of a climber is considered to further benefit air quality through the greater surface coverage, which is likely to entrap pollutants and acts as an additional barrier against traffic emissions.

4.63. Consequently, the benefit of the green infrastructure on local air quality, as presented in Chapter 10: Air Quality of the 2018 ES, remains applicable and valid.

Conclusion

4.64. Given the May 2019 Amendments make no changes to the traffic data; Energy Centre details; or modelled receptor locations, the air quality effects and the conclusions as reported in the Chapter 10: Air Quality of the 2018 ES remain applicable and valid.

4.65. Project specific air quality monitoring has been undertaken at Chalkers Corner and on Lower Richmond Road. The results show:

- The project specific monitoring at kerbside and roadside monitoring sites are comparable to LBRuT's own monitoring data as presented in Chapter 10: Air Quality of the 2018 ES;
- Existing air quality conditions at Chertsey Court are below the relevant AQS objective and as such air quality is good at Chertsey Court;
- Existing air quality conditions at the school site are below the relevant AQS objective and as such future users of the school are unlikely to be exposed to poor air quality, despite the proposed Development.

4.66. Using the project specific monitoring, the model is considered to be performing well against monitoring results. No adjustment factor has been applied. This is the same approach as presented in Chapter 10: Air Quality of the 2018 ES, and therefore the ES remain applicable and valid.

4.67. Further guidance documents have been published on the effectiveness of green infrastructure in improving air quality. The latest guidance provides evidence that the landscape proposals included in the Development (a 2 metre high wall and two landscaping areas of new mature planting, including 6 metre high mature trees) outside Chertsey Court, and the proposed Amendments (to include a climber planting on the street frontage at Chalkers Corner) will improve air quality conditions at Chertsey Court. As such the benefit of the green infrastructure on local air quality, as presented in Chapter 10: Air Quality of the ES 2018, remains applicable and valid.

4.68. On the basis of the reassessment presented above, there are no new likely significant air quality effects compared to those identified in the 2018 ES. Similarly, there is no change to the nature and significance of the environmental effects reported in that document. Therefore, the May 2019 Amendments and the reassessment above would not alter the conclusions of the air quality assessment as reported in the 2018 ES. As such, no additional mitigation measures are required and those identified in the 2018 ES remain valid.

4.69. Included in **Appendix E** of this ES Addendum, the conclusions of the Air Quality Neutral Assessment (as 'Air Quality Neutral' with respect to transport emissions and not 'Air Quality Neutral' with respect to building emissions) remains the same as those presented in Chapter 10: Air Quality of the ES.

Ground Conditions and Contamination

4.70. This assessment review has been prepared by Waterman IE who undertook the original ground conditions and contamination assessment reported in the 2018 ES.

4.71. No significant structural changes are associated with the May 2019 Amendments and no changes to foundations or basement design, or building footprint, are proposed. Therefore, the May 2019 Amendments would not affect by ground conditions contamination.

4.72. Therefore, the May 2019 Amendments would not alter the conclusions of the ground conditions and contamination assessment as reported in the 2018 ES. As such, no additional mitigation measures are required and those identified in the 2018 ES remain valid.

Surface Water Drainage and Flood Risk

Introduction

4.73. This assessment review has been prepared by Waterman IE, who prepared the original surface water drainage and flood risk Chapter, reported in the 2018 ES, and who undertook the original surface water drainage strategy for the 2018 Applications.

4.74. Since submission of the 2018 Planning Applications consultation with the Environment Agency (EA) regarding Building 9 (now referred to as the Water Sports Centre) and the Ship Lane and Bulls Alley flood defences has been undertaken.

4.75. In response to the EA's comments, changes were made to the layout of Building 9 and to how the future Ship Lane flood defence would operate. All other aspects that relate to the River Thames defences (e.g. access, alignment, offsets etc.) remain as per the 2018 ES.

4.76. Changes were also made to the drainage strategy post-submission in response to comments from the Greater London Authority (GLA) and the LBRuT arboricultural officer. A Drainage Strategy Addendum (**Appendix F**) has been prepared to summarise the changes made to the drainage strategy post-planning and to assess the impact on drainage of the May 2019 Amendments. A summary of the Drainage Strategy Addendum is included in the Assessment section below.

4.77. The May 2019 Amendments would not alter the footprint of buildings within the Development, areas of hard and soft landscaping (other than amendments to the Water Sports Centre) and there would be no change to foundation or basement design are proposed. As such, effects in respect of flood risk in relation to groundwater would remain as reported in ES Chapter 12: Surface Water Drainage and Flood Risk and ES Appendix 12.1: Flood Risk Assessment (prepared by Hydro-logic). The reduction of 4 residential units as part of the May 2019 Amendments and therefore potable water demand and foul water drainage capacity are considered further within the Assessment section below.

4.78. In summary, the Assessment below focuses on changes to surface water drainage and pluvial flood risk, foul water drainage capacity, potable water demand, and tidal flood risk.

Assessment

Breach Flood Risk

4.79. In response to the EA's comments regarding Ship Lane a permanent passive flood defence can be incorporated in the future and the May 2019 Amendments include for this. This has been achieved by:

- Extending the northern façade of Building 9 by including a raised ground floor terrace incorporated into the flood wall, replacing ground level landscaping in this location.
- Raising Building 9 ground floor levels (as previously reported).
- Ensuring that ground levels on Ship Lane could be raised to 6.70m AOD (in line with the future requirements of the TE2100 Plan).

4.80. Drawings provided in Appendix E of Waterman's River Wall Environment Agency Briefing Note (**Appendix G** of this ES Addendum) show how the required ramping to achieve the necessary flood defence level in Ship Lane 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).

4.81. Through the May 2019 Amendments, a permanent passive line of defence to 6.70m AOD has been provided along the front (river side) edge of Building 9, please refer to drawings included in Appendix F of Waterman's River Wall Environment Agency Briefing Note (**Appendix G**). This has been achieved by ramping up finished floor levels internally towards the River Thames where the edge of the building forms part of the defence. There are no windows, doors or other openings in the line of defence below 6.70m AOD.

4.82. The wall of Building 9 would tie into the existing Bulls Alley defence. The existing Bulls Alley defence is outside of the Applicant's ownership and therefore no works would be undertaken to this asset. As requested by the EA, to ensure future options for raising the Bulls Alley defence would not be limited as a result of the proposals, no access routes have been provided from Building 9 that front onto Bulls Alley. A ramp, wall or gate could therefore be installed in the future without affecting the proposed Building 9.

4.83. The baseline breach flood risk data has not changed, however active (temporary) defences proposed in Building 9 and proposed in the future across Ship Lane have been replaced by passive (permanent) defences. This has the benefit of removing the risk of defences being left open, however the risk of tidal flooding remains negligible.

Surface Water Drainage

4.84. The May 2019 Amendments do not alter the footprint of buildings within the Development, areas of hard and soft landscaping. The surface water drainage strategy is therefore not affected. Appropriate treatment of runoff would be provided by green roofs, rainwater harvesting, permeable paving, and pollutant-intercepting biomats in the geo-cellular tanks.

4.85. Following submission of the 2018 Planning Applications, the GLA and the LBRuT arboricultural officer provided a number of comments relating to the drainage strategy. A Briefing Note (Appendix B of **Appendix F**) was prepared demonstrating the changes to the drainage strategy that were made in response. The changes included the following:

- The 3G sports pitch was removed from the surface water drainage catchment on the basis that it would drain freely (requested by the GLA despite the infiltration rate likely being poor/unsuitable, to be confirmed during detailed design);
- Permeable paving extents and the rain garden would be added to the drainage strategy drawing with attenuation volumes quantified to demonstrate a reduction in runoff beyond the 50% mark; and
- A summary of all Sustainable Drainage Systems (SuDS) included within the scheme was provided to demonstrate how these provide multiple benefits to the Development.

4.86. The Briefing Note provides details of the updated drainage strategy including surface water calculations. The amended drainage strategy (Appendix B of **Appendix F**) demonstrates that a 69% betterment in surface water flows is achieved compared to the existing case and that the drainage strategy is integrated with the landscape proposals to provide wider amenity benefits to the Development.

4.87. The GLA subsequently confirmed (Appendix C of **Appendix F**) that the drainage strategy was in line with their aspirations.

4.88. A Pre-Planning Enquiry was submitted to Thames Water shortly after submission of the planning application. Thames Water confirmed (Appendix D of **Appendix F**) that at the time of their response (May 2018) there was sufficient capacity to accommodate the proposed surface water flows within their network. The rates submitted to Thames Water were higher than the rates currently proposed (due to the further reductions provided by the changes to the strategy). It is therefore anticipated that there would still be capacity. The letter is valid for 12 months, i.e. due to expire in May 2019. Thames Water have been re-consulted to confirm that their response is still valid, with a response currently outstanding.

4.89. As the Development would still include SuDS and the management of surface water, with a reduction in runoff beyond 50% of the existing rate, the likely residual effect of pluvial flooding would be as reported in the 2018 ES, i.e. long-term, local, beneficial and of minor significance. The risk of surcharging sewers is also considered to remain insignificant once the Development is completed and operational, given the further reductions provided by the changes to the drainage strategy and Thames Water have been re-consulted to confirm that there is still capacity within their network to accommodate the proposed foul flows.

Foul Water Drainage Capacity

4.90. The May 2019 Amendments include a reduction of four residential units, reducing the total number of residential units from 667 to 663. The proposed foul flow calculations have been amended to reflect this reduction (Appendix D of **Appendix F**), resulting in the same proposed foul flows (25.5 l/s). This means that the amendments have resulted in a negligible reduction in flows. The proposed reduction in non-residential floor space would have negligible effects on the proposed foul flows and has therefore not been considered further.

4.91. The proposed connections into the Thames Water sewer network are as per the previous strategy set out in the 2018 ES, shown on the drainage strategy plan (Appendix B of **Appendix F**).

4.92. Thames Water's response to the Pre-Planning Enquiry (Appendix D of **Appendix F**) confirms that at the time of the letter (May 2018) there was sufficient capacity to accommodate the proposed foul flows. The proposed number of units has decreased as a result of the amendments, and therefore it is anticipated that there would still be capacity. Thames Water have been re-consulted to confirm that their response is still valid, with a response currently outstanding.

4.93. Given the negligible reduction in proposed foul flows and Thames Water have previously confirmed that there is capacity within their network to accommodate the proposed flows, the Development is likely to result in an insignificant effect in respect of the capacity of foul water drainage, as reported in the 2018 ES.

Potable Water

4.94. In terms of potable water supply, the reduction of four residential units would not significantly alter the water supply demand rates of the Development (estimated to be 2.5 l/s for Buildings 1 to 4). As such, the effect of the Development on potable water demand would remain as reported in the 2018 ES (i.e. insignificant).

Conclusion

4.95. The May 2019 Amendments do not give rise to any new likely significant surface water drainage or flood risk effects compared to those identified in the 2018 ES. Similarly, there is no change to the nature and significance of the effects reported.

4.96. However, the May 2019 Amendments have provided further detail in respect of drainage and breach flood risk to take into consideration the comments provided by the Lead Local Flood Authority (LLFA), Greater London Authority (GLA) and the EA. Nevertheless, the May 2019 Amendments would not alter the conclusions of the 2018 ES. As such, no additional mitigation measures are required and those identified in the 2018 ES remain valid.

Ecology

4.97. This assessment review has been prepared by Waterman IE who undertook the original ecology assessment reported in the 2018 ES.

4.98. Although there is replacement climber planting proposed at Chalkers Corner a part of the May 2019 Amendments, there are no significant changes to the proposed areas of soft landscaping, green and brown roofs or lighting strategy as part of the May 2019 Amendments. On this basis the May 2019 Amendments would not change the effects of the Development in relation to ecology as reported in the 2018 ES.

4.99. Whilst the May 2019 Amendments do not change the predicted effects presented in Chapter 13: Ecology of the 2018 ES; further surveys of the existing river wall for roosting bats has been undertaken following comments from the LBRuT. On 18th and 25th October 2018 as agreed with LBRuT two separate endoscope inspections of those potential bat roosting features present were carried out. In summary, no evidence of roosting bats was recorded during either survey and consequently it is considered that results of these surveys would not materially alter the environmental effect(s) as stated within the 2018 ES.

4.100. Full details of the methodologies employed, and results of these surveys are provided within **Appendix H**.

4.101. In conclusion, the May 2019 Amendments and further surveys would not alter the conclusions of the ecology assessment as reported in the 2018 ES. As such, no additional mitigation measures are required and those identified in the 2018 ES remain valid.

Archaeology

4.102. This assessment review has been prepared by CgMs Heritage (part of RPS) who undertook the original archaeology assessment reported in the 2018 ES.

4.103. In respect of policy, since the 2018 ES was produced, the NPPF has been updated, (2019)[6], however, policy relating to archaeology has not significantly changed. A new London Plan[7] has been prepared in draft (not yet adopted). Policy in the adopted and draft London Plan would be adhered to by the agreed archaeological strategy already in place for the Development.

4.104. No significant structural changes are associated with the May 2019 Amendments and no changes to foundations or basement footprint are proposed.

4.105. The May 2019 Amendments would not alter the conclusions of the ecology assessment as reported in the 2018 ES. and the conclusions of the 2018 ES remain valid in relation to archaeology. As set out in the 2018 ES further archaeological mitigation measures are anticipated following the granting of planning consent and are anticipated to be secured by appropriately worded conditions. This strategy has been confirmed by the Greater London Archaeological Advisory Service who provide archaeological advice to LBRuT. As such, no additional mitigation measures are required and those identified in the 2018 ES remain valid.

Built Heritage

Introduction

4.106. The May 2019 Amendments include a number of changes to the built heritage (above ground) assets within the Development, including the Maltings Building, the Former Bottling Building and Former Hotel Building, as outlined in Section 2. These changes include the re-instatement of historic features, the retention and relocation of elements of historic fabric and the reconfiguration of internal spaces, which have the potential to materially alter the likely significant direct effects of the Development during the Works. Once completed and operational, the May 2019 Amendments would not change the conclusions and likely significance of effects reported within the 2018 ES Chapter 15, as the May 2019 Amendments relate solely to the Works to the heritage assets. Furthermore, the May 2019 Amendments would not result in any change to the likely indirect effects to heritage assets within and surrounding the Site as the May 2019 Amendments would not alter the indirect effects as set out in the 2018 ES Chapter 15, i.e. the demolition of the existing modern Stag Brewery structures, the potential for noise, vibration dust and additional traffic and change to the setting of heritage assets. The assessment below therefore focusses on the potential change to the likely significant direct effects during the Works as a result of the May 2019 Amendments.

4.107. Since the production of the ES a new version of the NPPF[6] (2019) has been published. This has not changed the conclusions of the ES.

[6] Ministry of Housing, Communities & Local Government (2019). National Planning Policy Framework. Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2
[7] Greater London Authority (GLA) (2017). Draft New London Plan.

4.108. The assessment methodology used for this addendum is the same as that used in the ES.

Assessment

Likely Significant Effects

The Works - Direct Effects

The Former Hotel Building (BTM)

4.109. The May 2019 Amendments to the former Hotel Building include the reinstatement of the two chimneys to the south side of the building and the retention of the chimney to the north side of the building, as well as a revision to the materiality of the roof, which would be finished in slate. These changes would allow the historic appearance of the roofscape, which contributes to the aesthetic value of the heritage asset, to be retained. It is also proposed to retain the brick window arches, which are a characteristic feature of the curved façade of the building and which contribute to the asset's aesthetic value. It is considered that these amendments would result in an improvement to the proposals for the former Hotel building. However, these changes result in no change to the likely significance of effects of the Works.

The Former Bottling Building (BTM)

4.110. It is proposed that a number of the internal cast iron columns within the former Bottling Building would now be retained as part of the Development and relocated across the ground, first and second floors of the building. These surviving characteristic architectural features contribute to the aesthetic and evidential values of the heritage asset and their retention would allow an understanding of the building's former industrial use. On the south façade of the building, the May 2019 Amendments include the insertion of new timber doors to replicate the historic hoist doors, this would allow the asset's former use to be appreciated and understanding of its context enhanced. In addition, the Stag sign is proposed to be relocated and positioned on the former Bottling building. Overall, it is considered that these amendments would enhance the proposals for the former Bottling building, although they do not alter the conclusions pertaining to the likely significance of effects of the Works.

The Maltings Building (BTM)

4.111. The May 2019 Amendments to the Maltings Building include changes to the number and placement of double height windows. To the east and south elevations of the building a number of additional double height windows are proposed, as well as a further column of windows on the east elevation. In addition, two new double doors to the ground floor on the south elevation are proposed in order to provide access to the flexible use space. To the significant north elevation, however, it is proposed to reduce the number of double height windows and to the west elevation it is proposed to completely remove the double height windows which previously formed part of the Development. As identified in the 2018 ES, the introduction of double height windows would diminish the appreciation of the heritage asset's significance, as the existing windows are illustrative of the shallow floor to ceiling heights that existed historically. Therefore, the May 2019 Amendments are considered to lessen this adverse effect and is considered to better preserve the aesthetic value of the building.

4.112. The works to the Maltings building also include the omission of the originally proposed balustrades to the balconies on the north elevation. This revision to the proposal would result in an aesthetic more in keeping with the industrial history of the building. It is also proposed to retain some of the internal cast iron columns, which would be relocated to the entrance area to the flexible use space. These surviving historic features contribute to the evidential and aesthetic value of the heritage asset and their retention would allow an appreciation and better understanding of the building's former industrial use. The memorial plaques would be relocated to the east elevation of the Maltings building.

Conclusion

4.113. It is overall considered that the May 2019 Amendments would improve the proposals for the Maltings building, however it is assessed that these revisions do not result in a change to the likely significance of effects of the Works.

4.114. **Table 9** re-provides a summary of the likely direct effects of the Works and their significance on the Former Hotel Building, Former Bottling Building and Maltings Buildings. This is consistent with Table 15.5 of ES Chapter 15: Built Heritage.

Table 9: Likely Direct Effects of the Works and their Significance (2018 ES Built Heritage)

Heritage Asset	Level of Heritage Significance	Magnitude of Impact	Significance of Direct Effect
Former Hotel Building (BTM).	Low.	Major adverse.	**Direct**, **permanent**, **local**, **adverse** effect of **minor to moderate significance**.
Former Bottling Building (BTM).	Low.	Major adverse.	**Direct**, **permanent**, **local**, **adverse** effect of **minor to moderate significance**.
Maltings Building (BTM).	Medium.	Moderate adverse.	**Direct**, **permanent**, **local**, **adverse** effect of **moderate significance**.

Townscape and Visual

Introduction

4.115. This assessment review has been prepared by Waterman IE who undertook the original townscape and visual impact assessment reported in the 2018 ES.

4.116. As outlined in Section 2 of this ES Addendum, the May 2019 Amendments have changed the exterior of the proposed built form of the Development. To determine the potential impact, the visual amenity and townscape character were reassessed in relation to these changes.

Assessment

Visual Assessment

4.117. While the May 2019 Amendments have potential to be visible from several of the viewpoint locations, when assessing the May 2019 Amendments, it is considered that viewpoints 4 and 6 would be most likely to be affected. Photomontages of these views are shown in Figure 1 and Figure 2 in **Appendix I**. These show the original photomontages produced for the 2018 ES and the updated photomontages produced for this ES Addendum including for the May 2019 Amendments. Visible changes include variations in façade design and the layout of window frontages as well as the relocation or omission of chimneys. Specifically, amendments to Building 9, which include the redesign of its roof top and changes to the northern elevation of the building could become visible. Furthermore, the windows on the Maltings building (Building 4) have been partially relocated and the associated balconies redesigned to have less disruptive effect on the existing building. The changes that can be seen from viewpoints 4 and 6 are considered negligible and do not alter the original findings of the 2018 ES. Assessments of all other viewpoints are unaffected by the May 2019 Amendments.

Townscape Character Assessment

4.118. From a townscape perspective the overall siting and appearance of the proposed built form would not be altered as a result of the May 2019 Amendments. As a result, the assessment of the effects on townscape character are considered to be in accordance with the 2018 ES.

Conclusion

4.119. Overall, the scale and massing of the Development would remain as per the 2018 Planning Applications. Whereas there are some changes to the facades and location of vertical elements such as chimneys, the overall appearance of the Development remains similar. The May 2019 Amendments do not give rise to any new likely significant townscape and visual effects compared to those identified in the 2018 ES. Similarly, there is no change to the nature and significance of the effects reported. Therefore, the May 2019 Amendments would not alter the conclusions of the 2018 ES. As such, no additional mitigation measures are required and those identified in the 2018 ES remain valid.

Wind Microclimate

Introduction

4.120. This assessment review has been prepared by RWDI who undertook the original wind microclimate assessment reported in the 2018 ES.

4.121. The assessment of the May 2019 Amendments has been undertaken using professional judgement as they do not constitute significant amendments to the scheme massing as assessed in the 2018 ES or the intended uses within the Development.

Assessment

4.122. The changes to entrance layouts as described in Section 2 of this ES Addendum associated with the Maltings building (Building 4) and Bottling building (Building 6) occur in areas where conditions were at worst suitable for standing during the windiest season, which would all be appropriate for entrances (Figure 17.5 of the 2018 ES:
Pedestrian Wind Comfort Conditions – Ground Floor, Configuration 2, Windiest Season). As such, these changes do not alter the conclusions of the 2018 ES.

4.123. The Watney's Brewery gates were not modelled within the 2018 ES, as their railing-type construction presents a highly porous structure to the wind. In addition, pedestrian thoroughfare routes are unaffected by their relocation. As such, these changes do not alter the conclusions of the 2018 ES.

4.124. Within the 2018 ES, Figure 17.9 (Pedestrian Wind Comfort Conditions - Balconies and Roof View, Configuration 2, Summer Season) all conditions on balconies for Building 2 and Building 3 (measured locations 285 - 293) were shown to be suitable for sitting during the summer season. As such, these changes do not alter the conclusions of the 2018 ES.

4.125. The Juliette balconies on the Maltings Building (Building 4) do not protrude from the façade line and were not assessed in respect of the wind microclimate. Their removal therefore does not alter the conclusions of the 2018 ES.

4.126. Within the 2018 ES, Figure 17.8 (Pedestrian Wind Comfort Conditions – The Development with existing surrounding buildings (Ground Floor Summer Season) indicates the area to the north of Building 9 (measured locations 244, 295 and 245) is suitable for standing and sitting during the summer season. It is not anticipated these conditions would change as a result of the changes to Building 9 as part of the May 2019 Amendments, i.e. raising ground levels at the northern façade of this building to 6.7m AOD and incorporating this area as a terrace. Should the areas of the terrace which have standing conditions be required for seating the wind microclimate would likely not be ideal for the intended pedestrian uses. As such, localised shelter (i.e. planters and shrubs and/or screens up to around 1.5m tall) would be required. This would likely improve wind conditions at these locations so that sitting conditions are achieved during the summer and therefore not changing the conclusions of the 2018 ES.

Conclusion

4.127. The 2018 ES concluded that notwithstanding two areas of tentative use, the Development was expected to be suitable for the desired uses. The May 2019 Amendments do not alter the findings of the 2018 ES.

4.128. The May 2019 Amendments do not give rise to any new likely significant wind effects compared to those identified in the 2018 ES. Similarly, there is no change to the nature and significance of the wind effects reported. Therefore, the May 2019 Amendments would not alter the conclusions of the 2018 ES. As such, no additional mitigation measures are required and those identified in the 2018 ES remain valid.

Daylight, Sunlight, Overshadowing and Light Pollution

Introduction

4.129. This assessment review has been prepared by EB7 who undertook the daylight, sunlight, overshadowing and light pollution assessment of the 2018 ES. As set out in the 2018 ES, internal daylight and sunlight of the residential units within the Development is not considered an EIA issue. Consideration of the May 2019 Amendments in relation to internal daylight and sunlight of the residential units within the Development is considered in a separate standalone document.

4.130. The methodology used for this assessment review is the same as Chapter 18: Daylight, Sunlight, Overshadowing and Light Pollution of the 2018 ES.

4.131. Since the 2018 ES the neighbouring planning consent at Boat Race House has been implemented. Boat Race House is situated immediately to the east of the Site, across Bulls Alley and is the subject of permitted development for the conversion of B1 (offices) to C3 (dwelling houses) under planning application reference no. 16/2087/GPD15. In addition, consent for the erection of one additional storey was also granted under planning application reference no. 16/4794/FUL. Given the residential use, this property is now considered to be a potentially sensitive receptor in relation to the Development and a daylight and sunlight assessment to the Boat Race House has been undertaken.

4.132. As the May 2019 Amendments in terms of the bulk and mass are not material, the 2018 ES massing has been utilised for the technical assessment. Similarly, because the changes to the bulk and mass are not material, further consideration of the sensitive receptors set out in the 2018 ES is not necessary and the conclusions of the 2018 ES in relation to them remain valid.

4.133. Appendix A of **Appendix J** provides a revised assessment of the 2018 ES Appendix 18.1: Drawings of the Baseline Condition and Development Scenario. Appendix B of **Appendix J** provides the detailed results of the daylight (VSC, NSC and ADF) and sunlight (APSH) analysis for the Boat Race House only and Appendix C of **Appendix J** provides the detailed mirror baseline results of the daylight and sunlight analysis for the Boat Race House.

Assessment

Baseline Conditions

4.134. **Tables 10 to 13** present the baseline daylight and sunlight results for the Boat Race House receptor.

Table 10: Baseline Daylight (VSC) Summary

Surrounding Properties	Total Number of Windows	Total number of windows that achieve VSC levels above those suggested in the BRE Guidance	Total number of windows that achieve VSC levels below those suggested in the BRE Guidance
Boat Race House	59	53	6

Table 11: Baseline Daylight (NSC) Summary

Surrounding Properties	Total Number of Rooms	Total number of rooms above 50% well lit	Total number of rooms below 50% well lit
Boat Race House	32	32	0

Table 12: Baseline Daylight (ADF) Summary

Surrounding Properties	Total Number of rooms	Total number of rooms above BRE suggested targets	Total number of rooms below BRE suggested targets
Boat Race House	32	20	12

Table 13: Baseline Sunlight (APSH) Summary

Surrounding Properties	Total Number of windows facing the Site and within 90º of due south	Total number of windows above BRE suggested targets for total and winter APSH	Total number of windows below BRE suggested targets for total and winter APSH
Boat Race House	57	48	9

4.135. The relevant façade of Boat Race House under the existing scenario overlooks a vacant part of the former Stage Brewery and as such, enjoys unusually high light levels for its urban context.

Likely Significant Effects

4.136. In relation to the likely effects of the completed Development, the new receptor, being Boat Race House has been assessed in regard to daylight and sunlight to the habitable rooms. The results are summarised in the **Tables 14 to 17**.

Table 14: Completed Development – VSC in relation to the BRE Guidance

Existing Property	Total Number of Windows	Total number of windows that achieve VSC levels in excess of 27% or a reduction of less than 20% from the baseline level	Total number of windows that see VSC reductions suggested as noticeable in the BRE Guidance			
			20%-29.9% reduction	30% - 39.9% reduction	>40% reduction	Total
Boat Race House	48	33	0	5	10	15

Table 15: Completed Development – NSC in relation to the BRE Guidelines

Existing Property	Total Number of rooms	Total number of rooms that see a reduction of less than 20% baseline level in NSC	Total number of windows that see NSC reductions suggested as noticeable in the BRE Guidance			
			20%-29.9% reduction	30% - 39.9% reduction	>40% reduction	Total
Boat Race House	32	21	3	2	6	11

Table 16: Completed Development – ADF in relation to the BRE Guidelines

Surrounding Properties	>2%	1.5-1.99%	1-1.49%	0.5-0.99%	<0.49 %	Total number of rooms	Total number of rooms above suggested levels for use	Total number of rooms below suggested levels for use
Boat Race House	2	8	9	12	1	30	11	21

Table 17: Completed Development – APSH in relation to the BRE Guidelines

Surrounding Properties	Total Number of windows facing the Site and within 90° of due south	Total number of windows above BRE suggested targets for total and winter APSH	Total number of windows below BRE suggested targets for total and winter APSH
Boat Race House	57	47	10

Boat Race House

Daylight

4.137. The VSC results suggest that with the Development in place (accounting for the May 2019 Amendments), 33 (69%) of the 48 windows assessed within Boat Race House would see no noticeable change in the daylight received at the window face. Of the remaining windows, 5 would see moderate adverse reductions and 10 would see substantial adverse reductions.

4.138. The reductions are primarily driven by the high daylight levels in the baseline condition and therefore causes this property to experience unusually high percentage reductions.

4.139. In addition, a number of windows indicating potential noticeable reductions serve dual aspect rooms, with the additional primary windows situated within the northern or southern elevation. The results show 5 windows indicating adverse impacts, are served by at least one other window experiencing little or no noticeable impact with the Development (with the May 2019 Amendments) in place with retained VSC levels in excess of 27%. As the main windows serving these rooms experience little material change and retain compliant levels of VSC, the daylight levels within these rooms are likely to remain acceptable. The remaining windows serve 10 rooms, 1 being a Living/Kitchen/Dining (LKD) (R8 First floor) and the remaining being bedrooms.

4.140. The results of the NSC assessment have shown that 21 (63%) of the 32 rooms assessed would experience no noticeable alteration in daylight. Of the remaining rooms, 3 would see minor adverse reductions, 2 would see moderate adverse reductions and 6 would see major adverse effects. As with VSC, high daylight levels in the baseline condition leave this building open to relatively high proportional reductions.

4.141. Boat Race House was subject to recent consent/permitted development and the design includes a number of single aspect rooms in proximity to the proposed Development and therefore increases its sensitivity and reliance on light from across the Development.

To illustrate this point, a hypothetical additional 'mirror-image' analysis has been undertaken, which compared the daylight and sunlight levels that will be left by the Development against a building of identical height and size as the neighbour on the site opposite. This approach is recommended in Appendix F of the BRE guidelines for existing buildings with windows *"unusually close to the site boundary…taking more than their fair share of light"* and *"to ensure that new development matches the height and proportions of existing buildings".*

4.142. The Development has been sensitively designed to be a similar scale as this neighbouring property and this is reflected in the generally minor absolute change in daylight levels. Whilst the results show some minor reductions in VSC, NSC and ADF levels, the overall levels are broadly in line with those shown by the 'mirrored' baseline position.

4.143. Considering the 10 single aspect Development facing rooms, the LKD is situated on the first floor and can be identified as R8. The results of the mirrored baseline approach show a reduction from 16.2% to 14.3%, with the absolute change being minor at 1.9% VSC. The remaining 9 rooms are single aspect bedrooms and show a slight change in VSC levels ranging between an improvement to 5.1% VSC. It should be noted that bedrooms, whilst relevant for assessment have a lower requirement for daylighting than main living spaces and this should be considered when applying the targets.

4.144. Finally, as the room layouts are known, the ADF assessment may be useful in understanding the daylight impacts. The results show that the ADF levels are within 0.1% of the proposed values under the mirrored baseline confirming broadly similar impacts.

4.145. The effect to daylight at Boat Race House with the Development in place is considered to be of **long-term, local** and of **moderate** to **major adverse** significance (purely based on reduction from the current unobstructed view). The element of the Development in proximity to this neighbour has been designed to be of a similar scale and distance from the boundary, in line with the suggestions of the BRE guidance.

4.146. In summary, the BRE guidelines acknowledge and advocate flexibility in precisely the context described above. Therefore, the potential daylight effects arising from the Development are considered acceptable.

Sunlight

4.147. The results of the APSH sunlight assessment have shown that 47 (82%) of the 57 windows assessed would experience no noticeable reduction in sunlight levels. The remaining 10 windows would experience levels below the suggested targets.

4.148. The remaining 10 windows are situated within the western flank elevation. Of these rooms, 1 serves a L/K/D, with the remaining 9 serving bedrooms. Generally main living spaces are considered the most important for sunlight.

4.149. As these windows are primarily west facing, the sunlight potential is limited compared with windows orientated directly towards due south. In addition, a number of these windows are overhung by balconies and the use of an external amenity area does limit daylight potential to the room set beneath.

4.150. Given the small number of constrained windows affected the overall likely effect to sunlight at Boat Race House with the Development in place is considered to be of **long-term**, **local** and of **minor adverse** significance.

Conclusion

4.151. The daylight results for the Boat Race House are not unusual where windows face an underdeveloped site and reasonable development can cause high proportional changes in daylight levels. The absolute retained VSC levels remain at 'mid teens' at its lowest, which is in in line with the recent Monmouth House Hearing and Whitechapel Appeal precedent. The proposal also provides for additional Housing and therefore the targets can be applied flexibly and sensitively in line with the Greater London Authority's Housing SPG to the London Plan (2016) and the National Planning Policy Framework 2019.

4.152. With regard to Boat Race House, the Development has been sensitively designed with the building most proximate to this neighbouring being of a similar scale and this is reflected in the generally minor absolute change in daylight levels under the alternative assessments. Given the isolated nature of the deviations, no mitigation measures are considered necessary.

4.153. In conclusion the consideration of the sensitive receptors set out in the 2018 ES is not necessary and the conclusions of the 2018 ES in relation to them remain valid. There are no new likely significant daylight, sunlight, overshadowing and light pollution effects as a result of the May 2019 Amendments compared to those identified for the receptors considered in the 2018 ES. Similarly, there is no change to the nature and significance of the environmental effects reported. Therefore, the May 2019 Amendments would not alter the conclusions of the daylight, sunlight, overshadowing and light pollution assessment as reported in the 2018 ES.

4.154. However, one new receptor, Boat Race House, has been considered within this ES Addendum. As outlined above, the effect to daylight at Boat Race House with the Development in place is considered to be of **long-term, local** and of **moderate** to **major adverse** significance and the effects to sunlight at Boat Race House with the Development in place is considered to be of **long-term**, **local** and of **minor adverse** significance. These effects are outside the range of significance of effects for daylight and sunlight concluded within the 2018 ES, and therefore, the assessment provided within this ES Addendum does introduce new likely significant daylight and sunlight effects as a result of the Development.

4.155. For ease, the overall results of the daylight, sunlight, overshadowing and light pollution are summarised below in **Table 18**, with the Boat Race House receptor included.

Table 18: Summary of Likely Significant Effects, Mitigation Measures and Likely Residual Effects

Description of Effect	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
The Works			
Demolition of existing buildings on-Site.			

Description of Effect	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Daylight, sunlight and overshadowing to surrounding receptors.	**Local**, **short to medium-term** and of **minor** to **moderate beneficial**.	None required.	**Local**, **short to medium-term** and of **minor** to **moderate beneficial**.
Light Pollution	**Insignificant**.	None required.	**Insignificant**.
Construction of proposed buildings			
	Insignificant. **Local**, **long-term**, **adverse** and of **minor significance** (Butler House, Aynescombe Cottage). **Local**, **long-term**, **adverse** and of **minor** to **moderate significance** (Rann House, 2 to 6 Williams Lane, Churchill Court and Jolly Gardeners).	Not applicable.	**Insignificant**. **Local**, **long-term**, **adverse** and of **minor significance** (Butler House, Aynescombe Cottage). **Local**, **long-term**, **adverse** and of **minor** to **moderate significance** (Rann House, 2 to 6 Williams Lane, Churchill Court and Jolly Gardeners).
Sunlight to surrounding receptors.	**Insignificant**.	None required.	**Insignificant**.
Overshadowing (Surrounding amenity areas).	**Insignificant**.	None required.	**Insignificant**.
Light Pollution.	**Insignificant**.	None required.	**Insignificant**.
Completed Development			
Daylight to surrounding receptors	**Insignificant**. **Local**, **long-term**, **adverse** and of **minor significance** (Butler House, Aynescombe Cottage). **Local**, **long-term**, **adverse** and of **minor** to **moderate significance** (Rann House, 2 to 6 Williams Lane, Churchill Court and Jolly Gardeners). **Local**, **long-term**, **adverse** and of **moderate** to **major significance** (Boat Race House).	Not applicable.	**Insignificant**. **Local**, **long-term**, **adverse** and of **minor significance** (Butler House, Aynescombe Cottage). **Local**, **long-term**, **adverse** and of **minor** to **moderate significance** (Rann House, 2 to 6 Williams Lane, Churchill Court and Jolly Gardeners. **Local**, **long-term**, **adverse** and of **moderate** to **major significance** (Boat Race House).

Description of Effect	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Sunlight to surrounding receptors	**Insignificant**. **Local**, **long-term**, **adverse** and of **minor significance** (Boat Race House).	None required.	**Insignificant**. **Local**, **long-term**, **adverse** and of **minor significance** (Boat Race House).
Overshadowing (surrounding amenity areas).	**Insignificant**.	None required.	**Insignificant**.
Overshadowing (proposed amenity areas).	**Insignificant** to **local**, **long-term**, **adverse** and of **moderate significance**	None required. Detailed design during reserved matters application may result in reduced maximum extents. Effects to be verified through further testing at the reserved matters stage.	**Insignificant** to **local**, **long-term**, **adverse** and of **moderate significance**. Potentially reduced to **insignificant** to **minor adverse significance** for the proposed amenity areas within the outline component of the Development
Light Pollution.	**Insignificant**.	None required.	**Insignificant**.

5. Cumulative Effects

5.1. Given that there are no proposed changes to the Works as part of the May 2019 Amendments, the assessments remain as reported in the 2018 ES and therefore so do the in-combination cumulative effects as reported in Chapter 19: Cumulative Effects of the 2018 ES.

5.2. With respect to the combined effects arising from the Development together with other reasonably foreseeable schemes, as reported in the 2018 ES there are no applications at the time of submission of the 2018 Planning Applications before the LRBuT, or with extant permissions in place, within 1 km of the proposed Development that would give rise to significant environmental effects owing to their proximity, nature, scale and / or location within areas. Therefore, cumulative effects arising from the completed and operational Development (with the May 2019 Amendments) and any such permissions are not considered further within this ES Addendum.

6. Summary of Residual Effects

6.1. As indicated in Section 4, the Development would give rise to new significant daylight and sunlight effects outside the range of significance of effects reported in the 2018 ES. However, these effects are due to the presence of a new sensitive receptor (Boat Race House), and not the May 2019 Amendments. A summary of Daylight, Sunlight, Overshadowing and Light Pollution residual effects is presented as **Table 17** - the effect to daylight at Boat Race House with the Development in place is considered to be of **long-term, local** and of **moderate** to **major adverse** significance and the effect to sunlight at Boat Race House with the Development in place is considered to be of **long-term**, **local** and of **minor adverse** significance. In respect of all other technical assessments the residual effects remain as reported in the 2018 ES.

7. Conclusion

7.1. As set out within Section 4 and 5, the May 2019 Amendments do not give rise to any new likely significant effects and there is no change to the nature and significance of the environmental effects compared to those identified in the 2018 ES, in respect of the following technical assessments:

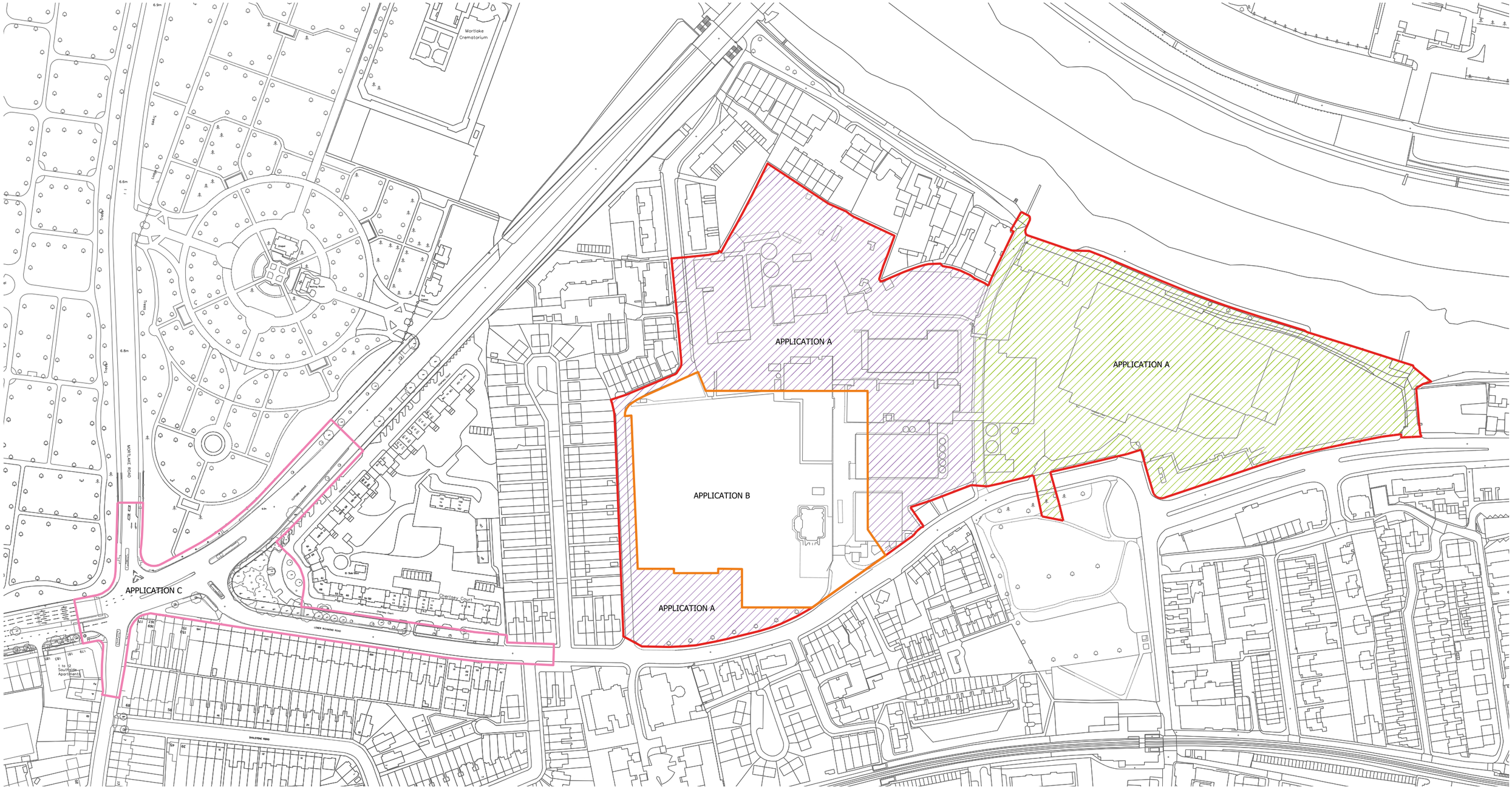
- Socio-economics;
- Transport and Access;
- Noise and Vibration;
- Air Quality;
- Ground Conditions and Contamination;
- Surface Water Drainage and Flood Risk;
- Ecology;
- Archaeology;
- Built Heritage;
- Townscape and Visual Assessment;
- Wind Microclimate;
- Daylight, Sunlight, Overshadowing and Light Pollution; and
- Cumulative Effects.

7.2. For these technical assessments no additional mitigation measures are required as a result of the May 2019 Amendments and those identified in the 2018 ES remain valid.

7.3. However, as set out in Section 4 and 5, Boat Race House, a new sensitive receptor, is situated immediately to the east of the Site, and is now in residential use. The Development would give rise to new significant daylight and sunlight effects outside the range of significance of effects reported in the 2018 ES, at Boat Race House. However, these effects are due to the presence of a new sensitive receptor (Boat Race House), and not the May 2019 Amendments.

FIGURES

waterman

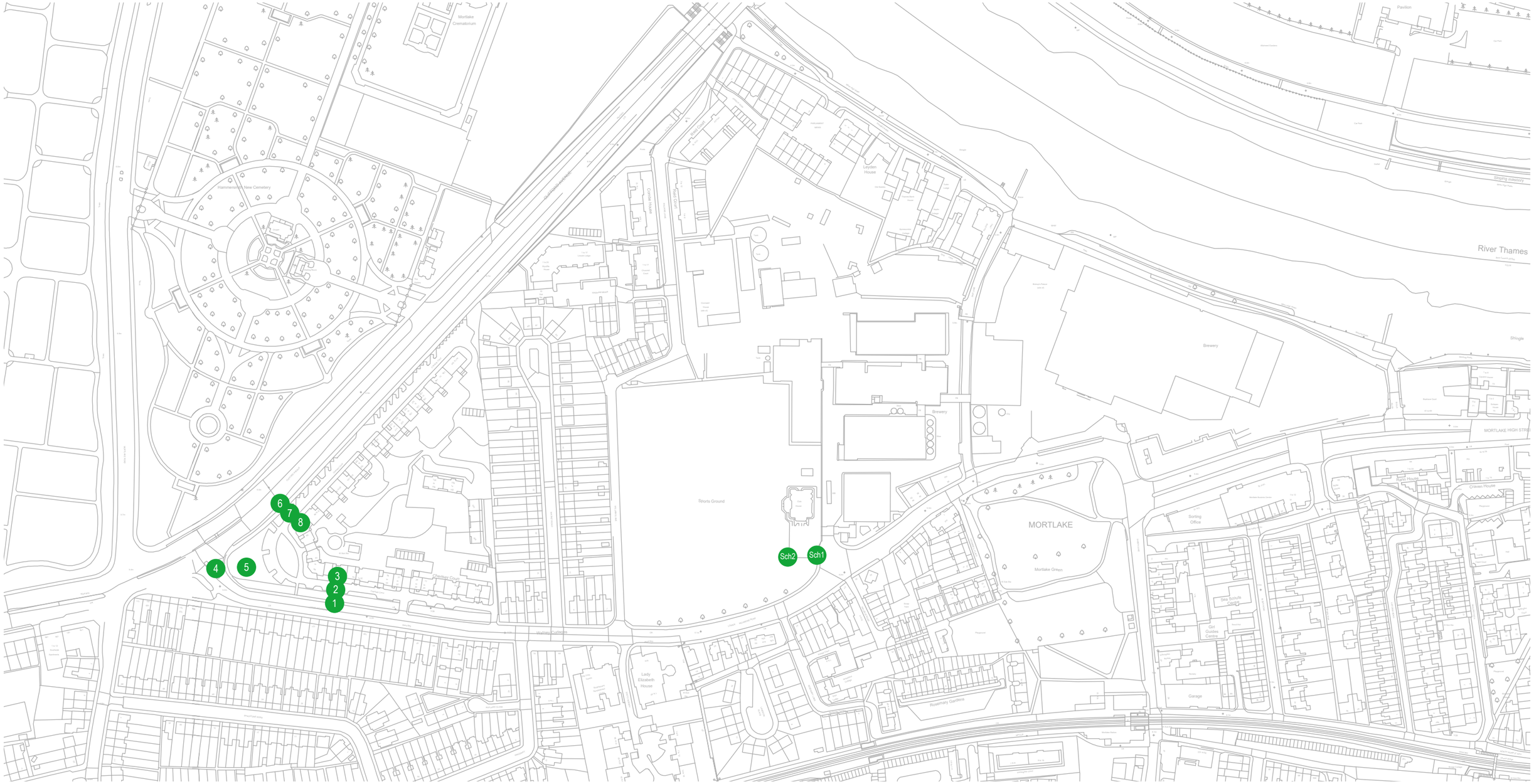


N

- Application A Boundary
- Application B Boundary
- Application C Boundary
- Development Area 1
- Development Area 2

Project Details	WIE10667-105: Stag Brewery, Mortlake
Figure Title	Figure 1: Planning Application Boundaries
Figure Ref	WIE10667-105_GR_ESA_1A
Date	2019
File Location	\\h-lncs\wiel\projects\wie10667\105\graphics\esa\issued figures

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N

X Diffusion Tube Monitoring Locations

Project Details	WIE10667-105: Stag Brewery, Mortlake
Figure Title	Figure 2: Diffusion Tube Monitoring Locations
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Date	2019
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APPENDICES

A. Transport Assessment Addendum

now part of

Stag Brewery, Mortlake

Transport Assessment Addendum

On behalf of **Reselton Properties**

Project Ref: 38262/5507 | Rev: AA | Date: April 2019

Registered Office: Buckingham Court Kingsmead Business Park, London Road, High Wycombe, Buckinghamshire, HP11 1JU
Office Address: 33 Bowling Green Lane, London, EC1R 0BJ
T: +44 (0)203 824 6600 E: london@peterbrett.com

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	Name	Position	Signature	Date
Prepared by:	Matt Bolshaw	Assistant Transport Planner	*M Bolshaw*	May 2019
Reviewed by:	Peter Wadey/Robert Parker	Associate/Director	*P Wadey/R Parker*	May 2019
Approved by:	Greg Callaghan	Director	*G Callaghan*	May 2019
For and on behalf of Peter Brett Associates LLP				

Revision	Date	Description	Prepared	Reviewed	Approved
1.1	1/05/19	Revised with changes to non-residential floor areas	MB	PW/RP	GC
1.2	03/05/19	Revision with changes to flexible land uses	MB	PW/RP	GC
1.3	07/05/19	Final Issue	MB	PW/RP	GC

This report has been prepared by Peter Brett Associates LLP ('PBA') on behalf of its client to whom this report is addressed ('Client') in connection with the project described in this report and takes into account the Client's particular instructions and requirements. This report was prepared in accordance with the professional services appointment under which PBA was appointed by its Client. This report is not intended for and should not be relied on by any third party (i.e. parties other than the Client). PBA accepts no duty or responsibility (including in negligence) to any party other than the Client and disclaims all liability of any nature whatsoever to any such party in respect of this report.

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1 Introduction

1.1 Overview

1.1.1 This Transport Assessment Addendum has been produced by Peter Brett Associates, now part of Stantec (PBA), on behalf of Reselton Properties Limited. The Addendum has been prepared in order to reflect the changes to the scheme design and planning policy updates which have occurred during the consultation period to date in respect of the three linked planning applications for the redevelopment of the former Stag Brewery site in Mortlake, London Borough Richmond upon Thames (LBRuT).

1.1.2 The applications (Refs: 18/0547/FUL,18/0548/FUL, 18/0549/FUL) from February 2018 included a Transport Assessment (TA) which set out the likely impacts of the proposed development on the surrounding transport network. This TA included a detailed transport strategy aimed at ensuring the development was sustainable from a transport perspective and was consistent with prevailing policies at the time of the application.

1.1.3 Since the application was submitted various meetings have been held with stakeholders, including TfL, LBRuT and Network Rail to discuss the submitted TA. In addition, a number of key policy documents have been revised.

1.1.4 The purpose of this addendum therefore includes the following:

- to provide an update on the potential transport impacts arising from minor changes proposed to the previously submitted scheme.
- to set out any changes to the proposed mitigations as a result of the post application discussions with the relevant stakeholders.
- to set out the changes in transport policy that have occurred and to identify their implications for the proposals.

1.1.5 The addendum is set out as follows:

- Chapter 1 Introduction
- Chapter 2 Policy Changes
- Chapter 3 Key Stakeholder Update
- Chapter 4 Scheme Update
- Chapter 5 Summary and Conclusion

2 Policy Changes

2.1 Overview

2.1.1 Chapter 3 of the TA set out the key transport policies at a national, regional and local level. Since the submissions of the three Stag Brewery applications in February 2018, alterations have been made to both regional and local policy with regards to transport. This chapter will discuss the differences between the policy at the time of submission of the previous TA and current / new policy.

2.1.2 It is considered that there have been no significant changes to transport policy at a national level that would materially impact upon the development proposals or associated mitigations.

2.1.3 At a regional level the following updates need to be considered:

- The Mayor's Transport Strategy (2018), which was previously only published in draft has now been issued.
- A new Draft London Plan (2018) has been issued. Whilst this does not carry the same weight as an approved Plan, TfL has asked that the transport policies and particularly the revised cycle parking standards provided within the new Draft be applied to the proposed development.
- At a local level London Borough of Richmond upon Thames (LBRuT) have now adopted their new Local Plan (July 2018).

2.1.4 The remainder of the chapter will discuss the changes as a result of the updated policies.

2.2 The 2018 Draft London Plan

2.2.1 The 2018 Draft London Plan will, once adopted, replace the current London Plan. The London Plan is an emerging plan, not yet adopted and carries very limited weight. Notwithstanding this, the Applicant has sought to amend the scheme in line with the draft standards. The changes to the London Plan affecting the transport aspect of the development mainly centre around parking. Any relevant updates are described below and are supported by policies from the Mayor's Transport Strategy.

Maximum Vehicle Parking Standards

2.2.2 For residential development, the current London Plan bases the maximum provision of car parking spaces on the density, number of habitable rooms/unit and location of the proposed development, with more dense and central developments allowed less parking than those less dense and more suburban. In comparison, the Draft London Plan bases maximum car parking provision on the location of the proposed development.

2.2.3 Table 2.1 and Table 2.2 show the maximum required number of car parking spaces for residential units for both the current and Draft London Plan, respectively.

Table 2-1 Current London Plan Maximum Residential Vehicle Parking Standards

Current London Plan	
No. of beds	**Parking Spaces**
1-2	Less than 1 per unit
3	Up to 1.5 per unit
4 or more	Up to 2 per unit

Table 2-2 Draft London Plan Maximum Residential Vehicle Parking Standards

Draft London Plan	
Location	**Maximum parking provision**
Central Activities Zone Inner London Opportunity Areas Metropolitan and Major Town Centres All areas of PTAL 5-6 Inner London PTAL 4	Car-free
Inner London PTAL 3	Up to 0.25 spaces per unit
Inner London PTAL 2 Outer London PTAL 4 Outer London Opportunity Areas	Up to 0.5 spaces per unit
Inner London PTAL 0-1 Outer London PTAL 3	Up to 0.75 spaces per unit
Outer London PTAL 2	Up to 1 space per unit
Outer London PTAL 0-1	Up to 1.5 spaces per unit

Non-Residential Parking

2.2.4 The following tables demonstrate the new Non-Residential parking standards that impact the site and the uses it contains. Previously non-residential parking was calculated using LBRuT standards, but the new adopted Local Plan (2018) now references the following standards in the tables below.

2.2.5 Maximum office parking is shown in Table 2.3.

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.

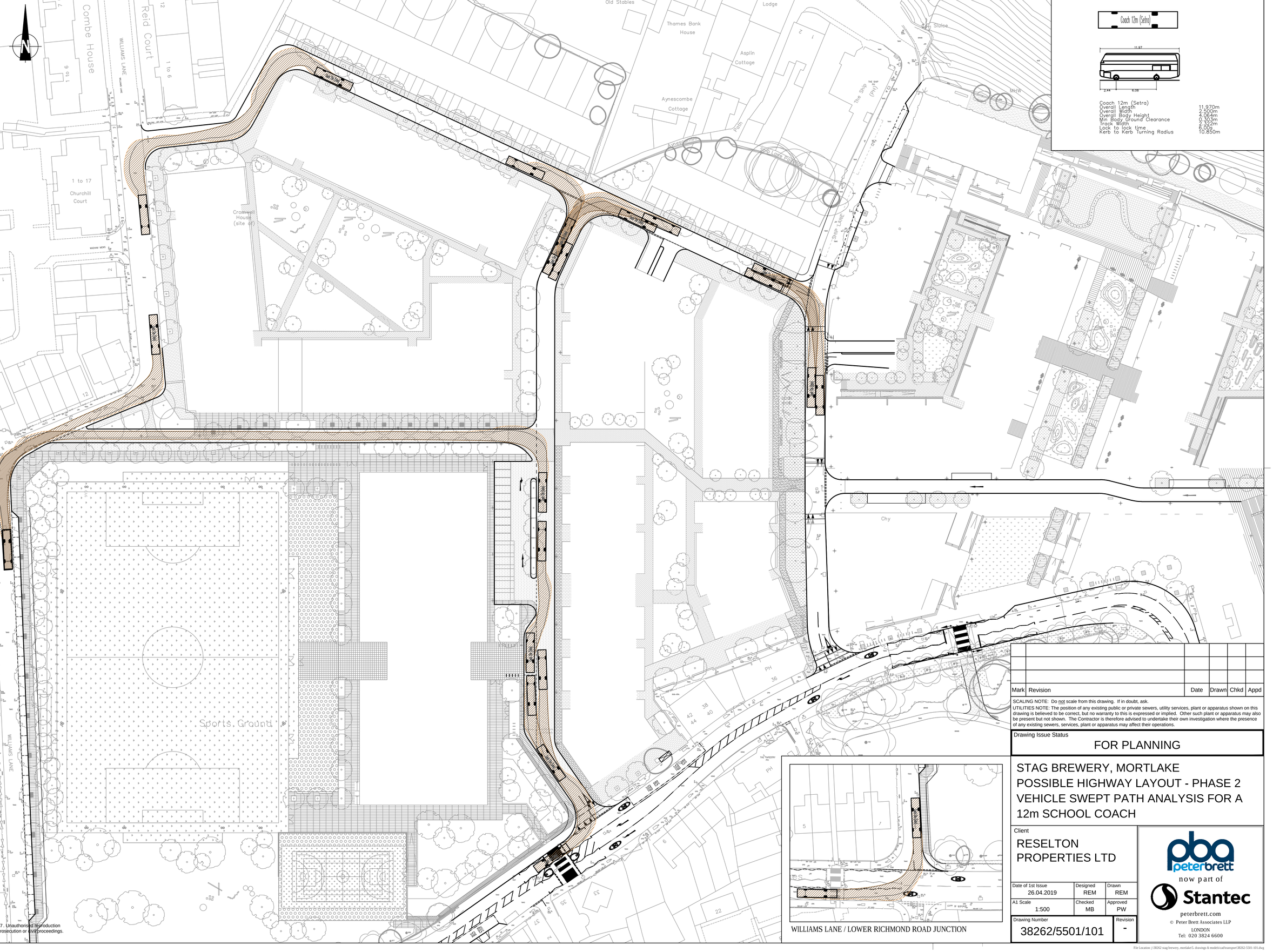
5.1.3 The development proposals have changed, with the number of residential units reducing by four. As a result of this, all assessment work has been retained as the original assessment now represents a worst case.

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



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Mark	Revision	Date	Drawn	Chkd	Appd

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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

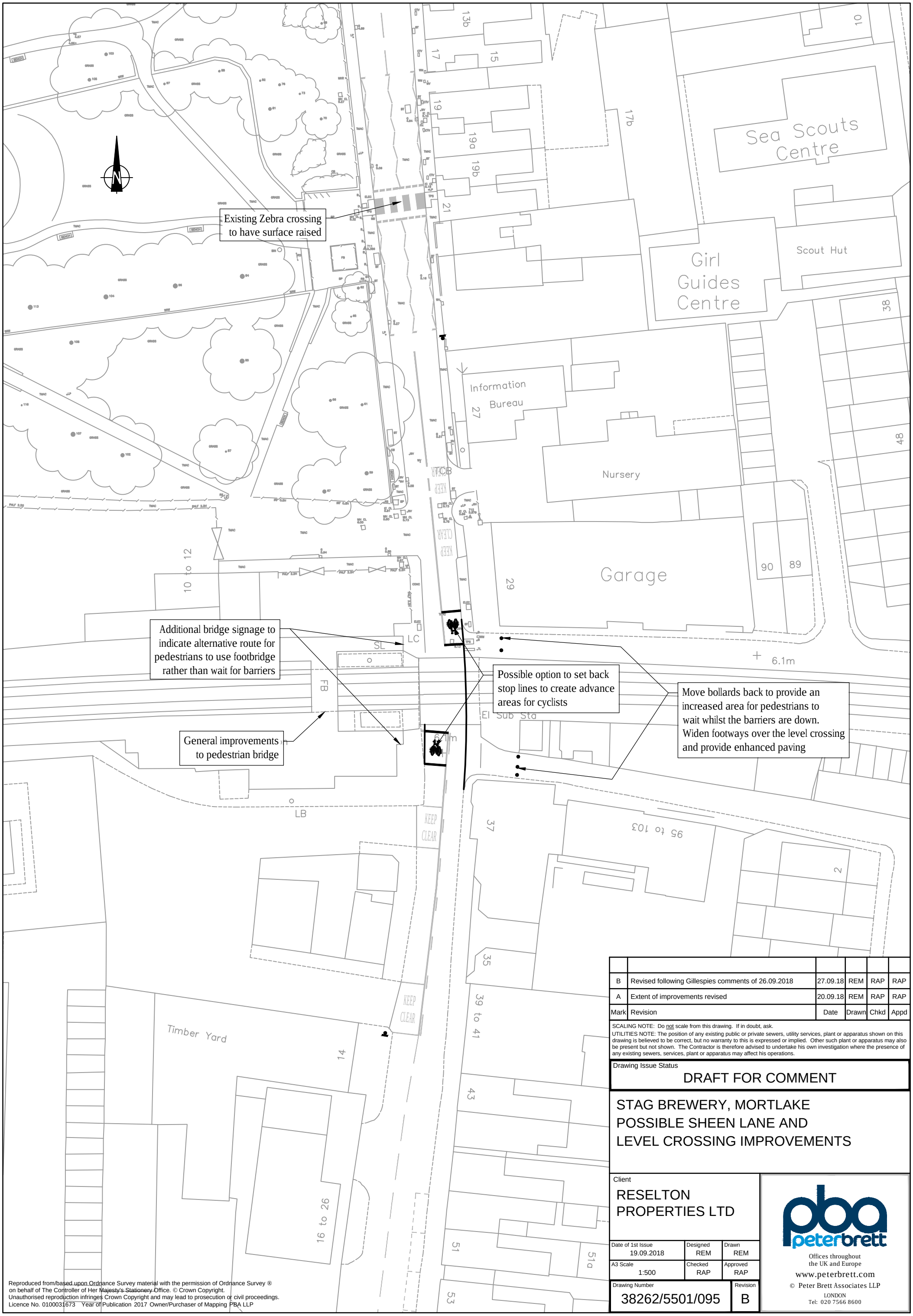
Date of 1st Issue	Designed	Drawn
26.04.2019	REM	REM
A1 Scale	Checked	Approved
1:500	MB	PW

Drawing Number: 38262/5501/101

Revision: -

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



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

peterbrett

Offices throughout the UK and Europe

www.peterbrett.com

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LONDON
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B. Noise Summary Note – Additional Information

Waterman Infrastructure & Environment Limited
2nd Floor, South Central, 11 Peter Street, Manchester,
M2 5QR
www.watermangroup.com

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

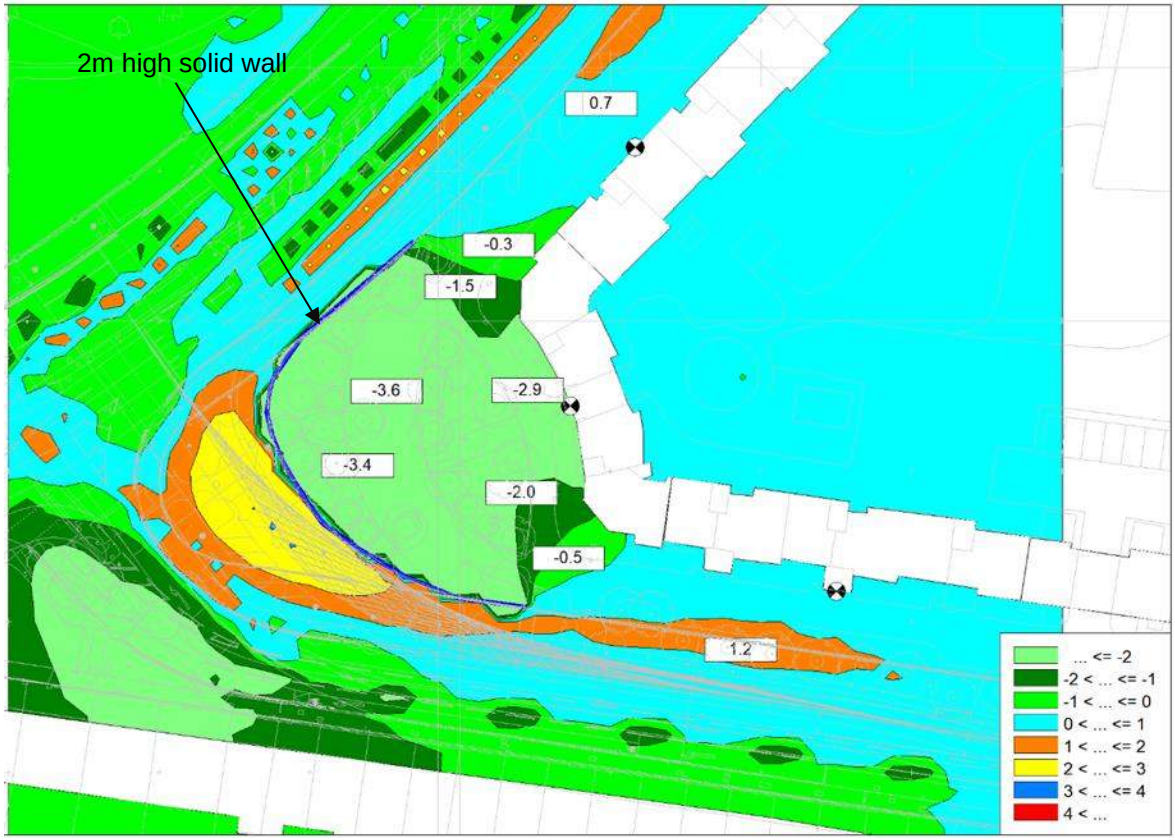
The Road Traffic Noise Assessment of Chalkers Corner presented within the ES was undertaken using the calculation methodology of The Calculation of Road Traffic Noise[1] and significance criteria of DMRB[2], which is the industry standard approach. The calculations use the 18-hr Average Annual Weekday 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

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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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Figure A1: Diffusion Tube Monitoring Locations

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Appendices

Appendix A Precision and Accuracy Spreadsheet

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/m^3 – 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/m^3 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/m^3 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/m^3. 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/m^3 (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/m^3 at DT3 and 32.8µg/m^3 at DT8) are below the annual mean NO_2 AQS objective of 40µg/m^3 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/m^3 at DT1; 42.7µg/m^3 at DT4; and 49.1µg/m^3 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/m^3 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/m^3 at DT2; 42.1µg/m^3 at DT7; and 49.1µg/m^3 at DT6) and in the carpark of Chertsey Court (as 40.4µg/m^3) are below the hourly equivalent annual mean NO_2 concentration of 60µg/m^3 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/m^3. 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/m^3 from the kerbside to the façade of Chertsey Court (difference between DT1/DT3 and DT6/DT8) and a decrease of 6µg/m^3 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/m^3. 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/m^3 at School 1 and 30.1µg/m^3 at School 2) are below the annual mean NO_2 AQS

objective of 40µg/m^3 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

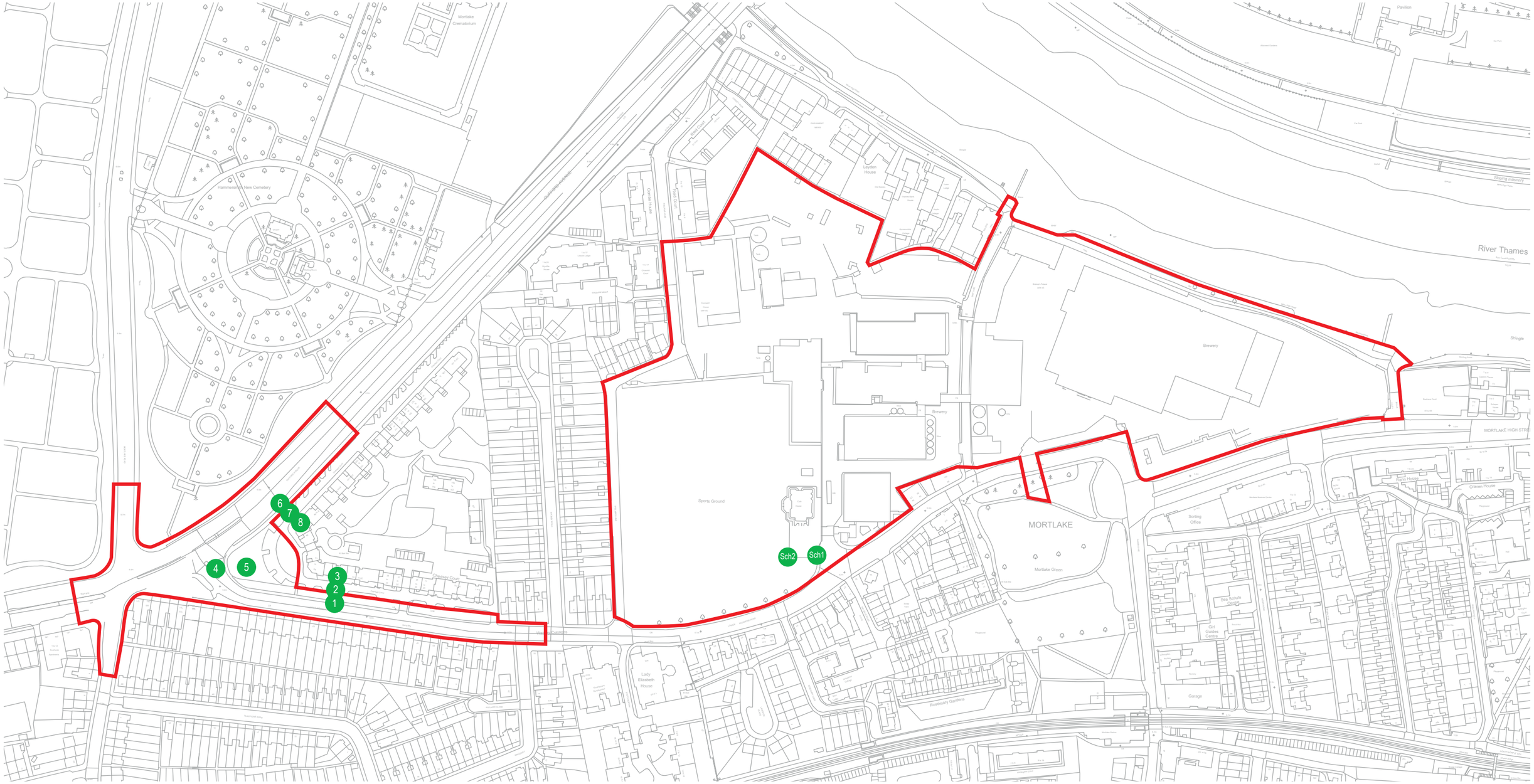
ID	Site Description	Monitor Classification[(a)]	9th July – 10th Aug 2018	10th Aug – 11th Sept 2018	11th Sept – 9th Oct 2018	9th Oct – 9th Nov 2018	9th Nov – 7th Dec 2018	7th Dec 2018 – 3rd Jan 2019	Unadjusted Average	Adjusted/Co-location Annual Mean*	Adjusted Estimated 2018 Annual Mean**
			µg/m³	µg/m³	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

X 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
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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%

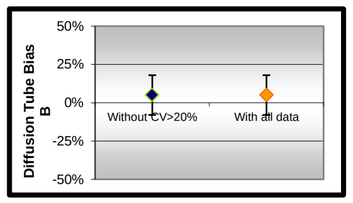
Bias calculated using 6 periods of data

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 40µg/m^3 (Diffusion Tube 1, 4, 6, 7) show good comparison (i.e. they also predict exceedance of 40µg/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.

INVESTOR IN PEOPLE

Query 1 – details of continuous fit for purpose defence line at construction stage
We accept that details will be provided at the detailed design stage when a contractor is appointed and a Flood Risk Activity Permit is applied for.

Query 2 – details of the lifespan of the flood defence
Accepted.

Query 3 – TE2100 raisings
We note that the proposed glass balustrade will be part of the flood defence wall thereby raising it to TE2100 levels at the construction phase. We will require cross sections representative of all sections through the defence illustrating the proposed crest level of the flood defence line and all supporting structures (particularly where steps are located).

Drawing 38262/5501/062 illustrates the boathouse building on the eastern end of the site incorporates windows and internal access point below the TE2100 level within the flood defence line. The finished floor levels in the lobby/entrance area of the boat house are proposed to be set at 6.03m AOD, but the boat house finished floor level is to be set at 4.25mAOD. Details of how access will be achieve from the landward side of the flood defences into the boathouse will need to be provided

We will require cross section drawings of the boathouse and demonstration of how TE2100 levels will be achieved. The flood defence line must be continuous and not contain openings such as windows and access points. Additional it will need to be demonstrated that no utilises which could compromise the defence line and integrity of the river wall structure.

The proposed boathouse should be structurally independent of the Tidal Defence and offset to allow access for inspection. The separation between the Tidal defence and the building is important as is would allow for potential future maintenance works and defence raising.

Additionally, the developer will need to demonstrate how the flood defence line within the redline boundary will tie into adjacent properties for future TE2100 raisings (specifically at Ship Lane and Bull Alley). The developer may wish to reconsider the line of the flood defence and how the contiuous line of the defence between the proposed boathouse and Bull Alley can be achieve.

Query 4 – Vehicle tracking plan
Drawing 38262/5501/062 illustrates a vehicle tracking plan for a 10m long lorry, however the circa 4m clearance height appears to be insufficient to actually operate any plant within these areas. Furthermore, the flood defence within the northwest corner of the site appears to be inaccessible. It appears that the applicant will use of the existing building as the defence line. Further information is required as to how the defence will be accessed from the landward side.

We appreciate a new flood defence will reduce the likelihood of failure, however unrestricted access is still required for any unforeseen maintenance and emergency works and the future raisings.

Query 5 – Ship Lane and Bull Alley
Bull Alley, and the flood boards for this location are within the redline boundary of the application. Irrespective of ownership, developer will have to demonstrate both the residual lifespan and TE2100 crest level raising for all tidal flood defences within their red-line boundary. Our preference would be for the flood boards to be removed and a passive (static) flood defence installed.

Regarding Ship Lane, we appreciate the applicant may not be the freeholder of this land, and therefore may not be liable to ultimately provide the flood defence across the road. However, the applicant is responsible for demonstrating how all flood defence line within their redline boundary, will be treated in light of TE2100 raising requirements and how these will tie in with the defences on adjacent properties. Developments should not preclude or limit future defence raising options nor should they increase flood risk to neighbouring properties.

A development that precludes options for passive defences (to meet TE2100 levels), both increases the cost of future flood defence provision and increases residual flood risk due to the potential for the gate not to be operated. On public highways this risk is greatly increased because of 3rd party vehicle use that may damage the gate or simply park across it.

We appreciate that the gate options were discussed at the meeting of 26 September 2016, but as set out in the minutes to the meeting the our preference is always for passive options for defence provision to be kept open – in this case we stated that the applicant would have to demonstrate that passive solutions where unsuitable prior to considering gated options. We do not believe the applicant has demonstrated this and do not accept that a flood gate is the only feasible solution, nor that gates are appropriate for a public highway. A review of our (open source) LiDAR data suggest the road levels already rises to approx. 6.1mAOD, albeit further landward than the current line. Hence a potential further 600mm is all that is required to archive TE2100 levels (not 1m). Given the complete re-development of this site, we see no obvious reason why the scheme cannot be designed to allow for a passive solution to be provided in ship lane, and would recommend you progress you designs along this principle (rather than try an demonstrate a passive defence is not possible).

We accept that some future passive defence line options would require changes to third party defences (namely the ship pub). While we do not expect the developer to deliver works outside their red-line boundary, we do expect the developer to design a scheme that would not preclude a passive defence being installed in the future, and that this future passive defence line should be achievable with the minimum level of cost and disruption both to the development itself and adjacent properties.

Query 6 – drainage strategy

Regarding the proposed outfalls, the applicant should note outfalls will have to be positioned at an appropriate height, and should be assessed to deal with expected tide locking at this height. An assessment of the need for scour protection (to protect foreshore and structural stability of flood defences) will be needed, along with delivery of appropriate scour mitigation. Outfalls, that penetrate the tidal defence line below the statutory level and with a diameter greater than >300 mm must contain 2 in-line non-return valve's (such as flap valves). Further details on the construction of the outfalls and method statements etc. will have to be provided and reviewed as part of the Flood Risk Activity Permit application.

Query 7 – enhancement to the Thames Path and river bank

The application offers minimal enhancements for nature and biodiversity. The development in located immediately adjacent to the River Thames and offers an excellent opportunity to enhance the river environment and improve the river corridor for people and wildlife.

The applicant states that they do not own do not own the tow path which. However little has been done to improve biodiversity within the submitted proposals. There are green areas and trees, but no mention of green roofs, biodiverse planting (i.e native species flowers to attract invertebrates) or bat boxes, bird boxes etc. It is therefore not been demonstrated that the development will result in a net gain to biodiversity.

Any new planting within the buffer zone should use native species. Any loss of habitat should be mitigated for within the development with the use of green and/or brown roof's to encourage biodiversity.

The National Planning Policy Framework (NPPF) requires local planning authorities to aim to conserve and enhance biodiversity when determining planning applications by minimising impacts on biodiversity and providing net gains in biodiversity where possible.

In addition, the Thames river basin management plan requires the restoration and enhancement of water bodies to prevent deterioration and promote recovery of water bodies

London Borough of Richmond's Local Plan Policy LP 15 Biodiversity states that 'The Council will protect and enhance the borough's biodiversity, in particular, but not exclusively, the sites designated for their biodiversity and nature conservation value, including the connectivity between habitats.

By

- supporting enhancements to biodiversity;
- incorporating and creating new habitats or biodiversity features, including trees, into development sites and into the design of buildings themselves where appropriate; major developments are required to deliver net gain for biodiversity, through incorporation of ecological enhancements, wherever possible;
- enhancing wildlife corridors for the movement of species, including river corridors, where opportunities arise; and
- maximising the provision of soft landscaping, including trees, shrubs and other vegetation that support the borough-wide Biodiversity Action Plan.'

The London Borough of Richmond's Local Plan Policy LP 18 River corridors states that 'Development adjacent to the river corridors will be expected to contribute to improvements and enhancements to the river environment.'

The development as submitted does therefore no comply with the requirements of the National and Local Planning Policy.

Flood Risk Activity Permit (FRAP)
Under the Environmental Permitting (England and Wales) Regulations 2016, you must submit plans to the Environment Agency and apply for a FRAP if you want to do work:

In, over or under a main river
Within 16m if it is a tidal main river
Within 16m on a tidal main river

Flood risk activities can be classified as: Exclusions, Exemptions, Standard Rules or Bespoke. These are associated with the level of risk your proposed works may pose to people, property and the environment.

You should apply for a Bespoke FRAP if your work cannot be classified as one of the following:

an **excluded activity** (listed here)
an **'exempt' activity** (listed here)
a **'standard rules' activity** (listed here).

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

Decision notice request
We record the outcome of planning decisions and request the decision notice is emailed to kslplanning@environment-agency.gov.uk

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

B. First Response Letter to Environment Agency

Infrastructure & Environment

Direct Tel: 0207 928 7888
Direct Email: sophie.mccabe@watermangroup.com

Our Ref: WIE10667-103-180627-SM-RiverWall
Your Ref: SL/2018/118128/01-L01

Date: 27th June 2018

Joe Martyn
Environment Agency
3rd Floor, Seacole Building
2 Marsham Street
London SW1P 4DF

Dear Joe,

RE: Stage Brewery – River Wall

I am writing in response to your objection dated 11th May 2018 in relation to the proposals for a new river wall at the Stag Brewery Site. Please see below the information for the removal of your objection.

Query 1) *– 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.*

Response – The outline method of work and the design presented to date is based on the assumption that the new river wall is to be constructed behind the existing river wall, allowing for the existing flood defences to be maintained throughout the construction of the new wall. Therefore, in the temporary case, whilst the new river wall is being constructed, the existing flood defence will remain in place and serve as the flood protection in the area as it currently stands. The existing wall would then be reduced in height to match the new flood defence, set at the statutory defence level. The new river wall will only come into use once it is completed along the alignment shown in WIE-SA-04-1006 A04 (Appendix A).

More detailed method statements and construction sequence drawings can be provided at the detailed design stage when a contractor is on board.

Query 2) *– Details of how the new flood defences will be commensurate with the 100 year lifetime of the development.*

Response – Currently two options are being proposed for the river wall. For the sheet piled wall option, the new flood defences will consider a 100 year design life by following the guidance provided in accordance with BS EN 1993-5 and the accompanying national annex. The standards present tables (specifically Table 4-2) that allow for a reduction in the section thickness over time for a marine/river environment. The section capacity for the sheet piled wall will be considered based on the reduced section thickness therefore allowing for the 100 year lifetime of the development.

For the concrete secant pile option, exposure classes for the concrete will be considered in accordance with BS 8500 with a mix design and concrete cover being provided that is appropriate for a marine environment exposure class. The section capacity will then be derived from BS EN 1992.

The building concrete retaining structures will be designed to accommodate the surcharge loads to BS EN 1992 and marine exposure class will be in accordance with BS8500 for both mix design and cover.

Any windows to the boathouse building that form part of the defence line would require a bespoke design to ensure protection to the appropriate standard. These windows would be fully tested prior to installation to ensure that they are fit for purpose. An example of the sort of product that could be used can be found here https://thefloodcompany.co.uk/case-study-items/bam-nuttall/. In this example testing of the bespoke flood product was undertaken at HR Wallingford to ensure it was of a suitable standard.

Query 3) *– We note that the new flood defence walls will have a crest level of 6.13m AOD and "topped by a 1.1m high glass balustrade, with effective crest at 7.23m AOD". 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?).*

Response – The main construction of the river wall would be either sheet pile or secant pile (to be confirmed at the detailed design stage). Where required to achieve the minimum defence height of 6.70m AOD, a glass balustrade/wall would be installed on top of the piled wall. The glass balustrade/wall would be a flood defence specific product, an example of which is provided in the enclosed document prepared by Hydro-Logic (Appendix B).

The flood defence would be raised to the full height of 6.70m AOD as part of the proposals, as required by the TE2100 Plan, no further raising would therefore be required. The construction of the crest of the defence would vary along its length, however would always be a minimum of 6.70m AOD. Please refer to the enclosed plans which shows the treatment of the river wall (Appendix A).

Query 4) *– 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.*

Response – As set out above, the defences would have a design life of 100 years. This would remove the requirement for future piling to raise/maintain the defences during the lifetime of the development. The requirement for tracking is therefore based on maintenance rather than reconstruction. It is considered that given the piled construction of the defences any maintenance is likely to be minor/superficial. Please find enclosed drawings prepared by Peter Brett Associates (Appendix C) showing the tracking of a 10m Rigid Vehicle and a Small Crane. These vehicles are considered appropriate for maintenance works. In the location adjacent to the Maltings Building the vehicles would not be able to park directly adjacent to the river wall, however they would be able to crane materials into the appropriate location. The proposed tracking accounts for vertical clearance to balconies and tree canopies, ensuring vehicles can pass beneath unrestricted.

Query 5) *– 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.*

Response – Please refer to the enclosed plan and sections prepared by Gillespies (Appendix A) which show the 4m minimum clear access route and offsets to defences.

The existing defence in Bull Alley is not part of this application and is not under the applicant's ownership. Our proposals would therefore only tie into this existing defence, however no changes would be made to it as part of our proposals.

In the existing situation there is no raised defence in Ship Lane. Instead the defence is formed by ground levels in the public highway itself, which rise away from the river. Ship Lane is a public highway and therefore outside of the applicant's ownership. Whilst some works would take place to Ship Lane (wider footways and landscaping (including retention of all trees) to provide a functional and attractive street) these would not impact on the existing flood defence level provided by the highway.

Whilst the applicant is not responsible for installing a flood defence across Ship Lane, options were discussed at the meeting on the 26th September 2016 that could be implemented by others in the future. It would not be feasible for a permanent defence to be located across Ship Lane as this would block access along the public highway. Instead, a demountable defence would more suitable for this location. The defence would need to tie into the existing Maltings Building on the Stag Brewery Site. On the other side of the public highway the defence would need to tie into the existing public house (noted as a defence on the Environment Agency's flood map). The enclosed document prepared by Hydro-Logic (Appendix B) provides information on the type of defence that could be provided in the future, and the approximate location it would need to be installed. Given the Thames Estuary 2100 Plan does not require this raising to take place until 2065 it would not be sensible to install a flood gate now as it would be required for several decades.

Query 6) *– 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.*

Response – Scour protection would be designed (e.g. concrete mattress) and incorporated to protect the River Thames in consultation with the Environment Agency and the Port of London Authority (PLA). The design of this protection would need to be confirmed at the detailed design stage once the pipe sizes, locations, and velocities are known.

Query 7) *– 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.*

Response – The tow path is outside of the ownership of the applicant and under the control of the PLA and LBRuT. Pre-application discussions were undertaken with the PLA, LBRuT, and local interest groups regarding the extent of the enhancements. Detailed works are covered within the Landscape Design and Access Statement (pages 103-111), an extract of which can be found in Appendix D. Please see the list of proposed works below:

- Pruning of understorey vegetation on Towpath to open key views;
- Existing granite setts on Towpath, public draw dock and slipway retained;
- Rediscovered railway track - express within new pavement design to new seating area;
- Seating provided at locations with good views to the river;
- Life-saving equipment will be provided by PLA - locate as directed;
- Retain lower section of boundary wall where feasible - as facing to new flood wall;
- Additional seating and interpretative signage is proposed to be added in the new paved dock area;
- Some amendments to existing kerbs and paving will be required to integrate with proposed works and access into the Rowing Club storage area.

Yours sincerely



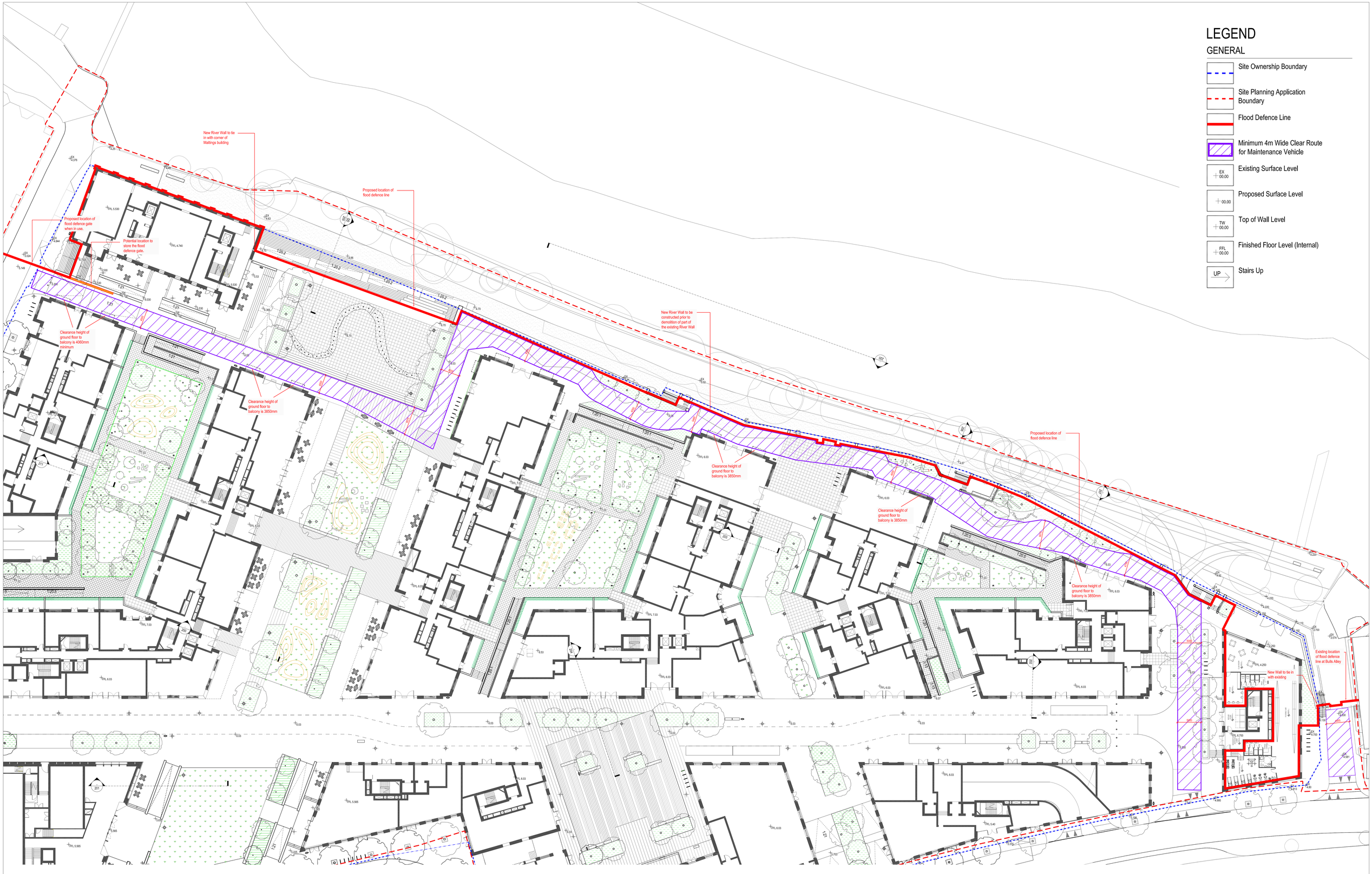
Sophie McCabe
Associate Director
For and On Behalf of Waterman Infrastructure & Environment Ltd

Appendix A

DRAFT

Pickfords Wharf, Clink Street, London, SE1 9DG
t. +44 (0)207 928 7888 ie@watermangroup.com **w.** www.watermangroup.com

Waterman Infrastructure & Environment Limited
Registered in England Number: 3269195 Registered Office: Pickfords Wharf, Clink Street, London SE1 9DG



LEGEND

GENERAL

- Site Ownership Boundary
- Site Planning Application Boundary
- Flood Defence Line
- Minimum 4m Wide Clear Route for Maintenance Vehicle
- EX 00.00 — Existing Surface Level
- 00.00 — Proposed Surface Level
- TW 00.00 — Top of Wall Level
- FFL 00.00 — Finished Floor Level (Internal)
- UP — Stairs Up

rev	details	by	date
D00	Issued for Planning.	RJ	04.06.2018
D01	Issued for Planning.	RJ	08.06.2018
D02	Issued for Planning.	RJ	21.06.2018

rev	details	by	date

Notes

1.0 Do not scale from drawing, use figured dimensions only
1.1 All dimensions to be checked onsite
1.2 This drawing to be read in conjunction with all other Gillespies drawings and specifications

Site plan

0 5 10 25m

N

Project title
Stag Brewery Planning

Drawing title
Development Area 1 Flood Defence Plan

Drawing number
P10736-00-001-116

Drawing Status: DESIGN
Revision: D02

Date	Scale	Drawn	Checked
04.06.18	1:250 @ A0	RJ	RC

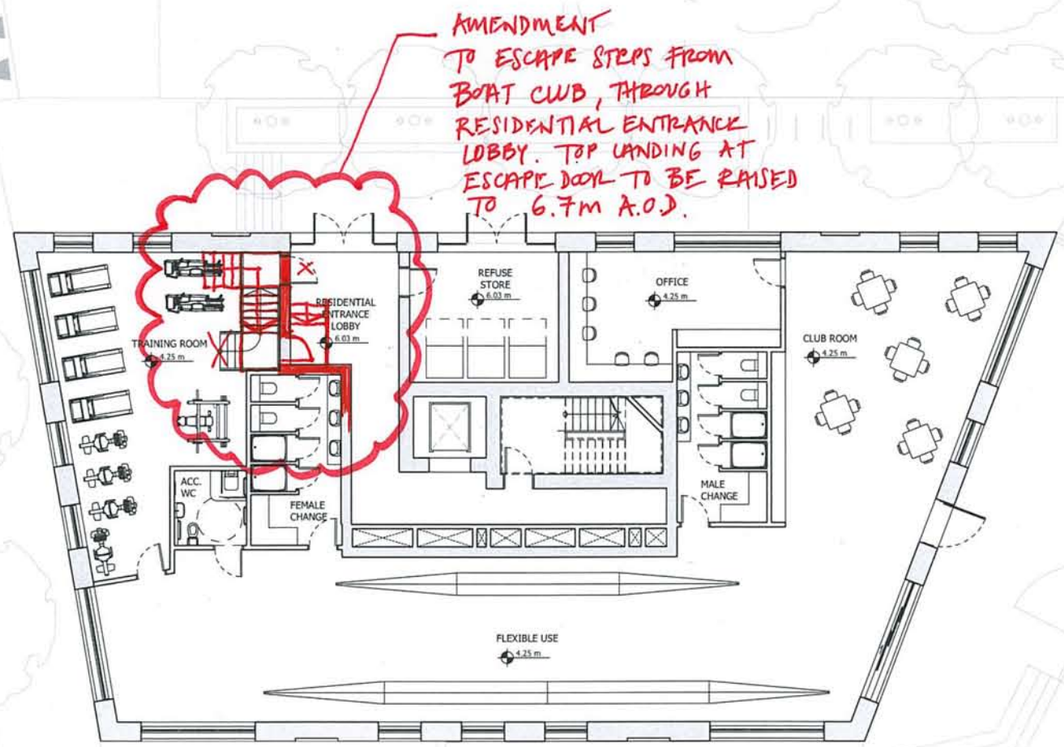
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Client
DARTMOUTH CAPITAL
Alameda House, 30-100 Sydney Street, London SW3 6NJ
P+ 0207 629 0239

GILLESPIES
1 St John's Square, London, EC1M 4DH
P 0207 2532929 F 0207 2533900 E design.london@gillespies.co.uk

R:\P10736-00-001 Stag Brewery Planning Application\Drawings\01 Design\CAD\P10736-00-001-100 Landscape Masterplan.dwg

NORTH



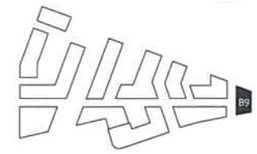
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NOTES:

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NORTH



NOTE:

[ ] WHEELCHAIR ACCESSIBLE UNIT / CONVERTIBLE UNIT

WHEELCHAIR TURNING AREA

S & P COMMENTS
19.06.2018

PLANNING APPLICATION	12/02/18	BJ	-
Revision description	Date	Check	Rev

SQUIRE & PARTNERS

The Department Store
248 Ferndale Road London SW9 8FR
T: 020 7278 5555 F: 020 7239 0495

info@squireandpartners.com
www.squireandpartners.com

Project

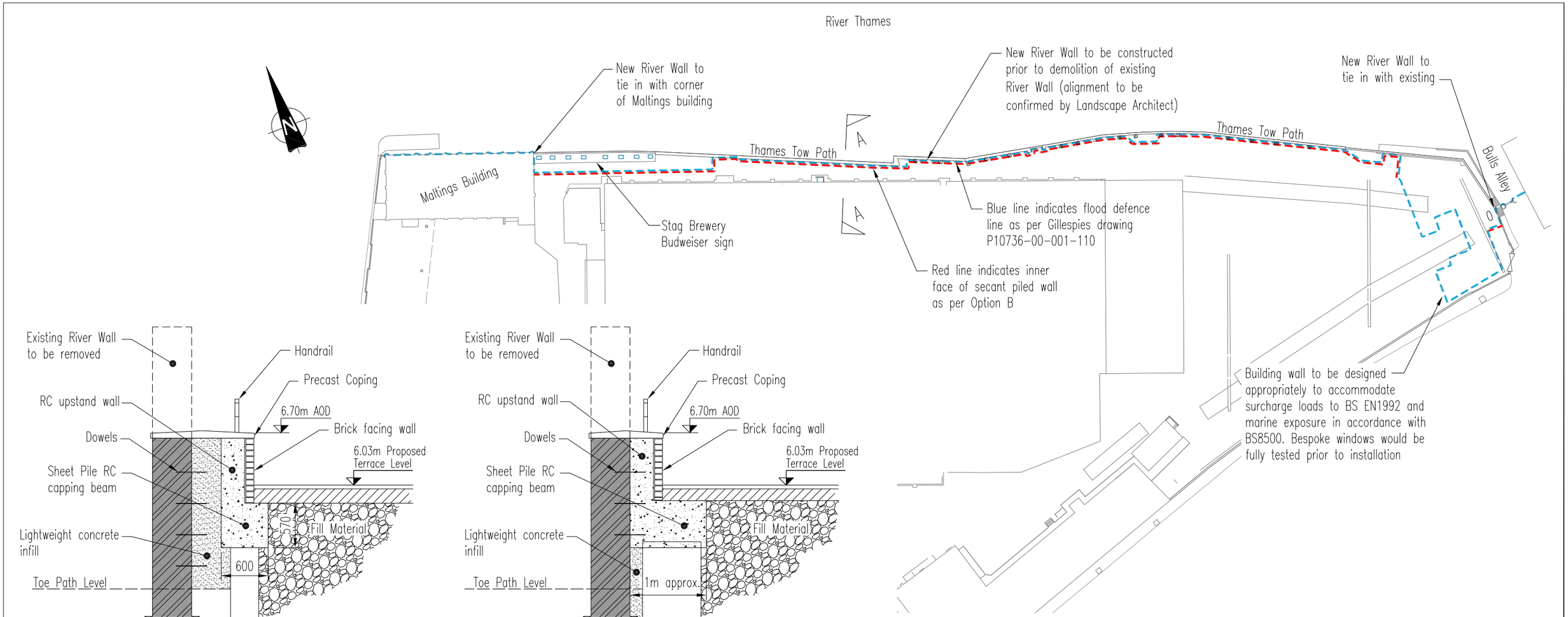
Stag Brewery
Richmond

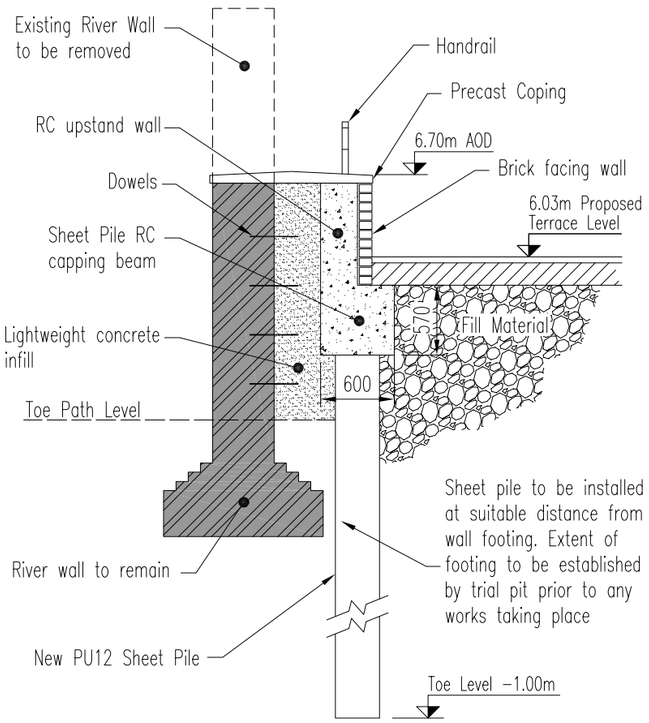
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BUILDING 09 - PROPOSED GROUND FLOOR PLAN

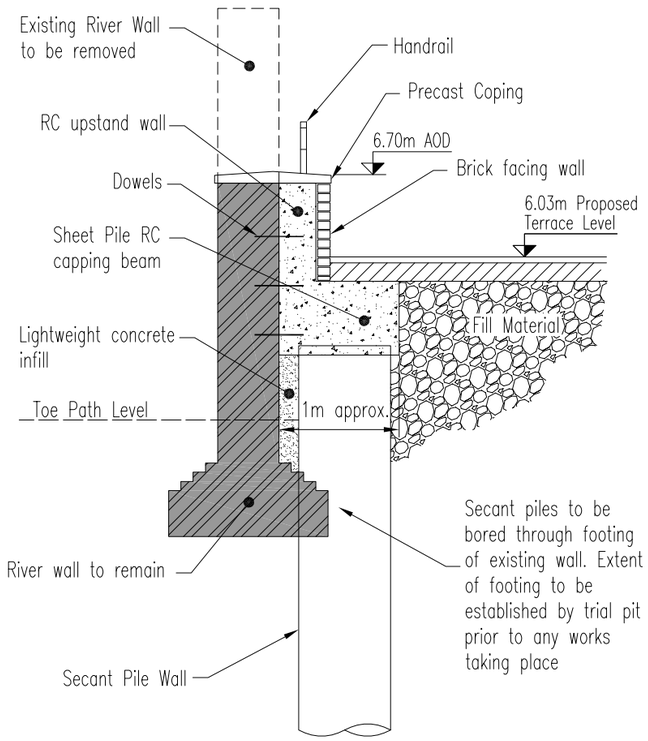
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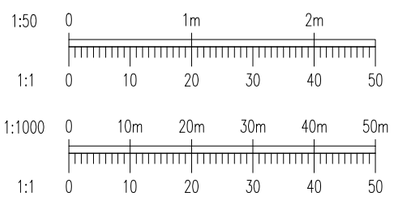




Section A-A
Typical New Wall Section
Option A
(Scale 1:50)



Section A-A
Typical New Wall Section
Option B
(Scale 1:50)



1. CONSTRUCTION JOINTS IN CAPPING BEAM AT 13m CENTRES.

GENERAL NOTES

Rev	Date	Description	By
A05	22.06.18	WALL ALIGNMENT REVISED	SPO
A04	14.06.18	WALL ALIGNMENT REVISED	SPO
A03	07.06.18	WALL ALIGNMENT REVISED. NOTES ADDED	SPO
A02	19.10.17	WALL ALIGNMENT REVISED, SECTIONS ADDED/REVISED	SPO
A01	13.07.17	ISSUED FOR INFORMATION	TLR

Amendments

Waterman

Pickfords Wharf Clink Street London SE19DG
t 020 7928 7888
mail@watermangroup.com www.watermangroup.com

Project
STAG BREWERY, MORTLAKE

Title
THAMES RIVER WALL
CONCEPT DESIGN

Client
DARTMOUTH CAPITAL ADVISORS LTD

Drawing Status
PRELIMINARY

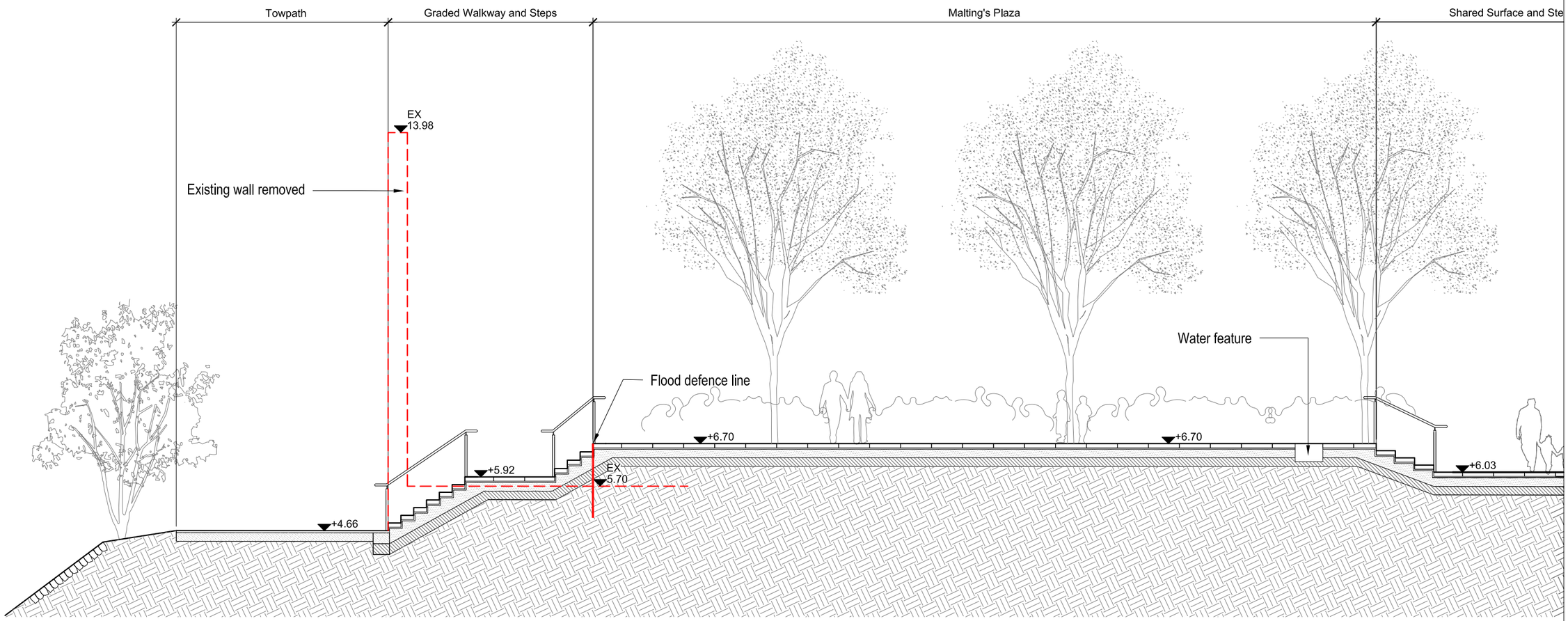
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Drawn by	MC	Date	JULY 2017

Project No: WIE10667

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Computer File No: WIE-10667-SA-04-1006.dwg

Publisher	Zone	Category	Number	Revision
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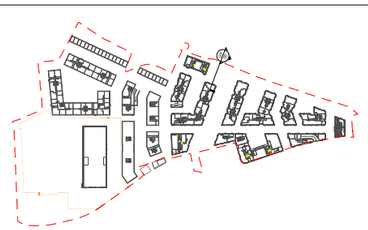


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rev	details	by	date
D00	Issued for Planning	CC	03.11.2017
D01	Issued for Planning	RJ	01.02.2018
D02	Issued for Planning	RJ	09.02.2018
D03	Issued for Planning	RJ	08.06.2018

Notes

1.0 All dimensions in millimeters.
1.2 Use only dimensions shown.



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STAG BREWERY

Drawing
Proposed Maltings Plaza Section

Drawing number
P10736-00-001-205

Revision
D03

drawing status
DESIGN

Date
03.11.17

Scale
1:100 @ A3

Drawn
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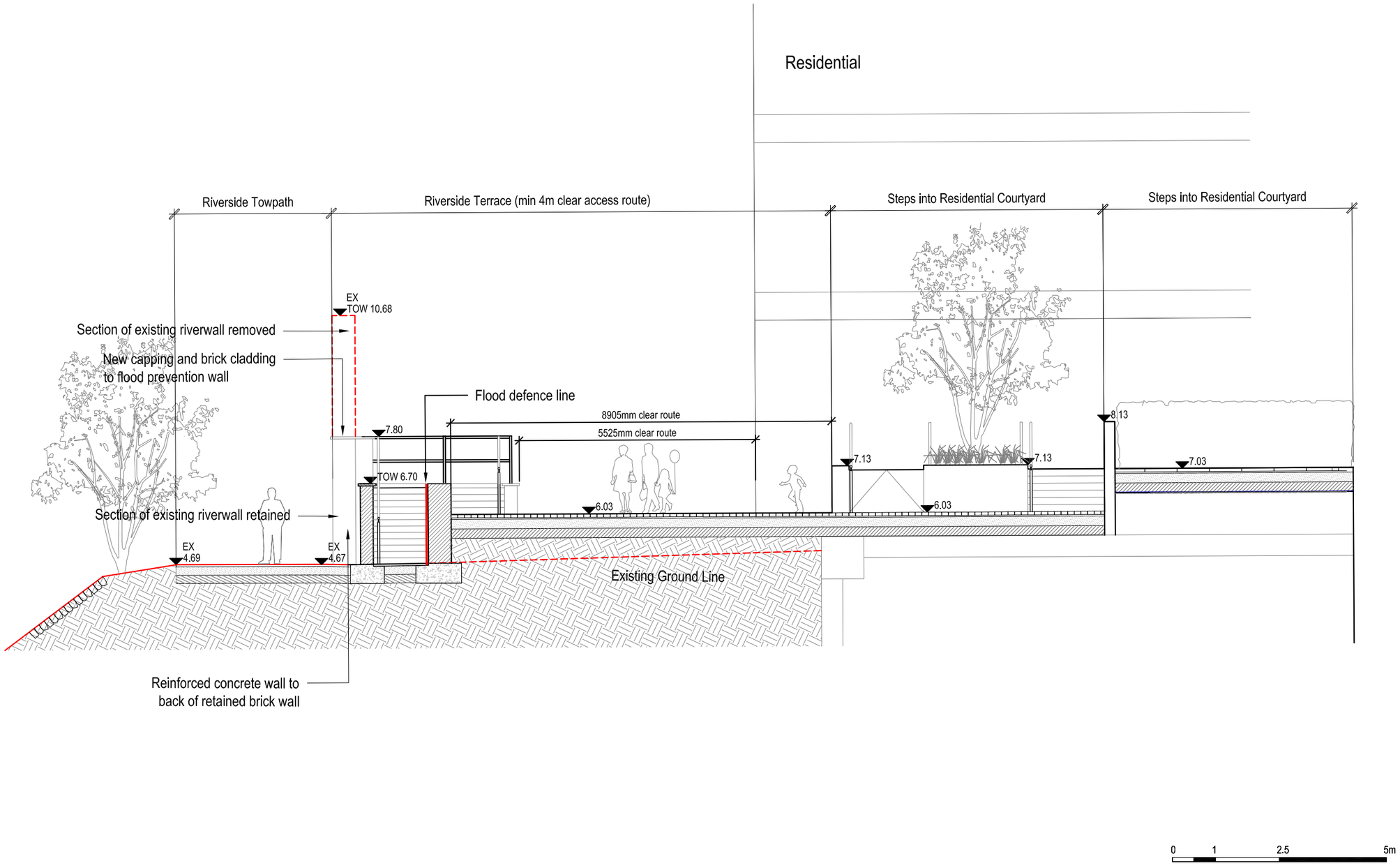
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RC

Client

DARTMOUTH CAPITAL
Alameda House, 90-100 Sydney Street, London SW3 6NJ
P: 0207 629 0239
F: xxxxx xxx xxx

GILLESPIES
1 St John's Square, London EC1M 4DH
P 0207 2532929 F 0207 2533900 E design.london@gillespies.co.uk

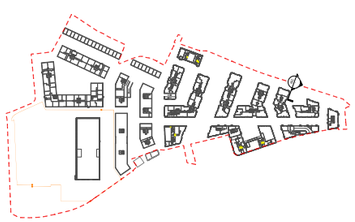
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rev	details	by	date
D00	Issued for Information	RJ	03.11.2017
D01	Issued for Planning	RJ	01.02.2018
D02	Issued for Planning	RJ	09.02.2018
D03	Flood defence update	RJ	05.06.2018

Notes

1.0 All dimensions in millimeters.
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STAG BREWERY

Drawing
Proposed River Terrace
Section 1

Drawing number
P10736-00-001-206

Revision
D03

drawing status
DESIGN

Date
03.11.17

Scale
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Drawn
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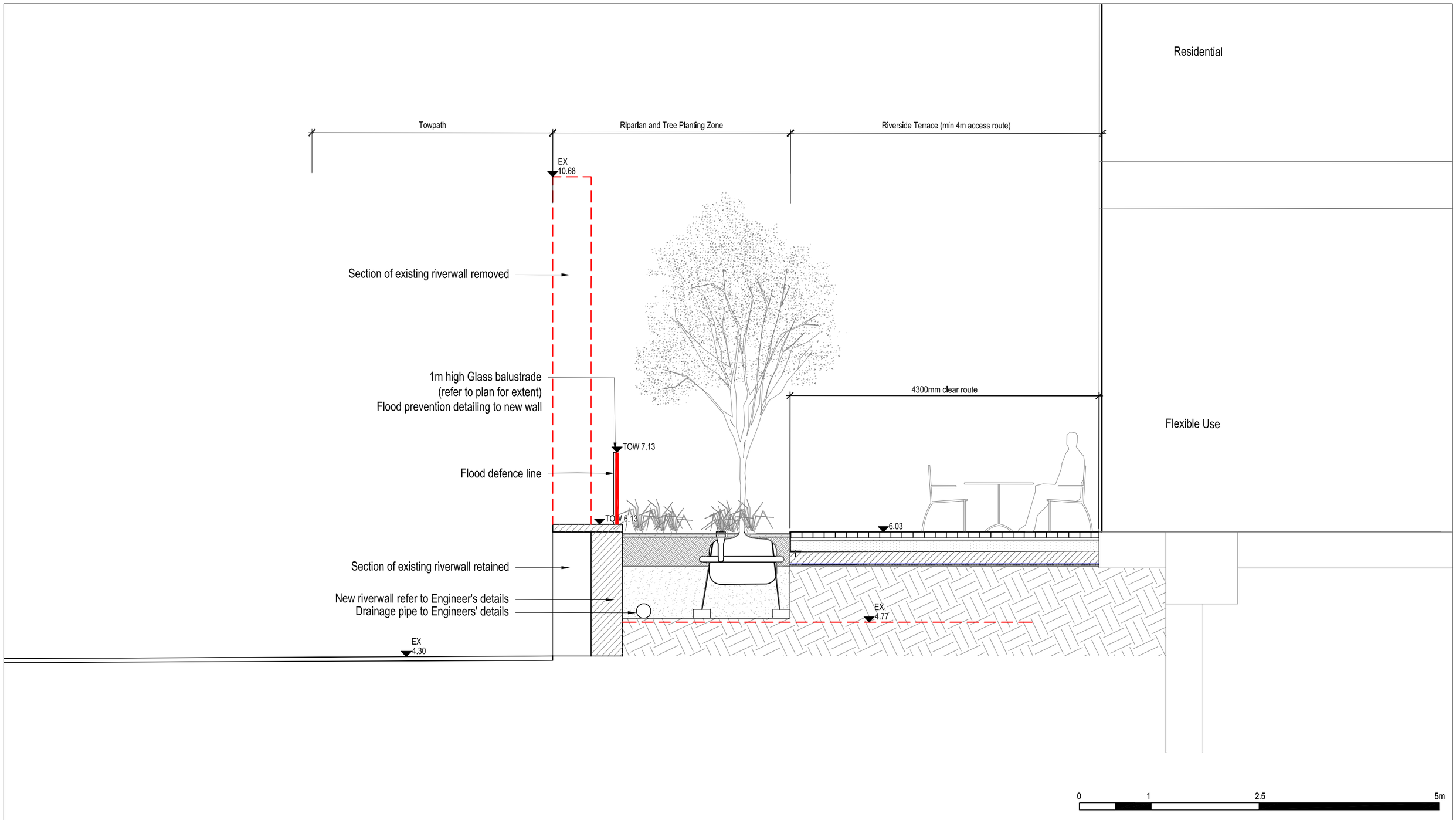
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Client

DARTMOUTH CAPITAL
Alameda House, 90-100 Sydney Street, London SW3 6NJ
P: 0207 629 0239
F: xxxxx xxx xxx

GILLESPIES
1 St John's Square, London EC1M 4DH
P 0207 2532929 F 0207 2533900 E design.london@gillespies.co.uk

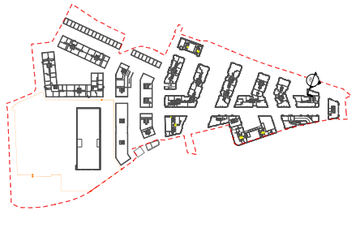
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rev	details	by	date
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D01	Issued for planning	RJ	01.02.2018
D02	Issued for Planning	RJ	09.02.2018
D03	Flood Defence Update	RJ	05.06.2018

Notes

1.0 All dimensions in millimeters.
1.2 Use only dimensions shown.



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STAG BREWERY

Drawing
Proposed River Terrace
Section 2

Drawing number
P10736-00-001-207

Revision
D03

drawing status
DESIGN

Date
03.11.17

Scale
1:50 @ A3

Drawn
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Client

DARTMOUTH CAPITAL
Alameda House, 90-100 Sydney Street, London SW3 6NJ
P: 0207 629 0239
F: xxxxx xxx xxx

GILLESPIES
1 St John's Square, London EC1M 4DH
P 0207 2532929 F 0207 2533900 E design.london@gillespies.co.uk

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Appendix B

DRAFT

Pickfords Wharf, Clink Street, London, SE1 9DG
t. +44 (0)207 928 7888 ie@watermangroup.com **w.** www.watermangroup.com

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GLASS WALL FLOOD BARRIERS/WINDOWS

http://www.floodcontrolinternational.com/PRODUCTS/FLOOD-BARRIERS/glass-barriers.html





Flood Control International has developed the ultimate glass wall flood defences that are capable of withstanding virtually any flood condition. See the new Hard Body Drop Test video below.

The glass walls require no operational input and cause minimal visual intrusion where flood protection is required.

Each glass barrier utilises a combination of specially designed high strength structural glass, engineered frames designed to withstand the static and impact loads of the specific location, structural anchoring system, and specially designed watertight and impact resisting sealing technology.

Flood protection heights up to 1.8m as standard.

The result is a virtually clear glass barrier with no loss of visual amenity that can be used as a direct first line flood defence without the need for sacrificial panels, additional deflection devices or external buffers. Self cleaning glass and grade 316 stainless steel frames allow this system to be used in aggressive marine environments if required. Ideal when sea wall flood defences are required.

Our glass barriers can be used as individual viewing panels incorporated into hard flood defences, or as a complete free standing glass wall spanning any length and following virtually any contour. There is also a version of the system that can be retrospectively mounted onto suitable existing foundations.

Tamper proof and concealed fixings are used throughout the system to reduce the possibility of vandalism. Safety factors are incorporated into all load calculations and material design to avoid the possibility of catastrophic system failure. See the Hard Body Drop Test video below.

LIFT-HINGE FLOOD GATE
http://www.floodcontrolinternational.com/PRODUCTS/FLOOD-GATES/lhg-floodgate.html



Our design for a lift-hinged flood gate utilises a unique 'raise-swing-lower' mechanism and does not require recessed ground channels, raised ground beams or ramps, making the gates ideal for vehicle entrances and especially suitable for forklift or wheelchair access.

Even the widest flood gate designs can be operated by one person using the smooth winding lift action and the single point locking mechanism. The aluminium construction also provides a far higher level of operator safety than heavy steel flood gate products.

These floodgates are available as single or double leaf, or integrated with a stop-log system for wide openings in flood defences. Our lift-hinge flood gate products are suitable for use in unmanned locations, are fully lockable and come complete with anti-theft and vandal resistant features.

The components are manufactured from construction grade steel and aluminium with stainless steel and are virtually maintenance free.

Our flood gate range is designed for extreme weather durability to give a lifetime of service and with EPDM seals that reform even after prolonged periods of compression, the gates can, if required, be left closed indefinitely. For locations where leafs greater than 4.5m wide are required, we can also manufacture from steel to any size.

SLIDING GATES
http://www.floodcontrolinternational.com/PRODUCTS/FLOOD-GATES/sliding-floodgate.html



Flood Control International offers a full design, manufacture and installation service for heavy duty sliding floodgates. Each sliding floodgate is individually designed for the specific customer's requirements and can be designed to incorporate automation of closure, locking and monitoring status where needed.

Sliding floodgates incorporate spring wheels to allow an easy sliding operation with the ability to compress seals when in position. Alternatively, inflating seals can be used.

Benefits

- Efficient use of space with no 'swing area' as with traditional flood gates.
- Designed to fit any building or opening.
- Floodgates can be automated and linked to building management systems.
- Can be designed for flood protection heights up to 5m and spans up to 7m.
- Simple one person operation.
- Ability to power / automate closing and opening.
- No excavations required for installation.
- Always on-site ready to be deployed.

Appendix C

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Pickfords Wharf, Clink Street, London, SE1 9DG
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Proposed location of flood defence gate when in use

Potential location to store the flood defence gate (indicative)

Proposed flood defence line

Only minor / cosmetic maintenance work anticipated. Crane would be able to lift materials from lorry to required location.

Route for maintenance vehicle

Clearance height of ground floor to balcony is 4060mm minimum

Clearance height of ground floor to balcony is 3850mm

Maintenance vehicle parking for flood defence line.

Clearance height of ground floor to balcony is 3850mm

Clearance height of ground floor to balcony is 3850mm

Proposed flood defence line

Clearance height of ground floor to balcony is 3850mm

Route for maintenance vehicle

Thames Bank House

Asplin Cottage

Aynescombe Cottage

Aynescombe Path

Sluice

The Ship (PH)

MHW

MP

Slipping Grounds

Mooring Posts

Ship Lane

Brewery

Boatrace Court

61 to 69

Mortlake Busines Centre

1 to 12

18 to 32

Butler House

Sorting Office

2 to 12

VINEYARD PATH

Sea Scouts Centre

Cromwell Place

Scrap Yard

PH

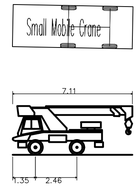
FB

BT Sub Sta

+ 5.5m

6.4m

Small Mobile Crane



Small Mobile Crane	
Overall Length	7.110m
Overall Width	2.500m
Overall Body Height	2.894m
Min Body Ground Clearance	0.427m
Track Width	2.500m
Lock to lock time	4.00s
Kerb to Kerb Turning Radius	5.800m

NOTE:
VEHICLE HEIGHT = 2.894m
BALCONY HEIGHT = 3.850m
BALCONY CLEARANCE = 866mm

Mark	Revision	Date	Drawn	Chkd	Appd
D	Boat House flood defence line revised	21.06.18	REM	MB	RAP
C	Masterplan base updated & vehicle tracking revised	11.06.18	REM	RAP	RAP
B	MASTERPLAN BASE UPDATED & TRACKS REVISED	04.06.18	REM	RAP	RAP
A	MASTERPLAN BASE UPDATED & TRACKS ADDED	31.05.18	JS	MB	RAP

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

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.

Drawing Issue Status

FOR PLANNING

STAG BREWERY, MORTLAKE
POSSIBLE HIGHWAY LAYOUT - PHASE 1
VEHICLE SWEPT PATH ANALYSIS FOR A SMALL MOBILE CRANE

Client

RESELTON PROPERTIES LTD

Date of 1st Issue	Designed	Drawn
25.05.2018	REM	REM
A1 Scale	Checked	Approved
1:500	GD	RAP

Drawing Number: 38262/5501/091

Revision: D

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Offices throughout the UK and Europe

www.peterbrett.com

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LONDON
Tel: 020 3824 6600

File Location: j:\38262 stag brewery, mortlake\5. drawings & models\cad\transport\38262-5501-91-d.dwg

Proposed location of flood defence gate when in use

Existing on-street parking

Proposed flood defence line

Potential location to store the flood defence gate (indicative)

Only minor / cosmetic maintenance work anticipated. Crane would be able to lift materials from lorry to required location.

Route for maintenance vehicle

Vehicle passes under balcony with 415mm minimum clearance

Clearance height of ground floor to balcony is 4060mm minimum

Clearance height of ground floor to balcony is 3850mm

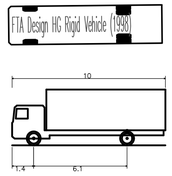
Vehicle passes under balcony with 205mm clearance

Clearance height of ground floor to balcony is 3850mm

Proposed flood defence line

Clearance height of ground floor to balcony is 3850mm

Route for maintenance vehicle



FTA Design HG Rigid Vehicle (1998)

Overall Length	10.000m
Overall Width	2.500m
Overall Body Height	3.645m
Min Body Ground Clearance	0.440m
Track Width	2.470m
Lock to lock time	3.00s
Kerb to Kerb Turning Radius	11.000m

NOTE:
VEHICLE HEIGHT = 3.645m
BALCONY HEIGHT =3.850m
BALCONY CLEARANCE = 205mm

Mark	Revision	Date	Drawn	Chkd	Appd
K	Boat House flood defence line revised	21.06.18	REM	MB	RAP
J	Masterplan base updated & tracking revised	11.06.18	REM	RAP	RAP
H	The Maltings access & tracking revised	04.06.18	REM	RAP	RAP
G	Masterplan base updated & tracking revised	31.05.18	REM	RAP	RAP
F	Balconies added and tracking updated	25.05.18	REM	RAP	RAP
E	Masterplan base updated & tracking revised	04.01.18	REM	GD	RAP
D	Landscape base updated, tracking & kerb geometries revised	01.12.17	REM	GD	RAP
C	Landscape base updated, tracking & kerb geometries revised	15.11.17	REM	-	-
B	Landscape base updated, tracking & kerb geometries revised	18.10.17	REM	-	-
A	Landscape base updated, tracking & kerb geometries revised	06.10.17	REM	-	-

SCALING NOTE: Do not scale from this drawing. If in doubt, ask.
UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake his own investigation where the presence of any existing sewers, services, plant or apparatus may affect his operations.

Drawing Issue Status

FOR PLANNING

STAG BREWERY, MORTLAKE
POSSIBLE HIGHWAY LAYOUT - PHASE 1
VEHICLE SWEPT PATH ANALYSIS FOR A 10m RIGID LORRY

Client

RESELTON PROPERTIES LTD

Date of 1st Issue: 04.09.2017	Designed: REM	Drawn: REM
A1 Scale: 1:500	Checked: GD	Approved: RAP
Drawing Number: 38262/5501/062		Revision: K

peterbrett
Offices throughout the UK and Europe
www.peterbrett.com

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LONDON
Tel: 020 7566 8600

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Appendix D

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Pickfords Wharf, Clink Street, London, SE1 9DG
t. +44 (0)207 928 7888 ie@watermangroup.com **w.** www.watermangroup.com

Waterman Infrastructure & Environment Limited
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EXISTING TOWPATH

SITE ANALYSIS



C. Second Response to Environment Agency

Infrastructure & Environment

Direct Tel: 0207 928 7888
Direct Email: brendan.mccarthy@watermangroup.com

Our Ref: WIE10667-103-181030-BM-RiverWall
Your Ref: SL/2018/118128/02-L01

Date: 30th October 2018

Joe Martyn
Environment Agency
3rd Floor, Seacole Building
2 Marsham Street
London SW1P 4DF

Dear Joe,

RE: Stage Brewery – River Wall

I am writing in response to your comments dated 18th September 2018 in relation to the proposals for a new river wall at the Stag Brewery Site (planning reference: 18/0547/FUL). Please see below the information in response to your comments.

Query 1) – Details of a continuous fit for purpose defence line at construction stage *– We accept that details will be provided at the detailed design stage when a contractor is appointed and a Flood Risk Activity Permit is applied for.*

Response – n/a

Query 2) – Details of the lifespan of the flood defence *– Accepted*

Response – n/a

Query 3) – TE2100 raisings *– We note that the proposed glass balustrade will be part of the flood defence wall thereby raising it to TE2100 levels at the construction phase. We will require cross sections representative of all sections through the defence illustrating the proposed crest level of the flood defence line and all supporting structures (particularly where steps are located).*

Drawing 38262/5501/062 illustrates the boathouse building on the eastern end of the site incorporates windows and internal access point below the TE2100 level within the flood defence line. The finished floor levels in the lobby/entrance area of the boat house are proposed to be set at 6.03m AOD, but the boat house finished floor level is to be set at 4.25mAOD. Details of how access will be achieved from the landward side of the flood defences into the boathouse will need to be provided.

We will require cross section drawings of the boathouse and demonstration of how TE2100 levels will be achieved. The flood defence line must be continuous and not contain openings such as windows and access points. Additional it will need to be demonstrated that no utilises which could compromise the defence line and integrity of the river wall structure.

The proposed boathouse should be structurally independent of the Tidal Defence and offset to allow access for inspection. The separation between the Tidal defence and the building is important as is would allow for potential future maintenance works and defence raising.

Additionally, the developer will need to demonstrate how the flood defence line within the redline boundary will tie into adjacent properties for future TE2100 raisings (specifically at Ship Lane and Bull Alley). The developer may wish to reconsider the line of the flood defence and how the continuous line of the defence between the proposed boathouse and Bull Alley can be achieve.

Response – We will provide cross sections illustrating the proposed crest level and all supporting structures once the detailed design has been undertaken. It is envisaged that this information would be provided as part of the Flood Risk Activity Permit application.

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In order for boats to be able to access the existing slip way it is necessary to set the Finished Floor Level (FFL) of the majority of the boat house at 4.25m AOD.

Passive Defence

Given these levels constraints, the only feasible solution to provide passive defence as well as allowing access to the river for the boats, would be to construct the defence line through the boat house building. As set out in our previous response dated 27th June 2018 (Appendix A), the building concrete retaining structures will be designed to accommodate the surcharge loads to BS EN 1992 and marine exposure class will be in accordance with BS8500 for both mix design and cover. Although not a preferred solution by the EA, this would provide the protection, working within the site constraints. This building would form part of the formal flood defence and would not be demolished in the future without prior construction of an alternative defence.

Any windows to the boathouse building that form part of the defence line would require a bespoke design to ensure protection to the appropriate standard and would not be able to open. These windows would be fully tested prior to installation to ensure that they are fit for purpose. An example of the sort of product that could be used can be found here https://thefloodcompany.co.uk/case-study-items/bam-nuttall/. In this example testing of the bespoke flood product was undertaken at HR Wallingford to ensure it was of a suitable standard.

The team considered the potential to remove the windows of the boat house that front onto Mortlake High Street. However, having undertaken extensive pre-application consultation with the local authority planning officers, it is our understanding that the incorporation of windows in this location is of significant townscape importance. Pre-application advice encouraged the incorporation of as much glazing as possible at the lower levels of the building in order to both lighten appearance of the building and provide active frontage to the streetscape.

Another alternative of raising the window sill to provide a solid rather than glazed line of defence was considered. The difficulty of achieving this option is that in order to provide a sill at or above the flood level (6.7m AOD), the sill would sit above eye level (1.6m above ground level) of pedestrians walking along the adjacent footpath which is set at 5.1m AOD. This would inhibit the provision of active frontage to the streetscape.

In addition to the above, the lobby/entrance area of the boat house would be raised to 6.7m AOD as per drawing P10736-00-001-116-D02 and the hand sketch submitted with the previous response, these drawings are included in Appendix A.

Active Defences

Due to level constraints with regards to accessing the river form the boat house, if the defence line is to be permanent (passive) it will need to run through the boat house and it would not be possible to ensure that the building is structurally independent of the building.

However, if a standalone structure is preferred then the river wall and proposed flood gate (currently proposed for property level protection) to the north of the boat house could form the formal defence (set at 6.7m AOD). The gate is required in order to provide direct access to the river. All these works would raise the standard of protection to 6.7m AOD and therefore no further raising would be anticipated based on the current TE2100 Plan.

It was considered that the permanent passive protection provided by running the River Thames Defence line through the boat house would be preferable to a standalone structure between the boat

house and the River Thames which would require a gate to allow boats to access the River. However, if desired, the standalone flood defence/gate could be implemented as the formal flood defence line.

Bulls Alley

The proposed defence would tie into the existing Bulls Alley defence to ensure continuous protection. Further information in relation to the Bulls Alley defence is given overleaf in response to Query 5.

Query 4) – Vehicle tracking plan *– Drawing 38262/5501/062 illustrates a vehicle tracking plan for a 10m long lorry, however the circa 4m clearance height appears to be insufficient to actually operate any plant within these areas. Furthermore, the flood defence within the northwest corner of the site appears to be inaccessible. It appears that the applicant will use of the existing building as the defence line. Further information is required as to how the defence will be accessed from the landward side.*

We appreciate a new flood defence will reduce the likelihood of failure, however unrestricted access is still required for any unforeseen maintenance and emergency works and the future raisings.

Response – As set out in the previous response dated 27th June 2018 (Appendix A), the tracking accounts for vertical clearance to balconies and trees, ensuring that vehicles can pass beneath unrestricted. Drawings 38262/5501/091/D and 38262/5501/062/K (Appendix A) show that the vertical constraints are only present in a limited number of locations and that there are only two locations where the 10m Rigid Vehicle needs to pass under a balcony. In the west of the site one balcony overhangs the tracked vehicle path by a maximum of approximately 360mm. In the east of the site the balcony would only overhang the tacked vehicle path during a three-point turn manoeuvre by a maximum of 670mm. Given the overhangs are so small, vehicles or plant would easily be able to manoeuvre around these overhangs and operate effectively, this is considered acceptable.

As set out in the previous response the area to the south of the proposed flood defence and to the east of the Maltings Building would not allow vehicles to park directly adjacent to the defence. However, a crane could be used to move maintenance materials to the required location. Furthermore, due to the proposed piled construction of the defence it is anticipated that any maintenance would be minor or superficial. In the highly unlikely scenario that vehicle access is required to this area a temporary ramp could be constructed to bypass the steps.

The existing Maltings Building is part of the River Thames Defences in the present situation and it is not proposed to alter this as part of the development. A structural assessment of the Maltings Building was submitted with the planning application (18/0547/FUL, Appendix 12.4 of the ES) which shows that the walls have sufficient capacity to resist the increase in water level indicated in the TE2100 Plan. Access to the landward side of the defence line would need to be made through the inside of the Maltings Building as is done so in the existing situation. Access would also be available to the river side via Ship Lane.

Query 5) – Ship Lane and Bull Alley *– Bull Alley, and the flood boards for this location are within the redline boundary of the application. Irrespective of ownership, developer will have to demonstrate both the residual lifespan and TE2100 crest level raising for all tidal flood defences within their red-line boundary. Our preference would be for the flood boards to be removed and a passive (static) flood defence installed. Regarding Ship Lane, we appreciate the applicant may not be the freeholder of this land, and therefore may not be liable to ultimately provide the flood defence across the road. However, the applicant is responsible for demonstrating how all flood defence line within their redline boundary, will be treated in light of TE2100 raising requirements and how these will tie in with the*

defences on adjacent properties. Developments should not preclude or limit future defence raising options nor should they increase flood risk to neighbouring properties.

A development that precludes options for passive defences (to meet TE2100 levels), both increases the cost of future flood defence provision and increases residual flood risk due to the potential for the gate not to be operated. On public highways this risk is greatly increased because of 3rd party vehicle use that may damage the gate or simply park across it.

We appreciate that the gate options were discussed at the meeting of 26 September 2016, but as set out in the minutes to the meeting the our preference is always for passive options for defence provision to be kept open – in this case we stated that the applicant would have to demonstrate that passive solutions where unsuitable prior to considering gated options. We do not believe the applicant has demonstrated this and do not accept that a flood gate is the only feasible solution, nor that gates are appropriate for a public highway. A review of our (open source) LiDAR data suggest the road levels already rises to approx. 6.1mAOD, albeit further landward than the current line. Hence a potential further 600mm is all that is required to archive TE2100 levels (not 1m). Given the complete re-development of this site, we see no obvious reason why the scheme cannot be designed to allow for a passive solution to be provided in ship lane, and would recommend you progress you designs along this principle (rather than try and demonstrate a passive defence is not possible).

We accept that some future passive defence line options would require changes to third party defences (namely the ship pub). While we do not expect the developer to deliver works outside their red-line boundary, we do expect the developer to design a scheme that would not preclude a passive defence being installed in the future, and that this future passive defence line should be achievable with the minimum level of cost and disruption both to the development itself and adjacent properties.

Response – The development proposals would not alter the status quo in relation to the Bulls Alley defence and would not increase flood risk. It is therefore not reasonable or necessary in planning terms for the client to undertake any works to this defence. The Bulls Alley defence is also outside of the applicant's ownership and therefore is not responsible for carrying out works to it. We understand that the highway authority is the land owner therefore they are the riparian owner and are responsible for any upgrade of the Bulls Alley defence. Furthermore, the Port of London Authority (PLA) are known to use this gate regularly to assist them in removing the debris that builds up in this location. In the future the owner of this gate (understood to be the highway authority) would need to replace it with a new gate/wall to 6.7m AOD, however this is something the applicant is not able to provide themselves.

We appreciate that a passive defence is always preferable, however the practicalities of raising Ship Lane itself mean that this option is not suitable. It is correct that the level of Ship Lane does rise to circa 6.1m AOD and that at this point a raise of only 600mm would be required. However, this would result in the River Thames Defence line moving back along Ship Lane in a southerly direction which in turn will allow flood water to flow further down Ship Lane than it would currently do. As a result, the defence height of 6.7m AOD would then need to be in place on either side of Ship Lane. This would render the currently proposed active frontages along Ship Lane unfeasible and would create a narrow corridor with walls on either side.

All ground floor level residential units within Building 3 on Ship Lane are proposed to have a finished floor level of 7.03m AOD, which is above the defence height of 6.5m AOD. However, there are several entrances to the building that are set at a level below this datum. These elements include a refuse store, a residential entrance, a substation and ramped access to the basement car park. All of these require level access in order to meet legislative requirements and must be accessible from street side.

The residential entrance is designed to connect to a raised entrance route from the opposite side of the building. This would provide an alternative means of escape in the event of a flood. Raising the street itself would encounter various technical challenges including the ability to achieve wheelchair accessible gradient slopes and the ability to retain mature trees within altered footpath levels.

Building 17 also fronts onto Ship Lane, however this building has only been submitted in outline and therefore details such as the internal layout and location of access are not fixed at this stage. However, similarly to Building 3 it is likely that there will be a need for refuse stores/substations etc. that will require level access from the street side.

In addition, the Ship Lane Passage is located between the application site and the Ship Pub. Based on the current proposal the future gate would protect this area from flooding. However, if the defence line is moved back then there is the potential for flood water to flow down this passage and affect the existing properties to the north of the site (i.e. by passing the defences at the front of these properties). Alternatively, a gate would need to be provided to protect the passage.

We take on board your comment regarding the potential for vehicles to block the future gate. To mitigate this risk bollards could be incorporated to ensure vehicles do not block the gate.

Query 6) – drainage strategy *– Regarding the proposed outfalls, the applicant should note outfalls will have to be positioned at an appropriate height, and should be assessed to deal with expected tide locking at this height. An assessment of the need for scour protection (to protect foreshore and structural stability of flood defences) will be needed, along with delivery of appropriate scour mitigation. Outfalls, that penetrate the tidal defence line below the statutory level and with a diameter greater than >300 mm must contain 2 in-line non-return valve's (such as flap valves). Further details on the construction of the outfalls and method statements etc. will have to be provided and reviewed as part of the Flood Risk Activity Permit application.*

Response – We will ensure that any relevant outfalls have two in-line non-return values and that further details are provided as part of the Flood Risk Activity Permit application. Please note that tide locking was considered in the Drainage Strategy and MicroDrainage calculations undertaken to confirm that the surcharged outfalls would operate without flooding the site.

Query 7) – enhancement to the Thames Path and river bank *– The application offers minimal enhancements for nature and biodiversity. The development in located immediately adjacent to the River Thames and offers an excellent opportunity to enhance the river environment and improve the river corridor for people and wildlife.*

The applicant states that they do not own do not own the tow path which. However little has been done to improve biodiversity within the submitted proposals. There are green areas and trees, but no mention of green roofs, biodiverse planting (i.e native species flowers to attract invertebrates) or bat boxes, bird boxes etc. It is therefore not been demonstrated that the development will result in a net gain to biodiversity.

Any new planting within the buffer zone should use native species. Any loss of habitat should be mitigated for within the development with the use of green and/or brown roof's to encourage biodiversity.

The National Planning Policy Framework (NPPF) requires local planning authorities to aim to conserve and enhance biodiversity when determining planning applications by minimising impacts on biodiversity and providing net gains in biodiversity where possible.

In addition, the Thames river basin management plan requires the restoration and enhancement of water bodies to prevent deterioration and promote recovery of water bodies.

London Borough of Richmond's Local Plan Policy LP 15 Biodiversity states that 'The Council will protect and enhance the borough's biodiversity, in particular, but not exclusively, the sites designated for their biodiversity and nature conservation value, including the connectivity between habitats.

By

- *Supporting enhancements to biodiversity;*
- *Incorporating and creating new habitats or biodiversity features, including trees, into development sites and into the design of buildings themselves where appropriate;*
- *Major developments are required to deliver net gain for biodiversity, through incorporation of ecological enhancements, wherever possible;*
- *Enhancing wildlife corridors for the movement of species, including river corridors, where opportunities arise; and*
- *Maximising the provision of soft landscaping, including trees, shrubs and other vegetation that support the borough-wide Biodiversity Action Plan.*

The London Borough of Richmond's Local Plan Policy LP 18 River corridors states that 'Development adjacent to the river corridors will be expected to contribute to improvements and enhancements to the river environment.'

Response – Ecological input was provided at an early stage of the scheme design, commencing with the provision of a Preliminary Ecological Appraisal (PEA) in 2016 and then refined based on the results of additional surveys for birds and bats.

As set out within the Landscape Design and Access Statement (Landscape DAS) prepared by Gillespies and submitted with the planning applications (references: 18/0547/FUL, 18/0548/FUL, and 18/0549/FUL), bat boxes will be integrated into the green and brown roofs on various buildings of the development (detailed component, Development Area 1) with a total of 10 boxes, tubes or bricks provided in association with soft landscape treatment on these roofs. Boxes are to be oriented between southeast and southwest to suit use.

Bird boxes are also provided on roofs closer to the River Thames, including 3 Schwegler 2H Nest Boxes for black redstarts (a London BAP and S41 species) and 7 additional boxes for more general species. These are to be oriented east or west to suit use.

Plant species have been selected to suit a variety of habitats and microclimatic conditions across the site. These will include a range of plants suitable as food or habitat plants for a wide range of fauna, including bee attracting flowering plants.

For the outline component of the Development (Development Area 2), the biodiversity strategy will utilise the same principles as above and will be provided at the detailed design stage. The biodiversity strategy is in line with the recommendations of the PEA and protected species report. As detailed in the ES Chapter the proposed development will provide landscaping as well as other artificial habitats to birds and bats detailed above (as detailed in the landscape DAS submitted for planning, extracts of the landscape DAS are provided in Appendix B), inherent to the scheme design, which would provide enhanced opportunities for biodiversity. The opportunities within the Stag Brewery component of the Site include:

- Over 400 new trees and up to 51 retained trees;
- Hedge planting (1.5 m high) enclosing all ground level residential courtyards east of Ship Lane in the detailed part of the Stag Brewery component of the Development;
- A minimum of 10 bat boxes incorporated in the Development Area 1 (number of bat boxes within the outline component of the Site would be determined following the reserved matters application);
- Provision of new trees including the use of native species, or species of benefit to wildlife. This includes littoral plant species in areas close to the river edge responding to existing riverside vegetation and fruit / berry and nut bearing trees located in the community park south of the proposed school;
- Provision of biodiversity roofs, including a mix of green and brown roofs; and
- A new green link connecting the River Thames and Mortlake Green.

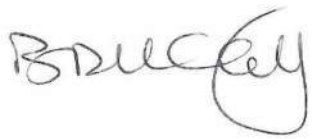
In addition, the Chalkers Corner component of the Site would provide a new public resting space, enhanced public realm and replacement and additional tree planting.

The recommended detailed towpath works are covered within the Landscape Design and Access Statement (pages 103-111) and summarised below:

- Pruning of understorey vegetation on Towpath to open key views;
- Existing granite setts on Towpath, public draw dock and slipway retained;
- Rediscovered railway track - express within new pavement design to new seating area;
- Seating provided at locations with good views to the river;
- Life-saving equipment will be provided by PLA - located as directed;
- Retain lower section of boundary wall where feasible - as facing to new flood wall;
- Additional seating and interpretative signage is proposed to be added in the new paved dock area; and
- Some amendments to existing kerbs and paving will be required to integrate with proposed works and access into the Rowing Club storage area.

Given the ecological baseline of the Site and the proposed enhancement measures it is assessed that the scheme will provide an ecological enhancement in line with planning policy requirements.

Yours sincerely



Brendan McCarthy
Technical Director
For and On Behalf of Waterman Infrastructure & Environment Ltd

Appendix A

SEE APPENDIX B OF BREIFING NOTE FOR FIRST RESPONSE LETTER TO ENVIRONMENT AGENCY

DRAFT

Pickfords Wharf, Clink Street, London, SE1 9DG
t. +44 (0)207 928 7888 ie@watermangroup.com **w.** www.watermangroup.com

Waterman Infrastructure & Environment Limited
Registered in England Number: 3269195 Registered Office: Pickfords Wharf, Clink Street, London SE1 9DG

Appendix B

DRAFT

Pickfords Wharf, Clink Street, London, SE1 9DG
t. +44 (0)207 928 7888 ie@watermangroup.com **w.** www.watermangroup.com

Waterman Infrastructure & Environment Limited
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PLANTING STRATEGY

The soft landscape strategy of the Stag Brewery development includes several layers of planting typologies including streetscapes, plazas and squares, courtyards, riverside littoral planting and incorporation of existing trees.

The main structural planting of trees will comprise lines of feature trees defining one or both edges of the main access routes – Ship Lane, Linear Park and Thames Street.
Street trees will also be installed along residential streets, as well as augmenting tree planting on Lower Richmond Road and Mortlake High Street. A mix of perennial shrub and groundcover planting will be provided throughout all softscape areas, with mass planting and screen planting to suit use of each area. Planting mature heights will take into account safety and secure by design parameters to ensure general safety and to maintain sightlines and passive surveillance opportunities.

Soft landscape strategy for plazas and squares in the development will provide for a range of functions and activities, as well as providing resting places, shade and seasonal celebration. Residential courtyards will provide green amenity open space for residents and visitors, as well as natural play opportunities for children.

Littoral plant species are used in the areas close to the river edge, responding to existing riverside vegetation. This plant selection emphasises the riverside location and integrates the river edge living environment into the development. A mix of native, locally adapted and exotic plants are proposed to provide increased biodiversity and a sustainable mix of plants with improved drought resistance and longevity.

Good quality existing trees around the site will add valuable character to the site, and together with the soft landscape strategy, will deliver a well-connected green network in and around Stag Brewery development.

PLANT PALETTE



- Lawn
- Mass Plantings
- Hedges
- Rain Gardens
- Site Application Boundary
- School Application Boundary

BIODIVERSE ROOFS:

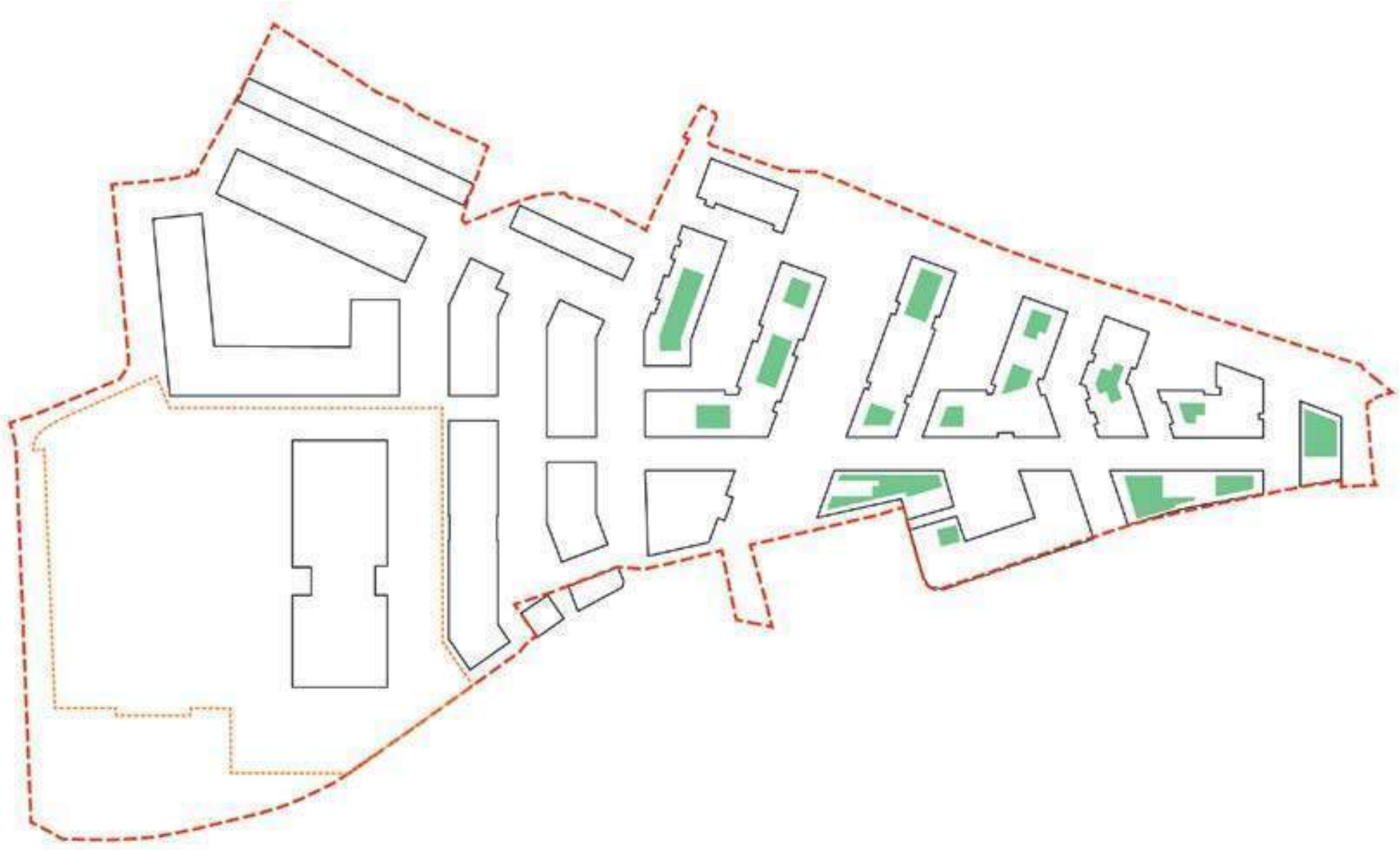
It is proposed to implement extensive green / brown roof systems on a number of the buildings with flat roofs, exploiting the ecological potential of these upper levels. A percentage of the roof space on new buildings in the development has been designed as extensive green or brown roofs, to provide biodiversity and energy benefits, as well as contributing to stormwater drainage and short term attenuation storage.

Green and brown roofs provide beneficial insulation to buildings and a degree of infiltration and storage of rainwater, while adding to the biodiversity of the site with a range of plant types, habitats for various insects and invertebrates and potentially birds and bats. A number of bat and bird boxes and bricks will be integrated into the roofscape and informal habitats created with rocks and gravel surfaces to brown roof sections.

Green roofs include a wildflower and native grasses mix and are designed as a sustainable, biodiverse roofscape and a pleasant visual outlook for surrounding higher buildings. This light weight roof system will assist in absorbing rainwater as well as increasing the biodiversity of the site by providing additional foraging and habitat for insects and birds.

Brown roofs are accessible for maintenance purposes and will incorporate PV cells in some areas, as indicated in Architectural and MEP drawings. Each roof will be seeded with plant species collected from the site or nearby, to boost local endemic habitat and foraging for local species. Certain features will be introduced to maximise potential for biodiversity and habitat for target species. These will include log piles, slabs or twigs gathered from the local area, combined with bird and bat boxes noted below. Where possible, the substrate depth will be varied to provide opportunities for small pools of water to collect on the roof.

For Development Area 2, biodiverse roofs will be incorporated using same principles as above and additional details will be provided in detail design stage.



LEGEND

- Biodiverse roof (total 2,265m²)
- Site Application Boundary
- School Application Boundary

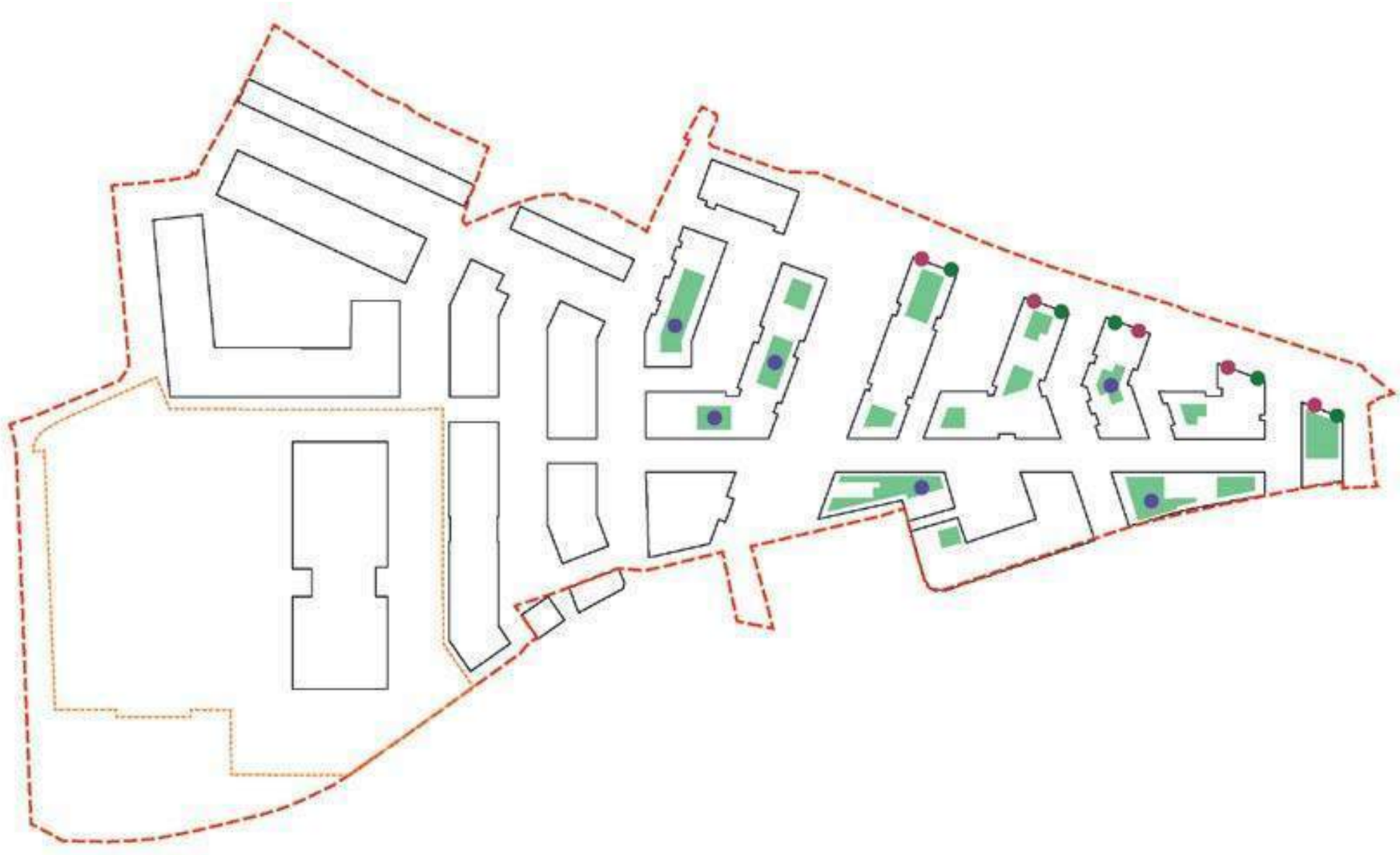
BIRD AND BAT BOXES:

Bat boxes are integrated into the green and brown roofs on various buildings of the development (detailed component) with a total of ten (10) boxes, tubes or bricks provided in association with soft landscape treatment on these roofs. Boxes are to be oriented between south-east and south-west to suit use.

Bird boxes are also provided on roofs closer to the River Thames, including three (3) Schwegler 2H Nest Boxes for black redstarts and seven (7) additional boxes for other bird types. These are to be oriented east or west to suit use. Plant species have been selected to suit a variety of habitats and micro-climatic conditions across the site.

These will include a range of plants suitable as food or habitat plants for a wide range of fauna, including bee attracting flowering plants.

For Development Area 2, the biodiversity strategy will utilise the same principles as above and will be provided in detail design stage.



LEGEND

- Bird Boxes
- Bat Boxes
- Hibernaculums
- Roof Habitat
- Site Application Boundary
- School Application Boundary


Ship Lane
Maltings
River Thames
Thames Street
Secondary School
Lower Richmond Road
Mortlake High Street
Mortlake Green
Sheen Lane
Williams Lane
1 Green Link
2 Bottleworks Square
3 Maltings Plaza
4 Riverside terrace
5 Courtyard garden
6 Towpath
7 School Entry Court
8 Private gardens
9 Residential street
10 School sports field
11 Public amenity space
12 Community park
13 New park entrance
14 Car park
Site Application Boundary
School Application Boundary
(Refer to Application B)

D. Environment Agency Meeting Notes (03/12/18)

Donal O'Donovan

From: Donal O'Donovan
Sent: 10 December 2018 09:51
To: 'Martyn, Joe'
Cc: Brendan McCarthy
Subject: Stag Brewery EA Meeting Notes
Attachments: WIE10667-103-181030-BM-RiverWall.pdf

Hi Joe,

Thanks for meeting us last week. I have drafted some notes on the meeting below, please let me know if you have any comments. I have also attached our previous responses for reference.

Query 1 – It was agreed that sufficient information has now been submitted that confirms that there is a continuous fit for purposes flood defence line for the main length of the site. However, further work is required in relation to the Bulls Alley and Ship Lane defences (see Queries 3 and 5).

Query 2 – No further information is required.

Query 3 and 5 – The EA's preference is for passive flood defences that provide permanent protection and they do not want future flood defence options restricted to the use of gates. One potential option discussed in relation to the Boat House was to introduce a separate flood defence wall within the building, however this had knock on impacts in relation to DDA compliance. The design team agreed to look at potential options for the Boat House and Ship Lane, that would aim to provide design solutions to allow future proofing to achieve a passive flood defence in these locations by 2065. Where there are constraints that have informed the current design (i.e. highways, planning officers etc.) or that restrict other options these will be clearly set out for the EA to review.

The EA agreed that no works would need to be undertaken to the Bulls Alley defence in the present. However, they require work/drawings that show that the Boat House building would not limit options for raising the Bulls Alley defence in the future as part of the TE2100 Plan (i.e. look at feasibility of a ramp). One example discussed was the potential for a ramp to be introduced. Again if there are constraints that limit options these will need to be clearly set out for the EA to review.

If constraints mean that passive defences are not possible to the full TE2100 height of 6.7m AOD then the EA would want the height of any gate limited to minimum it needs to be (i.e. raised ground provides protection to say 6.0m AOD and then a gate would only need to be 0.7m high).

Query 4 – The EA agreed that the vehicle tracking undertaken to date was sufficient. However, it was noted that if changes are made to the layout as a result of the Ship Lane or Bulls Alley defences then the tracking would need to be updated accordingly.

Query 6 – No further information is required.

Query 7 – This information has been provided within the application documents. Pages of Landscape DAS Application A relating to biodiversity include:

Landscape Masterplan: Page 23
Trees and planting stategy: Page 38-43
Biodiversity strategy: Page 60-62
Maltings Plaza: Page 83-85
River terrace: Page 87-91
Towpath information: Page 103 -111

We have also prepared document P10736-00-001-717 ‘Supporting document to response to LBRUT ecologist comments’ which contain latest information about planting, trees, biodiversity roof and rain garden.

https://Gillespies.bigfilebox.com/lwt/231953-4Vh2HQAJyUZXZuKXHQ06A73BA

Cheers,

Donal O’Donovan
Senior Engineer
Waterman Infrastructure & Environment Ltd

Pickfords Wharf | Clink Street | London SE1 9DG
t +44 207 928 7888 | **d** +44 3300 602 316
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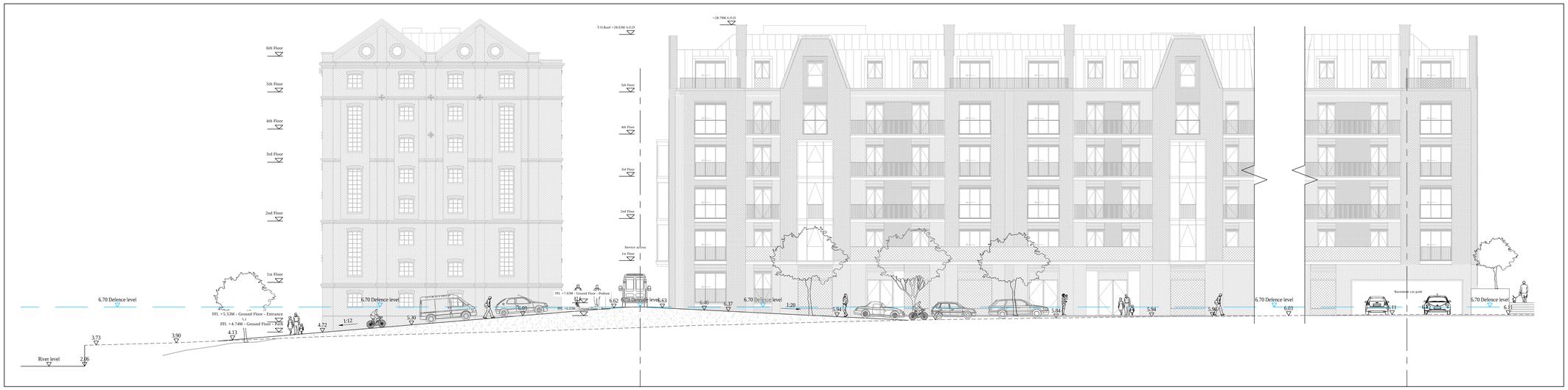
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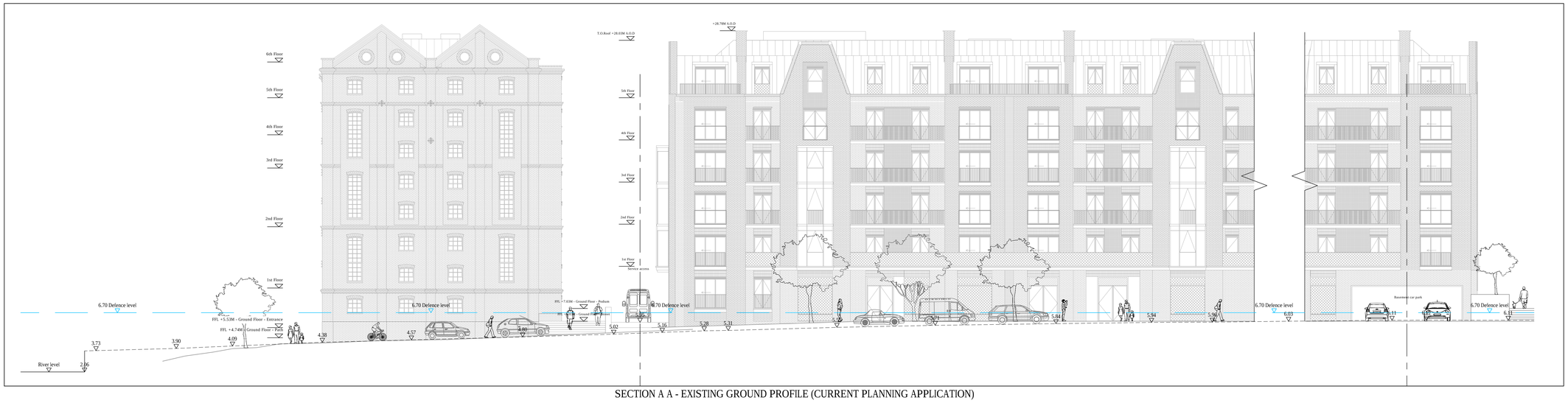
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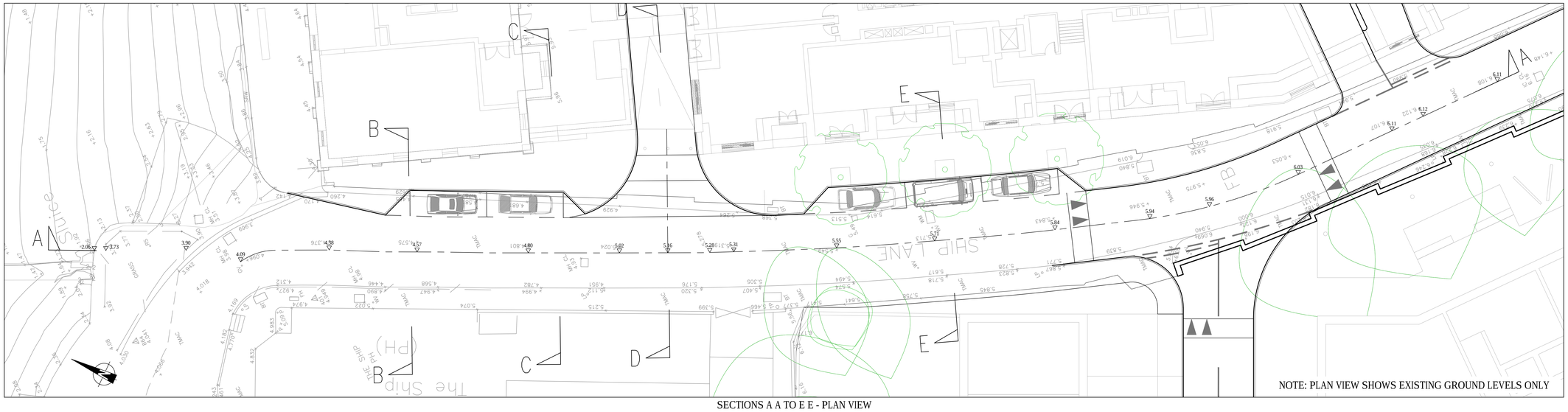
E. Updated Defence Drawings – Ship Lane



SECTION A A - FUTURE GROUND PROFILE (1:12 SLOPE)



SECTION A A - EXISTING GROUND PROFILE (CURRENT PLANNING APPLICATION)



SECTIONS A A TO E E - PLAN VIEW

Mark	Revision	Date	Drawn	Chkd	Appd
A	Labelling revised	07.01.19	REM	MB	MB

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Drawing Issue Status

FOR INFORMATION

STAG BREWERY, MORTLAKE
SHIP LANE
POSSIBLE GROUND PROFILES FOR FLOOD DEFENCE MEASURES (SHEET 1 OF 2)

Client

RESELTON PROPERTIES

Date of 1st Issue	Designed	Drawn
20.12.2018	REM	REM
A0 Scale	Checked	Approved
1:125	RAP	RAP

Drawing Number: 38262/5501/097

Revision: A

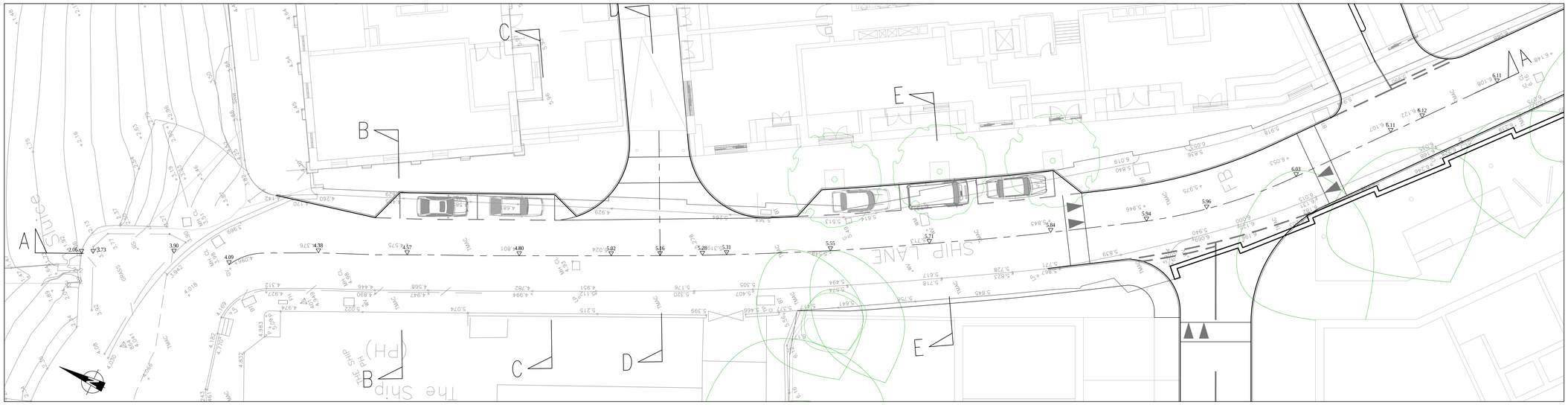
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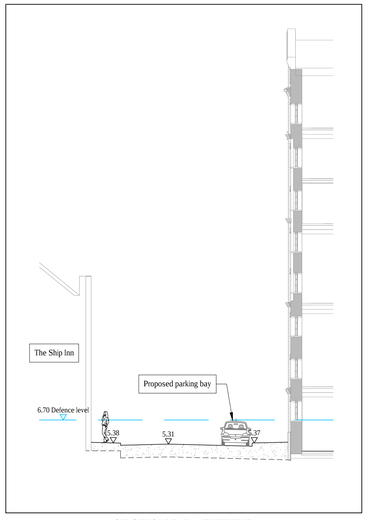
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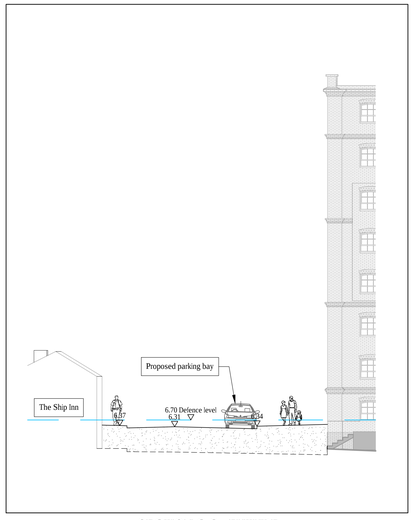
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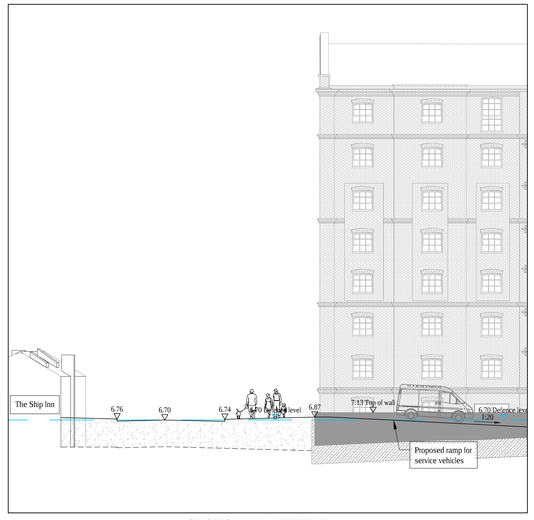
SECTIONS A A TO E E - PLAN VIEW



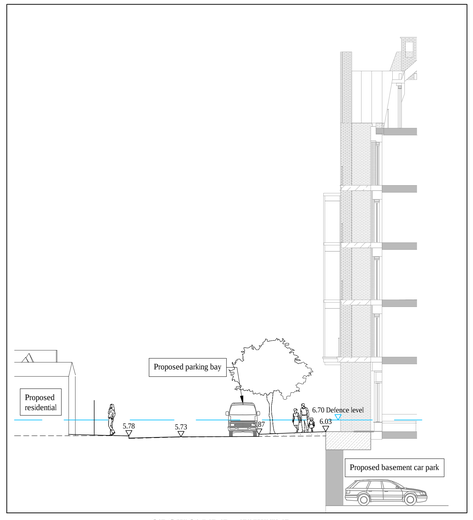
SECTION B B - FUTURE



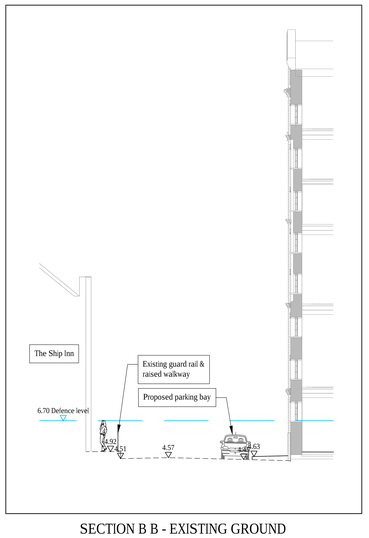
SECTION C C - FUTURE



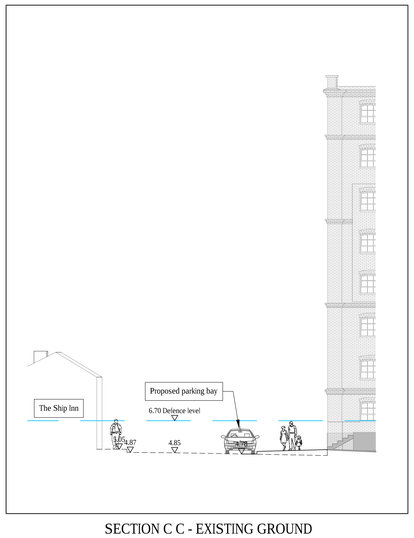
SECTION D D - FUTURE



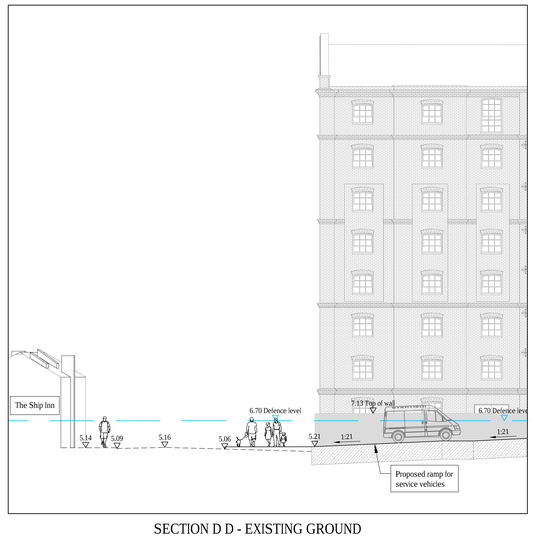
SECTION E E - FUTURE



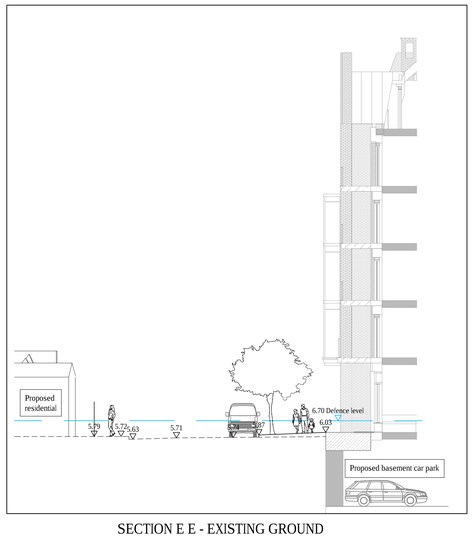
SECTION B B - EXISTING GROUND



SECTION C C - EXISTING GROUND



SECTION D D - EXISTING GROUND



SECTION E E - EXISTING GROUND

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STAG BREWERY, MORTLAKE
SHIP LANE
POSSIBLE GROUND PROFILES FOR
FLOOD DEFENCE MEASURES (SHEET 2 OF 2)

Client
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Date of 1st Issue	Designed	Drawn
20.12.2018	REM	REM
A0 Scale	Checked	Approved
1:125	RAP	RAP
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38262/5501/098		A

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F. Updated Defence Drawings – Bulls Alley and the Boat House



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KEY

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02. METAL CLAD ROOF
03. HORIZONTAL CONCRETE BAND
04. CLEAR GLAZING WITH GREY PPC ALUMINIUM FRAMES
05. CLEAR GLAZING WITH BRONZE ANODIZED ALUMINIUM FRAMES
06. GLASS BALUSTRADE
07. METAL BALUSTRADE
08. TEXTURED BRICK DETAIL
09. PROFILED METAL CLADDING
10. BRONZE ANODIZED ALUMINIUM PROFILE
11. COLOURED MOSAIC TILES
12. CURTAIN WALL
13. PRE-CAST CONCRETE CLADDING
14. DECORATIVE FRIEZE
15. FASCIA SIGNAGE
16. OBSCURE GLAZING
17. ANODIZED ALUMINIUM SLIDING DOORS

Revision description	Date	Check	Rev
DESIGN STUDY	11/12/18		F
THIRD DRAFT PLANNING APPLICATION	04/01/18	BJ	E
SCENARIO 5C	21/11/17	BJ	D
SECOND DRAFT PLANNING APPLICATION	09/11/17	BJ	C
FINAL ELEVATION ISSUE	24/10/17	BJ	B
FIRST DRAFT PLANNING APPLICATION	12/10/17	BJ	A
FIRST DRAFT ELEVATION ISSUE	14/09/17	KHa	-

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Project

Stag Brewery
Richmond

Drawing

BUILDING 09 - PROPOSED EAST ELEVATION

Drawn	Date	Scale
NLe	14/09/17	1 : 100 @ A1 1 : 200 @ A3

Job Number	Drawing number	Revision
16019	G200_B09_E_E_001	F



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17. ANODIZED ALUMINIUM SLIDING DOORS

Revision description	Date	Check	Rev
DESIGN STUDY	11/12/18		F
THIRD DRAFT PLANNING APPLICATION	04/01/18	BJ	E
SCENARIO 5C	21/11/17	BJ	D
SECOND DRAFT PLANNING APPLICATION	09/11/17	BJ	C
FINAL ELEVATION ISSUE	24/10/17	BJ	B
FIRST DRAFT PLANNING APPLICATION	12/10/17	BJ	A
FIRST DRAFT ELEVATION ISSUE	14/09/17	KHa	-

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Drawing

BUILDING 09 - PROPOSED NORTH ELEVATION

Drawn	Date	Scale
NLe	14/09/17	1 : 100 @ A1 1 : 200 @ A3

Job Number	Drawing number	Revision
16019	G200_B09_E_N_001	F



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KEY

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02. METAL CLAD ROOF
03. HORIZONTAL CONCRETE BAND
04. CLEAR GLAZING WITH GREY PPC ALUMINIUM FRAMES
05. CLEAR GLAZING WITH BRONZE ANODIZED ALUMINIUM FRAMES
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Revision description	Date	Check	Rev
DESIGN STUDY	11/12/18		F
THIRD DRAFT PLANNING APPLICATION	04/01/18	BJ	E
SCENARIO 5C	21/11/17	BJ	D
SECOND DRAFT PLANNING APPLICATION	09/11/17	BJ	C
FINAL ELEVATION ISSUE	24/10/17	BJ	B
FIRST DRAFT PLANNING APPLICATION	12/10/17	BJ	A
FIRST DRAFT ELEVATION ISSUE	14/09/17	KHa	-

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Project

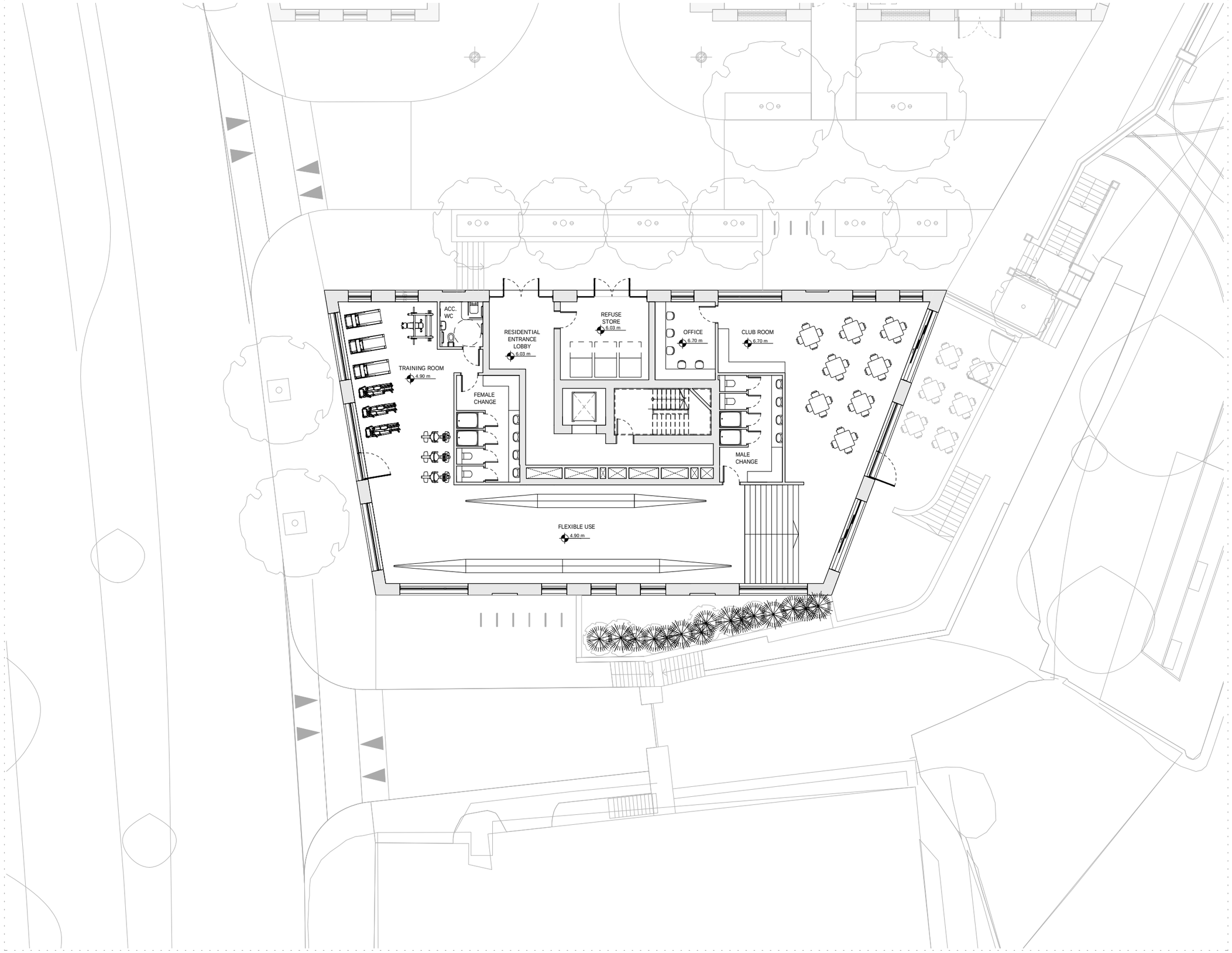
Stag Brewery
Richmond

Drawing

BUILDING 09 - PROPOSED SOUTH ELEVATION

Drawn	Date	Scale
NLe	14/09/17	1 : 100 @ A1 1 : 200 @ A3

Job Number	Drawing number	Revision
16019	G200_B09_E_S_001	F



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NORTH

B9

Revision description	Date	Check	Rev
DESIGN STUDY	11/12/18		L
FINAL DRAFT PLANNING APPLICATION	18/01/18	BJ	K
THIRD DRAFT PLANNING APPLICATION	04/01/18	BJ	J
SCENARIO 5C	21/11/17	BJ	H
SECOND DRAFT PLANNING APPLICATION	09/11/17	BJ	G
ISSUE TO DESIGN TEAM	24/10/17	BJ	F
ISSUE TO DESIGN TEAM	23/10/17	BJ	E
FIRST DRAFT PLANNING APPLICATION	12/10/17	BJ	D
SCENARIO 4a	27/09/17	BJ	C
SCENARIO 4	12/09/17	BJ	B
SCENARIO 2 DESIGN FREEZE	09/08/17	BJ	A
SCENARIO 1 BASELINE SCHEME	26/07/17	BJ	-

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The Department Store
248 Ferndale Road London SW9 8FR
T: 020 7278 5555 F: 020 7239 0495

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Stag Brewery
Richmond

Drawing

BUILDING 09 - PROPOSED GROUND FLOOR PLAN

Drawn	Date	Scale
KH	25/07/17	1 : 100 @ A1 1 : 200 @ A3

Job Number	Drawing number	Revision
16019	G200_B09_P_00_002	L

G. Drainage Strategy Addendum



Stag Brewery, Mortlake Amended Scheme

Drainage Strategy Addendum

May 2019

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

Client Name:	Reselton Properties
Document Reference:	WIE10667-105-R-2-2-1-DSAddendum
Project Number:	WIE10667

Quality Assurance – Approval Status

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	Date	Prepared by	Checked by	Approved by
First	May 2019	Nora Balboni	Donal O'Donovan	Peter O'Flaherty







Comments

Comments

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We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

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2. Surface Water Drainage 2
3. Foul Drainage 3
4. Conclusions 4
Appendices 5

Appendices

A. Amended Scheme Plans
B. Greater London Authority Briefing Note
C. Greater London Authority Correspondence
D. Thames Water Correspondence
E. Amended Foul Estimate

1. Introduction

1.1. Waterman Infrastructure and Environment was commissioned by Reselton Properties to produce a Drainage Strategy for the proposed redevelopment of the former Stag Brewery site in Mortlake ('the Site') within the London Borough of Richmond Upon Thames (LBRuT). This was submitted for planning in February 2018. Post-planning submission, changes were made to the drainage strategy in response to comments from the Greater London Authority (GLA) and the LBRuT arboricultural officer. In addition, small amendments have been made to the proposed scheme.

1.2. This Drainage Strategy Addendum has been prepared to summarise the changes made to the drainage strategy post-planning and to assess the impact on drainage of the amendments to the scheme.

1.3. In response to the latest comments received from LBRuT's arboricultural officer dated 9th April 2019, it is considered that the drainage strategy presented in this report (as approved by the GLA) satisfies policy and best practice, whilst taking into account Site-specific constraints.

Development Proposals

1.4. The proposed changes (Appendix A) to the scheme relevant to this Drainage Strategy addendum submitted for planning in February 2018 include:

- Internal reconfiguration to building layouts and levels, including to Building 9 to allow for a continuous flood defence.
- A reduction of four residential units in Building 2 and a reduction in overall non-residential use floor area by 6m^2 Gross External Area;
- Increase in habitable room numbers and amenity space for each residential unit; and
- Non-residential and car parking areas would remain the same as before.
- Alterations related to building materials, façade treatments, including architectural detailing.

2. Surface Water Drainage

2.1. The proposed amendments to the scheme do not alter the proposed building layout or significantly alter the proposed landscape proposals. The surface water drainage strategy is therefore not affected. Appropriate treatment of runoff would be provided by green roofs, rainwater harvesting, permeable paving, and pollutant-intercepting biomats in the geo-cellular tanks.

2.2. Following planning submission in February 2018, the GLA and the LBRuT arboricultural officer provided a number of comments relating to the drainage strategy. A Briefing Note (Appendix B) was prepared demonstrating the changes to the drainage strategy that were made in response. The changes included the following:

- The 3G sports pitch was removed from the surface water drainage catchment on the basis that it would drain freely (requested by the GLA despite the infiltration rate likely being poor/unsuitable, to be confirmed during detailed design);
- Permeable paving extents and the rain garden would be added to the drainage strategy drawing with attenuation volumes quantified to demonstrate a reduction in runoff beyond the 50% mark; and
- A summary of all Sustainable Drainage Systems (SuDS) included within the scheme was provided to demonstrate how these provide multiple benefits to the scheme.

2.3. The Briefing Note provides details of the updated drainage strategy including surface water calculations. The amended drainage strategy (Appendix B of Appendix B) demonstrates that a 69% betterment in surface water flows is achieved compared to the existing case and that the drainage strategy is integrated with the landscape proposals to provide wider amenity benefits to the scheme.

2.4. The GLA subsequently confirmed (Appendix C) that the drainage strategy was in line with their aspirations.

2.5. A Pre-Planning Enquiry was submitted to Thames Water shortly after submission of the planning application. Thames Water confirmed (Appendix D) that at the time of their response (May 2018) there was sufficient capacity to accommodate the proposed surface water flows within their network. The rates submitted to Thames Water were higher than the rates currently proposed (due to the further reductions provided by the changes to the strategy). It is therefore anticipated that there would still be capacity. The letter is valid for 12 months, i.e. due to expire in May 2019. Thames Water have been re-consulted to confirm that their response is still valid, with a response currently outstanding.

3. Foul Drainage

3.1. The proposed amendments to the scheme include a reduction of four residential units, reducing the total number of residential units from 667 to 663. The proposed foul flow calculations have been amended to reflect this reduction (Appendix D), resulting in the same proposed foul flows (25.5 l/s). This means that the amendment resulted in a negligible reduction in flows.

3.2. The very minor reduction of non-residential floor areas by 6m^2 GEA has a negligible impact to overall foul flows and has therefore not been considered further.

3.3. The proposed connections into the Thames Water sewer network are as per the previous strategy, shown on the drainage strategy plan (Appendix B of Appendix B).

3.4. Thames Water's response to the Pre-Planning Enquiry (Appendix D) confirms that at the time of the letter (May 2018) there was sufficient capacity to accommodate the proposed foul flows. The proposed number of units has decreased as a result of the amendments, and therefore it is anticipated that there would still be capacity. Thames Water have been re-consulted to confirm that their response is still valid, with a response currently outstanding.

4. Conclusions

4.1. Following submission of the planning application in February 2018, changes were made to the proposed drainage strategy in response to comments from the GLA and LBRuT. The strategy was amended to further restrict surface water runoff, achieving a 69% betterment compared to the existing case. The attenuation provided within the proposed permeable paving and rain gardens was quantified to provide further volume in addition to that provided within the geo-cellular attenuation tanks. The permeable paving and rain gardens would provide water quality benefits in addition to the green roofs and rainwater harvesting proposed.

4.2. The amended drainage strategy demonstrates that it is integrated with the landscape proposals to provide wider amenity benefits to the scheme. The GLA subsequently confirmed that the drainage strategy is in line with their aspirations. In addition, Thames Water confirmed that there is capacity within their network to accommodate the proposed flows.

4.3. Small amendments have been made to the proposals since submission of the planning application. The proposed amendments to the scheme do alter the proposed building layout or significantly change the landscape proposals, therefore not affecting the proposed surface water drainage strategy.

4.4. The proposed reduction in residential units results in a negligible reduction in proposed foul flows. Thames Water have been re-consulted to confirm that there is still capacity within their network to accommodate the proposed flows.

APPENDICES

A. Amended Scheme Plans



NOTES:

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NORTH

- 1 BED
- 1 BED (L)
- 1 BED (S)
- 2 BED (L)
- 2 BED (M)
- 2 BED (S)
- ASSISTED LIVING
- CAR PARK ENTRANCE
- CINEMA
- CORE
- FLEXIBLE USE
- GAS METER ROOM
- HOTEL
- OFFICE
- PLANT
- REFUSE
- REFUSE STORE
- RESTAURANT/BAR
- SMOKE
- SUBSTATION

Revision description	Date	Check	Rev
PLANNING SUBSTITUTION DRAWINGS	01/03/19	EmK	A
PLANNING APPLICATION	12/02/18	BJ	-

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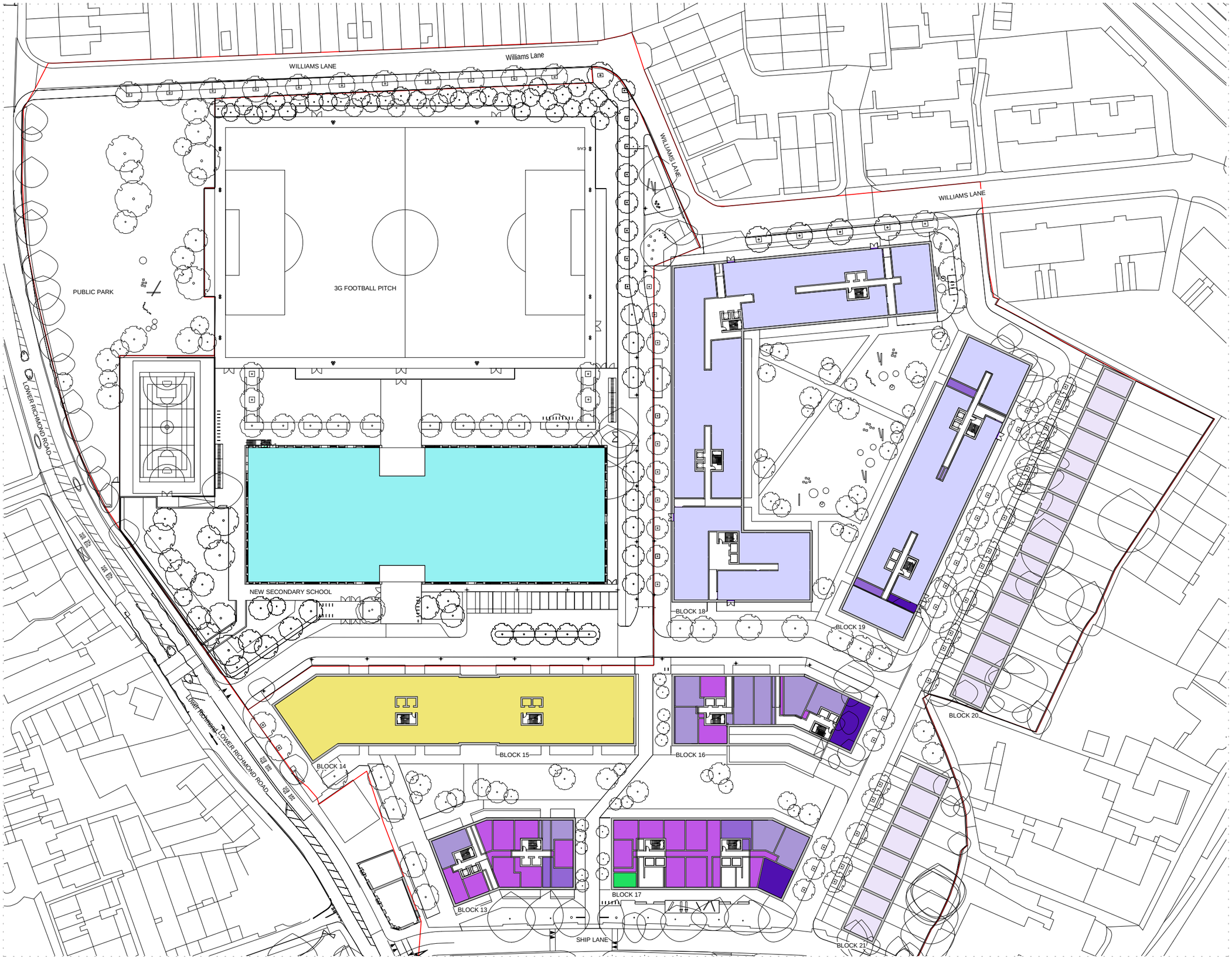
Stag Brewery
Richmond

Drawing

PROPOSED DEVELOPMENT AREA 01
GROUND LEVEL PLAN

Drawn	Date	Scale
KHO	18/01/18	1 : 500 @ A1 1 : 1000 @ A3

Job Number	Drawing number	Revision
16019	C645_Z1_P_00_001	A



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NORTH

- 1 BED
- 2 BED
- 3 BED
- 3 BED (H)
- 4 BED
- 4 BED (H)
- AC WC
- AHU EAST
- ASSISTED LIVING
- BIKE ST
- BT COMMS INTAKE
- CARE HOME
- CIRCULATION_PLANT
- CL ST
- COMMUNITY LOCKERS
- COMMUNITY OFFICE
- LV SWITCH ROOM
- MAINTENANCE ST
- OFFICE
- REFUSE
- REPROGRAPHICS
- SCHOOL
- SERVER
- ~~RESIDENTIAL~~

Revision description	Date	Check	Rev
PLANNING SUBSTITUTION DRAWINGS	01/03/19	EmK	A
PLANNING APPLICATION	12/02/18	BJ	-

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T: 020 7278 5555 F: 020 7239 0495

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Stag Brewery
Richmond

Drawing

PROPOSED DEVELOPMENT AREA 02
GROUND LEVEL PLAN

Drawn	Date	Scale
RKL	18/01/18	1 : 500 @ A1 1 : 1000 @ A3

Job Number	Drawing number	Revision
16019	C645_Z2_P_00_002	A

B. Greater London Authority Briefing Note

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

Surface Water Drainage Update Briefing Note

Stag Brewery

Date: 8th January 2019

Client Name: Reselton Properties

Document Reference: WIE10667-103-BN-1-1-3

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	
	Nora Balboni	Donal O'Donovan	Harry Chetty
First			

1. Introduction

1.1. Waterman Infrastructure and Environment (WIE) was commissioned by Reselton Properties to undertake a Drainage Strategy for the redevelopment of the former Stag Brewery Site in Mortlake (hereafter referred to as the 'Site'). Following planning submission in February 2018, the Greater London Authority (GLA) provided a number of comments relating to the drainage strategy.

1.2. Following two sets of comments from the GLA and responses from WIE (Appendix A) the GLA's last outstanding remark was related to the proposed discharge rate, as below:

"I have reviewed the Applicant's second response to our Stage 1 comments. Following our previous response at the end of October the final point of contention appears to be the proposed discharge rate where the site will drain to the public sewer. It is noted that the London Plan and DEFRA national guidance require a development to achieve as close to greenfield runoff rate as possible (approximately a >90% reduction from pre-development rates for a brownfield site). In this case the Applicant is proposing to reduce the discharge by 50%, well short of the policy requirements. The Applicant should calculate the greenfield runoff rate and provide calculations showing the attenuation storage required to meet this discharge rate. The Applicant should then seek to include additional attenuation storage to get as close to this value as possible. Our original comments suggested building the biodiverse roofs as green/blue roofs to provide additional storage and this has not been addressed to date. The Applicant should then provide a clear drawing or mark up clearly showing the constraints to expanding attenuation storage if discharge at greenfield runoff rate is not proposed."

1.3. Discussions were undertaken with the GLA in order to decide on the most preferential way forward (Appendix A). It was agreed that in order to demonstrate that the potential to restrict runoff was maximised, the following information would be provided:

1. The 3G sports pitch would be removed from the surface water drainage catchment on the basis that it would drain freely (requested by the GLA despite WIE advising the infiltration rate is likely to be poor/unsuitable);
2. Permeable paving extents and the rain garden would be added to the drainage strategy drawing with attenuation volumes quantified to demonstrate a reduction in runoff beyond the 50% mark; and
3. A summary of all Sustainable Drainage Systems (SuDS) included within the scheme would be provided to demonstrate how these provide multiple benefits to the scheme.

1.4. The purpose of this Briefing Note is to summarise the amendments to the drainage strategy that were made following the discussions with the GLA. It is considered that the amended Drainage Strategy now demonstrates that the scheme is in line with the GLA's aspirations.

2. Surface Water Drainage Strategy - Updates

Sports Pitch

2.1. In the strategy submitted for planning it was assumed that the 3G sports which would need to be positively drained due to the underlying London Clay and the likelihood of a high groundwater table due to the Site's proximity to the River Thames. This was to prevent the possibility of water logging beneath the pitch.

2.2. The GLA requested that the 3G sports pitch in the south west of the Site would be removed from the surface water calculations on the basis that it would drain freely. WIE advised that infiltration would likely be very poor due to the underlying clay and that the feasibility of this option would be subject to infiltration rates which would be confirmed by ground investigations during detailed design. If results show that infiltration is not feasible, then a tank would be provided as per the strategy provided previously or similar.

2.3. As a result of removing the sports pitch, the area of the school catchment to be drained is reduced from 2.18ha to 1.31ha. This provides a reduction in the surface water runoff that would be drained into the Thames Water sewer network.

Additional Attenuation

Permeable Paving

2.4. In the drainage strategy submitted for planning it was stated that the inclusion of permeable paving as an attenuation feature would be further investigated during detailed design. This was to provide a conservative approach where sufficient attenuation would be provided within the tank features to achieve the required restriction.

2.5. Following discussions with the GLA, the porous surfacing proposed across the Site has been added to the drainage strategy drawing (Appendix B) and the attenuation volume available within has been quantified.

2.6. Permeable surfacing, i.e. artificial stone flag paving and porous macadam surfacing, is proposed within the school Site as per the hard landscape strategy drawing by Gillespies (Appendix C). A

permeable sub-base with 300mm depth is proposed beneath the porous surfacing surrounding the school building and beneath the MUGA sports pitch. The aggregate sub-base provides treatment of runoff as well as attenuation. A 150mm deep geo-cellular storage crate is proposed beneath the aggregate sub-base to provide additional attenuation. The geo-cellular attenuation tank previously proposed beneath the MUGA pitch has been removed as a result. The total attenuation volume available within the school catchment including for the permeable paving sub-base storage is 993m^3. This allows discharge from the catchment to be reduced from the previously proposed 155.2 l/s to 16.0 l/s. This provides a 91% betterment compared to the existing rate for this catchment (187.0 l/s).

Rain Garden

2.7. As per the Landscape Design and Access Statement by Gillespies[1], a green link is proposed in the eastern part of the Stag Brewery component of the Site. A rain garden is proposed along the eastern edge of the green link (Appendix C). Surface water runoff from the surrounding pavement would be directed into the soil within the rain garden. The rain garden has been added to the surface water drainage strategy drawing (Appendix B).

2.8. The primary function of the rain garden is to provide treatment of runoff prior to discharge into the surface water network. A small volume of water would be attenuated within the rain garden itself. The northern part of the green link is located within the part of the Site from where surface water is discharged unrestricted into the River Thames. The volume available within this portion of the rain garden has therefore not been quantified.

2.9. Based on an attenuating depth of 150mm and a porosity of 30%, the attenuation volume available within the two sections of rain garden within Catchment 1 is 3m^3. The increased attenuation from 140m^3 to 143m^3 allows the discharge rate for catchment 1 to be reduced from the previously proposed 21.3 l/s to 20.0 l/s. This provides a 53% betterment compared to the existing rate (42.8 l/s).

Summary

2.10. The surface water calculations were updated (Appendix D) to reflect the reduction in the school catchment site due to the sports pitch draining freely, and the amended attenuation volumes. Table 1 outlines the discharge rates and attenuation provision for the Site, with changes to the previous strategy in **bold**.

Table 1: Attenuation Requirements

Catchment	Area (ha)	Existing Rate (l/s)	Proposed Rate (l/s)	Attenuation (m^3)	Betterment (%)
East part of the Stag Brewery component of the Site – 1	0.30	42.8	**20.0**	**143**	**53**
East part of the Stag Brewery component of the Site – 2	0.25	35.7	17.8	117	50
East part of the Stag Brewery component of the Site – 3	0.18	25.7	12.8	84	50

[1] Gillespies (February 2018). Stag Brewery, Mortlake Landscape Design and Access Statement: Application A

Catchment	Area (ha)	Existing Rate (l/s)	Proposed Rate (l/s)	Attenuation (m^3)	Betterment (%)
West part of the Stag Brewery component of the Site – School	**1.31**	187.0	**16.0**	**993**	**91**
West part of the Stag Brewery component of the Site – 4	1.07	152.7	76.2	499	50
West part of the Stag Brewery component of the Site – 5	0.54	77.1	38.5	252	50
West part of the Stag Brewery component of the Site – 6	0.38	54.0	26.9	177	50
West part of the Stag Brewery component of the Site – 7	0.79	112.8	56.3	369	50
Sub-Total	**4.82**	**688**	**265**	**2634**	**62**
Total (accounting for increased discharge to the River Thames)	**5.89**	**840.8**	**265**	**2634**	**69**

2.11. When accounting for the maximised attenuation volumes, in addition to maximising the area of the Site that is discharged into the River Thames, the proposed drainage strategy provides a 69% betterment compared to the existing rate.

2.12. It is considered that the proposed reduction in flows satisfies the GLA aspirations. In addition, in response to a pre-planning enquiry, Thames Water have stated that there is capacity within their network for the proposed surface water flows as per the previous strategy (Appendix E), which were higher than the revised flows presented in this Briefing Note. Surface water flows would only be conveyed within the Thames Water network for a short section (maximum of circa 350m), prior to discharging into the River Thames.

SuDS

2.13. A range of SuDS features are proposed throughout the development to ensure that appropriate treatment is provided prior to discharge into the River Thames and the Thames Water sewer network, including the following methods:

- Rainwater harvesting butts throughout the development reduce runoff and facilitate water re-use for irrigation;
- Green roofs intercept and treat rainwater at source. The green roofs are designed such that a variety of planting can be sustained (as per Gillespie's landscape strategy);
- The aggregate sub-base beneath the porous surfacing provides treatment of runoff prior to being attenuated within the underlying geo-cellular crates;

- The large number of tree pits and planters throughout the development (in addition to the rain garden in the green link) provide a soft surface allowing rainwater to filter through and hold back a nominal amount of runoff; and
- Pollutant-intercepting biomats within the geo-cellular crates provide additional treatment for any residual pollution.

2.14. The drainage strategy is integrated with the landscaping strategy, ensuring that the SuDS features provide amenity and sustainability benefits for the Site.

3. Conclusion

3.1. The previous drainage strategy submitted for planning demonstrated that the minimum policy requirements, i.e. 50% restriction of flows, was achievable. Although permeable paving and rain garden were already proposed, the attenuation provided within these features was not quantified to provide a conservative approach.

3.2. Following discussions with the GLA, the sports pitch was removed from the drainage catchment and the additional attenuation volumes were quantified along with the increase in discharge to the River Thames. This demonstrates that a 69% betterment compared to the existing rate can be achieved.

3.3. A variety of SuDS are proposed throughout the Site which provide treatment of runoff as well as amenity benefits.

3.4. It is considered that the amended drainage strategy satisfies policy, best practice, and the GLA's aspirations.

APPENDICES

A. Greater London Authority Correspondence

Nora Balboni

From: Nora Balboni
Sent: 12 December 2018 09:24
To: Stuart McTaggart
Cc: Anna Gargan; Ellen Smith; Donal O'Donovan; Abby Crisostomo; Katherine Wood
Subject: RE: Stag Brewery (GLA ref: 4172a/b) drainage strategy [Filed 12 Dec 2018 09:24]

Hi Stuart

Thank you for confirming.

As discussed, we will provide a Briefing Note which will cover the following:

- Amended drainage strategy plan to show permeable paving extents;
- Volume calculations to estimate the attenuation available within the permeable paving sub-base and rain garden feature to show that a restriction of surface water runoff beyond the minimum 50% requirement is achieved;
- Sports pitch in south-west of site removed from surface water calculations under the assumption that it would drain freely, subject to ground investigations during detailed design; and
- Summary of all SuDS included.

Kind regards,

Nora Balboni
Flood Risk Engineer
Waterman Infrastructure & Environment Ltd

Pickfords Wharf | Clink Street | London SE1 9DG
t +44 207 928 7888 | **d** +44 3300 602 725
www.watermangroup.com | LinkedIn | Twitter

From: Stuart McTaggart <Stuart.McTaggart@london.gov.uk>
Sent: 11 December 2018 15:23
To: Nora Balboni <nora.balboni@watermangroup.com>
Cc: Anna Gargan <AGargan@geraldeve.com>; Ellen Smith <ellen.smith@watermangroup.com>; Donal O'Donovan <donal.odonovan@watermangroup.com>; Abby Crisostomo <Abby.Crisostomo@london.gov.uk>; Katherine Wood <Katherine.Wood@london.gov.uk>
Subject: Re: Stag Brewery (GLA ref: 4172a/b) drainage strategy [Filed 12 Dec 2018 09:17]

Hi Nora,

To summarise our chat earlier:

1. The intent of the original drainage strategy was to show that it is possible within site constraints to meet the absolute minimum requirements of London Plan policy 5.13.
2. We would like to see that all efforts have been made to get as close to possible to the policy targets (i.e. greenfield runoff, drainage hierarchy, and a preference for SuDS with multiple benefits). We expect that on large sites such as this the policy targets should be able to be met in most cases.
3. Waterman will produce an addendum to the drainage strategy to more clearly show how the drainage will integrate SuDS with multiple benefits and identify an approximate maximum reduction in discharge rate. Where appropriate the reduction in discharge rate can be caveated with assumptions/risks that need confirmation during detailed design (e.g. infiltration rates of the subgrade below the 3G pitch).

Regards,

Stuart McTaggart
Flood Risk, Drainage & Water Policy Officer
Development, Enterprise & Environment
Greater London Authority
City Hall, The Queens Walk, London SE1 2AA

Email: stuart.mctaggart@london.gov.uk
Web: Greening London / Greater London Authority
Follow the GLA's Environment team on Twitter @LDN_Environment
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From: Nora Balboni <nora.balboni@watermangroup.com>
Sent: 04 December 2018 10:32
To: Stuart McTaggart <Stuart.McTaggart@london.gov.uk>
Cc: Anna Gargan <AGargan@geraldeve.com>; Ellen Smith <ellen.smith@watermangroup.com>; Donal O'Donovan <donal.odonovan@watermangroup.com>
Subject: RE: GLA Flood Feedback

Hi Stuart

Thanks for your comments. Please feel free to give me a call to discuss as I don't have your contact number.

We understand that developments should aim to achieve greenfield runoff rates, or as close as feasible. To endeavour to achieve this we took the following approach:

1. As per the drainage hierarchy, the amount of surface water that could be discharged into the River Thames was maximised by incorporating the innovative shallow conveyance channel system;

2. For the remaining site, where discharge into the Thames was not feasible due to levels or crossing third party land, as many tanks were incorporated as possible. The horizontal constraints for the tanks include the basement extent, proposed building outlines, and landscaping. The vertical constraints include the required soil depth for tree pits and achieving a gravity connection into the surrounding sewer network. London Borough of Richmond accepted the 50% restriction during pre-application consultation. Conscious that the constraints of the site preclude a greater reduction in runoff, Thames Water were consulted to ensure that the surrounding sewer network has sufficient capacity. Thames Water confirmed capacity for both surface and foul water flows. It is important to note that the surface water flows from the development are only conveyed within the Thames Water network for maximum of 350m before discharging into the River Thames.

We are keen to find a solution to reduce runoff further to find an agreeable solution. I would appreciate your thoughts on the following options:

- Allowing the proposed sports pitch to drain freely, i.e. excluding it from the surface water calculations and therefore reducing the size requirement for the tank beneath the MUGA pitch. Subject to levels I could explore the possibility of directing surface water from other areas into this tank, reducing the restriction beyond the 50% mark. In the current strategy we assumed that the pitch would need to be positively drained due to the underlying London Clay to avoid potential water logging beneath the pitch. However, if no other areas would drain towards the pitch, allowing it to free drain could be considered.

- We took a conservative approach when designing the current drainage strategy, assuming 100% impermeable proposed area (discounting the park area in the south eastern corner of the site). We did not quantify the attenuation available within the rain garden along the green link and within the permeable paving, to demonstrate the worst-case scenario that the minimum required restriction (i.e. 50%) can be achieved within the tanks themselves. I will do a quick calculation to demonstrate the additional attenuating volume that these features would hold, reducing the restriction beyond the 50% mark.

- Exploring further areas for incorporation of permeable paving.

- The current proposals do not include for blue roofs. However, green roofs are proposed throughout the development, which, although not quantifiable, provide a betterment to the surface water runoff regime.

Let me know whether you find the above agreeable, I will then amend the drainage strategy drawing to show the constraints to the attenuation volumes and incorporate any changes, and will re-issue for you to review.

Kind regards,

Nora Balboni
Flood Risk Engineer
Waterman Infrastructure & Environment Ltd

Pickfords Wharf | Clink Street | London SE1 9DG
t +44 207 928 7888 | **d** +44 3300 602 725
www.watermangroup.com | LinkedIn | Twitter

From: Anna Gargan
Sent: 28 November 2018 16:51
To: 'Ellen Smith'; 'Nora Balboni'
Cc: Guy Duckworth; Susie Taylor; Neil Henderson
Subject: GLA Flood Feedback

Hi Ellen / Nora,

I hope you are well.

The GLA has provided the following response to Flood comments issued on 20 November 2018.

Please can you review and respond. The officer states that he is happy to speak with you directly.

Kind regards,
Anna

"I have reviewed the Applicant's second response to our Stage 1 comments. Following our previous response at the end of October the final point of contention appears to be the proposed discharge rate where the site will drain to the public sewer.

It is noted that the London Plan and DEFRA national guidance require a development to achieve as close to greenfield runoff rate as possible (approximately a >90% reduction from pre-development rates for a brownfield site). In this case the Applicant is proposing to reduce the discharge by 50%, well short of the policy requirements. The Applicant should calculate the greenfield runoff rate and provide calculations showing the attenuation storage required to meet this discharge rate. The Applicant should then seek to include additional attenuation storage to get as close to this value as possible. Our original comments suggested building the biodiverse roofs as green/blue roofs to provide additional storage and this has not been addressed to date. The Applicant should then provide a clear drawing or markup clearly showing the constraints to expanding attenuation storage if discharge at greenfield runoff rate is not proposed.

I am happy to discuss directly with the Applicant's consultant to resolve this if required.

Regards,

Stuart McTaggart
Flood Risk, Drainage & Water Policy Officer
Development, Enterprise & Environment

Greater London Authority
City Hall, The Queens Walk, London SE1 2AA

Email: stuart.mctaggart@london.gov.uk

Anna Gargan
Planning Consultant

Tel. +44 (0)20 7518 7240
Mobile. +44 (0) 7979532721
AGargan@geraldeve.com

Gerald Eve LLP
72 Welbeck Street London W1G 0AY
www.geraldeve.com





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Stag Brewery – Response to GLA Comments received 25 October 2018

Original GLA comment	Further comment	Waterman Response
Flood Risk		
The proposed development complies with London Plan Policy 5.12 (and draft Policy SI12) relating to flood risk, however conditions relating to the need for increased flood defences, inclusion of property level protection measures and the future Ship Lane flood gate will be required, in agreement with the Environment Agency.	The applicant has provided sufficient justification that a condition would not be appropriate for a future Ship Lane Flood gate. For those parts of the development with ground levels below the reference flood level it is proposed that self-activating barriers be installed for the car park entrances and flood proof doors and/or demountable barriers will be installed. These must be appropriately conditioned.	Noted.
In both cases [discharge to River and rest of site restricted to 50%] it points to the presence of a new extensive basement that is preventing optimising the drainage design. Given that the basement is a proposed new structure this is not deemed to be an acceptable rationale for not optimising the drainage design.	The applicant's response does not address the issue of the basement being a new structure and therefore not being an acceptable rationale for not optimising the drainage design. The applicant advises that a rain garden will be provided along the green link although it is not clear where it would be located and it is considered there is potential for more than one such feature in the proposed landscaping.	The drainage strategy has been optimised, achieving the following: 1. Maximising gravity discharge into the River Thames; 2. Minimising runoff discharged into sewers; 3. Maximising attenuation while achieving gravity discharge to the surrounding Thames Water sewer network; 4. Inclusion of a range of SuDS features to provide water quality and amenity benefits (i.e. green roofs, permeable paving/porous surfacing with aggregate sub-base, rainwater harvesting, and rain garden). The main green link (i.e. rain garden) is located in the eastern part of the Stag Brewery site, running from Lower Richmond Road north eastwards towards the River Thames, as per the Landscape DAS (reference: P10736-00-001). The rain garden would channel and treat runoff as it is conveyed towards the River Thames. However, due to levels, it is not feasible to direct all surface water from this part of the site into the green link. As a result, a network of shallow geo-cellular storage conveyance channels is proposed. These would convey and treat runoff (via pollutant-intercepting biomats within the tanks) prior to discharging into the Thames. There are a large number of planters proposed across the site, which would allow surface water runoff to filter through the soil providing treatment, prior to discharge into the geo-cellular conveyance channels and eventually the River Thames.
The area of site draining directly to the River Thames seems to ignore the presence of the proposed public realm and in particular the "Green Link" (ref Drainage Layout Sheet 3). The surface water drainage should be integrated within these elements with surface water directed across the surface rather than proposing a large array of permavoid cells to convey the surface water underground. This will not only provide a whole host of benefits to the public realm but will also help to improve the water quality of the surface water if managed by nature based SuDS solutions. The reference to potential contaminated land issues seems to have been used as thinly veiled excuse and is unlikely to be a barrier to above ground SuDS. At present the proposal makes no reference to water quality when it really should do given that it is	The applicant has provided justification as to why it would not be feasible to direct all surface water to rain gardens but does not consider other greener conveyance features. The applicant has highlighted where water quality is considered in the drainage strategy however some measures are described as 'potential'. It is recommended that clear demonstration of consideration of water quality in the final design is conditioned.	

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proposing discharging into a waterbody.		The basement is an essential part of the scheme to provide required car and cycle parking and plant. Locating these elements at grade would unlikely to be acceptable in planning and design terms and would have a significant negative impact on place making. Importantly, notwithstanding this, the basement does not preclude the scheme from optimising the drainage design by achieving a considerable restriction of runoff while discharging via gravity and including a variety of SuDS features. The presence of the basement does not limit the inclusion of the rain garden or the other SuDS features listed above, which together provide amenity benefits across the site and treatment of runoff prior to discharge.
Although the preference would be to see the entire site drain to the River Thames via gravity direct discharge, it is noted however that the Thames Water surface water sewer, that the development proposes to connect into for the rest of the development, does in fact discharge into the River Thames adjacent to the site. Therefore, proposing a restricted discharge rate into this stretch of existing network, assuming there is capacity, is deemed to be acceptable. However, the Drainage Strategy is proposing a 50% reduction on flow rates by referring to the density of development as a rationale for not being able to achieve greenfield. This argument is not accepted for this development. Given the areas of public realm proposed, it is deemed that there is more that could be done to manage surface water within the landscaping by utilising nature based SuDS solutions that are incorporated within the public realm. This will provide far greater benefits to the development than directing all surface water straight into a series of underground attenuation tanks and could ultimately provide significant opportunities for evapotranspiration losses. The drainage strategy ostensibly needs a rethink as the current proposals are far from being integrated into the masterplan for this site. The proposed development does not comply with London Plan Policy 5.13 (and draft Policy SI.13). Justification as to why the development is not able to achieve greenfield or three times greenfield runoff is necessary. The general approach of relying on	The applicant has provided reasonable justification with regards to the size of attenuation being restricted however it is not suitably clarified why further above ground SuDS (including conveyance features) cannot be implemented to reduce the discharge rate further.	A variety of above-ground SuDS features are included within the proposals as outlined above (i.e. green roofs, permeable paving, and rain gardens). These intercept runoff at source, providing treatment, prior to being discharged into the River or the Thames Water network. It is considered that given the nature of the site, the potential for above-ground SuDS has been maximised.

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underground attenuation rather than maximising green infrastructure-based and above ground SuDS strategies through the integration with the landscaping proposals is not deemed to be acceptable. In addition to this the lack of water quality treatment for the section of the site directly drainage to the River Thames is not acceptable.		

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Stag Brewery – Response to GLA Stage 1 Comments dated 30 July 2018

(Ref: GLA/4172,4172a&4172b/01/KW)

Ref.	Comment	Waterman Response
70	The proposed development complies with London Plan Policy 5.12 (and draft Policy SI12) relating to flood risk, however conditions relating to the need for increased flood defences, inclusion of property level protection measures and the future Ship Lane flood gate will be required, in agreement with the Environment Agency.	In the existing situation there is no raised defence in Ship Lane. Instead the defence is formed by ground levels in the public highway itself, which rise away from the river. Ship Lane is a public highway and therefore outside of the applicant's ownership. Whilst some works would take place to Ship Lane (wider footways and landscaping (including retention of all trees) to provide a functional and attractive street) these would not impact on the existing flood defence level provided by the highway. Whilst the applicant is not responsible for installing a flood defence across Ship Lane, options were discussed with the EA at a meeting on the 26th September 2016 that could be implemented by others in the future. It would not be feasible for a permanent defence to be located across Ship Lane as this would block access along the public highway. Instead, a demountable defence would be more suitable for this location. The defence would need to tie into the existing Maltings Building on the Stag Brewery Site. On the other side of the public highway the defence would need to tie into the existing public house (noted as a defence on the Environment Agency's flood map). As a result, a condition relating to the offsite future flood defence on Ship Lane would not be appropriate. As stated in #4.2.3 of the FRA, the FFL for ALL residential property is at a minimum elevation of 7.03 mAOD; there is accordingly no need for "residential" PLP measures. The majority of non-residential property also satisfies this condition, the exceptions being discussed in the FRA. The specific protection measures that are required are presented in the FRA and comprise: • Flood Proof Doors to protect the Boathouse (B09) whose FFL is at 4.25 mAOD (note that these doors do NOT form part of the formal tidal defences). • Flood-proof doors for the sub-station (in building B10) in the event of breach/overtopping. • Self-activating flood barrier (SAFB) for the entrance to the Basement Car Park from Mortlake High Street in the event of breach/overtopping. Note that the entrance off Ship Lane and the entrance to the car park on the west of Ship Lane are at a safe level. Please note that these issues are being discussed and progressed separately with the Environment Agency.
71	The scheme is not currently proposing to achieve greenfield run-off rates and the presence of the large basement is a barrier to optimising the sustainable drainage of this site. Further justification is required on the drainage strategy to ensure compliance with London Plan Policy 5.13 and draft Policy SI13. The general approach of relying on underground attenuation rather than	The potential to restrict runoff to greenfield rates was explored during the design process and where feasible runoff has been directed directly to the River Thames, minimising runoff discharged to sewers. The attenuation volume has been maximised while achieving gravity discharge, which is considered a more sustainable option than pumping. Due to the depth of the existing Thames Water sewers surrounding the site, the tanks cannot

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	maximising green infrastructure-based and above ground SuDS strategies through the integration with the landscaping proposals is not acceptable. In addition to this the lack of water quality treatment for the section of the site directly draining to the River Thames is not acceptable.	feasibly be made any deeper without requiring pumping, thus precluding the possibility to achieve greenfield rates. Providing a 50% restriction to the existing rate has been agreed with the London Borough of Richmond upon Thames. In addition, Thames Water have confirmed that there is capacity in their network to serve the proposed flows (surface and foul). The potential for SuDS was considered throughout the design process with workshops being held by the design team to ensure constraints are taken into account and opportunities are maximised. As per the FRA submitted with the planning application (reference: WIE10667-101-R-9-5-1-DS) and the Landscape DAS (reference: P10736-00-001) by Gillespies, the following SuDS are proposed: - Green roofs; - Permeable paving (or porous surfacing with an aggregate sub-base) for all roads that are not to be adopted. These areas would treat the runoff within the aggregate sub-base prior to discharge into the drainage system. The exact location of the permeable surfacing would be confirmed during detailed design; - Rainwater harvesting is proposed in the form of rainwater butts throughout the development; - Rain garden along the green link proposed within the detailed part of the application (east of Ship Lane); and - Pollutant-intercepting biomats within the geo-cellular attenuation tanks/culverts, which intercept and treat any residual pollutants that may be present within the surface water. For the section of the site discharging into the River Thames (east of Ship Lane), there are a number of SuDS proposed which would treat runoff prior to discharge. These include the rain garden, planters, and the potential for permeable paving adjacent to the Thames. In addition to the biomats within the shallow geo-cellular tanks within the podium build-up, a downstream defender can be incorporated if found necessary, to be confirmed during detailed design.
72	The proposed development is compliant with London Plan Policy 5.15 (and draft Policy SI15) for water use, which should be maintained through detailed design. Detailed comments have been provided to the applicant.	Comment by Hoare Lea: The comments state that the scheme is in accordance with policies and that this should continue throughout the design. This would be ensured throughout the design development.

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Stag Brewery – Response to GLA comments dated 18th June 2018

Surface Water Management

GLA comment	Waterman Response
In both cases [discharge to River and rest of site restricted to 50%] it points to the presence of a new extensive basement that is preventing optimising the drainage design. Given that the basement is a proposed new structure this is not deemed to be an acceptable rationale for not optimising the drainage design.	The potential to restrict to greenfield runoff rates and the potential for inclusion of SuDS was considered throughout the design process with workshops being held by the design team to ensure constraints are taken into account and opportunities are maximised. The drainage strategy has been optimised given the constraints of the existing site. Discharge into the River Thames has been maximised through the use of flat conveyance routes above the basement as detailed within the Drainage Strategy submitted for planning (reference: WIE10667-101-R-9-5-1-DS). For the remaining areas of the site, gravity discharge into the River Thames was not possible due to levels and/or crossing third party land. The drainage design therefore maximises attenuation whilst allowing for gravity discharge into the surrounding Thames Water sewer network and the River Thames. The drainage strategy also optimises the use of SuDS as described in the Drainage Strategy submitted with the planning application and the Landscape DAS (reference: P10736-00-001) by Gillespies. These are: - Green roofs; - Permeable paving (or porous surfacing with an aggregate sub-base) for all roads that are not to be adopted. These areas would treat the runoff within the aggregate sub-base prior to discharge into the drainage system. The exact location of the permeable surfacing would be confirmed during detailed design; - Rainwater harvesting is proposed in the form of rainwater butts throughout the development; - Rain garden along the green link proposed within the detailed part of the application (east of Ship Lane); and - Pollutant-intercepting biomats within the geo-cellular attenuation tanks/culverts, which intercept and treat any residual pollutants that may be present within the surface water.
The area of site draining directly to the River Thames seems to ignore the presence of the proposed public realm and in particular the “Green Link” (ref Drainage Layout Sheet 3). The surface water drainage should be integrated within these elements with surface water directed across the surface rather than proposing a large array of permavoid cells to convey the surface water underground. This will not only provide a whole host of benefits to the public realm but will also help to improve the water quality of the surface water if managed by nature based SuDS solutions. The reference to potential contaminated land issues seems to have been used as thinly veiled excuse and is unlikely to be a barrier to above ground SuDS. At present the proposal makes no reference to water quality when it really should do given that it is proposing discharging into a waterbody.	Water quality is considered within the drainage strategy, paragraph 4.32. For the section of the site discharging into the River Thames (east of Ship Lane), there are a number of SuDS proposed which would treat runoff prior to discharge. These include the rain garden, planters, and the potential for permeable paving adjacent to the Thames. In addition to the biomats within the shallow geo-cellular tanks within the podium build-up, a downstream defender can be incorporated if found necessary, to be confirmed during detailed design. It would be unfeasible to direct all surface water runoff from this part of the development into the rain gardens within the green link. Due to the depth of build up above the ground floor slab the distance drainage can run in this zone is limited, hence why the shallow geo-cellular conveyance channels are provided adjacent to the

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	buildings (so that falls from the rainwater pipes are minimised). The use of shallow geo-cellular conveyance channels is the design solution that ensures that discharge to the River Thames is maximised. A more traditional system would have been to drop downpipes into the basement where they could have run at high level, however due to the required falls this would have severely limited the area of the site that could have discharged to the river by gravity. The benefit of the geocellular channels is that they would be able to be laid flat ensuring gravity discharge to the river from a much larger area of the site. The potential contamination issues are not a preclusion to SuDS, however they are a reason for infiltration drainage not being practical (along with the likely groundwater levels due to proximity to the River Thames).
Although the preference would be to see the entire site drain to the River Thames via gravity direct discharge, it is noted however that the Thames Water surface water sewer, that the development proposes to connect into for the rest of the development, does in fact discharge into the River Thames adjacent to the site. Therefore, proposing a restricted discharge rate into this stretch of existing network, assuming there is capacity, is deemed to be acceptable. However, the Drainage Strategy is proposing a 50% reduction on flow rates by referring to the density of development as a rationale for not being able to achieve greenfield. This argument is not accepted for this development. Given the areas of public realm proposed, it is deemed that there is more that could be done to manage surface water within the landscaping by utilising nature based SuDS solutions that are incorporated within the public realm. This will provide far greater benefits to the development than directing all surface water straight into a series of underground attenuation tanks and could ultimately provide significant opportunities for evapotranspiration losses. The drainage strategy ostensibly needs a rethink as the current proposals are far from being integrated into the masterplan for this site. The proposed development does not comply with London Plan Policy 5.13 (and draft Policy SI.13). Justification as to why the development is not able to achieve greenfield or three times greenfield runoff is necessary. The general approach of relying on underground attenuation rather than maximising green infrastructure-based and above ground SuDS strategies through the integration with the landscaping proposals is not deemed to be acceptable. In addition to this the lack of water quality treatment for the section of the site directly drainage to the River Thames is not acceptable.	The potential to restrict runoff to greenfield rates was explored during the design process and where feasible runoff has been directed directly to the River Thames, minimising runoff discharged to sewers. The part of the site located west of Ship Lane cannot be discharged directly into the Thames without crossing third-party land. For flows going to the Thames Water sewer network (where it was not possible to discharge into the river), a 50% reduction in rates compared to the existing case is achieved, which was agreed with the London Borough of Richmond upon Thames. The proposed flows (surface and foul water) have also been agreed with Thames Water. A restriction greater than this would make gravity discharge unfeasible due to the larger attenuation requirement. The attenuation volume has been maximised while achieving gravity discharge, which is considered a more sustainable option than pumping. Due to the depth of the existing Thames Water sewers surrounding the site, the tanks cannot feasibly be made any deeper without requiring pumping, thus precluding the possibility to achieve greenfield rates. The SuDS outlined in the response to the previous comment provide treatment to the surface water runoff prior to discharging into the sewer system/the River Thames. The green roofs provide treatment in line with CIRIA SuDS Manual for roof runoff, and the rain garden and permeable paving provide treatment for runoff arising from other hard-standing areas of the development. The attenuation tanks would be fitted with pollutant-intercepting biomats which provide an additional level of treatment prior to discharge into the Thames Water network/the River. This is considered to be acceptable in line with latest guidance.

The proposed inclusion of green roofs is welcomed however it is recommended that if attenuation opportunities are as limited on the site as stated within the report that blue/green roofs should be incorporated to assist with these issues.	The potential for inclusion of blue roofs was explored during the design development. The inclusion of blue roofs would not have removed the requirement for underground tanks as runoff from the roads and other associated hard-landscaping would require to be attenuated. It was considered that green roofs (alongside the other SuDS proposed) to provide treatment and the geo-cellular tanks to provide the attenuation volume would be the best solution for providing the necessary attenuation volume and achieving the required water quality benefits.

Flood Risk

GLA comment	Hydrologic Response
Finished floor levels for all residential properties are proposed to be 1m above reference flood levels. For those parts of the development with ground levels below the reference flood level it is proposed that self-activating barriers be installed for the car park entrances and flood proof doors and/or demountable barriers will be installed	The specific protection measures that are required are presented in the FRA and comprise: • Flood Proof Doors to protect the Boathouse (B09) whose FFL is at 4.25 mAOD (note that these doors do NOT form part of the formal tidal defences). • Flood-proof doors for the sub-station (in building B10) in the event of breach/overtopping. • Self-activating flood barrier (SAFB) for the entrance to the Basement Car Park from Mortlake High Street in the event of breach/overtopping. Note that the entrance off Shjp Lane and the entrance to the car park on the west of Ship Lane are at a safe level.
All other sources of flooding are considered to be low, except for surface water flooding, where portions of the site are identified on EA mapping as having a low/medium risk of surface water flooding and a few areas of high risk. This risk is heavily influenced by the existing development's building make up and the existing levels on site. With the proposed changes the SW flood extents will likely change with new flow routes created as a result. Surface water on the site will need to be appropriately managed so as not to increase risk both on the site and to the surrounding areas.	Post-development, rain water falling onto the site would be captured within the on-site drainage network, providing the adequate amount of attenuation and restriction prior to discharge. The drainage network would be designed to deal with all events up to and including the 1 in 100 year plus 40% climate change. In addition, the provision of soft landscaping as part of the proposals would reduce the amount of surface water runoff within the site compared to the existing case.
The Flood Emergency Plan (Appendix G of the FRA) identifies the presence of safe and dry access and egress routes (within Flood Zone 1) provided for all. It also references that there will be a future need for a tidal flood gate along Ship Lane to prevent inundation. This will require suitable conditions to be set following advice from the EA.	Whilst the applicant is not responsible for installing a flood defence across Ship Lane, options were discussed with the EA at a meeting on the 26th September 2016 that could be implemented by others in the future. It would not be feasible for a permanent defence to be located across Ship Lane as this would block access along the public highway. Instead, a demountable defence would be more suitable for this location. The defence would need to tie into the existing Maltings Building on the Stag Brewery Site. On the other side of the public highway the defence would need to tie into the existing public house (noted as a defence on the Environment Agency's flood map). As a result, a condition relating to the offsite future flood defence on Ship Lane is simply not appropriate. It will not be required for some decades and will involve third parties.
The proposed development complies with London Plan Policy 5.12 (and draft Policy SI.12), however conditions	These issues have been previously commented on, but are restated here:

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relating to the need for increased flood defences, inclusion of property level protection measures and the future Ship Lane flood gate will be required.	• A Condition relating to the increase of flood defences is appropriate. • Note that as stated in #4.2.3 of the FRA, the FFL for ALL residential property is at a minimum elevation of 7.03 mAOD; there is accordingly no need for "residential" PLP measures. The majority of non-residential property also satisfies this condition, the exceptions being discussed in the FRA. The specific measures have been re-stated in this response. As noted in this response, a Condition for the Ship Lane flood gate is not considered to be appropriate.

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B. Amended Drainage Strategy Drawing

N

TWMH1104
CL:
IL: -4.99

TWMH2201

TWMH1104
CL: 4.53
IL: 0.29

TWMH1206A
CL: 5.06
IL: 4.00

TWMH1103
CL: 5.88
IL: 1.73

TWMH2101

TWMH3104
CL:
IL: -4.82

TWMH3001
CL: 4.14
IL: 0.92

TWMH4101
CL: 3.47
IL: 1.08

TWMH4102B
CL:
IL: -4.73

TWMH3002
CL: 5.77
IL: 1.35

TWMH3003
CL: 6.12
IL: 1.37

TWMH3004
CL: 4.81
IL: 1.77

TWMH3006
CL: 6.59
IL: 1.59

TWMH3007
CL: 6.65
IL: 1.70

TWMH3008

TWMH2001

TWMH3005
CL: 5.56
IL: 1.22

TWMH3003
CL: 6.06
IL: 2.01

TWMH3907
CL: 5.99
IL: 1.99

TWMH1104
CL: 5.93
IL: 4.19

TWMH1006
CL: 6.30
IL: 1.96

TWMH1001
CL: 6.30
IL: 1.96

TWMH1004
CL: 6.26
IL: 2.79

TWMH1005
CL: 6.30
IL: 3.66

TWMH1901

WILLIAMS LANE

SHIP LANE

PROPOSED SEWER DIVERSION ROUTE

EXISTING SW CONNECTION TO BE MAINTAINED

SEWER CONVEYING FLOWS FROM BASEMENT TANKS

1.95m DEEP OFFLINE ATTENUATION TANKS IN SERIES BELOW TREE PITS (COMBINED VOL. 369m³)

SEWER CONVEYING FLOWS FROM BASEMENT TANKS

1.8m DEEP ATTENUATION TANKS IN SERIES (VOL. 100m³)

EXISTING FOUL WATER CONNECTION TO BE MAINTAINED

BLOCK 20

BLOCK 19

BLOCK 18

BLOCK 21

BLOCK 17

BLOCK 15

BLOCK 13

BLOCK 04

BLOCK 02

7

6

5

4

PROPOSED POROUS SURFACING (POROUS MACADAM SURFACING AND ARTIFICIAL STONE FLAG PAVING) WITH AGGREGATE SUB-BASE UNDERLAIN BY GEO-CELLULAR CRATES

THAMES STREET

GREEN LINK

1:500 0 10m 20m 30m 40m 50m

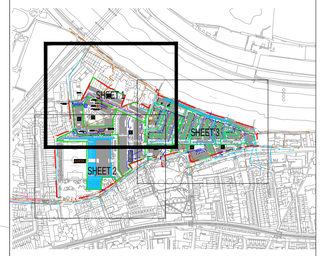
1:1 0 10 20 30 40 50 60 70 80 90 100

LEGEND

- EXISTING PRIVATE SURFACE WATER SEWER
- EXISTING PRIVATE FOUL SEWER
- EXISTING PRIVATE COMBINED SEWER
- EXISTING PUBLIC SURFACE WATER SEWER
- EXISTING PUBLIC FOUL SEWER
- EXISTING PUBLIC COMBINED SEWER
- EXISTING PUBLIC RISING MAIN
- EXISTING SEWER TO BE ABANDONED
- PROPOSED FOUL WATER SEWER
- PROPOSED SURFACE WATER SEWER
- PROPOSED ATTENUATION TANK
- PROPOSED CONVEYANCE CHANNEL
- PROPOSED POROUS SURFACING
- PROPOSED RAIN GARDEN
- APPLICATION A BOUNDARY
- APPLICATION B (SCHOOL) BOUNDARY
- SURFACE WATER DRAINAGE CATCHMENT

NOTES

1) EXISTING DRAINAGE LAYOUT BASED ON THAMES WATER SEWER RECORDS AND PENBORN TECHNICAL SERVICES DRAWING (REF: P979/07/31).
2) THE PART OF THE DEVELOPMENT WEST OF SHIP LANE IS SUBMITTED AS AN OUTLINE APPLICATION. THE BASEMENT PLAN PROVIDED (REF.16019_C645_Z2_P_B1_001_ - RECEIVED FROM SQUIRE & PARTNERS 29.01.2018) IS INDICATIVE ONLY AND SUBJECT TO THE PARAMETER PLANS SUBMITTED.
3) DRAINAGE SUBJECT TO DETAILED DESIGN.



Rev	Date	Description	By
A06	20.12.18	PERMEABLE PAVING AND RAIN GARDEN ADDED	NB
A05	13.02.18	UPDATED APPLICATION BOUNDARY	NB
A04	29.01.18	UPDATED ARCHITECT LAYOUT	NB
A03	01.11.17	TEAM ISSUE	NB
A02	23.10.17	SURFACE WATER ATTENUATION AMMENDED	NB
A01	29.09.17	PRELIMINARY ISSUE	MAC

Amendments

Project
STAG BREWERY

Title
PROPOSED FOUL AND SURFACE WATER DRAINAGE LAYOUT
SHEET 1 OF 4

Client
RESELTON PROPERTIES LIMITED

Waterman
Pickfords Wharf Clink Street London SE1 9DG
t 020 7928 7888
mail@watermangroup.com www.watermangroup.com

Drawing Status
PRELIMINARY

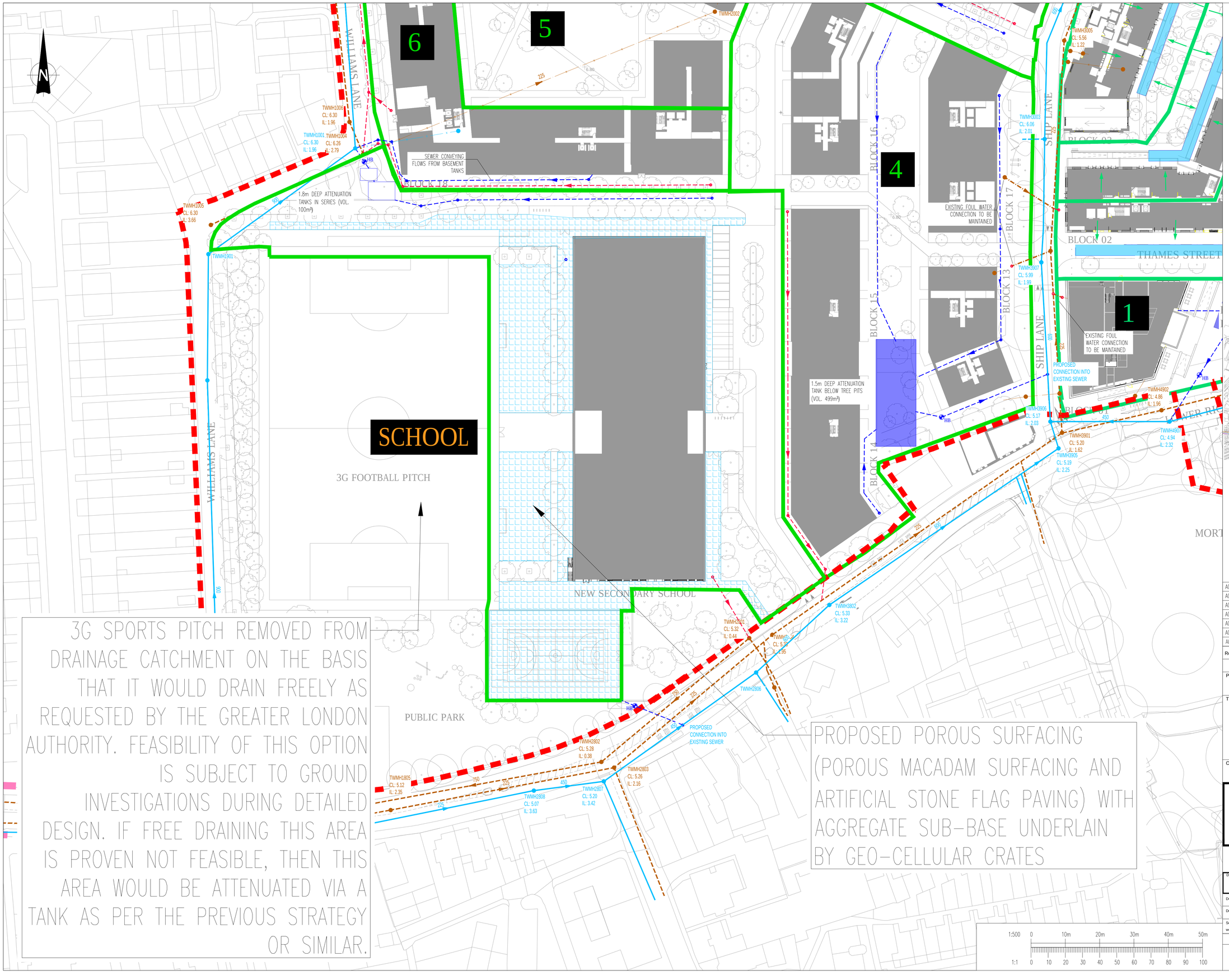
Designed by	NB	Checked by	DO
Drawn by	MAC	Date	SEPTEMBER 2017
Scales @ A1 work to figured dimensions only	1:500		

Project No WIE10667
Computer File No WIE10667CSA920004.dwg

Publisher	Zone	Category	Number	Revision
WIE	SA	92	0004	A06

File Path N:\Projects\WIE10667\100\7 CAD\92 Drainage and Water Management\

A1-Wat-S, C645_MP_P_00_001, WIE10667-X-PR-DRAINAGE



Rev	Date	Description	By
A07	08.01.19	MINOR AMENDMENT TO TEXT	NB
A06	20.12.18	PERMEABLE PAVING AND RAIN GARDEN ADDED	NB
A05	13.02.18	UPDATED APPLICATION BOUNDARY	NB
A04	29.01.18	UPDATED ARCHITECT LAYOUT	NB
A03	01.11.17	TEAM ISSUE	NB
A02	23.10.17	SURFACE WATER ATTENUATION AMMENDED	NB
A01	29.09.17	PRELIMINARY ISSUE	MAC

Amendments

Project
STAG BREWERY

Title
PROPOSED FOUL AND SURFACE WATER DRAINAGE LAYOUT
SHEET 2 OF 4

Client
RESELTON PROPERTIES LIMITED

Waterman
Pickfords Wharf Clink Street London SE1 9DG
t 020 7928 7888
mail@watermangroup.com www.watermangroup.com

Drawing Status
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Designed by	NB	Checked by	DO
Drawn by	MAC	Date	SEPTEMBER 2017
Scales @ A1 work to figured dimensions only	1:500		

Project No WIE10667
Computer File No WIE10667CSA920005.dwg

Publisher	Zone	Category	Number	Revision
WIE	SA	92	0005	A07

A1-Wat-S, C645_MP_P_00_001, WIE10667-X-PR-DRAINAGE

File Path: \\hc-buwat\Projects\WIE10667\101\CAD\03_Drainage and Water Management\

PROPOSED POROUS SURFACING (RESIN BOUND AGGREGATE PAVING)

PROPOSED RAIN GARDEN IN GREEN LINK

RIVER THAMES

PROPOSED OUTFALL

PROPOSED OUTFALL

CONNECTION INTO EXISTING OUTFALL; BACKWALL TO BE RECONSTRUCTED

TWMH3001 CL: 4.14 IL: 0.92

TWMH4101 CL: 3.47 IL: 1.08

TWMH4102B CL: IL: -4.73

TWMH3002 CL: 5.77 IL: 1.35

TWMH3003 CL: 6.12 IL: 1.37

TWMH3004 CL: 4.81 IL: 1.77

TWMH3005 CL: 5.56 IL: 1.22

TWMH3003 CL: 6.06 IL: 2.01

TWMH6001 IL: -4.57

TWMH6001 IL: -4.45

TWMH6002 CL: IL: -4.41

TWMH6003 CL: 3.64 IL: 0.92

TWMH6917 CL: 4.57 IL: 1.51

TWMH6918 CL: 4.60 IL: 1.82

TWMH6903 CL: 4.71 IL: 1.07

TWMH6919 CL: 4.82 IL: 2.06

TWMH6902 CL: 4.92 IL: 1.21

TWMH6912 CL: 4.72 IL: 2.17

TWMH6913 CL: 4.82 IL: 1.52

TWMH6901 CL: 5.06 IL: 1.13

TWMH6910

TWMH3907 CL: 5.99 IL: 1.99

TWMH3906 CL: 5.17 IL: 2.03

TWMH3901 CL: 5.20 IL: 1.62

TWMH3905 CL: 5.19 IL: 2.25

TWMH4906 CL: 4.96

TWMH4902 CL: 4.86 IL: 1.96

TWMH4907 CL: 4.94 IL: 2.32

TWMH4901 CL: 4.93 IL: 2.36

TWMH5902 CL: 5.45 IL: 1.11

TWMH5905 CL: 5.22 IL: 3.40

TWMH5906 CL: 5.39 IL: 2.77

TWMH4903 CL: 5.08 IL: 0.89

TWMH5904 CL: 5.33 IL: 3.55

BLOCK 01

BLOCK 02

BLOCK 03

BLOCK 04

BLOCK 05

BLOCK 06

BLOCK 07

BLOCK 08

BLOCK 09

BLOCK 10

BLOCK 12

BLOCK 13

BLOCK 17

MALTINGS PLAZA

GREEN LINK

BOTTLEWORKS SQUARE

PLAZA

THAMES STREET

THAMES STREET

SHIP LANE

SHIP LANE

SHIP LANE

MORTLAKE HIGH STREET

MORTLAKE HIGH STREET

LOWER RICHMOND ROAD

MORTLAKE GREEN

1

2

3

0.935m DEEP ATTENUATION TANK (VOL. 140m³)

0.935m DEEP ATTENUATION TANK BELOW TREE PITS (VOL. 117m³)

0.935m DEEP ATTENUATION TANK BELOW TREE PITS (VOL. 84m³)

CONVEYANCE CHANNEL SET BENEATH SHALLOW (1M DEEP) TREE PIT

EXISTING FOUL WATER CONNECTION TO BE MAINTAINED

EXISTING FOUL WATER CONNECTION TO BE MAINTAINED

PROPOSED CONNECTION INTO EXISTING SEWER

NEW CONNECTION

G FOUL WATER NECTION TO BE MAINTAINED

LEGEND

- EXISTING PRIVATE SURFACE WATER SEWER
- EXISTING PRIVATE FOUL SEWER
- EXISTING PRIVATE COMBINED SEWER
- EXISTING PUBLIC SURFACE WATER SEWER
- EXISTING PUBLIC FOUL SEWER
- EXISTING PUBLIC COMBINED SEWER
- EXISTING PUBLIC RISING MAIN
- EXISTING SEWER TO BE ABANDONED
- PROPOSED FOUL WATER SEWER
- PROPOSED SURFACE WATER SEWER
- PROPOSED ATTENUATION TANK
- PROPOSED CONVEYANCE CHANNEL
- PROPOSED POROUS SURFACING
- PROPOSED RAIN GARDEN
- APPLICATION A BOUNDARY
- APPLICATION B (SCHOOL) BOUNDARY
- SURFACE WATER DRAINAGE CATCHMENT

NOTES

1) EXISTING DRAINAGE LAYOUT BASED ON THAMES WATER SEWER RECORDS AND PENBORN TECHNICAL SERVICES DRAWING (REF: P979/07/31).
2) THE PART OF THE DEVELOPMENT WEST OF SHIP LANE IS SUBMITTED AS AN OUTLINE APPLICATION. THE BASEMENT PLAN PROVIDED (REF.16019_C645_Z2_P_B1_001 - RECEIVED FROM SQUIRE & PARTNERS 29.01.2018) IS INDICATIVE ONLY AND SUBJECT TO THE PARAMETER PLANS SUBMITTED.
3) DRAINAGE SUBJECT TO DETAILED DESIGN.



Rev	Date	Description	By
A06	20.12.18	PERMEABLE PAVING AND RAIN GARDEN ADDED	NB
A05	13.02.18	UPDATED APPLICATION BOUNDARY	NB
A04	29.01.18	UPDATED ARCHITECT LAYOUT	NB
A03	01.11.17	TEAM ISSUE	NB
A02	23.10.17	SURFACE WATER ATTENUATION AMMENDED	NB
A01	29.09.17	PRELIMINARY ISSUE	MAC

Amendments

Project: STAG BREWERY

Title: PROPOSED FOUL AND SURFACE WATER DRAINAGE LAYOUT SHEET 3 OF 4

Client: RESELTON PROPERTIES LIMITED

Waterman

Pickfords Wharf Clink Street London SE1 9DG
t 020 7928 7888
mail@watermangroup.com www.watermangroup.com

Drawing Status: PRELIMINARY

Designed by: NB	Checked by: DO	Project No: WIE10667	
Drawn by: MAC	Date: SEPTEMBER 2017		
Scales @ A1 work to figured dimensions only: 1:500		Computer File No: WIE10667CSA920006.dwg	

Publisher	Zone	Category	Number	Revision
WIE	SA	92	0006	A06

1:500 0 10m 20m 30m 40m 50m

1:1 0 10 20 30 40 50 60 70 80 90 100

File Path: N:\Projects\WIE\667\10\07 CAD\02_Drainage and Water Management\

A1-Wat-S, C645_MP_P_00_001, WIE10667-X-PR-DRAINAGE

C. Hard Landscaping Strategy (Gillespies)

PAVING STRATEGY:

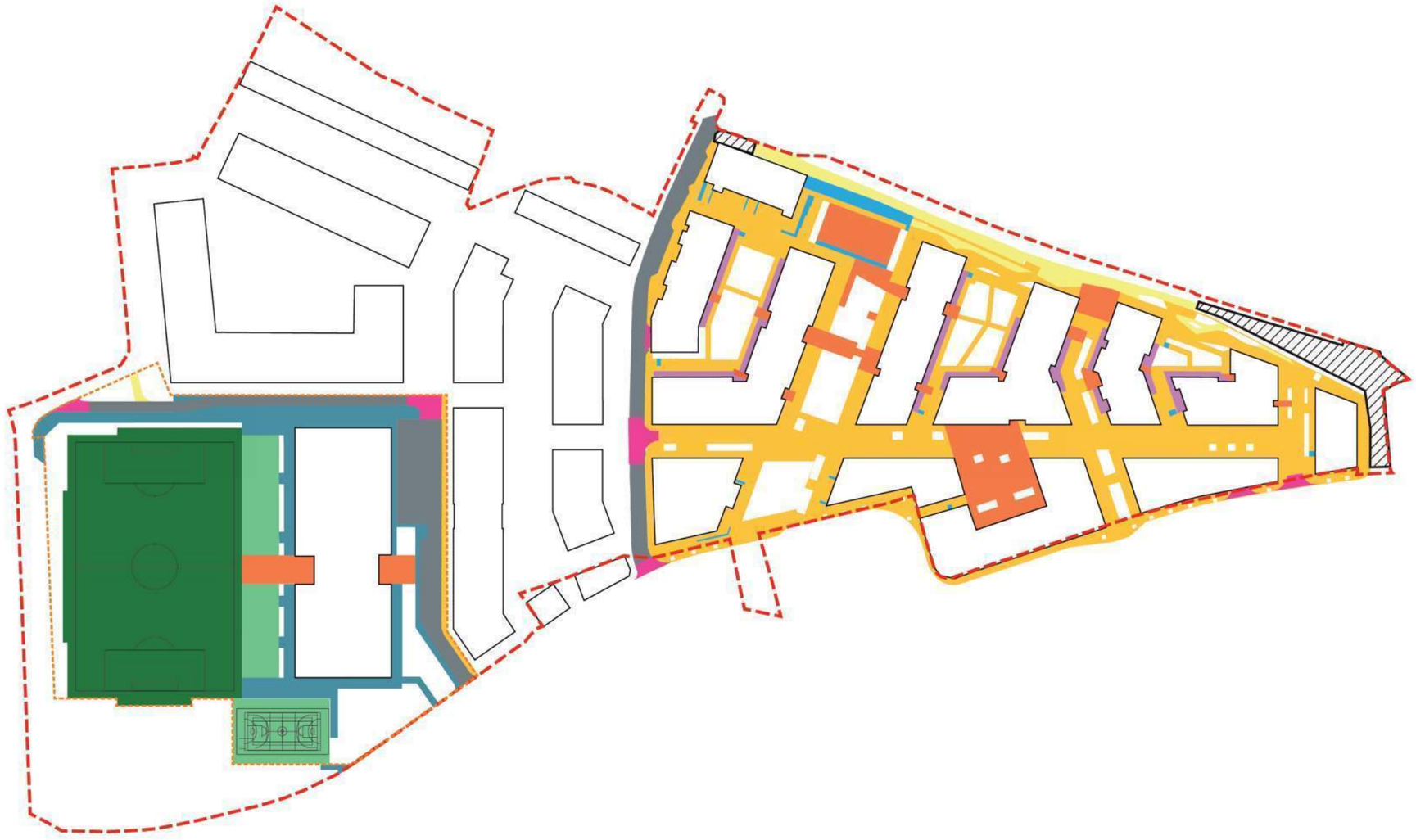
The main aims of the hard landscape strategy are simplicity of design and layout, and overall quality, bearing in mind maintenance considerations, and cost limitations. The best of existing granite sett paving will be retained and reinstated wherever possible, in particular historic cobbles in Bull's Alley and along the Towpath.

Colour, texture and unit size help to define the uses of various spaces, including using paving sizes and patterns in 'streets' to identify pedestrian priority, service vehicle routes and loading bays. The accessibility requirements of vision and mobility impaired users is a factor in the determination of surface and edge types to provide a legible and safe environment in accordance with current requirements.

It is proposed to use paved surfaces of different scale and grain to create a range of distinct characters within a unified warm palette of materials. Natural stone paving is proposed in areas of shared (vehicular and pedestrian) zones, with some integration of bound gravel in several of flexible open spaces created within the masterplan, to provide variety and definition while creating a more permeable surface for stormwater infiltration.

The courtyard areas will be finished with stone pavements and resin bound gravel, with softfall (rubberised) pavements in designated play spaces.

LBRuT Guidance
Consideration has been given to Public Realm Design Guidelines (2006) published by LBRuT and pavements in the public realm reflect the intent and broad material selections recommended by this guide.



- Asphalt
- Ceramic Tiles (Private terrace)
- Small Block Setts
- Pre-Cast Concrete Steps
- Artificial Stone Flag Paving
- 3G Pitch
- Porous Macadam Surfacing
- Resin Bound Aggregate Paving
- Stone Paving
- Feature Stone Paving
- Existing Granite Setts to Retain
- Site Application Boundary
- School Application Boundary



Small block setts



MUGA - Pitch Treatment



3G Pitch Treatment



Resin Bound Aggregate Paving



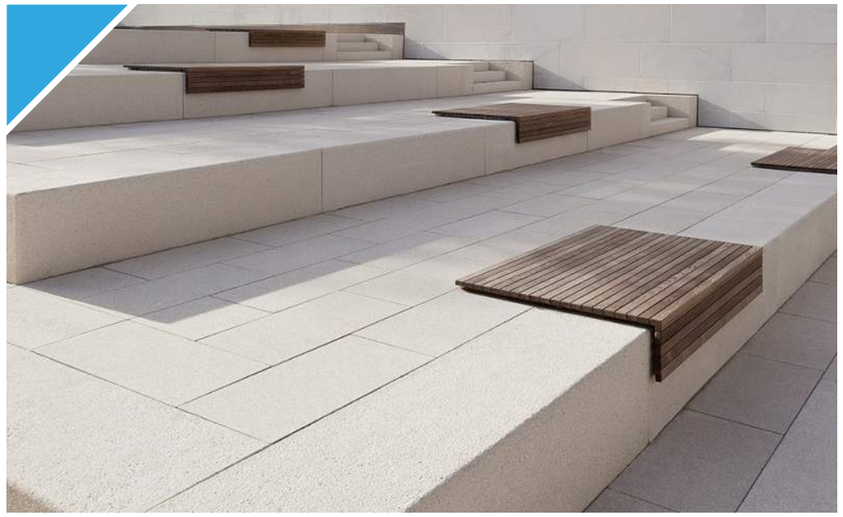
Artificial Stone Flag Paving



Ceramic Tiles



Hot Rolled Asphalt



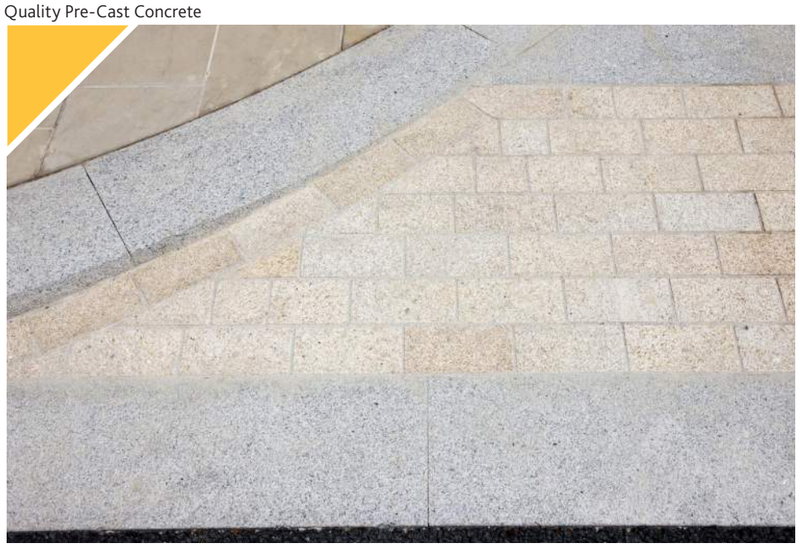
High Quality Pre-Cast Concrete



Feature Mix Stone Paving



High Quality Stone Paving



High Quality Stone Paving

SUSTAINABLE URBAN DRAINAGE STRATEGY:

RAIN GARDENS

A 'rain garden' forms a significant landscape feature within the central Green Link, draining one side of the pavement directly into a planted storage 'trench' which ultimately connects to the stormwater attenuation system. This feature provides an effective sustainable drainage system while creating an obvious ecological feature in the public realm, accentuating the visibility of sustainable measures taken in the development. This feature provides a link to the master planning strategy for ecological development and sustainable drainage and allows surface water to be collected in mass planting areas along the Green Link.

BIODIVERSE ROOFS

Green and brown roofs on the majority of buildings across the site provide biodiversity and also contribute to the rainwater attenuation. Surface treatments in the public and private realm are proposed as predominantly permeable, with soft landscape, turf and grasses, together with permeable pavements of gravel (self-binding or bonded) contrasting with hard paving surfaces and assisting drainage of stormwater.

IRRIGATION

An irrigation system will be provided to all soft landscape areas (planting and grassed) excluding green or brown roofs. This will include soil moisture monitors and a programmable control system to ensure efficiencies in operation and water management.

The irrigation plant room and central controls will be positioned in the basement plant room and link to mains water supply.

PERMEABLE SURFACES

Paved areas will be designed where feasible to drain into tree pits and planting areas, providing natural watering and assisting infiltration and storage of stormwater.

For Development Area 2, the sustainable urban drainage strategy will be developed in accordance with the above and provided in detail design stage.



Legend

- Rain Garden
- Planter
- Permeable Paving
- Site Application Boundary
- School Application Boundary

D. Updated Surface Water Calculations

CALCULATIONS

Company:	WIE	Office:	London
Sheet No:	1 of 4	Project No:	WIE10667
By	N Balboni	Date	19/12/2018
Checked:	D O'Donovan	Date	19/12/2018

Project Title **Former Stag Brewery, Mortlake**

Calculations Title **Existing Discharge Rate - Modified Rational Method - Update**

LOCATION	CALCULATIONS			OPTIONS
	Calculations based on: Design and Analysis of urban storm drainage. The Wallingford Procedure, Volume 1 Principles methods and practice.			
	User Input Data			
	Total site area	**4.82**	ha	
	SAAR (From FEH)	605		
	Rainfall Intensity (From FEH)	51.80		
	PIMP (% impervious)	100	%	
	Soil Type	0.40		
	Very Low Runoff (well drained sandy, loamy or earthy peat soils)	0.15		
	Low Runoff (Very permeable soils (e.g. gravel, sand)	0.30		
	Moderate (Very fine sands, silts and sedimentary clays)	0.40		
	High Runoff (Clayey or loamy soils)	0.45		
	Very High Runoff (Soils of the wet uplands)	0.50		
Fig. 9.7	UCWI (From Figure 9.7 of Wallingford Method)	52		
Eqn. 13	Qp (peak discharge) = 2.78 Cv CR i A			
	Where: Qp (Peak Discharge) i = rainfall intensity A = Total Area			
From FEH	Average rainfall Intensity (i)			
	M100_60 is: 51.80 mm			
Eqn 7.20	Cv = PR/100			
Eqn 7.3	PR = (0.829 PIMP) + (25.0 SOIL) + (0.078 UCWI) - 20.7			
	PIMP (Percentage of catchment which is impervious)	100	%	
Page 52	Note: PIMP can not be less than 40%	40	%	
	Thus value of PIMP to be used	100	%	
	Soil: 0.40 UCWI: 52			
	PR =	76.26		
	Thus Cv =	0.76		
Sec 7.10	CR (Recommended for simulation and design)	1.3		
	Qp for 1 in 100 year 60 minute duration =	**688.1**	**l/s**	**142.8** **l/s/ha**
	50% of the existing runoff rate=	**405.0**	**l/s**	**71.4** **l/s/ha**

waterman

CALCULATIONS

Company:	WIE	Office:	London
Sheet No:	2 of 4	Project No:	WIE10667
By	N Balboni	Date	19/12/2018
Checked:	O O'Donovan	Date	19/12/2018

Project Title **Former Stag Brewery, Mortlake**

Calculations Title **Surface water attenuation volume Summary - Update**

LOCATION | CALCULATIONS | OPTIONS

In order to calculate the volume of surface water attenuation required for the Site, Windes Microdrainage version 2018.1, Source Control module, Quick Storage Estimate has been used. The input and output data for which are shown below;

Existing discharge rate:		50% of existing rate	
688	l/s	405	l/s
143	l/s/ha	71	l/s/ha

Summary - Discharge Rates and Attenuation Volumes

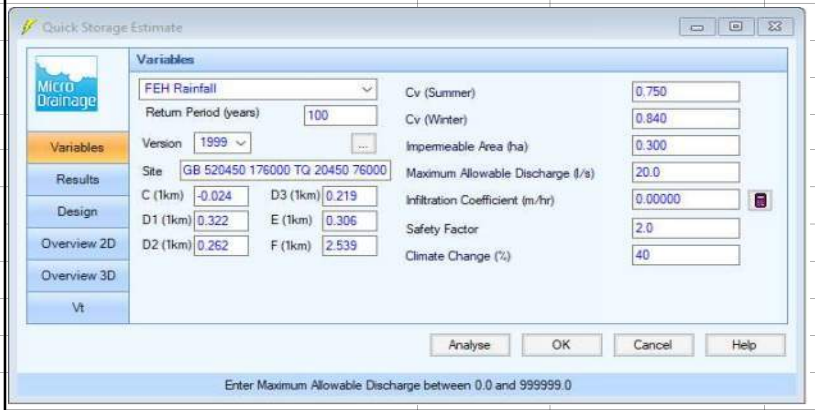
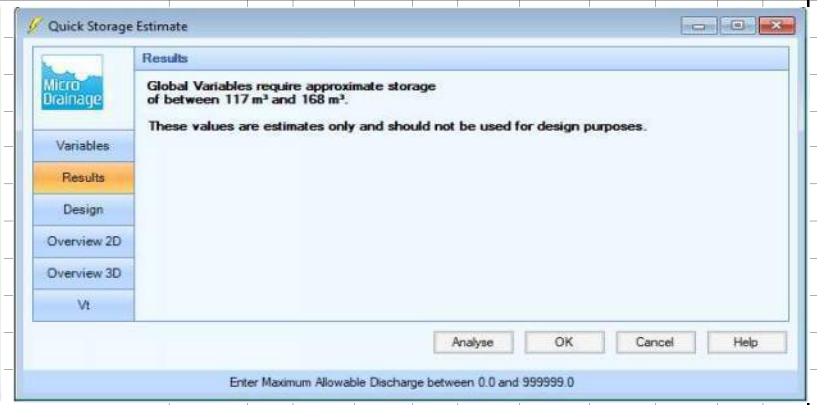
Catchment	Area (ha)	Existing Rate (l/s)	Proposed Rate (l/s)	Attenuation (m3)	Betterment
East - 1	0.30	42.8	**20.0**	**143**	**53**
East - 2	0.25	35.7	17.8	117	50
East - 3	0.18	25.7	12.8	84	50
West - school	**1.31**	**187.0**	**16.0**	**993**	**91**
West - 4	1.07	152.7	76.2	499	50
West - 5	0.54	77.1	38.5	252	50
West - 6	0.38	54.0	26.9	177	50
West - 7	0.79	112.8	56.3	369	50
Total	4.82	688	265	2634	62

CALCULATIONS

Company:	WIE	Office:	London
Sheet No:	3 of 4	Project No:	WIE10667
By	N Balboni	Date	19/12/2018
Checked:	O O'Donovan	Date	19/12/2018

Project Title **Former Stag Brewery, Mortlake**

Calculations Title **Surface water attenuation volume - Catchment 1 Update**

LOCATION	CALCULATIONS			OPTIONS
	In order to calculate the volume of surface water attenuation required for the Site, Windes Microdrainage version 2018.1, Source Control module, Quick Storage Estimate has been used. The input and output data for which are shown below;			
	Drainage Catchment - East 1			
	Area	0.30	ha	
	Attenuation Available	143	m3	
	Discharge Rate	20.0	l/s	
	Betterment	53	%	
				
				
	Required volume to achieve 20.0 l/s			
	Attenuation volume (m3)	143		

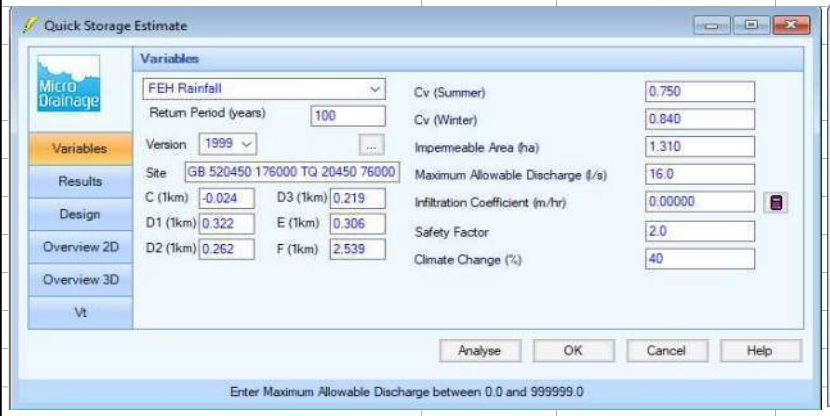
CALCULATIONS

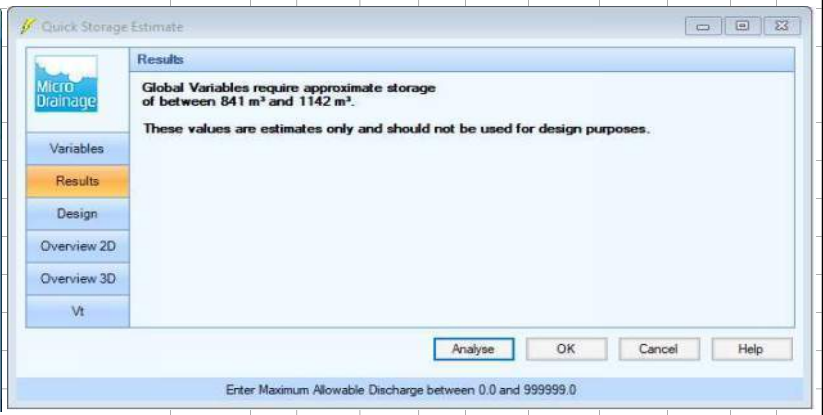
Company:	WIE	Office:	London
Sheet No:	4 of 4	Project No:	WIE10667
By	N Balboni	Date	19/12/2018
Checked:	O O'Donovan	Date	19/12/2018

Project Title **Former Stag Brewery, Mortlake**

Calculations Title **Surface water attenuation volume - School Catchment Update**

LOCATION	CALCULATIONS			OPTIONS
	In order to calculate the volume of surface water attenuation required for the Site, Windes Microdrainage version 2018.1, Source Control module, Quick Storage Estimate has been used. The input and output data for which are shown below;			
	Drainage Catchment - School			
	Area	1.31	ha	
	Attenuation Available	993	m3	
	Discharge Rate	16.00	l/s	
	Betterment	91	%	





Required volume to achieve 24.5 l/s			
Attenuation volume (m3)	992		

E. Thames Water Pre-Development Enquiry Response

Miss Nora Balboni
Pickfords Wharf
Clink Street
SE1 9DG

Our ref: DS6041473

0800 009 3921
Monday to Friday, 8am to 5pm

13 May 2018

Pre-planning enquiry: Confirmation of sufficient capacity

Dear Miss Balboni

Thank you for providing information on your development **Stag Brewery, Mortlake, SW14 7QR, OS grid ref. 520380, 176003.**

Redevelopment of the former Stag Brewery site to provide mix use development (Flats: 687, Primary School for 1200 pupils, Cinema: 475 seats, Sports Hall: 189 people, Hotel: 20 rooms, Car Home: 220 beds, Offices: 2424m^2, Warehouse: 5113m^2). Foul Water discharging by gravity into multiple outfalls. Surface Water to be attenuated and discharged by gravity and pump into multiple outfalls (50% betterment anticipated from existing sw run-off). Surface Water from the north-eastern part of the site discharging into the River Thames.

If your proposals progress in line with the details you've provided (drawings ref: WIE SA 92 0004 Rev A05, WIE SA 92 0005 Rev A05, WIE SA 92 0006 Rev A05, WIE SA 92 0007 Rev A05) we're pleased to confirm that there will be sufficient sewerage capacity to serve your development.

However, Thames Water has concerns with capacity to the West of the development based on the proposed flows and connection points. We request that the developer updates Thames Water in advance of building phases as they come forwards in order to ensure that any investigative or upgrade works can be carried out before development commences.

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.

Please note that you must 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 sewerage 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

C. Greater London Authority Correspondence

Nora Balboni

From: Katherine Wood <Katherine.Wood@london.gov.uk>
Sent: 08 February 2019 17:12
To: Nora Balboni; Stuart McTaggart; Abby Crisostomo
Cc: Anna Gargan; Suzanne Robson
Subject: RE: Stag Brewery (GLA ref: 4172a/b) drainage strategy [Filed 08 Feb 2019 17:19]

Hi Nora,

Apologies, I should have confirmed with you that Stuart had reviewed this response and confirmed that it addressed outstanding issues on drainage.

Kind regards,

Katherine

Katherine Wood
Team Leader, Development Management
GREATER**LONDON**AUTHORITY
City Hall, The Queen's Walk, London SE1 2AA
020 7983 5743
www.london.gov.uk/what-we-do/planning
katherine.wood@london.gov.uk

From: Nora Balboni <nora.balboni@watermangroup.com>
Sent: 08 February 2019 17:07
To: Stuart McTaggart <Stuart.McTaggart@london.gov.uk>; Abby Crisostomo <Abby.Crisostomo@london.gov.uk>; Katherine Wood <Katherine.Wood@london.gov.uk>
Cc: Anna Gargan <AGargan@geraldeve.com>; Suzanne Robson <SRobson@geraldeve.com>
Subject: FW: Stag Brewery (GLA ref: 4172a/b) drainage strategy

Hi Stuart

Hope you are well. Have you had the chance to look at the Briefing Note?

Kind regards,

Nora Balboni
Flood Risk Engineer
Waterman Infrastructure & Environment Ltd

Pickfords Wharf | Clink Street | London SE1 9DG
t +44 207 928 7888 | **d** +44 3300 602 725
www.watermangroup.com | LinkedIn | Twitter

From: Nora Balboni
Sent: 08 January 2019 16:22
To: 'Stuart McTaggart' <Stuart.McTaggart@london.gov.uk>
Cc: 'Anna Gargan' <AGargan@geraldeve.com>; 'Abby Crisostomo' <Abby.Crisostomo@london.gov.uk>; 'Katherine Wood' <Katherine.Wood@london.gov.uk>; Ellen Smith <ellen.smith@watermangroup.com>; Donal O'Donovan

<donal.odonovan@watermangroup.com>; Harry Chetty <harry.chetty@watermangroup.com>
Subject: RE: Stag Brewery (GLA ref: 4172a/b) drainage strategy

Hi Stuart

Happy new year, I hope you had a great break.

Please find attached the Briefing Note outlining the amendments to the drainage strategy for the Stag Brewery development as per our agreements below.

Let me know if you have any queries.

Kind regards,

Nora Balboni
Flood Risk Engineer
Waterman Infrastructure & Environment Ltd

Pickfords Wharf | Clink Street | London SE1 9DG
t +44 207 928 7888 | **d** +44 3300 602 725
www.watermangroup.com | LinkedIn | Twitter

From: Nora Balboni
Sent: 12 December 2018 09:24
To: Stuart McTaggart <Stuart.McTaggart@london.gov.uk>
Cc: Anna Gargan <AGargan@geraldeve.com>; Ellen Smith <ellen.smith@watermangroup.com>; Donal O'Donovan <donal.odonovan@watermangroup.com>; Abby Crisostomo <Abby.Crisostomo@london.gov.uk>; Katherine Wood <Katherine.Wood@london.gov.uk>
Subject: RE: Stag Brewery (GLA ref: 4172a/b) drainage strategy [Filed 12 Dec 2018 09:24]

Hi Stuart

Thank you for confirming.

As discussed, we will provide a Briefing Note which will cover the following:

- Amended drainage strategy plan to show permeable paving extents;
- Volume calculations to estimate the attenuation available within the permeable paving sub-base and rain garden feature to show that a restriction of surface water runoff beyond the minimum 50% requirement is achieved;
- Sports pitch in south-west of site removed from surface water calculations under the assumption that it would drain freely, subject to ground investigations during detailed design; and
- Summary of all SuDS included.

Kind regards,

Nora Balboni
Flood Risk Engineer
Waterman Infrastructure & Environment Ltd

Pickfords Wharf | Clink Street | London SE1 9DG
t +44 207 928 7888 | **d** +44 3300 602 725
www.watermangroup.com | LinkedIn | Twitter

From: Stuart McTaggart <Stuart.McTaggart@london.gov.uk>
Sent: 11 December 2018 15:23
To: Nora Balboni <nora.balboni@watermangroup.com>
Cc: Anna Gargan <AGargan@geraldeve.com>; Ellen Smith <ellen.smith@watermangroup.com>; Donal O'Donovan <donal.odonovan@watermangroup.com>; Abby Crisostomo <Abby.Crisostomo@london.gov.uk>; Katherine Wood

<Katherine.Wood@london.gov.uk>
Subject: Re: Stag Brewery (GLA ref: 4172a/b) drainage strategy [Filed 12 Dec 2018 09:17]

Hi Nora,

To summarise our chat earlier:

1. The intent of the original drainage strategy was to show that it is possible within site constraints to meet the absolute minimum requirements of London Plan policy 5.13.
2. We would like to see that all efforts have been made to get as close to possible to the policy targets (i.e. greenfield runoff, drainage hierarchy, and a preference for SuDS with multiple benefits). We expect that on large sites such as this the policy targets should be able to be met in most cases.
3. Waterman will produce an addendum to the drainage strategy to more clearly show how the drainage will integrate SuDS with multiple benefits and identify an approximate maximum reduction in discharge rate. Where appropriate the reduction in discharge rate can be caveated with assumptions/risks that need confirmation during detailed design (e.g. infiltration rates of the subgrade below the 3G pitch).

Regards,

Stuart McTaggart
Flood Risk, Drainage & Water Policy Officer
Development, Enterprise & Environment
Greater London Authority
City Hall, The Queens Walk, London SE1 2AA

Email: stuart.mctaggart@london.gov.uk
Web: Greening London / Greater London Authority
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From: Nora Balboni <nora.balboni@watermangroup.com>
Sent: 04 December 2018 10:32
To: Stuart McTaggart <Stuart.McTaggart@london.gov.uk>
Cc: Anna Gargan <AGargan@geraldeve.com>; Ellen Smith <ellen.smith@watermangroup.com>; Donal O'Donovan <donal.odonovan@watermangroup.com>
Subject: RE: GLA Flood Feedback

Hi Stuart

Thanks for your comments. Please feel free to give me a call to discuss as I don't have your contact number.

We understand that developments should aim to achieve greenfield runoff rates, or as close as feasible. To endeavour to achieve this we took the following approach:

1. As per the drainage hierarchy, the amount of surface water that could be discharged into the River Thames was maximised by incorporating the innovative shallow conveyance channel system;

2. For the remaining site, where discharge into the Thames was not feasible due to levels or crossing third party land, as many tanks were incorporated as possible. The horizontal constraints for the tanks include the basement extent, proposed building outlines, and landscaping. The vertical constraints include the required soil depth for tree pits and achieving a gravity connection into the surrounding sewer network. London Borough of Richmond accepted the 50% restriction during pre-application consultation. Conscious that the constraints of the site preclude a greater reduction in runoff, Thames Water were consulted to ensure that the surrounding sewer network has sufficient capacity. Thames Water confirmed capacity for both surface and foul water flows. It is important to note that the surface water flows from the development are only conveyed within the Thames Water network for maximum of 350m before discharging into the River Thames.

We are keen to find a solution to reduce runoff further to find an agreeable solution. I would appreciate your thoughts on the following options:

- Allowing the proposed sports pitch to drain freely, i.e. excluding it from the surface water calculations and therefore reducing the size requirement for the tank beneath the MUGA pitch. Subject to levels I could explore the possibility of directing surface water from other areas into this tank, reducing the restriction beyond the 50% mark. In the current strategy we assumed that the pitch would need to be positively drained due to the underlying London Clay to avoid potential water logging beneath the pitch. However, if no other areas would drain towards the pitch, allowing it to free drain could be considered.

- We took a conservative approach when designing the current drainage strategy, assuming 100% impermeable proposed area (discounting the park area in the south eastern corner of the site). We did not quantify the attenuation available within the rain garden along the green link and within the permeable paving, to demonstrate the worst-case scenario that the minimum required restriction (i.e. 50%) can be achieved within the tanks themselves. I will do a quick calculation to demonstrate the additional attenuating volume that these features would hold, reducing the restriction beyond the 50% mark.

- Exploring further areas for incorporation of permeable paving.

- The current proposals do not include for blue roofs. However, green roofs are proposed throughout the development, which, although not quantifiable, provide a betterment to the surface water runoff regime.

Let me know whether you find the above agreeable, I will then amend the drainage strategy drawing to show the constraints to the attenuation volumes and incorporate any changes, and will re-issue for you to review.

Kind regards,

Nora Balboni
Flood Risk Engineer
Waterman Infrastructure & Environment Ltd

Pickfords Wharf | Clink Street | London SE1 9DG
t +44 207 928 7888 | **d** +44 3300 602 725
www.watermangroup.com | LinkedIn | Twitter

From: Anna Gargan
Sent: 28 November 2018 16:51
To: 'Ellen Smith'; 'Nora Balboni'
Cc: Guy Duckworth; Susie Taylor; Neil Henderson
Subject: GLA Flood Feedback

Hi Ellen / Nora,

I hope you are well.

The GLA has provided the following response to Flood comments issued on 20 November 2018.

Please can you review and respond. The officer states that he is happy to speak with you directly.

Kind regards,
Anna

"I have reviewed the Applicant's second response to our Stage 1 comments. Following our previous response at the end of October the final point of contention appears to be the proposed discharge rate where the site will drain to the public sewer.

It is noted that the London Plan and DEFRA national guidance require a development to achieve as close to greenfield runoff rate as possible (approximately a >90% reduction from pre-development rates for a brownfield site). In this case the Applicant is proposing to reduce the discharge by 50%, well short of the policy requirements. The Applicant should calculate the greenfield runoff rate and provide calculations showing the attenuation storage required to meet this discharge rate. The Applicant should then seek to include additional attenuation storage to get as close to this value as possible. Our original comments suggested building the biodiverse roofs as green/blue roofs to provide additional storage and this has not been addressed to date. The Applicant should then provide a clear drawing or markup clearly showing the constraints to expanding attenuation storage if discharge at greenfield runoff rate is not proposed.

I am happy to discuss directly with the Applicant's consultant to resolve this if required.

Regards,

Stuart McTaggart
Flood Risk, Drainage & Water Policy Officer
Development, Enterprise & Environment
Greater London Authority
City Hall, The Queens Walk, London SE1 2AA

Email: stuart.mctaggart@london.gov.uk

Anna Gargan
Planning Consultant

Tel. +44 (0)20 7518 7240
Mobile. +44 (0) 7979532721
AGargan@geraldeve.com

Gerald Eve LLP
72 Welbeck Street London W1G 0AY
www.geraldeve.com





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D. Thames Water Correspondence

Miss Nora Balboni
Pickfords Wharf
Clink Street
SE1 9DG

Our ref: DS6041473

0800 009 3921
Monday to Friday, 8am to 5pm

13 May 2018

Pre-planning enquiry: Confirmation of sufficient capacity

Dear Miss Balboni

Thank you for providing information on your development **Stag Brewery, Mortlake, SW14 7QR, OS grid ref. 520380, 176003.**

Redevelopment of the former Stag Brewery site to provide mix use development (Flats: 687, Primary School for 1200 pupils, Cinema: 475 seats, Sports Hall: 189 people, Hotel: 20 rooms, Car Home: 220 beds, Offices: 2424m^2, Warehouse: 5113m^2). Foul Water discharging by gravity into multiple outfalls. Surface Water to be attenuated and discharged by gravity and pump into multiple outfalls (50% betterment anticipated from existing sw run-off). Surface Water from the north-eastern part of the site discharging into the River Thames.

If your proposals progress in line with the details you've provided (drawings ref: WIE SA 92 0004 Rev A05, WIE SA 92 0005 Rev A05, WIE SA 92 0006 Rev A05, WIE SA 92 0007 Rev A05) we're pleased to confirm that there will be sufficient sewerage capacity to serve your development.

However, Thames Water has concerns with capacity to the West of the development based on the proposed flows and connection points. We request that the developer updates Thames Water in advance of building phases as they come forwards in order to ensure that any investigative or upgrade works can be carried out before development commences.

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.

Please note that you must 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 sewerage 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

E. Amended Foul Estimate

		Sheet No:	1 of 1	Project No:	WIE10667		
Project Title:	**Stag Brewery**	By:	N Balboni	Date:	18/04/2019		
Calculations Title:	**Amended Proposed Foul Flow Estimate**	Checked:	D O'Donovan	Date:	18/04/2019		

		Dry Weather Flow Rate (per day)	Source	Number of	Factor	Profile (hours)	Peak Flow Rate (litres/second)
Residential					2.12	24	
Existing property =	*160 litres/person/day*	400.0 litres per unit	Thames Water Guidelines (2016)	0 existing units			0.0
New property =	*125 litres/person/day*	312.5 litres per unit	Thames Water Guidelines (2016)	664 proposed units			5.1
Occupancy =	*2.5 persons*						
Hotel		500.0 litres per room	British Water (2013)	16 rooms	3	24	0.3
Student Accommodation		200.0 litres per bed	Thames Water Guidelines (2016)	0 beds	3	24	0.0
Offices		750.0 litres per $100m^2$	Jones (1992)	7121 m^2	3	10	4.5
Retail		400.0 litres per $100m^2$	Jones (1992)	0 m^2	3	12	0.0
Cinema		10.0 litres per seat	Jones (1992)	530 seats*	3	8	0.6
Health Club/Sports Centre		50.0 litres per customer	British Water (2013)	185 customers**	3	16	0.5
Day School		90.0 litres per pupil	British Water (2013)	1200 pupils	3	10	9.0
Boarding School		175.0 litres per pupil	British Water (2013)	0 pupils	3	24	0.0
Hospital		625.0 litres per bed	Jones (1992)	4 beds	3	24	0.1
Nursing Home		350.0 litres per bed	British Water (2013)	230 beds	3	24	2.8
Restaurant		30.0 litres per cover	British Water (2013)	0 covers	3	8	0.0
Pub/Club		15.0 litres per customer	Butler and Davies (2004)	0 customers***	3	12	0.0
Warehouse		150.0 litres per $100m^2$	Jones (1992)	4493 m^2	3	12	0.5
Manufacturing		550.0 litres per $100m^2$	Jones (1992)	0 m^2	3	12	0.0
Commercial		300.0 litres per $100m^2$	Jones (1992)	0 m^2	3	12	0.0
SUB TOTAL							23.2
Infiltration percentage	10%						2.3
TOTAL							**25.5**

* Foul flow rate needs to be calculated based on number of seats. An allowance of $4m^2$ has been made for each seat.

Floor area = 2120 m^2 4 m^2 per person

** Foul flow rate needs to be calculated based on number of customers. An allowance of $4m^2$ has been made for each customer.

Floor area = 740 m^2 4 m^2 per person

*** Foul flow rate needs to be calculated based on number of customers. An allowance of $4m^2$ has been made for each customer.

Floor area = 0 m^2 4 m^2 per person

UK and Ireland Office Locations



H. Bat Survey – River Wall Inspection

Briefing Note:

Bat Survey – River Wall Inspection

The Former Stag Brewery, Mortlake

Date: October 2018

Client Name: Reselton Properties Limited

Document Reference: WIE10667-103-BN-2-1-2-LM

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 by	Approved by
	Lee Mantle Associate Director	Sebastian Fitzgerald Senior Ecologist	Lee Mantle Associate Director
Draft			

1. Introduction

1.1. This briefing note has been prepared by Waterman Infrastructure & Environment Ltd (Waterman IE) on behalf of Reselton Properties Limited. It presents the findings of two external and endoscope inspections for bats at the Former Stag Brewery in Mortlake, London (hereafter referred to as the 'Site'). The inspections were undertaken upon a wall present within the north-east of the Site and adjacent to the River Thames.

1.2. In February 2016 the wall was subject to a ground-based inspection to determine its potential to support roosting bats as part of a Preliminary Ecological Appraisal (PEA)[1]. As part of this inspection it was found that the brickwork was generally in good condition with no signs of missing mortar or features that may provide suitable roosting opportunities for bats.

1.3. Following comments received from the London Borough of Richmond upon Thames ('LBRuT') on 19th September 2018 in relation to a proposed mixed-use development at the Site, it was noted by LBRuT that the river wall now contained 'numerous cracks and hanging cement providing plenty of potential bat roosting locations'.

[1] Waterman IE (2016): 'The Former Stag Brewery, Mortlake. Preliminary Ecological Appraisal'. WIE10667-100-R-1-3-1-RA

2. Legislation

2.1. In summary, all bat species in England are protected by The Conservation of Habitats and Species Regulations 2017[2] and by the Wildlife and Countryside Act 1981 (as amended)[3]. Taken together, it is an offence to:

- deliberately kill, injure or capture a bat;
- deliberately disturb bats in such a way as to be likely to significantly affect:

  (i) the ability of any significant group of bats to survive, breed, or rear / nurture their young; or

  (ii) the local distribution of that species;
- damage or destroy any breeding or resting place used by bats; or
- intentionally or recklessly obstruct access to any place used by bats for shelter or protection.

3. Methodology

3.1. To address the comments received by LBRuT an update inspection of the river wall was undertaken on the 18th October 2018, which comprised a visual ground-based inspection for any potential roosting features (PRFs), followed by an endoscope inspection of any PRFs recorded. The inspection was undertaken by two Natural England Class 2 Bat Licence Holders, with a ladder used to access any PRF's present at height as part of the endoscope inspection.

3.2. An assessment of each PRF recorded along the wall was made in terms of its suitability to support roosting bats. The ground-based and endoscope inspections searched for evidence of bat use (e.g. droppings, scratch marks, staining and sightings). A number of factors were also considered, including presence of features suitable for use by roosting bats; proximity to foraging habitats or cover; and potential for disturbance. Following the ground-based and endoscope inspections, each feature was scored as per the criteria set out in **Table 1**, based on adapted current best practice guidelines[4], to determine its potential to support roosting bats.

Table 1: Bat Roost Potential Ratings

Assigned Bat Roosting Potential	Description
Known or confirmed roost	Evidence of roosting bats within the feature.
High	A feature that is obviously suitable for use by a larger number of bats on a more regular basis and potentially for longer periods of time due to its size, shelter, protection, conditions and surrounding habitat.
Moderate	A feature that could be used by bats due to its size, shelter, protection, conditions and surrounding habitat, but unlikely to support a roost of high conservation status (with respect to roost type only).
Low	A feature that could be used by individual bats opportunistically. However, these PRFs do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
Negligible	A structure with negligible features likely to be used by roosting bats.

[2] HMSO (2017): '*The Conservation of Habitats and Species Regulations*'
[3] HMSO (1981): '*The Wildlife and Countryside Act*' (WCA) (as amended)'
[4] Collins, J. (ed.) (2016): 'Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)'. The Bat Conservation Trust, London. ISBN-13 978-1-872745-96-1

3.3. Following the undertaking of the above, the wall was then subject to re-inspection by the same surveyors on 25th October 2018. Again, this comprised a visual ground-based and endoscope inspection of those PRFs previously recorded.

4. Results

4.1. The results of the ground-based and endoscope inspections are detailed in **Table 2** below. In summary a total of fourteen PRFs were recorded, both on the interior and exterior of the wall (Site and river side) and were assessed to be of between low and moderate bat roosting potential. The locations of those PRFs recorded are provided on **Figure 1**.

Table 2: Results of the River Wall Preliminary Bat Roost Inspections

Description	Building Photographs	Bat Roost Rating
PRF 1 Feature present on the river side of the wall. The front of 'Budweiser' sign comprises sheet metal wording to wooden boarding. The rear of the sign comprises a steel frame and corrugated steel sheeting. Whilst the sign is assessed to be a solid structure with no cavities, gaps are present between the wooden boarding and 'Budweiser' lettering. The gaps are 4 to 5cm at their widest and open to the elements from above, below and the sides. During the inspection no signs of roosting bats were recorded.		**Low**
PRF 2 Feature present on the Site side of the wall. This section of the wall has areas of paint that are peeling, which may offer temporary sheltering opportunities for bats. During the inspection no signs of roosting bats were recorded.		**Low**
PRF 3 Feature present on the Site side of the wall. An open gap is present between a steel support and the wall with 14 of these features present in close succession. The majority of the supports are flush with the wall or with a wide gap present, however several have a 1-3cm gap present along the length of the support. During the inspection no signs of roosting bats were recorded.		**Low**

Description	Building Photographs	Bat Roost Rating
PRF 4 Feature present on the Site side of the wall. An open cavity is present at the base of the wall, with 3 of these features present in close succession. Looking into the cavity, bricking up work has been undertaken on the riverside of the wall. , This PRF the wall was fully bricked up on the Site side, creating a cavity at the top of the brick work. However the remaining features were open at the base from ground level to approximately 40cm high. During the inspection no signs of roosting bats were recorded.		**Moderate**
PRF 5 Feature present on the Site side of the wall. An area of render has broken away from the wall and has created a linear gap between the render and the wall. The gap is 1cm wide at its greatest extent and protrudes up between 2 to 6cm. It is arguable if the cavity present is wide enough to provide an entrance point for bats, however spider webs are present both in the cavity and at the entrance. During the inspection no signs of roosting bats were recorded.		**Low/Moderate**
PRF 6 Feature present on the Site side of the wall. Linear gaps are present in the wall where mortar is missing, in the vicinity of PRF 5. The gaps are 1 to 1.5cm tall, 4cm at their widest and protrude into the wall 3-5cm. The gaps contain debris from the mortar and spider webs are present. During the inspection no signs of roosting bats were recorded.		**Moderate**
PRF 7 Feature present on the Site side of the wall. An open gap is present around the window frame with 3 of these features present in close succession. The gap is 3 to 4cm wide and 5cm deep. Spider webs are present. During the inspection no signs of roosting bats were recorded.		**Low**

Description	Building Photographs	Bat Roost Rating
PRF 8 Feature present on the riverside of the wall. A crack is present in the wall running up the brickwork from 1m to 3m above ground level. The crack is assessed to be superficial and is 2cm at its widest and contains snails, woodlice and spider webs. The crack is 6cm at its deepest. During the inspection no signs of roosting bats were recorded.		**Low**
PRF 9 Feature present on the riverside of the wall. The feature is present at 1.5m above ground level and is assessed to have formed due to bricking up work. The access point is triangle in shape 25cm long and 10cm high where brickwork is missing and leads into an internal cavity which is open at the bottom on the Site side of the wall. The cavity runs 1m along the top of the brick work is 10cm wide but then drops down to ground level on the Site side of the wall. The cavity contains debris from the brick work including mortar and spider webs are present. An old disused birds nest is also present. During the inspection no signs of roosting bats were recorded.	 	**Moderate**
PRF 10 Feature present on the riverside of the wall. The feature is present at 0.5m above ground level and is assessed to have formed due to bricking up work. The access point (created as a result of missing mortar) is 2 to 3cm high, 7cm long and protrudes 10cm back. The cavity contains debris from the brick work including mortar and spider webs are present. During the inspection no signs of roosting bats were recorded.		**Low**

Description	Building Photographs	Bat Roost Rating
PRF 11 Feature present on the riverside of the wall. A gap is present between the top of a 'new' wall (constructed from darker brick work as part of previous bricking up work) and a concrete lintel above. The gap is 2cm wide and goes up 2cm and back the width of a brick. No internal cavity is present behind. During the inspection no signs of roosting bats were recorded.		**Moderate**
PRF 12 Feature present on the riverside of the wall. A large crack is present at the stone lintel at the top of the wall (above ladder). The crack has split the stone work in two and is 4cm at its widest. The cavity is therefore open to the elements and leaf little and spider webs are present. During the inspection no signs of roosting bats were recorded.		**Low**
PRF 13 Feature present on the riverside of the wall. The feature is present at 1.5m above ground level and is assessed to have formed due to bricking up work. The access point (created as a result of missing mortar) is 3 to 4cm high and 7 to 8cm wide and leads into a confined internal cavity. The cavity runs 1m along the top of the brick work and 10cm wide but drops down by 5cm on the site side of the wall. The cavity contains debris from the brick work including mortar and spider webs are present. During the inspection no signs of roosting bats were recorded.		**Moderate**
PRF 14 Feature present on the riverside of the wall. A crack is present above the bricked-up window. The crack is 1.5cm at is widest with spider webs and woodlice present. During the inspection no signs of roosting bats were recorded.		**Low**

4.2. Other than a greater concentration of spider webs, no change in feature conditions were recorded during the second ground-based and endoscope inspections.

5. Discussion and Conclusions

5.1. The results of the external and endoscope inspections undertaken in October 2018 have assessed that the wall in question does contain PRFs. Based on the findings of these inspections these PRFs have been assessed to be of between low and moderate roosting potential. The inspections also recorded no evidence of roosting bats to be present.

5.2. Best practice guidelines (Collins, J. 2016) state that the recommended number of presence/absence survey visits to give confidence in a negative result for structures of moderate roosting potential is two separate survey visits. The surveys associated with the two visits would normally comprise evening emergence or pre-dawn re-entry surveys. However, and on this occasion, it was assessed that undertaking two external and endoscope inspections was a suitable way forward as every PRF could be fully assessed.

5.3. It is recognised that the external and endoscope inspections were undertaken outside of the recognised active bat period for evening emergence and pre-dawn re-entry surveys (May to August/September inclusive, for these types of surveys) to confirm the presence/absence of roosting bats. However best practice guidelines state that bat activity surveys are optimal into October (location and weather dependent). The weather conditions at sunset before the inspections on the 18th and 25th were both above 10ºc and therefore bats would still be active given the mild weather conditions experienced in October 2018.

5.4. It is therefore assessed that the inspections undertaken at the wall provides an adequate survey baseline and the absence of roosting bats can be assumed.

5.5. Notwithstanding the above, as stated within the August 2018 Briefing Note[5], a commitment has already been made to update bat surveys prior to demolition works to ensure legal compliance. Should any roosting bats be recorded, the necessary licencing and mitigation would be attained from Natural England.

[5] Waterman IE (2018): 'Ecology Response to the London Borough of Richmond upon Thames Consultation Comments. The Former Stag Brewery, Mortlake.

FIGURES

Figure 1: Potential Roosting Feature Locations (ref: WIE10667-103_GR_EC_1A)



N

The Site

X Potential Roosting Features

Project Details	WIE10667-103: Stag Brewery
Figure Title	Figure 1: Potential Roosting Feature Locations
Figure Ref	WIE10667-103_GR_EC_1A
Date	2018
File Location	\\s-lncs\wiel\projects\wie10667\103\graphics\ec\issued figures

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I. May 2019 Amendment Photomontages of Viewpoints 4 and 6

WIE10667: Stag Brewery
ES Addendum Photomontages



Viewpoint 4 - TVIA 2018



Viewpoint 4 - ES Addendum 2019

Project Details	WIE10667: Stag Brewery
Figure Title	Figure 1: Viewpoint 4
Figure Ref	WIE10667-105-GR-TVIA-01A
Date	April 2019
File Location	\\H-Incs\wiel\Projects\WIE10667\105\8_Reports\1. ES Addendum\Inputs\TVIA



Viewpoint 6 - TVIA 2018



Viewpoint 6 - ES Addendum 2019

Project Details	WIE10667: Stag Brewery
Figure Title	Figure 2: Viewpoint 6
Figure Ref	WIE10667-105-GR-TVIA -02A
Date	April 2019
File Location	\\H-Incs\wiel\Projects\WIE10667\105\8_Reports\1. ES Addendum\Inputs\TVIA

J. Daylight, Sunlight, Overshadowing and Light Pollution Appendix

Appendix A

Drawings of the Baseline Condition and Development Scenario



4th Floor, Holborn Tower
137-144 High Holborn
London WC1V 6PL
T: +44(0)20 7148 6290
E: info@eb7.co.uk
W: eb7.co.uk

Sources of information

SQUIRE & PARTNERS
3DView-{3D-kh}.dwg
Received 04/01/18

APR SERVICES
Topographical Survey.pdf
Received 22/09/16

CLOUD 10
Stag Brewery East end 15-09-16.dwg
11263_Stag Brewery_MASTER.dwg
Stag Brewery West end 22-09-16 Pt1.dwg
Stag Brewery West end 23-09-16.dwg
The Ship PH.dwg
Jolly Gardeners.dwg
Received 11/10/16

EB7 Ltd
Site Photographs
Ordnance Survey

Key:

Existing

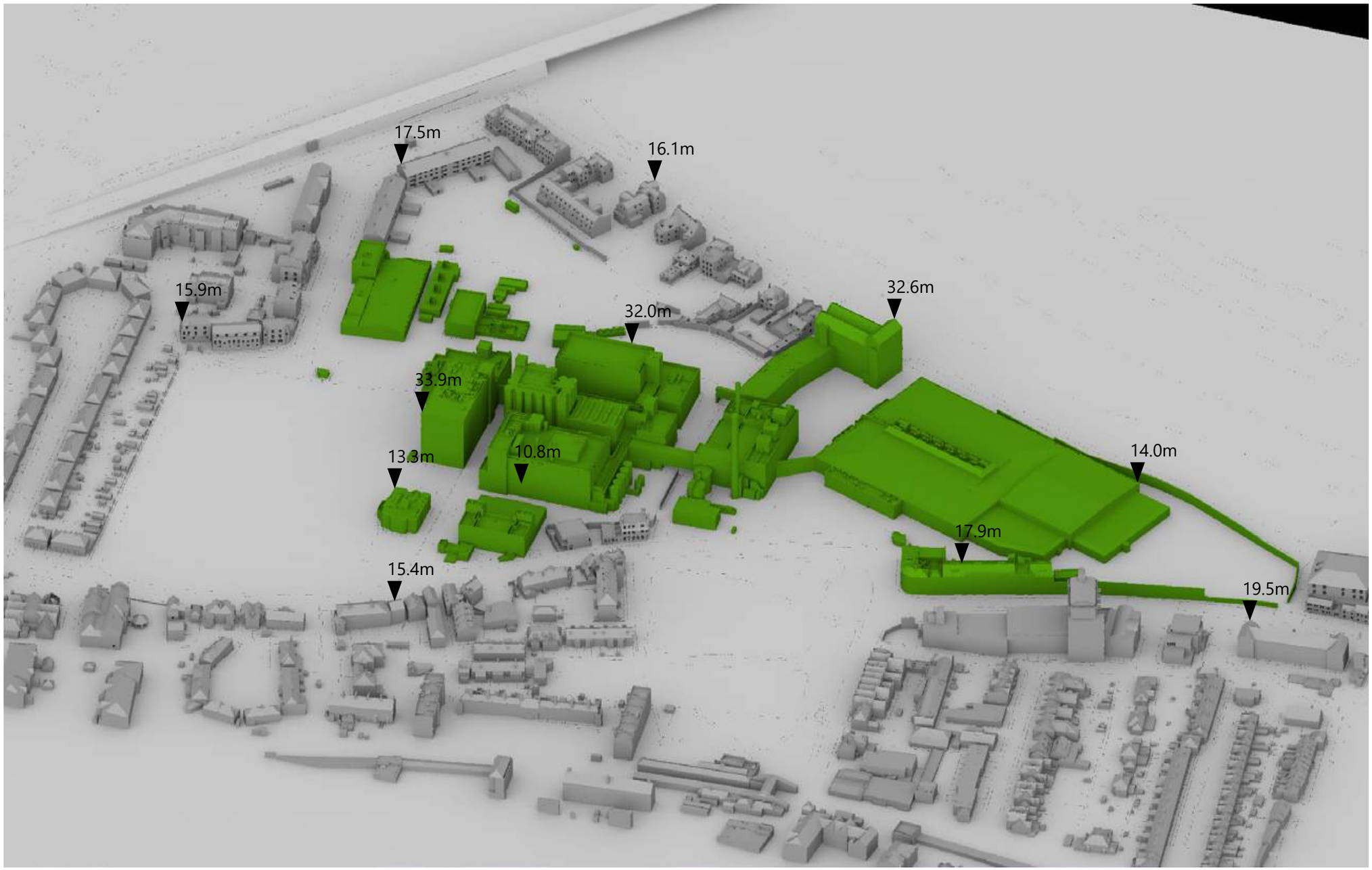
Proposed

NORTH

Project	The Stag Brewery SW14 7ET London
Title	Existing Condition Plan View

Drawn	BA	Checked	--
Date	25/04/2019	Project	2201
Rel no.	09	Prefix	DS01
Page no.	01		

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4th Floor, Holborn Tower
137-144 High Holborn
London WC1V 6PL
T: +44(0)20 7148 6290
E: info@eb7.co.uk
W: eb7.co.uk

Sources of information

SQUIRE & PARTNERS
3DView-{3D-kh}.dwg
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11263_Stag Brewery_MASTER.dwg
Stag Brewery West end 22-09-16 Pt1.dwg
Stag Brewery West end 23-09-16.dwg
The Ship PH.dwg
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Key:

Existing

Proposed

Notes:
All heights and dimensions are in AOD

Project: The Stag Brewery
SW14 7ET
London

Title: Existing Condition
3D View

Drawn	BA	Checked	--
Date	25/04/2019	Project	2201
Rel no.	09	Prefix	DS01
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Key:

Existing

Proposed

NORTH

Project	The Stag Brewery SW14 7ET London
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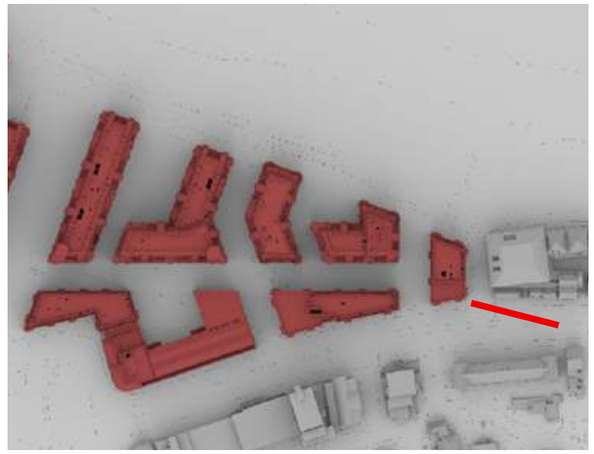
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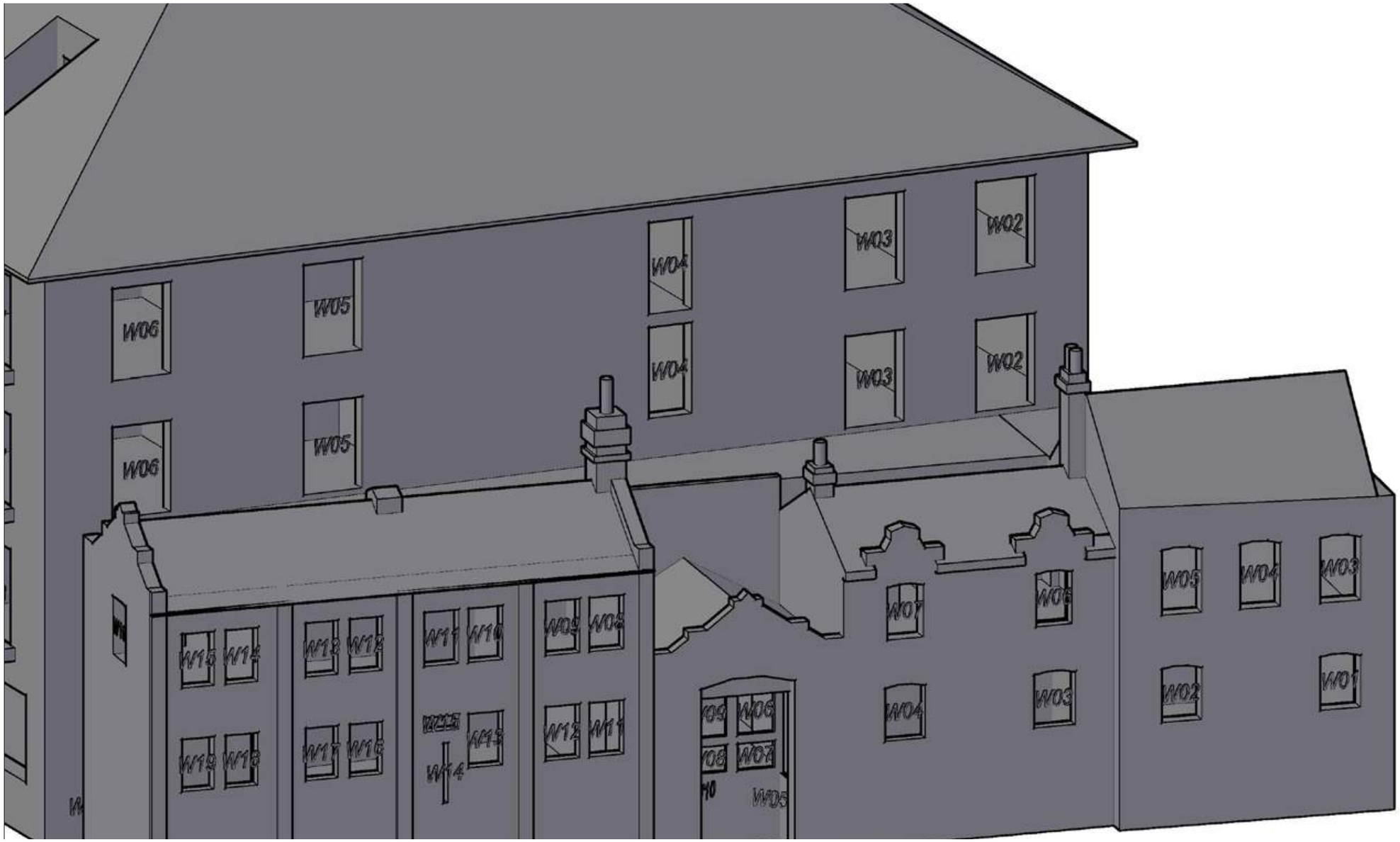
Notes:
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Project	The Stag Brewery SW14 7ET London
Title	Proposed Development 3D View

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09	DS01	04





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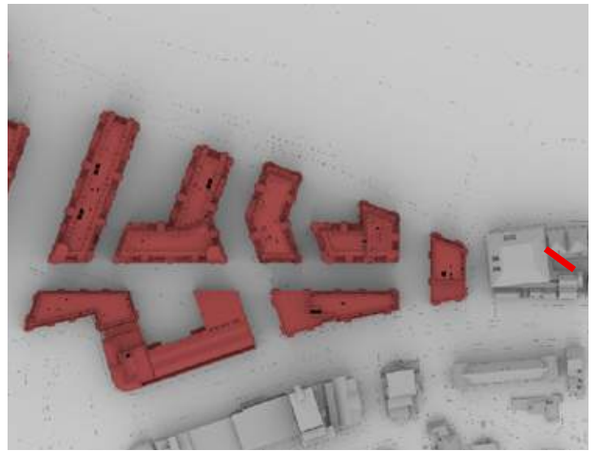
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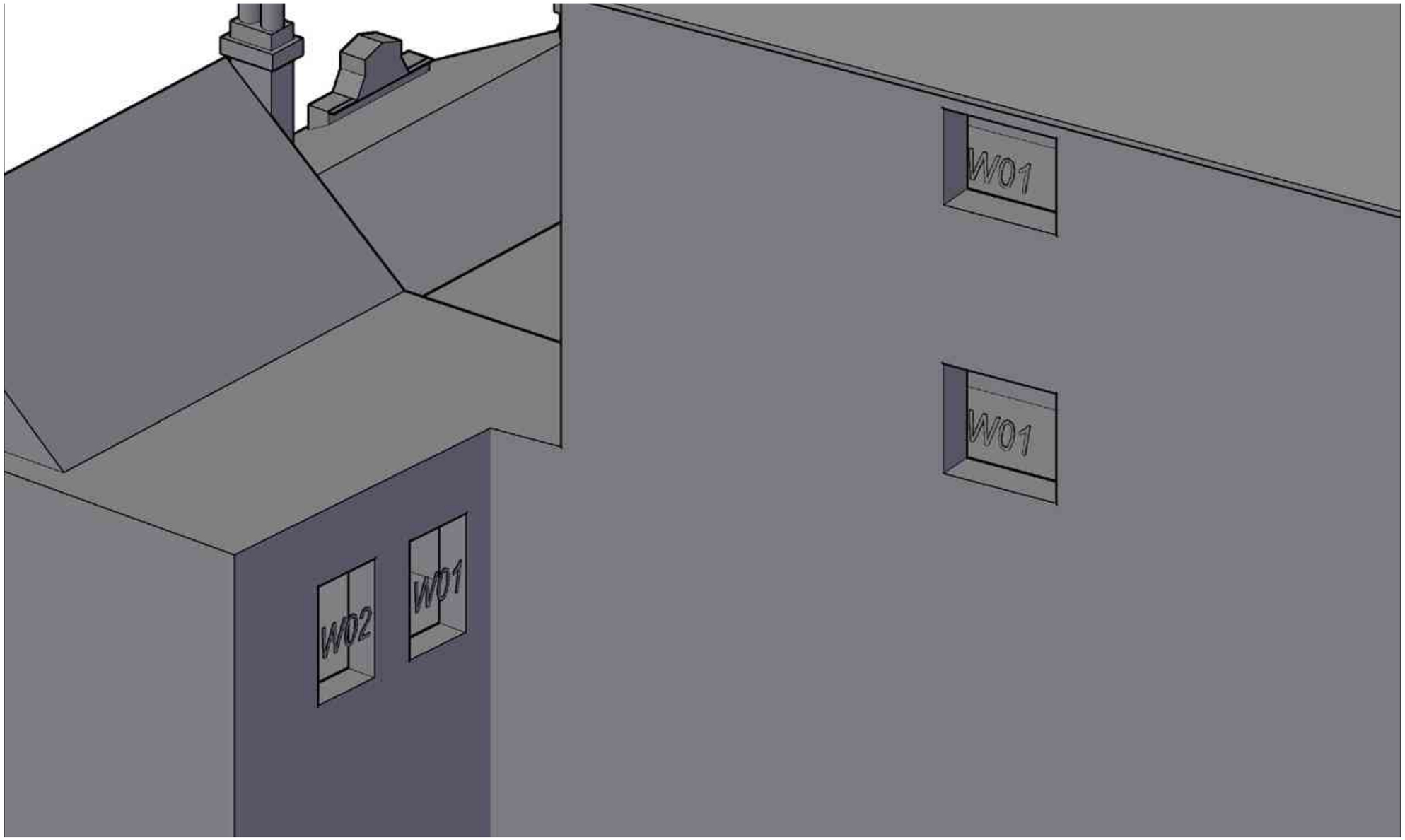
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Title	Boat Race House Window Map

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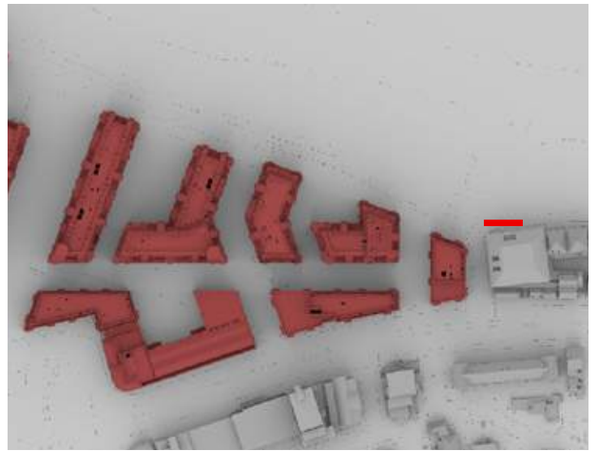
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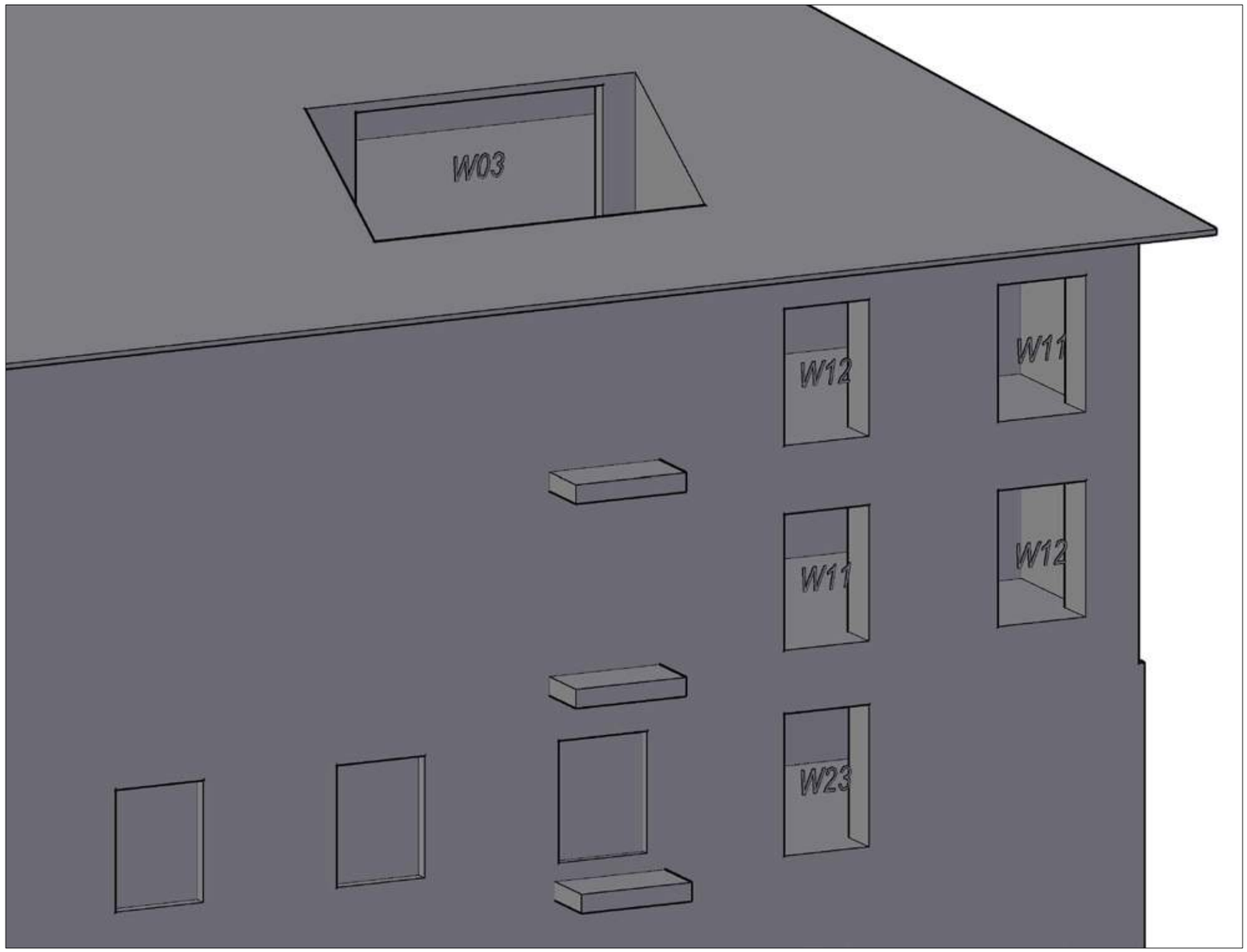
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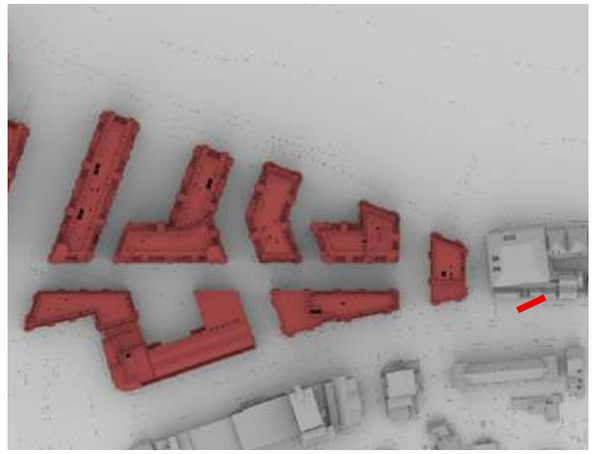
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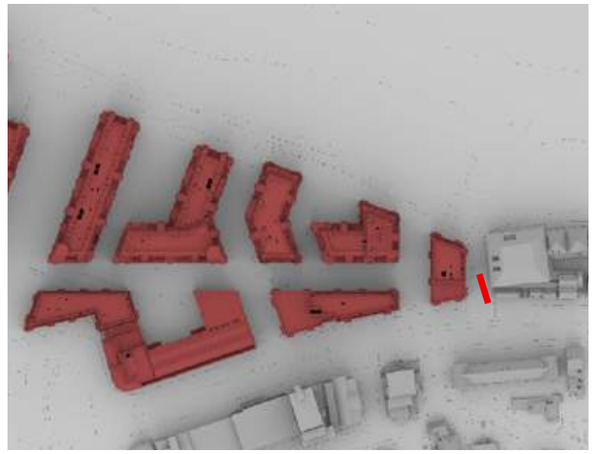
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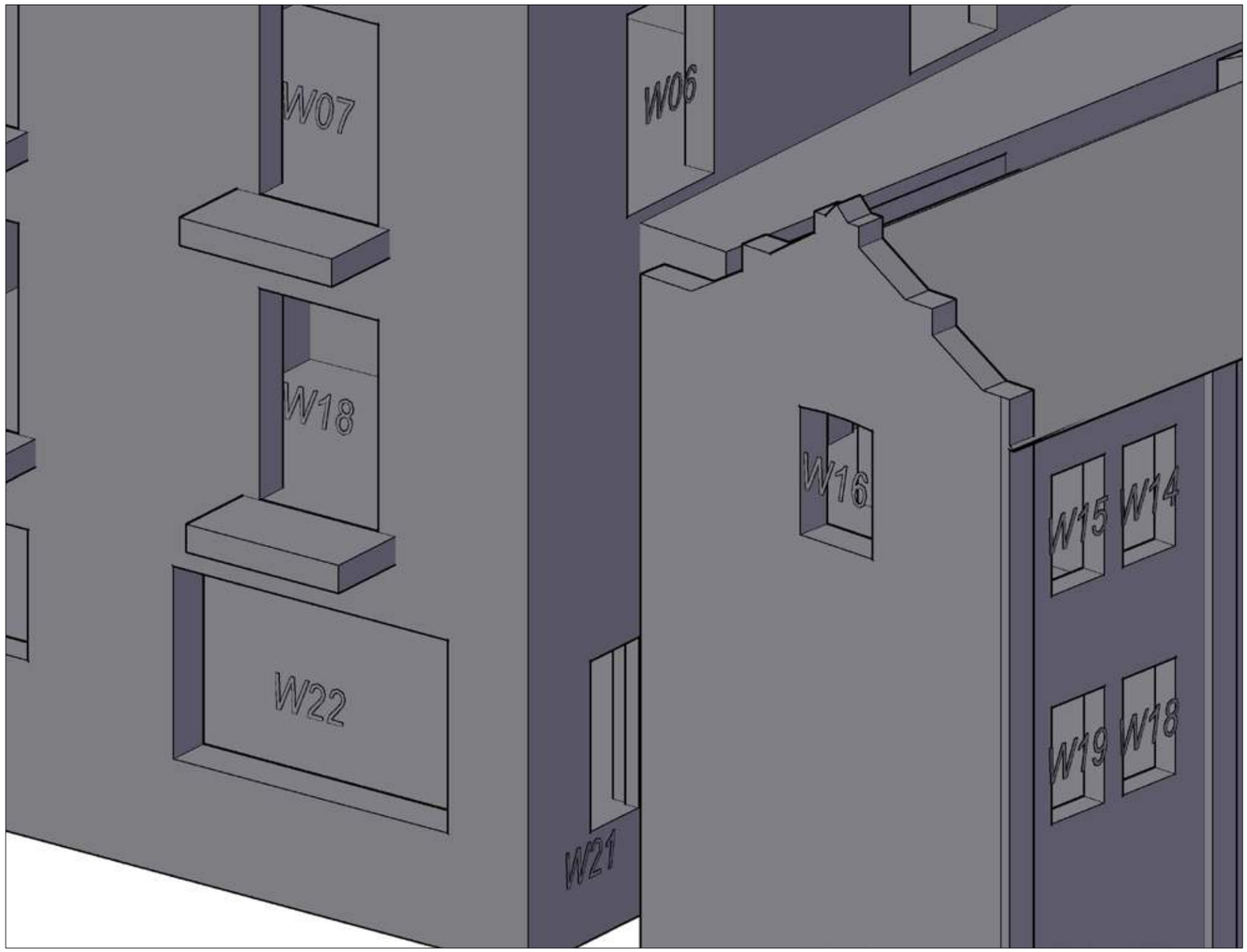
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Appendix B

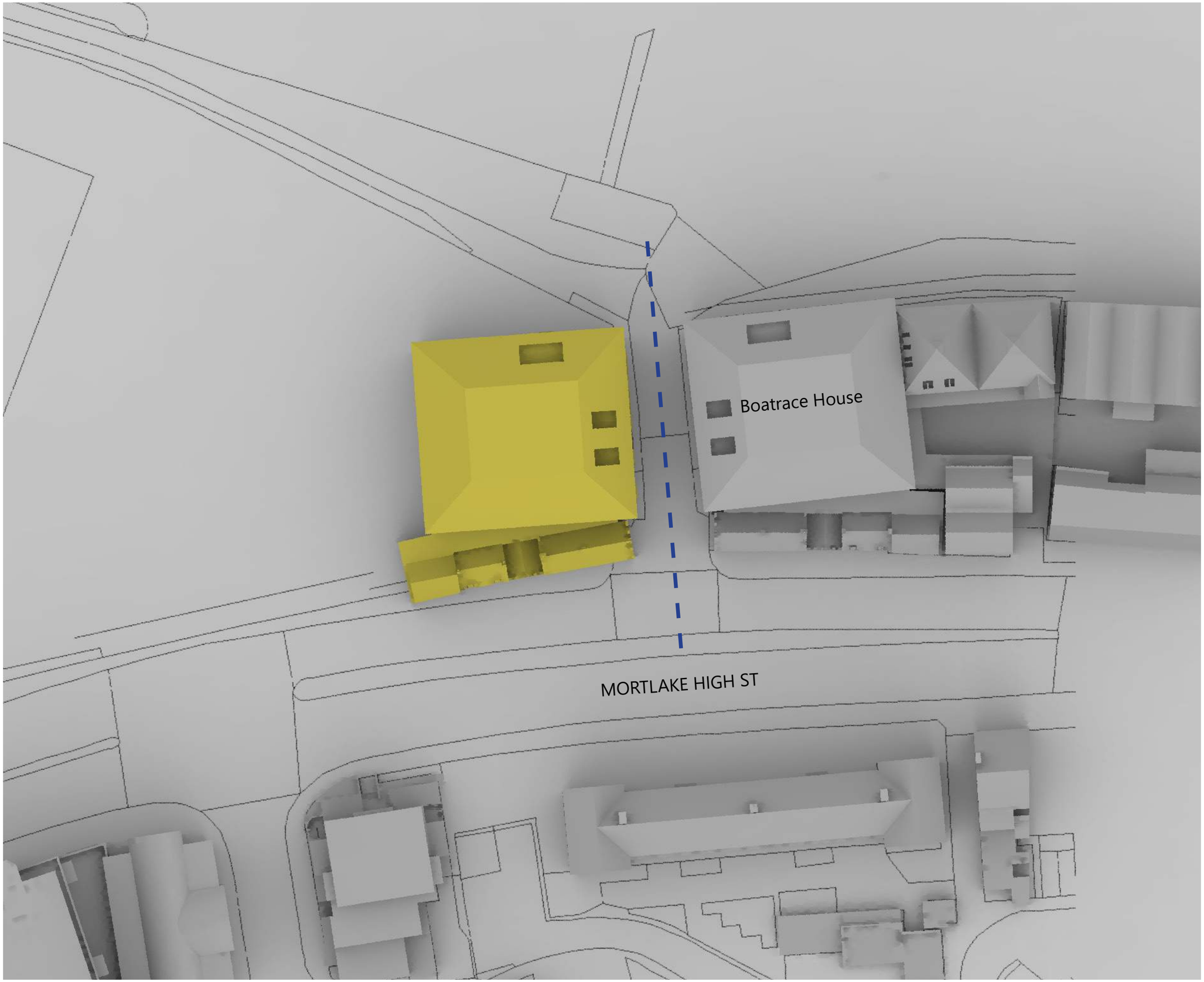
Detailed Results of the Daylight (VSC, NSC and ADF) and Sunlight (APSH) Analysis (Boat Race House only)

Address	Room	Window	Room Use	Existing VSC	Proposed VSC	Loss	Loss %	Room Area	Existing NSC	Proposed NSC	Loss	Loss %	Existing ADF Window	Existing ADF Total	Proposed ADF Window	Proposed ADF Total	Loss	Loss %	Existing APSH Total	Existing APSH Winter	Proposed APSH Total	Proposed APSH Winter	Total Retained	Winter Retained
Boat Race House																								
Ground	R1	W01	Residential	31.8	31.8	0.0	0.1						0.5		0.5				78	20	78	20	1.0	1.0
	R1	W02		31.3	31.3	0.0	0.1	367.3	339.1	339.1	0.0	0.0	0.5	1.0	0.5	1.0	0.0	0.0	78	20	78	20	1.0	1.0
Ground	R4	W11	Residential	30.1	30.1	0.0	0.1						0.2		0.2				74	21	74	21	1.0	1.0
	R4	W12		30.1	30.1	0.0	0.0						0.2		0.2				77	21	77	21	1.0	1.0
	R4	W13		30.1	30.1	0.0	0.1						0.2		0.2				75	21	75	21	1.0	1.0
	R4	W14-L		29.6	29.6	0.0	0.0						0.0		0.0				76	20	76	20	1.0	1.0
		W14-U											0.0		0.0									
	R4	W15		30.5	30.5	0.0	0.0						0.0		0.0				78	22	78	22	1.0	1.0
	R4	W16		30.1	30.1	0.0	0.1						0.2		0.2				73	20	73	20	1.0	1.0
	R4	W17		30.2	30.2	0.0	0.0						0.2		0.2				76	20	76	20	1.0	1.0
	R4	W18		30.3	30.2	0.1	0.2						0.2		0.2				75	21	75	21	1.0	1.0
	R4	W19		30.3	30.3	0.0	0.0	663.0	645.2	645.2	0.0	0.0	0.2	1.6	0.2	1.6	0.0	0.0	78	22	78	22	1.0	1.0
First	R1	W01-L	LKD	0.8	0.8	0.0	0.0						0.0		0.0				N/A	N/A	N/A	N/A	N/A	N/A
		W01-U											0.1		0.1									
	R1	W02-L		1.2	1.2	0.0	0.0						0.0		0.0				N/A	N/A	N/A	N/A	N/A	N/A
		W02-U											0.1		0.1									
	R1	W03-L		33.6	33.6	0.0	0.1						0.0		0.0				82	24	82	24	1.0	1.0
		W03-U											0.4		0.4									
	R1	W04-L		33.4	33.4	0.0	0.1						0.0		0.0				81	23	81	23	1.0	1.0
		W04-U											0.4		0.4									
	R1	W05-L		33.2	33.2	0.0	0.1						0.0		0.0				81	23	81	23	1.0	1.0
		W05-U						500.2	455.5	455.5	0.0	0.0	0.4	1.5	0.4	1.5	0.0	0.0						
First	R2	W06-L	Bedroom	32.1	32.0	0.0	0.1						0.0		0.0				72	22	72	22	1.0	1.0
		W06-U						165.8	110.9	110.9	0.0	0.0	0.6	0.6	0.6	0.6	0.0	0.0						
First	R3	W07-L	Bedroom	32.4	32.3	0.0	0.1						0.0		0.0				80	24	80	24	1.0	1.0
		W07-U						158.8	111.9	111.9	0.0	0.0	0.6	0.6	0.6	0.6	0.0	0.0						
First	R4	W08	Bedroom	31.6	31.6	0.0	0.1						0.8		0.8				78	25	78	25	1.0	1.0
	R4	W09		31.6	31.6	0.0	0.0	145.3	144.3	144.3	0.0	0.0	0.8	1.6	0.8	1.6	0.0	0.0	81	25	81	25	1.0	1.0
First	R5	W10	LKD	31.7	31.6	0.0	0.1						0.6		0.6				78	24	78	24	1.0	1.0
	R5	W11		31.6	31.6	0.0	0.0						0.6		0.6				79	23	79	23	1.0	1.0
	R5	W12		31.6	31.6	0.0	0.1						0.5		0.5				77	24	77	24	1.0	1.0
	R5	W13		31.7	31.7	0.0	0.0	227.2	225.9	225.9	0.0	0.0	0.5	2.2	0.5	2.2	0.0	0.0	80	24	80	24	1.0	1.0
First	R6	W14	Bedroom	31.7	31.7	0.0	0.1						0.5		0.5				79	25	79	25	1.0	1.0
	R6	W15		31.8	31.8	0.0	0.0						0.5		0.5				81	25	81	25	1.0	1.0
	R6	W16		36.4	23.8	12.6	34.6						0.8		0.6				N/A	N/A	N/A	N/A	N/A	N/A
	R6	W17		14.2	7.5	6.7	47.1	197.4	188.0	165.2	22.8	12.1	0.1	1.9	0.1	1.6	0.3	13.3	16	0	8	0	0.5	0.0
First	R7	W18-L	Bedroom	32.9	15.7	17.3	52.5						0.1		0.1				49	14	33	12	0.7	0.9
		W18-U						164.8	157.2	100.2	57.0	36.3	1.4	1.5	0.8	0.9	0.6	41.9						

Address	Room	Window	Room Use	Existing VSC	Proposed VSC	Loss	Loss %	Room Area	Existing NSC	Proposed NSC	Loss	Loss %	Existing ADF Window	Existing ADF Total	Proposed ADF Window	Proposed ADF Total	Loss	Loss %	Existing APSH Total	Existing APSH Winter	Proposed APSH Total	Proposed APSH Winter	Total Retained	Winter Retained
First	R8	W19-L	LKD	33.0	14.3	18.7	56.7						0.1		0.0				47	13	25	9	0.5	0.7
		W19-U						449.7	429.6	46.1	383.5	89.3	0.6	0.7	0.3	0.4	0.3	45.5						
First	R9	W20-L	Bedroom	33.3	14.8	18.5	55.5						0.1		0.1				47	14	22	8	0.5	0.6
		W20-U						228.5	224.7	90.9	133.8	59.6	1.1	1.2	0.6	0.6	0.5	44.4						
First	R10	W21-L	Bedroom	33.8	17.4	16.5	48.7						0.1		0.1				48	14	23	8	0.5	0.6
		W21-U						184.9	128.9	86.6	42.3	32.8	1.3	1.4	0.8	0.8	0.5	39.1						
First	R11	W22-L	LKD	36.6	21.3	15.4	41.9						0.0		0.0				44	13	19	7	0.4	0.5
		W22-U											0.5		0.3									
	R11	W23-L		38.8	38.5	0.4	1.0						0.1		0.1				N/A	N/A	N/A	N/A	N/A	N/A
		W23-U						367.4	322.8	227.1	95.7	29.6	0.8	1.4	0.8	1.3	0.2	12.9						
Second	R1	W01	Bedroom	29.8	29.8	0.0	0.0						1.0		1.0				N/A	N/A	N/A	N/A	N/A	N/A
	R1	W02-L		33.6	33.6	0.0	0.1						0.1		0.1				84	28	84	28	1.0	1.0
		W02-U						253.6	251.8	251.8	0.0	0.0	1.0	2.0	1.0	2.0	0.0	0.0						
Second	R2	W03-L	Bedroom	34.2	34.2	0.0	0.1						0.1		0.1				84	28	84	28	1.0	1.0
		W03-U						242.1	236.0	236.0	0.0	0.0	1.1	1.2	1.1	1.2	0.0	0.0						
Second	R4	W05-L	Bedroom	34.4	34.2	0.2	0.5						0.2		0.2				86	29	85	28	1.0	1.0
		W05-U						134.9	132.8	132.8	0.0	0.0	1.7	1.9	1.7	1.9	0.0	0.2						
Second	R5	W06-L	LKD	34.8	34.4	0.4	1.1						0.1		0.1				86	29	82	27	1.0	0.9
		W06-U											0.9		0.9									
	R5	W07-L		33.7	19.4	14.4	42.6						0.1		0.1				49	15	35	13	0.7	0.9
		W07-U						348.2	347.2	336.2	11.0	3.2	0.8	1.8	0.5	1.5	0.3	16.1						
Second	R6	W08-L	Bedroom	33.8	18.0	15.8	46.8						0.1		0.1				46	13	28	9	0.6	0.7
		W08-U						233.4	219.8	46.3	173.5	78.9	1.0	1.1	0.6	0.7	0.4	36.7						
Second	R7	W09-L	Bedroom	33.4	17.7	15.7	47.0						0.1		0.1				45	13	24	7	0.5	0.5
		W09-U						185.3	181.2	80.1	101.1	55.8	1.1	1.2	0.7	0.8	0.4	36.8						
Second	R8	W10-L	Bedroom	33.8	19.8	14.0	41.5						0.1		0.1				46	14	24	8	0.5	0.6
		W10-U						167.4	118.9	90.0	28.9	24.3	1.3	1.4	0.8	0.9	0.5	32.6						
Second	R9	W11-L	LKD	38.4	38.1	0.3	0.8						0.1		0.1				N/A	N/A	N/A	N/A	N/A	N/A
		W11-U											0.8		0.8									
	R9	W12-L		38.7	38.3	0.4	1.0						0.1		0.1				N/A	N/A	N/A	N/A	N/A	N/A
		W12-U						367.5	300.2	300.2	0.0	0.0	0.8	1.7	0.8	1.7	0.0	0.7						
Third	R1	W01	Bedroom	26.4	26.4	0.0	0.0						0.8		0.8				N/A	N/A	N/A	N/A	N/A	N/A
	R1	W02-L		32.4	32.4	0.0	0.1						0.1		0.1				79	30	79	30	1.0	1.0
		W02-U						257.0	254.8	254.8	0.0	0.0	0.9	1.8	0.9	1.8	0.0	0.0						

Address	Room	Window	Room Use	Existing VSC	Proposed VSC	Loss	Loss %	Room Area	Existing NSC	Proposed NSC	Loss	Loss %	Existing ADF Window	Existing ADF Total	Proposed ADF Window	Proposed ADF Total	Loss	Loss %	Existing APSH Total	Existing APSH Winter	Proposed APSH Total	Proposed APSH Winter	Total Retained	Winter Retained
Third	R2	W03-L	Bedroom	32.2	32.1	0.0	0.1						0.1		0.1				77	30	77	30	1.0	1.0
		W03-U						221.8	218.4	218.4	0.0	0.0	1.0	1.1	1.0	1.1	0.0	0.0						
Third	R4	W05-L	Bedroom	31.6	31.5	0.1	0.3						0.1		0.1				76	29	76	29	1.0	1.0
		W05-U						157.6	138.5	138.5	0.0	0.0	1.2	1.4	1.2	1.4	0.0	0.1						
Third	R5	W06-L	LKD	31.6	31.4	0.2	0.7						0.1		0.1				77	29	75	27	1.0	0.9
		W06-U											0.7		0.7									
	R5	W07-L		33.0	22.7	10.3	31.3						0.1		0.1				40	13	29	11	0.7	0.8
		W07-U						347.6	346.5	335.0	11.5	3.3	0.8	1.7	0.6	1.5	0.2	12.6						
Third	R6	W08-L	Bedroom	33.0	21.3	11.7	35.5						0.1		0.1				39	12	26	10	0.7	0.8
		W08-U						186.0	179.7	81.7	98.0	54.5	1.2	1.3	0.9	1.0	0.4	27.8						
Third	R7	W09-L	Bedroom	32.0	20.2	11.9	37.1						0.1		0.1				39	12	23	8	0.6	0.7
		W09-U						178.1	169.7	100.4	69.3	40.9	1.1	1.2	0.8	0.9	0.4	29.0						
Third	R8	W10-L	Bedroom	32.1	21.5	10.7	33.2						0.1		0.1				39	12	22	6	0.6	0.5
		W10-U						171.7	123.2	106.0	17.2	14.0	1.2	1.3	0.9	1.0	0.3	26.0						
Third	R9	W11-L	LKD	33.7	33.3	0.3	0.9						0.1		0.1				N/A	N/A	N/A	N/A	N/A	N/A
		W11-U											0.7		0.6									
	R9	W12-L		33.5	33.2	0.2	0.7						0.1		0.1				N/A	N/A	N/A	N/A	N/A	N/A
		W12-U						367.2	299.6	299.6	0.0	0.0	0.6	1.4	0.6	1.4	0.0	0.5						
Fourth	R1	W01-L	Bedroom	25.8	22.1	3.7	14.4						0.1		0.1				26	2	21	1	0.8	0.5
		W01-U						311.0	291.8	205.5	86.3	29.6	0.8	0.9	0.7	0.8	0.1	9.3						
Fourth	R2	W02-L	Bedroom	25.6	21.4	4.2	16.5						0.1		0.1				28	2	23	0	0.8	0.0
		W02-U						214.5	195.4	195.2	0.2	0.1	1.1	1.2	1.0	1.1	0.1	10.4						
Fourth	R3	W03-L	LKD	38.8	38.8	0.0	0.0						0.1		0.1				N/A	N/A	N/A	N/A	N/A	N/A
		W03-U						730.8	713.9	713.9	0.0	0.0	1.6	1.7	1.6	1.7	0.0	0.1						

Detailed Mirror Baseline Results of the Daylight (VSC, NSC and ADF) and Sunlight (APSH) Analysis (Boat Race House only)



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4th Floor, Holborn Tower
137-144 High Holborn
London WC1V 6PL
T: +44(0)20 7148 6290
E: info@eb7.co.uk
W: eb7.co.uk

Sources of information

See appendix 1

Key:

Mirrored

NORTH

Project	The Stag Brewery SW14 7ET London		
Title	Mirrored baseline Plan View		
Drawn	DB	Checked	--
Date	02/05/2019	Project	2201
Rel no.	01	Prefix	DS03
Page no.	01		



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4th Floor, Holborn Tower
137-144 High Holborn
London WC1V 6PL
T: +44(0)20 7148 6290
E: info@eb7.co.uk
W: eb7.co.uk

Sources of information

See appendix 1

Key:

Mirrored

Notes:
All heights and dimensions are in AOD

Project	The Stag Brewery SW14 7ET London
Title	Mirrored baseline 3D View

Drawn	DB	Checked	--
Date	02/05/2019	Project	2201

Rel no.	Prefix	Page no.
01	DS03	02

Address	Room	Window	Room Use	Mirror VSC	Proposed VSC	Loss	Loss %	Room Area	Mirror NSC	Proposed NSC	Loss	Loss %	Mirror ADF Window	Mirror ADF Total	Proposed ADF Window	Proposed ADF Total	Loss	Loss %	Mirror APSH Total	Mirror APSH Winter	Proposed APSH Total	Proposed APSH Winter	Total Retained	Winter Retained
Boatrace House																								
Ground	R1	W01	Residential	31.8	31.8	0.1	0.2						0.5		0.5				78	20	78	20	1.0	1.0
	R1	W02		31.3	31.3	0.1	0.2	367.3	339.1	339.1	0.0	0.0	0.5	1.0	0.5	1.0	0.0	0.0	78	20	78	20	1.0	1.0
Ground	R4	W11	Residential	30.1	30.1	0.0	0.1						0.2		0.2				74	21	74	21	1.0	1.0
	R4	W12		30.1	30.1	0.0	0.0						0.2		0.2				77	21	77	21	1.0	1.0
	R4	W13		30.1	30.1	0.0	0.1						0.2		0.2				75	21	75	21	1.0	1.0
	R4	W14-L		29.6	29.6	0.0	0.1						0.0		0.0				76	20	76	20	1.0	1.0
		W14-U											0.0		0.0									
	R4	W15		30.5	30.5	0.0	0.0						0.0		0.0				78	22	78	22	1.0	1.0
	R4	W16		30.1	30.1	0.0	0.1						0.2		0.2				73	20	73	20	1.0	1.0
	R4	W17		30.2	30.2	0.0	0.1						0.2		0.2				76	20	76	20	1.0	1.0
	R4	W18		30.3	30.2	0.1	0.2						0.2		0.2				75	21	75	21	1.0	1.0
	R4	W19		30.3	30.3	0.0	0.1	663.0	645.2	645.2	0.0	0.0	0.2	1.6	0.2	1.6	0.0	0.0	78	22	78	22	1.0	1.0
First	R1	W01-L	LKD	0.8	0.8	0.0	0.0						0.0		0.0				N/A	N/A	N/A	N/A	N/A	N/A
		W01-U											0.1		0.1									
	R1	W02-L		1.2	1.2	0.0	0.0						0.0		0.0				N/A	N/A	N/A	N/A	N/A	N/A
		W02-U											0.1		0.1									
	R1	W03-L		33.7	33.6	0.0	0.1						0.0		0.0				82	24	82	24	1.0	1.0
		W03-U											0.4		0.4									
	R1	W04-L		33.4	33.4	0.0	0.1						0.0		0.0				81	23	81	23	1.0	1.0
		W04-U											0.4		0.4									
	R1	W05-L		33.2	33.2	0.0	0.2						0.0		0.0				81	23	81	23	1.0	1.0
		W05-U						500.2	455.5	455.5	0.0	0.0	0.4	1.5	0.4	1.5	0.0	0.0						
First	R2	W06-L	Bedroom	32.1	32.0	0.0	0.1						0.0		0.0				72	22	72	22	1.0	1.0
		W06-U						165.8	110.9	110.9	0.0	0.0	0.6	0.6	0.6	0.6	0.0	0.0						
First	R3	W07-L	Bedroom	32.4	32.3	0.0	0.1						0.0		0.0				79	23	79	23	1.0	1.0
		W07-U						158.8	111.9	111.9	0.0	0.0	0.6	0.6	0.6	0.6	0.0	0.0						
First	R4	W08	Bedroom	31.6	31.6	0.0	0.1						0.8		0.8				78	25	78	25	1.0	1.0
	R4	W09		31.6	31.6	0.0	0.0	145.3	144.3	144.3	0.0	0.0	0.8	1.6	0.8	1.6	0.0	0.0	81	25	81	25	1.0	1.0
First	R5	W10	LKD	31.6	31.6	0.0	0.1						0.6		0.6				78	24	78	24	1.0	1.0
	R5	W11		31.6	31.6	0.0	0.1						0.6		0.6				79	23	79	23	1.0	1.0
	R5	W12		31.6	31.6	0.0	0.1						0.5		0.5				77	24	77	24	1.0	1.0
	R5	W13		31.7	31.7	0.0	0.0	227.2	225.9	225.9	0.0	0.0	0.5	2.2	0.5	2.2	0.0	0.0	80	24	80	24	1.0	1.0
First	R6	W14	Bedroom	31.7	31.7	0.0	0.1						0.5		0.5				79	25	79	25	1.0	1.0
	R6	W15		31.8	31.8	0.0	0.0						0.5		0.5				81	25	81	25	1.0	1.0
	R6	W16		27.5	23.8	3.7	13.5						0.6		0.6				N/A	N/A	N/A	N/A	N/A	N/A
	R6	W17		10.4	7.5	2.9	27.9	197.4	176.4	165.2	11.3	6.4	0.1	1.7	0.1	1.6	0.1	4.4	10	0	8	0	0.8	0.0
First	R7	W18-L	Bedroom	19.1	15.7	3.4	18.0						0.1		0.1				37	13	33	12	0.9	0.9
		W18-U						164.8	121.3	100.2	21.1	17.4	1.0	1.0	0.8	0.9	0.1	13.9						

Address	Room	Window	Room Use	Mirror VSC	Proposed VSC	Loss	Loss %	Room Area	Mirror NSC	Proposed NSC	Loss	Loss %	Mirror ADF Window	Mirror ADF Total	Proposed ADF Window	Proposed ADF Total	Loss	Loss %	Mirror APSH Total	Mirror APSH Winter	Proposed APSH Total	Proposed APSH Winter	Total Retained	Winter Retained
First	R8	W19-L	LKD	16.2	14.3	1.9	11.6						0.0		0.0				29	11	25	9	0.9	0.8
		W19-U						449.7	58.6	46.1	12.6	21.4	0.4	0.4	0.3	0.4	0.0	9.7						
First	R9	W20-L	Bedroom	15.4	14.8	0.6	3.8						0.1		0.1				25	9	22	8	0.9	0.9
		W20-U						228.5	69.0	90.9	-21.9	-31.7	0.6	0.7	0.6	0.6	0.0	4.3						
First	R10	W21-L	Bedroom	17.1	17.4	-0.3	-1.8						0.1		0.1				25	8	23	8	0.9	1.0
		W21-U						184.9	72.7	86.6	-13.9	-19.1	0.8	0.8	0.8	0.8	0.0	0.5						
First	R11	W22-L	LKD	21.9	21.3	0.6	2.7						0.0		0.0				22	6	19	7	0.9	1.2
		W22-U											0.3		0.3									
	R11	W23-L		38.9	38.5	0.4	1.1						0.1		0.1				N/A	N/A	N/A	N/A	N/A	N/A
		W23-U						367.4	233.4	227.1	6.3	2.7	0.8	1.3	0.8	1.3	0.0	1.4						
Second	R1	W01	Bedroom	29.8	29.8	0.0	0.0						1.0		1.0				N/A	N/A	N/A	N/A	N/A	N/A
	R1	W02-L		33.6	33.6	0.0	0.1						0.1		0.1				84	28	84	28	1.0	1.0
		W02-U						253.6	251.8	251.8	0.0	0.0	1.0	2.0	1.0	2.0	0.0	0.0						
Second	R2	W03-L	Bedroom	34.2	34.1	0.0	0.1						0.1		0.1				84	28	84	28	1.0	1.0
		W03-U						242.1	236.0	236.0	0.0	0.0	1.1	1.2	1.1	1.2	0.0	0.0						
Second	R4	W05-L	Bedroom	34.4	34.2	0.2	0.5						0.2		0.2				86	29	85	28	1.0	1.0
		W05-U						134.9	132.8	132.8	0.0	0.0	1.7	1.9	1.7	1.9	0.0	0.2						
Second	R5	W06-L	LKD	34.7	34.4	0.4	1.0						0.1		0.1				86	29	82	27	1.0	0.9
		W06-U											0.9		0.9									
	R5	W07-L		24.3	19.4	4.9	20.3						0.1		0.1				40	15	35	13	0.9	0.9
		W07-U						348.2	336.7	336.2	0.5	0.1	0.6	1.6	0.5	1.5	0.1	6.5						
Second	R6	W08-L	Bedroom	22.3	18.0	4.3	19.3						0.1		0.1				33	11	28	9	0.8	0.8
		W08-U						233.4	70.3	46.3	24.0	34.1	0.7	0.8	0.6	0.7	0.1	14.0						
Second	R7	W09-L	Bedroom	21.3	17.7	3.6	17.0						0.1		0.1				30	9	24	7	0.8	0.8
		W09-U						185.3	87.9	80.1	7.8	8.9	0.8	0.9	0.7	0.8	0.1	12.5						
Second	R8	W10-L	Bedroom	22.5	19.8	2.7	12.0						0.1		0.1				29	8	24	8	0.8	1.0
		W10-U						167.4	84.8	90.0	-5.2	-6.1	0.9	1.0	0.8	0.9	0.1	9.1						
Second	R9	W11-L	LKD	38.5	38.1	0.4	1.0						0.1		0.1				N/A	N/A	N/A	N/A	N/A	N/A
		W11-U											0.8		0.8									
	R9	W12-L		38.8	38.3	0.4	1.1						0.1		0.1				N/A	N/A	N/A	N/A	N/A	N/A
		W12-U						367.5	300.2	300.2	0.0	0.0	0.8	1.7	0.8	1.7	0.0	0.8						
Third	R1	W01	Bedroom	26.4	26.4	0.0	0.0						0.8		0.8				N/A	N/A	N/A	N/A	N/A	N/A
	R1	W02-L		32.4	32.4	0.0	0.1						0.1		0.1				79	30	79	30	1.0	1.0
		W02-U						257.0	254.8	254.8	0.0	0.0	0.9	1.8	0.9	1.8	0.0	0.0						

Address	Room	Window	Room Use	Mirror VSC	Proposed VSC	Loss	Loss %	Room Area	Mirror NSC	Proposed NSC	Loss	Loss %	Mirror ADF Window	Mirror ADF Total	Proposed ADF Window	Proposed ADF Total	Loss	Loss %	Mirror APSH Total	Mirror APSH Winter	Proposed APSH Total	Proposed APSH Winter	Total Retained	Winter Retained
Third	R2	W03-L	Bedroom	32.1	32.1	0.0	0.1						0.1		0.1				77	30	77	30	1.0	1.0
		W03-U						221.8	218.4	218.4	0.0	0.0	1.0	1.1	1.0	1.1	0.0	0.0						
Third	R4	W05-L	Bedroom	31.6	31.5	0.1	0.3						0.1		0.1				76	29	76	29	1.0	1.0
		W05-U						157.6	138.5	138.5	0.0	0.0	1.2	1.4	1.2	1.4	0.0	0.1						
Third	R5	W06-L	LKD	31.6	31.4	0.2	0.7						0.1		0.1				77	29	75	27	1.0	0.9
		W06-U											0.7		0.7									
	R5	W07-L		27.6	22.7	4.9	17.8						0.1		0.1				35	13	29	11	0.8	0.8
		W07-U						347.6	336.5	335.0	1.6	0.5	0.7	1.6	0.6	1.5	0.1	6.6						
Third	R6	W08-L	Bedroom	26.4	21.3	5.1	19.2						0.1		0.1				32	10	26	10	0.8	1.0
		W08-U						186.0	135.3	81.7	53.6	39.6	1.0	1.1	0.9	1.0	0.2	14.7						
Third	R7	W09-L	Bedroom	25.0	20.2	4.8	19.2						0.1		0.1				31	10	23	8	0.7	0.8
		W09-U						178.1	148.6	100.4	48.2	32.4	0.9	1.0	0.8	0.9	0.2	14.8						
Third	R8	W10-L	Bedroom	25.6	21.5	4.1	16.0						0.1		0.1				30	9	22	6	0.7	0.7
		W10-U						171.7	123.2	106.0	17.2	14.0	1.0	1.1	0.9	1.0	0.1	12.6						
Third	R9	W11-L	LKD	33.7	33.3	0.3	1.0						0.1		0.1				N/A	N/A	N/A	N/A	N/A	N/A
		W11-U											0.7		0.6									
	R9	W12-L		33.5	33.2	0.3	0.9						0.1		0.1				N/A	N/A	N/A	N/A	N/A	N/A
		W12-U						367.2	299.6	299.6	0.0	0.0	0.6	1.4	0.6	1.4	0.0	0.6						
Fourth	R1	W01-L	Bedroom	24.6	22.1	2.6	10.4						0.1		0.1				26	2	21	1	0.8	0.5
		W01-U						311.0	291.8	205.5	86.3	29.6	0.8	0.8	0.7	0.8	0.1	7.0						
Fourth	R2	W02-L	Bedroom	24.2	21.4	2.8	11.7						0.1		0.1				27	1	23	0	0.9	0.0
		W02-U						214.5	195.4	195.2	0.2	0.1	1.1	1.2	1.0	1.1	0.1	7.6						
Fourth	R3	W03-L	LKD	38.8	38.8	0.0	0.0						0.1		0.1				N/A	N/A	N/A	N/A	N/A	N/A
		W03-U						730.8	713.9	713.9	0.0	0.0	1.6	1.7	1.6	1.7	0.0	0.1						

UK and Ireland Office Locations

