From:

Sent: 22 April 2024 14:01

To:

Cc:

Subject:

RE: Mitcham Gasworks - Amended application submission pack

Attachments: 13. Mitcham Gasworks Site_GLA CE Memo_Stage 2_19.04.24.xlsx; Mitcham Gasworks (Post Stage

1 set 5) GLA Consultation - Energy Memo 19.04.24.xlsx; 10. Mitcham Gas Works_GLA WLC

Memo 19.04.24.xlsx



I have received responses from colleagues on energy, WLC and CE.

Energy – all matters resolved. GLA officers support the proposed condition for PV.

<u>WLC</u> - No further comments and no further actions are required by the applicant at the planning stage - all previous queries have been responded to, as confirmed in the attached memo.

A condition should be secured requiring the applicant to submit a post-construction assessment to report on the development's actual WLC emissions. The template and suggested condition wording are available on the GLA website (https://www.london.gov.uk/programmes-strategies/planning/implementing-london-plan/london-planguidance/whole-life-cycle-carbon-assessments-guidance).

<u>CE</u> - There is one key point remaining relating to the reused and recycled content calculation. The total material reported in the calculation provided differs from the Bill of Materials reported. Where it is noted that the reused and recycled content calculated does not demonstrate compliance with the GLA Policy target for a minimum of 20% reused and/or recycled content at the current stage. The Applicant is strongly encouraged to set out key opportunities which will be explored through detailed design to address this.

Please let me know if you have any questions.

Kind regards,

Senior Strategic Planner – Development Management GREATER**LONDON**AUTHORITY 169 Union Street, London SE1 0LL

london.gov.uk

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london.gov.uk

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From: wsp.com>
Sent: Friday, April 5, 2024 2:01 PM
To: london.gov.uk>; wsp.com>
Cc: service berkeleygroup.co.uk>; merton.gov.uk>

Subject: RE: Mitcham Gasworks - Amended application submission pack

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Hi Marian Caracteria de la companya
Thanks for the comments on energy, WLC and CE in your email below. I attach the various updated spreadsheets: □. Energy Memo □. Carbon emission reporting spreadsheet □. CE Memo □. CE Spreadsheet
□. WLC Memo
□. WLC spreadsheet
Let us know if these matters are now agreed or if there are any other comments.
We have today submitted an updated package of documents to Merton. These are largely the same as the package of documents that were submitted in December 2023. We are re-submitting these as a whole to allow Merton to go out to public consultation on these. There have been a few additional minor amendments since December 2023, the most notable of which are: □. The removal of the central pressure reduction system and replacement with landscaping (which addresses one of the design comments that the GLA had in its Stage 1 report about relationship between the PRS and ground floor residential units). □. The relocation of some of the ground floor residential units to move them further away from servicing bays.
The addition of two more servicing bays within the site.Improvements to servicing routes within the site for the non-residential units.
 Improvements to servicing routes within the site for the hori-residential units. The commitment to a contribution to provide off-site ecology compensation in the form of restoration of acid grassland on Mitcham Common.
All the other key changes that you are aware of from the December 2023 submission remain the same, such as the increase to 79% dual aspect homes, the reduction in total homes to 579, and the introduction of setbacks along Portland Road and Hay Drive to reduce the perception of scale on these boundaries.
The link below contains all the updated and amended applications documents and drawings. Let me know if you have any trouble accessing these or have any queries on the amendments. https://we.tl/t-FOKIOKUefB

An image showing the ground floor layout with the removal of the central pressure reduction system is shown below for reference.

{Remainder of email chain duplicates in separate email chain]

From:

Sent: To:

Subject:

RE: 2023/0107/S1 - Mitcham Gasworks

16 March 2023 10:22

Thanks The report and letter will be with you by Tuesday morning at the latest.

Kind regards,

Strategic Planner – Development Management GREATERLONDONAUTHORITY 169 Union Street, London SE1 0LL

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From: berkeleygroup.co.uk>

Sent: 16 March 2023 10:12

To: Indon.gov.uk>
Subject: RE: 2023/0107/S1 - Mitcham Gasworks

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Hi

Understood.

Let's wait for the issue of the Stage 1 and we can discus next steps after that, along with a meeting with our architects and if required.

Kind regards,

Senior Development Manager Berkeley Ventures

Berkeley Ventures

21b Albert Embankment SE1 7GR

St William Homes LLP – Registered in England and Wales Number OC396332
Registered Office - Berkeley House, 19 Portsmouth Road, Cobham, Surrey, KT11 1JG
This email including attachments is confidential, may be covered by legal professional privilege and is intended for the addressee only.

Sent: 15 March 2023 14:59

Subject: RE: 2023/0107/S1 - Mitcham Gasworks

london.gov.uk>. Please be careful opening This message was sent from london.gov.uk < attachments or clicking links and report any suspicious emails to securitythreats@berkeleygroup.co.uk

email is london.gov.uk if you need to send the VuCity model on. so would not be available for a call before the Mayor's meeting.

I can't share the Stage 1 report until it is discussed with the Mayor. Like I said, we broadly support the development layout and massing strategy, but have identified some smaller issues. We can resolve these after the Stage 1 report has been issued in consultation with the LPA.

Kind regards,

Strategic Planner – Development Management GREATER**LONDON**AUTHORITY 169 Union Street, London SE1 0LL london.gov.uk

london.gov.uk

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berkeleygroup.co.uk> From:

Sent: 15 March 2023 14:28

london.gov.uk> To: Subject: RE: 2023/0107/S1 - Mitcham Gasworks

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Can you send me the GLA officer's email please so I can pass on?

Our architect has informed me that to share the job it needs to be through the viewer.

Thanks

Senior Development Manager **Berkeley Ventures**

Berkeley Ventures 21b Albert Embankment SE1 7GR This email including attachments is confidential, may be covered by legal professional privilege and is intended for the addressee only.

From:

Sent: 15 March 2023 14:18



I've requested the VuCity and I'm hoping it will be across shortly from the architects.

We currently still have availability tomorrow afternoon, if you're colleague is free to run through once they have had chance to review.

Are you able to share a draft of the stage 1, so we can understand areas we may need to start looking at?

Kind regards,

Senior Development Manager Berkeley Ventures

Berkeley Ventures

21b Albert Embankment SE1 7GR

St William Homes LLP – Registered in England and Wales Number OC396332
Registered Office - Berkeley House, 19 Portsmouth Road, Cobham, Surrey, KT11 1JG
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From: < <u>london.gov.uk</u>>

Sent: 15 March 2023 12:12

To: berkeleygroup.co.uk>

Subject: RE: 2023/0107/S1 - Mitcham Gasworks

This message was sent from a london.gov.uk | l

Hi

Can you please provide that to us? I spoke with the urban designer and she said she would like to review before discussing further.

The case is on the agenda for the Mayor's meeting on Monday and the draft report has been signed off by managers. We will continue our engagement with you and the LPA after the Stage 1 report is issued so as and when we resolve matters we could provide correspondence to that effect. It may not be necessary to amend the plans, for instance, if you have provided sufficient justification / further information which we have had time to review.

Kind regards,

Strategic Planner – Development Management GREATERLONDONAUTHORITY 169 Union Street, London SE1 0LL london.gov.uk



london.gov.uk

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From: < <u>berkeleygroup.co.uk</u>>

Sent: 15 March 2023 11:41

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Hi

Yes we have a VuCity model that we can use.

Are you still meeting with the Mayor on Monday?

Kind regards,

Senior Develop

Senior Development Manager Berkeley Ventures

Berkeley Ventures

21b Albert Embankment SE1 7GR

St William Homes LLP - Registered in England and Wales Number OC396332

Registered Office - Berkeley House, 19 Portsmouth Road, Cobham, Surrey, KT11 1JG

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From: < london.gov.uk>

Sent: 15 March 2023 09:36

To: <u>berkeleygroup.co.uk</u>>

Subject: RE: 2023/0107/S1 - Mitcham Gasworks

This message was sent from a london.gov.uk | l

Hi

I am just trying to see if I can arrange a chat. Did you happen to have a VuCity model for this proposal?

Kind regards,

Strategic Planner – Development Management GREATERLONDONAUTHORITY 169 Union Street, London SE1 0LL london.gov.uk



london.gov.uk

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From: < <u>berkeleygroup.co.uk</u>>

Sent: 14 March 2023 17:38

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Have tried calling a couple of times but it's good to know that you are broadly in support of the proposals.

Can I please request a short design meeting ahead of the finalisation of the Stage 1? Thursday afternoon would work well.

Given the change in personnel and also the large amount of redesign following the previous GLA meeting, it would be helpful to discuss any more detailed points before it is issued. For example, at pre-app with LBM they have suggested 5 storeys along Portland Road is appropriate but it appears there may be concerns over this relationship from the GLA.

We are targeting a June 15 committee and understand that LBM are looking for the GLA feedback to move the application forward.

Appreciate you mentioned the GLAs design comments may be more strategic and high level but conscious of any comments that may contradict what LBM are saying and lead to a delay in making the June committee.

On my mobile if you want to discuss initially.

Kind regards,

Senior Development Manager Berkeley Ventures

Berkeley Ventures

21b Albert Embankment SE1 7GR

St William Homes LLP – Registered in England and Wales Number OC396332
Registered Office - Berkeley House, 19 Portsmouth Road, Cobham, Surrey, KT11 1JG

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From: < london.gov.uk>

Sent: 09 March 2023 12:02

 To:

 berkeleygroup.co.uk>

 Cc:
 wsp.com>;

 wsp.com>

Subject: RE: 2023/0107/S1 - Mitcham Gasworks



I have spoken with urban design colleagues and we are broadly supportive of the development layout and massing strategy.

Some comments have been provided on the north perimeter blocks and their relationship with the low-rise homes opposite, residential quality, variation in architecture and materiality, and public realm works. It is unclear what will be included in the Stage 1 report at this stage as it needs to go through the sign off process and discussed with the Mayor.

Kind regards,

Strategic Planner – Development Management GREATERLONDONAUTHORITY 169 Union Street, London SE1 0LL london.gov.uk

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Thank you for sending across.

Have you heard back from your colleagues, notably design, in preparation for the Stage 1 report?

Was there anything worth picking up or discussing to assist?

Kind regards,

Senior Development Manager Berkeley Ventures

Berkeley Ventures

21b Albert Embankment SE1 7GR

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Hi all,

Please see attached GLA assessment of the footnote 59 information confirming the 35% affordable housing threshold is accepted.

Please let me know if you have any questions.

Kind regards,

Strategic Planner – Development Management
GREATERLONDONAUTHORITY
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079

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NHS health information and advice about coronavirus can be found at nhs.uk/coronavirus

The GLA stands against racism. Black Lives Matter.

Response to financial viability information

GLA Case Number: 2023 - 0107

Scheme Address: Mitcham Gas Works

Applicant: St William Homes LLP

Local Planning Authority: LB Merton

Date: 8th March 2023

Prepared by:

1. Introduction

- 1.1 This document represents the position of the Greater London Authority's Viability Team in relation to the following viability submission made in relation to the planning application on this site:
 - Exceptional Enabling / Abnormal Costs Summary Note ("Applicant Report")
 prepared by St William, dated January 2023.
- 1.2 The above referenced document has been prepared to demonstrate that an affordable housing threshold of 35% can apply in respect of this site. The London Plan (footnote 59) supports that this level of threshold can be applied where it can be robustly demonstrated that extraordinary decontamination, enabling or remediation costs must be incurred to bring a surplus utilities site forward for development. The relevant part of footnote 59 states:
 - ...it is recognised that some surplus utilities sites are subject to substantial decontamination, enabling and remediation costs. If it is robustly demonstrated that extraordinary decontamination, enabling or remediation costs must be incurred to bring a surplus utilities site forward for development, then a 35 percent affordable housing threshold could be applied, subject to detailed evidence, including viability evidence, being made available.
- 1.3 This report has been prepared to advise the GLA's Development Management Team and the Mayor of London and is also provided onto the LPA and applicant. Relevant professional guidance has been taken into account.
- 1.4 This document covers the following (where appropriate):
 - Proposed development and affordable housing.
 - Site and context.
 - Assessment of viability in Applicant Report.
 - Appraisal results and GLA Viability Team conclusion.
 - Appendix 1: Photographs and plans.

2. Proposed development and affordable housing

GLA Viability Team 2

2.1 This is a surplus National Grid utilities site on which a comprehensive residential-led mixed use development is proposed. The Applicant (St William Homes LLP) is a joint venture between the Berkeley Group and National Grid Property Holdings Ltd with the objective of bringing forward gasworks sites for residential development.

- 2.2 The proposed scheme is described as follows:
 - "Full planning application for the erection of new buildings to provide residential accommodation (Class C3) and flexible commercial/community space (Class E and/or Class F2), with associated access, parking and landscaping arrangements, including the demolition of the existing telecommunications mast and re-provision of new telecommunications mast."
- 2.3 The Planning Statement for the scheme describes that the site could deliver circa 595 new homes, 35% of which will be affordable housing comprising a policy compliant split of social rented units and shared ownership units (70:30 tenure split). Ten buildings are proposed ranging from five up to nine storeys. A small amount of flexible commercial floorspace (3,907 sq. ft) is also proposed.

3. Site and context

- 3.1 The site is 2.43 hectares (6 acres) and is located within the Lavender Fields Ward in Mitcham which is in the London Borough of Merton.
- 3.2 The gasworks was originally formed in 1849 and held a dual function for gas production and storage. Some of the gasworks infrastructure has already been rationalised in preparation for the site coming forward for development. The Pressure Reduction System has been consolidated to a below ground compound with gas mains also relocated. Demolition of the final above-ground gasholder structure was undertaken from June 2021 to January 2022.
- 3.3 A large portion of the south of the site was remediated in 2010/11. The works involved service investigation, demolition of the former boiler house and removal of the sources of highest contamination. The extent of in-ground obstructions on the site is expected to be considerable and may include the remnants of gas purifier tanks, oil stores, tar tanks concrete slabs and foundations. The above ground element of the gasholder walls in the north of the site still need to be removed, whilst the walls of the other gasholders will need to be broken out below ground to facilitate development. However, the tanks will be left in-situ due to their depth and will require specialist piling strategies to accommodate construction above.
- 3.4 The 2010/11 remediation works improved the position to a secure vacant land use. However, further extensive remediation is required to bring the site forward for residential use. The remediation strategy will involve the removal and treatment of contaminated hotspots and the off-site disposal of grossly impacted hazardous materials, as well as in-situ groundwater remediation. The ground water levels and the proximity to sensitive receptors mean that ongoing groundwater clean-up and monitoring will be required. It is understood that the applicant has engaged with the Local Planning Authority's Contaminated Land Officer and the Environmental Agency and that a strategy for remediating the site will be agreed.
- 3.5 It is understood that other abnormal works will be required to facilitate residential development on the site. The existing Pressure Reduction System contains outdated equipment and generates excessive noise. Noise mitigation measures are being progressed which may include the replacement of a high proportion of the existing equipment. The site also currently

- provides a large telecommunications mast which will be relocated to a new roof top installation within the proposed development.
- 3.6 The abnormal activity costs for Mitcham Gasworks are estimated at c£13.2m. A detailed schedule setting out the specific works and associated costs is attached as Appendix 3 to the Applicant Report. Whilst these costs are largely specialised, the schedule provided is considered to be appropriate to fulfil the purpose of this report.

4. Assessment of viability in Applicant Report

- 4.1 The Applicant report compares the viability of two scenarios; one assuming that remediation works and abnormal costs will be required to deliver the scheme and another that assumes these works/costs do not need to be incurred (and is therefore more typical Brownfield land). The principle of this approach is that it seeks to demonstrate that extraordinary decontamination, enabling or remediation costs must be incurred to bring the site forward for redevelopment. This methodology is accepted as appropriate for the purposes of this exercise.
- 4.2 The appraisal assumptions and their basis are set out in Appendix 4 of the Applicant Report. Key appraisal inputs/assumptions that apply to both appraised scenarios are set out in the table below:

Input	Allowance Adopted
Market Tenure Residential Value	£629 per sq. ft
Social Rent Value	£229.58 per sq. ft
Intermediate Value	£437.89 per sq. ft
Car Parking	£25,000 per parking space
Construction Cost	£329.37 per sq. ft +15% external costs
Allowance for CIL/S106	£7.25m
Professional Fees	10% of construction costs
Finance Rate	7%
Combined Allowance for Sales and Marketing Costs	4.5% of GDV

- 4.3 The principal differences in inputs/assumptions between the two appraised scenarios are:
 - The inclusion of £13,177,751 of abnormal costs in the scenario that assumes remediation works and abnormal costs will be required to deliver the scheme.
 - An elongated development programme for the scenario that assumes remediation works and abnormal costs will be required. This appraisal assumes a start on site 5 years prior to the grant of planning permission and consequently incurs additional finance costs.
 - Different Benchmark Land Values for the scenarios: £3m for the scenario that assumes remediation works and abnormal costs will be required and c£9m for the scenario assuming no remediation or abnormal costs will need to be incurred to deliver the scheme.

5. Appraisal results and GLA Viability Team conclusion

5.1 The appraisal outputs of each scenario tested are set out in the table below:

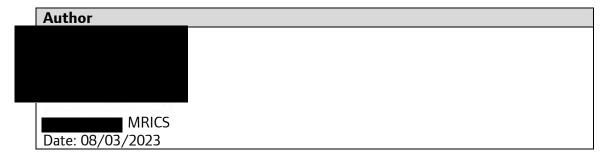
	_	Scenario: Assumes remediation/abnormal costs are required to deliver scheme
Profit £	-£4,220,262	-£19,937,577
Profit: % of Gross Development Value	-1.95%	-9.21%

- 5.2 Whilst there are a number of assumptions with which the GLA do not necessarily agree, this is mitigated by the exercise in question involving the comparison of the profit levels found in each scenario and the fact that the appraisals carried out are appropriately consistent with one another in terms of inputs/assumptions.
- 5.3 The inputs/assumptions with which the GLA do not necessarily agree include the finance rate of 7%, the combined sales and marketing allowance of 4.5% and the approach to profiling expenditure which is stated to be on a "standard straight line" basis whereas an s-curve approach is typically adopted for viability assessment purposes. The GLA also note that the base build costs of £329.37 per sq. ft have not been reviewed by a specialist cost consultant. Were the purpose of the exercise to be to assess whether the affordable housing offer represented the maximum viable amount, the GLA Viability Team would also raise concerns with the extent of deficit identified (in both scenarios appraised) and the issue of the deliverability of the proposed scheme.
- 5.4 The elongated development programme of 5 years to reflect the remediation works could be pessimistic; the input is relevant to the extent of finance costs incurred in the appraisal. The applicant has stated that the timescales for completing the enabling activities "will vary but will typically be between 2 5 years". The GLA Viability Team can reasonably find that that the conclusion in this report would be the same if the programme elongation was shorter than adopted by the applicant.
- In conclusion, the GLA Viability Team consider that the Applicant Report does robustly demonstrate that extraordinary decontamination, enabling or remediation costs must be incurred to bring the site forward for development. Therefore, it is appropriate that a threshold of 35% applies in this case.
- 5.6 The Section 106 Agreement for the scheme should contain provisions for an early-stage review in line with the requirements of the Affordable Housing and Viability Supplementary Planning Guidance. It is noted that the Draft Section 106 Heads of Terms included in the Planning Statement describes that the early-stage viability review should take place if "substantial implementation is not achieved within 3 years of commencement". The GLA note that the substantial implementation target date should be tethered to the date of planning permission rather than the date of commencement on site. The length of time beyond the date of planning permission that an applicant has to reach substantial implementation is typically 24 months, however, this can be agreed in due course with reference to the extent of works that constitute substantial implementation.

6. **Author Sign Off**

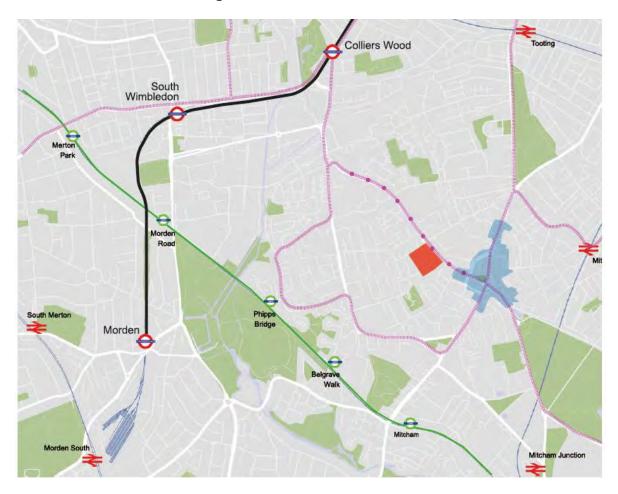
- 6.1 The author of this report confirms that:
 - In preparing this report they have acted with objectivity, impartiality, without interference, and with reference to all appropriate sources of information.

- They are not aware of any conflicts of interest in relation to this report.
- In preparing this report, no performance-related or contingent fees have been agreed.
- This report has been prepared on the basis that it can be made publicly available.
- They are not providing ongoing advice in relation to an area-wide financial viability assessment.
- Where this report relies on external contributions who have been instructed directly by the GLA, the contributors have been considered competent and understand that they must comply with the mandatory requirements of the relevant professional guidance. Where this report relies on external contributions who have <u>not</u> been instructed directly by the GLA (such as in relation to build cost advice) the GLA expects the instructing organisation to ensure the party appointed is aware of relevant requirements.
- Adequate time was taken to produce this report, proportionate to the scale and complexity
 of the planning application.



Appendix 1 Photographs/ Plans

Site Location Plan. Source: Design and Access Statement



GLA Viability Team 7

Aerial Photograph of Site – 2021. Source: Exceptional Enabling / Abnormal Costs – Summary Note



Proposed Scheme Masterplan. Source: Design and Access Statement



From:

14 November 2023 18:58 Sent:

To:

Subject: RE: Mitcham Gasworks - amended package resubmission

No worries – I am also free all day Wednesday 6th.

Kind regards,

Strategic Planner – Development Management **GREATERLONDON**AUTHORITY 169 Union Street, London SE1 0LL

079

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From: wsp.com>

Sent: 14 November 2023 18:46

london.gov.uk>

Subject: RE: Mitcham Gasworks - amended package resubmission

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Hi

Apologies, I've just realised I've mixed my day and dates up. Thursday is the 7th which is when we are planning to submit. Does Wednesday 6th work for you?

Kind regards,



Planning Associate MTCP MRTPI

T + 44(0)

70 Chancery Ln Holborn London

WC2A 1AF

wsp.com

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Subject: RE: Mitcham Gasworks - amended package resubmission



Thanks for your time on the phone yesterday. Thursday 6 December works best for me and I am available all day. Feel free to send me a Teams invite.

Kind regards,

Strategic Planner – Development Management
GREATERLONDONAUTHORITY
169 Union Street, London SE1 0LL
london.gov.uk
079

london.gov.uk

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From: wsp.com>
Sent: 14 November 2023 11:35
To: london.gov.uk>
Cc: wsp.com>; sp.com>; berkeleygroup.co.uk>
Subject: Mitcham Gasworks - amended package resubmission

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Good to speak to you yesterday. As discussed, we are preparing to submit a package of amendments to the current Mitcham Gasworks application on Friday 7 December and thought it would be useful to take you through these changes in advance of the resubmission to bring you up to speed on what to expect.

If you could please let me know your availability for a call on either Wednesday 5 or Thursday 6 December, I will set up a call. If neither of the dates work for you, please let me know when would suit.

Kind regards,





From:

28 June 2023 14:13

Sent: To:

Subject:

RE: 2023/0195/S2 - Mitcham Gasworks consultee responses

Attachments:

5.0 Hodkinson Comments - Mitcham Gasworks site_GLA CE Memo_Stage 2_27.06.23.xlsx; 6. Mitcham Gas Works_GLA WLC Memo_27.06.23.xlsx; 20230195 (20230107) Mitcham Gasworks

(Post Stage 1 set 2) GLA Consultation - Energy Memo 2023.xlsx

Hi

Please see attached energy, CE and WLC spreadsheets with some points to be addressed.

Kind regards,

Strategic Planner – Development Management GREATER**LONDON**AUTHORITY 169 Union Street, London SE1 0LL

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From: wsp.com> **Sent:** 19 June 2023 16:50

Subject: RE: 2023/0195/S2 - Mitcham Gasworks consultee responses

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Hi

Thanks for sending the further comments through from your water team. It is encouraging that a number of the points are now supported. With regards to the additional points, we will review and revert with further comments as necessary.

In relation to the WAT01 point raised, the comments are noted, however it is considered that in this instance the credit is not applicable to the proposed development. No sanitaryware will be provided within the commercial units which means that Wat 01 is scoped out of the BREEAM assessment, therefore there is no improvement over defined baseline performance standards to be achieved. Please do let us know if you require anything further on this or whether this clarification is sufficient to address this point.

With regards to the additional comments on WLC, energy and circular economy spreadsheets, please see responses attached.



Planning Associate
MTCP MRTPI
T +44 (0)

70 Chancery Ln
Holborn
London
WC2A 1AF
wsp.com

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Subject: RE: 2023/0195/S2 - Mitcham Gasworks consultee responses

Hi

The water team have reviewed the updated FRA and drainage strategy and made the following comments:

In response to our previous response (27th February 2023) the Applicant provided a Flood Risk Assessment and Drainage Strategy (BR31002-JNP-XX-XX-RP-C-1000) and a completed version of the London Borough of Merton's Sustainable Drainage Proforma (6th June 2023).

- 1. Further information regarding ground water, existing and proposed levels and flow routes has been provided in Appendix C and Appendix F of the Flood Risk Assessment and Drainage Strategy (BR31002-JNP-XX-XX-RP-C-1000), which is supported.
- 2. Clarification of the impermeable areas and calculations showing how the greenfield rates have been obtained have been provided in Appendix E of the Flood Risk Assessment and Drainage Strategy (BR31002-JNP-XX-XX-RP-C-1000), which is supported.
- 3. No further reduction to the greenfield rate has been provided. Detailed network calculations for the drainage networks have been provided , however, calculations show flooding from the system for the 1 in 100 plus 40% climate change event. The drainage strategy should be revisited to ensure sufficient storage is being provided for the estimated flood volume. Sufficient space should be provided so that flood water is retained on site for the 1 in 100 plus 40% climate change event.
- 4. The location and dimension of all SuDS proposed are clearly shown on the drainage plan provided As Appendix D of the Flood Risk Assessment and Drainage Strategy (BR31002-JNP-XX-XX-RP-C-1000). The plan also includes the rainwater harvesting system, which is supported.
- 5. The direction of the exceedance flood flow routes above the 100-year event plus 40% climate change have been provided in Appendix F of the Flood Risk Assessment and Drainage Strategy (BR31002-JNP-XX-XX-RP-C-1000). Sufficient space should be provided so that flood water is retained on site for the 1 in 100 plus 40% climate change event..
- 6. The Applicant has provided a completed version of the London Borough of Merton's Sustainable Drainage

Proforma.

7. No further information has been provided as to the targeted Wat 01 credits for non-residential uses on site.

Kind regards,



london.gov.uk

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Further to your email below I am emailing to confirm that we are reviewing the energy comments and will respond in the spreadsheet format shortly.

I did in the interim want to draw your attention to the updated FRA and Drainage Strategy – attached, that we have submitted to the LPA along with the proforma. Hopefully this addresses the comments raised in relation to drainage. Apologies, this was not sent along with the updated energy information as we were seeking to progress comments on the energy and sustainability aspects in the first instance and will be making a more formal resubmission to the LPA shortly, which we will draw your attention to once submitted.

Kind regards,



Planning Associate
MTCP MRTPI
T +44 (0)

70 Chancery Ln
Holborn
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WC2A 1AF
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 From:
 Image: series of control of con

Subject: RE: 2023/0195/S2 - Mitcham Gasworks consultee responses



Please see attached energy and circular economy spreadsheets with some points to be addressed. I am still waiting on the whole-life cycle carbon spreadsheet to be reviewed.

Please see below response from the water team:

In response to our previous response (27th February 2023) the Applicant provided an updated Sustainability Report (23rd May 2023).

The following drainage responses remain outstanding:

- 1. It is not clear from Paragraph 6.2.4 whether the impermeable area is 1.63 ha or 1.56 ha. From the microdrainage calculations it is understood that the positively drained area is 1.614 ha. This needs to be clarified/amended.
- 2. Calculations showing how the greenfield rates have been obtained need to be provided.
- 3. The drainage strategy proposes to restrict runoff to 3 times the QBAR greenfield rate for the 100-year event plus 40% climate change. (7.5 l/s) This should be further reduced to achieve the greenfield QBAR rate, or robust justification should be provided.
- 4. In terms of SuDS, the drainage strategy proposes green/blue roofs, rain gardens and filter drains, which is welcomed. The location and dimension of all SuDS proposed should be clearly shown on the drainage plan.
- 5. The Sustainability Statement notes that a rainwater harvesting system for irrigation will be installed. This should also be included on the drainage strategy for consistency across reports.
- 6. The direction of the exceedance flood flow routes above the 100-year event plus 40% climate change should be shown on the plan.
- 7. The Applicant should ensure that the London Borough of Merton's version of the London Sustainable Drainage Proforma is completed and accompanies the planning application. The proformas for all Local Authorities can be found here: https://www.london.gov.uk/what-we-do/environment/climate-change/surface-water/london-sustainable-drainage-proforma.

The Sustainability Report has been resubmitted following Stage 1 Water Comments which stated that "No information is provided as to the targeted Wat 01 credits for the non-residential uses on site.".

The applicant has provided the following response "As there are no fully fitted commercial spaces provided within the proposed development, BREEAM Wat 01 is not applicable.".

The London Plan 2021 states that commercial development should "achieve at least the BREEAM excellent standard for the 'Wat 01' water category or equivalent".

Considering the proposed development has commercial use, even though this is not fully fitted, it should still make every effort to comply with the London Plan Policy 2021 Policy SI.5

Kind regards,

Strategic Planner – Development Management
GREATERLONDONAUTHORITY
169 Union Street, London SE1 0LL
london.gov.uk

london.gov.uk

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From:	<	wsp.com>			
Sent: 23 May 202	3 18:03				
To:		london.gov.uk>;	<	merton.gov.uk>;	
	wsp.com>;	<		group.co.uk>	
Subject: RE: 2023	/0195/S2 - Mitc	ham Gasworks consulte	ee responses		

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Further to your Stage 1 Report for Mitcham Gasworks and the comments from your energy colleagues, please see spreadsheets and updated Energy Statement and Sustainability Statements attached, to address comments raised, in summary:

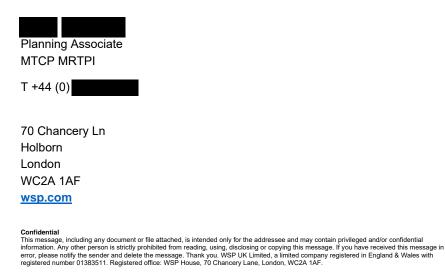
Energy and sustainability	
Updated Energy Statement	Updated to address GLA and LBM comments, principally: □. Be Green – demonstration that renewable energy has been maximised, including roof layouts showing the extent of PV provision and details of the proposed air source heat pumps. Overall achievement of 55.1% reduction over Part L 2021 baseline. □. Be Seen – confirmation of compliance with this element of policy, □. Energy infrastructure and potential for district heating network connection, □. Managing heat risk – further details to demonstrate the cooling hierarchy has been followed □. Clarification on baseline position □. Updated carbon offset figure (due to baseline) Updates can be found at: □. Updated figures in all tables and exec summary/summary □. Paragraphs 4.3; 6.5; 6.9; 6.17-6.18; 6.24-6.26; 7.8-7.9; 7.12-7.13 □. Appendices J and K added.
Be Seen spreadsheet	Spreadsheet to be issued directly to GLA via web portal
GLA energy response spreadsheet	Schedule of GLA comments and responses on energy matters, aligning with report updates
Updated Sustainability Statement	Updated to reflect water efficiency comments and updated energy figures Updates can be found at: □. Executive summary (energy efficiency), □. Chapter 6 (energy strategy), □. paragraph 7.5, □. Conclusion (energy efficiency)
Whole Life Carbon	Completed WLC template
Assessment template spreadsheet	
Circular Economy Statement	Updated to clarify that pre-redevelopment audit and pre-demolition audit not relevant Updates can be found at:

	Figure 3 Targets and Monitoring 5.4, 5.5, 5.6, 5.7
Circular Economy Statement template spreadsheet	Completed CES template
Carbon Emission Spreadsheet	Completed carbon emission spreadsheet
Overheating Supplementary Note on DS2/DS3	To address GLA and LBM comments, including: □. Providing clarity on unit selection □. Confirmation of mechanical ventilation rates □. DSY1 results □. Peak lopping clarification □. DSY2 and DSY3 weather scenarios

I hope this information adequately addresses comments raised in relation to energy and sustainability and that these matters can be considered "resolved", but please do let us know if you have any questions, require any further clarity or wish to discuss.

Kind regards,





Sent: Tuesday, March 21, 2023 2:28 PM

To: wsp.com>; wsp.com>; berkeleygroup.co.uk>

london.gov.uk>

Subject: 2023/0195/S2 - Mitcham Gasworks consultee responses

Hi all,

From:

Following on from the Stage 1 report and letter, please see attached sustainability consultee comments for green infrastructure, air quality, energy and water.

The energy spreadsheet needs to be filled out and sent back along with the circular economy and whole-life cycle carbon spreadsheets which can be downloaded from our website using the links from the Stage 1 report.

We would like these matters resolved prior to Stage 2. Please let me know if you have any questions.

Kind regards,



GREATERLONDON AUTHORITY

Circular Economy: GLA Consultation

Case Details

- 1 Development Name
- 2 Applicant
- 3 London Borough
- 4 Case Officer

Mitchan Gasworks St William Homes LLP London Borough of Merton



Planning Application: Proposal

Full planning application for the erection of new buildings to provide residential accommodation (Class C3) and flexible commercial/community space (Class E and/or Class F2), with associated access, parking and landscaping arrangements, including the demolition of the existing telecommunications mast and re-provision of new telecommunications mast

N.B - the applicant's proposals as currently submitted are for a scheme comprising 595 flats in 6 blocks ranging between 5 and 9 storeys with 135 parking spaces, vehicle access from Western road and Portland road and with 363 sq.m of flexible community/commercial floorspace

Planning Application: Uses - Floorspace

1	C3	58837	m^2
2	E	382	m^2
3			m^2
4			m^2
5			m^2
6			m^2
7			m^2
8			m^2
9			m^2
10			m^2
11			m^2
12			m^2
13			m^2
14			m^2
15			m^2
	TOTAL	59219	m ²

GLA STAGE 1 GLA POST STAGE 1

Doo	cument Information		Additional Information	_			
1 2 3 4	Date of Review Document Title Author Document Date Template Submitted (Y/N)	01/06/2023 2.1 Mitcham Gas Works - Circular Economy Statement April 2023 Hodkinson Consultancy Apr-23	1.1 22P3620_Planning Statement 1.2 22P3620_Circular Economy Statement 1.3 22P3620_Operational Waste Management Strategy 2.1 Mitcham Gas Works - Circular Economy Statement April 2023 2.3 Mitcham Gas Works - WLCCE GLA Spreadsheet - v.1 - 09.12.2022	Date of Applicant's Response	08.06.2023	Date of GLA Response	27/06/2023
GLA	A Stage 1 Comments			Applicant's Stage	e 1 Response		GLA Post Stage 1 Response
No	Title	Description	Action Required	Description		Description	
		sion of the Circular Economy Statement (written represent information, according to the comments below.		Updated - June 202	23	Please provide a report and/or GLA	n the memo are welcomed. evised version of the Circular Economy Statement (written a CE template) that incorporates the additional required rding to the comments below.
0	Policy and Guidance	London Plan Policy SI7 requires development applications that are referrable to the Mayor of London to submit a Circular Economy Statement, whilst Policy D3 requires development proposals to integrate circular economy principles as part of the design process. Applicants should follow the London Plan Guidance: Circular Economy Statements (March 2022) to produce a written Circular Economy Statement and populate the template.	It is welcomed that the Applicant has provided a Circular Economy Statement, in line with the adopted London Plan Guidance: Circular Economy Statements (March 2022), including the completed CE template and an accompanying written report.	See below for respo	onses	Statement and CE	that the Applicant has provided an updated Circular Economy template and an accompanying written report.

	The Applicant is required to submit a Circular Economy Statement in line with the policy and current guidance.			
1 Development Details	The Applicant has provided description of the development.	Nothing further is required.		
1 Development Details	The Applicant has provided details of the proposed development in the template, including gross internal floor area (GIA).	Nothing further is required.		
2 Design Approach	The Applicant has partially defined the design approach for the existing site.	The applicant must provide a response to the applicable phase/building/area/layer as outlined in the Circular Economy approaches for existing structures and buildings in the CES spreadsheet. Where an approach hasn't been defined, it is required the applicant provides narrative around this and how the design team aim to address this. It is noted that the site has been cleared prior to St Williams involvement and ownership. It is advised further description of the existing site is provided including images to demonstrate the current conditions.	See 'existing buildings' part of the report for an update.	It is welcomed the applicant has provided further information within the report. As per the previous comment, t is required the applicant confirms the phase/building/area/layer fields which the existing design approach and strategic responses are applicable too.
2 Design Approach	The Applicant has partially defined the design approach for the new buildings, infrastructure and layers over the lifetime of the development.	Whilst it is acknowledge the strategy to the new buildings has been confirmed via the reporting template, the Applicant must provide a response to the Decision Tree prompts in the template and corresponding guidance (see Figure 5) and/or set out strategic responses accordingly. The Applicant should further explore how each of the design approaches will be applied to suit the requirements of each of the building types / layers across the Site where this is expected to vary.	Updated in CE spredsheet	It is welcomed the applicant has provided further information within the report. As per row 28, it is required the applicant confirms the phase/building/area/layer fields which the design approach and strategic responses are applicable too for the proposed building.
3 Pre-Redevelopment Audit	The Applicant has not provided a Pre- Redevelopment Audit assessing the existing site, including any buildings, structures and materials.	It is noted that the site was cleared prior to St William's involvement and ownership of the site, and therefore a predemolition audit and pre-redevelopment audit is not required and has not been undertaken by St William. Nothing further is required.		

3 Pre-Demolition Audit	The Applicant has not provided a Pre- Demolition Audit to define an inventory of the materials in the building to be managed upon demolition and identify components of the building which can be reused or recycled.	It is noted that the site was cleared prior to St William's involvement and ownership of the site, and therefore a predemolition audit and pre-redevelopment audit is not required and has not been undertaken by St William. Nothing further is required.		
4 Design Principles	The Applicant has partially summarised the key commitments in the Circular Economy Design Principles by Building Layer.	The applicant should update the table ensuring key commitments are specified for each of the Circular Economy Design Principles by Building Layer in the template. The Applicant should also complete the 'Summary', 'Challenges', 'Actions & Counter-Actions, Who and When' and 'Plan to Prove and Quantify' columns for all of the design principles, where these will support the development of the strategy post-planning.	Updated in CE spreadsheet Section 3.4.2 of the guidance notes	The additional information is welcomed. As per previous comment it is required the Applicant ensures <u>all fields</u> in association with 'Summary', 'Challenges', 'Actions & Counter-Actions, Who and When' and 'Plan to Prove and Quantify' columns for all of the design principles, where these will support the development of the strategy post-planning, are fully completed.
4 Design Principles	Many of the commitments are considered standard practice. The template states that the response should consider where the Applicant seeks to go beyond standard practice.	The Applicant should consider key circular economy commitments that go beyond standard practice.	that 'A compliant CE statement is one that meets the requirements set out in Policy SI 7 and the requirements of this guidance.' and that developers are encouraged but not required to undertake practices that go beyond the compliant standard. St WIlliam have, in areas, gone beyond the minimum as highlighted in the CE statement: - Total reduction in regulated CO2 emissions of 56% which is beyond the required 35%. - St William LLP have undertaken studies on recycled content in concrete. The aim is to increase cement replacement to as high as technically feasible- no less than 50% for substructure and up to 60-70% for the superstructure. For steel, a 23-30% recycled content is targeted in line with current advise from British Steel.	It is acknowledged that the Applicant has gone above the minimum requirements in the areas noted. It is required Applicants continue to encourage the team to develop and define the principles outlined, ensuring clear measurable metrics and targets are set in order to monitor and integrate the commitment into the design moving forward. Nothing further is required.

5	Bill of Materials	The Applicant has partially completed the Bill of Materials including metrics through module stages A to D.	The Applicant should ensure that the Bill of Materials presented in the GLA CE template is aligned with the information provided in the WLCA per Section 1.2.1 of the GLA guidance, the Applicant should ensure that any updates are reflected across both reporting submissions. It is noted that the material intensity of the building element category is very high for Superstructure (Windows, External Doors and External walls). The Applicant should review and provide clarification, including revision as necessary.	The latest GLA WLC spreadsheet was not used. Both now align.	The applicants comments are noted. The applicant is required to ensure the following columns are fully completed: - Construction waste factor (Module A) (Column I); - Recycled content (kg) (Column K); - Recycled content by value (Column L); - Construction waste factor (Module B) (Column P). Please ensure the row 455 are fully reported where required.
5	Bill of Materials	The Applicant has not confirmed that reused or recycled content will be 20 per cent by value for the whole building and provided supporting calculations.	Provide details of the reused and recycled content proposed including supporting calculations in line with GLA guidance.	Updated in the report	The applicants response is noted. The Applicant is required to update Column K and L in the CES reporting template BOM table in order align and demonstrate with their commitment to ensure 25% of the building material elements to be comprised of recycled or reused content.
6	Recycling and Waste Reporting	The Applicant has partially provided overall waste estimates and relevant cross references in the Recycling and Waste Reporting table.	It is noted a figure has been provided for the Demolition, Excavation, Construction and Operational waste reporting however, it is unclear as to where this figure has been drawn from. Please provide clarity.	Updated in CE spreadsheet. The CE report highlights where these figures have come from: - Construction waste shown in Table 1 - Excavation waste from Section 5.24 - No demolition waste	The additional information is welcomed. Nothing further is required.
6	Recycling and Waste Reporting	The Applicant has not provided a breakdown of waste management routes in the Recycling and Waste Reporting table which demonstrates compliance with London Plan Policy SI 7 targets for diversion of 95% (by weight/tonnage) construction and demolition waste from landfill and 95% (by weight/tonnage) beneficial reuse of excavation waste.	Provide a breakdown of the expected waste management routes for each of the waste streams which demonstrate compliance with London Plan Policy SI 7 targets for diversion of 95% (by weight/tonnage) construction and demolition waste from landfill and 95% (by weight/tonnage) beneficial reuse of excavation waste.	Updated in the table	As per previous comment. Please provide a breakdown of the waste management routes for the Excavation, Construction and Municipal waste estimates provided.
7	Operational Waste	The Applicant has partially provided an Operational Waste Management Plan to demonstrate how the proposed development will achieve the relevant targets and meet requirements of London Plan Policies D3, SI 7 and D6.	It is require the Applicant provides further information around the listed items below: • Provide evidence to demonstrate how operational performance will be monitored and reported. • Provide evidence that the application of consolidated, smart logistics and community-led waste minimisation schemes has been explored.	The only operational waste management plan produced to date is what has been appended to the CE report. This is significantly more detailed than other operational waste management plans provided at this early stage and is deemed sufficient. This will be updated and refined as the design progresses. Additional information on operational	The applicants response is noted. It is expected that the OWMP will be developed throughout the project programme in order to reflect any changes. As per previous comment at this stage, the Applicants must demonstrate that the listed measures below have been considered in order to ensure initial thought into this has been considered and will not be missed in the latest stages of the programme. - How operational performance will be monitored and reported; - That waste measures such as consolidated, smart logistics and community-led waste minimisation schemes have been explored.

monitoring has been provided in 5.69 - 5.71 of the updated CE report.

7	Operational Waste	The Applicant has partially included a commitment to meet or exceed the London Plan Policy SI7 municipal waste recycling target of 65% (by weight/tonnage) by 2030 or business waste recycling target of 75% (by weight/tonnage) by 2030.	It is noted the applicant has provided a commitment to meet or exceed the London Plan Policy SI 7 municipal waste recycling target of 65% (by weight/tonnage) by 2030 . It is unclear from the information provided as to whether the business waste recycling target of 75% (by weight/tonnage) by 2030 has been considered. Applicant to confirm.	This was noted and included in the list of targets in section 5.4 and in section 5.69.	The applicants response is noted. It is noted in the report sect 3.12 - 'The London Borough of Merton recommends that 50% of waste storage capacity be allocated for residual waste, and 50% for mixed recycling.' Whilst it is noted the applicant has acknowledged the targets for 75 per cent recycling for business waste, it is required to understand that sufficient space allocations have been allowed for in order to ensure a 25/75 per cent split is accommodated for within the base build, and not just the 50 per cent split as required by LBM. Applicants required to demonstrate that sufficient space allocations have been allowed for in order to ensure the 25/75 per cent split can be accommodated.
		The Applicant has previded a seminiture of the			
8	Circular Economy Targets	The Applicant has provided a commitment to targets for demolition waste, excavation waste, construction waste, municipal waste and reused/recycled content in line with GLA policy.	Nothing further is required.		
8	Circular Economy Targets	The Applicant has partially provided a brief explanation of how performance against each of the key policy targets will be secured through design, implementation and monitoring.	It is welcomed that the applicant has committed to exceed the requirement to ensure a minimum of 20% of the building material elements to be comprised of recycled or reused content. It is advised the BOM table is updated in order to reflect this commitment and ensure the target has already been achieved based on the current design.	This level of detail is not yet available. It will be provided in the next update of the CE statement.	The applicants response is noted. The response included in the CES reporting template states: The Applicant is committed to a target a benchmark of 25% reused or recycled content by value., where feasible. A detailed Bill of Materials will be provided at a later stage. The Applicant is required to update Column K and L in the BOM table in order align and demonstrate with their commitment to ensure 25% of the building material elements to be comprised of recycled or reused content. See row 38.
9	Post-Construction Report	The Applicant has partially acknowledged acceptance for a Planning Condition to submit a Post-Construction Report to the relevant local authority and the GLA at circulareconomystatements@london.gov.uk	Please acknowledge acceptance for a Planning Condition and set out an indicative timescale and responsible party for the provision of this information.	Post Construction to take place in Quarter 4 of 2030.	The additional information is welcomed. As per previous comments, It is required the Applicant confirms the indicative timescale and responsible party for the provision of this information.

10 End-of-life strategy	The Applicant has partially provided an End-of-Life Strategy, including how this will be communicated to future building owners, managers and occupiers and how the building information will be stored.	It is noted the Applicant has provided a narrative surrounding the End of Life Strategy for the building. The Applicant should outlined how this information will be communicated to future building owners, managers and occupiers and how the building information will be stored. The Applicant should provide some additional information to describe how the end-of-life scenarios as set out in the Bill of Materials will be facilitated by the design.	This is not yet known and will be updated once the design has been progressed further. This level of detail has been sufficient for other projects at this stage.	The applicants comments are noted. It is required in the initial early stages the applicant demonstrates that the fundamentals of the EOL strategy have been considered within their CES statement ensuring the following information is provided. As per GLA guidance, The written report element of the CE statement should also set out an end of-life strategy for the development, including: - How the EOL strategy will be communicated to future building owners, managers and occupiers; and - How the building information will be stored, for example, by using Building Information Modelling or material passporting during the building's life to facilitate disassembly and identify any key challenges. This will support the recovery of components and materials at the end of the life of the building. It is required the Applicant provides this detail in order to ensure the fundamentals for the EOL strategy have been acknowledged and developed upon for the next stages. The Applicant should provide some additional information to describe how the end-of-life scenarios as set out in the Bill of Materials will be facilitated by the design.
Supporting 11 Documentation	The Applicant has provided the following supporting information as an appendix to the written report: • Operational waste strategy	It is strongly encouraged that the Applicant provide the following additional supporting information as a minimum: • Site Waste / Resource Management Plan • Cut and fill calculations and/or Excavated - Materials Options Assessment • Circular Economy workshop/ meeting notes • Reused or recycled content calculations • Scenario modelling demonstrating adaptability (for non-domestic areas)	Cut and fill calculations were provided in the CE report, section 5.22 - 5.25. An example SWMP has now been provided.	The additional information is welcomed. The SWMP doesn't appear to be appended or the CES report. Please can the applicant provide this. As per previous comments it is strongly encouraged the applicant provides the additional supporting information as a minimum: • Site Waste / Resource Management Plan • Circular Economy workshop/ meeting notes • Reused or recycled content calculations • Scenario modelling demonstrating adaptability (for non-domestic areas)

WLC Memo: GLA Consultation

Case details

Date of first review: 02/06/2023 Case Name: Mitcham Gas works Case Number: 2023/0195 Case Officer: London Borough: Merton Application Type Detailed (Outline/Hybrid/Detailed): Applicant: St William Homes LLP WLC Consultant: Hodkinson Consultancy (R Rust) - WLCCE GLA Spreadsheet - v.1 - 09.12.2022 (1) Document Title: Document Date: 09.12.2022

Development proposals

Use	-	 Floorspace/Number of units
C3		59,219 m ²
		m^2
		$^{\rm m^2}$

GREATER**LONDON**AUTHORITY

	London Plan : Policy SI 2 of the London Plan requires planning applicants to submit a Whole Life-Cycle Carbon (WLC) assessment: https://www.london.gov.uk/sites/default/files/the_london_plan_2021.pdf	
	Guidance and assessment template: Applicants should follow the GLA 'Whole Life-Cycle Carbon Assessments Guidance - March 2022 and the GLA WLC assessment template (https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/london-plan-guidance/whole-life-cycle-carbon-assessments-guidance) which should be completed in full and submitted as an Excel document. Applicants should ensure they are familiar with the guidance in preparation for submitting their planning application.	
	The following comments set out how the applicant's planning application stage WLC assessment complies with the policy and guidance.	
LA Re	view_02/06/23	Applicant's response
enera	compliance comments	
1	The applicant has provided all information within the project details section of the template under the Detailed planning stage tab, in line with the GLA Whole Life-Cycle Carbon Assessment guidance document.	
2	The assessment method stated does conform with BS EN 15978 and 'RICS Professional Statement and guidance, Whole Life carbon assessment for the built environment' (RICS PS) as set out in the GLA Whole Life-Cycle Carbon Assessment guidance document.	
3	The applicant has confirmed that the operational modelling methodology for Module B6 results follows SAP. The applicant should confirm if TM54 is being followed for the commercial spaces.	Currently, the commercial spaces have not been assessed using TM54, SBEM has been used.
4	The assessment has been completed with a reference study period of 60 years.	
5	The software tool used is listed in Appendix 1 of the GLA Whole Life-Cycle Carbon Assessment guidance document. The applicant has provided confirmation that the tool used follows BS EN 15978 and covers modules A-C as a minimum.	
6	The source of carbon data for materials and products, and EPD database stated within the assessment does come from acceptable sources as set out in the GLA Whole Life-Cycle Carbon Assessment guidance document.	
7	The applicant has confirmed that 95% of the cost allocated to each building element category has been accounted for in the assessment. The applicant should provide details/evidence of the review process undertaken to confirm that 95% of the cost per building element category has been modelled.	Yes - The client confirmed that 95% of the cost allocated to each building element category has been included.
8	The applicant should provide explanation of the third-party verification mechanisms that have been adopted to quality assure the assessment.	All work completed by a competent individual (BSc, MSc, CEnv, MIEMA) who has undertaken multiple LCAs for GLA compliance. She is suitability competent to undertake the work. Her work was checked was (MEng (Hons), CEng, MIMechE) who was not involved in the project and undertook a detailed QA of the assessment to ensure it was accurate, in line with information received and compliant with the GLA guidance.
	The applicant has given permission for the GLA to submit the assessment to the Built Environment Carbon Database.	
	The applicant has provided results that cover all of the life-cycle modules (A1-A5, B1-B5, B6-B7, C1-C4 and D).	
11	The applicant has provided results that fall within the WLC benchmarks and has reasonably explained the reasons for any divergences from the WLC benchmark.	
etenti 12	on of existing buildings and structures The applicant has confirmed that options for retaining the existing buildings and structures have been fully explored before considering substantial	
	demolition. The applicant has provided the pre-construction demolition carbon related emissions.	
14	The applicant has confirmed the percentage estimates of the new building development which will be made up of existing elements is 0%	
ey act	ions and further opportunities to reduce whole life-cycle carbon emissions	
15	The applicant should provide details of the main actions with the biggest impacts which have informed this stage of the assessment. Since the results almost achieve the aspirational benchmarks for modules A1-A5, the applicant should be able to provide more than one action taken to reduce the embodied carbon of the proposed development to near the aspirational benchmarks, especially considering retention is not significant on-site.	Updated in GLA spreadsheet
16	The applicant has provided details of further potential opportunities which could be investigated as the design progresses, but which don't currently contribute towards the emissions reported in this WLC assessment.	
17	The applicant has provided an estimation of the WLC reduction ($kgCO_2e/m^2$ GIA) for all actions and further potential opportunities stated within the template.	
	Il quantity, assumptions and end of life scenarios The applicant has mostly completed the material quantity and end of life scenarios table in full. See comments below.	
	All material types and quantities have been provided for all the applicable building element categories and align with the Assessment table.	
20	Assumptions made with respect to replacement cycles (Module B) have been stated. Assumptions made with respect to maintenance and repair should also be stated but it appears that the CLA recommendations are used	
21	be stated but it appears that the GLA recommendations are used. Material 'end of life' scenarios (Module C) has been filled out for all applicable significant materials. The BoM should align with the projects separate Circular Economy Statement. The substructure and stair quantities do not quite align.	Updated in CE spreadsheet
22	The applicant has provided an estimated mass (kg) of reusable and recyclable materials for each building element category. The applicant has provided details of the refrigerants (name, charge, annual leakage rate, GWP, end of life recovery rate). However, the leakage and end of life do not align with the TMGE calculation.	Updated, typo.
	The do not aligh with the 1965 Calculation.	
	The applicant has completed the template table completely and all results do seem within a reasonable range.	

GLA compliance. She is suitability in the project and undertook a

Green Infrastructure Memo: Stage 1 consultation

MITCHAM GASWORKS SITE 01/03/2023

To / Case officer:

From:

Case name: Mitcham Gasworks Site

London Borough: Merton

Case number: 2023/0107/S1

Outline/Full: Full

Applicant: St William Homes LLP

Landscape Plan: Page 107 of Design and Access Statement

DAS: 22P3620_Design and Access Statement Part 1-14.pdf

Overview of assessment

The applicant is requested to provide additional information in relation to green infrastructure policy. The following is requested prior to Stage 2:

- Review of urban greening provided relating to fire safety guidance; and
- Clarification regarding trading rules relating to Biodiversity Net Gain.

Proposal

Full planning application for the erection of new buildings to provide residential accommodation (Class C3) and flexible commercial/community space (Class E and/or Class F2), with associated access, parking and landscaping arrangements, including the demolition of the existing telecommunications mast and re-provision of new telecommunications mast.

Policy Review

Open Space - London Plan Policy G4: Local Green and Open Space

1. The applicant demonstrates consideration of access to public open space across the site, including landscaped courtyards and the green ring, in accordance with London Plan Policy G4.

Biodiversity - London Plan Policy G6: Biodiversity and Access to Nature

- 2. London Plan Policy G6 states that proposals that create new or improved habitats that result in positive gains for biodiversity should be considered positively. Policy G6 further states that development proposals should aim to secure net biodiversity gain. Trading rules should also be satisfied.
- 3. The Ecological Assessment sets out that 13.05% Biodiversity Net Gain will be achieved in habitat units and 217.13 (100%) hedgerow units provided. The report sets out that trading rules have not been satisfied and that the trading summary should be checked. This cannot be found. The applicant should give further information on this prior to Stage 2.
- 4. Recommendations in the Ecological Assessment should be implemented, or robust justification should be given as to why they cannot be. The applicant should prepare an Ecological Management Plan (EMP) to support long-term maintenance and habitat creation. The EMP should be secured by planning condition and approved, if the proposed development is granted planning consent.

Green Infrastructure and Urban Greening - London Plan Policy G1: Green Infrastructure and London Plan Policy G5: Urban Greening

- 5. The proposed development presents a well-considered approach to integrating green infrastructure and urban greening across the masterplan. This is evidenced from early on within the Design and Access Statement (DAS) where it is recognised that new green infrastructure can be brought to the derelict site. This includes the incorporation of rain gardens which supports multifunctionality, in accordance with Policy G1 of the London Plan.
- 6. The proposals also include a landscaped green route through the centre of the site, which is encouraging. The applicant as recognised the opportunity to contribute to the greening of the public realm as the site boundaries front onto the public highway.
- 7. The applicant has calculated the Urban Greening Factor (UGF) score of the proposed development as 0.4, which meets the target set by Policy G5 of the London Plan. This should be treated as a minimum and any improvements to the quality and quantity of urban greening made where possible.
- 8. London Plan Guidance on Fire Safety restricts the use of combustible materials, limiting the use of green walls where they form part of the external wall of a building. The proposed urban greening should therefore be reviewed against this guidance and updated as appropriate. Where this review finds it necessary to remove a green wall, opportunities should be sought to make up any reduction in the UGF by improving the

quality or quantity of greening across the wider masterplan. For further information on combustible materials see: https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/london-plan-quidance/fire-safety-lpg

Trees - London Plan Policy G7: Trees and Woodlands

- 9. There are a number of existing trees on site. The applicant has provided a Tree Survey and Impact Assessment, which states that "there are no trees of particular merit upon the site". The report also states that all existing trees on site would be required for removal to facilitate the proposed development. Appendix 3 Schedule of Trees reports that all 19 existing trees on site at of Category C status. Page 142 of the DAS sets out that over 100 new trees will be planted on site, therefore it is considered that adequate replacement is made.
- 10. Recommendations in the Tree Survey and Impact Assessment should be adhered to, or robust justification should be given as to why they cannot be.
- 11. The applicant appears to demonstrate a consideration of a diverse range of proposed tree species, which is positive in terms of biosecurity and should be brought to fruition. The applicant should also consider large-canopied trees to target urban heat island (UHI) effects.

Air Quality Memo: Consultation Stage 1

2023/0107

01/03/2023

Western Road Mitcham CR4 3ED

London Borough of Merton

To (Case Officer):

From:

Applicant: St William Homes LLP

Air Quality Consultant: Tetra Tech

Document Title: Mitcham Gasworks Air Quality Assessment

Document Date: 01/12/2022

Proposal

Full planning application for the erection of new buildings to provide residential accommodation (Class C3) and flexible commercial/community space (Class E and/or Class F2), with associated access, parking and landscaping arrangements, including the demolition of the existing telecommunications mast and re-provision of new telecommunications mast N.B - the applicant's proposals as currently submitted are for a scheme comprising 595 flats in 6 blocks ranging between 5 and 9 storeys with 135 parking spaces, vehicle access from Western road and Portland road and with 363 sq.m of flexible community/commercial floorspace

Policy Review

- 1. The report is comprehensive and of sufficient technical quality to demonstrate compliance with London Plan policies.
 - a. The development is air quality neutral (London Plan Policy SI 1 (B) (2a). No further mitigation measures are required (London Plan Policy SI 1 (E))
- 2. The development is compliant with London Plan policy SI 1 (B) (no adverse impacts on air quality)

Recommendations

The following conditions are recommended:

1. On-site plant and machinery must comply with the London Non-Road Mobile Machinery (NRMM) Low Emission Zone standards (London Plan Policy SI 1 (D)).

2. Measures to control emissions during the construction phase relevant to a medium risk site should be written into an Air Quality and Dust Management Plan (AQDMP), or form part of a Construction Environmental Management Plan, in line with the requirements of the Control of Dust and Emissions during Construction and Demolition SPG. The AQDMP should be approved by the LPA and the measures and monitoring protocols implemented throughout the construction phase (London Plan Policy SI 1 (D)).

GREATER LONDON AUTHORITY

Energy Memo: GLA Consultation

Case details

Date of first review:

Case Name:

Case Number:

Case Officer:

01/03/2023

Mitcham Gasworks Site

2023/0107

London Borough: Merton

Application Type
(Outline/Hybrid/Detailed):

Detailed

Applicant:

Energy Consultant:

Document Title:

Document Date:

St William Homes LLP

Hodkinson

Energy Statement

01/12/2022

Development proposals

Use Floorspace/Number of units

Residential 595 units
Non-residential 700 m2

Compliance Schedule - To be completed by the GLA Energy Officer

Policy	Policy Sub-Area	Required Data (In line with EAG)	Status	Policy Compliance	GLA Comme nt Referen ce
SI 1 - Improving Air Quality (relating only to air quality impacts of energy systems; separate air quality officer consultation required)	Measures/design features to reduce exposure to air pollution	Measures to minimise NOx emissions from energy systems	N/A	Compliant	
			Dogoises d but		
		Details of energy efficiency measures	Received but items still outstanding		3,4
	Be Clean	Alignment with Cooling and Overheating	Received but items still outstanding		6,7
		Be Lean 10% and/or 15% reduction achieved	Received but items still outstanding		3,4
SI 2 - Minimising		EUI and space heating demands provided	Received and nothing further required		14
Greenhouse Gas Emissions (excluding SI-2-F- WLC;		SI 3 - Energy Infrastructure data provided (see below)	Received but items still outstanding	Potential Compliance- Pending	8,9
separate WLC consultation required)		Roof Layout detailing maximised PV proposal	Received but items still outstanding	Information	10
		PV array metrics provided	Received but items still outstanding		10
		Heat Pump arrangement confirmed	Received but items still outstanding		11
		Confirmation of carbon emission factors used	Received; SAP 10.2 proposed and nothing further required		

		GLA carbon emission reporting spreadsheet v2.0	Received but items still outstanding		2
		Supporting Modelling Outputs (BRUKLs/DER Worksheets)	Received but items still outstanding		16
		On-site minimum met	Received but items still outstanding		
	Carbon offset payment confirmed	Draft S106 wording of carbon offset (from borough)	Not yet received - applicant to submit and provide reference>		15
		Written confirmation/understanding of data requirements	Received and nothing further required		13
	Be Seen commitment provided	Confirmation of Planning Stage 1 submission	Not yet received - applicant to submit and provide reference>		13
	Aligned with heating hierarchy	Applicant/Heat Network Stakeholder correspondence	Received and nothing further required		8
		Heating system details provided	Received but items still outstanding		9
SI 3 - Energy Infrastructure	Acceptable Design	Futureproofed DHN connection drawings	Received and nothing further required	Potential Compliance- Pending	9
		Site heat network drawings	Received and nothing further required	Information	9
		Details of management measures proposed	Received and nothing further required		5
		Completed GHA overheating tool	Received and nothing further required		
SI 4 - Managing Heat Risk	Aligned with cooling hierarchy	CIBSE dynamic overheating analysis	Received but items still outstanding	Potential Compliance- Pending	6,7
		Confirmation that cooling criteria have been met	Received and nothing further required	Information	7

Application Metrics	Outline Value (if applicable)	Detailed Stage 1 Value	Detailed Final Value
Domestic carbon emissions		55%	
Non-domestic carbon emissions		36%	
Carbon offset payment amount		£666,895	
kWp renewable generation capacity		131	
kWh annual renewable energy generation		ТВС	
Sqm of proposed PV array		ТВС	
Calculated SCOP of heat pumps		ТВС	
Heat fraction provided by heat pumps		80%	
Flow/Return temperatures proposed		2.8	
Distribution loss assumption		65 / 35	
Energy Use Intensity		37.4 Dom // 89.5 Non-Res	
Space Heating Demand		15 Dom // 3.3 Non-Res	
Whole Life Carbon Assessment		Received and Under Separate Consultation	
Innovative Features			

Detailed Comments - Applicant MUST provide detailed responses to the below items

Comment No. Date: 01/03/23 Applicant's Stage I response Applicant's Stage I response GLA Post Stage I response Stage I response Onte: 01/06/2023 Bate: 01/06/2023 Applicant's Post of CLA Post Stage I response Stage I response Onte: 01/06/2023 On

Documents to be secured

Energy Statement (01/12/2022)

General compliance comments

The energy strategy could be compliant with the London Plan 2021 policies however, the applicant is required to submit the additional information to demonstrate policy compliance which has been requested below.

Note.

The applicant's response to GLA's energy comments should be provided directly within this Energy Memo. Any wider supporting material submitted should be referenced within the applicant's memo response.

This item will be closed in conjunction with all comments below.

Nothing further is required here.

2 Be Lean	The applicant should submit the GLA's Carbon Emission Reporting spreadsheet in excel format. The applicant should ensure that all tabs are completed as per methodology on Introduction tab. [The link to the spreadsheet can be found here: https://www.london.gov.uk/programmes-strategies/planning/planning-applications-and-decisions/pre-planning-application-meeting-service/energy-planning-guidance]	An updated GLA spreadsheet has been provided. This has been altered to adjust the TER to reflect the heating system the same as the final proposed building specification. This has changed the overall carbon reduction % slightly and subsequently the carbon offset has changed to £663,195.	The applicant has provided the GLA carbon emission reporting spreadsheet which appears to align with the reported CO2 emissions and broadly align with the supporting modelling. There are some small discrepancies between some TER values for the domestic element and the non-domestic element efficiencies for space heating and hot water seem to be interchanged. The applicant should correct this and resubmit. This item is outstanding.	We are currently looking at this and will provide an update as soon as we can	Clarification is welcomed. The applicant should provide the updated GLA carbon emission reporting spreadsheet when available. This item is outstanding.
5	The applicant should consider and minimise the estimated energy costs to occupants and outline how they are committed to protecting the consumer from high prices. This should cover the parameters set out in the guidance and include a confirmation of the quality assurance mechanisms that will be considered as part of the strategy. See GLA Energy Assessment Guidance June 2022 paragraphs 7.16-7.19 for further details.	In line with the energy hierarchy, energy demands have been reduced through enhanced energy efficiency measures before the heating system has been selected. The details of the heat network will be developed at a later stage, however, appropriate monitoring systems will be put in place as part of the "Be Seen" policy, and a range of quality assurance mechanisms will be considered and the most appropriate ones applied to ensure that costs are kept as low as possible for the residents.	The applicant should confirm the specific quality assurance mechanisms that will be considered as part of the strategy. This item is outstanding.	The applicant will investigate management of the heat network, which could include the ESCo model. Appointment of either an ESCo or contractors for billing/maintena nce activities will be undertaken on a competitive tendering basis to ensure the best deal for residents.	The applicant has suggested that the appointment of ESCo or contractors for billing/maintena nce activities will be undertaken on a competitive basis to ensure the best deal for residents. The applicant should continue to consider protecting the consumer from high prices via quality assurance mechanisms throughout the design and construction stages. Nothing further is required here.

Overheating

The results of the Dynamic Overheating Analysis, using the CIBSE TM59 methodology, demonstrate that compliance can be achieved against DSY1 assuming a g-value of 0.40 with the following strategy:

- Solar exposed dwellings at low/medium level of noise disruption will utilise openable windows as the primary means of ventilation with background mechanical ventilation rate of 2 ACH
- For dwellings at the ground floor level where windows must be restricted for security purposes as well as dwellings at high risk of noise disruption where windows must remain shut during the night, a peak lopping MVHR unit.

The applicant has confirmed that the overheating assessment has taken account all the requirements and limits set out in Approved Document O.

The applicant has modelled only 6 units within the development of over 550. As per CIBSE TM59 guidance, the applicant should try to identify all dwellings at risk of overheating. The applicant should justify the sample of units chosen for the assessment and explain why this is appropriate. If required, the applicant should submit the results of additional units.

The applicant has provided a calculation of the required boost ventilation rates to achieve the ventilation rate of 2ACH. The applicant should provide datasheets for the proposed MVHR unit capable of achieving the boost ventilation rates required.

For the units with restrictions to window openings, the applicant should present one version of overheating assessment with windows open (to demonstrate that the passive design could achieve compliance in the absence of external constraints) and

According to CIBCE TM59 "The assessment should try to identify all the dwellings that are at risk of overheating. These are likely to be those (a) with large glazing areas, (b) on the topmost floor, (c) having less shading, (d) having large, sunfacing windows, (e) having a single aspect, or (c) having limited opening windows."

Requested dwelling results can be found in Appendix E that will be submitted separately.

We can confirm that all the above have been considered in the unit selection. Each dwelling has at least one of the mentioned characteristics. A ground floor unit as representative of units at risk of overheating due to lack of security features. A single aspect west facing unit with large glazing area as representative of single aspects facing west, which is highly at risk of overheating. A double aspect dwelling facing the south and west as representative of a dwelling at high noise risk with different shading and high risk of overheating due to the orientations and window constraints due to noise and lack of shading for the south facing rooms. 1 flat at top floor representing the top floor units with no shading and at high risk of noise. 1 flat at top floor representing the top floor units with no shading.

See "Table B.3: Mechanical ventilation rates for dwellings (enhanced rates)" in the report. The exact specification of the ventilation system will be determined at the detailed design stage by the M&E designer. There are various systems available on the market which will be able to achieve the required ventilation rates.

All dwellings at the ground floor level as well as dwellings at high risk of noise disruption (see the ADO noise mark-up provided by RSK Acoustics LTD, October 2022) require a peak lopping MVHR unit providing 90 l/s air flow and combined cooling of 1 kw and a set point temperature of 23°C. The number of the units need to be confirmed by the architects.

Result of DSY2 and DSY3 Weather Scenarios
The dynamic overheating assessment has been run under the more extreme DSY2 and DSY3 weather files, with results presented in Tables D.1 -D.4, these will be submitted as Appendix D separately. TM59 states that compliance should be met for the DSY1 weather scenario, and that additional testing can be undertaken using the 2020 versions of DSY2 and DSY3. However, it is acknowledged that meeting the CIBSE compliance criteria is challenging for the DSY2 and DSY3 weather files. In the future, residents could use further

The sample of 6 units is considered small for the scale of the development and this can be also seen by the comparison with the 10 units modelled for energy performance. The applicant should confirm that all unit typologies and different orientations have been covered with the sample units. The applicant should model additional units to have a more representative sample. The analysis demonstrates that there are a number of failures under the DSY 2 and DSY 3 weather files. The applicant should commit to providing guidance to occupants on future minimising future dwelling overheating risk in line with the cooling hierarchy.

This item is outstanding.

The applicant has provided an openable windows scenario that shows compliance with DSY1. The applicant has provided the number of the units that will include peak lopping and have confirmed a setpoint of 23C. The applicant has also confirmed that there are various systems available on the market which will be able to achieve the required ventilation rates.

response, the 6 units modelled align with the description set out within section 3 of TM59. This selection method is reiterated in the **GLA** energy assessment guidance (2022) which states 'the applicant must ensure that the assumptions for the overheating assessment follow the methodology within Section 3 [of TM59]'. There is no requriement in either document for all unit typologies to be modelled.

As relayed in

the previous

The strategies proposed address the varying considerations of noise, security and orientation in the development of strategies.

The applicant commits to providing guidance to occupants on minimising

The quoted TM59 paragraph by the applicant continues that the applicant should justify the sample of units and why this is appropriate and that this depends on the scale of the development. The applicant should confirm whether typologies (a) with large glazing areas and (d) having arge, sun-facing windows (different orientations) have been assessed. The applicant is still advised to model additional units to have a more representative sample. This item is

outstanding.

another with windows closed including constraints. Any cooling provision (both cooling capacity and number of units provided with cooling) should be minimised.

The applicant should quantity the number of units that will require temperature lopping and the expected cooling load associated. The applicant should provide details on the set point and control strategy, to ensure that the system will not be used for comfort cooling.

The applicant should also investigate the risk of overheating using the DSY 2 & 3 weather files.

adaptation measures to combat any additional overheating risk such as the use of fans.

future overheating risk

Be Clean

Be Green

The applicant is proposing to install 130.5 kWp of PV.

A roof layout has been provided, however it appears that there is additional roof space available for PV. A detailed roof layout should be provided demonstrating that the roof's potential for a PV installation has been maximised and clearly outlining any constraints to the provision of further PV, such as plant space or solar insolation levels. The applicant is expected to situate PV on any green/brown roof areas using biosolar arrangement and should indicate how PV can be integrated with any amenity areas.

The on-site savings from renewable

- The roof areas that are not currently proposed for PV are to the North and East of taller parts of the building and would be subject to overshading. This would significantly reduce the efficiency of panels if they were located in these areas and so have not been proposed. Some space has also been left for the potential for providing additional heat pump infrastructure to the network in future if feasible. The provision of solar PV will be reviewed at detailed design stage. The latest roof plan has been included for reference.

- 130.5 kWp; annual output 100,786 kWh.

The applicant has suggested that the spaces not currently proposed for PV are overshaded. Where overshading is cited as a constraint, solar insolation levels should be provided and PV optimisers should be considered. A further detailed roof layout of all roof spaces should be provided demonstrating that the roof's potential for a PV installation has been maximised and clearly outlining any constraints to the provision of further PV in each instance with mark-ups, such as plant space or solar insolation levels.

This item is outstanding.

We are currently looking at this and will provide an update as soon as we can

welcomed. Response should be provided when available. The applicant has suggested that the spaces not currently proposed for PV are overshaded. Where overshading is cited as a constraint, solar insolation levels should be provided and PV

Clarification is

10

11

energy technologies should be maximised regardless of the London Plan targets having been

The applicant should provide the capacity (kWp), total net area (m2) and annual output (kWh) of the proposed PV array.

Heat pumps are being proposed in the form of a (centralised) hybrid ASHP/Gas Boiler system. Further information on the heat pumps should be provided including: a. An estimate of the heating and energy (MWh/annum) the heat pumps would provide to the development and the percentage of contribution to the site's heat loads. They should demonstrate how the heat fraction from heat pump technologies has been maximised and should consider if the percentage split can be further increased. b. Details of the Seasonal

- Coefficient of Performance (SCOP) and how these have been calculated for the specific proposed system's operation. This should incorporate the expected heat source and heat distribution temperatures (for space heat and hot water).
- c. The applicant has suggested a distribution loss factor of 1.33 will be used in line with CP1, however, Part L 2021 indicates a DLF = 1.50

- The current estimated energy demand of the heat pumps is 531.84 MWh, assuming 80% contribution to the site's heat loads.
- The contribution from the heat pumps will be reviewed at the detailed design stage. However, gas boilers have been incorporated to help mitigate certain risks, as outlined in Chapter 6.21-6.26 in the energy statement and expanded on as follows. Gas boilers can reduce both capital and operational expenditure on the network as well as offering resilience in times that heat pumps prove inefficient during certain conditions (for example, prolonged cold period of weather). Based on current fuel prices, gas boiler as supporting plant will be the most effective at reducing operational costs to residents.
- The SCOP has been taken from an example heat pump available from Mitsubishi. The actual heat pump provided and product will be decided at detailed design stage, but this was used as an example that we know is deliverable.
- It is assumed that the distribution loss factor would be calculated and added to the PCDB prior to operation, which is why the default figure has not been used. The DLF of 1.33 has been derived based on the target design losses that are set out in CP1. It is recommended that these will be incorporated into

The 20% contribution from gas boilers is considered high, the applicant should consider the maximisation of heat fraction from heat pumps at this stage and should facilitate this with the ASHP capacity and operation.

The applicant should submit an example datasheet to demonstrate that the proposed SCOP is achievable for the specific proposed system's operation.

This item is outstanding.

Clarifications on the DLF seem reasonable and this will be accepted in this case. The applicant should ensure that the DLF will be added to the PCDB.

optimisers should be considered. A further detailed roof layout of all roof spaces should be provided demonstrating that the roof's potential for a PV installation has been maximised and clearly outlining any constraints to the provision of further PV in each instance with mark-ups, such as plant space or solar insolation levels.

This item is outstanding.

fraction from

heat pump

technologies

The applicant Clarifications will continue to are welcomed reevaluate the and as there are balance of plant currently no planned for the design decisions network asthe that will impede the heat pump design evolves. It is recognised contribution to that the heat be 100%, the conservative network industry will be estimation of 80% could be accepted at this experienced with the stage. The applicant should operation of be **conditioned** heat pump-led networks in a prior to few years time. occupation to This, combined provide an with changes in updated split utility costs (gas assessment to vs electricity), demonstrate may result in a that the heat

more

network where

90% or even

100% of heat

being used for CP1 compliant networks. The applicant should update the DLF and provide revised figures or provide detailed calculations for the DLF. the design of the heat network, and therefore limit the expected heat loss to 25% across the Primary and Secondary networks. This equates to the loss factor of 1.33. We believe this is a reasonable assumption to make and will be reflective of what can be achieved in reality.

originating from heat pumps represents a better approach than the current 80%/20% proposals.

maximised.

This item is outstanding.

The applicant has submitted example datasheets showing that the COP of 2.8 can be achievable.

has been

Nonetheless, at this point in time, a 80%/20% split is considered the best approach for the reasons articualted in the energy statement. For reassurance, no design decisions have been taken to date which prevent a switch to 90%/10% or indeed 100% heat pumps these options can be explored again postplanning.

Example products sheets for heat pumps which could be used for this network provided alongside these comment responses

Whole Life-Cycle Carbon Assessment

Be Seen Energy Monitoring

13	A commitment has been provided that the development will be designed to enable post construction monitoring and that the information set out in the 'Be Seen' guidance is submitted to the GLA's portal at the appropriate reporting stages. This will be secured through suitable legal wording. The 'Be Seen' reporting spreadsheet has been developed to enable development teams to capture all data offline before this is submitted via the webform. The applicant should confirm that the planning stage data has been submitted to GLA.	The Be Seen reporting spreadsheet has been completed and the information will be submitted via the webform.	Clarifications are welcomed. Submission via the webform should be confirmed. This item is outstanding.	This will be submitted very soon - update to be provided	Clarifications are welcomed. Submission via the webform should be confirmed. This item is outstanding.
Demand	Reporting				
Other po	ints				
15	The draft s106 agreement should be submitted when available to evidence the carbon offset agreement with the borough.	Note	The draft s106 agreement should be submitted when available. This item is outstanding.		The draft s106 agreement should be submitted when available. This item is outstanding.
Move res	solved comments under this section Based on the information provided,				
3	the domestic element of the proposed development is estimated to achieve a reduction of 53.2 tonnes per annum (10%) in regulated CO2 emissions compared to a 2021 Building Regulations compliant development.	Note.	Nothing further is required.		
4	Based on the information provided, the non-domestic element of the proposed development is estimated to achieve a reduction of 1 tonnes per annum (21%) in regulated CO ₂ emissions compared to a 2021 Building Regulations compliant development.	Note.	Nothing further is required.		
7	The area weighted average (MJ/m2) and total (MJ/year) cooling demand for the actual and notional building has been provided and the applicant has demonstrated that the actual	Note.	Nothing further is required.		

The applicant has carried out an investigation and there are no existing or planned district heating networks within the vicinity of the

12

local heat network connection opportunities. Evidence of the correspondence should be submitted.

The applicant is proposing a sitewide heat network supplied by a centralised energy centre. It has been confirmed that all apartments will be connected to the heat network, with the non-residential space being provided with capped off connections.

A drawing/schematic showing the route of the heat network linking all buildings/uses on the site has been provided alongside a drawing indicating the floor area, internal layout and location of the energy centre.

The applicant has provided a commitment that the development is designed to allow future connection to a district heating network and has provided a drawing showing the route from the network to the site boundary. Drawings should be provided demonstrating space for heat exchangers in the energy centre. This requirement is to be secured through a **suitable condition or legal wording.**

The applicant has submitted a WLC assessment which will be reviewed separately; comments will be provided. The WLC assessment should be presented separately in excel using the GLA's WLC assessment template and should follow the GLA WLC guidance. The

The energy officer from The London Borough of Merton has confirmed that there are no networks in proximity to the site. Evidence is provided separately.

Note. Requirement to be met through condition.

Note. To be reviewed separately.

The applicant has provided the mail correspondence with Merton energy officer that confirms that there are no existing or planned district heating networks in cl

ose proximity to the site.

Nothing further is required.

An indicative energy centre layout that shows that there is enough space for heat exchangers.

Nothing further is required.

Condition to be drafted and agreed.

Nothing further is required.

template and guidance are available here: https://www.london.gov.uk/whatwe-do/planning/implementinglondon-plan/london-planguidance/whole-life-cycle-carbonassessments-guidance. Applicants will also be conditioned to submit a post-construction assessment to report on the development's actual WLC emissions. EUI and space heating demands has been provided. The applicant has used the Part L and BREDEM methodology for these calculations.

The applicant has reported the EUI and space heating demand against Note. 14 the reference values in Table 4 of GLA guidance. The applicant has indicated the expected performance differs from the reference values due to large unregulated energy demands which can't be reduced significantly. The applicant should provide the relevant modelling output sheets 16 (i.e. DER) for the Be Green stage of the energy hierarchy.

Be Green DER Worksheets have been provided.

Nothing further is required. Nothing further is required.

Domestic (detailed)

SAP 10.2	Total residual regulated CO ₂ emissions	Regulated CO ₂ emissions reductions		
	(tonnes per annum)	(tonnes per annum)	(per cent)	
Baseline i.e. 2021 Building Regulations	513.9			
Energy Efficiency	444.5	69.4	14%	
СНР	211.3	233.2	45%	
Renewable energy	229.6	-18.3	-4%	
Total		284.3	55%	

Non-domestic (detailed)

SAP 10.2	Total residual regulated CO ₂ emissions	Regulated CO ₂ emissions reductions		
	(tonnes per annum)	(tonnes per annum)	(per cent)	
Baseline i.e. 2021 Building Regulations	4.8			
Energy Efficiency	3.8	1.0	21%	
CHP	3.8	0.0	0%	
Renewable energy	3.1	0.7	15%	
Total		1.7	36%	

Carbon offsetting (detailed)

	Shortfall (tonnes per annum)	Shortfall (£)
Domestic	230	654433
Non-domestic	3	8852
Total	233	663286



GREATER LONDON AUTHORITY



The London Sustainable Drainage Proforma

Introduction

This proforma is intended to accompany a drainage strategy prepared for a planning application where required by national or local planning policy. It should be used to summarise the key outputs from the strategy to allow assessing officers at the Lead Local Flood Authority (LLFA) to quickly assess compliance with sustainable drainage (SuDS) planning ...

The proforma is divided into 4 sections, which are intended to be used as follows:

- 1. Site and project information Provide summary details of the development, site and drainage
- 2. Proposed discharge arrangement Summarise site ground conditions to determine potential for infiltration. Select a surface water discharge method (or mix of methods) following the hierarchical approach set out in the London Plan.
- 3. Drainage strategy Prioritise SuDS measures that manage runoff as close to source as possible and contribute to the four main pillars of SuDS; amenity, biodiversity, water quality and water quantity.
- 4. Supporting information Provide cross references to the page or section of the drainage strategy report where the detailed information to support each element can be found. This may be more than one reference for each

Policy

Drainage strategies for developments in the London Borough of Merton need to comply with the following policies on SuDS:

- 1. London Borough of Merton Core Strategy policy C16.
- 2. London Borough of Merton Sites & Policies document policy DM F2.
- 3. London Plan policy 5.13 and draft New London Plan policy SI13
- 4. The National Planning Policy Framework (NPPF)

Technical Guidance

- Post-development surface water discharge rate should be limited to greenfield runoff rates. Proposals for higher
 discharge rates should be agreed with the LLFA ahead of submission of the Planning Application. Clear evidence
 should be provided with the Planning Application to show why greenfield rates cannot be achieved.
- Greenfield runoff rate is the runoff rate from a site in its natural state, prior to any development. This should be calculated using one of the runoff estimation methods set out in Table 24.1 of CIRIA C753 The SuDS Manual.
- Attenuation storage volumes required to reduce post-development discharge rates to greenfield rates should be calculated using one of the runoff estimation methods set out in Table 24.1 of CIRIA C753 The SuDS Manual.
- 'CC' refers to climate change allowance from the current Environment Agency guidance.
- An operation and maintenance strategy for proposed SuDS measures should be submitted with the Planning Application and include the details set out in section 32.2 of CIRIA C753 The SuDS Manual. The manual should be site-specific and not directly reproduce parts of The SuDS Manual.
- Other useful sources of guidance are:
 - o Merton's draft Sustainable Drainage (SuDS) Design and Evaluation Supplementary Planning Document (SPD)
- o Merton's Surface Water Drainage and SuDS general advice page
- o The London Plan Sustainable Design and Construction SPG
- o DEFRA non-statutory technical standards for sustainable drainage
- o Environment Agency climate change guidance
- o CIRIA C753 The SuDS Manual



GREATER**LONDON**AUTHORITY



	Project / Site Name (including subcatchment / stage / phase where appropriate)	Mitcham Gasworks, Western Road
	Address & post code	Mitcham Gasworks, Western Road, Mitcham, CR4 3EQ
	OS Grid ref. (Easting, Northing)	E 527407
	O3 GHd Tel. (Easting, Northing)	N 169123
tails	LPA reference (if applicable)	22/P3620
1. Project & Site Details	Brief description of proposed work	Multi storey residential development.
	Total site Area	24,300 m ²
	Total existing impervious area	8,250 m ²
	Total proposed impervious area	16,100 m ²
	Is the site in a surface water flood risk catchment (ref. local Surface Water Management Plan)?	Site is not within a critical drainage area but is at the head o fone.
	Existing drainage connection type and location	Multiple existing connections to sewers in Western Road.
	Designer Name	Samuel Hinson
	Designer Position	Senior Civil Engineer
	Designer Company	JNP Group

	2a. Infiltration Feasibility					
	Superficial geology classification	Breckearth u	ndy silt or clay nderlain by sa the Terrace G	nd and gravels		
	Bedrock geology classification		London Clay	,		
	Site infiltration rate	NOL LESTE	m/c			
	Depth to groundwater level	Vareis 0.3 -		w ground level		
	Is infiltration feasible?		No			
	2b. Drainage Hierarchy					
ements			Feasible (Y/N)	Proposed (Y/N)		
ang	1 store rainwater for later use	Υ	Υ			
ırge Arr	2 use infiltration techniques, such surfaces in non-clay areas	N	N			
2. Proposed Discharge Arrangements	3 attenuate rainwater in ponds or features for gradual release	Υ	Υ			
ropose	4 attenuate rainwater by storing ir sealed water features for gradual re		Υ	Υ		
2. P	5 discharge rainwater direct to a w	atercourse	N	N		
	6 discharge rainwater to a surface sewer/drain	water	Υ	Υ		
	7 discharge rainwater to the comb	Y	N			
	2c. Proposed Discharge Details					
	Proposed discharge location	stern Road SW	' Sewer. Portla	and Road SW Se		
	Has the owner/regulator of the discharge location been consulted?		Yes			



GREATER**LONDON**AUTHORITY



	3a. Discharge Rat	es & Required St	orage		
		Greenfield (GF) runoff rate (I/s)	Existing discharge rate (I/s)	Required storage for GF rate (m ³)	Proposed discharge rate (I/s)
	Qbar	3.4			
	1 in 1	3.9			
	1 in 30	8.7			
	1 in 100	12.4	244.9		
	1 in 100 + CC		$\geq <$		
	Climate change a	llowance used	40%		
3. Drainage Strategy	3b. Principal Method of Flow Control		Hydrobrake Manhole		
e St	3c. Proposed SuD	S Measures			
inag			Catchment	Plan area	Storage
Dra			area (m²)	(m²)	vol. (m³)
3.	Rainwater harves		TBC	$\geq \leq$	TBC
	Infiltration system	าร	0	\geq	0
	Green roofs		2830	0	0
	Blue roofs		0	0	0
	Filter strips		ТВС	0	TBC
	Filter drains		0	0	0
	Bioretention / tree pits		600	0	0
	Pervious paveme	nts	0	0	0
	Swales		0	0	0
	Basins/ponds		0	0	1712
	Attenuation tanks	5	1651		1743
	Total		5081	0	1743

	4a. Discharge & Drainage Strategy	Page/section of drainage report
	Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results	Pages 10, 12, 17
	Drainage hierarchy (2b)	12
no	Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location	Appendix G
4. Supporting Information	Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations	Appendix D & E
ting Inf	Proposed SuDS measures & specifications (3b)	Pages 13-14 Appendix D & E
por	4b. Other Supporting Details	Page/section of drainage report
Sup	Detailed Development Layout	Appendix B
4.	Detailed drainage design drawings, including exceedance flow routes	Appendix D & F
	Detailed landscaping plans	Appendix H
	Maintenance strategy	Pages 15-17
	Demonstration of how the proposed SuDS measures improve:	Pages 14, 17 & 18
	a) water quality of the runoff?	
	b) biodiversity?	
	c) amenity?	



Flood Risk Assessment and Drainage Strategy

Project:

Mitcham Gasworks, Western Road, Mitcham, CR4 3EQ

Client: St Williams Homes LLP

Reference: BR31002-JNP-XX-XX-RP-C-1000

December 2022



DOCUMENT CONTROL SHEET

Prepared By	
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Senior Civil Engineer	
Approved By	
k Director	

FOR AND ON BEHALF OF JNP GROUP

Document Issue ControlRev	Date	Description	Prepared	Checked	Approved
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1 INTRODUCTION

1.1 Terms of Reference

- 1.1.1 JNP Group has been commissioned by St Williams Homes LLP to prepare a flood risk assessment and drainage strategy for the proposed development at Mitcham Gasworks, Western Road in the London Borough of Merton, London, CR4 3EQ.
- 1.1.2 This report assesses flood risk at the development site from all potential sources and describes the measures adopted in the master planning process to manage such risks. It has been prepared in compliance with current policies and best practices.

1.2 Policy Framework and Key Stakeholders

- 1.2.1 The *National Planning Policy Framework* (NPPF) (July 2021) sets strict tests to protect people and property from flooding which all local planning authorities are expected to follow. Where these tests are not met, national policy is clear that new development should not be allowed.
- 1.2.2 In areas at risk of flooding or for sites of one hectare (ha) or more, developers must undertake a site-specific flood risk assessment to accompany applications for planning permission (or prior approval for certain types of permitted development).
- 1.2.3 In decision-taking, local planning authorities must ensure a sequential approach to site selection and master planning is followed so that development is, as far as reasonably possible, located where the risk of flooding (from all sources) is lowest, taking account of climate change and the vulnerability of future uses to flood risk.
- 1.2.4 Where development needs to be in locations where there is a risk of flooding, local planning authorities and developers must ensure development is appropriately flood resilient and resistant, safe for its users for the development's lifetime, and will not increase flood risk elsewhere.
- 1.2.5 The Environment Agency (EA) is a statutory consultee on applications where there is a risk of flooding from the sea or main rivers.
- 1.2.6 Lead local flood authorities (unitary authorities or county councils) are responsible for managing local flood risk from ordinary watercourses, surface water or groundwater, and for preparing local flood risk management strategies. Local planning authorities work with lead local flood authorities to ensure local planning policies are compatible with the local flood risk management strategy.
- 1.2.7 The London Borough of Merton (LBM) is the lead local flood authority (LLFA) and the local planning authority (LPA). Its strategy for managing local flood risk is set out in the Local Flood Risk Management Strategy (August 2014), Level 1 Strategic Flood Risk Assessment (SFRA) (November 2020), Level 2 Strategic Flood Risk Assessment (February 2021), and the Merton Sustainable Drainage Design & Evaluation Guide (March 2018).
- 1.2.8 The London Plan (March, 2021) sets out the Mayor of London's policies regarding developments in London. Policy SI 12 sates policies with respect to flood risk management and Policy SI 13 with respect to sustainable drainage.
- 1.2.9 Flood Risk Management policies are given in Policy 16 of the LBM's Core Planning Strategy (July 2011).



- 1.2.10 Flood risk management and SuDS polies are also set out in policy DM F1 and DM F2 respectively of LBM's Sites and Policies Plan (July 2014).
- 1.2.11 The site is included in Chapter 4 of LBM's draft local plan (Site Mi16), there is no specific mention of drainage or flood risk considerations for this site. Strategic Policy F8.8 of the draft local plan sets out general polices with respect to flood risk management and sustainable drainage.
- 1.2.12 Where relevant, local planning authorities and developers must also take advice from:
 - Internal drainage boards; to identify the scope of their interests.
 - Sewerage undertakers; to ensure they can assess the impact of new development on their assets and plan any required improvements. Thames Water (TW) is the local sewerage undertaker.
 - Reservoir undertakers; to avoid an intensification of development within areas at risk
 from reservoir failure and ensure they can assess the cost implications of any reservoir
 safety improvements required due to change in land use downstream of their assets.
 - Navigation authorities; in relation to developments adjacent to, or which discharge into, canals (especially where these are impounded above natural ground level).

1.3 Sources of Information

- 1.3.1 This flood risk assessment has been based on the following sources of information:
 - Bespoke topographic survey undertaken by GridPoint Surveys in February 2021;
 - British Geological Survey's Geoindex Tool; (http://mapapps2.bgs.ac.uk/geoindex/home.html)
 - Cranfield University's soils data; (http://www.landis.org.uk/soilscapes/)
 - DEFRA / EA's aquifer and source protection data (https://magic.defra.gov.uk/MagicMap.aspx)
 - British Geological Survey's borehole scans; (http://mapapps.bgs.ac.uk/geologyofbritain/home.html)
 - FEH's catchment data (https://fehweb.ceh.ac.uk/)
 - EA's Flood Map for Planning; (https://flood-map-for-planning.service.gov.uk/)
 - EA's Long Term Flood Risk Information; (https://flood-warning-information.service.gov.uk/long-term-flood-risk/map)
 - LBM's Local Flood Risk Management Strategy (August 2014);
 - LBM's Level 1 Strategic Flood Risk Assessment (SFRA) (November 2020);
 - LBM's Level 2 Strategic Flood Risk Assessment (February 2021);
 - LBM' SFRA Online Map; (https://lbmerton.maps.arcgis.com/apps/MapSeries/index.html?appid=6753ddf8656b4dc197f9f5683d7dec74)
 - LBM's Merton Sustainable Drainage Design & Evaluation Guide (March 2018);



- London Regional Flood Risk Appraisal (2018)
- TW's Asset Location Plans.



2 DEVELOPMENT SITE

2.1 Location

- 2.1.1 The development site is located off Western Road in Mitcham, London Borough of Merton (Figure 2.1 and Table 2.1).
- 2.1.2 The site is approximately 2.43ha in size and sits within the Lavender Fields Ward, located in the London Borough of Merton. It is bounded by Portland Road to the northwest, open space with Hay Drive beyond to the west, Field Gate Lane to the southeast and Western Road to the northeast.
- 2.1.3 The proposed development is on the site of an old gasworks. A large gasholder frame was present towards the north. The frame was demolished in early 2022, although the gasholder walls and below ground base remain. Other historic gasholders have already been removed. A 65m high telecommunication mast is located on site, it is proposed that a replacement mast will be provided on top of one of the development buildings. SGN retain two areas of land for operational gas use within the site. Aside from the above, and some remaining small buildings and hard standing, the site has been cleared.
- 2.1.4 Part of the site was remediated in 2010/2011 which involved the removal of buildings and a sheet piled cofferdam with chemically unsuitable material disposed offsite. A cover system was installed over any material left in-situ. These areas were remediated to a commercial end-use.

Table 2.1: Site Location

OS X	OS Y	National Grid Reference	Nearest Postcode
527400	169133	TQ 27400 69133	CR4 3EQ







2.2 Topography

- 2.2.1 The available topographic information (Appendix A) shows that ground levels within the development site range between 17.0 m AOD and 19.9 m AOD. The development site generally falls to the north with the south west corner falling to the south.
- 2.2.2 The site is generally elevated above the adjacent roads.

2.3 Hydrology

- 2.3.1 The River Wandle is approximately 1 km west of the development site. It is classified as a tributary of the River Thames.
- 2.3.2 Three Kings Pond is located approximately 600 m south east of the development site.
- 2.3.3 There are no water bodies located on the development site.

2.4 Geology and Hydrogeology

- 2.4.1 In accordance with BGS' *Geoindex*, the development site lies on superficial deposits of Taplow Gravel Member Sand and Gravel underlain by London Clay Formation Clay and Silt bedrock. Cranfield University's *Soilscapes* describes the site's soils as "loamy soils with naturally high groundwater".
- 2.4.2 DEFRA / EA's *MAGIC* classifies the site's superficial deposits as Secondary A Aquifer and its bedrock as unproductive.
- 2.4.3 The EA defines Secondary A Aquifers as "permeable layers capable of supporting water supplies at a local rather than strategic scale, in some cases forming an important source of base flow to rivers".
- 2.4.4 The EA defines Unproductive Strata as "layers of rock or drift deposits with low permeability that have a negligible significance for water supply or river base flow".
- 2.4.5 In accordance with DEFRA / EA's *MAGIC*, the site is partially in a groundwater source protection zone (Zone 2). The north west of site is within a source protection zone, while the south east is not.
- 2.4.6 Outer zone (Zone 2) is defined as "the 400-day travel time from any point below the water table to the groundwater source".
- 2.4.7 Records of four boreholes within 250 m of the site were obtained from BGS' *Geology of Britain Viewer* (Appendix A) The boreholes identified varying thicknesses of made ground.
- 2.4.8 Historical site investigation works have confirmed that made ground is present across the site with an average depth of 1.8m below ground level.
- 2.4.9 The natural ground consists of gravelly sandy silt or clay of the Head Breckearth underlain by sand and gravels of the Terrace Gravel. These layers are underlain by London Clay.
- 2.4.10 Groundwater was encountered at depths between 0.3 m bgl and 2 m bgl.
- 2.4.11 Historical site investigation works has previously identified the contaminants related to the former gasworks, part of the site has been remediated to commercial end use, refer to the Preliminary Geo-Environmental Risk Assessment for further details on this.
- 2.4.12 Based on the available geological, hydrogeological and geo-environmental information namely soil permeability, shallow groundwater and contamination present across the site infiltration drainage is deemed unfeasible at the development site.



3 PROPOSED DEVELOPMENT

- 3.1.1 The proposed development (Figure 3.1 and Appendix B) comprises 2.43 ha, including 1.61 ha of impermeable surfaces (e.g., roofs, roads, driveways, parking areas, etc.) and 0.82 ha of permeable surfaces (e.g., gardens, green corridors, public open spaces, etc.).
- 3.1.2 Under *Table 2* of the *Flood Risk and Coastal Change Guidance* (March 2014), the proposed residential development is classified as more vulnerable.





4 FLOOD RISK ASSESSMENT

4.1 Overview

4.1.1 All potential sources of flood risk at the development site have been assessed based on the information listed in Section 1.3 and are summarised in Table 4.1. The key sources of flood risk to the proposed development are further described in the ensuing sections.

Table 4.1: Potential Sources of Flood Risk

140.0 112.1 040.144.000 01.1004.146.		
Source Flood Risk		
Coastal	Very low risk, site levels >17 m AOD.	
Fluvial	Very low risk, site entirely in Flood Zone 1.	
Surface Water	Very low risk in general, but low risk in the centre of site.	
Groundwater	Low to medium risk due to shallow groundwater	
Sewers	Low risk as no sewers cross the site, but sewers located near site.	
Infrastructure Failure	No risk, no reservoirs near the site.	

4.2 Climate Change

- 4.2.1 The NPPF sets out how the planning system should help minimise vulnerability and provide resilience to the impacts of climate change. This includes demonstrating how flood risk will be managed now and over the development's lifetime, taking climate change into account.
- 4.2.2 In accordance with the EA's guidance *Flood Risk Assessment: Climate Change Allowances* (May 2022), the proposed development with anticipated life span into the 2080's (2070 to 2115) must take account of the following allowances:
 - Peak River Flows (Thames River basin district)

• Central	1/%
Higher Central	27%
Upper End	54%
Peak Rainfall Intensity	
Central	20%

Upper End......35%

4.3 Fluvial Flood Risk

- 4.3.1 Fluvial flooding occurs when a catchment area receives greater than usual amounts of water (e.g., rainfall or snow melt). When the converging runoff exceeds the conveyance capacity of the receiving channel, water spills onto the surrounding floodplains and fluvial flooding occurs.
- 4.3.2 Fluvial flooding usually occurs hours or days after heavy and / or prolonged rainfall and its effects often last several hours or days.
- 4.3.3 Besides posing a direct flood risk to floodplain areas, high water levels in watercourses can exacerbate other sources of flood risk by surcharging / locking outfalls, thus preventing the normal discharge of flows or even back flowing into tributary drainage systems.
- 4.3.4 In accordance with the EA's *Flood Map for Planning* (Figure 4.1), the development site is in Flood Zone 1 (0.1% AEP).



4.3.5 The site does not benefit from formal flood defences.

Other Sports
Facility

Allotments

Liberty
Primary School

Play Space
Play Sp

Figure 4.1: Flood Map for Planning

- 4.3.6 LBM's Level 1 strategic flood risk assessment states that "flooding has been recorded from the River Wandle on June 24th 2016, and June 10th 2019". The SFRA does not provide any additional information on historic fluvial flood events in the vicinity of the development site.
- 4.3.7 The overall fluvial flood risk at the development site is deemed as very low.

4.4 Surface Water Flood Risk

- 4.4.1 Surface water flooding is a description for excessive overland flows that have yet to enter a natural or manmade receptor (e.g., aquifer, watercourse or sewer). Surface water flooding also occurs when the amount of runoff exceeds the capacity of the collecting system and spills onto overland flow routes.
- 4.4.2 Surface water flooding is usually the result of very intense, short lived rainfall events, but can also occur during milder, longer lived rainfall events, when collecting systems are at capacity or the ground is saturated. It often results in the inundation of low points in the terrain.
- 4.4.3 In accordance with the EA's Long Term Flood Risk Information (Figure 4.2), the development site is mostly at very low (< 0.1% AEP) risk of surface water flooding with small areas of low (0.1% to 1.0% AEP) risk in the centre of the site. However, the site is adjacent to prominent overland flow paths along Portland Road and Western Road which are at low (0.1% to 1.0% AEP), medium (1.0% to 3.3% AEP) and high (> 3.3% AEP) risk of surface water flooding.



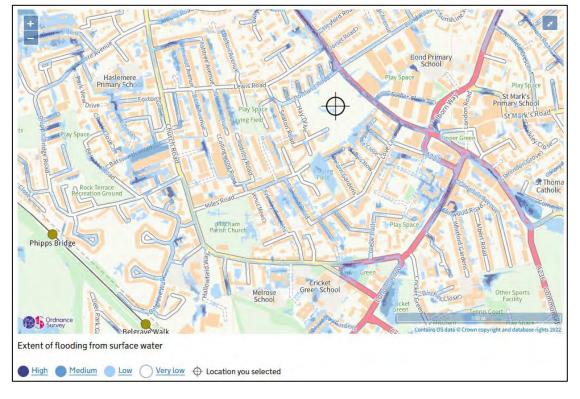


Figure 4.2: Flood Risk from Surface Water

- 4.4.4 LBM's s Level 1 Strategic Flood Risk Assessment is based on the EA's Long Term Flood Risk Information. There are 276 records of surface water flooding recorded on the LBM SFRA Online Map, no events are recorded at the development site
- 4.4.5 According to the LBM Local Flood Risk Management Strategy (2014) the site is at the upstream end of the East Merton Critical Drainage Area (CDA 010). Although the site itself is unlikely to be affected by the known flooding issues associated with this (which are understood to occur some distance to the north of the development) it is an upstream part of the catchment and will contribute flows to the area.
- 4.4.6 The on-site areas indicated as low risk on the mapping are due to topographical low spots and are not part of overland flow paths, no buildings are proposed within these low spots. The topography of the site will change as part of the development works and the on-site surface water flood risk will be managed by directing overland flows away from proposed buildings.
- 4.4.7 The site is elevated relative to the prominent overland flow paths of adjacent roads
- 4.4.8 The overall surface water flood risk at the development site is deemed as very low, with small parts of site being considered as low risk.

4.5 Groundwater Flood Risk

4.5.1 Groundwater flooding occurs when the level of water filling the pores and / or cracks in the underlying soil and / or rock (i.e., water table) rises and emerges on the surface. The level of the water table varies seasonally and depends upon long term rainfall, thickness and porosity of the underlying strata and groundwater abstraction.



- 4.5.2 Groundwater flooding is most common in areas where the underlying bedrock and superficial deposits are very porous, but it can also happen at locations where superficial layers of sand or gravel overlay impermeable bedrock.
- 4.5.3 Groundwater flooding usually occurs after days or weeks of prolonged rainfall and often lasts for days or weeks, as subsiding of the water table can be a very slow process.
- 4.5.4 Besides posing a direct flood risk to developments (particularly basements), high water table levels can exacerbate other sources of flood risk by preventing infiltration and / or leaking into drainage systems.
- 4.5.5 LBM's Level 1 strategic flood risk assessment identifies the site as being within an area of increased potential for elevated groundwater due to permeable superficial deposits. No history of groundwater flooding at the development site is recorded in the SFRA.
- 4.5.6 Shallow groundwater was encountered during ground investigation works.
- 4.5.7 The groundwater flood risk will be managed by directing emerging overland flows away from proposed buildings, as indicated on the appended Flood Routing Layout (Appendix F).
- 4.5.8 The overall groundwater flood risk at the development site is deemed as low to medium.

4.6 Sewer Flood Risk

- 4.6.1 Sewer flooding occurs when a manmade drainage system receives greater than usual amounts of water and the overwhelmed system starts overflowing at gullies and manholes, thus generating overland flows.
- 4.6.2 Sewer flooding is usually the result of very intense, short lived rainfall events, but can also occur during milder, longer lived rainfall events, when outfalls become surcharged / locked by high water levels in the receiving feature.
- 4.6.3 In addition to a flood risk, overflowing combined sewers also pose a significant public health and environmental risk.
- 4.6.4 LBM's level 1 strategic flood risk assessment affirms that "The London Borough of Merton PFRA states that the West Barnes, Raynes Park and Colliers Wood areas in particular are known to experience sewer flooding during heavy rainfall." However, the development site is not located within any of these areas. No additional information regarding historic flooding is offered in the SFRA.
- 4.6.5 Consultation with LBM has confirmed that there are long term sewer flooding issues within Western Road to the north of the site particularly around Liberty Primary School and the adjacent surgery. This is downstream of the site and therefore is not a risk to the development. Development of this site will alleviate the downstream flood risk by reducing the peak surface water discharge rates as outlined in Section 6 of this report.
- 4.6.6 TW's asset location plans (Appendix A), show several public sewers within the roads bounding the development site. The site is elevated relative to these roads. There is no record of sewers crossing the site.
- 4.6.7 The overall sewer flood risk at the development site is considered low.



5 FLOOD RISK MANAGEMENT

5.1 Sequential and Exception Tests

- 5.1.1 The sequential, risk-based approach to the location of development is designed to ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk. The aim is to keep development out of medium and high flood risk areas (Flood Zones 2 and 3) and areas affected by other sources of flooding where possible.
- 5.1.2 Application of the sequential approach in the master planning process, in particular application of the *Sequential Test*, helps ensure that development can be safely and sustainably delivered, and developers do not waste resources promoting proposals which are inappropriate on flood risk grounds.
- 5.1.3 The *Sequential Test* ensures that a sequential approach is followed to steer new development to areas with the lowest risk of flooding from any source.
- 5.1.4 The proposed development is located entirely in Flood Zone 1 and no buildings are proposed within the isolated areas identified at low surface water flood risk, therefore, the requirements of the sequential test have been met and the exception test is not required.

5.2 Flood Risk Management Measures

- 5.2.1 The following flood risk management measures will be incorporated in the proposed development:
 - Finished floor levels will be set 150 mm above surrounding external levels.
 - External ground levels shall be designed to safely route overland flows away from buildings, as indicated on the appended Flood Routing Layout Appendix F).
 - The location and depth of proposed SuDS and underground structures (e.g., foundations and drainage infrastructure) must consider groundwater levels in their design and construction.



6 SURFACE WATER DRAINAGE STRATEGY

6.1 Existing Drainage

- 6.1.1 There are existing public sewers within the roads adjacent to the site. According to records there is a surface water sewer within Portland Road, a combined trunk sewer and a surface water sewer within Western Road, and a foul water sewer within Field Gate Lane.
- 6.1.2 Due to the remediation and demolition works that have been previously undertaken the majority of the site is currently scrubland. It is estimated that 8,250 m² (33%) of the site remains impermeable consisting of concrete and tarmac surfacing, and the remaining buildings (see plan in Appendix C).
- 6.1.3 Rainfall of 50mm/hr gives an existing brownfield rate of 115 l/s (8,250 m² x 50 mm/hr / 3,600s).
- 6.1.4 Utility tracing has been undertaken which identified a number of existing surface water drainage manholes and sewer runs associated with the remaining buildings and hardstanding areas. Connectivity to the public sewers has not been proved but lateral connections from manholes on the site boundary were found, heading in the direction of the public sewers in the road. Therefore, it is likely that the site drains to the surface water sewers within Western Road. There is no evidence of existing flow controls on site, therefore, any current discharge to the public sewers will be unrestricted.
- 6.1.5 Most of the site, including the majority of the buildings and hardstanding areas, is not served by any form of positive drainage. It is anticipated, therefore, that the majority of surface water runoff follows the natural topography of the site and flows to the northeast and is picked up by gullies within Western Road and Portland Road prior to discharge to the public sewers.
- 6.1.6 Greenfield runoff rates of 1.4 l/s/ha (100.0% AEP), 1.6 l/s/ha (Q_{BAR}), 3.6 l/s/ha (3.3% AEP) and 5.1 l/s/ha (1.0% AEP) have been established for the development site using the *IH124* methodology with *ICP SuDS* correction for small catchments (Appendix E).

6.2 Proposed Drainage Strategy

6.2.1 Based on the available geo

- Based on the available geological, hydrogeological and geo-environmental information namely soil permeability, shallow groundwater and contamination present across the site infiltration drainage is ruled out. There are no watercourses within the vicinity of the site. In accordance with the drainage hierarchy, and Policy SI 13 of the London Plan, surface water disposal will therefore be to the public surface water sewers.
- 6.2.2 There are two public surface water sewers at the junction of Portland Road and Western Road Appendix A) which would be suitable outfalls. TW have confirmed via a pre-planning enquiry (5th October 2022) that attenuated surface water can connect to the chamber 4201 (Appendix F).
- 6.2.3 The proposed surface water drainage strategy has been designed in accordance *Building Regulations Part H* and in compliance with the *NPPF;* local requirements including the London Plan, LBM's Core Planning Strategy and LBM's draft Local Plan; and current best practices[†], to collect, convey and attenuate runoff from all impermeable areas before discharge into an existing public sewer.

[†] e.g. Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015) and The SuDS Manual (2015).



- 6.2.4 Given the unfeasibility of infiltration drainage, the volume of runoff leaving the proposed development cannot be reduced to greenfield and the excess volume must be discharge at a low rate that will not pose a flood risk downstream of the site. In accordance with Section 6 of LBM's Sustainable Drainage and Design Evaluation Guide the proposed drainage strategy has been designed to limit the discharge rate to three times the greenfield rate which given a proposed impermeable area of 1.61 ha is 7.7 l/s (1.6 l/s/ha x 1.61 ha x 3). A site-wide discharge rate of **7.5 l/s** is proposed, providing a further slight betterment.
- 6.2.5 Two separate surface water discharge points are now proposed, following feedback from LBM. 1.4 l/s shall discharge to the 225mm surface water sewer at the existing manhole TW MH3101 within Portland Road and 6.1 l/s shall discharge to the 225mm surface water sewer at the existing manhole TW MH4207 at the junction of Portland Road and Western Road.
- 6.2.6 The proposed drainage strategy (Appendix D) has been designed so that:
 - flooding does not occur on any part of the site for all events up to 3.3% AEP (1 in 30 years);
 - flooding does not occur in any part of a building or utility plant susceptible to water for all events up to 1.0% AEP (1 in 100 years) + 40% climate change allowance.
- 6.2.7 The performance of the proposed surface water drainage strategy has been tested for storm events with 100.0% AEP, 3.3% AEP and 1.0% AEP + 40% climate change and durations of 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640 and 10080 minutes.
- Attenuation storage will be provided within three podium deck slab tanks within green / blue roofs, and five below ground geocellular crate tanks beneath parking and landscaped areas. The tanks have been sized to attenuate flows up to the 1 in 100 year +40% critical event, as per the Proposed Drainage Layout in Appendix D and calculations in Appendix E. Additionally, raingardens are proposed across the site to provide conveyance, treatment, and some attenuation. Filter drains will be provided alongside roads to provide conveyance and treatment.
- 6.2.9 The results of the simulations are included in Appendix E and demonstrate how the proposed surface water drainage strategy can manage surface water flood risk at the development site without increasing flood risk elsewhere for storm events up to the 1.0% AEP + 40% climate change allowance.
- 6.2.10 Blue / green and brown roofs are proposed across the development as indicated on the landscaping layouts, Appendix H These features will intercept runoff at source and provide some degree of attenuation.
- 6.2.11 Rainwater harvesting will also be provided. Indicative locations for two rainwater harvesting tanks are shown on the Proposed Drainage Layout in Appendix D. The detail and sizing of the system will be determined at detailed design stage.

6.3 Sustainable Drainage Systems (SuDS)

6.3.1 In accordance with the *NPPF*, (major) developments should incorporate sustainable drainage systems (SuDS) unless there is clear evidence that this would be inappropriate. In addition to water quantity control, SuDS should consider opportunities to provide water quality and amenity / biodiversity benefits (i.e., multifunctionality approach).



- 6.3.2 A wide range of SuDS are proposed for this scheme as indicated on the drainage strategy (Appendix D) and landscaping layouts (Appendix H), additionally filter drains shall be provided alongside proposed roads. Descriptions of the proposed SuDS are provided within Table 6.1.
- 6.3.3 It is important to note the need to remove silt from runoff prior to discharge into SUDS features. The rain gardens and filter drains are sustainable alternatives to proprietary treatment systems otherwise required to manage silt.

Table 6.1: Sustainable Drainage Systems (SuDS)		
SuDS Component	Description and Opportunities	
Green / Blue Roofs	Green roofs are areas of living vegetation installed on the top of buildings for a range of reasons including visual benefit, ecological value, enhanced building performance and reduction of surface water runoff. A blue roof is a roof designed explicitly to store water for use within the building (rainwater harvesting) or controlled discharge. Green roofs that include reservoir storage zones beneath the growing medium could also be considered blue roofs.	
	Green roofs can improve the thermal performance of buildings, help combat the urban heat island effect and contribute to improved air quality.	
	Through evapotranspiration, green roofs can reduce peak flow rates to a site drainage system (principally for small and medium-sized events) but are unlikely to a have a significant impact on downstream attenuation storage requirements. Blue roofs can be designed to provide significant attenuation (and evapotranspiration).	
	The higher density zones of the proposed development offer ample opportunities to implement green / blue roofs on the top of buildings and on the courtyards above podium parking.	
Rain Gardens	Rain gardens are shallow landscaped depressions that can reduce runoff rates and volumes and treat pollution. They also provide attractive landscape features and biodiversity.	
	Rain gardens can help reduce flow rates from a site by promoting infiltration / evapotranspiration and providing some attenuation storage. Rain gardens can also provide very effective treatment functionality.	
	Rain gardens are a very flexible surface water management component that can be integrated into a wide variety of developments / densities using different shapes, materials, planting and dimensions.	
Filter Drains/Strips	Filter drains are trenches filled with stone/gravel that create temporary subsurface storage for the filtration, attenuation, and conveyance of surface water runoff. Ideally, filter drains receive lateral inflow from adjacent impermeable surfaces pre-treated over a filter strip.	
	Filter drains can help manage peak flows by naturally limiting rates of conveyance through the filter medium and by providing attenuation storage when the rate of flow at the outlet is controlled.	
	Filter drains can be effectively incorporated into the landscape and public open spaces and can have minimal land take requirements. The use of filter drains is typically restricted to flat sites (unless placed parallel to contours).	
	Filter drains are best located adjacent to (small) impermeable surfaces such as car parks and roads / highways.	
Attenuation Storage Tanks	Attenuation storage tanks are used to create a below-ground void space for the temporary storage of surface water before use, infiltration or controlled release.	
	Attenuation storage tanks can help reduce flow rates from a site by providing significant attenuation storage. Storage tanks do not provide any form of treatment of surface water runoff and therefore need to be combined in a "management train" with other methods that do provide suitable treatment of all relevant pollutants (coarse sediment must always be removed upstream of a storage tank).	
	The inherent flexibility in size and shape of the typical attenuation storage tank systems means that they can be tailored to suit the specific characteristics and requirements of any site. However, the lack of amenity and biodiversity benefits means that storage tanks should be a last resource in any surface water drainage strategy for a major development.	



6.4 Exceedance Events

6.4.1 Buildings levels are set at least 150 mm above external ground levels and external ground levels have been designed to safely route overland flows away from buildings, using the less vulnerable parts of the proposed development such as public open spaces, parking areas and roads to convey and store overland flows.

6.5 Water Quality Management

6.5.1 The suitability of the proposed drainage strategy to manage the development's pollution risk has been assessed using the simple index approach in *The SuDS Manual* (2015), as summarised in Table 6.2.

Table 6.2: Surface Water Quality Management (Simple Index Approach)

Runoff Route / Treatment Train 1					
Land Use / SuDS	Hazard Level	TSS	Metals	Hydro-Carbons	
Pollution Hazard Indices					
Residential Roofs	Very Low	0.20	0.20	0.05	
Driveways, residential car parks and low traffic roads	Low	0.50	0.40	0.40	
SuDS Mitigation Indices					
Filter drains - 0.40 0.40 0.40					
Total SuDS Mitigation Index ≥ Pollution Hazard Index (for metals and Hydro-Carbons)					

Runoff Route / Treatment Train 2				
Land Use / SuDS	Hazard Level	TSS	Metals	Hydro-Carbons
	Polls	ution Hazard Indices		
Residential Roofs	Very Low	0.20	0.20	0.05
Driveways, residential car parks and low traffic roads	Low	0.50	0.40	0.40
	SuDS Mitigation Indices			
Bioretention System (rain gardens) - 0.80 0.80 0.80				
Total SuDS Mitigation Index ≥ Pollution Hazard Index (for each contaminant type)				

6.5.2 For 'Treatment Train 1' (Table 6.2) the pollution hazard index for total suspended solids (TSS) is just less than SuDS mitigation index provided by the proposed filter drains. It is proposed that catchpit chambers are used within the network to provide the additional means for the removal of suspended solids.

6.6 Operation and Maintenance

- 6.6.1 The function of the surface water drainage system must be understood by those responsible for maintenance, regardless of whether individual components are below ground or on the surface. In any system properly designed, monitored and maintained, performance deterioration can usually be minimised.
- 6.6.2 The long-term operation and maintenance of the proposed surface water drainage strategy will be the responsibility of the entities, as detailed in Table 6.3. Appropriate legal agreements defining maintenance responsibilities and access rights over the lifetime of the proposed development must be established prior to construction.



Table 6.3: Entities Responsible for SuDS Maintenance

SuDS Component	Location	Function	Responsible Entity
Rain Gardens	Public open spaces	Store & treat runoff	Private management company
Filter Drain	Public open spaces	Store & treat runoff	Private management company
Blue / Green Roofs	Roofs	Store & treat runoff	Private management company
Attenuation Storage Tanks	Public open spaces, below parking and on roofs	Store runoff	Private management company

- 6.6.3 Where the user of a system is not responsible for maintenance, then it is important to ensure that they know when the SuDS is not functioning correctly and who to contact if any issue arises.
- 6.6.4 Maintenance plans are often required to clearly identify who is responsible for maintaining proposed SuDS as well as the maintenance regime to be applied. Maintenance plans can also form a useful tool for public engagement with SuDS and understanding their wider benefits. The maintenance requirements of the proposed surface water drainage strategy are summarised in Table 6.4.

Table 6.4: Typical Operation and Maintenance Requirements

		SuDS Component		
Operation and Maintenance Activity	Bioretention System (Rain gardens)	Filter Drain	Attenuation Storage Tank	Blue / Green Roofs
Regular Maintenance				
Inspection				
Litter and debris removal				
Grass cutting				
Weed and invasive plant control				
Shrub management (including pruning)				
Shoreline vegetation management				
Aquatic vegetation management				
Occasional Maintenance				
Sediment management				
Vegetation replacement				
Vacuum sweeping and brushing				
Remedial Maintenance				
Structure rehabilitation/repair				
Infiltration surface reconditioning				

Key:



	SuE	S Cor	nponen	t
Operation and Maintenance Activity	Bioretention System (Rain gardens)	Filter Drain	Attenuation Storage Tank	Blue / Green Roofs

Will be required
□ May be required

6.7 Consultation with London Borough of Merton Drainage Team – Pre-Planning

- 6.7.1 A pre-application meeting was held with the London Borough of Merton drainage team on 6th June 2022.
- 6.7.2 The drainage officers provided information regarding the long-term sewer flooding issues within Western Road, to the north of the site, particularly around Liberty Primary School and the adjacent surgery. Following the meeting, Thames Water were consulted and advised that they were unaware of these flooding issues or at least had no record on their system. Thames Water later confirmed, in their pre-application response, that the proposed surface water discharge rate and connection point are acceptable (Appendix G).
- 6.7.3 It should also be noted that proposed discharge rate of 7.5 I/s provides a significant betterment over the existing brownfield rate of 115 I/s. This will free up capacity within the existing sewer network.
- 6.7.4 The drainage officers also raised questions about the potential to increase green SuDS features. The strategy has since been reviewed to increase the number and size of rain gardens (the total area has increased from 253 m² to 600 m²). Blue / green roofs will also be provided on the three largest blocks, covering an area of 2,800m² (Appendix H). Although these SuDS features cover a significant area of the site, and provide water quality and amenity benefits, by their nature they do not provide significant storage volumes. Given the requirement to restrict the discharge rate to 3x greenfield, tanks are still required to provide the necessary storage volume.

6.8 Consultation with London Borough of Merton Drainage Team – Planning Consultation

- 6.8.1 In response to the submission of revision P01 of this report with the planning application the Merton drainage officers have raised some further points which are addressed here. Some of the points are similar to those raised by the Greater London Authority so these are addressed in Section 6.9.
- 6.8.2 Given the site's former use as a gasworks, residual contamination is known to exist at depth. Although remediation to protect controlled waters has previously been completed to the satisfaction of the Environment Agency on part of the site under planning permission 06/P2627, an infiltration solution for drainage of the proposed development is considered unsuitable in this case, due to the potential to mobilise and distribute the residual contamination across a wider area. For this reason, no infiltration testing has been carried out.



- 6.8.3 The drainage officers have raised concerns about the single point of connection previously proposed at the Portland Road / Western Road junction where they advise flooding has occurred numerous times.
- TW have been consulted on the proposed single point of connection and in their 'Confirmation of Capacity' (Appendix G) have raised no objection. As noted, the attenuated discharge rate provides a significant betterment over the existing brownfield rates and will therefore free up capacity within the existing network. To provide further resilience, it is now proposed that a second discharge point is provided to the 225mm surface water sewer within Portland Road as indicated on the appended drainage layout (Appendix D).
- 6.8.5 All SuDS features have now been indicated and dimensioned on the appended drainage layout, with the exception of the highway filter strips which have been identified as suitable for receiving runoff from impermeable areas, the precise location and dimensions of these features will be confirmed at detailed design stage.
- Comments have been raised in relation to the balance of above and below ground storage. Whilst large areas of the site are set aside for SuDS features (rain gardens, green roofs, etc) which provide runoff treatment and source control, these do not offer significant storage volumes. Due to the significant volume of attenuation required to meet the discharge rate the design team have looked to utilise tanks beneath roads, buildings, and within the proposed blue / green roofs. This approach finds a balance of maximising SuDS at source and working with the site layout and other design requirements. To reduce the number of below ground tanks, significant areas of the site would need to be set aside for SuDS features such as attenuation basins, which would unacceptably and significantly reduce the area of useable open space, child play space, limit the routes through the site, and / or reduce building footprints.
- 6.8.7 The scheme has sought to maximise drainage features that provide amenity, biodiversity and water quality benefits by utilising source control SuDS wherever possible, whilst also providing the necessary attenuation volumes to provide a significant betterment over existing runoff rates. It is therefore the option of the design team that the proposals are more than compliant with local and national guidance

6.9 Consultation with the Greater London Authority

- 6.9.1 In response to the submission of revision P01 of this report with the planning application the Greater London Authority provided a 'Water Memo: Stage I Comments'. This report has been updated to suit and responses to the comments are provided below.
- 6.9.2 The site has been has assessed as having a low to medium groundwater flood risk, although there is no record of groundwater flooding in the vicinity of the stie, it is an area where high groundwater is anticipated. A flood routing layout is now appended to show how overland flows will be directed away from proposed buildings, safely routing any emergent ground water and any other residual flood risks.
- 6.9.3 The proposed impermeable area has been clarified as 1.61 ha.
- 6.9.4 Greenfield runoff calculations are provided in Appendix E.
- 6.9.5 Justification as to why the proposed discharge rate cannot be lowered from 7.5 I/s to the greenfield runoff rate has been requested.



- 6.9.6 The MicroDrainage 'Quick Storage Estimate' tool has been used to assess the storage implications of reducing the discharge rate. Using the greenfield rate of 2.6 l/s it is estimated that the total storage volume would need to increase by 22%. The proposed discharge rate of 7.5 l/s requires a total attenuation volume of 1,743 m³ split between 8 tanks, it is estimated that approximately 384 m³ of additional attenuation volume would need to be provided. Based on a tank height of 1.2m (the maximum achievable given level constraints) this equates to an additional area of 320 m²
- 6.9.7 Due to the contaminated nature of the site, the constraints of the gas main and associated easements, the available space on the site for additional attenuation is limited. The potential reduction in building footprint required to accommodate this additional tank is illustrated in Figure 3.
- 6.9.8 It is having been judged that, given the site constraints, the proposals offer an appropriate and balanced approach, providing a significant volume of attenuation and a betterment over the existing situation, without encroaching too much on developable area.



Figure 3 Additional Tank Footprint



7 FOUL WATER DRAINAGE STRATEGY

- 7.1.1 Sewerage undertakers have a legal obligation under the Water Industries Act 1991 to provide developers with the right to connect to public (foul) networks. The Water Industries Act 1991 also contains safeguards to ensure that flows resulting from new developments do not cause detriment to the existing public sewerage networks by imposing a duty on sewerage undertakers to carry out works required to accommodate additional flows into their networks.
- 7.1.2 The undeveloped development site does not benefit from a formal foul water drainage system, but in accordance with records obtained from TW (Appendix A), Western Road immediately east of the site is served by a public network of combined sewers.
- 7.1.3 Foul water will drain via gravity to the existing combined sewers within Western Road.
- 7.1.4 TW have confirmed via a pre-planning enquiry response (5th October 2022) that the combined sewer in Western Road has capacity to accommodate the additional foul water flows (Appendix G).

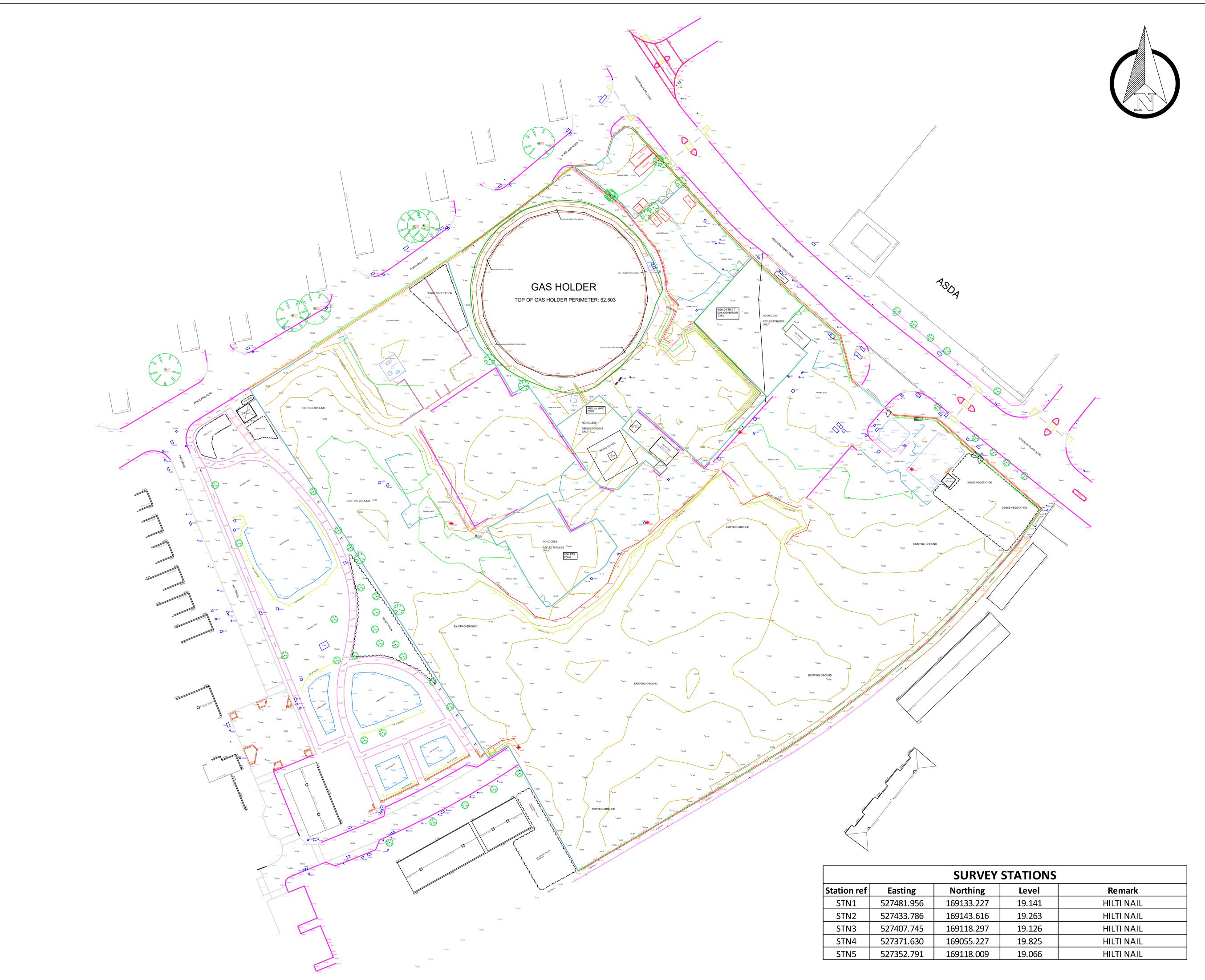


8 CONCLUSIONS AND RECOMMENDATIONS

- 8.1.1 The proposed development site at Mitcham Gasworks has a very low risk of coastal and fluvial flooding, a very low to low risk of surface water flooding, a low risk of sewer flooding, a low to medium risk of groundwater flooding and no risk of infrastructure failure flooding.
- 8.1.2 Appropriate mitigation will be included within the detailed design of the development to manage any risks. This will include:
 - Finished floor levels will be set 150 mm above surrounding external levels.
 - External ground levels shall be designed to safely route overland flows away from buildings.
 - The location and depth of proposed SuDS and underground structures (e.g., foundations and drainage infrastructure) must consider groundwater levels in their design and construction.
- 8.1.3 As the site is entirely located in Flood Zone 1, and no buildings are proposed within areas of low surface water risk, the requirements of the Sequential Test have been met.
- 8.1.4 Infiltration is deemed unfeasible at the development site due to soil permeability, shallow groundwater and contamination present across the site
- 8.1.5 A wide range of SuDS will be incorporated across the site in the form of rain gardens, filter drains, blue / green and brown roofs, and attenuation tanks. The scheme has been designed with a large area of central landscaping with linear rain gardens at ground floor. These rain gardens have been maximised whilst also looking to maintain the usability of the landscaping.
- 8.1.6 Surface water will discharge via gravity to the public surface water sewer and restricted to a rate of 7.5 l/s, which is less than three times the greenfield rate. On-site storage will be provided for all storm events up to the 1 in 100 year + climate change event.
- 8.1.7 Foul water will discharge via gravity to the public combined sewers in Western Road.
- 8.1.8 The proposals have been developed in compliance with polices SI 12 and SI 13 of the London Plan (March 2021) policy 16 of the LBM's Core Planning Strategy (July 2011) and policies DM F1 and DM F2 of the LBM's Site and Polices Plan (July 2014).



APPENDIX A SITE INFORMATION



NOTES



SURVEY CONTROL STATION



BACK OF KERB LINE SPOT LEVELS TAKEN FROM TOP



OF KERB



MH/ IC COVER LEVELS



BRICK WALL SPOT LEVELS TAKEN AT TOP



EXISTING GROUND SPOT LEVEL



EAVES LEVEL



RIDGE HEIGHTS

- 1. THIS SURVEY IS ACCURATE AS OF 6TH FEB' 2021
- 2. THE ACCURACY AND AMOUNT OF DETAIL SHOWN IS ONLY EQUIVALENT WITH THE GEOGRAPHICAL SCALE OF MAPPING. CARE SHOULD BE TAKEN WHEN USING LARGER SCALES
- 3. DO NOT SCALE FROM THIS DRAWING. WORK FROM FIGURED DIMENSIONS ONLY
- 4. ALL DIMENSIONS SHOWN ON THIS DRAWING ARE IN METRES UNLESS OTHERWISE STATED
- ALL LEVELS SHOWN ON THIS DRAWING ARE IN METRES AOD UNLESS OTHERWISE STATED
- 6. ALL DIMENSIONS, LEVELS AND SURVEY GRID CO-ORDINATES ARE TO BE CHECKED ON SITE AND THE ENGINEER NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO THE COMMENCEMENT OF THE WORKS
- 7. GPS COORDINATED CONTROL STATIONS WERE
 USED AS A BASE IN WHICH TO RELATE THE SURVEY
 BACK TO ORDNANCE SURVEY GRID
- ANY DESIGN UNDERTAKEN BASED ON THIS TOPO SURVEY SHOULD BE CONSULTED WITH GRIDPOINT IN THE FIRST INSTANCE



GRIDPOINT

SITE ENGINEERS



0118 466 0293

Albany House, 14 Shute End Wokingham, Berkshire, RG40 1BJ

www.grid-point.co.uk enquiries@grid-point.co.uk

Job Title:

ST WILLIAM HOMES
MITCHAM GAS HOLDER

Title:

TOPOGRAPHICAL SURVEY

Drawing No.		Rev.:
STWH-R397-05		Α
Date:	Scale:	
13.02.2021	NTS	
Drawn by:	Checked	d by:
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INFORMATION



JNP Group

BRISTOL BS1 4UA

Search address supplied Mitcham Gas Works

Western Road Mitcham London CR4 3ED

Your reference Mitcham Gas Works

Our reference ALS/ALS Standard/2021_4476654

Search date 28 July 2021

Knowledge of features below the surface is essential for every development

The benefits of this knowledge not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility of any development.

Did you know that Thames Water Property Searches can also provide a variety of utility searches including a more comprehensive view of utility providers' assets (across up to 35-45 different providers), as well as more focused searches relating to specific major utility companies such as National Grid (gas and electric).

Contact us to find out more.



Thames Water Utilities Ltd Property Searches, PO Box 3189, Slough SL1 4WW DX 151280 Slough 13



searches@thameswater.co.uk www.thameswater-propertysearches.co.uk





Search address supplied: Mitcham Gas Works, Western Road, Mitcham, London, CR4 3ED

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This searchprovides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0800 009 4540, or use the address below:

Thames Water Utilities Ltd Property Searches PO Box 3189 Slough SL1 4WW

Email: searches@thameswater.co.uk

Web: www.thameswater-propertysearches.co.uk



Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an 'as constructed' record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and



pressure test to be carried out for a fee.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public
 water mains in the vicinity of the property. It should be possible to estimate the
 likely length and route of any private water supply pipe connecting the property to
 the public water network.

Payment for this Search

A charge will be added to your suppliers account.



Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water) Thames Water Clearwater Court Vastern Road Reading RG1 8DB

Tel: 0800 009 3921

Email: developer.services@thameswater.co.uk

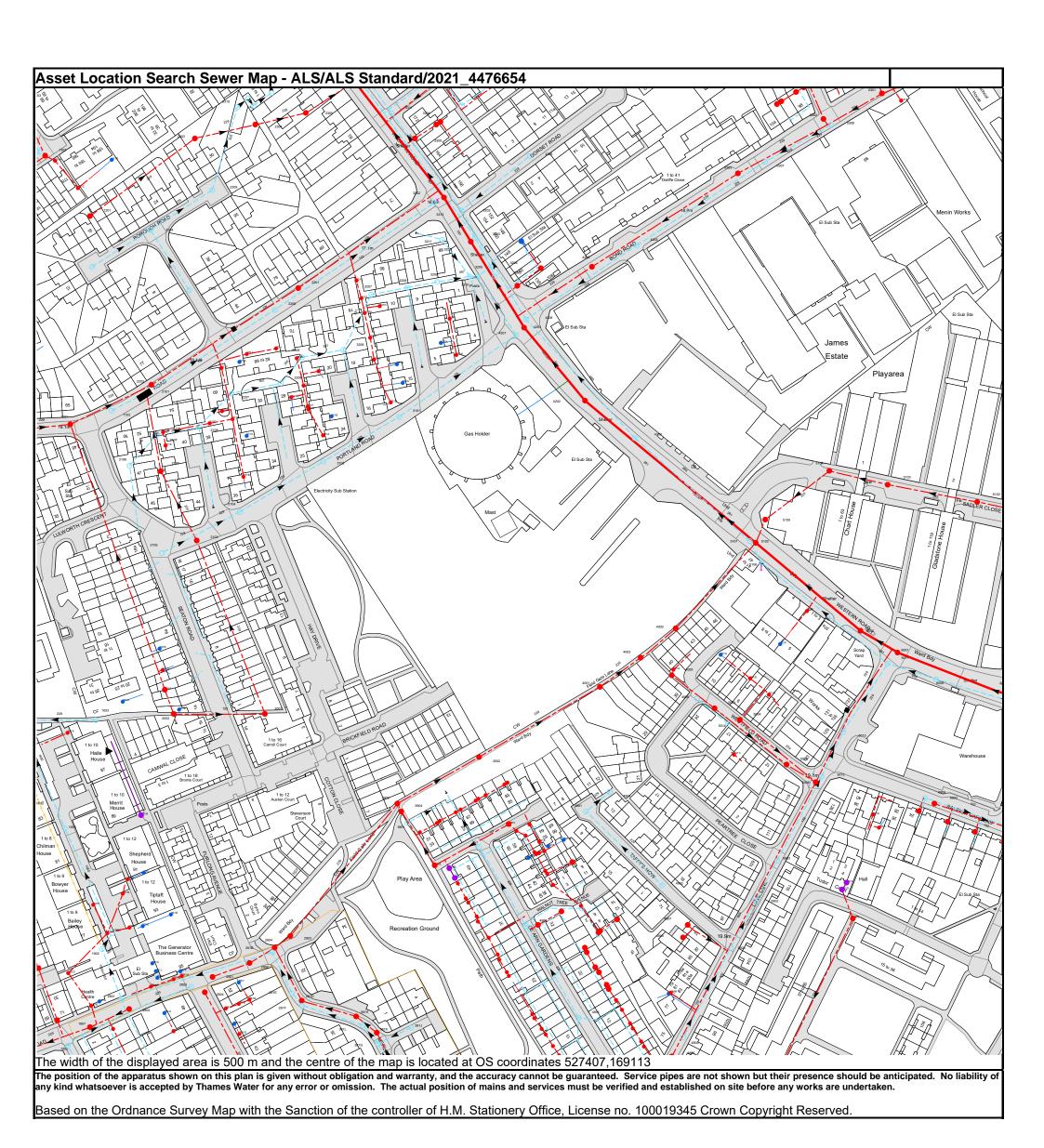
Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water) Thames Water Clearwater Court Vastern Road Reading RG1 8DB

Tel: 0800 009 3921

Email: developer.services@thameswater.co.uk



<u>Thames Water Utilities Ltd.</u> Property Searches, PO Box 3189, Slough SL1 4W, DX 151280 Slough 13 T 0800 009 4540 E searches@thameswater.co.uk I www.thameswater-propertysearches.co.uk

Manhole Reference	Manhole Cover Level	Manhole Invert Level
631A 5301	n/a	n/a
5301 5104	19.43 18.97	16.64 15.94
5013	19.35	17.61
5002	n/a	n/a
591A	n/a	n/a
591B 5011	n/a 19.2	n/a 17.3
5103	19.01	16.28
6001	n/a	n/a
69DA	n/a	n/a
6906 6903	20.4 20.4	19.53 n/a
6006	19.27	17.52
69CI	n/a	n/a
69BJ	n/a	n/a
69CG 69BG	n/a n/a	n/a n/a
6102	19.18	16.87
69CE	n/a	n/a
69BD	n/a	n/a
491B 491C	n/a n/a	n/a n/a
49GE	n/a n/a	n/a n/a
4901	18.91	17.89
4001	n/a	n/a
4904 4002	18.92 n/a	n/a n/a
4902 4902	n/a 19.07	n/a 18.05
4005	n/a	n/a
401A	n/a	n/a
4003 4008	n/a	n/a
5003	n/a 18.79	n/a 17.41
501A	n/a	n/a
5014	19	18.19
501C	n/a 18.8	n/a 17.55
5004 501B	n/a	17.33 n/a
501D	n/a	n/a
5903	n/a	n/a
501F	n/a	n/a 17.22
5005 501E	19.03 n/a	n/a
5006	19.47	16.58
5012	19.51	17.71
3305	16.78	14.93
3312 3304	16.76 16.96	n/a 15.68
33DE	n/a	n/a
3302	n/a	n/a
33CH	n/a	n/a
3202 33CG	16.93 n/a	15.73 n/a
4303	17.4	16.44
5303	18.95	15.91
5307	19.02	17.86
53AJ 53BA	n/a n/a	n/a n/a
53BB	n/a	n/a
53BD	n/a	n/a
5302	19.31	16.43
5308 321A	19.25 n/a	18.1 n/a
3208	n/a	n/a
3209	n/a	n/a
321N 3211	n/a n/a	n/a n/a
3211 321I	n/a n/a	n/a n/a
321H	n/a	n/a
3210	n/a	n/a
3201	n/a 17.02	n/a 15.92
3203 3205	17.02 17.19	15.92 16.25
3204	n/a	n/a
3212	n/a	n/a
4207 43BB	17.31	16.3
42BB 42AI	n/a n/a	n/a n/a
4201	n/a	n/a
4206	17.54	15.94
42BA	n/a	n/a
4202 4203	n/a 18.1	n/a 15.06
4102	18.31	16.44
4205	n/a	n/a
5107	18.83	16.83
5102 5106	n/a 18.81	n/a 16.98
U 1 V U		
5105	18.97	15.33

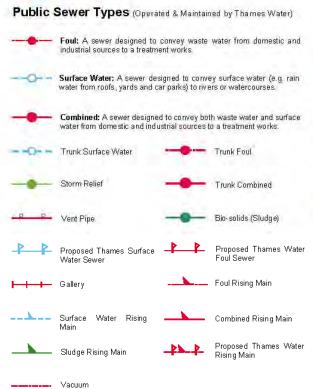
Manhole Reference	Manhole Cover Level	Manhole Invert Level
3901	19.21	18.36
39DC	n/a	n/a
39DB	n/a	n/a
39DA 391B	n/a n/a	n/a n/a
391A	n/a	n/a
39CJ 39AI	n/a n/a	n/a n/a
39CI	n/a	n/a
39CH	n/a	n/a
39CG 3002	n/a n/a	n/a n/a
3902	18.84	18.29
39EE 30AE	n/a n/a	n/a n/a
30AD	n/a	n/a
491A	n/a	n/a
49DH 2309	n/a n/a	n/a n/a
221F	n/a	n/a
221H 2207	n/a n/a	n/a n/a
211A	n/a	n/a
221A	n/a	n/a
221J 2206	n/a 17.56	n/a 15.91
2211	n/a	n/a
2208 221D	n/a	n/a
221D 221G	n/a n/a	n/a n/a
2201	17.4	15.19
2209 221B	n/a n/a	n/a n/a
211F	n/a	n/a
311C	n/a	n/a
321C 311B	n/a n/a	n/a n/a
3206	n/a	n/a
321L 321F	n/a n/a	n/a n/a
321M	n/a	n/a
321E	n/a	n/a
3207 321D	n/a n/a	n/a n/a
321K	n/a	n/a
321B 321G	n/a n/a	n/a n/a
3101	17.34	16.59
2303	16.92	14.94
2304 3311	16.63 16.6	14.64 15.29
2305	16.42	14.33
2310 231A	n/a 16.7	n/a 15.88
231E	16.7 16.7	15.95
231B	16.7	15.75
101A 1003	n/a 18.84	n/a 16.7
2002	19.13	17.96
2001 201E	19.41 n/a	18.33 n/a
201C	n/a	n/a
201A	n/a	n/a
201D 201B	n/a n/a	n/a n/a
2105	18.27	17.29
2103 2104	18.14 17.82	16.9 17.03
211B	n/a	n/a
2102	17.96	16.44
2106 3102	n/a 17.56	n/a 16.76
211E	n/a	n/a
211H 311A	n/a n/a	n/a n/a
2107	n/a	n/a
211D	n/a	n/a
2108 1101	n/a 19	n/a 16.24
211C	n/a	n/a
131C 1201	n/a 17.5	n/a 15.58
1202	n/a	n/a
1103	18.69	16.41
2101 2204	18.42 n/a	15.99 n/a
2203	18.36	15.9
2205	n/a	n/a
	i n/a	n/a
131A 131B	n/a n/a	n/a n/a
131A		

Manhole Reference	Manhole Cover Level	Manhole Invert Level
39AJ	n/a	n/a
39BA	n/a	n/a
39BB 39BC	n/a n/a	n/a n/a
4903	18.8	17.69
49DE	n/a	n/a
49DD 49DC	n/a n/a	n/a n/a
49DB	n/a	n/a
49CE	n/a	n/a
491D 491E	n/a n/a	n/a n/a
49DG	n/a	n/a
49DA 49FE	n/a n/a	n/a n/a
49FD	n/a	n/a
49CD	n/a	n/a
49FC 49FJ	n/a n/a	n/a n/a
19EC	n/a	n/a
1808 1903	19.31 18.95	17.29 15.71
1802	19.16	17.6
191D	n/a	n/a
1807 181B	19.21 n/a	17.23 n/a
191B	n/a	n/a
181D 1902	n/a 19.33	n/a 15.8
1902 191C	19.33 n/a	15.8 n/a
1901	19.14	15.78
1812 2801	n/a 19.25	n/a 15.92
291N	n/a	n/a
191A	n/a	n/a 17.81
2802 291O	19.21 n/a	n/a
291M	n/a	n/a
291E 291L	n/a n/a	n/a n/a
281M	n/a	n/a
291C	n/a	n/a
291J 291K	n/a n/a	n/a n/a
281U	n/a	n/a
291D 49AI	n/a n/a	n/a n/a
49FH	n/a	n/a
49FB	n/a	n/a
49AJ 49FA	n/a n/a	n/a n/a
48BD	n/a	n/a
48BE 48BF	n/a n/a	n/a n/a
49EJ	n/a	n/a
48BG 48BH	n/a n/a	n/a n/a
48BI	n/a	n/a
48BJ	n/a	n/a
48CA 291G	n/a n/a	n/a n/a
281T	n/a	n/a
291F 291H	n/a n/a	n/a n/a
2803	19.27	17.69
2804 2901	19.28 19.29	18.32 17.34
281P	n/a	17.34 n/a
281R	n/a	n/a
281O 291I	n/a n/a	n/a n/a
281Q	n/a	n/a
281N 2902	n/a 19.36	n/a 16.98
291B	19.36	17.02
2904	19.35	17.1
2903 281E	19.39 19.4	16.92 17.08
281D	19.34	17.31
281F 381H	19.3 19.08	17.1 17.5
381L	19.08	17.18
381K	19.18	17.59 17.43
381G 3903	19.26 19.18	17.43 16.56
481C	n/a	n/a
481B 4805	n/a 20.14	n/a 17.6
4906	n/a	n/a
4802	20	18.52
4907 5904	n/a n/a	n/a n/a
5902	20.5	18.87

Manhole Reference	Manhole Cover Level	Manhole Invert Level
591D	n/a	n/a
591C	n/a	n/a
591E	n/a	n/a
48CI	n/a	n/a
48CH	n/a	n/a
48CG	n/a	n/a
48CF	n/a	n/a
381J	19.1	18
48CE	n/a	n/a
4801	19.16	18.55
48CD	n/a	n/a
49BB	n/a	n/a
39BE	n/a	n/a
39BF	n/a	n/a
39BG	n/a	n/a
49AH	n/a	n/a
49AG	n/a	n/a
39BD	n/a	n/a
4905	19.06	18.43

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.





Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

▼ Control Valve

Drop Pipe

Ancillary

✓ Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

J

Outfall



Undefined End

1

Inlet

Notes:

- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plans are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
- Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
- 5) 'na' or '0' on a manhole level indicates that data is unavailable.

6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Searches on 0800 009 4540.

Other Symbols

Symbols used on maps which do not fall under other general categories

A/A Public/Private Pumping Station

* Change of characteristic indicator (C.O.C.I.)

Invert Level

← Summit

Areas

Lines denoting areas of underground surveys, etc.

______ Agreement

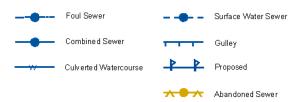
/// Operational Site

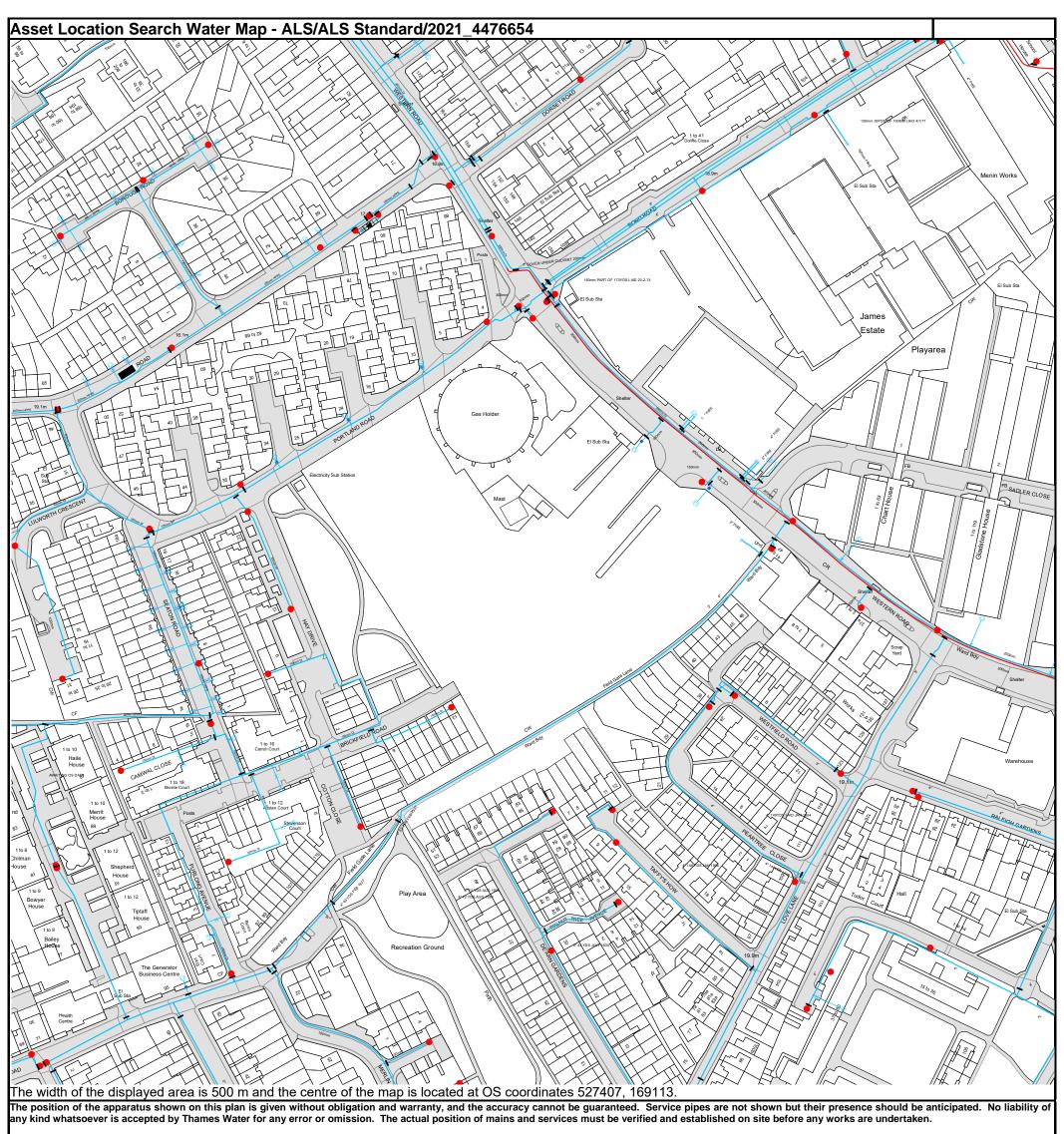
Chamber

Tunnel

Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)





Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.



Water Pipes (Operated & Maintained by Thames Water)

	-
4	Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.
16	Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.
3 SUPPLY	Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.
3 FIRE	Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.
3 METERED	Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.
	Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.
	Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

PIPE DIAMETER	DEPTH BELOW GROUND		
Up to 300mm (12)	900mm (3')		
300mm - 600mm (12 - 24)	1100mm (3' 8)		
600mm and bigger (24 plus)	1200mm (4')		

Valves Operational Sites General PurposeValve **Booster Station** Air Valve Other Pressure ControlValve Other (Proposed) Customer Valve **Pumping Station** Service Reservoir **Hydrants Shaft Inspection** Single Hydrant Treatment Works Meters Unknown Meter Water Tower **End Items Other Symbols** Symbol indicating what happens at the end of L a water main. Data Logger Blank Flange Capped End **Emptying Pit** Undefined End

Manifold

Fire Supply

Customer Supply

Other Water Pipes (Not Operated or Maintained by Thames Water) Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them. Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with

them indicating the diameter and owner of the pipe.

Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

- 1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
- 2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
- 3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
- 4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
- 5. In case of dispute TWUL's terms and conditions shall apply.
- 6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
- 7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
- 8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

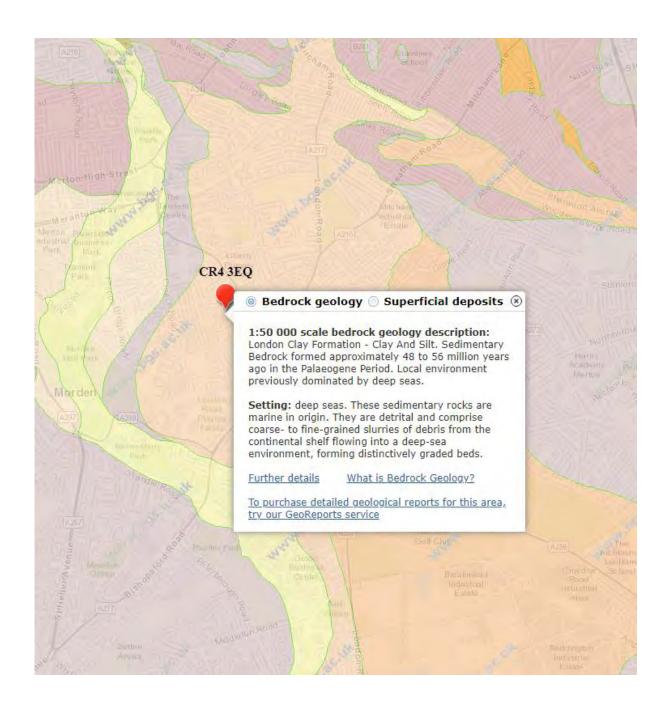
If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

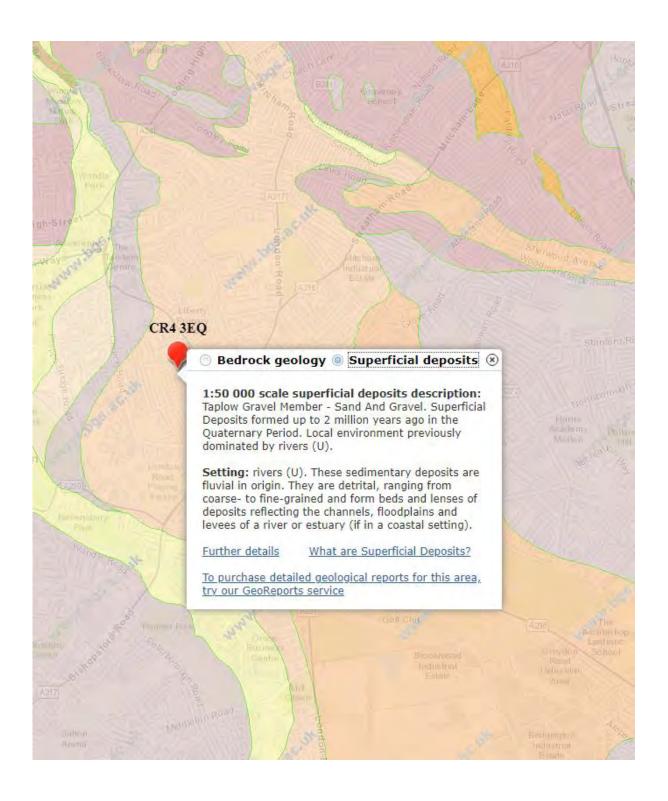
If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	BACS Payment	Telephone Banking	Cheque
Call 0800 009 4540 quoting your invoice number starting CBA or ADS / OSS	Account number 90478703 Sort code 60-00-01 A remittance advice must be sent to: Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW. or email ps.billing@thameswater. co.uk	By calling your bank and quoting: Account number 90478703 Sort code 60-00-01 and your invoice number	Made payable to 'Thames Water Utilities Ltd' Write your Thames Water account number on the back. Send to: Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW or by DX to 151280 Slough 13

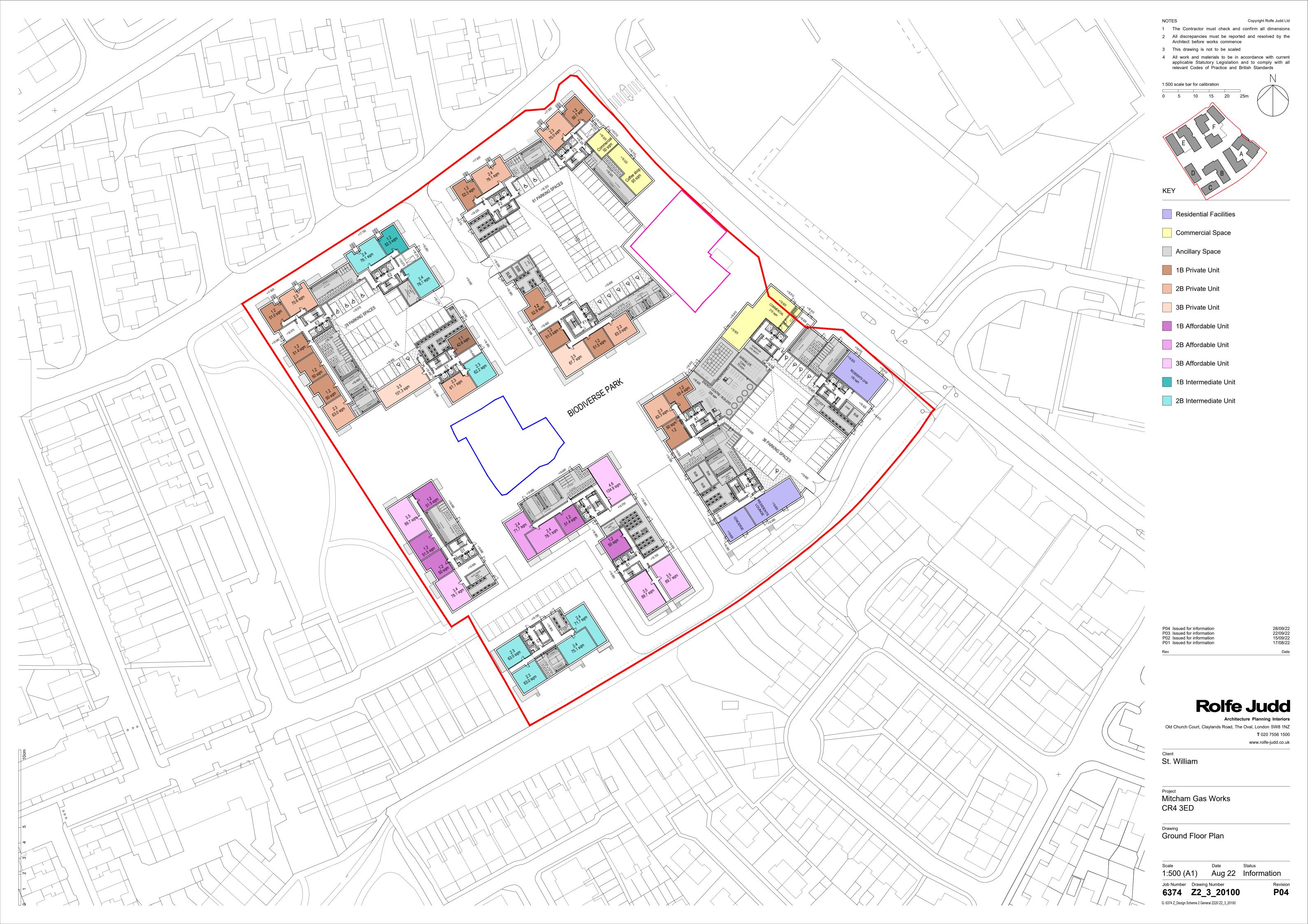
Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.

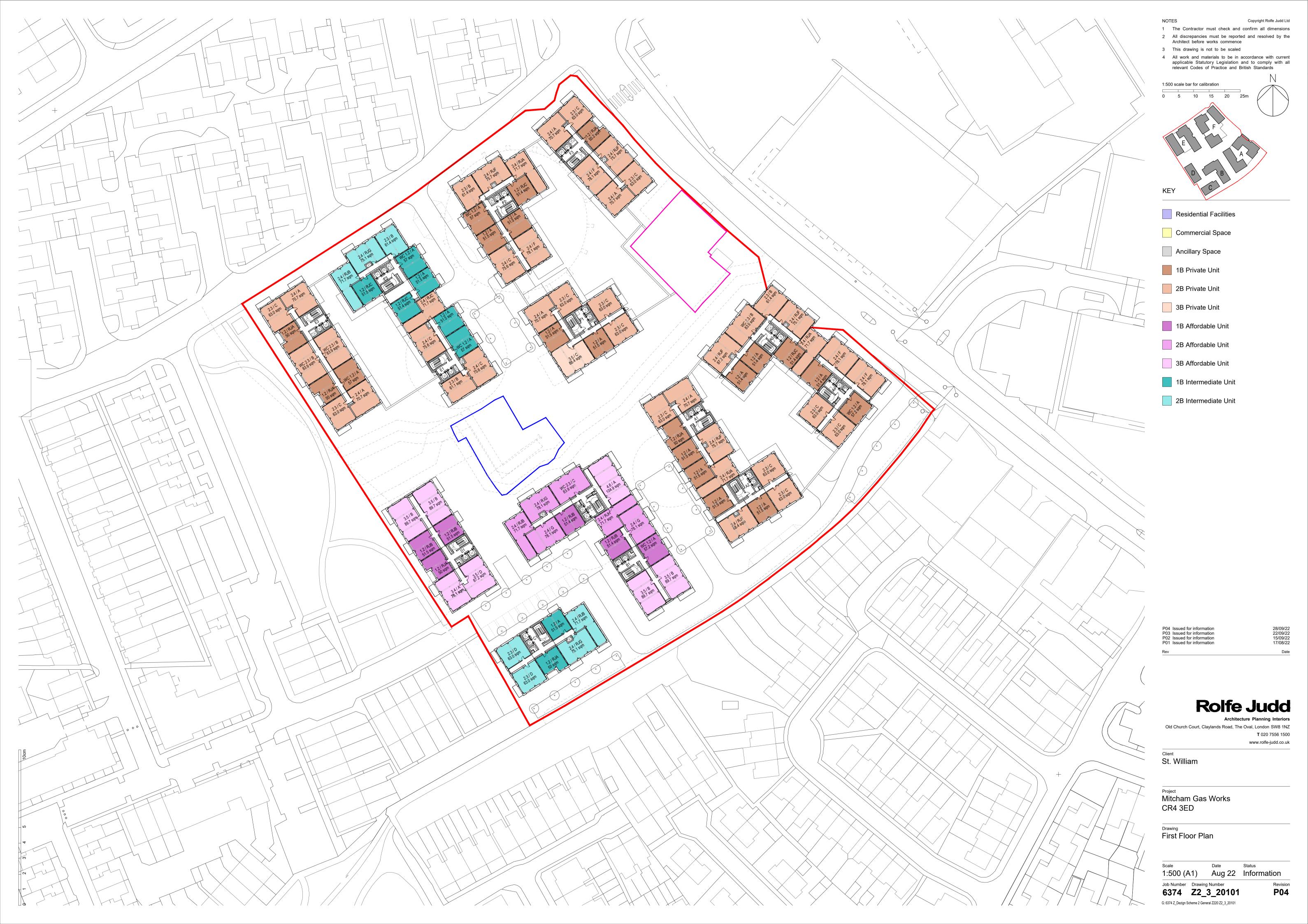






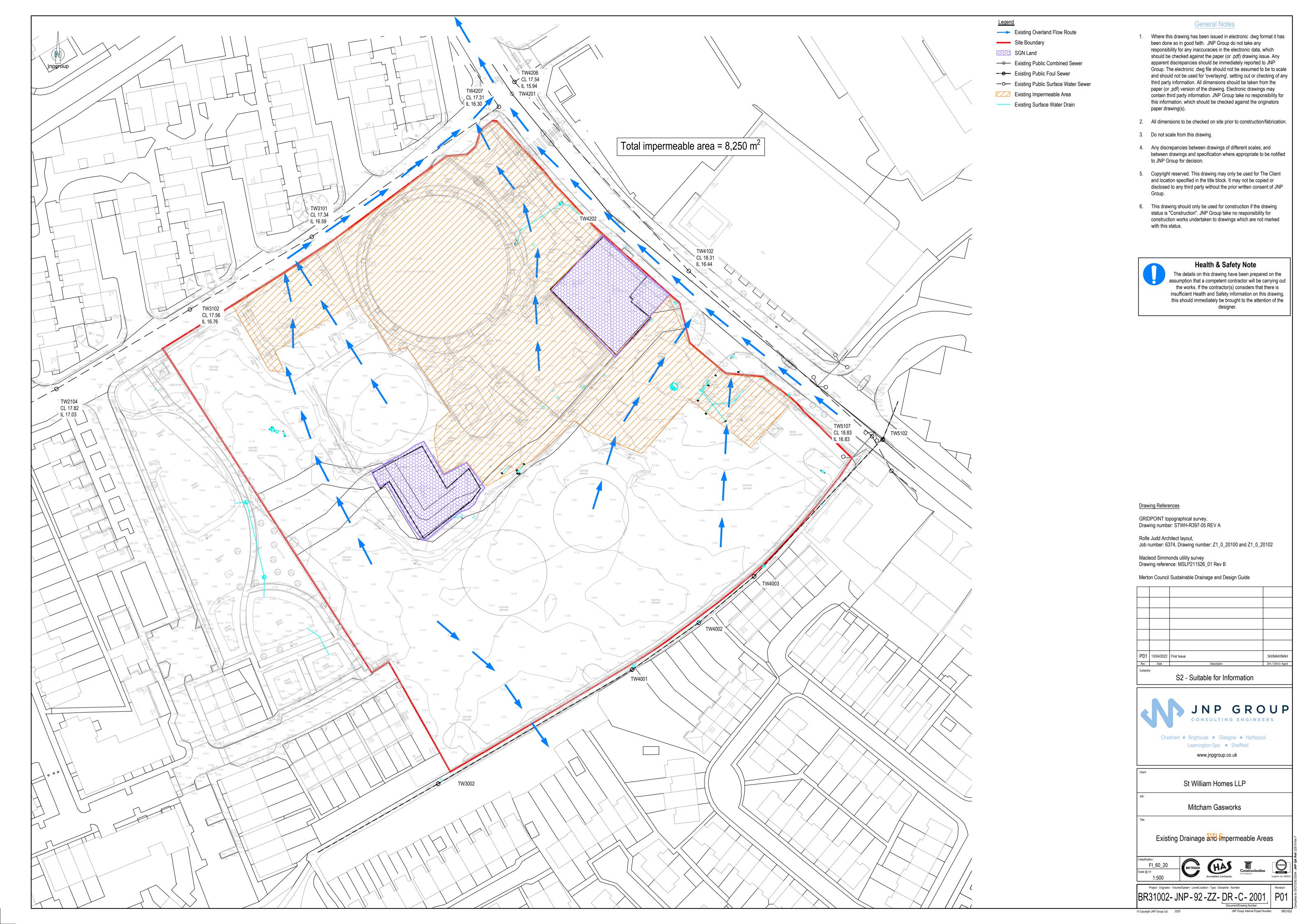
APPENDIX B PROPOSED DEVELOPMENT





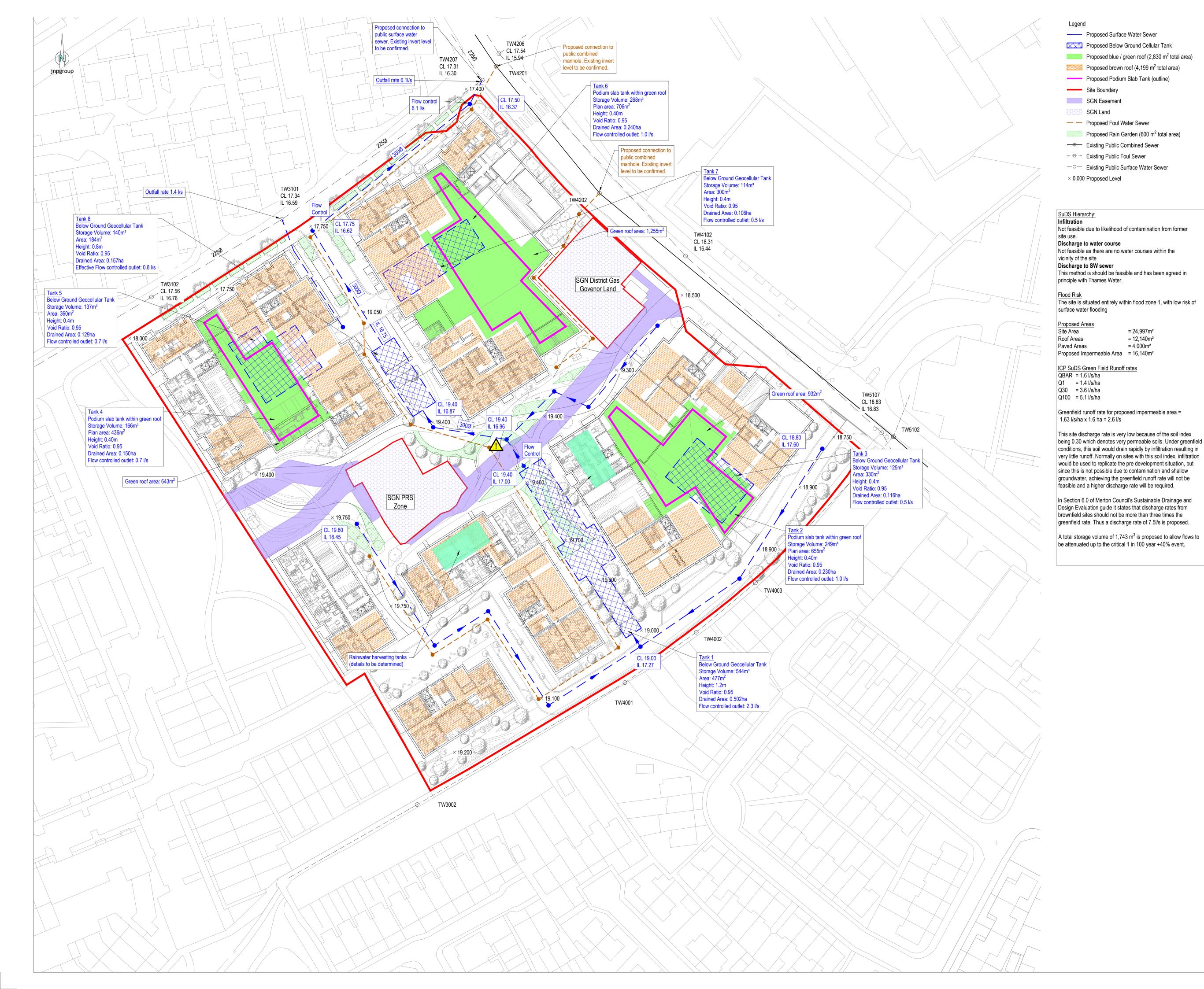


APPENDIX C EXISTING DRAINAGE AND IMPERMEABLE AREAS





APPENDIX D Drainage Layout



General Notes

- 1. Where this drawing has been issued in electronic .dwg format it has been done so in good faith. JNP Group do not take any responsibility for any inaccuracies in the electronic data, which should be checked against the paper (or .pdf) drawing issue. Any apparent discrepancies should be immediately reported to JNP Group. The electronic .dwg file should not be assumed to be to scale and should not be used for 'overlaying', setting out or checking of any third party information. All dimensions should be taken from the paper (or .pdf) version of the drawing. Electronic drawings may contain third party information. JNP Group take no responsibility for this information, which should be checked against the originators paper drawing(s).
- 2. All dimensions to be checked on site prior to construction/fabrication.
- 3. Do not scale from this drawing.
- 4. Any discrepancies between drawings of different scales, and between drawings and specification where appropriate to be notified to JNP Group for decision.
- 5. Copyright reserved. This drawing may only be used for The Client and location specified in the title block. It may not be copied or disclosed to any third party without the prior written consent of JNP
- This drawing should only be used for construction if the drawing status is "Construction". JNP Group take no responsibility for construction works undertaken to drawings which are not marked with this status.



Health & Safety Note

The details on this drawing have been prepared on the assumption that a competent contractor will be carrying out the works. If the contractor(s) considers that there is insufficient Health and Safety information on this drawing, this should immediately be brought to the attention of the

HAZARD IDENTIFICATION BOX						
This table is provided to assist the Principal Contractor to fulfil their obligations under the CDM Regulations 2015						
Hazard Type Hazard Ref (Construction/Maintenance/Cleaning/Demolition/Adaptation)		Hazard Description	Mitigation Measures/ Residual Risk			
1	Existing gas infrastructure	Damaging gas pipes during construction	Mark out location of gas easement on site and seek advice from SGN			

Drawing References

Rolfe Judd Ground Floor Plan,

GRIDPOINT topographical survey, Drawing number: STWH-R397-05 REV A

Job number: 6374, Drawing number: Z2_3_20100 rev P04

Rolfe Judd First Floor Plan, Job number: 6374, Drawing number: Z2_3_70101 rev P04

Macleod Simmonds utility survey

Drawing reference: MSLP211526_01 Rev B

Gillespies LLP General Arrangement

Drawing reference: P20689-00-001-GIL-0100 rev 12

Merton Council Sustainable Drainage and Design Guide

P05	31/05/2022	Drainage strategy updated to suit new landscaping layout	ACT/MAH/MA
P04	26/05/2022	Podium slab tank depths reduced. Below parking storage tanks added.	SH/MAH/MAI
P03	19/04/2022	Discharge rates updated to 3x greenfield rate. Storage volumes revised to suit.	SH/MAH/MA
P02	01/04/2022	Updated to suit revised site layout.	SH/MAH/MA
P01	21/07/2021	First Issue	TLB/MAH/MA
Rev.	Date	Description	Drn / Chk'd / App

S2 - Suitable for Information



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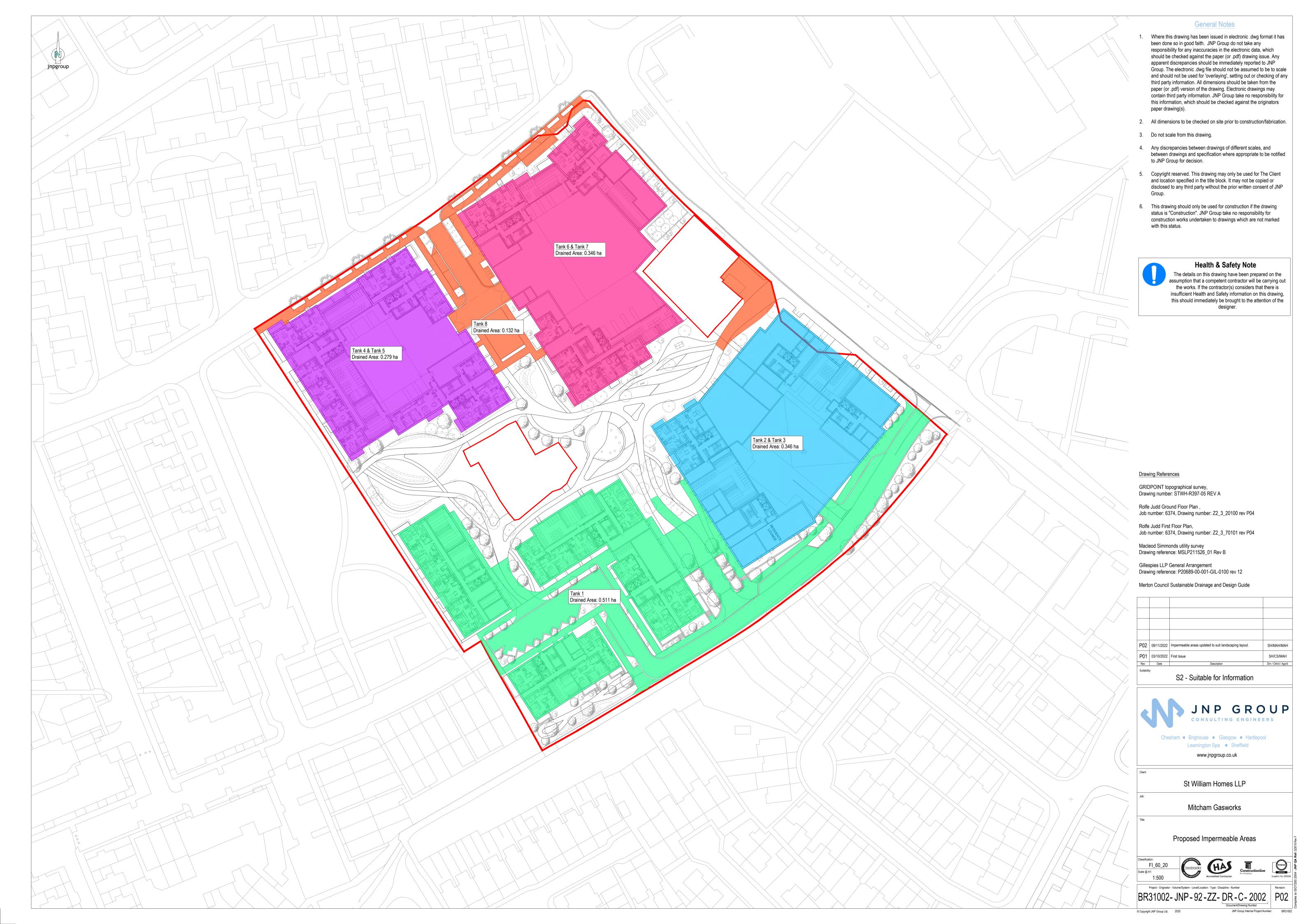
Mitcham Gasworks

Drainage Layout



BR31002- JNP-92-ZZ- DR-C-2000 | P08

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APPENDIX E GREENFIELD AND MICRODRAINAGE CALCULATIONS

JNP Group		Page 1
Link House, St Mary's Way	Mitcham Gasworks	
Chesham, Buckinghamshire	BR31002	The same of
HP5 1HR	ICP SuDS RunOff Rates	Micro
Date 19/07/2021	Designed by TLB	Drainage
File	Checked by MAH	Diamage
Innovyze	Source Control 2020.1.3	•

ICP SUDS Mean Annual Flood

Input

Return Period (years) 100 Soil 0.300 Area (ha) 1.000 Urban 0.000 SAAR (mm) 628 Region Number Region 6

Results 1/s

QBAR Rural 1.6 QBAR Urban 1.6

Q100 years 5.1

Q1 year 1.4 Q30 years 3.6 Q100 years 5.1

JNP Group		Page 1
No. 1 Meadowhall Riverside	Mitcham Gas Works	
Meadowhall Road	BR310002	The same
Sheffield S9 1BW		Micro
Date 09/11/2022	Designed by SH	Drainage
File TANK 1.SRCX	Checked by CS	niairiade
Innovyze	Source Control 2020.1.3	

Summary of Results for 100 year Return Period (+40%)

Storm Event		Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Volume (m³)	Status	
15	min	Summer	0.429	0.429	2.1	194.4	O K
30	min	Summer	0.557	0.557	2.1	252.1	O K
60	min	Summer	0.685	0.685	2.1	310.5	O K
120	min	Summer	0.868	0.868	2.1	393.3	O K
180	min	Summer	0.973	0.973	2.1	441.0	Flood Risk
240	min	Summer	1.042	1.042	2.2	472.1	Flood Risk
360	min	Summer	1.122	1.122	2.2	508.3	Flood Risk
480	min	Summer	1.163	1.163	2.3	526.8	Flood Risk
600	min	Summer	1.183	1.183	2.3	536.0	Flood Risk
720	min	Summer	1.192	1.192	2.3	539.8	Flood Risk
960	min	Summer	1.187	1.187	2.3	537.8	Flood Risk
1440	min	Summer	1.143	1.143	2.2	517.9	Flood Risk
2160	min	Summer	1.061	1.061	2.2	480.7	Flood Risk
2880	min	Summer	0.997	0.997	2.1	451.7	Flood Risk
4320	min	Summer	0.904	0.904	2.1	409.5	Flood Risk
5760	min	Summer	0.835	0.835	2.1	378.0	O K
7200	min	Summer	0.780	0.780	2.1	353.4	O K
8640	min	Summer	0.734	0.734	2.1	332.5	O K
0800.	min	Summer	0.693	0.693	2.1	314.1	O K
15	min	Winter	0.429	0.429	2.1	194.4	O K
30	min	Winter	0.556	0.556	2.1	252.1	O K

Storm		Rain	${\tt Flooded}$	Discharge	Time-Peak	
Event		(mm/hr)	Volume	Volume	(mins)	
				(m³)	(m³)	
15	min	Summer	153.427	0.0	168.0	19
30	min	Summer	99.829	0.0	175.5	34
60	min	Summer	61.856	0.0	302.8	64
120	min	Summer	39.634	0.0	333.6	124
180	min	Summer	29.960	0.0	332.5	184
240	min	Summer	24.318	0.0	332.0	244
360	min	Summer	17.833	0.0	332.9	362
480	min	Summer	14.154	0.0	334.4	482
600	min	Summer	11.766	0.0	336.1	602
720	min	Summer	10.084	0.0	337.6	722
960	min	Summer	7.860	0.0	338.5	962
1440	min	Summer	5.493	0.0	333.2	1440
2160	min	Summer	3.828	0.0	652.7	1840
2880	min	Summer	2.970	0.0	632.0	2220
4320	min	Summer	2.096	0.0	576.2	3024
5760	min	Summer	1.651	0.0	807.7	3856
7200	min	Summer	1.383	0.0	845.2	4680
8640	min	Summer	1.203	0.0	881.8	5528
10080	min	Summer	1.075	0.0	917.2	6352
15	min	Winter	153.427	0.0	168.1	19
30	min	Winter	99.829	0.0	175.5	34

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JNP Group		Page 2
No. 1 Meadowhall Riverside	Mitcham Gas Works	
Meadowhall Road	BR310002	The same
Sheffield S9 1BW		Micro
Date 09/11/2022	Designed by SH	Drainage
File TANK 1.SRCX	Checked by CS	nialilade
Innovyze	Source Control 2020.1.3	

Storm Event		Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Volume (m³)	Status	
60	min	Winter	0.685	0.685	2.1	310.4	O K
120	min	Winter	0.868	0.868	2.1	393.4	O K
180	min	Winter	0.974	0.974	2.1	441.3	Flood Risk
240	min	Winter	1.043	1.043	2.2	472.6	Flood Risk
360	min	Winter	1.124	1.124	2.2	509.2	Flood Risk
480	min	Winter	1.165	1.165	2.3	527.9	Flood Risk
600	min	Winter	1.186	1.186	2.3	537.5	Flood Risk
720	min	Winter	1.196	1.196	2.3	541.7	Flood Risk
960	min	Winter	1.193	1.193	2.3	540.5	Flood Risk
1440	min	Winter	1.154	1.154	2.3	522.6	Flood Risk
2160	min	Winter	1.070	1.070	2.2	484.9	Flood Risk
2880	min	Winter	0.997	0.997	2.1	451.5	Flood Risk
4320	min	Winter	0.884	0.884	2.1	400.4	O K
5760	min	Winter	0.788	0.788	2.1	357.0	O K
7200	min	Winter	0.705	0.705	2.1	319.3	O K
8640	min	Winter	0.622	0.622	2.1	281.8	O K
10080	min	Winter	0.533	0.533	2.1	241.5	O K

Storm		Rain	Flooded	Discharge	Time-Peak
	Event	(mm/hr)	Volume	Volume	(mins)
			(m³)	(m³)	
60	min Winte	r 61.856	0.0	202.0	64
				302.8	
	min Winte		0.0	333.6	122
180	min Winte	r 29.960	0.0	332.4	182
240	min Winte	r 24.318	0.0	331.9	240
360	min Winte	r 17.833	0.0	332.6	358
480	min Winte	r 14.154	0.0	334.0	476
600	min Winte	r 11.766	0.0	335.5	592
720	min Winte	r 10.084	0.0	337.0	708
960	min Winte	r 7.860	0.0	337.7	940
1440	min Winte	r 5.493	0.0	332.2	1384
2160	min Winte	r 3.828	0.0	651.9	2012
2880	min Winte	r 2.970	0.0	632.1	2276
4320	min Winte	r 2.096	0.0	580.3	3200
5760	min Winte	r 1.651	0.0	807.8	4144
7200	min Winte	r 1.383	0.0	845.3	5040
8640	min Winte	r 1.203	0.0	882.2	5968
10080	min Winte	r 1.075	0.0	918.8	6656

JNP Group		Page 3
No. 1 Meadowhall Riverside	Mitcham Gas Works	
Meadowhall Road	BR310002	The same of
Sheffield S9 1BW		Mirro
Date 09/11/2022	Designed by SH	Drainage
File TANK 1.SRCX	Checked by CS	pramaye
Innovyze	Source Control 2020.1.3	<u>'</u>

Rainfall Model						FEH
Return Period (years)						100
FEH Rainfall Version						2013
Site Location	GB	527373	169089	TQ	27373	69089
Data Type						Point
Summer Storms						Yes
Winter Storms						Yes
Cv (Summer)						1.000
Cv (Winter)						1.000
Shortest Storm (mins)						15
Longest Storm (mins)						10080
Climate Change %						+40

<u>Time Area Diagram</u>

Total Area (ha) 0.511

 Time
 (mins)
 Area

 From:
 To:
 (ha)

 0
 4
 0.511

JNP Group		Page 4
No. 1 Meadowhall Riverside	Mitcham Gas Works	
Meadowhall Road	BR310002	The same of
Sheffield S9 1BW		Mirro
Date 09/11/2022	Designed by SH	Drainage
File TANK 1.SRCX	Checked by CS	Diamage
Innovyze	Source Control 2020.1.3	<u>'</u>

Storage is Online Cover Level (m) 1.200

Tank or Pond Structure

Invert Level (m) 0.000

Depth	(m)	Area	(m²)	Depth	(m)	Area	(m²)	Depth	(m)	Area	(m²)
0.	000	4	453.0	1.	200	4	153.0	1.	210		0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0069-2300-1200-2300
Design Head (m)	1.200
Design Flow $(1/s)$	2.3
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	69
Invert Level (m)	0.000
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control	Points	Head (m)	Flow (1/s)
Design Point	(Calculated)	1.200	2.3
	Flush-Flo™	0.304	2.1
	Kick-Flo®	0.617	1.7
Mean Flow ove	r Head Range	_	1.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m) F	Low (1/s)	Depth (m) Flow	(1/s)	Depth (m) Flow	(1/s)	Depth (m)	Flow (1/s)
0.100	1.7	1.200	2.3	3.000	3.5	7.000	5.2
0.200	2.0	1.400	2.5	3.500	3.8	7.500	5.4
0.300	2.1	1.600	2.6	4.000	4.0	8.000	5.6
0.400	2.1	1.800	2.8	4.500	4.2	8.500	5.7
0.500	2.0	2.000	2.9	5.000	4.5	9.000	5.9
0.600	1.8	2.200	3.0	5.500	4.7	9.500	6.0
0.800	1.9	2.400	3.2	6.000	4.8		
1.000	2.1	2.600	3.3	6.500	5.0		

JNP Group		Page 1
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same
Sheffield S9 1BW		Mirro
Date 03/10/2022	Designed by SH	Drainage
File Tank 2.SRCX	Checked by CS	niailiade
Innovyze	Source Control 2020.1.3	

	Stor Even		Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Volume (m³)	Stat	cus
15	min	Summer	0.141	0.141	1.0	87.6	Flood	Risk
30	min	Summer	0.183	0.183	1.0	113.6	Flood	Risk
60	min	Summer	0.225	0.225	1.0	139.8	Flood	Risk
120	min	Summer	0.285	0.285	1.0	177.5	Flood	Risk
180	min	Summer	0.321	0.321	1.0	199.4	Flood	Risk
240	min	Summer	0.344	0.344	1.0	213.7	Flood	Risk
360	min	Summer	0.371	0.371	1.0	230.6	Flood	Risk
480	min	Summer	0.385	0.385	1.0	239.5	Flood	Risk
600	min	Summer	0.393	0.393	1.0	244.1	Flood	Risk
720	min	Summer	0.396	0.396	1.0	246.4	Flood	Risk
960	min	Summer	0.396	0.396	1.0	246.5	Flood	Risk
1440	min	Summer	0.385	0.385	1.0	239.3	Flood	Risk
2160	min	Summer	0.360	0.360	1.0	224.2	Flood	Risk
2880	min	Summer	0.341	0.341	1.0	212.3	Flood	Risk
4320	min	Summer	0.312	0.312	1.0	193.9	Flood	Risk
5760	min	Summer	0.288	0.288	1.0	178.8	Flood	Risk
7200	min	Summer	0.266	0.266	1.0	165.2	Flood	Risk
8640	min	Summer	0.247	0.247	1.0	153.4	Flood	Risk
10080	min	Summer	0.231	0.231	1.0	143.5	Flood	Risk
15	min	Winter	0.141	0.141	1.0	87.5	Flood	Risk
30	min	Winter	0.183	0.183	1.0	113.5	Flood	Risk

	Stor	m	Rain	${\tt Flooded}$	Discharge	Time-Peak
	Even	t	(mm/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
15	min	Summer	153.427	0.0	69.0	19
30	min	Summer	99.829	0.0	82.0	34
60	min	Summer	61.856	0.0	129.8	64
120	min	Summer	39.634	0.0	156.5	124
180	min	Summer	29.960	0.0	159.9	184
240	min	Summer	24.318	0.0	158.0	244
360	min	Summer	17.833	0.0	155.5	362
480	min	Summer	14.154	0.0	153.9	482
600	min	Summer	11.766	0.0	152.5	602
720	min	Summer	10.084	0.0	151.1	722
960	min	Summer	7.860	0.0	148.2	962
1440	min	Summer	5.493	0.0	142.4	1440
2160	min	Summer	3.828	0.0	291.6	1864
2880	min	Summer	2.970	0.0	285.7	2224
4320	min	Summer	2.096	0.0	258.1	3024
5760	min	Summer	1.651	0.0	360.8	3864
7200	min	Summer	1.383	0.0	377.2	4680
8640	min	Summer	1.203	0.0	393.1	5448
10080	min	Summer	1.075	0.0	407.7	6160
15	min	Winter	153.427	0.0	69.0	19
30	min	Winter	99.829	0.0	82.0	34

JNP Group		Page 2
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same of
Sheffield S9 1BW		Mirro
Date 03/10/2022	Designed by SH	Designado
File Tank 2.SRCX	Checked by CS	Dialilade
Innovyze	Source Control 2020.1.3	-

	Stor Even		Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Volume (m³)	Stat	cus
60	min	Winter	0.225	0.225	1.0	139.8	Flood	Risk
120	min	Winter	0.285	0.285	1.0	177.5	Flood	Risk
180	min	Winter	0.320	0.320	1.0	199.3	Flood	Risk
240	min	Winter	0.344	0.344	1.0	213.7	Flood	Risk
360	min	Winter	0.371	0.371	1.0	230.6	Flood	Risk
480	min	Winter	0.385	0.385	1.0	239.5	Flood	Risk
600	min	Winter	0.393	0.393	1.0	244.3	Flood	Risk
720	min	Winter	0.396	0.396	1.0	246.6	Flood	Risk
960	min	Winter	0.397	0.397	1.0	246.9	Flood	Risk
1440	min	Winter	0.386	0.386	1.0	240.2	Flood	Risk
2160	min	Winter	0.362	0.362	1.0	224.9	Flood	Risk
2880	min	Winter	0.338	0.338	1.0	210.4	Flood	Risk
4320	min	Winter	0.301	0.301	1.0	187.4	Flood	Risk
5760	min	Winter	0.265	0.265	1.0	164.8	Flood	Risk
7200	min	Winter	0.232	0.232	1.0	144.4	Flood	Risk
8640	min	Winter	0.205	0.205	1.0	127.3	Flood	Risk
10080	min	Winter	0.181	0.181	1.0	112.7	Flood	Risk

	Stor	m	Rain	${\tt Flooded}$	Discharge	Time-Peak
	Even	t	(mm/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
60	min	Winter	61.856	0.0	129.8	64
		Winter	39.634	0.0	156.6	122
		Winter		0.0	160.0	182
240	min	Winter	24.318	0.0	158.2	240
360	min	Winter	17.833	0.0	155.7	358
480	min	Winter	14.154	0.0	154.1	476
600	min	Winter	11.766	0.0	152.6	592
720	min	Winter	10.084	0.0	151.3	708
960	min	Winter	7.860	0.0	148.5	940
1440	min	Winter	5.493	0.0	142.9	1386
2160	min	Winter	3.828	0.0	292.1	2028
2880	min	Winter	2.970	0.0	287.4	2280
4320	min	Winter	2.096	0.0	262.7	3200
5760	min	Winter	1.651	0.0	360.9	4096
7200	min	Winter	1.383	0.0	377.5	4904
8640	min	Winter	1.203	0.0	393.5	5704
10080	min	Winter	1.075	0.0	408.5	6456

JNP Group		Page 3
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same of
Sheffield S9 1BW		Mirco
Date 03/10/2022	Designed by SH	Drainage
File Tank 2.SRCX	Checked by CS	pran rade
Innovyze	Source Control 2020.1.3	

Rainfall Model						FEH
Return Period (years)						100
FEH Rainfall Version						2013
Site Location	GB	527373	169089	TQ	27373	69089
Data Type						Point
Summer Storms						Yes
Winter Storms						Yes
Cv (Summer)						1.000
Cv (Winter)						1.000
Shortest Storm (mins)						15
Longest Storm (mins)						10080
Climate Change %						+40

<u>Time Area Diagram</u>

Total Area (ha) 0.230

 Time From:
 (mins) (ha)

 0
 4

 0
 2

JNP Group		Page 4
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same of
Sheffield S9 1BW		Micro
Date 03/10/2022	Designed by SH	Drainage
File Tank 2.SRCX	Checked by CS	Dialilade
Innovyze	Source Control 2020.1.3	<u>'</u>

Storage is Online Cover Level (m) 0.400

Tank or Pond Structure

Invert Level (m) 0.000

Depth	(m)	Area	(m²)	Depth	(m)	Area	(m²)	Depth	(m)	Area	(m²)
0.	000	6	522.0	0.	400	6	522.0	0.	401		0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0055-1000-0400-1000
Design Head (m)	0.400
Design Flow $(1/s)$	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	55
Invert Level (m)	0.000
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control P	Points	Head (m)	Flow	(1/s)
Design Point (Calculated)	0.400		1.0
	Flush-Flo™	0.117		1.0
	Kick-Flo®	0.273		0.8
Mean Flow over	Head Range	_		0.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (1/s)	Depth (m) Flo	w (1/s)	Depth (m) Flo	w (1/s)	Depth (m)	Flow (1/s)
0.100	1.0	1.200	1.6	3.000	2.5	7.000	3.8
0.200	1.0	1.400	1.8	3.500	2.7	7.500	3.9
0.300	0.9	1.600	1.9	4.000	2.8	8.000	4.0
0.400	1.0	1.800	2.0	4.500	3.0	8.500	4.1
0.500	1.1	2.000	2.1	5.000	3.2	9.000	4.3
0.600	1.2	2.200	2.2	5.500	3.3	9.500	4.4
0.800	1.4	2.400	2.2	6.000	3.5		
1.000	1.5	2.600	2.3	6.500	3.6		

JNP Group		Page 1
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same
Sheffield S9 1BW		Micro
Date 03/10/2022	Designed by SH	Drainage
File TANK 3.SRCX	Checked by CS	nialilade
Innovyze	Source Control 2020.1.3	

	Stor Even		Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Volume (m³)	Stat	cus
15	min	Summer	0.141	0.141	0.5	44.1	Flood	Risk
30	min	Summer	0.183	0.183	0.5	57.2	Flood	Risk
60	min	Summer	0.225	0.225	0.5	70.5	Flood	Risk
120	min	Summer	0.285	0.285	0.5	89.4	Flood	Risk
180	min	Summer	0.320	0.320	0.5	100.4	Flood	Risk
240	min	Summer	0.343	0.343	0.5	107.6	Flood	Risk
360	min	Summer	0.370	0.370	0.5	116.0	Flood	Risk
480	min	Summer	0.384	0.384	0.5	120.4	Flood	Risk
600	min	Summer	0.391	0.391	0.5	122.7	Flood	Risk
720	min	Summer	0.395	0.395	0.5	123.8	Flood	Risk
960	min	Summer	0.395	0.395	0.5	123.7	Flood	Risk
1440	min	Summer	0.382	0.382	0.5	119.9	Flood	Risk
2160	min	Summer	0.357	0.357	0.5	111.9	Flood	Risk
2880	min	Summer	0.337	0.337	0.5	105.6	Flood	Risk
4320	min	Summer	0.306	0.306	0.5	96.0	Flood	Risk
5760	min	Summer	0.281	0.281	0.5	88.2	Flood	Risk
7200	min	Summer	0.259	0.259	0.5	81.1	Flood	Risk
8640	min	Summer	0.240	0.240	0.5	75.2	Flood	Risk
10080	min	Summer	0.224	0.224	0.5	70.2	Flood	Risk
15	min	Winter	0.141	0.141	0.5	44.1	Flood	Risk
30	min	Winter	0.183	0.183	0.5	57.2	Flood	Risk

	Stor Even		Rain (mm/hr)		Discharge Volume (m³)	Time-Peak (mins)
15	min	Summer	153.427	0.0	36.3	19
30	min	Summer	99.829	0.0	41.7	34
60	min	Summer	61.856	0.0	67.0	64
120	min	Summer	39.634	0.0	79.7	124
180	min	Summer	29.960	0.0	80.2	184
240	min	Summer	24.318	0.0	79.3	244
360	min	Summer	17.833	0.0	78.2	362
480	min	Summer	14.154	0.0	77.4	482
600	min	Summer	11.766	0.0	76.7	602
720	min	Summer	10.084	0.0	76.1	722
960	min	Summer	7.860	0.0	74.8	962
1440	min	Summer	5.493	0.0	72.3	1440
2160	min	Summer	3.828	0.0	148.4	1880
2880	min	Summer	2.970	0.0	144.8	2248
4320	min	Summer	2.096	0.0	131.4	3024
5760	min	Summer	1.651	0.0	182.6	3864
7200	min	Summer	1.383	0.0	191.1	4680
8640	min	Summer	1.203	0.0	199.2	5448
10080	min	Summer	1.075	0.0	206.9	6160
15	min	Winter	153.427	0.0	36.3	19
30	min	Winter	99.829	0.0	41.7	34

JNP Group		Page 2
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same
Sheffield S9 1BW		Micro
Date 03/10/2022	Designed by SH	Drainage
File TANK 3.SRCX	Checked by CS	Drainage
Innovyze	Source Control 2020.1.3	

	Stor Even		Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Volume (m³)	Stat	cus
60	min	Winter	0.225	0.225	0.5	70.4	Flood	Risk
120	min	Winter	0.285	0.285	0.5	89.4	Flood	Risk
180	min	Winter	0.320	0.320	0.5	100.4	Flood	Risk
240	min	Winter	0.343	0.343	0.5	107.6	Flood	Risk
360	min	Winter	0.370	0.370	0.5	116.1	Flood	Risk
480	min	Winter	0.384	0.384	0.5	120.5	Flood	Risk
600	min	Winter	0.392	0.392	0.5	122.9	Flood	Risk
720	min	Winter	0.395	0.395	0.5	124.0	Flood	Risk
960	min	Winter	0.396	0.396	0.5	124.0	Flood	Risk
1440	min	Winter	0.384	0.384	0.5	120.5	Flood	Risk
2160	min	Winter	0.359	0.359	0.5	112.4	Flood	Risk
2880	min	Winter	0.334	0.334	0.5	104.8	Flood	Risk
4320	min	Winter	0.296	0.296	0.5	92.8	Flood	Risk
5760	min	Winter	0.259	0.259	0.5	81.2	Flood	Risk
7200	min	Winter	0.226	0.226	0.5	70.8	Flood	Risk
8640	min	Winter	0.198	0.198	0.5	62.2	Flood	Risk
10080	min	Winter	0.175	0.175	0.5	54.9	Flood	Risk

	Storm	R	ain	Flooded	Discharge	e Time-Peak
	Event	(mr	n/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
				0 0	6.7	
	min Wir		1.856	0.0	67.	
120	min Wir	nter 3	9.634	0.0	79.	7 122
180	min Wir	nter 2	9.960	0.0	80.3	2 182
240	min Wir	nter 2	4.318	0.0	79.	1 240
360	min Wir	nter 1	7.833	0.0	78.	2 358
480	min Wir	nter 1	4.154	0.0	77.	476
600	min Wir	nter 1	1.766	0.0	76.	592
720	min Wir	nter 1	0.084	0.0	76.	L 708
960	min Wir	nter '	7.860	0.0	74.	940
1440	min Wir	nter !	5.493	0.0	72.	1386
2160	min Wir	nter :	3.828	0.0	148.	5 2028
2880	min Wir	nter 2	2.970	0.0	145.	5 2304
4320	min Wir	nter 2	2.096	0.0	133.	7 3204
5760	min Wir	nter :	1.651	0.0	182.	7 4096
7200	min Wir	nter :	1.383	0.0	191.	2 4904
8640	min Wir	nter :	1.203	0.0	199.	5704
10080	min Wir	nter :	1.075	0.0	207.	2 6456

JNP Group		Page 3
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same of
Sheffield S9 1BW		Mirco
Date 03/10/2022	Designed by SH	Drainage
File TANK 3.SRCX	Checked by CS	pran lade
Innovyze	Source Control 2020.1.3	'

Rainfall Model						FEH
Return Period (years)						100
FEH Rainfall Version						2013
Site Location	GB	527373	169089	TQ	27373	69089
Data Type						Point
Summer Storms						Yes
Winter Storms						Yes
Cv (Summer)						1.000
Cv (Winter)						1.000
Shortest Storm (mins)						15
Longest Storm (mins)						10080
Climate Change %						+40

<u>Time Area Diagram</u>

Total Area (ha) 0.116

 Time
 (mins)
 Area

 From:
 To:
 (ha)

 0
 4
 0.116

JNP Group		Page 4
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same of
Sheffield S9 1BW		Micro
Date 03/10/2022	Designed by SH	Drainage
File TANK 3.SRCX	Checked by CS	Dialilade
Innovyze	Source Control 2020.1.3	1

Storage is Online Cover Level (m) 0.400

Tank or Pond Structure

Invert Level (m) 0.000

Depth	(m)	Area	(m²)	Depth	(m)	Area	(m²)	Depth	(m)	Area	(m²)
0.	000	3	313.5	0.	400	3	313.5	0.	401		0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0039-5000-0400-5000 Design Head (m) 0.400 Design Flow (1/s) 0.5 Flush-Flo™ Calculated Objective Minimise upstream storage Application Surface Sump Available Diameter (mm) 39 Invert Level (m) 0.000 Minimum Outlet Pipe Diameter (mm) 75 Suggested Manhole Diameter (mm) 1200

Control	Points	Head (m)	Flow (1/s)
Design Point	(Calculated)	0.400	0.5
	Flush-Flo™	0.123	0.5
	Kick-Flo®	0.269	0.4
Mean Flow ove	er Head Range	-	0.4

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m) Flow	w (1/s)	Depth (m) Flow	(1/s)	Depth (m) Flow	(1/s)	Depth (m)	Flow (1/s)
0 100	0 5	1 000	0 0	2 000	1 0	7 000	1 0
0.100	0.5	1.200	0.8	3.000	1.2	7.000	1.8
0.200	0.5	1.400	0.9	3.500	1.3	7.500	1.9
0.300	0.4	1.600	0.9	4.000	1.4	8.000	2.0
0.400	0.5	1.800	1.0	4.500	1.5	8.500	2.0
0.500	0.6	2.000	1.0	5.000	1.6	9.000	2.1
0.600	0.6	2.200	1.1	5.500	1.6	9.500	2.1
0.800	0.7	2.400	1.1	6.000	1.7		
1.000	0.7	2.600	1.1	6.500	1.8		

JNP Group		Page 1
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same
Sheffield S9 1BW		Mirro
Date 03/10/2022	Designed by SH	Drainage
File Tank 4.SRCX	Checked by CS	nialilade
Innovyze	Source Control 2020.1.3	

	Stor Even		Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Volume (m³)	Stat	cus
15	min	Summer	0.138	0.138	0.7	57.1	Flood	Risk
30	min	Summer	0.179	0.179	0.7	74.0	Flood	Risk
60	min	Summer	0.220	0.220	0.7	91.0	Flood	Risk
120	min	Summer	0.279	0.279	0.7	115.5	Flood	Risk
180	min	Summer	0.313	0.313	0.7	129.6	Flood	Risk
240	min	Summer	0.335	0.335	0.7	138.8	Flood	Risk
360	min	Summer	0.361	0.361	0.7	149.5	Flood	Risk
480	min	Summer	0.374	0.374	0.7	155.0	Flood	Risk
600	min	Summer	0.381	0.381	0.7	157.8	Flood	Risk
720	min	Summer	0.384	0.384	0.7	158.9	Flood	Risk
960	min	Summer	0.383	0.383	0.7	158.5	Flood	Risk
1440	min	Summer	0.369	0.369	0.7	152.8	Flood	Risk
2160	min	Summer	0.343	0.343	0.7	142.3	Flood	Risk
2880	min	Summer	0.323	0.323	0.7	134.0	Flood	Risk
4320	min	Summer	0.292	0.292	0.7	121.0	Flood	Risk
5760	min	Summer	0.265	0.265	0.7	109.7	Flood	Risk
7200	min	Summer	0.241	0.241	0.7	100.0	Flood	Risk
8640	min	Summer	0.222	0.222	0.7	92.1	Flood	Risk
10080	min	Summer	0.206	0.206	0.7	85.5	Flood	Risk
15	min	Winter	0.138	0.138	0.7	57.1	Flood	Risk
30	min	Winter	0.179	0.179	0.7	74.0	Flood	Risk

Storm		Rain	Flooded	Discharge	Time-Peak	
	Even	t	(mm/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
15	min	Summer	153.427	0.0	47.3	19
30	min	Summer	99.829	0.0	56.8	34
60	min	Summer	61.856	0.0	86.7	64
120	min	Summer	39.634	0.0	106.7	124
180	min	Summer	29.960	0.0	111.9	184
240	min	Summer	24.318	0.0	111.3	244
360	min	Summer	17.833	0.0	109.6	362
480	min	Summer	14.154	0.0	108.3	482
600	min	Summer	11.766	0.0	107.1	602
720	min	Summer	10.084	0.0	106.0	722
960	min	Summer	7.860	0.0	103.9	962
1440	min	Summer	5.493	0.0	99.4	1440
2160	min	Summer	3.828	0.0	196.8	1820
2880	min	Summer	2.970	0.0	197.4	2192
4320	min	Summer	2.096	0.0	182.1	2984
5760	min	Summer	1.651	0.0	236.1	3808
7200	min	Summer	1.383	0.0	246.9	4544
8640	min	Summer	1.203	0.0	257.5	5360
10080	min	Summer	1.075	0.0	267.3	6144
15	min	Winter	153.427	0.0	47.3	19
30	min	Winter	99.829	0.0	56.8	34

JNP Group		Page 2
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same
Sheffield S9 1BW		Mirro
Date 03/10/2022	Designed by SH	Drainage
File Tank 4.SRCX	Checked by CS	niairiade
Innovyze	Source Control 2020.1.3	

	Storm Event			Max Depth (m)	Max Control (1/s)	Max Volume (m³)	Stat	us
60	min	Winter	0.220	0.220	0.7	91.0	Flood	Risk
120	min	Winter	0.279	0.279	0.7	115.4	Flood 1	Risk
180	min	Winter	0.313	0.313	0.7	129.5	Flood 1	Risk
240	min	Winter	0.335	0.335	0.7	138.8	Flood 1	Risk
360	min	Winter	0.361	0.361	0.7	149.5	Flood 1	Risk
480	min	Winter	0.374	0.374	0.7	155.1	Flood 1	Risk
600	min	Winter	0.381	0.381	0.7	157.9	Flood 1	Risk
720	min	Winter	0.384	0.384	0.7	159.1	Flood 1	Risk
960	min	Winter	0.383	0.383	0.7	158.8	Flood 1	Risk
1440	min	Winter	0.371	0.371	0.7	153.5	Flood 1	Risk
2160	min	Winter	0.343	0.343	0.7	142.3	Flood 1	Risk
2880	min	Winter	0.320	0.320	0.7	132.3	Flood 1	Risk
4320	min	Winter	0.279	0.279	0.7	115.6	Flood 1	Risk
5760	min	Winter	0.239	0.239	0.7	98.8	Flood 1	Risk
7200	min	Winter	0.206	0.206	0.7	85.3	Flood 1	Risk
8640	min	Winter	0.178	0.178	0.7	73.9	Flood 1	Risk
10080	min	Winter	0.155	0.155	0.7	64.2	Flood 1	Risk

	Storm	Rain	Flooded	Discharge	Time-Peak
	Event	(mm/hr)	Volume	Volume	(mins)
			(m³)	(m³)	
60	min Winte	r 61.856	0.0	86.7	64
	min Winte		0.0	106.8	122
180	min Winte	r 29.960	0.0	111.9	182
240	min Winte	r 24.318	0.0	111.4	240
360	min Winte	r 17.833	0.0	109.7	358
480	min Winte	r 14.154	0.0	108.4	476
600	min Winte	r 11.766	0.0	107.2	592
720	min Winte	r 10.084	0.0	106.2	708
960	min Winte	r 7.860	0.0	104.1	936
1440	min Winte	r 5.493	0.0	99.8	1384
2160	min Winte	r 3.828	0.0	197.0	2008
2880	min Winte	r 2.970	0.0	198.3	2252
4320	min Winte	r 2.096	0.0	186.3	3196
5760	min Winte	r 1.651	0.0	236.1	4032
7200	min Winte	r 1.383	0.0	247.0	4824
8640	min Winte	r 1.203	0.0	257.7	5616
10080	min Winte	r 1.075	0.0	267.6	6352

JNP Group		Page 3
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same of
Sheffield S9 1BW		Micco
Date 03/10/2022	Designed by SH	Drainage
File Tank 4.SRCX	Checked by CS	Diali lade
Innovyze	Source Control 2020.1.3	

Rainfall Model						FEH
Return Period (years)						100
FEH Rainfall Version						2013
Site Location	GB	527373	169089	ΤQ	27373	69089
Data Type						Point
Summer Storms						Yes
Winter Storms						Yes
Cv (Summer)						1.000
Cv (Winter)						1.000
Shortest Storm (mins)						15
Longest Storm (mins)						10080
Climate Change %						+40

<u>Time Area Diagram</u>

Total Area (ha) 0.150

 Time From:
 (mins) (ha)

 0
 4

 0
 4

JNP Group		Page 4
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same of
Sheffield S9 1BW		Micro
Date 03/10/2022	Designed by SH	Designado
File Tank 4.SRCX	Checked by CS	nialilade
Innovyze	Source Control 2020.1.3	

Storage is Online Cover Level (m) 0.400

Tank or Pond Structure

Invert Level (m) 0.000

Depth	(m)	Area	(m²)	Depth	(m)	Area	(m²)	Depth	(m)	Area	(m²)
0.	000	4	114.2	0.	400	4	114.2	0.	401		0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0046-7000-0400-7000 Design Head (m) 0.400 Design Flow (1/s) 0.7 Flush-Flo™ Calculated Objective Minimise upstream storage Application Sump Available Diameter (mm) 46 Invert Level (m) 0.000 Minimum Outlet Pipe Diameter (mm) 75 Suggested Manhole Diameter (mm) 1200

Control Points Head (m) Flow (1/s) Design Point (Calculated) 0.400 0.7 Flush-Flo $^{\text{TM}}$ 0.119 0.7

Kick-Flo® 0.270 0.6 Mean Flow over Head Range - 0.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m) H	Flow (1/s)	Depth (m) Flow	(1/s)	Depth (m) Flow	(1/s)	Depth (m)	Flow (1/s)
0.100	0.7	1.200	1.1	3.000	1.7	7.000	2.6
0.200	0.7	1.400	1.2	3.500	1.8	7.500	2.7
0.300	0.6	1.600	1.3	4.000	2.0	8.000	2.8
0.400	0.7	1.800	1.4	4.500	2.1	8.500	2.9
0.500	0.8	2.000	1.4	5.000	2.2	9.000	2.9
0.600	0.8	2.200	1.5	5.500	2.3	9.500	3.0
0.800	0.9	2.400	1.6	6.000	2.4		
1.000	1.0	2.600	1.6	6.500	2.5		

JNP Group		Page 1
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same
Sheffield S9 1BW		Mirro
Date 03/10/2022	Designed by SH	Drainane
File TANK 5.SRCX	Checked by CS	Dialilads
Innovyze	Source Control 2020.1.3	

Storm Event			Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Volume (m³)	Stat	cus
15	min	Summer	0.143	0.143	0.7	49.0	Flood	Risk
30	min	Summer	0.186	0.186	0.7	63.5	Flood	Risk
60	min	Summer	0.228	0.228	0.7	78.0	Flood	Risk
120	min	Summer	0.289	0.289	0.7	98.8	Flood	Risk
180	min	Summer	0.324	0.324	0.7	110.6	Flood	Risk
240	min	Summer	0.346	0.346	0.7	118.3	Flood	Risk
360	min	Summer	0.371	0.371	0.7	126.9	Flood	Risk
480	min	Summer	0.383	0.383	0.7	131.0	Flood	Risk
600	min	Summer	0.388	0.388	0.7	132.9	Flood	Risk
720	min	Summer	0.390	0.390	0.7	133.3	Flood	Risk
960	min	Summer	0.386	0.386	0.7	131.8	Flood	Risk
1440	min	Summer	0.366	0.366	0.7	125.1	Flood	Risk
2160	min	Summer	0.338	0.338	0.7	115.6	Flood	Risk
2880	min	Summer	0.315	0.315	0.7	107.9	Flood	Risk
4320	min	Summer	0.279	0.279	0.7	95.3	Flood	Risk
5760	min	Summer	0.245	0.245	0.7	83.9	Flood	Risk
7200	min	Summer	0.219	0.219	0.7	75.1	Flood	Risk
8640	min	Summer	0.198	0.198	0.7	67.8	Flood	Risk
0800.	min	Summer	0.180	0.180	0.7	61.6	Flood	Risk
15	min	Winter	0.143	0.143	0.7	49.0	Flood	Risk
30	min	Winter	0.186	0.186	0.7	63.5	Flood	Risk

Storm		Rain	${\tt Flooded}$	Discharge	Time-Peak	
	Even	t	(mm/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
15	min	Summer	153.427	0.0	42.9	19
30	min	Summer	99.829	0.0	53.6	34
60	min	Summer	61.856	0.0	76.2	64
120	min	Summer	39.634	0.0	96.1	124
180	min	Summer	29.960	0.0	106.0	184
240	min	Summer	24.318	0.0	110.2	244
360	min	Summer	17.833	0.0	110.7	362
480	min	Summer	14.154	0.0	109.6	482
600	min	Summer	11.766	0.0	108.4	602
720	min	Summer	10.084	0.0	107.3	722
960	min	Summer	7.860	0.0	104.9	960
1440	min	Summer	5.493	0.0	100.0	1372
2160	min	Summer	3.828	0.0	173.8	1708
2880	min	Summer	2.970	0.0	178.5	2076
4320	min	Summer	2.096	0.0	180.6	2900
5760	min	Summer	1.651	0.0	203.4	3688
7200	min	Summer	1.383	0.0	212.9	4464
8640	min	Summer	1.203	0.0	222.0	5192
10080	min	Summer	1.075	0.0	230.6	5952
15	min	Winter	153.427	0.0	42.9	19
30	min	Winter	99.829	0.0	53.6	33

JNP Group		Page 2
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same
Sheffield S9 1BW		Micro
Date 03/10/2022	Designed by SH	Drainage
File TANK 5.SRCX	Checked by CS	Dialilade
Innovyze	Source Control 2020.1.3	

	Stor Even		Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Volume (m³)	Stat	cus
60	min	Winter	0.228	0.228	0.7	78.0	Flood	Risk
120	min	Winter	0.289	0.289	0.7	98.8	Flood	Risk
180	min	Winter	0.323	0.323	0.7	110.6	Flood	Risk
240	min	Winter	0.346	0.346	0.7	118.3	Flood	Risk
360	min	Winter	0.371	0.371	0.7	127.0	Flood	Risk
480	min	Winter	0.384	0.384	0.7	131.2	Flood	Risk
600	min	Winter	0.389	0.389	0.7	133.0	Flood	Risk
720	min	Winter	0.391	0.391	0.7	133.6	Flood	Risk
960	min	Winter	0.387	0.387	0.7	132.3	Flood	Risk
1440	min	Winter	0.368	0.368	0.7	125.9	Flood	Risk
2160	min	Winter	0.335	0.335	0.7	114.7	Flood	Risk
2880	min	Winter	0.309	0.309	0.7	105.5	Flood	Risk
4320	min	Winter	0.257	0.257	0.7	87.9	Flood	Risk
5760	min	Winter	0.211	0.211	0.7	72.3	Flood	Risk
7200	min	Winter	0.175	0.175	0.7	59.8	Flood	Risk
8640	min	Winter	0.145	0.145	0.7	49.7	Flood	Risk
10080	min	Winter	0.122	0.122	0.7	41.6	Flood	Risk

Storm		Rain	${\tt Flooded}$	Discharge	Time-Peak	
	Even	t	(mm/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
60	min	Winter	61.856	0.0	76.2	64
		Winter	39.634	0.0	96.2	122
180	min	Winter	29.960	0.0	106.1	180
240	min	Winter	24.318	0.0	110.2	240
360	min	Winter	17.833	0.0	110.8	358
480	min	Winter	14.154	0.0	109.7	474
600	min	Winter	11.766	0.0	108.5	590
720	min	Winter	10.084	0.0	107.4	706
960	min	Winter	7.860	0.0	105.1	932
1440	min	Winter	5.493	0.0	100.3	1370
2160	min	Winter	3.828	0.0	173.9	1732
2880	min	Winter	2.970	0.0	178.7	2192
4320	min	Winter	2.096	0.0	184.0	3072
5760	min	Winter	1.651	0.0	203.5	3864
7200	min	Winter	1.383	0.0	212.9	4680
8640	min	Winter	1.203	0.0	222.1	5360
10080	min	Winter	1.075	0.0	230.7	6056

JNP Group		Page 3
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same of
Sheffield S9 1BW		Mirco
Date 03/10/2022	Designed by SH	Drainage
File TANK 5.SRCX	Checked by CS	pran lade
Innovyze	Source Control 2020.1.3	'

Rainfall Model						FEH
Return Period (years)						100
FEH Rainfall Version						2013
Site Location	GB	527373	169089	TQ	27373	69089
Data Type						Point
Summer Storms						Yes
Winter Storms						Yes
Cv (Summer)						1.000
Cv (Winter)						1.000
Shortest Storm (mins)						15
Longest Storm (mins)						10080
Climate Change %						+40

<u>Time Area Diagram</u>

Total Area (ha) 0.129

 Time From:
 (mins) (ha)

 0
 4

 0
 4

JNP Group		Page 4
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same of
Sheffield S9 1BW		Mirro
Date 03/10/2022	Designed by SH	Designation
File TANK 5.SRCX	Checked by CS	namaye
Innovyze	Source Control 2020.1.3	-

Storage is Online Cover Level (m) 0.400

Tank or Pond Structure

Invert Level (m) 0.000

Depth	(m)	Area	(m²)	Depth	(m)	Area	(m²)	Depth	(m)	Area	(m²	²)
0.	.000	3	342.0	0.	400	3	342.0	0.	401		0.	. 0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0046-7000-0400-7000
Design Head (m)	0.400
Design Flow $(1/s)$	0.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	46
Invert Level (m)	0.000
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m) H	Flow (1/s)	Depth (m) Flow	(1/s)	Depth (m) Flow	(1/s)	Depth (m)	Flow (1/s)
0.100	0.7	1.200	1.1	3.000	1.7	7.000	2.6
0.200	0.7	1.400	1.2	3.500	1.8	7.500	2.7
0.300	0.6	1.600	1.3	4.000	2.0	8.000	2.8
0.400	0.7	1.800	1.4	4.500	2.1	8.500	2.9
0.500	0.8	2.000	1.4	5.000	2.2	9.000	2.9
0.600	0.8	2.200	1.5	5.500	2.3	9.500	3.0
0.800	0.9	2.400	1.6	6.000	2.4		
1.000	1.0	2.600	1.6	6.500	2.5		

JNP Group		Page 1
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same
Sheffield S9 1BW		Mirro
Date 03/10/2022	Designed by SH	Drainage
File Tank 6.SRCX	Checked by CS	Dialilads
Innovyze	Source Control 2020.1.3	

	Stor Even		Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Volume (m³)	Stat	cus
15	min	Summer	0.136	0.136	1.0	91.4	Flood	Risk
30	min	Summer	0.177	0.177	1.0	118.5	Flood	Risk
60	min	Summer	0.218	0.218	1.0	146.0	Flood	Risk
120	min	Summer	0.276	0.276	1.0	185.4	Flood	Risk
180	min	Summer	0.311	0.311	1.0	208.4	Flood	Risk
240	min	Summer	0.333	0.333	1.0	223.5	Flood	Risk
360	min	Summer	0.360	0.360	1.0	241.5	Flood	Risk
480	min	Summer	0.374	0.374	1.0	251.0	Flood	Risk
600	min	Summer	0.382	0.382	1.0	256.2	Flood	Risk
720	min	Summer	0.386	0.386	1.0	258.9	Flood	Risk
960	min	Summer	0.387	0.387	1.0	259.5	Flood	Risk
1440	min	Summer	0.377	0.377	1.0	253.1	Flood	Risk
2160	min	Summer	0.355	0.355	1.0	238.1	Flood	Risk
2880	min	Summer	0.337	0.337	1.0	225.9	Flood	Risk
4320	min	Summer	0.309	0.309	1.0	207.2	Flood	Risk
5760	min	Summer	0.286	0.286	1.0	192.0	Flood	Risk
7200	min	Summer	0.266	0.266	1.0	178.3	Flood	Risk
8640	min	Summer	0.248	0.248	1.0	166.5	Flood	Risk
10080	min	Summer	0.233	0.233	1.0	156.6	Flood	Risk
15	min	Winter	0.136	0.136	1.0	91.4	Flood	Risk
30	min	Winter	0.177	0.177	1.0	118.5	Flood	Risk

Storm		Rain	Flooded	Discharge	Time-Peak	
	Event		(mm/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
15	min	Summer	153.427	0.0	70.1	19
		Summer	99.829	0.0	82.6	34
60	min	Summer	61.856	0.0	133.6	64
120	min	Summer	39.634	0.0	159.1	124
180	min	Summer	29.960	0.0	159.9	184
240	min	Summer	24.318	0.0	157.6	244
360	min	Summer	17.833	0.0	154.8	362
480	min	Summer	14.154	0.0	153.0	482
600	min	Summer	11.766	0.0	151.5	602
720	min	Summer	10.084	0.0	150.1	722
960	min	Summer	7.860	0.0	147.2	962
1440	min	Summer	5.493	0.0	141.5	1440
2160	min	Summer	3.828	0.0	295.0	1928
2880	min	Summer	2.970	0.0	284.9	2276
4320	min	Summer	2.096	0.0	257.3	3064
5760	min	Summer	1.651	0.0	375.8	3872
7200	min	Summer	1.383	0.0	392.8	4688
8640	min	Summer	1.203	0.0	409.0	5448
10080	min	Summer	1.075	0.0	423.8	6256
15	min	Winter	153.427	0.0	70.1	19
30	min	Winter	99.829	0.0	82.6	34

JNP Group		Page 2
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same
Sheffield S9 1BW		Micco
Date 03/10/2022	Designed by SH	Drainage
File Tank 6.SRCX	Checked by CS	Dialilade
Innovyze	Source Control 2020.1.3	

	Stor Even		Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Volume (m³)	Stat	cus
60	min	Winter	0.218	0.218	1.0	146.0	Flood	Risk
120	min	Winter	0.276	0.276	1.0	185.4	Flood	Risk
180	min	Winter	0.311	0.311	1.0	208.4	Flood	Risk
240	min	Winter	0.333	0.333	1.0	223.5	Flood	Risk
360	min	Winter	0.360	0.360	1.0	241.5	Flood	Risk
480	min	Winter	0.374	0.374	1.0	251.1	Flood	Risk
600	min	Winter	0.382	0.382	1.0	256.3	Flood	Risk
720	min	Winter	0.386	0.386	1.0	259.0	Flood	Risk
960	min	Winter	0.387	0.387	1.0	259.9	Flood	Risk
1440	min	Winter	0.379	0.379	1.0	253.9	Flood	Risk
2160	min	Winter	0.356	0.356	1.0	239.1	Flood	Risk
2880	min	Winter	0.334	0.334	1.0	224.0	Flood	Risk
4320	min	Winter	0.300	0.300	1.0	201.1	Flood	Risk
5760	min	Winter	0.266	0.266	1.0	178.7	Flood	Risk
7200	min	Winter	0.236	0.236	1.0	158.1	Flood	Risk
8640	min	Winter	0.210	0.210	1.0	140.9	Flood	Risk
10080	min	Winter	0.188	0.188	1.0	126.0	Flood	Risk

Storm			Rain	Flooded	Discharge	Time-Peak
	Even	t	(mm/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
60	min	Winter	61.856	0.0	133.6	64
		Winter				
			39.634	0.0	159.1	122
180	min	Winter	29.960	0.0	160.1	182
240	min	Winter	24.318	0.0	157.8	240
360	min	Winter	17.833	0.0	155.0	358
480	min	Winter	14.154	0.0	153.2	476
600	min	Winter	11.766	0.0	151.7	594
720	min	Winter	10.084	0.0	150.3	708
960	min	Winter	7.860	0.0	147.5	942
1440	min	Winter	5.493	0.0	142.0	1396
2160	min	Winter	3.828	0.0	295.8	2032
2880	min	Winter	2.970	0.0	286.9	2336
4320	min	Winter	2.096	0.0	261.9	3240
5760	min	Winter	1.651	0.0	376.0	4152
7200	min	Winter	1.383	0.0	393.2	4968
8640	min	Winter	1.203	0.0	409.6	5784
10080	min	Winter	1.075	0.0	425.0	6552

JNP Group		Page 3
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same of
Sheffield S9 1BW		Micro
Date 03/10/2022	Designed by SH	Drainage
File Tank 6.SRCX	Checked by CS	prairiage
Innovyze	Source Control 2020.1.3	'

Rainfall Model						FEH
Return Period (years)						100
FEH Rainfall Version						2013
Site Location	GB	527373	169089	TQ	27373	69089
Data Type						Point
Summer Storms						Yes
Winter Storms						Yes
Cv (Summer)						1.000
Cv (Winter)						1.000
Shortest Storm (mins)						15
Longest Storm (mins)						10080
Climate Change %						+40

<u>Time Area Diagram</u>

Total Area (ha) 0.240

 Time
 (mins)
 Area

 From:
 To:
 (ha)

 0
 4
 0.240

JNP Group		Page 4
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same of
Sheffield S9 1BW		Micro
Date 03/10/2022	Designed by SH	Designado
File Tank 6.SRCX	Checked by CS	Dialilade
Innovyze	Source Control 2020.1.3	-

Storage is Online Cover Level (m) 0.400

Tank or Pond Structure

Invert Level (m) 0.000

Depth	(m)	Area	(m²)	Depth	(m)	Area	(m²)	Depth	(m)	Area	(m²)
0.	000	6	570.7	0.	400	6	570.7	0.	401		0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0055-1000-0400-1000 Design Head (m) 0.400 Design Flow (1/s) 1.0 Flush-Flo™ Calculated Objective Minimise upstream storage Application Surface Sump Available Diameter (mm) 55 Invert Level (m) 0.000 Minimum Outlet Pipe Diameter (mm) 75 Suggested Manhole Diameter (mm) 1200

Control Points Head (m) Flow (1/s) Design Point (Calculated) 0.400 1.0 Flush-Flom 0.117 1.0 Kick-Flom 0.273 0.8 Mean Flow over Head Range - 0.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m) Flo	w (1/s)	Depth (m) Flow	(1/s)	Depth (m) Flow	(1/s)	Depth (m)	Flow (1/s)
0 100	1 0	1 000	1 (2 000	0 5	7 000	2 0
0.100	1.0	1.200	1.6	3.000	2.5	7.000	3.8
0.200	1.0	1.400	1.8	3.500	2.7	7.500	3.9
0.300	0.9	1.600	1.9	4.000	2.8	8.000	4.0
0.400	1.0	1.800	2.0	4.500	3.0	8.500	4.1
0.500	1.1	2.000	2.1	5.000	3.2	9.000	4.3
0.600	1.2	2.200	2.2	5.500	3.3	9.500	4.4
0.800	1.4	2.400	2.2	6.000	3.5		
1.000	1.5	2.600	2.3	6.500	3.6		

JNP Group		Page 1
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same of
Sheffield S9 1BW		Mirro
Date 03/10/2022	Designed by SH	Drainage
File Tank 7.SRCX	Checked by CS	Dialilade
Innovyze	Source Control 2020.1.3	

	Stor Even		Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Volume (m³)	Stat	cus
15	min	Summer	0.141	0.141	0.5	40.3	Flood	Risk
30	min	Summer	0.183	0.183	0.5	52.3	Flood	Risk
60	min	Summer	0.226	0.226	0.5	64.3	Flood	Risk
120	min	Summer	0.286	0.286	0.5	81.5	Flood	Risk
180	min	Summer	0.321	0.321	0.5	91.4	Flood	Risk
240	min	Summer	0.343	0.343	0.5	97.9	Flood	Risk
360	min	Summer	0.370	0.370	0.5	105.3	Flood	Risk
480	min	Summer	0.383	0.383	0.5	109.1	Flood	Risk
600	min	Summer	0.389	0.389	0.5	111.0	Flood	Risk
720	min	Summer	0.392	0.392	0.5	111.7	Flood	Risk
960	min	Summer	0.390	0.390	0.5	111.2	Flood	Risk
1440	min	Summer	0.375	0.375	0.5	106.9	Flood	Risk
2160	min	Summer	0.348	0.348	0.5	99.2	Flood	Risk
2880	min	Summer	0.327	0.327	0.5	93.2	Flood	Risk
4320	min	Summer	0.294	0.294	0.5	83.8	Flood	Risk
5760	min	Summer	0.266	0.266	0.5	75.8	Flood	Risk
7200	min	Summer	0.241	0.241	0.5	68.8	Flood	Risk
8640	min	Summer	0.222	0.222	0.5	63.2	Flood	Risk
10080	min	Summer	0.205	0.205	0.5	58.4	Flood	Risk
15	min	Winter	0.141	0.141	0.5	40.3	Flood	Risk
30	min	Winter	0.183	0.183	0.5	52.2	Flood	Risk

	Stor Even		Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15	min	Summer	153.427	0.0	34.4	19
30	min	Summer	99.829	0.0	40.9	34
60	min	Summer	61.856	0.0	62.1	64
120	min	Summer	39.634	0.0	76.5	124
180	min	Summer	29.960	0.0	80.0	184
240	min	Summer	24.318	0.0	79.7	244
360	min	Summer	17.833	0.0	78.6	362
480	min	Summer	14.154	0.0	77.8	482
600	min	Summer	11.766	0.0	77.1	602
720	min	Summer	10.084	0.0	76.4	722
960	min	Summer	7.860	0.0	74.9	962
1440	min	Summer	5.493	0.0	71.9	1440
2160	min	Summer	3.828	0.0	140.6	1812
2880	min	Summer	2.970	0.0	141.6	2164
4320	min	Summer	2.096	0.0	131.3	2980
5760	min	Summer	1.651	0.0	167.1	3808
7200	min	Summer	1.383	0.0	174.9	4544
8640	min	Summer	1.203	0.0	182.4	5352
10080	min	Summer	1.075	0.0	189.5	6056
15	min	Winter	153.427	0.0	34.4	19
30	min	Winter	99.829	0.0	40.9	34

JNP Group		Page 2
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same of
Sheffield S9 1BW		Mirro
Date 03/10/2022	Designed by SH	Drainage
File Tank 7.SRCX	Checked by CS	Drainage
Innovyze	Source Control 2020.1.3	

	Stor Even		Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Volume (m³)	Stat	cus
60	min	Winter	0.225	0.225	0.5	64.3	Flood	Risk
120	min	Winter	0.286	0.286	0.5	81.5	Flood	Risk
180	min	Winter	0.321	0.321	0.5	91.4	Flood	Risk
240	min	Winter	0.343	0.343	0.5	97.9	Flood	Risk
360	min	Winter	0.370	0.370	0.5	105.4	Flood	Risk
480	min	Winter	0.383	0.383	0.5	109.2	Flood	Risk
600	min	Winter	0.390	0.390	0.5	111.1	Flood	Risk
720	min	Winter	0.393	0.393	0.5	111.9	Flood	Risk
960	min	Winter	0.391	0.391	0.5	111.5	Flood	Risk
1440	min	Winter	0.377	0.377	0.5	107.5	Flood	Risk
2160	min	Winter	0.348	0.348	0.5	99.2	Flood	Risk
2880	min	Winter	0.323	0.323	0.5	92.1	Flood	Risk
4320	min	Winter	0.281	0.281	0.5	80.0	Flood	Risk
5760	min	Winter	0.238	0.238	0.5	67.9	Flood	Risk
7200	min	Winter	0.204	0.204	0.5	58.2	Flood	Risk
8640	min	Winter	0.176	0.176	0.5	50.1	Flood	Risk
10080	min	Winter	0.152	0.152	0.5	43.4	Flood	Risk

	Stor	m	Rain	Flooded	Discharge	Time-Peak
	Even	t	(mm/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
60	min	Winter	61.856	0.0	62.1	64
		Winter	39.634	0.0	76.5	122
		Winter	29.960	0.0	80.0	182
240	min	Winter	24.318	0.0	79.7	240
360	min	Winter	17.833	0.0	78.7	358
480	min	Winter	14.154	0.0	77.9	476
600	min	Winter	11.766	0.0	77.1	592
720	min	Winter	10.084	0.0	76.4	708
960	min	Winter	7.860	0.0	75.0	936
1440	min	Winter	5.493	0.0	72.1	1384
2160	min	Winter	3.828	0.0	140.7	1992
2880	min	Winter	2.970	0.0	142.1	2248
4320	min	Winter	2.096	0.0	134.1	3196
5760	min	Winter	1.651	0.0	167.2	4032
7200	min	Winter	1.383	0.0	174.9	4824
8640	min	Winter	1.203	0.0	182.5	5616
10080	min	Winter	1.075	0.0	189.7	6352

JNP Group		Page 3
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same of
Sheffield S9 1BW		Micro
Date 03/10/2022	Designed by SH	Drainage
File Tank 7.SRCX	Checked by CS	Drail laye
Innovyze	Source Control 2020.1.3	·

Rainfall Model						FEH
Return Period (years)						100
FEH Rainfall Version						2013
Site Location	GB	527373	169089	ΤQ	27373	69089
Data Type						Point
Summer Storms						Yes
Winter Storms						Yes
Cv (Summer)						1.000
Cv (Winter)						1.000
Shortest Storm (mins)						15
Longest Storm (mins)						10080
Climate Change %						+40

<u>Time Area Diagram</u>

Total Area (ha) 0.106

 Time
 (mins)
 Area

 From:
 To:
 (ha)

 0
 4
 0.106

JNP Group		Page 4
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same of
Sheffield S9 1BW		Mirro
Date 03/10/2022	Designed by SH	Designado
File Tank 7.SRCX	Checked by CS	Diali lade
Innovyze	Source Control 2020.1.3	'

Storage is Online Cover Level (m) 0.400

Tank or Pond Structure

Invert Level (m) 0.000

Depth	(m)	Area	(m²)	Depth	(m)	Area	(m²)	Depth	(m)	Area	(m²)
0.	000	2	285.0	0.	400	2	85.0	0.	401		0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0039-5000-0400-5000 Design Head (m) 0.400 Design Flow (1/s) 0.5 Flush-Flo™ Calculated Objective Minimise upstream storage Application Sump Available Diameter (mm) 39 Invert Level (m) 0.000 Minimum Outlet Pipe Diameter (mm) 75 Suggested Manhole Diameter (mm) 1200

Control Points Head (m) Flow (1/s) Design Point (Calculated) 0.400 0.5 Flush-Flom 0.123 0.5 Kick-Flom 0.269 0.4 Mean Flow over Head Range - 0.4

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m) Flow	w (1/s)	Depth (m) Flow	(1/s)	Depth (m) Flow	(1/s)	Depth (m)	Flow (1/s)
0 100	0 5	1 000	0 0	2 000	1 0	7 000	1 0
0.100	0.5	1.200	0.8	3.000	1.2	7.000	1.8
0.200	0.5	1.400	0.9	3.500	1.3	7.500	1.9
0.300	0.4	1.600	0.9	4.000	1.4	8.000	2.0
0.400	0.5	1.800	1.0	4.500	1.5	8.500	2.0
0.500	0.6	2.000	1.0	5.000	1.6	9.000	2.1
0.600	0.6	2.200	1.1	5.500	1.6	9.500	2.1
0.800	0.7	2.400	1.1	6.000	1.7		
1.000	0.7	2.600	1.1	6.500	1.8		

JNP Group		Page 1
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same
Sheffield S9 1BW		Micro
Date 09/11/2022	Designed by SH	Drainage
File Tank 8.SRCX	Checked by SH	Dialilads
Innovyze	Source Control 2020.1.3	

	Stor Even		Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Volume (m³)	Status
15	min	Summer	0.287	0.287	0.7	50.1	ОК
30	min	Summer	0.371	0.371	0.7	64.9	O K
60	min	Summer	0.456	0.456	0.7	79.8	O K
120	min	Summer	0.576	0.576	0.7	100.6	Flood Risk
180	min	Summer	0.643	0.643	0.7	112.4	Flood Risk
240	min	Summer	0.686	0.686	0.7	119.9	Flood Risk
360	min	Summer	0.733	0.733	0.8	128.2	Flood Risk
480	min	Summer	0.755	0.755	0.8	131.9	Flood Risk
600	min	Summer	0.762	0.762	0.8	133.2	Flood Risk
720	min	Summer	0.762	0.762	0.8	133.2	Flood Risk
960	min	Summer	0.748	0.748	0.8	130.8	Flood Risk
1440	min	Summer	0.702	0.702	0.8	122.6	Flood Risk
2160	min	Summer	0.642	0.642	0.7	112.3	Flood Risk
2880	min	Summer	0.596	0.596	0.7	104.2	Flood Risk
4320	min	Summer	0.526	0.526	0.7	91.9	Flood Risk
5760	min	Summer	0.471	0.471	0.7	82.4	O K
7200	min	Summer	0.425	0.425	0.7	74.3	O K
8640	min	Summer	0.379	0.379	0.7	66.2	O K
10080	min	Summer	0.336	0.336	0.7	58.8	O K
15	min	Winter	0.287	0.287	0.7	50.1	O K
30	min	Winter	0.371	0.371	0.7	64.9	O K

Storm Event		Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
30 60 120	min min min	Summer Summer Summer Summer	153.427 99.829 61.856 39.634 29.960	0.0 0.0 0.0 0.0	47.5 57.0 80.3 101.7 111.5	19 34 64 124 184
240 360 480 600	min min min min	Summer Summer Summer Summer	24.318 17.833 14.154 11.766	0.0 0.0 0.0	114.1 114.9 114.7 114.4	242 362 482 602
960 1440 2160	min min min	Summer Summer Summer Summer	10.084 7.860 5.493 3.828 2.970	0.0 0.0 0.0 0.0	113.8 112.4 109.1 180.7 186.3	722 960 1284 1644 2020
5760 7200 8640	min min min	Summer Summer Summer Summer Summer	2.096 1.651 1.383 1.203 1.075	0.0 0.0 0.0 0.0	188.5 208.9 218.7 228.3 237.6	2856 3688 4536 5280 6048
15 30		Winter Winter	153.427 99.829	0.0	47.5 57.0	19 34

JNP Group		Page 2
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same
Sheffield S9 1BW		Mirro
Date 09/11/2022	Designed by SH	Drainage
File Tank 8.SRCX	Checked by SH	Dialilads
Innovyze	Source Control 2020.1.3	

	Storm Event	Max Level (m)	Max Depth (m)	Max Control (1/s)	Max Volume (m³)	Status
120 180 240 360 480 600 720 960 1440 2160 2880 4320 5760 7200	min Winter	0.576 0.644 0.687 0.735 0.757 0.765 0.766 0.754 0.709 0.642 0.587 0.494 0.412 0.327	0.576 0.644 0.687 0.735 0.757 0.765 0.766 0.754 0.709 0.642 0.587 0.494 0.412 0.327	0.7 0.7 0.7 0.8 0.8 0.8 0.8 0.8 0.7 0.7 0.7	112.5 120.1 128.5 132.3 133.9 131.8 124.0 112.2 102.6 86.4 72.1 57.1	O K Flood Risk O K O K O K
10080	min Winter	0.214	0.214	0.7	37.5	O K

Storm		Rain	Flooded	Discharge	Time-Peak	
Event			(mm/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
60	min	Winter	61.856	0.0	80.3	64
120		Winter	39.634	0.0	101.7	122
180		Winter	29.960	0.0	111.5	180
240	min	Winter	24.318	0.0	114.1	240
360	min	Winter	17.833	0.0	114.8	356
480	min	Winter	14.154	0.0	114.6	474
600	min	Winter	11.766	0.0	114.2	590
720	min	Winter	10.084	0.0	113.6	702
960	min	Winter	7.860	0.0	112.2	930
1440	min	Winter	5.493	0.0	108.9	1356
2160	min	Winter	3.828	0.0	180.7	1688
2880	min	Winter	2.970	0.0	186.4	2160
4320	min	Winter	2.096	0.0	190.4	3072
5760	min	Winter	1.651	0.0	208.9	3976
7200	min	Winter	1.383	0.0	218.7	4688
8640	min	Winter	1.203	0.0	228.3	5440
10080	min	Winter	1.075	0.0	237.7	6144

JNP Group	Page 3	
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same of
Sheffield S9 1BW		Mirro
Date 09/11/2022	Designed by SH	Drainage
File Tank 8.SRCX	Checked by SH	Diali lade
Innovyze	Source Control 2020.1.3	'

Rainfall Model						FEH
Return Period (years)						100
FEH Rainfall Version						2013
Site Location	GB	527373	169089	TQ	27373	69089
Data Type						Point
Summer Storms						Yes
Winter Storms						Yes
Cv (Summer)						1.000
Cv (Winter)						1.000
Shortest Storm (mins)						15
Longest Storm (mins)						10080
Climate Change %						+40

<u>Time Area Diagram</u>

Total Area (ha) 0.132

 Time From:
 (mins) (ha)

 0
 4

 0
 1

JNP Group	Page 4	
No. 1 Meadowhall Riverside	Mitcham Gasworks	
Meadowhall Road	BR31002	The same of
Sheffield S9 1BW		Mirro
Date 09/11/2022	Designed by SH	Designation
File Tank 8.SRCX	Checked by SH	Drainage
Innovyze	Source Control 2020.1.3	

Storage is Online Cover Level (m) 0.800

Tank or Pond Structure

Invert Level (m) 0.000

Depth	(m)	Area	(m²)	Depth	(m)	Area	(m²)	Depth	(m)	Area	(m²)
0.	000	1	74.8	0.	800	1	74.8	0.	801		0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0044-8000-0800-8000 Design Head (m) 0.800 Design Flow (1/s) 0.8 Flush-Flo™ Calculated Objective Minimise upstream storage Application Sump Available Diameter (mm) 44 Invert Level (m) 0.000 Minimum Outlet Pipe Diameter (mm) 75 Suggested Manhole Diameter (mm) 1200

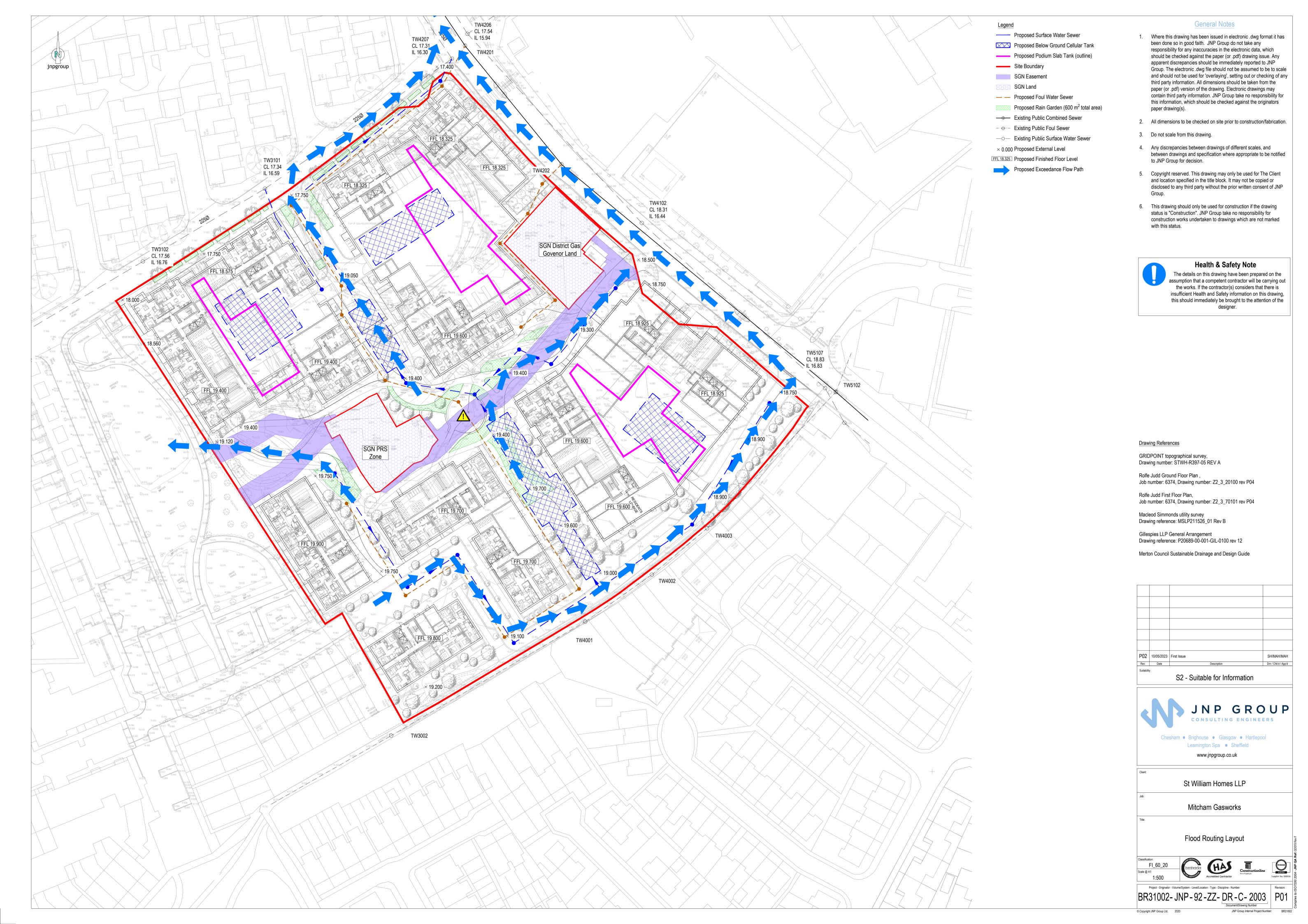
Control Points Head (m) Flow (1/s) Design Point (Calculated) 0.800 0.8 0.8 Flush-Flom 0.194 0.7 Kick-Flom 0.390 0.6 Mean Flow over Head Range - 0.7

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m) Flow	(1/s)	Depth (m) Flow	(1/s)	Depth (m) Flow	(1/s)	Depth (m)	Flow (1/s)
0.100	0.7	1.200	1.0	3.000	1.4	7.000	2.1
0.200	0.7	1.400	1.0	3.500	1.5	7.500	2.2
0.300	0.7	1.600	1.1	4.000	1.6	8.000	2.3
0.400	0.6	1.800	1.1	4.500	1.7	8.500	2.3
0.500	0.6	2.000	1.2	5.000	1.8	9.000	2.4
0.600	0.7	2.200	1.3	5.500	1.9	9.500	2.5
0.800	0.8	2.400	1.3	6.000	2.0		
1.000	0.9	2.600	1.4	6.500	2.1		



APPENDIX F FLOOD ROUTING LAYOUT





APPENDIX G THAMES WATER PRE-PLANNING RESPONSE



Mr Samuel Hinson

MBP2, Meadowhall Business Park Carbrook Hall Road Sheffield S9 2EQ



05 October 2022

Pre-planning enquiry: Confirmation of sufficient capacity

Dear Mr Hinson

Thank you for providing information on your development located at Mitcham Gasworks, Western Road, Mitcham, Merton for the construction of 600 flats.

Foul water from 450 units to connect via gravity to foul water sewer at chamber 4201 Western Road.

Foul water from 150 units via gravity to connect foul water sewer at chamber chamber 4002.

Surface water to connect via gravity into surface water sewer at chamber 4207 attenuated to 7.5l/s.

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

Foul Water

If your proposals progress in line with the details you've provided, we're pleased to confirm that there will be sufficient sewerage capacity in the adjacent foul water sewer network to serve your development.

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

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

Source Protection Zone

The development site boundary falls within a Source Protection Zone for groundwater abstraction. These zones may be at particular risk from polluting activities on or below the land surface. To prevent pollution, the Environment Agency and Thames Water (or other local water undertaker) will use a tiered, risk-based approach to regulate activities that may impact groundwater resources. The applicant is encouraged to read the Environment Agency's approach to groundwater protection (available at https://www.gov.uk/government/publications/

groundwater-protection-position-statements) and may wish to discuss the implications for their development with a suitably qualified environmental consultant.

Surface Water

When developing a site, policy 5.13 of the London Plan and Policy 3.4 of the Supplementary Planning Guidance (Sustainable Design and Construction) states that every attempt should be made to use flow attenuation and SuDS/Storage to reduce the surface water discharge from the site as much as possible.

In accordance with the Building Act 2000 Clause H3.3, positive connection of surface water to a public sewer will only be consented when it can be demonstrated that the hierarchy of disposal methods have been examined and proven to be impracticable. Before we can consider your surface water needs, you'll need written approval from the lead local flood authority that you have followed the sequential approach to the disposal of surface water and considered all practical means.

The disposal hierarchy being:

- 1. store rainwater for later use.
- 2. use infiltration techniques where possible.
- 3. attenuate rainwater in ponds or open water features for gradual release.
- 4. attenuate rainwater by storing in tanks or sealed water features for gradual release.
- 5. discharge rainwater direct to a watercourse.
- 6. discharge rainwater to a surface water sewer/drain.
- 7. discharge rainwater to the combined sewer.
- 8. discharge rainwater to the foul sewer

Where connection to the public sewerage network is still required to manage surface water flows we will accept these flows at a discharge rate in line with CIRIA's best practice guide on SuDS or that stated within the sites planning approval.

If the above surface water hierarchy has been followed and if the flows are restricted to a total of 7.5l/s then Thames Water would not have any objections to the proposal.

Please see the attached 'Planning your wastewater' leaflet for additional information.

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 020 3577 9811.

Yours sincerely

Many Thanks

Kind Regards

Adoption Engineer

 $\label{lem:constraint} \begin{tabular}{ll} Developer Services - Adoptions Engineer, Sewer Adoptions Team \\ \textbf{Get advice on making your sewer connection correctly at } \\ \underline{\textbf{connectright.org.uk}} \\ \end{tabular}$

Clearwater Court, Vastern Road, Reading, RG1 8DB Find us online at <u>developers.thameswater.co.uk</u>



APPENDIX H LANDSCAPING LAYOUTS



rev details 00 DRAFT ISSUE FOR PLANNING	SO	29.06.2022
01 DRAFT ISSUE FOR PLANNING 02 ISSUE FOR PLANNING APPLICATION	SO SO	29.09.2022
02 ISSUE FOR PLANNING APPLICATION	50	18.11.2022
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GENERAL Application Site Boundary Line		
PAVING		
Paving Type 1 Concrete Paver, Brown/Reddish Colour		
Paving Type 2 Concrete Pever, Buff Colour		
Paving Type 3 & 3a Concrete Paver Perpendicular, Buff colour Paving Type 4 Seals Bound Grawl, BrownFleddsh Colour		
Reain Bound Gravel, BrownReddish Colour Paving Type 5 Self Binding Gravel, Buff Colour		
Paving Type 6 Bark mulch		
Paving Type 7 Coloured Termic		
Paving Type 8		
Paving Type 9 Private Terrace Paving to Architects Specs		
PLANTING Species Rich Lawn		
Species Rich Lawn Planting Mix Type 1 Omemental planting mix		
X × X X Y X × X X Shade tolerant plants with dense shrubs		
Planting Mix Type 3 Sensory planting mix Sensory planting mix		
Planting Mix Type 4 Grassland Planting Mix Type 5		
Planting Mix Type 5 Buffer planting for half shaded areas Planting Mix Type 6		
Planting Mix Type 7 Woodard (full shade blerant plants)		
Hedge Type 1		
Hedge Type 2 Hedge planting		
TREES		
Tree type 1 Street tree - Large size		
Tree type 2 Shrgle stem tree - Medium size -		
Species Vary		
Tree type 3 Multi-stem tree - Medium/small size - Species vary		
Tree type 5 [sarge shrub - Medium/small size - ** ** ** ** ** ** ** ** ** ** ** ** **		
FURNITURE & STRUCTURE		
Furniture Type 1 Standatore backless timber top bench- Dimensions vary		
Furniture Type 2 Play equipment (Types Very) Furniture Type 3 Page 15		
Boulders Furniture Type 4 Reused gnaholder seet		
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1.1 All dimensions to be checked onsite
1.2 This drawing to be read in conjunction with all other
Gillespies drawings and specifications

Berkley St William

Drawing title

GILLESPIES



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CLADE

THE OAK //



LOW CARBON HEATING TECHNOLOGY

Clade CO₂ heat pumps will reduce carbon emissions whilst maximising efficiency with existing cooling and heating systems. Our full-service offering makes heat pumps a simple and low risk way to improve your ESG and operational performance.





POTENTIAL SOLUTIONS TO DECARBONISE HEAT //

There are many factors to consider when selecting your preferred heating technology. The table below illustrates some key factors for consideration.

Technology	Flow Temperature	Carbon g/KWh	Local air quality	Flexible input tariff	Availability	Overall environmental impact	Operational cost
CO ₂ heat pump	85°C	83			At all scales	•	£
heat pump	60°C	83			At all scales for low temp applications	8	££
Direct electrical	85°C	250			Yes but peak power demands are high	**	£££££
Natural gas boilers	85°C	280			Yes, requires flue	25	£ £ £
Solar thermal	85°C	25		n/a	No, seasonal generation, requires large non shaded area	•	£
Hydrogen boiler	85°C	-			Not available commercially, fuel not available, high NOX emissions	**	-
Biomass boiler	85°C	95			No - physical size, emissions, fuel supply and larger flue	8	££££
Bio gas boiler	85°C	60			No - available gas certificates constraints	8	££££





BENEFITS OF THE CLADE OAK CO₂ RANGE //

100-700kW of heating capacity, with COPH of up to 3.84*







BENEFITS OF THE CLADE OAK RANGE //

100-700kW of heating capacity

Low noise weather proof housing ensures low noise levels as expected by local Environmental Health Authorities.

Supplied with one fan per evaporator coil section, reducing noise levels and enabling advanced defrost adaptive control whilst simplifying the overall control process.



Gas cooler plate heat exchanger transfers heat from refrigerant to water.

Removable panels for access to individual evaporator expansion devices.

Plug and Play - Close coupled V block evaporator eradicates the requirement for on-site connections between the heat pump and heat source.







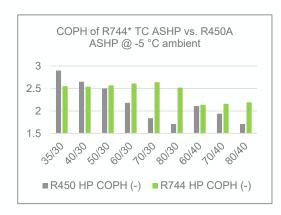


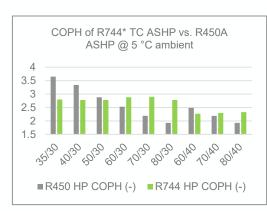


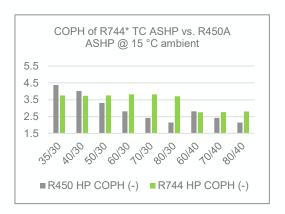




CO₂ HEAT PUMPS PERFORMANCE //







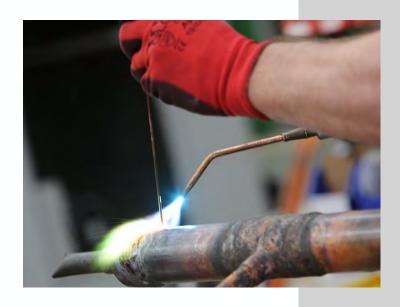
AT HIGHER FLOW TEMPERATURES THE CO₂ HEAT PUMP DELIVERS SIGNIFICANTLY BETTER PERFORMANCE

* R744 is CO_{2.} R450A is a typical HFO





UK BASED MANUFACTURE AND TECHNICAL SUPPORT //



- Clade manufacture all our products in the UK and are committed to continue to do so. This will create jobs in the green economy.
- Clade's technical team are based in the UK and can provide support before, during and after installation.
- Clade offer an aftercare service staffed by highly trained technicians and backed by our technical team.





ABOUT CLADE //



- UK based
- 35 years of engineering experience
- Leeds manufacturing division
- Delivered first Heat pump in 2019.
- New production facility from August 2021 increasing capacity by 120 - 130%.
- Project division delivering first class installations excellent customer feedback
- Committed to sustainable business and sustainable products
- Non leveraged, owner operated



ACCREDITATIONS ISO 9001: 2015 ISO14001: 2015



Altius Assured Vendor Award Altius CDM Vendor Award

8







THANK YOU //

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Greater London Authority - Circular Economy Statement template

How to use this spreadsheet

This template should be used by planning applicants to fulfil the requirements of the Mayor's Circular Economy (CE) Statement policy set out in London Plan Policy SI 7 'Reducing waste and supporting the Circular Economy'. Before completing and submitting this spreadsheet to the GLA, applicants should read the CE statement guidance: https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/london-plan-guidance-and-spgs/circular-economy-statement-guidance-consultation-draft

Applicant are required to submit CE statement information to the GLA at the following three stages: preapplication, outline/detailed planning submission and post-construction. Separate tabs are provided in this spreadsheet for each stage. An outline of the information required at each stage and how to submit it is provided below. Please enter information to the light yellow-coloured cells only, do not enter information in the grey cells as these will be automatically calculated. The light green-coloured cells should be completed to achieve 'pioneering' status.

1. Pre-application stage

At pre-application stage, applicants are required to complete the pre-application information tab of this template which requires applicants to confirm details about the site and to provide details of the circular economy design approaches that are informing the existing and new development (including by building layer for the latter). All tables should be completed. This should be submitted to the GLA along with all other pre-application material.

2. Outline/detailed planning submission stage

At this stage, applicants are required to complete the outline or detailed planning stage tab of this template (whichever is relevant) and submit it to the GLA along with their planning application. Applicants are required to complete all tables, including the Bill of Materials and Recycling and Waste Reporting tables. Please enter information to the light yellow-coloured cells only, do not enter information in the grey cells as these will be automatically calculated. The light green-coloured cells should be completed to achieve 'pioneering' status.

3. Post-construction stage

At the final stage of the CE statement process, applicants should complete the post-construction tab of this template and submit it to the GLA within three months of practical completion. This will require an update of the information provided at planning submission stage and for the actual figures to be reported using actual material quantities during construction. Information should be submitted to: circulareconomystatements@london.gov.uk

Queries

Any queries or feedback on this template should be submitted to: circulareconomystatements@london.gov.uk

Requirement by application stage (see relevant section of guidance for more information)	Pre-application stage (suggested)	Outline application[1]	Full application / reserved matters[2]	Post- construction	Checklist	Information Reference (Please indicate whether this has been included in the report to accompany this template or as a separate submission)
CE targets (see section 4.2)	Encouraged	Yes	Yes	Yes (Performance reported)		Evidence in CES template spreadsheet
CE design approaches (see sections 2.3 - 2.5 and 4.3)	Yes	Yes	Yes	N/A		Evidence in CES template spreadsheet
CE design principles (see sections 2.1, 4.4 - 4.5)	Yes	No	No	No		Evidence in CES template spreadsheet
CE design principles by building layer (see sections 4.5)	No	Yes	Yes	No		Evidence in CES template spreadsheet
Pre-redevelopment audit (see section 4.6)	Encouraged	Yes	Yes	N/A		
Pre-demolition audit (see section 4.6)	Encouraged	Yes	Yes	N/A		
Bill of materials (including calculations – see section 4.7)	No	Yes (Estimated)	Yes (Estimated)	Yes (Actual)		Evidence in CES template spreadsheet
End of life strategy (see section 4.7)	No	No	Yes	Encouraged		
Operational waste management plan (see section 4.8)	No	No	Yes	Encouraged		
Recycling and waste reporting (see Section 4.9)	No	Yes (Estimated)	Yes (Estimated)	Yes (Actual)		Evidence in CES template spreadsheet
Lessons learnt and key achievements (see section 4.10)	N/A	N/A	N/A	Yes		Evidence in CES template spreadsheet

- [1] Also applicable to the outline and detailed part of hybrid applications.[2] Also applicable to the outline and detailed part of hybrid applications.

Pre-Application Stage - Circular Economy Statement

	Project details	
Project name		
Planning application reference number (if		
applicable)		
Applicant		
London Borough		
Brief description of the project		
Author/s		
Date of assessment		
Number of Use Types		
Use Class / Type	Floor Area by use type (m ²)	
Use Class / Type 1	Use Class / Type 1 GIA	
Overall GIA (m ²)	0.	.00

Circular Economy Design Approaches

Circular Economy Design Approaches for Existing Structures / Buildings Applicant Response

Is there an existing building on the site?

Circular Economy
Design Approach

Phase / Building / Area / Layer

Strategic Response Retain and Retrofit Reconstruct Disassemble Demolish and Recycle Circular Economy Design Approaches for New Buildings, Infrastructure and Applicant Response
Is the whole building designed to have a short life on its current site? (e.g. less than 10 yrs)

Circular Economy Design Approach

Phase / Building / Area / Layer

Strategic Response Building relocation

Component or material Adaptability Flexibility Replaceability Disassembly

Circular Economy Design Principles

Circular Economy Design Principles			
	Design Principle	Phase / Building / Area / Layer	Design Response
	Module A - Product Sourcing and Construction Stage	r nase / Bananig / Alea / Layer	Design Response
	Module B - In-Use Stage		
Designing out waste	Module C - End-of-Life Stage		
	Module D - Benefits and Loads Beyond the System Boundary		
	esigning for longevity g for adaptability or flexibility		
	signing for disassembly		
	or materials that can be re-used and recycled		

Circular Economy Targets

Circular economy targets for existing and new development	Policy Requirement	Target Aiming For (%)	Policy Met?
Demolition waste materials (non-hazardous)	Minimum of 95% diverted from landfill for reuse, recycling or recovery.		
Excavation waste materials	Minimum of 95% diverted from landfill for beneficial reuse.		
Construction waste materials	Minimum of 95% diverted from landfill for reuse, recycling or recovery.		
Municipal waste	Minimum 65% recycling rate by 2030.		

Recycled content	Minimum 20% of the building material elements to be comprised of recycled or reused content.	

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		Outline Application Stage - Circular Economy Statemen
		Project details
	Project name	1 i ojočt dotalic
	Planning application reference number (if applicable)	
	Applicant	
	London Borough	
	Brief description of the project	
	Author/s	
	Date of assessment	
	Number of Use Types	
	Use Class / Type	Floor Area by use type (m ²)
	Use Class / Type 1	Use Class / Type 1 GIA
	Overall GIA (m ²)	0.00
Circular Economy D	Design Approaches	
Circular Economy Design	gn Approaches for Existing Structures / Buildings	Applicant Response
Is there an existing building	ng on the site?	
Circular Economy	Phase/Building/Area/Layer	
Design Approach		Strategic Response
Refurbish		
Repurpose		
Disassemble /		
Deconstruct and Reuse		
Demolish / Deconstruct		
and Recycle		
	gn Approaches for New Buildings, Infrastructure and L	av Applicant Response
Is the whole building desi	igned to have a short life on its current site? (e.g. less than	- The same response
10 yrs)	5 (g. 1000 u.a.)	
Circular Faanamu	Dhees/Duilding/Auss/Lause	
Design Approach	Phase/Building/Area/Layer	Strategic Response
Building relocation		
Component or material		
reuse		
Adaptability		
Flexibility		
D 1		
Replaceability		
Diagogarahk		
Disassembly		

Circular Economy Design Principles by Building Layer

The Circular Economy Commitments table should consider where the Applicant seeks to go beyond standard practice. If there are multiple phases / buildings / areas with different measures / strategies, please specify these separately within the table below.

					Buildir	ng Layer							
		Site	Substructure	Superstructure	Shell/Skin	Services	Space	Stuff	Construction Stuff	Summary	Challenges	Actions & Counter-Actions, Who and When	Plan to Prove and Quantify
1. Is it likely the layer (or components within it) will need to be m	noved or otherwise modified within 5-15 years, e.g. due to changing use patterns or user requirements? changed, upgraded or replaced within 5-15 years, e.g. for improved performance, aesthetics	N/A							N/A				
2. Is it likely the layer (or components within it) will need to be cl	changed, upgraded or replaced within 5-15 years, e.g. for improved performance, aesthetics	N/A							N/A				
The preferred strategy is:		-							-				
	Design Principles			All developments should apply the 6 circu	llar economy principles, including designing for DISASS	EMBLY and ADAPTABILITY, MATERIAL REUSE ON-S	TE and/or RECYCLING should be maximised.						
	Module A - Product Sourcing and Construction Stage Module B - In-Use Stage Module C - End-of-Life Stage Module D - Benefits and Loads Beyond the System Boundary												
Designing out waste	Module B - In-Use Stage												
	Module C - End-of-Life Stage												
	Module D - Benefits and Loads Beyond the System Boundary												
	Designing for longevity												
	Designing for adaptability or flexibility												
	Doolgining for adaptability of noxionity												
	Designing for disassembly												
Heina eveteme	elements or materials that can be re-used and recycled												
Using systems,	elements of materials that can be re-used and recycled												

Bill of Materials

BUILDING ELEMENT CATEGORY - LEVEL 1 (based on the RICS New Rules of ement (NRM) classification system level 2 sub-elements https://www.rics.org/globalassets/rics-website/media/products/data-products/bcis-construction/bcis-elemental-standard-form-cost-analysis-4th-nrm-edition-2012.pdf)				PRODUCT AND CONSTRUCTION	ON STAGE (MODULE A)						USE STAGE (MODULE B)				END OF LIFE STAG	E (MODULE C)		BENEFITS BEYOND 1	THE SYSTEM BOUNDARY (M
Building Element Category	Material Type	Material quantity (Module A) (kg)	Material intensity (Module A) (kg/m² GIA)	Performance Indicator (LPG Appendix 1)	Construction Waste Factor (Module A)	Construction Waste (Module A) (kg)	Recycled Content by mass (kg)	Recycled Content by value (%)	Expected Lifespan (years)	Number of Replacements (over assumed 60-year period)	Repair and Replacement quantities of materials (Module B) (kg)	Construction Waste Factor (Module B)	Construction Waste (Module B) (kg)	Design for Disassembly	Assumed End of Life Scenario % Reus (Description)	ing % Recycling		ed reusable materials inticals (kg) (kg/m² G	eusable ntensity GIA) Estimated recyclab materials (kg)
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ructure: Stairs and Ramps	-	0		-	-	0	-	-	-	-	0	-		0 -	- 0%	0%	100%	0	0
ructure: External Walls ructure: Windows and External Doors	_	0		0	_	0	_	_		_	0	_			- 0%	0%	100%	0	0
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		TOTAL ESTIMATES OF WASTE				WASTE MANAGE	MENT ROUTES				SU	MMARY	
				REUS	E	RECYC	CLE	OTHER D	ISPOSAL				
Source of Information	Overall Waste (tonnes)	Overall Waste (tonnes/m² GIA)	Performance Indicator (LPG Appendix 1)	Reuse Onsite (%)	Reuse Offsite (%)	Recycle Onsite(%)	Recycle Offsite (%)	To Landfill (%)	To Other Management (%)	Total Reuse (%)	Total Recycle (%)	Total Reuse and Recycle (%)	Total Waste Reported (%)
	PRODUCT AND CONSTRUCTION STAGE (MODULE A)												
		0.000								0%	0	%	0%
		0.000								0%	0	% 0 %	0%
		0.000								0%	0	0%	0%
	USE STAGE (MODULE B)												
	0	0.000	-							0%	0	% 0%	0%
	0	0.000	-							0%	0	0%	0%
	Overall Waste (tonnes/annum)	Overall Waste (tonnes/annum /m²)	Performance Indicator (LPG Appendix 1)	Reuse Onsite (%)	Reuse Offsite (%)	Recycle Offsite(%)	Recycle Offsite (%)	To Landfill (%)	To Other Management (%)	Total Reuse (%)	Total Recycle (%)	Total Reuse and Recycle (%)	Total Waste Reported (%)
		0.000								0%	0	% 0 %	0%
		-	-							0%	0	0%	0%
	MODULE A - MODULE C												
	Overall Materials (tonnes)	Overall Materials (Modules A-C) (tonnes /m²)	-	Reuse Onsite (%)	Reuse Offsite (%)	Recycle Offsite(%)	Recycle Offsite (%)	To Landfill (%)	To Other Management (%)	Total Reuse (%)	Total Recycle (%)	Total Reuse and Recycle (%)	Total Waste Reported (%)
	0	0.000	-							0%	0	0%	0%
1000 March	Source of Information	Source of Information PRODUCT AND CONSTRUCTION STAGE (MODULE A) USE STAGE (MODULE B) 0 0 Overall Waste (tonnes/annum) MODULE A - MODULE C Overall Materials	Overall Waste (tonnes) Overall Waste (tonnes/m² GIA)	Overall Waste (tonnes) Overall Waste (tonnes/m² GIA) Performance Indicator (LPG Appendix 1)	Source of Information Performance Indicator (LPG Appendix 1) Reuse Onsite (%) Performance Indicator (LPG Appendix 1) Reuse Onsite (%)	Source of Information PRODUCT AND CONSTRUCTION STAGE (MODULE A)	Source of Information Performance Indicator (LPG Appendix 1) Reuse Onsite (%) Reuse Offsite (%) Reuse	Source of Information Performance Indicator (LPG Appendix 1) Reuse Onsite (%) Reuse Offsite (%) Recycle Offsite (%) Re	Reuse Ontate (1) Performancia (1) Perfor	Reuse Onitie (Novell Wate) Source of Information of Coverll Wate (Coverll Wate) Source of Information of In	Super of Information of Informatio	Source of Information	$\frac{1}{00000000000000000000000000000000000$

Circular Economy Targets Policy Met? Target Aiming For (%) Explanation (How will performance against this metric be secured through design, implementation and monitoring?) Policy Requirement Circular economy targets for existing and new development Demolition waste materials (non-hazardous) Minimum of 95% diverted from landfill for reuse, recycling or recovery. Minimum of 95% diverted from landfill for beneficial reuse. Excavation waste materials Minimum of 95% diverted from landfill for reuse, recycling or recovery. Construction waste materials Minimum 65% recycling rate by 2030. Municipal waste Minimum 20% of the building material elements to be comprised of recycled or reused content. Recycled content Policy Requirement

A condition will be attached to an approval of a referable outline planning permission, securing the submission of a CE Statement as a reserved matter.

Applications for reserved matters will be required to review and address the information provided at outline stage and update any default values used as far as possible. Please acknowledge acceptance for a planning condition Please set out an indicative timescale and responsible party for the provision of this information Additional requirements Reserved Matters Reporting

GREATERLONDON AUTHORITY

Circular Economy: GLA Consultation

Case Details

- 1 Development Name
- 2 Applicant
- 3 London Borough
- 4 Case Officer

Mitchan Gasworks St William Homes LLP London Borough of Merton



Planning Application: Proposal

Full planning application for the erection of new buildings to provide residential accommodation (Class C3) and flexible commercial/community space (Class E and/or Class F2), with associated access, parking and landscaping arrangements, including the demolition of the existing telecommunications mast and re-provision of new telecommunications mast

N.B - the applicant's proposals as currently submitted are for a scheme comprising 595 flats in 6 blocks ranging between 5 and 9 storeys with 135 parking spaces, vehicle access from Western road and Portland road and with 363 sq.m of flexible community/commercial floorspace

Planning Application: Uses - Floorspace

1	C3	58837	m^2
2	E	382	m^2
3			m^2
4			m^2
5			m^2
6			m^2
7			m^2
8			m^2
9			m^2
10			m^2
11			m^2
12			m^2
13			m^2
14			m^2
15			m^2
	TOTAL	59219	m ²

GREATER LONDON AUTHORITY

Full Application - Circular Economy Statement

GLA STAGE 1

2 Design Approach 3 Author Applicant has partially defined the desert one was not provided a Pre-Reder 2 Design Approach 3 Author Applicant has not provided a Pre-Reder 4 Hodkinson Consultancy 4 Hodkinson Consultancy 5 Hodkinson Consultancy 7 Description 8 Description 9 Descripti		Additional Information
Document Title Author Document Date Template Submitted (Y/N)	2.1 Mitcham Gas Works - Circular Economy Statement April 2023 Hodkinson Consultancy Apr-23	 1.1 22P3620_Planning Statement 1.2 22P3620_Circular Economy Statement 1.3 22P3620_Operational Waste Management Strategy 2.1 Mitcham Gas Works - Circular Economy Statement April 2023 2.3 Mitcham Gas Works - WLCCE GLA Spreadsheet - v.1 - 09.12.2022
	Description	Action Required
		E template) that incorporates the additional required information,
0 Policy and Guidance	London Plan Policy SI7 requires development applications that are referrable to the Mayor of London to submit a Circular Economy Statement, whilst Policy D3 requires development proposals to integrate circular economy principles as part of the design process. Applicants should follow the London Plan Guidance: Circular Economy Statements (March 2022) to produce a written Circular Economy Statement and populate the template. Applicants should complete the template in full in line with the GLA guidance and submit this as an Excel document with the written report. Applicants should ensure they are familiar with the guidance in preparation for submitting their planning application. The Applicant is required to submit a Circular Economy Statement in line with the policy and current guidance.	It is welcomed that the Applicant has provided a Circular Economy Statement, in line with the adopted London Plan Guidance: Circular Economy Statements (March 2022), including the completed CE template and an accompanying written report. Please refer to the below for detailed comments.
1 Development Details	The Applicant has provided description of the development.	Nothing further is required.
1 Development Details	The Applicant has provided details of the proposed development in the template, including gross internal floor area (GIA).	Nothing further is required.
2 Design Approach	The Applicant has partially defined the design approach for the existing site.	The applicant must provide a response to the applicable phase/building/area/layer as outlined in the Circular Economy approaches for existing structures and buildings in the CES spreadsheet. Where an approach hasn't been defined, it is required the applicant provides narrative around this and how the design team aim to address this. It is noted that the site has been cleared prior to St Williams involvement and ownership. It is advised further description of the existing site is provided including images to demonstrate the current conditions.
2 Design Approach	The Applicant has partially defined the design approach for the new buildings, infrastructure and layers over the lifetime of the development.	Whilst it is acknowledge the strategy to the new buildings has been confirmed via the reporting template, the Applicant must provide a response to the Decision Tree prompts in the template and corresponding guidance (see Figure 5) and/or set out strategic responses accordingly. The Applicant should further explore how each of the design approaches will be applied to suit the requirements of each of the building types / layers across the Site where this is expected to vary.
3 Pre-Redevelopment Audit	The Applicant has not provided a Pre-Redevelopment Audit assessing the existing site, including any buildings, structures and materials.	It is noted that the site was cleared prior to St William's involvement and ownership of the site, and therefore a predemolition audit and pre-redevelopment audit is not required and has not been undertaken by St William. Nothing further is required.

3 Pre-Demolition Audit	The Applicant has not provided a Pre-Demolition Audit to define an inventory of the materials in the building to be managed upon demolition and identify components of the building which can be reused or recycled.	It is noted that the site was cleared prior to St William's involvement and ownership of the site, and therefore a predemolition audit and pre-redevelopment audit is not required and has not been undertaken by St William. Nothing further is required.
4 Design Principles	The Applicant has partially summarised the key commitments in the Circular Economy Design Principles by Building Layer.	The applicant should update the table ensuring key commitments are specified for each of the Circular Economy Design Principles by Building Layer in the template. The Applicant should also complete the 'Summary', 'Challenges', 'Actions & Counter-Actions, Who and When' and 'Plan to Prove and Quantify' columns for all of the design principles, where these will support the development of the strategy postplanning.
4 Design Principles	Many of the commitments are considered standard practice. The template states that the response should consider where the Applicant seeks to go beyond standard practice.	The Applicant should consider key circular economy commitments that go beyond standard practice.
Bill of 5 Materials	The Applicant has partially completed the Bill of Materials including metrics through module stages A to D.	The Applicant should ensure that the Bill of Materials presented in the GLA CE template is aligned with the information provided in the WLCA per Section 1.2.1 of the GLA guidance, the Applicant should ensure that any updates are reflected across both reporting submissions. It is noted that the material intensity of the building element category is very high for Superstructure (Windows, External Doors and External walls). The Applicant should review and provide clarification, including revision as necessary.
Bill of Materials	The Applicant has not confirmed that reused or recycled content will be 20 per cent by value for the whole building and provided supporting calculations.	Provide details of the reused and recycled content proposed including supporting calculations in line with GLA guidance.
Recycling and Waste Reporting	The Applicant has partially provided overall waste estimates and relevant cross references in the Recycling and Waste Reporting table.	It is noted a figure has been provided for the Demolition, Excavation, Construction and Operational waste reporting however, it is unclear as to where this figure has been drawn from. Please provide clarity.
Recycling and Waste Reporting	The Applicant has not provided a breakdown of waste management routes in the Recycling and Waste Reporting table which demonstrates compliance with London Plan Policy SI 7 targets for diversion of 95% (by weight/tonnage) construction and demolition waste from landfill and 95% (by weight/tonnage) beneficial reuse of excavation waste.	Provide a breakdown of the expected waste management routes for each of the waste streams which demonstrate compliance with London Plan Policy SI 7 targets for diversion of 95% (by weight/tonnage) construction and demolition waste from landfill and 95% (by weight/tonnage) beneficial reuse of excavation waste.
7 Operational Waste	The Applicant has partially provided an Operational Waste Management Plan to demonstrate how the proposed development will achieve the relevant targets and meet requirements of London Plan Policies D3, SI 7 and D6.	It is require the Applicant provides further information around the listed items below: • Provide evidence to demonstrate how operational performance will be monitored and reported. • Provide evidence that the application of consolidated, smart logistics and community-led waste minimisation schemes has been explored.
7 Operational Waste	The Applicant has partially included a commitment to meet or exceed the London Plan Policy SI7 municipal waste recycling target of 65% (by weight/tonnage) by 2030 or business waste recycling target of 75% (by weight/tonnage) by 2030.	It is noted the applicant has provided a commitment to meet or exceed the London Plan Policy SI 7 municipal waste recycling target of 65% (by weight/tonnage) by 2030. It is unclear from the information provided as to whether the business waste recycling target of 75% (by weight/tonnage) by 2030 has been considered. Applicant to confirm.
8 Circular Economy Targets	The Applicant has provided a commitment to targets for demolition waste, excavation waste, construction waste, municipal waste and reused/recycled content in line with GLA policy.	Nothing further is required.
8 Circular Economy Targets	The Applicant has partially provided a brief explanation of how performance against each of the key policy targets will be secured through design, implementation and monitoring.	It is welcomed that the applicant has committed to exceed the requirement to ensure a minimum of 20% of the building material elements to be comprised of recycled or reused content. It is advised the BOM table is updated in order to reflect this commitment and ensure the target has already been achieved based on the current design.
		based on the current design.

9 Post-Construction Report	The Applicant has partially provided an End-of-Life Strategy, including how this will be communicated to future building owners, managers and occupiers and how the building information will be stored. The Applicant has partially provided an End-of-Life Strategy, including how this will be communicated to future building owners, managers and occupiers and how the building information will be stored. The Applicant has partially provided an End-of-Life Strategy, including how this will be communicated to future building owners, managers and occupiers and how the building information will be stored. The Applicant should provide some additional information to describe how the end-of-life scenarios as set out in the Bill of Materials will be facilitated by the design. It is strongly encouraged that the Applicant provide the following additional supporting information as a minimum: • Site Waste / Resource Management Plan	
10 End-of-life strategy	including how this will be communicated to future building owners, managers and occupiers and how the building	The Applicant should provide some additional information to describe how the end-of-life scenarios as set out in the Bill of
11 Supporting Documentation	as an appendix to the written report:	following additional supporting information as a minimum: • Site Waste / Resource Management Plan • Cut and fill calculations and/or Excavated - Materials Options Assessment • Circular Economy workshop/ meeting notes • Reused or recycled content calculations • Scenario modelling demonstrating adaptability (for non-

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	Detailed Application Stage - Circular Economy Statement
	Project details
Project name	Mitcham Gas Works
Planning application reference number (if applicable)	
Applicant	St William Homes LLP
London Borough	London Borough of Merton
Brief description of the project	Erection of new buildings to provide residential accommodation (Class C3) and flexible commercial/community space (Class E and/or Class F2), with associated access, parking and landscaping arrangements, including the demolition of the existing telecommunications mast and re-provision of new telecommunications mast.
Author/s	- Hodkinson Consultancy
Date of assessment	08.06.2023
Number of Use Types	2
Use Class / Type	Floor Area by use type (m2)
C3 E	58837
E	382

Circular Economy Design Approaches

Circular Economy Design Approaches for Existing Structures / Buildings Applicant Response

Is there an existing building on the site? Are there any building materials or elements available on site that can be used? Various above ground structures have existed on site previously, including gasholders, industrial units, and office buildings. The site is largely cleared (ahead of St William owning the site) and the 35mgasholder frame was recently demolished, although the lower structure and foundations remain. The 65m telecoms mast remains and will require relocation on site. Lower structure and foundations remain. The 65m telecoms mast remains and will require relocation on site. The telecoms tower will be demolished once the equipment has been reinstalled on top of a building in the first phase of the development. The tower will be removed in pieces using a mobile crane to take the load while an operative cuts the mast into pieces, following a temporary works design and lifting plan. Once demolished, the final phase of the development will commence. Disassemble /
Deconstruct and Reuse Demolish / Deconstruct and Recycle Circular Economy Design Approaches for New Buildings, Infrastructure and Lay Applicant Response
Is the whole building designed to have a short life on its current site? (e.g. less than Is it foreseeable that the building will need to change use/function within its design All developments should apply the 6 Circular Economy principles, including: Designing for DISASSEMBLY and ADAPTABILITY, MATERIAL REUSE ON-SITE and/or RECYCLING should be maximised Circular Economy
Design Approach
Phase/Building/Area/Layer The 65m telecoms mast remains and will require relocation on site. In accordance with GLA guidance, the Bill of Materials will include kg/m2 for the proposed new development and will commit to exceeding the benchmark of 25% (by value) reused or recycled content. The building envelope will predominantly comprise of brickwork, and therefore at the end-of-life stage, all brick material will be repurposed. The cut and fill sequence has been reviewed in detail to maximise the re-use of material on site via treatment and distribution Component or material The detailed design of the site layout should include opportunities to make it adaptable, this could include the use of moveable planters and limiting the use of adhesives and fixings. The flexible commercial/community space offer further opportunities for the site and the future tenants. Durable, hard-wearing, and low-maintenance façade materials are also proposed. Glazing replacement is expected to be required on an occasional basis and will generally be from the inside of the building via the lifts, with access equipment or abseiling as described opposite used to position the operative and assist from the outside and applying any necessary seals between the window and masonry. The project has been largely designed with projecting bolt-on balconies, allowing for these to be manufactured off site and for these to be disassembled at the end of their life. The proposed development will be designed with disassembly in mind as well as maintenance and replacement of elements. Where feasible, assets will seek to be designed to allow for easy assembly and reconfiguration, for alternative future uses The development will include a reinforced concrete build up, improving the structural integrity and durability of the buildings. This reduces the long-term maintenance requirements, promoting longevity within design.

Economy Design Principles by Building Layer lar Economy Commitments table should consider where the Applicant seeks to go beyond standard practice. If there are multip	le phases / buildings / areas with different measu	ures / strategies, please specify these separately w	rithin the table below.									
				Build	ing Layer							
e layer (or components within it) will need to be moved or otherwise modified within 5-15 years, e.g. due to changing use patterns or user requirements?	Site N/A	Substructure No	Superstructure No	Shell/Skin No	Services No	Space No	Stuff No	Construction Stuff N/A	Summary	Challenges	Actions & Counter-Actions, Who and When	Plan to Prove and Quantify
e layer (or components within it) will need to be changed, upgraded or replaced within 5-15 years, e.g. for improved performance, aesthetics ed strategy is:	N/A -	No Design for ADAPTABILITY	No Design for ADAPTABILITY	No Design for ADAPTABILITY	No Design for ADAPTABILITY	Yes Design for REPLACEABILITY	Yes Design for REPLACEABILITY	N/A -				
Design Principles Module A - Product Sourcing and Construction Stage	define sustainable specification and procurement to be the responsible selection and sourcing of products and services, considering environmental, social, economic and ethical aspects over their whole lifecycle. They have an extensive materials supply chain which is	St William LLP have undertaken studies on recycled content in concrete. The aim is to increase cement replacement to as high as technically feasible- no less than 50% for substructure. For steel, a 23-30% recycled content is targeted. The cut and fill sequence has been reviewed in detail to maximise the re-use of material on site via treatment and distribution. It is assumed that the gasholder void will be left unfilled so that some of these arising's can be used to fill this structure.	St William LLP have undertaken studies on recycled	The plasterboard contractor (once appointed) is to be se a target of 5% waste within their contract conditions, based on final fixed quantities of plasterboard. Off cuts from plasterboard works will be stored on pallets for use in more detailed work near completions. Also, it is	All new dwellings will target a minimum internal water efficiency standard of 105 litres/person/day in accordance with the London Plan Policy SI5 and the optional tighter Building Regulations Approved Document G requirement (110 litres/person/day). The development will achieve a total reduction in regulated	d/or RECYCLING should be maximised.	The main building materials will be responsibly and legally sourced from manufacturers with environmental management systems and/or responsible sourcing credentials, such as BES 6001. All timber specified will be legally harvested and traded timber and will be sourced from schemes supported by the Central Point of Expertise for Timber Procurement such as Forest Stewardship Council (FSC) accreditation – which ensures that the harvest of timber and non-timber products maintains the forest's ecology and its long-term viability.	Off cuts from plasterboard works will be stored on pallets for use in more detailed work near completions. Also, it is proposed that smaller off cuts are to be used for filling in ceiling voids and any plasterboard in temporary partitions are to be re-used as inner skin of permanent walls, whenever practicable A ground contamination assessment has found that the site is of high risk of contaminants and appropriate remediation works will need to take place. Remediation of contaminated land removes threats to health and safety, and enables land, to be improved that would otherwise be left. Site welfare facilities to be modular so they can be installed and disassembled and removed to another site once works are complete.		Ensuring the contractor completes the SWMP and str to achieve the targets set Sustainable procurement plan is not implemented duri construction Higher recycled content targets may limit supply chair Site welfare facilities are not sufficiently sized Use of contaminated land means that additional waste generated to ensure all of this material is removed.	Ensure the procurement plan iand requirements (e.g. for plasterboard) are included in all tender documents. Preconstruction supply chain engagement to take place. Implementation of these actions will be checked in the post construction statement The site welfare will evolve along the duration of the project so it is the site managers responsibility to ensure that an appropriate number of welfare modules are in situ during the right stages. It is expected that the scale of facilities will be less at the start and end of the project. Ensure that the specification is incorporated into all tends specifications Handover and commissioning must be planned prior to completion to ensure relevant parties are informed of the	Regular review of the project programme to ensur site welfare facilities are suitable.
Module B - In-Use Stage	The onsite Facilities Management team will be responsible for monitoring, managing, and cleaning the communal commercial waste storage area New residents and property occupants will be encouraged to reduce and prevent waste through good practice measures such as providing information packs to residents about how the waste segregation and recycling scheme operates The development is committed to meet the mayor's 65% target for municipal waste recycling by 2030 (75% for commercial spaces) and will strive to ensure no biodegradable or recyclable waste is sent to landfill by	ed		The building envelope will predominantly comprise of brickwork, and therefore at the end-of-life stage, all brick material will be repurposed.	CO2 emissions of 56% through be lean, be clean and be green on-site measures and will provide homes that are energy efficient and incorporate Low and Zero Carbon technologies.					also to ensure the building performs as per the prediction the energy model. Space requirements for the waste storage facility Ensure an appropraite mortar is used to allow for the dissassmebly of bricks end of life	place to understand any key divergence of the real building performance compared to the predicted energy model. Steps should be taken to correct any issues as soon as practicable. Design team to incorporate requirements into base build e.g. waste store	Design stage and as built energy BRUKL Relevant commissioning information to be provide
Module C - End-of-Life Stage	2026, once the proposed development is operational.			material will be repurposed.								
Module D - Benefits and Loads Beyond the System Boundary Designing for longevity			The development will include a reinforced concrete build up, improving the structural integrity and durability of the buildings. This reduces the long-term maintenance requirements, promoting longevity within design.		An Operations and Maintenance (O&M) program will be produced, and records kept across the building life cycle to increase longevity.					Ensuring robustness and longevity don't compromise CE principles	other Review of specifications at each stage and regular workshops with the design team	
Designing for adaptability or flexibility			The project has been largely designed with projecting bole on balconies, allowing for these to be manufactured off site. Some layouts incorporate fully recessed balconies, which are also being constructed as recessed bolt on balconies.	The flexible commercial/community space offer further opportunities for the site and the future tenants. This space will therefore be designed with flexible use in mind ensuring that the site will cater for the requirements and demands of time. Glazing replacement is expected to be required on an occasional basis and will generally be from the inside of the building via the lifts, with access equipment or abseiling as described opposite used to position the operative and assist from the outside and applying any necessary seals between the window and masonry.			Infrastructure and hard landscaping are typically less adaptable than other elements of the built environment. At present a resilient hard landscaping design has been designed which enables servicing and maintainability. The detailed design of the site layout should include opportunities to make it adaptable, this could include the use of moveable planters and limiting the use of adhesives and fixings.			Ensuring the design is not over engineered. Balance to be struck between a resillient landscaping strategy and ensuring we don't increase the embodied carbon	Detailed workshops to plan the most appropriate adapability studies within the contraints of the project. Assess embodied carbon of landscaping	Regular design reviews and workshops
Designing for disassembly	All assets will seek to be designed to allow for easy assembly and reconfiguration where feasible, for alternative future uses, for example, the design of interior systems for disassembly. Materials will have the option to be taken apart through mechanical and reversable fixing to allow for future reuse.	or o gs	A brief end-of-life strategy will be developed at detailed design to demonstrate how the building materials, components and products could be disassembled and reused at the end of their useful life. One fundamental principle of this is creating accessible connections and choosing the appropriate joinery to ease dismantlement and avoid the use of heavy equipment, or too many tools. The focus should be on mechanical joinery, using bolted, screwed, or nailed connections, as opposed to non-removable, chemical ones such as binders, sealers, glues or welding, which would make the material difficult to separate and recycle.				Permanent fixing of products, such as by glue and cement mortar, will be avoided where feasible, to enable end of life deconstruction and salvage of building elements. Fixings will be easily accessible, where possible, for disassembly. Pre-fabrication is intended for bolt on balconies, m&e installations, facade elements and kitchen units.			Potentially compromising the initial design concept having to account for different design considerations principles which might have previously been overseen Ensuring that the design for for the prefab elements is fixed as once designed and cosntructed (off site) it cavery difficult to make changes	Ensure the required performance spec is designed early to ensure all pre-fab elements are incuded and not over designed.	Review exercise at next stage of design and confirm design consideration made in line with aspirations.
Using systems, elements or materials that can be re-used and recycled	The proposed design is not yet fixed as it is at the planning stage, therefore ongoing reviews at each RIBA stage will continue to take place to ensure material efficiency is maximised.		The building envelope will predominantly comprise of brickwork, and therefore at the end-of-life stage, all brick material will be repurposed.							Ensuring users are aware of these schemes to reduce waste. Also ensuring waste is monitored appropriately	Ensure building management are aware of these requirements for the 65% waste reduction (75% commercial) and seek to implement a building user guid to ensure users are aware of their duties with regard to waste management	

BUILDING ELEMENT CATEGORY - LEVEL 1 (based on the RICS New Rules of Measurement (NRM) classification system level 2 sub-elements https://www.rics.org/globalassets/rics-website/media/products/data-products/bcis-construction/bcis-elemental-standard-form-cost-analysis-4th-nrm-edition-2012.pdf)			PRODUC	AND CONSTRUCTION STAGE (MODULE A)						USE STAGE (MODULE B)				END OF	LIFE STAGE (MODULE C	5)		BENEFITS BEYOND TH	HE SYSTEM BOUNDARY (MODULE D)
Building Element Category	Material Type	Material quantity (Module A) (kg)	Material intensity (Module A) Performance Indicator (LPG A	pendix 1) Construction Waste Factor (Module A)	Construction Waste (Module A) (kg)	Recycled Content by mass (kg)	Recycled Content by value (%)	Expected Lifespan (years)	Number of Replacements (over assumed 60-year period)	Repair and Replacement quantities of materials (Module B) (kg)	Construction Waste Factor (Module B)	Construction Waste (Module B) (kg)	Design for Disassembly	Assumed End of Life Scenario (Description)	% Reusing	% Recycling	% Landfill	Estimated reusable materials (kg) Estimated reusable materials inten (kg/m² GIA)	Estimated recyclable materials (kg) Estimated materials (kg)
Demolition: Toxic/Hazardous/Contaminated Material Treatment	-	0	0 -		0	-	-	-	-	0	-		0 -	-	0%	0%	100%	0	0 0
Major Demolition Works	_	0	0 -	_	0	_	-	-	-	0	_		0 -	_	0%	0%	100%	0	0 0
Temporary Support to Adjacent Structures	_	0	0 -	-	0	-	-	-	-	0	-		0 -	-	0%	0%	100%	0	0 0
Specialist Ground Works	-	0	0 -	-	0	-	-	-	-	0	-		0 -	-	0%	0%	100%	0	0 0
Substructure	-	9,404,015	159 Building Element Category 1, 1	t Quartile -	0	-	-	-	-	0	-		0 -	-	0%	74%	26%	0	0 6,913,989
Superstructure: Frame	-	5 241 960	89 Building Element Category 2.1,	st Quartile -	0	-	-	-	-	0	-		0 -	-	0%	100%	0%	0	0 5,241,960 0 23,298,710
Superstructure: Upper Floors	-	23,442,260 3,310,722 1,130,088 5,421,146 2,589,525 1,224,398 865,091	396 Building Element Category 2.2,	······································	0	-	-	-	-	0	-		0 -	-	0%	99%	1%		0 23,298,710
Superstructure: Roof	_	3,310,722	56 Building Element Category 2.3,	rd Quartile -	0	-	-	-	_	0	-		0 -	-	0%	92%	8%	0	0 3,039,120
Superstructure: Stairs and Ramps	-	1,130,088	19	-	0	_	_	_	_	0	_		0 -	_	0%	100%	0%	345	0 1,129,743
Superstructure: External Walls	-	5,421,146	92 Building Element Category 2.5 & 2		0	_	_	_	_	0	_		0 -	_	7%	79%	13%	397,217	7 4,298,459
Superstructure: Windows and External Doors	-	2,589,525	44 Building Element Category 2.5 & 2		0	_	-	-	-	0	-		0 -	***************************************	5%	95%	0%	133,046	2 2,456,479
Superstructure: Internal Walls and Partitions	-	1,224,398	21 Building Element Category 2.7 & 2		0	-	-	-	-	0	-		0 -		0%	90%	10%	0	0 1,102,681
Superstructure: Internal Doors	-	865,091	15 Building Element Category 2.7 & 2	, 2nd Quartile -	0	-	-	-	-	0	-		0 -		100%	0%	0%	865,091	15 0
Finishes	-	2,715,423 1,916,064 13,556,606	-		0	-	-	-	-	0	-		0 -		0%	75%	25%	0	0 2,025,814
Fittings, furnishings & equipment (FFE)	-	1,916,064	32	-	0	-	-	-	-	0	-		0 -	······	39%	38%	22%	752,371	13 /36,412
Services (MEP)	-	13,556,606	229	_	0	-	-	-	-	0	-		0 -	-	0%	100%	0%	0	0 13,556,606
Prefabricated Buildings and Building Units	-	0	-	_	0	_	-	_	-	0	-		0 -	-	0%	0%	100%	0	0 0
Work to Existing Building	-	0	0 -	-	0	-	-	-	-	0	-		0 -	-	0%	0%	100%	0	0 0
External works Overall	-	1,298,845	-		U	•	-	-	-	U	-		-	-	0%	100%	0%	890	0 1,297,955
Overall		72,116,143	1,218		0					0			0		0%	0%	100%	4,297,920	73 130,195,855

Recycling an The light green-	and Waste Reporting table en-coloured cells should be completed to achieve 'pioneeri	ing' status.													
				TOTAL ESTIMATES OF WASTE				WASTE MANAG	SEMENT ROUTES				S	UMMARY	
						R	EUSE	REC	CYCLE	OTHE	R DISPOSAL				
	Type of Waste	Source of Information	Overall Waste (tonnes)	Overall Waste (tonnes/m² GIA)	Performance Indicator (LPG Appendix 1)	Reuse Onsite (%)	Reuse Offsite (%)	Recycle Onsite(%)	Recycle Offsite (%)	To Landfill (%)	To Other Management (%)	Total Reuse (%)	Total Recycle (%)	Total Reuse and Recycle (%)	Total Waste Reported (%)
			PRODUCT AND CONSTRUCTION STAGE (MODULE	E A)											
1	Demolition Waste	No demolition to take place	0	0.000								0%		0%	0%
2	Excavation Waste	Section 5.25 in CE report	14,560	0.246	2nd Quartile							0%		0%	0%
3	Construction Waste	Table 1 in CE report	8,080	0.136	4th Quartile							0%		0%	0%
			USE STAGE (MODULE B)												
3	Demolition / Strip-out Waste		0	0.000	-							0%		0%	0%
4	Construction Waste		0	0.000	-							0%		0%	0%
			Overall Waste (tonnes/annum)	Overall Waste (tonnes/annum /m²)	Performance Indicator (LPG Appendix 1)	Reuse Onsite (%)	Reuse Offsite (%)	Recycle Offsite(%)	Recycle Offsite (%)	To Landfill (%)	To Other Management (%)	Total Reuse (%)	Total Recycle (%)	Total Reuse and Recycle (%)	Total Waste Reported (%)
5	Municipal Waste	Operational Waste Strategy (Iceni Projects)	7518.36	0.127	4th Quartile							0%		0%	0%
6	Industrial Waste (if applicable)			-	-							0%		0%	0%
			MODULE A - MODULE C												
			Overall Materials (tonnes)	Overall Materials (Modules A-C) (tonnes /m²)	-	Reuse Onsite (%)	Reuse Offsite (%)	Recycle Offsite(%)	Recycle Offsite (%)	To Landfill (%)	To Other Management (%)	Total Reuse (%)	Total Recycle (%)	Total Reuse and Recycle (%)	Total Waste Reported (%)
7	Total Materials		0	0.000	-							0%		0%	0%

Circular Economy Targets				
Circular economy targets for existing and new development	Policy Requirement	Target Aiming For (%)	Policy Met?	Explanation (How will performance against this metric be secured through design, implementation and monitoring?)
Demolition waste materials (non-hazardous)	Minimum of 95% diverted from landfill for reuse, recycling or recovery.	95	Yes	Various above ground structures have existed on sit previously, including gasholders, industrial units, and office buildings. The site is largely cleared and the 35m (11 storey) gasholder frame was recently demolished, although the lower structure and foundations remain. The 65m (20 storey) telecoms mast remains and will require relocation on site. The Berkeley Group Waste Data Tool (WDT) will be used to monitor the volume and type of waste produced on site. Details of the waste produced on site will be analysed periodically. As part of their commitment to divert construction waste from landfill, St William Homes LLP will be required to regularly monitor and record the site's waste reduction performance.
Excavation waste materials	Minimum of 95% diverted from landfill for beneficial reuse.	95	Yes	The Berkeley Group Waste Data Tool (WDT) will be used to monitor the volume and type of waste produced on site. Details of the waste produced on site will be analysed periodically. As part of their commitment to divert construction waste from landfill, St William Homes LLP will be required to regularly monitor and record the site's waste reduction performance. A benchmark of 95% for potential excavation waste put to beneficial use will also be set. This figure will therefore be set as a target for the site.
Construction waste materials	Minimum of 95% diverted from landfill for reuse, recycling or recovery.	95	Yes	The Berkeley Group Waste Data Tool (WDT) will be used to monitor the volume and type of waste produced on site. Details of the waste produced on site will be analysed periodically. As part of their commitment to divert construction waste from landfill, St William Homes LLP will be required to regularly monitor and record the site's waste reduction performance. A benchmark of 95% for reuse or recycle, and diversion of waste from landfill (excluding hazardous waste).

Municipal waste	Minimum 65% recycling rate by 2030.	65%	Yes	The development is committed to meet the mayor's 65% target for municipal waste recycling by 2030 and will strive to ensure no biodegradable or recyclable waste is sent to landfill by 2026, once the proposed development is operational. Building Management (or separate contractor engaged on their behalf) would undertake regular, no less than weekly, a monitoring inspection of each of the waste storage arrangements across the site and the waste collection arrangements, with information on both waste storage areas and waste collection records to be recorded as a minimum.
Recycled content	Minimum 20% of the building material elements to be comprised of recycled or reused content.	25%	Exceeds Policy	The Applicant is committed to a target a benchmark of 25% reused or recycled content by value., where feasible. A detailed Bill of Mateirals will be provided at a later stage.
Additional requirements	Policy Requirement	Please acknowledge acceptance for a planning condition	on	Please set out an indicative timescale and responsible party for the provision of this information
Post-Construction Report	A CE Statement is required at post-construction (i.e. upon commencement of RIBA Stage 6 and prior to the building being handed over, if applicable. Generally, it would be expected that the assessment would be received no more than three months post-construction)	It is accepted that the Post Construction Reporting will be c	onditioned	Quarter four - 2030.

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		Post-Construction Stage - Circular Economy Statement	t en		
		Project details]		
	Project name		<u> </u>		
	Planning application reference number (if applicable)				
	Applicant		-		
	London Borough Brief description of the project		-		
	Author/s		1		
	Date of assessment				
	Number of Use Types				
	Use Class / Type	Floor Area by use type (m2)	-		
	Use Class / Type 1 Overall GIA (m2)	Use Class / Type 1 GIA 0.00			
Bill of Materials Please click the		table to view or hide the input rows for each Building Element Catego	ry. The rows for substructure and frame have be	een unhidden to highlight this.	
	Measurement (NRM) classification system level 2 sub-	GORY - LEVEL 1 (based on the RICS New Rules of elements https://www.rics.org/globalassets/rics-website/media/products/datamental-standard-form-cost-analysis-4th-nrm-edition-2012.pdf)			
	B	Building Element Category	Material Type	Material quantity (Module A) (kg)	Material intensity (Module A) (kg/m² GIA)
0.1	Demolition: Toxic/Hazardous/Contaminated Material Tr	reatment	-		
0.2	Major Demolition Works		-		
0.3	Temporary Support to Adjacent Structures Specialist Ground Works				
0.4	Substructure		-		
A	Cubatmatima				
1	Substructure				

BULDING ELEMENT CATEGORY - LEVEL 1 (based on the RICS New Rules of Measurement (NRIQ) classification system level 2 abus elements https://www.rics.com/globalassestrive.webstel/media/products/data-products/bcis-construction/bcis-elementa-standard-form-cost-analysis-4th-nrm-edition-2012.pdf) Building Element Category Building Element Category Building Element Category Demolition: Toxic/hazardous/Contaminated Material Treatment Major Demolition Works Temporary Support to Asjacent Structures Suberructure Suberructure: Frame Superstructure: Frame Superstructure: Upper Floors Superstructure: Upper Floors Superstructure: Vipper Floors Superstructure: Windows and Enternal Doors Superstructure: Windows and Enternal Doors Superstructure: Windows and Enternal Doors Finishes Fitnings, Intrahings & apulpment (FFE) Services (MEP) Prefabricated Building Units Work to Existing Building External Works Covarial		PRODUCT AND CONSTRUCTION STAGE (MODULE A)									USE STAGE (MODULE B)		END (F LIFE STAGE (MODUL		BENEFITS BEYOND THE SYSTEM BOUNDARY (MODULE				
Building Element Category	Material Type	Material quantity (Module A) (kg)	Material intensity (Module A) (kg/m² GIA)	Performance Indicator (Planning Stage Estimate)	Construction Waste Factor (Module A)	Construction Waste (Module A) (kg)	Recycled Content by mass (kg)	Recycled Content by value (%)	Expected Lifespan (years)	Number of Replacements (over assumed 60-year period)	Repair and Replacement quantities of materials (Module B) (kg)	Construction Waste Factor (Module B)	Construction Waste (Module B) (kg)	Design for Disassembly Assumed End of Life Scenario (Description)	% Reusing	% Recycling	% Landfill Esti	nated reusable mater aterials (kg)	rials intensity rg/m² GIA) Estimated i materia	l recyclable mails (kg)
nolition: Toxic/Hazardous/Contaminated Material Treatment	-	0		0 -	_	0	_	_	-	_	0	-		0	0%	0%	100%	0	0	0
or Demolition Works	-	0			-	0	-	-	-	-	0	-		0	0%	0%	100%	0	0	0
porary Support to Adjacent Structures	-	U		<u> </u>	-	<u>U</u>	-	-	-		0			0	U% 0%	U% 0%	100%	0	0	0
estructure	-	0		0		0	-			_	0	_		0	0%	0%	100%	0	0	0
				-		0				0	0			0	0%	0%	100%	0	0	0
				0 -		0				0	0			0	0%	0%	100%	0	0	0
				-		0				0	0			0	0%	0%	100%	0	0	0
				0 -		0				0	0			0	0% 0%	0%	100%	0	0	0
				0 -		0				0	0			0	0%	0%	100%	0	0	0
				0 -		0				0	0			0	0%	0%	100%	0	0	0
						0				0	0			0	0%	0%	100%	0	0	0
				0 -		0				U 0	0			0	0%	0% 0%	100%	0	0	0
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			Overall Waste (tonnes) Overall Waste (tonnes/m² GIA)	Performance Indicator (Planning Stage Estimate)	RI	EUSE	RE	ECYCLE	OTHE	R DISPOSAL					
Type of Waste	Source of Information	Reuse Onsite (%)			Reuse Offsite (%)	Recycle Onsite(%)	Recycle Offsite (%)	To Landfill (%)	To Other Management (%)	Total Reuse (%)	Total Recycle (%)	Total Reuse and Recycle (%)	Total Waste Reported (%)		
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			MODULE A - MODULE C												
			Overall Materials (tonnes)	Overall Materials (Modules A-C) (tonnes /m²)	Performance Indicator (Planning Stage Estimate)	Reuse Onsite (%)	Reuse Offsite (%)	Recycle Offsite(%)	Recycle Offsite (%)	To Landfill (%)	To Other Management (%)	Total Reuse (%)	Total Recycle (%)	Total Reuse and Recycle (%)	Total Waste Reported (%)
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ircular economy targets for existing and new development	Policy Requirement	Target at Application Stage (%)	Rate Achieved (%)	Policy Met?	Actions Undertaken / Explanation (How has this been achieved? What are the reasons for any differences between targets/performance?)
emolition waste materials (non-hazardous)	Minimum of 95% diverted from landfill for reuse, recycling or recovery.	Talget at Application Stage (70)	95%		
cavation waste materials	Minimum of 95% diverted from landfill for beneficial reuse.		95%		
onstruction waste materials	Minimum of 95% diverted from landfill for reuse, recycling or recovery.		95%		
unicipal waste	Minimum 65% recycling rate by 2030.		65%		
ecycled content	Minimum 20% of the building material elements to be comprised of recycled reused content.	or	25%		

Key Achievements and Gap Assessment: Summary of <u>key actions</u> undertaken to achieve circular economy outcomes, including achievements and reasons for any differences between targets/performance						
Key Achievements	Measure / Target Proposed at Application Stage (if applicable)	Actions Undertaken / Explanation (How has this been achieved? What are the reasons for any differences between targets/performance?)				
This list does not need to be exhaustive but should identify	the actions with the					
iggest impacts.]						

Lessons Learnt:							
Lesson's Learnt. Lessons learnt from the process of undertaking a CE Statement that will inform future projects							
Description Explanation / Solution / Future Approach							
Decor iption	[i.e. Design options or materials that could be used, design principles that could be applied.]						
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Circular Economy Statement

St William Homes LLP

Mitcham Gasworks

Final

BSc (Hons), MSc, CEnv, MIEMA

June 2023



DOCUMENT CONTROL RECORD

REPORT STATUS: FINAL

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ABOUT HODKINSON CONSULTANCY

Our team of technical specialists offer advanced levels of expertise and experience to our clients. We have a wide experience of the construction and development industry and tailor teams to suit each individual project.

We are able to advise at all stages of projects from planning applications to handover.

Our emphasis is to provide innovative and cost-effective solutions that respond to increasing demands for quality and construction efficiency.

This report has been prepared by Hodkinson Consultancy using all reasonable skill, care and diligence and using evidence supplied by the design team, client and where relevant through desktop research.

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Executive Summary

This detailed Circular Economy Statement has been prepared by Hodkinson Consultancy, a specialist energy and environmental consultancy for planning and development, appointed by St William Homes LLP.

The purpose of this statement is to demonstrate that the proposed development at Mitcham Gasworks, has considered the following circular economy principles to:

- > Conserve resources and source ethically.
- > Design to eliminate waste (and for ease of maintenance).
- > Manage waste sustainably and at the highest value.

The commitments below have been set to ensure that changes are made at a strategic level in order to ensure that the core principles of Circular Economy are adopted:

- > A minimum of 95% of non-hazardous construction waste is to be recycled or reused.
- > Municipal waste recycling target of 65% by 2030 for residential and 75% for commercial.
- > At least 25% of materials will include reused or recycled content by value, where feasible.
- > 100% of timber used on site, including timber used in the construction phase, will be sourced from sustainable forestry sources (e.g., PEFC and FSC).
- > The development will be designed to meet long-term resident needs, be robust, durable, and resilient to climate change.
- > Target of no less than 50% for substructure and up to 60-70% for the superstructure for cement replacement and for steel, a 23-30% recycled content is targeted.
- > All residential units and the self-storage building will be provided with access to a refuse store, supporting the separate collection of dry recyclables (mixed plastics, metals, glass, card and paper) and food waste.
- > All residential units will be provided with a user guide to promote the principles of circular economy.

Further different strategic approaches that can be adopted and how they could be incorporated have also been outlined in the report and will support a circular economy approach for the development. This report has demonstrated that the proposed development is compliant with the requirements of Policy SI7 of the London Plan.



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1. INTRODUCTION

- 1.1 This detailed Circular Economy Statement has been prepared by Hodkinson Consultancy, a specialist energy and environmental consultancy for planning and development, appointed by St William Homes LLP.
- 1.2 The purpose of this statement is to demonstrate that the proposed development at Mitcham Gasworks, has considered the following circular economy principles to:
 - > Conserve resources and source ethically.
 - > Design to eliminate waste (and for ease of maintenance).
 - > Manage waste sustainably and at the highest value.
- 1.3 The above has been undertaken throughout RIBA stages 2/3 and this statement will be included within the full planning application that is being submitted to the London Borough of Merton.
- 1.4 The aim of circular economy is to retain the value of materials and resources indefinitely, with no residual waste at all. This is possible but will require a fundamental change in the way that buildings are designed, built, operated, and deconstructed.
- **1.5** This report should be read in conjunction with the *GLA Circular Economy Spreadsheet* which will be submitted alongside this report.



2. DEVELOPMENT OVERVIEW

Site Location

2.1 The proposed development site is approximately 2.43ha in size and sits within the Lavender Fields Ward, located in the London Borough of Merton, as shown in Figure 1 below. It is bounded by Portland Road to the northwest, open space with Hay Drive beyond to the west, Field Gate Lane to the southeast and Western Road to the northeast.



Figure 1: Site Location - Map data © 2022 Google

Proposed Development

2.2 The proposed development is described as follows:

"Erection of new buildings to provide residential accommodation (Class C3) and flexible commercial/community space (Class E and/or Class F2), with associated access, parking and landscaping arrangements, including the demolition of the existing telecommunications mast and re-provision of new telecommunications mast."

2.3 Figure 2 below illustrates the proposed site layout.



Figure 2: Ground Floor Layout (Rolfe Judd, November 2022).

- 2.4 The total Gross Internal Floor Area (GIA) is 59,219 m². This consists of the following use classes:
 - > Residential: 52,419 m²
 - > Commercial: 382 m²
 - > Communal: 6,418 m²
- **2.5** The principles noted within this report apply to this GIA.

Existing Buildings

2.6 The site was formerly in use as a gasworks by National Grid, with a large gasholder in the northern corner of the site. The gasholder frame was demolished in 2021 under prior approval20/P0703. The main access to the site is via Western Road, with a secondary entrance of Portland Road. The existing



site contains a telecommunications mast and two pressure reduction stations (PRS). A number of underground gas mains run across the site, with some requiring diversion to facilitate redevelopment.

- 2.7 The telecoms tower will be demolished once the equipment has been reinstalled on top of a building in the first phase of the development. The tower will be removed in pieces using a mobile crane to take the load while an operative cuts the mast into pieces, following a temporary works design and lifting plan. Once demolished, the final phase of the development will commence.
- The site is otherwise vacant, with high walls or fences around all boundaries. No public access is possible and the site acts as a barrier to the permeability of the area. The nature of the sites boundaries also contributes to an unattractive and uninviting environment along the routes that run adjacent to the site, including Portland Road, Western Road and Field Gate Lane.
- **2.9** Figure 3 demonstrates what the existing site looks like:



Figure 3: Existing site (DAS, October 2022)

Circular Economy Workshop

- **2.10** A workshop was held with key members of the design team. Early collaboration between the key stakeholders ensured that Circular Economy Principles can be achieved and embedded in the design.
- **2.11** The following elements were discussed:
 - > **Pre-redevelopment and Pre-Demolition Audit:** As the site was clearer prior to St William coming on board it was determined that no audits were required.

- > **Pre fabrication and modular:** To reduce on-site construction, pre-fabricated materials, and modular units will be specified where possible, at this stage the following was discussed:
 - o Bathroom pods will be modular and prefabricated balconies are proposed.
 - Additional aspects of design will aim to be prefabricated, with further decisions to be made as the design progresses.
- > **Embodied carbon:** To ensure there is no conflict with embodied carbon targets, all circular economy measures that are proposed will be discussed with Hodkinson Consultancy to ensure the carbon impact is taken into consideration.

3. POLICY AND REGULATIONS

3.1 This chapter highlights the policies and regulations which are relevant to the proposed development at Mitcham Gasworks.

London Plan (2021)

3.2 The London Plan sets out an integrated economic, environmental, transport and social framework for the development of London. The following policies are considered relevant to the proposed development and this Statement:

Policy SI7 Reducing Waste and supporting the Circular Economy.

- A. Waste reduction, increases in material re-use and recycling, and reductions in waste going for disposal will be achieved by:
 - 1. Promoting a more circular economy that improves resource efficiency and innovation to keep products and materials at their highest use for as long as possible;
 - 2. Encouraging waste minimisation and waste avoidance through the reuse of materials and using fewer resources in the production and distribution of products;
 - 3. Designing developments with adequate and easily accessible storage space that supports the separate collection of dry recyclables (at least card, paper, mixed plastics, metals, glass, and food).
- B. Referable applications should promote circular economy outcomes and aim to be net zerowaste. A Circular Economy Statement should be submitted, to demonstrate:
 - 1. How all materials arising from demolition and remediation works will be re-used and/or recycled.



- 2. How the proposal's design and construction will enable building materials, components, and products to be disassembled and re-used at the end of their useful life.
- 3. Opportunities for managing as much waste as possible on site.
- 4. Adequate and easily accessible storage space to support recycling and re-use.
- 5. How much waste the proposal is expected to generate, and how and where the waste will be handled.
- 6. How performance will be monitored and reported.

Local Policy: London Borough of Merton

Core Planning Strategy (2011)

- 3.3 The London Borough of Merton's Core Planning Strategy was adopted in 2011. The following policies are considered relevant to this Statement:
- **3.4 Policy CS 14 Design** encourages high quality sustainable design that meets urban design and climate change objectives.
- **3.5 Policy CS 17 Waste Management** requires integrated, well-designed waste storage facilities that will include recycling facilities for all new developments where appropriate.

Draft New Local Plan

- The Draft New Local Plan sets out the council's statutory planning policy framework for the borough. It sets out the level of growth which needs to be planned for in Merton and identifies where that growth should be located and how it should be delivered. The local plan does not yet carry weight but those relevant policies have been noted here for completeness.
- 3.7 Strategic Policy CC2.1 Promoting Sustainable Design to Mitigate and Adapt to Climate Change states that development must:
 - > Minimise greenhouse gas emissions and support the transition to a low carbon society by maximising energy efficiency, low carbon heat and local renewable energy generation.
 - > Support the principles of the circular economy and promote more effective resource use.
 - > Recognise and adapt to Merton's changing climate and ensure that development mitigates the risk of overheating and flooding and maximises comfort and wellbeing in a changing climate.

- > Maximise opportunities to enhance green infrastructure and tree planting to deliver multifunctional benefits such as minimising the urban heat effect, enhancing natural carbon sinks and improving air quality.
- > Promote healthy and sustainable lifestyles in line with Merton's net-zero carbon target.
- 3.8 Policy CC2.5 Minimising Waste and Promoting a Circular Economy requires development to undertake a Whole Life-Cycle Carbon assessment proportionate to the scale of development and demonstrate that whole life-cycle carbon savings have been maximised. Source and prioritise materials that can easily be maintained, repaired and renewed. Specify sustainably and locally sourced, low impact and re-used or recycled materials.

Guidance Documents

- **3.9** Guidance was released by the Greater London Authority (GLA) "Circular Economy Statement Guidance", issued in March 2022. It outlines guidance on Circular Economy statements that should accompany all referable planning applications in line with the London Plan Policy SI 7.
- **3.10** The guidance notes that Circular Economy Statements should be submitted at the following stages:
 - > Full application (RIBA Stage 2/3) Detailed Circular Economy Statement outlining how the principles will be addressed through detailed design.
 - > Post-completion stages (RIBA Stage 5/6) Post-Planning Updates should outline the progress in meeting the targets and commitment can be provided during the construction process.
- 3.11 As the proposed development, in the London Borough of Merton is already at RIBA Stage 2/3 with a full application being submitted, a detailed Circular Economy Statement is required.

4. CIRCULAR ECONOMY PRINCIPLES

- **4.1** A circular economy is defined in the London Plan Policy *SI7 'Reducing Waste and Supporting the Circular Economy'* as one where materials are retained in use at their highest value for as long as possible and are then reused or recycled, leaving a minimum of residual waste.
- 4.2 In contrast to a linear economy (take, make, dispose), a circular economy keeps products and materials circulating through the system at their highest value for as long as possible, through reuse, recycling, refurbishment, and remanufacturing.



- 4.3 The end goal is to retain the value of materials and resources indefinitely, with no residual waste at all. This is possible but will require a fundamental change in the way that buildings are designed, built, operated, and deconstructed.
- 4.4 Applying circular economy thinking to the built environment is complex, with many overlapping issues and trade-offs to consider. However, there are some core guiding principles that promote a regenerative and restorative whole systems approach that should be applied on every project. These are as follows:
 - 1. Conserve resources and source ethically
 - > Minimise the quantities of materials used
 - > Minimise the quantities of other resources used
 - > Specify and source materials and other resources responsibly and sustainably
 - 2. Design to eliminate waste (and for ease of maintenance)
 - > Design for longevity, adaptability or flexibility and reusability or recoverability
 - > Design out construction, demolition, excavation, and municipal waste arising
 - 3. Manage waste sustainably and at the highest value
 - > Manage demolition waste
 - > Manage excavation waste
 - > Manage construction waste
 - > Manage municipal waste
- 4.5 Adoption of these three core principles on developments typically reduce the amount of raw and new materials required. Alongside this, a reduction in vehicle movements, air pollution, noise and greenhouse gas emissions would also be beneficial. There are also benefits from cost savings through the reduction in materials required.

Method Statement

Berkeley Group 'Our Vision' (2030)

4.6 As part of the Berkeley Group, St William Homes LLP will ensure that the Proposed Development achieves the goals and targets set out in the 'Our Vision' document.



- **4.7** Berkeley Group's approach to sustainability is about considering the future. It is about developing the homes and places of the future without compromising the ability of the younger generations to meet their needs.
- 4.8 Berkeley Group consider the long-term impacts of their activities an ensure that they take action to reduce them both in terms of running the business efficiently and considerately and by developing sustainable homes and places. Berkeley has had a strong commitment to sustainability and environmental management across the business for many years, with their Sustainability and Climate Change policies launched in 2007. Berkeley Group's sustainability strategy sets out the approach to maintaining a leadership position by embedding sustainability within the business and setting out key focus areas which seek to protect, enhance and inspire. To meet these ambitions, Berkeley Group have five focus areas Climate action, Communities and sustainable living, Nature, Environmental management and Resources.
- 4.9 This Circular Economy Statement supports the wider business strategy 'Our Vision' and is supported by sustainability standards that set out the detail on how Berkeley Group manage sustainability and circular economy principles through their projects and in their business.

Berkeley Group sustainability standards

4.10 Specific design requirements are required on each Berkeley Group development and as such, need to be implemented. The relevant sustainability standards applicable to this statement are as follows:



- **4.11** Resources and Material Efficiency: All developments will reduce their impact on key resources and work collaboratively with the supply chain to procure sustainable materials by:
 - > Providing internal recycling facilities to all new homes.
 - > Ensuring that materials and products are sourced responsibly.
 - > Ensuring that all timber is FSC or PEFC certified and has a Chain of Custody.



5. APPROACH TO CIRCULAR ECONOMY

Strategic Design Making

5.1 The GLA decision tree within the *GLA Circular Economy Spreadsheet* has been used to determine the most appropriate design approach for the site. This has determined to be a 'new building' based on the questions within the spreadsheet.

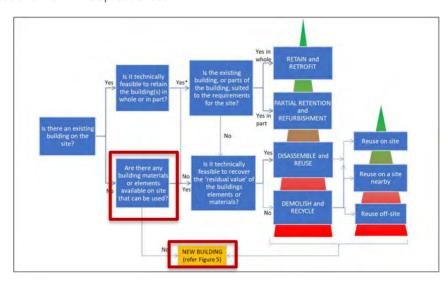


Figure 4: Decision tree for design approaches for existing structures/buildings (Circular Economy Statement guidance, GLA, March 2022)

- 5.2 St William Homes LLP are aiming to make changes at a strategic level to ensure that the core principles of circular economy are adopted where feasible. Identifying and applying these approaches during concept design will enable them to be incorporated as part of the development brief.
- **5.3** Further different strategic approaches that can be adopted and how they could be incorporated are listed below. Those in **bold** are considered to be exceeding expectations.

Targets and Monitoring

- **5.4** Circular economy targets have been agreed with the design team and will be used to influence decisions and design as we progress through the project. These are outlined below:
 - > Demolition waste materials (non-hazardous) 95%

- > Excavation waste materials 95%
- > Construction waste materials 95%
- > Municipal waste residential (by 2030) 65%
- > Municipal waste business (by 2030) 75%
- > Recycled content 25%
- An overview on how the Applicant will meet these targets is outlined in this report and in the accompanying GLA spreadsheet.
- To monitor the targets, the Applicant will ensure that waste associated with the enabling works (demolition and excavation waste) and construction will be accurately recorded via a Site Waste Management Plan. Operational waste will be measured post-construction to ensure that the targets set are achieved. Finally, the recycled content will be monitored through the development of the actual Bill of Materials.
- **5.7** More detailed information on the monitoring process is outlined in later section of this report.

Conserve Resources

Existing Buildings

- Various above ground structures have existed on site previously, including gasholders, industrial units, and office buildings. The site was cleared (ahead of St William owning the site) and the 30m gasholder frame was recently demolished, although the lower structure and foundations remain. The 65m telecoms mast remains and will be relocated on site.
- 5.9 As the site was cleared prior to St William's involvement and ownership of the site, a pre-demolition audit and pre-redevelopment audit is not required and has not been undertaken by St William. Any hard standing discovered on site will be 100% reused in the proposed development.

Sustainable Procurement

- **5.10** St William Homes LLP will operate within the wider Berkeley Group Sustainable Procurement Strategy. They define sustainable specification and procurement to be the responsible selection and sourcing of products and services, considering environmental, social, economic and ethical aspects over their whole lifecycle. This procurement strategy aims to do the following:
 - > Select contractors based on their sustainability credentials and work in partnership to create a more sustainable supply chain



- o Encourage all contractors to have appropriate policies and management systems in place as standard.
- Work in partnership with appointed contractors to ensure that the environmental and social impacts of their work are minimised and that each operative is appropriately trained.
- o Encourage contractors to sign up to the Supply Chain Sustainability School.
- > Preferentially source sustainable products and materials.
 - Consider transportation distance and mode, including from the original source of extraction/manufacture.
 - Review the sustainability credentials of materials and their suppliers as part of the procurement process.
- > Consider the sustainability of materials from the outset and specify sustainable products throughout the design process
 - o Consider environmental impacts when specifying products and ISO 20400 Sustainable Procurement Standard where appropriate.
 - Specify products with consideration to the likely source and processing locations of materials, with a preference given to those which are produced within Organisation for Economic Co-operation and Development (OECD) countries.
 - o Incorporate sustainable specification aspirations within briefs for consultants and architects.
 - o Give preference to materials which have a low environmental impact, have high recycled content, and have recognised sustainability ratings.
- 5.11 They have an extensive materials supply chain which is critical to meeting production needs. To support resilience and continuity of supply for typical materials, Berkeley Group are launching a new materials strategy and are forming strategic agreements with suppliers. They will ensure materials meet quality, safety and sustainability requirements and are procured ethically.
- 5.12 They will build on this further by preferentially partnering with companies that share their commitment to climate action, maximising the use of products with lower embodied carbon, and working together on sustainability targets such as waste reduction and following the principles of the circular economy.
- **5.13** Materials from suppliers who participate in responsible sourcing schemes such as the BRE BES 6001:2008 Responsible Sourcing Standard will be targeted, where feasible. In addition, products with a recognised environmental product declaration (EPD) will be targeted where possible.

- 5.14 All timber specified will be legally harvested and traded timber and will be sourced from schemes supported by the Central Point of Expertise for Timber Procurement such as Forest Stewardship Council (FSC) accreditation which ensures that the harvest of timber and non-timber products maintains the forest's ecology and its long-term viability.
- 5.15 St William LLP have undertaken studies on recycled content in concrete. The aim is to increase cement replacement to as high as technically feasible- no less than 50% for substructure and up to 60-70% for the superstructure. For steel, a 23-30% recycled content is targeted in line with current advise from British Steel.

Recycled Content of Materials

5.16 The Applicant is committed to target a benchmark of 25% reused or recycled content by value., where feasible. A brief bill of materials summary table has been provided in the *GLA Circular Economy Template*, submitted alongside this application.

Minimised Material Use

- **5.17** Adopting a design approach that focuses on material resource efficiency so that less material is used in the design (e.g., lean design), and / or less waste is produced in the construction process, without compromising the design concept.
- 5.18 The heights of the proposed buildings have been reduced following consultation with the GLA, Merton Council, the Design Panel, and the local community. Through the reduction of building heights, the overall material use has been reduced.
- 5.19 Off cuts from plasterboard works will be stored on pallets for use in more detailed work near completions. Also, it is proposed that smaller off cuts are to be used for filling in ceiling voids and any plasterboard in temporary partitions are to be re-used as inner skin of permanent walls, whenever practicable.
- **5.20** The development has taken steps to ensure other resource use will be kept to a minimum. Examples include:
 - > The development will achieve a **total reduction in regulated CO**₂ **emissions of 56**% through be lean, be clean and be green on-site measures and will provide homes that are energy efficient and incorporate Low and Zero Carbon technologies.
 - > All new dwellings will target a minimum internal water efficiency standard of 105 litres/person/day in accordance with the London Plan Policy SI5 and the optional tighter Building Regulations Approved Document G requirement (110 litres/person/day).
- 5.21 A ground contamination assessment has found that the site is of high risk of contaminants and appropriate remediation works will need to take place. **Remediation of contaminated land**



removes threats to health and safety, and enables land, to be improved that would otherwise be left.

Cut and Fill

- **5.22 The cut and fill sequence has been reviewed in detail** to maximise the re-use of material on site via treatment and distribution.
- 5.23 Taking the assumed existing site levels, the buildings, landscaping, and roads build up has been subtracted to provide the formation level (below pile mat). The difference between the existing and proposed formation level is then calculated and then multiplied by the area to equal the total cut and total fill volumes. Added to these are the piles, pile caps, ground beams/rafts, surface water attenuation tanks and utilities distribution trenches which will require redistribution or carting off-site.
- 5.24 It is assumed that the gasholder void will be left unfilled so that some of these arising's can be used to fill this structure. A first draft for the overall quantity of arising's has been put together by St William and is outlined below:
 - > The total formation arising's CUT = 13,486m³
 - > The total formation arising's FILL = -5,895m³ (Gasholder volume = -5,662m³)
 - > The substructure and infrastructure arising's for the development = 8,109m³
 - > Site won hard for re-use across site = 2,569m³
 - > The volume of disposed off-site material = 12,054m³
- 5.25 Iceni (June 2023) have calculated that 12,054m³ of waste will weigh circa 14,560 tonnes. This figure has been used in the accompanying Circular Economy Spreadsheet.
- 5.26 Locations where the landscaped areas might be artificially raised to create mounds will be investigated within the landscape design. Further options for lowering the site and graded to meet boundary levels have been explored.

Eliminating Waste

Designing for Longevity

5.27 The proposed development will seek to design with longevity in mind. Examples include protecting materials from degradation due to environmental conditions, adopting passive design strategies to provide resilience, and sizing systems to cope with future climate scenarios.

- **5.28** The development will include a reinforced concrete build up, improving the structural integrity and durability of the buildings. This reduces the long-term maintenance requirements, promoting longevity within design.
- **5.29** Appropriate durability measures will be incorporated in vulnerable parts of the internal building to minimise the frequency of replacing materials and therefore optimising material use. These measures are likely to include:
 - > Hard-wearing floor finishes.
 - > Stair treads.
 - > Kick plates on doors and
 - > Kerbs in servicing/vehicle areas.
- **5.30** Durable, hard-wearing, and low-maintenance façade materials are also proposed.
- **5.31** Various energy saving sustainable initiatives will be included in the design, such as highly insulated external fabric and walls, and low-energy lighting throughout.

Designing for Assembly, Disassembly and Recoverability

- **5.32** The proposed development will be designed with disassembly in mind as well as maintenance and replacement of elements. Where feasible, assets will seek to be designed to allow for easy assembly and reconfiguration, for alternative future uses.
- **5.33** Materials, where possible, will have the option to be taken apart through mechanical and reversable fixings to allow for future reuse. Permanent fixing of products, such as by glue and cement mortar, will be minimised where feasible, to enable end of life deconstruction and salvage of building elements.
- **5.34** The building envelope will predominantly comprise of brickwork, and therefore at the end-of-life stage, all brick material will be repurposed.
- **5.35** A brief end-of-life strategy will be developed at detailed design to demonstrate how the building materials, components and products could be disassembled and reused at the end of their useful life.
- 5.36 At this RIBA stage, a detailed Bill of Materials is not yet available and will instead be provided in time for the Post Construction Circular Economy Statement. In accordance with GLA guidance, the Bill of Materials will include kg/m² for the proposed new development and will commit to exceeding the benchmark of 25% (by value) reused or recycled content. A brief bill of materials summary table has been provided in the GLA spreadsheet.



Designing for Adaptability or Flexibility

- **5.37** The project has been largely designed with projecting bolt-on balconies, allowing for these to be manufactured off site. Some layouts incorporate fully recessed balconies, which are also being constructed as recessed bolt on balconies.
- **5.38** The flexible commercial/community space offer further opportunities for the site and the future tenants. This space will therefore be designed with flexible use in mind, ensuring that the site will cater for the requirements and demands of time.
- 5.39 Infrastructure and hard landscaping are typically less adaptable than other elements of the built environment. At present a resilient hard landscaping design has been designed which enables servicing and maintainability. The detailed design of the site layout should include opportunities to make it adaptable, this could include the use of moveable planters and limiting the use of adhesives and fixings.

Standardisation

- **5.40** The proposed development will consider designing and construction methods by applying, where feasible, standardised elements for materials and products that enable a reduction in construction waste and easier reuse in next life.
- 5.41 The plasterboard contractor (once appointed) is to be set a target of 5% waste within their contract conditions, based on final fixed quantities of plasterboard.
- **5.42** It will be a requirement that plasterboard sheet sizes will be matched to storey height, loading out to correct quantities.

Managing Waste

Site Waste Management

- Prior to any Enabling works beginning on site, a Project Waste Management Plan will be drafted, a draft copy has been provided in **Appendix B.** The plan will include details on waste minimisation strategies incorporated in design and procurement stages. It will also include information on how waste will be managed during the construction phase, along with predictions for various waste streams.
- 5.44 The Waste Hierarchy Strategy is currently employed on all St William site, to minimise the volume of wastes produced and divert waste from landfill as far as reasonably practicable. This will also be true for the proposed demolition and remediation works. A target of 95% (volume) recycle/ reuse for demolition and construction waste will be set on this project.

- The location of the waste handling site that materials will be taken to, will vary dependent upon their specific make up, of which is yet to be confirmed. Notification of the likely destination of all waste streams (incl. beyond the Materials Recycling Facility) will be provided, including confirmation that the destination landfill(s) has/have the capacity to receive waste.
- **5.46** Waste facility sites in Morden, Lower Morden, Mitcham, and Merton Abbey may be used amongst others as appropriate. Wherever possible, materials will be recycled and re-used either onsite, or provided for use elsewhere. Waste segregation will take place during construction as far as the site allows logistically to give the highest possible recycling rates.
- 5.47 A strategy will be put in place to minimise the space taken by storage of new materials. Frequently used items will be placed in easy to access areas. This will increase efficiency and minimise wastage due to damage. Prolonged storage of materials on site will be avoided, where possible, and implementation of 'just in time' deliveries will be encouraged.
- **5.48** Waste segregation will take place during construction as far as the site allows logistically to give the highest possible recycling rates.
- **5.49** The energy and water consumptions of the project will be monitored, either through sub-metering or reading utility bills, to allow comparison against best practice benchmarks and improvements made.
- **5.50** Iceni projects (June 2023) have calculated the estimated construction waste for the project, this is shown in Table 1:

Table 1: Construction waste volume (Iceni, June 2023)

Total GIA	BRE project type	Tonnes per 100m² (GFA)	Estimated construction waste (tonnes)	
52,419	Residential	15.3	8,020	
382	Commercial	15.7	60	
Total	-		8,080	

5.51 The above figures have been used in the accompanying Circular Economy Spreadsheet.

Construction Waste Monitoring

The Berkeley Group Waste Data Tool (WDT) will be used to monitor the volume and type of waste produced on site. Details of the waste produced on site will be analysed periodically. Charts



- demonstrating the percentage of waste recycled and the type of waste produced will be displayed on the project office and site welfare area to raise staff awareness.
- **5.53** The tool can be used to demonstrate 'Duty of Care' in ensuring waste produced on site is being disposed of in accordance with legislation. It is proposed that periodic due diligence checks will also be carried out at the end disposal facilities accepting waste from the project.
- 5.54 As part of their commitment to divert construction waste from landfill, St William Homes LLP will be required to regularly monitor and record the site's waste reduction performance. They aim to reuse or recycle 95% of waste from landfill (excluding hazardous waste) by 2025 from their sites. A benchmark of 95% potential excavation waste, excluding hazardous waste will be put to beneficial reuse.

Operational Waste

- **5.55** Waste reduction during the operational phase is also being considered for opportunities in implementing waste mitigation measures for the potential impacts arising during the operation of the development to ensure that such measures are consistent with both national and local waste policies and targets.
- The Waste Hierarchy strategy in accordance with the London Plan will be used to ensure that waste is reduced or reused prior to being put out for recycling or refuse collection. The waste hierarchy, as shown in Figure 5 below, establishes waste management options according to what is best for the environment. It places great importance on preventing waste in the first place. When waste is created it prioritises preparing if for re-use, then recycling, recovery and lastly disposal (e.g., landfill).



Waste Arising & Storage - Dwellings

- 5.57 To facilitate easy sorting of waste streams for residents, each dwelling will be fitted with a three-compartment waste bin, with each compartment corresponding to the relevant waste stream to be collected by the Council. This will maximise the potential for residents to correctly sort waste within their home. Guidance for waste stream sorting and collection will be provided in the home user manual.
- **5.58** The anticipated arisings from the residential component of the Proposed Development are shown in Table 2 below.

Table 2: Domestic waste arisings

Block	Homes	Weekly arisings (litres)				
		Refuse	Dry recyclables	Compostable		
А	143	17,160	17,160	1,144		
В	86	10,320	10,320	688		
С	28	3,360	3,360	224		
D	43	5,160	5,160	344		
Е	143	17,160	17,160	1,144		
F	152	18,240	18,240	1,216		
Total	595	71,400	71,400	4,760		

- **5.59** When internal bins are full, residents will transfer their waste to a dedicated storage area, located within the curtilage of their block on the ground floor. In accordance with the Council's waste collection requirements, waste storage bins are defined by the waste stream as follows:
 - > Refuse: 1,100 litre Eurobins.
 - > **Dry recyclables:** 1,100 litre Eurobins.
 - > Compostable (without garden waste): 240 litre wheeled bins.
- Table 3 below shows the number of Eurobins required in each location, and the associated minimum area required for the bin store, excluding circulation space. The below assumes both residual and recycling waste streams will be collected by the Council on a weekly basis.



Table 3: Domestic waste storage requirements

Location	Storing refuse for blocks	No. of dwellings	No. of 1,100 l residual bin	No. of 1,100 l recycling bin	No. of 240 l bin	Min. area of store (m²)
Core A2	A1, A2	76	8	8	3	27.26
Core A4	A3, A4	67	7	7	3	24.12
Block B1, and B2 (Central Waste Store)	B1, B2, C, D	157	16	16	6	54.51
Block C	С	28	3	3	1	10.13
Block D	D	43	5	5	2	17.13
Block E	E1, E2, E3	143	15	15	5	50.65
Core F1	F1	57	6	6	2	20.26
Block F2 and F3	F2, F3	95	10	10	4	34.25

5.61 Locations of the bin storage areas, where all bins will be stored, is shown in Figure 6 below.



Figure 6: Refuse Store Locations (Rolfe Judd, November 2022)

- As demonstrated in the table above, a total of eight waste storage locations will be provided, with weekly waste arisings to be collected by the Council's waste operatives from six of these locations on a weekly basis, accounting for a weekly transfer of waste from Blocks C and D to the waste storage area provided within Block B by the estate management team.
- **5.63** The turning circle for the refuse vehicle is quoted as 18.0 metres and in-roads are able to accommodate this.

Waste Arising & Storage - Commercial

5.64 The anticipated arisings from the commercial component of the Proposed Development are shown in the table below:

Table 4: Commercial waste storage requirements

Location	Use	GIA Type (m²)		Weekly waste volume	Proportion of waste stream		
				(litres)	Residual	Recycling	
Block A	Flexible Commercial / Community Use	215	Industrial	1,075	50%	50%	
Block F	Flexible Commercial / Community Use	51	Industrial	255	50%	50%	
Block F	Flexible Commercial / Community Use	96	Industrial	480	50%	20%	

The bins will be located within the curtilage of the flexible commercial and community spaces and will be accessible to waste collection operatives. 1,100 litre Eurobins and 240 litre wheeled bins will be provided for the storage of waste arising from both the flexible community and flexible commercial spaces. The resulting non-domestic waste storage requirements are provided in the table overleaf. For the purposes of this waste management strategy, a weekly collection rate has been assumed.



Table 5: Non-domestic waste storage requirements

Location	Use Type Numbe	r of 1,1 00 li	tre Eurobins	Number of wheele	Min. area of store (m²)	
		Residual	Recycling	Residual	Recycling	
Block A	Flexible Commercial / Community Space	1	1	-	-	3.97
Block F	Flexible Commercial / Community Space	-	-	1	1	1.83
Block F	Flexible Commercial / Community Space	-	-	1	1	1.83

Operational Waste

- 5.66 The reduction of operational waste from developments is essential to reducing their environmental impacts. The expected volume of waste alongside necessary provisions and management for ensuring that waste is both minimised and properly processed should be outlined and then managed.
- The implementation of an Operational Waste Strategy is best industry practice and imperative for good environmental performance in buildings. Iceni Projects Limited (November 2022) have produced a strategy as shown in **Appendix A**, this demonstrates that the Proposed Development has been designed to be compliant with all relevant waste management policy and will manage and dispose of waste in a sustainable manner.
- **5.68** New residents and property occupants will be encouraged to reduce and prevent waste through good practice measures such as providing information packs to residents about how the waste segregation and recycling scheme operates in the proposed development.
- **5.69** The information packs will also include details on waste prevention schemes in and around the borough such as:
 - > **Too Good to Go** Aims to reduce food waste, it is a mobile application that connects restaurants and stores that have unsold, surplus food with customers who can then buy whatever food the outlet considers surplus to requirements, at a much lower price than normal.
 - > **Local Charities** Sustainable Merton is a local environmental charity in Merton that inspires, engages and influences local people and partner organisations to be the solution to environmental issues.

- > **Reuse and Recycling Centres** Reuse and recycling centres allow occupants and residents to dispose of a wide range of reusable and recyclable items for free.
 - Garth Road Household Reuse and Recycling is located in the London Borough of Merton and is open to the public. If visiting by car, bookings should be made online at least five days in advance.
- > **Freecycle Network; and Freegle** These are networks that aims to increase reuse and reduce landfill by offering a free online based service where people can give away and ask for things that would otherwise be thrown away.
- > **Sustainable Merton** Merton's local environmental charity aiming to inspire and educate the community to take action against climate change, and waste reduction and prevention in particular.
- **5.70** For more detailed information on the Operational Waste Management Strategy, the report submitted by Iceni Projects Limited should be referred to (November 2022).

Operational Waste Monitoring

- **5.71** The development is committed to meet the mayor's 65% target for municipal waste recycling by 2030 (75% for commercial spaces) and will strive to ensure no biodegradable or recyclable waste is sent to landfill by 2026, once the proposed development is operational.
- **5.72** Building Management (or a separate contractor engaged on their behalf) would undertake a regular monitoring inspection of each of the waste storage arrangements across the site and the waste collection arrangements, with information on both waste storage areas and waste collection records to be recorded as a minimum.
- 5.73 Unless otherwise advised through separate discussions, building management would notify London Borough of Merton of any changes to the site waste management arrangements proposed to be brought forward as a result of the review programme and have these agreed (in writing if required) prior to implementation and operation at the site.

Recycling Waste Reporting Form

5.74 The recycling and waste metrics reporting will be provided by the main contractor, once appointed. This will be agreed with the project manager and a site waste management plan, which will contain improved estimates for figures shown in Table 5 below.



Table 5: Recycling and Waste Reporting - Construction and Municipal Waste

		Excavation Waste	Demolition Waste	Construction Waste	Municipal Waste
Total Estimate (t/m² GIA)		0.246	0	0.136	0.127
% Reused on o	r off site	>95%	0	>95%	>65% (Resi)
% Recycled or composted, on or off site		30,0			>75% (Non-resi)
% not reused or recycled	% to landfill	<5%	0	<4%	Max 35% and no recyclable or
	% to other management (e.g. incineration)	0%	0	<1%	compostable waste

Plans for Implementation

- **5.75** Considerations for circular economy implementation will be required through active engagement with key stakeholders at each stage, of which include (but not limited to):
 - > Principal Contractor and Sub-contractors (when appointed).
 - > Project Architect.
 - > Structural Engineers.
 - > Transport Consultants.
 - > Client.
- **5.76** A brief plan of implementation (short, medium, and long term) and action list will be compiled throughout the early stages of design. Key actions to include:
 - > Structural team to ensure ongoing review of cement replacement content and recycled content of steel.
 - > Continue to update and refine cut and fill calculations.

- **5.77** Such requirements, along with the projects strategic approach to implementing circular economy principles, will be included in tendering specifications to contractors, ensuring responsibilities in line with these aspirations are embedded from the earliest opportunity.
- **5.78** Waste is a key performance indicator included in project performance dashboards for St William Homes LLP for the ongoing monitoring of construction waste by site managers. This will help to ensure that construction waste targets (95% diversion from landfill) are met.
- **5.79** St William Homes LLP will continue to work with the design team to identify and provide solutions on key challenges with material use with the aim to reduce this even further.
- **5.80** It is proposed the following actions are taken to implement and monitor the actions included in this Circular Economy Statement:
 - > Ensure a site specific SWMP is produced (post planning) and populated with the targets and actual waste data.
 - > Provide an updated bill of materials.
 - > Update recycling and waste forms.
 - > Provide reused or recycled content calculations and building weight calculations.
 - > Undertake a lesson learned workshop at the end of the project.

End of Life Strategy

- **5.81** Although the proposed development is still at an early design phase, engagement with the design team has been undertaken to address the end-of-life strategy for the building materials and components.
- 5.82 Once planning is secured, St William Homes LLP will work on progressing the design and specifying exact materials and products, the end-of-life scenarios for the building will become more detailed as a result. The main aim is to extend the lifetime of the building through careful design and specification through the measures listed herein.
- **5.83** Where individual elements have shorter design life periods, the development seeks to design for the repurpose and independent replacement of these individual elements.
- **5.84** Exact materials and products will be selected and designed and will aim to allow for disassembly and reuse at the end of their useful life.



- 5.85 Building Information will be stored for the entire duration of the building's lifetime to facilitate end of life strategy, disassembly, future reuse, waste avoidance, and waste reduction. The material specification and manufacturers data sheets will be stored and updated as and when additional works are undertaken. This information can be used towards the end of life to inform the end-of-life strategy, disassembly, future reuse, waste avoidance, waste reduction.
- **5.86** The project has been assessed on the assumption of a 60-year design life, at which point material reuse and recycling technologies are expected to be more advanced than today.
- 5.87 Assumptions made with respect to maintenance, repair and replacement cycles and the material ''end of life'' scenarios have been included within the GLA Spreadsheet that accompanies the Whole Life Cycle Carbon assessment (Hodkinson, June 2023).

6. CONCLUSION

- 6.1 This detailed Circular Economy Statement has been prepared by Hodkinson Consultancy, a specialist energy and environmental consultancy for planning and development, appointed by St William Homes LLP.
- The purpose of this statement is to demonstrate that the proposed development at Mitcham Gasworks, it has considered the following circular economy principles to:
 - > Conserve resources and source ethically.
 - > Design to eliminate waste (and for ease of maintenance).
 - > Manage waste sustainably and at the highest value.
- **6.3** It demonstrates that the proposed development is compliant with the requirements of Policy SI7 of the London Plan and should be read in conjunction with the *GLA Circular Economy Spreadsheet*, which has been submitted alongside this report.
- 6.4 A Post Construction Completion Report is to be provided at project completion. This will seek to set out the predicted and actual performance against all numerical targets and provide updated versions of the items covered in the *GLA Circular Economy Spreadsheet*. The following reports will be prepared and included in the Post Construction Completion Report:
 - > Updated Site Waste Management Plan.
 - > Reused or Recycled Content Calculations.
 - > Updated Bill of Materials.
 - > Updated Recycling and Waste Reporting table.

7. APPENDICES

Appendix A

Operational Waste Strategy

Appendix B

Draft SWMP



Operational Waste Management Strategy

Mitcham Gasworks

Iceni Projects Limited on behalf of St William Homes LLP

June 2022

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- A5. GENERAL NOTES

1. EXECUTIVE SUMMARY

- 1.1 Iceni Projects Ltd was commissioned by St William Homes LLP to produce an Operational Waste Management Strategy to support the planning application for the Proposed Development at Mitcham Gasworks, Merton.
- 1.2 With reference to the policy requirements, guidance and industry best practice detailed in Section 3, anticipated arisings have been determined on the basis of relevant data and the Proposed Development mix. Waste storage areas and locations are subsequently set out in order to demonstrate compliance with local authority policy requirements and relevant standards.
- 1.3 An Operational Waste Management Strategy utilising traditional wheeled bins is proposed. The Proposed Development is anticipated to produce approximately 155,744 litres of waste from residential uses per week.
- 1.4 Residential waste storage will consist of separate 1,110 litre Eurobins for refuse and dry recyclables, and 240 litre wheeled bins for compostable waste, in accordance with local authority guidance. Waste stores have been located within the curtilage of the residential blocks at ground level to ensure easy access for both residents and waste collection operatives.
- 1.5 The Proposed Development will include commercial space in the form of flexible community space and a café. These spaces are anticipated to produce approximately 4,480 litres of refuse, recycling and food waste per week. Waste storage for these commercial spaces will consist of 1,100 litre Eurobins to be collected by a contractual arrangement. The waste storage areas will be located within the curtilage of the buildings for ease of use and to ensure accessibility for commercial waste collection operatives.
- 1.6 This Strategy therefore demonstrates that the Proposed Development has been designed to be compliant with all relevant waste management policy, and will manage and dispose of waste in a sustainable manner.

2. INTRODUCTION

2.1 Iceni Projects Ltd was commissioned by St William Homes LLP to produce an Operational Waste Management Strategy to support the planning application for the Proposed Development at Mitcham Gasworks, Merton.

Report Objective

- 2.2 This document details the operational waste management measures adopted by the Proposed Development at Mitcham Gasworks and gives an overview of the design proposals that will ensure that operational waste will be stored, collected and disposed of effectively over the lifespan of the scheme, within guidelines set out by the London Borough of Merton Council.
- 2.3 The report is structured to meet these guidelines as follows:
 - Section 3 discusses the planning context and policies which are relevant to operational waste management;
 - Section 4 discusses the development response to the policy drivers for operational waste management; and
 - Section 5 summarises the development's design response.

Site and Surroundings

2.4 TBC

The Proposed Development

2.5 TBC

3. PLANNING AND REGULATORY CONTEXT

3.1 The means of sorting, storing and collecting operational waste are incorporated within policy and regulation as set out below:

Regional

The London Plan (Adopted March 2021)

- 3.2 The London Plan outlines the Mayor's commitment to creating a low carbon circular economy, in which the greatest possible value is extracted from resources before they become waste, as this is not only socially and environmentally responsible, but will save money and limit the likelihood of environmental threats affecting London's future. The following London Plan policies are relevant to waste:
- 3.3 **Policy SI7 (Reducing waste and supporting the circular economy)** states that resource conservation, waste reduction, increase in material re-use and recycling, and reductions in waste going for disposal will be achieved by the Mayor, waste planning authorities and industry working in collaboration to:
 - Promote a more circular economy that improves resource efficiency and innovation to keep products and materials at their highest use for as long as possible;
 - Encourage waste minimisation and waste prevention through the reuse of materials and using fewer resources in the production and distribution of goods;
 - Ensure that there is zero biodegradable or recyclable waste to landfill by 2026;
 - Meet or exceed the municipal waste recycling target of 65 per cent by 2030;
 - Meet or exceed the targets for each of the following waste and materials streams:
 - Construction and demolition 95 per cent reuse/recycling/recovery
 - Excavation 95 per cent beneficial use
 - Design developments with adequate, flexible, and easily accessible storage space and collection systems and that supports the separate collection of dry recyclables (at least card, paper, mixed plastics, metals, glass) and food waste, as well as residual waste.

3.4 **Policy D6 (Housing quality and standards)** states that housing should be designed with adequate and easily accessible storage space that that supports the separate collection of dry recyclables (at least card, paper, mixed plastics, metals, glass) and food waste, as well as residual waste.

Local

The Mitcham Gasworks development is located in the London Borough of Merton (LBM) and key LBM guidance and policy requirements are detailed below.

Merton Recycling and Waste Collection

- 3.6 LBM currently collects residual, recycling and food waste from residential developments on a weekly basis.
- 3.7 Waste from commercial properties can be collected by LBM, with a range of container options and collection frequencies to suit all types of premises. Collections can be arranged with LBM via email (uk.slwpcommercialwaste@veolia.com) or telephone (0203 991 6202). Commercial properties may also arrange collections via an alternative fully licensed private waste collection firm, as long as they are licensed by the Environment Agency.

Merton Local Development Framework: Core Planning Strategy (July 2011)

- 3.8 **Strategic Objective 1** in the Core Planning Strategy aims to make Merton a municipal leader in improving the environment, taking the lead in tackling climate change, reducing pollution, developing a low carbon economy, consuming fewer resources and using them more effectively. This is to be achieved, in part, by applying the waste hierarchy, and by exploiting the opportunities to use energy from waste.
- 3.9 Strategic Objective 6 in the Core Planning Strategy aims to make Merton an exemplary borough in mitigating and adapting to climate change and to make it a more attractive and green place. This will be achieved, in part, by applying the waste hierarchy where waste is minimised, re-used and recycled, and residual waste is disposed of sustainably and in the right location using the most appropriate means.
- 3.10 **Policy CS 17 (Waste Management)** states that LBM support the objectives of the sustainable waste management set out by the government in Planning Policy Statement 10: Planning for Sustainable Waste Management and within the Mayor's London Plan. It is stated that the Council will increase recycling rates and address waste as a resource, looking to disposal as the last option in line with the waste hierarchy. To support recycling, the Council will require integrated, well-designed waste storage facilities that will include recycling facilities for all new developments where appropriate.

Waste and Recycling Storage Requirements

- 3.11 The Waste and Recycling Storage Requirements document provides guidelines for architects and developers of new residential, commercial and mixed-use units in the London Borough of Merton, to ensure that the arrangements for storing, collecting and managing waste are appropriate.
- 3.12 The guidance states that a waste storage capacity for up to a total of 240 litres should be provided per dwelling for residual and recycling waste. The London Borough of Merton recommends that 50% of waste storage capacity be allocated for residual waste, and 50% for mixed recycling. These calculations are based on residual waste accounting for 50% of all household waste, 40% of all waste comprising paper, card, cartons, mixed cans and plastic bottles, and the remaining 10% comprising glass. This is equivalent to the provision of one 1,100 litre Eurobin per 10 dwellings for the collection of residual waste, and one 1,100 litre Eurobin per 10 dwellings for the collection of recycling waste. It is also required that waste storage capacity for food waste is provided, with one 240 litre wheeled bin to be provided per 30 dwellings for the collection of organic waste. Sufficient capacity for waste storage must be provided for each household to allow for extended gaps between collections owing to Bank Holidays, therefore space to store waste must be provided over a minimum of eight days.
- 3.13 Communal bin storage areas must be located within the footprint of the development, ideally at ground level. The storage areas should be easily accessible to the dwelling that they serve, with residents being required to walk no further than 30m from the front door of their dwelling to the bin storage area (excluding vertical distances).
- 3.14 The guidance also outlines the following design features that should be integrated within the communal bin storage areas:
 - In designing facilities, the principles in BS 5906:1980 (The code of practice for storage and on-site treatment of solid waste from buildings) or any successor standard must be applied.
 - Container storage areas should be in a position that is mutually convenient and easily accessible for the occupants and the collection crew.
 - The design of storage areas should include hard, smooth, continuous surfaces to allow for the easy removal of the containers.
 - There should be at least 1.55m clearance across the doorways (including the thickness of the doors) for the movement of a 1,100 litre bin and a clearance of 1.20m for the movement of a 240 litre bin.
 - Where there are separate storage areas for residual waste and recycling, the recycling store should be the easiest to access (e.g. closest, least restricted access etc.).

- If containers are to be located in the open then ideally this area will include a fence or wall on at least three sides.
- If containers are to be located in a shed or cupboard then adequate ventilation must be provided together with electric lighting controlled by a local switch.
- Containers should be located away from windows and ventilators, to avoid any nuisance odours entering the premises.
- All locks must be a standard 'Fire Brigade' pattern to allow access for the fire brigade.
- There must be space available to wash down container areas at intervals and a local hose point should be provided with suitable drainage.
- 3.15 With respect to the collection of waste, the following guidance is provided:
 - It should not be assumed that collection crews are able to carry keys, codes or electronic fobs during the collection. However, arrangements can be made for this when necessary, subject to approval from LBM Waste Operations Team. This must be discussed prior to the submission of plans.
 - Containers must not be presented on or moved across a slope that exceeds 1.12 (in line with Part H of the Building Regulations 2002).
 - Surfaces that containers need to move across shall be free from steps or other obstacles. If
 it is impossible to avoid steps they must incorporate a drop-kerb.
 - The collection should not take place in an area that is regularly used by residents.
 - Access to the domestic and commercial containers, must be possible from 06.00 hours to 22.00 hours, Monday to Saturday.
 - Access should be planned so that it does not restrict the times in which domestic collections
 can be made due to existing or planned traffic control measures such as controlled parking
 zones, yellow lines, red routes, bus lanes, etc.
 - A suitable crossover must be constructed over any public footway for an entrance way or road. It is essential that the access route for the residual waste vehicle is not blocked; hence there may be a need for yellow/white lines and other measures to control parking.
 - Any gates or pinch points on the vehicle route to the residual waste storage area should give a minimum clearance width of 3.5m.

 After the collection is made the collection crews, management staff or cleaning staff should return the containers to storage. There should be clear responsibility for who carries out the task.

Other Considerations

British Standard 5906:2005

3.16 The Standard provides a code of practice for the storage, collection, segregation for recycling and recovery, and on-site treatment of waste. It applies to new buildings, refurbishments and conversions of residential and non-residential buildings. The Standard also presents typical weekly waste airings and subsequent storage requirements for a variety of building types, as shown below:

Table 3.1 Waste volume calculations for relevant non-domestic uses proposed for the Site

Building Type	Equation for weekly waste arisings (litres)
Industrial	Volume per m² of floor area [5 l] x floor area
Restaurant	Volume per number of covers [75 I]

4. OPERATIONAL WASTE MANAGEMENT

- 4.1 The operational waste management strategy for the Proposed Development has been assessed using the waste hierarchy methodology. This approach is consistent with that required by the Council, requiring new development to demonstrate how the scheme addresses waste separation, storage and collection.
- 4.2 For the Proposed Development, it is intended that a strategy utilising traditional wheeled bins will be adopted. The adoption of this waste management strategy will aid in maximising the area of landscaped open space provided as part of the Proposed Development, whilst also maximising pedestrian and cycle permeability through the Site.
- 4.3 The waste management strategy for the Proposed Development is outlined below, with residential and non-domestic uses addressed separately.

Residential Operational Waste Management Strategy

- 4.4 In order to facilitate easy sorting of waste streams for residents, each dwelling will be fitted with a three-compartment waste bin, with each compartment corresponding to the relevant waste stream to be collected by the Council. This will maximise the potential for residents to correctly sort waste within their home. Guidance for waste stream sorting and collection will be provided in the home user manual.
- 4.5 The anticipated arisings from the residential component of the Proposed Development are shown in the table below, based on the Council's waste capacity guidelines detailed in Section 3.

Table 4.1 Domestic weekly waste arisings

	Number		Weekly arisings (litres)			
Block	of	Refuse	Dry recyclables	Compostable (without garden waste)		
А	155	18,600	18,600	1,240		
В	38	4,560	4,560	304		
С	33	3,960	3,960	264		
D	114	13,680	13,680	912		
E	142	17,040	17,040	1,136		
F	146	17,520	17,520	1,168		
Total	628	75,360	75,360	5,024		

4.6 When internal bins are full, residents will transfer their waste to a dedicated storage area, located within the curtilage of their block on the ground floor. In accordance with the Council's waste collection requirements, waste storage bins are defined by the waste stream as follows:

• Refuse: 1,100 litre Eurobins

• Dry recyclables: 1,100 litre Eurobins

- Compostable (without garden waste): 240 litre wheeled bins
- 4.7 Table 4.2 below details the dimensions of the bin type proposed for use in the residential element of the scheme.

Table 4.2 Domestic waste storage dimensions

	1,100 litre Eurobin	240 litre wheeled bin
Height (mm)	1,475	1,100
Width (mm)	1,250	580
Depth (mm)	980	740

4.8 The table below shows the number of Eurobins required in each location, and the associated minimum area required for the bin store, excluding circulation space. The below assumes both residual and recycling waste streams will be collected by the Council on a weekly basis.

Table 4.3 Domestic waste storage requirements

Location	Storing refuse for blocks	No. of dwellings	No. of 1,100 litre residual Eurobins	No. of 1,100 litre recycling Eurobins	No. of 240 litre wheeled bins	Min. area of store (m²) (excluding circulation space)
Α	A1, A2, A3, A4	155	16	16	6	54.51
В	B1	38	4	4	2	13.99
С	C1	33	4	4	2	13.99
D1	D1	56	6	6	2	20.26
D2	D2	58	6	6	2	20.26
E1	E1, E2, E3	142	15	15	5	50.65
E2 (Central Waste Store)	B1, C1, D1, D2	185	20	20	8	68.51
F1	F1	57	6	6	2	20.26
F2	F2, F3	89	9	9	3	30.39

4.9 Locations of the bin storage areas, where all bins will be stored, are shown in Appendix A2. As demonstrated in Table 4.3 above, a total of nine waste storage locations will be provided, with weekly

waste arisings to be collected by the Council's waste operatives from five of these locations on a weekly basis, accounting for a weekly transfer of waste from Blocks B, C and D to the waste storage area provided within Block E by the estate management team. It should be noted that the number of waste containers located within the refuse store in Core E2 (Central Waste Store) is equal to the total number of waste containers to be provided for Blocks B, C and D, as the waste containers located within Blocks B, C and D will be transferred to the Central Waste Store once per week to enable the collection of the waste by the Council.

- 4.10 As required by the Council, the bin storage areas are within 30m walking distance of the front door of the blocks. Collection vehicles will have clear access to any bin, with waste operatives required to manoeuvre the bins no more than 10m from the external door of the storage areas to the refuse collection vehicle. As noted above, in order to ensure the Council's waste operatives are not required to manoeuvre Eurobins in excess of 10m, it is intended that waste collected in Blocks B, C and D will be transferred to a waste storage area within Block E on a weekly basis by the estate management team where it will be collected by the Council's waste operatives on a weekly basis.
- 4.11 The turning circle for the vehicle is quoted as 18.0 metres and in-roads are able to accommodate this. The area where the vehicle will be stationed for collections will be appropriately surfaced to withstand the weight of the collection vehicle. Details of the collection vehicle are provided in Appendix A3.

Non-Domestic Operational Waste Management Strategy

4.12 Approximately 494 sqm of commercial space in the form of flexible community space and a café is to be delivered as part of the Proposed Development. Based on the information provided in BS 5906:2005 and by Rolfe Judd Architecture, the waste arisings from the non-residential elements are provided in the table below. Full details of the calculations are provided in Appendix A4.

Table 4.4 Non-domestic weekly waste arising

Location	Use	NIA Type Weekly (m²) waste		,	Proportion of waste stream			
				volume (litres)	Residual	Recycling	Food	
Block A	Flexible Community Use	394	Industrial	1,970	50%	50%	-	
Block F	Café	100	Restaurant	2,510	50%	20%	30%	

4.13 The bins will be located within the curtilage of the flexible community and café spaces and will be accessible to waste collection operatives. 1,100 litre Eurobins will be provided for the storage of waste arising from both the café and the flexible community space. The dimensions of these bins are provided below:

 Table 4.5
 Non-domestic waste storage dimensions

	1,100 litre Eurobin		
Height (mm)	1,370		
Width (mm)	1,280		
Depth (mm)	980		

4.14 The resulting non-domestic waste storage requirements are provided below. For the purposes of this waste management strategy, a weekly collection rate has been assumed.

Table 4.6 Non-domestic waste storage requirements

Location	Uses Served	Number of 1,100 litre Eurobins			Min. area of store (m²)
		Residual	Recycling	Food	
Block A	Flexible Community Space	1	1		3.97
Block F	Café	2	1	1	7.94

4.15 In accordance with BS 5906:2005, all waste containers will need to be stored under cover in a specially designed waste storage room, or store. The walls and roofs of this store will be formed of non-combustible, robust, secure and impervious material, and have a fire resistance of one hour when tested in accordance with BS 476-21 – Fire tests on building materials and structures: Part 21 (Ref. 40), whilst the door of the store will be made of steel, or have a fire resistance of 30 minutes when tested in accordance with BS 476-22 – Fire tests on buildings materials and structure: Part 22 (Ref 41).

- 4.16 Further to these requirements, BS 5906:2005 outlines the measures which have been included in the design of the waste stores. Compliance with these requirements, the most applicable of which are outlined below, will help maintain a compliant waste strategy for the operation of the Proposed Development.
 - All containers for waste, including recyclable material, are easily accessible to both the occupier and waste collector;
 - Collectors will not have to manoeuvre waste storage containers from the storage areas to the collecting vehicles for a distance of more than 10m (four wheeled bins) or 15m (two wheeled bins);
 - Paths between storage areas and collecting vehicles are free from steps, kerbs or inclines with a gradient of more than 1:12, be non-slip and a minimum of 2m wide. They will have foundations and a hardwearing surface that will withstand the loading imposed by wheeled containers;
 - Waste stores have been designed and located in such a way as to limit potential noise disturbance to residents;
 - Storage areas for waste and recycling will be clearly designated for this use only, by a suitable door or wall sign and, where appropriate, with floor markings;
 - Waste storage sites will include areas for instructional signage detailing correct use of the facilities;
 - The entrance of the waste storage room will be free from steps and projections;
 - Adequate ventilation will be provided, with permanent ventilators giving a total ventilation area of no less than 0.2m²;
 - Electrical lighting will include sealed bulkhead fittings (housings rated to IP65 in BS EN 60529:1992 (Ref. 43)) for the purpose of cleaning down with hoses and inevitable splashing.
 Luminaires will be low energy light fittings or low energy lamp bulbs, controlled by proximity detection or a time delay button to prevent lights being left on; and
 - Gullies for wash down facilities will be positioned so as not to be in the track of container trolley wheels.

5. SUMMARY

- 5.1 With reference to the policy requirements, guidance and industry best practice detailed in Section 3, a comprehensive Operational Waste Management Strategy has been defined for the Proposed Development.
- 5.2 The Proposed Development has been designed with high standards of waste management performance. This strategy describes the consideration that has been given to waste generated by the Proposed Development during its operation, including how it will be sorted, stored and collected, therefore contributing towards the Council's targets for waste minimisation, recycling and reuse.
- 5.3 The strategy has been prepared to demonstrate that tenants and occupiers of the Proposed Development will be provided with convenient and effective waste management systems that will promote high levels of recycling and ease of collection by the Council.
- 5.4 An Operational Waste Management Strategy utilising traditional wheeled bins is proposed. The Proposed Development is anticipated to produce approximately 155,744 litres of waste from residential uses per week.
- 5.5 Residential waste storage will consist of separate 1,110 litre Eurobins for refuse and dry recyclables, and 240 litre wheeled bins for compostable waste, in accordance with local authority guidance. Waste stores have been located within the curtilage of the residential blocks at ground level to ensure easy access for both residents and waste collection operatives.
- 5.6 The Proposed Development will include commercial space in the form of flexible community space and a café. These spaces are anticipated to produce approximately 4,480 litres of refuse, recycling and food waste per week. Waste storage for these commercial spaces will consist of 1,100 litre Eurobins to be collected by a contractual arrangement. The waste storage areas will be located within the curtilage of the buildings for ease of use and to ensure accessibility for commercial waste collection operatives.
- 5.7 This Strategy therefore demonstrates that the Proposed Development has also been designed to be compliant with all relevant waste management policy, and will manage and dispose of waste in a sustainable manner.

A1. SITE PLAN



A2. GROUND FLOOR PLAN



A3. REFUSE COLLECTION VEHICLE SPECIFICATIONS

Sufficient room should be allowed to manoeuvre and load a vehicle of the following dimensions:

- Length = 11 metres
- Width = 2.5 metres
- Height = 3.5 metres
- Turning circle = 18.0 metres

A fully laden collection vehicle will weigh approximately 26 tonnes. The access road therefore must have a road surface that is able to hold a vehicle of this size.

Overhead service cables, pipes, archways and other potential obstacles must be at least 7 metres from ground level.



A4. NON-DOMESTIC WASTE CALCULATIONS

Location	Use	Area (sqm)	Class	BS5906 metric	Equation	Volume (I)	Residual proportion	Recycling proportion	Food proportion	Residual 1,100 litre Eurobins	Recycling 1,100 litre Eurobins	Food 1,100 litre Eurobins	Footprint (m²)
Block A	Flexible Community Space	394.0	Industrial	No. of pupils	Volume per m² floor area [5 l] x floor area	1,970	50%	50%		1	1		3.97
Block F	Café	100.4	Restaurant	No. covers	Volume per number of covers [75 I]	2,510	50%	20%	30%	2	1	1	7.94

A5. GENERAL NOTES

- A5.1 The report is based on information available at the time of the writing and discussions with the client during any project meetings. Where any data supplied by the client or from other sources have been used it has been assumed that the information is correct. No responsibility can be accepted by Iceni Projects Ltd for inaccuracies in the data supplied by any other party.
- A5.2 The review of planning policy and other requirements does not constitute a detailed review. Its purpose is as a guide to provide the context for the development and to determine the likely requirements of the Local Authority.
- A5.3 No site visits have been carried out, unless otherwise specified.
- A5.4 This report is prepared and written in the context of an agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in guidance may necessitate a re-interpretation of the report in whole or in part after its original submission.
- A5.5 The copyright in the written materials shall remain the property of Iceni Projects Ltd but with a royaltyfree perpetual licence to the client deemed to be granted on payment in full to Iceni Projects Ltd by the client of the outstanding amounts.
- A5.6 The report is provided for sole use by the Client and is confidential to them and their professional advisors. No responsibility whatsoever for the contents of the report will be accepted to any person other than the client, unless otherwise agreed.
- A5.7 These terms apply in addition to the Iceni Projects Ltd "Standard Terms of Business" (or in addition to another written contract which may be in place instead thereof) unless specifically agreed in writing. (In the event of a conflict between these terms and the said Standard Terms of Business the said Standard Terms of Business shall prevail). In the absence of such a written contract the Standard Terms of Business will apply.

Procedure: Waste Management

Introduction

This procedure outlines how the Berkeley Group shall manage waste arising on construction sites. This procedure follows the recycling and waste disposal elements of the waste hierarchy.

For further information regarding the waste hierarchy please see the Waste Reduction Procedure.

Berkeley operating companies have targets to reduce the waste arising from construction activities in accordance with Berkeley Group Our Vision targets.

To assist teams in the delivery of these targets, all projects are required to complete a Project Waste Management Plan (PWMP). Details on completion and responsibilities are set out in this procedure.

Responsibilities

The Technical. Commercial and Construction teams are responsible for completing parts of the PWMP; this document should remain live and any pertinent changes included as the project progresses.

The Commercial and Construction Teams are responsible for ensuring this procedure is implemented on site and ensuring that contractors and operatives work in accordance with it.

The Commercial Team must discuss with any logistics contractors (where relevant) Berkeley Group requirements relating to waste.

Method

Project Waste Management Plan (PWMP)

- 1. A PWMP is completed for all Berkeley Group projects and sets out a process for the following:
 - Minimising waste production through technical, procurement and construction decisionmaking processes.
 - Managing waste efficiently on site, including the segregation of waste streams where possible.
 - Diverting waste from landfill, through either re-use or recycling.
- 2. The document sets out waste targets for the project based on the type of build, floor area etc. and is used not only as a management tool but for evidence submissions within BREEAM assessments. This procedure should be reviewed in conjunction with the Waste Paperwork Procedure and Waste Reduction Procedure.

Technical

- 3. The 'Project Details Tab' should be completed as much as possible by the Technical Team. This should include input from the Land and Planning team regarding the methodologies for waste reduction proposed by the project Design Team.
- 4. The 'Project Details Tab' may require further review as the project progresses or if amendments are made to the original project proposal (through optimisation, value engineering etc.).
- 5. The 'Waste Minimisation and Management' tab should also be completed based on how waste minimisation has been considered and implemented during the design stage. This includes information on the demolition of existing buildings or structures, and measures taken to reduce non-hazardous and hazardous waste during design.

- 6. The Technical Team are also required to work with the Design Team to reduce at least three waste groups / streams specific to the development and confirm in the PWMP how they have been minimised during design.
- 7. The Technical team should review in conjuction with the Commercial Team and complete the information on the 'Predictions and Targets Tab' and select the number of BREEAM credits targeted by the project (where commercial and/or other relevant spaces are included in the development). The number of credits targeted under the Waste Section of BREEAM must be confirmed with the Sustainability Advisor / Manager.

Commercial

- 8. The Commercial Team should review the 'Waste Minimisation and Management Tab' in conjunction with the Technical team and include any waste minimisation measures incorporated into the project through procurement and/or engagement with contractors. This should be completed in relation to both hazardous and non-hazardous waste.
- 9. Where a demolition contractor has been employed on the project, specifics about how they will reduce waste during this process should be detailed on this tab.
- 10. The Commercial Team should review the waste predictions set out in the 'Predictions and Targets Tab' and amend where appropriate based on understanding of the project. Waste estimations should be sought from all key contractors to help feed into the waste predictions for the project.

Build

- 11. The Construction Team should review the 'Waste Minimisation and Management Tab' and include any waste minimisation measures incorporated by the project during production. This should include the details of any specific provisions to enable the reduction / segregation of waste on site.
- 12. The Construction Team should review the waste predictions set out in the 'Predictions and Targets Tab' and amend where appropriate based on understanding of the project.

Review and Lessons Learnt

- 13. The PWMP should be reviewed at least once a quarter to ensure that any relevant changes to waste production and management are included. Ahead of the project going into build the Technical and Commercial team should lead the review. Once the project is in build, the Construction team should lead the review process, with input as required from the Technical and Commercial teams.
- 14. Updates could relate to the following:
 - Administration (changes to the Project Team or changes to Group requirements / Our Vision commitments)
 - Changes on site (addition of a logistics contractor, change from hazardous material to nonhazardous alternative).
 - Predictions (where appropriate, based on any amendments to the design, inclusion of revised estimates from contractors).
- 15. All revisions should be logged in the appropriate section of the 'Project Details Tab'.
- 16. A post completion review of the Waste Data Tool should be completed and lessons learnt regarding waste management circulated across the project / division.

On Site Management











Recycling of Materials

- 17. The Production Team are responsible for segregating key waste streams, where logistics allow, this would normally include but is not limited to timber, metal, inert and office paper. These waste streams should be recycled where possible. (Note: it is a legal requirement to segregate liquid waste, hazardous waste, and waste electrical and electronic equipment (WEEE) waste).
- 18. The PWMP completed for the project should be reviewed, every three months, to ensure waste management is being completed in accordance with the document; any revisions should be made as necessary (see guidance above).
- 19. On site segregation is preferred, as dedicated recycling facilities often have higher percentage rates of recycling than that of material recovery facilities (MRFs). On sites where waste is sent to a MRF a breakdown of the waste received should be requested monthly to assist with reporting through the Waste Data Tool (See Waste Paperwork Procedure for further information). The breakdown information received should be project specific to enable analysis against known activities occurring on site.
- 20. All sites have a Duty of Care to ensure plasterboard waste is segregated to avoid disposal in general landfill. Preference is for on site segregation. Where plasterboard waste is segregated at an off-site facility, due to space constraints etc. confirmation from the relevant contractor regarding disposal alongside other wastes must be obtained. Plasterboard waste should be recycled where possible. Any specific requirements of the receiving end destination should be followed.

Disposal of Waste / Waste Management

- 21. Disposal of waste to landfill should only be carried out if no other options are available. The Commercial Team are responsible for clearly communicating our requirements regarding diversion from landfill to any contractor responsible for removing waste from site; this includes the logistics contractor or individual contractors responsible for removing their own waste from site. Requirements should be included in the contracts for any relevant packages.
- 22. End destinations shoul be provided by the logistics contractor or individual contractors responsible for removing their own waste from site, before they start on site, and updated as required. See Waste Paperwork Procedure for further details.
- 23. Any hazardous waste produced on site should be segregated in a clearly labelled and suitable container. This includes items such as used spill kits and empty COSHH containers. See point 26 below regarding suitability of containers and waste storage areas.
- 24. Other wastes that must legally be segregated ahead of disposal include waste electric and electronic equipment (WEEE), sanitary waste and liquid wastes. A strategy regarding plasterboard segregation must be set for project in accordance with end destination (see Point 20 and the Waste Paperwork Procedure for further details relating to plasterboard segregation options).
- 25. Provisions must be in place for the storage and disposal of liquid wastes, such as effluent from temporary toilets, waste cooking oil from canteens and waste hazardous liquids. Appropriate storage space must be available for ahead of removal from site; with removal arranged at the earliest opportunity to limit storage time on site.
- 26. Storage areas and containers must guarantee the effective containment of waste streams (i.e. bunded, secure, watertight). The requirements for appropriate storage will differ depending on the waste stream and where unsure, consultation with your Sustainabiltiy Advisor / Manager should be undertaken. Waste should not be stored on site for prolonged periods of time and must not exceed 12 months.

- 27. Where a site has oily water (from drip trays etc.) an oil segregation system such as an 'oily pig' should be used on site to treat the water and avoid large volumes of water being disposed of as hazardous liquid waste. The oily absorbent materials must be disposed of as hazardous waste (see Hazardous Waste Management Procedure). The manufacturer guidelines must be followed when using an 'oily pig' system; this includes any set volume of water filtration limits and regularly checking the water leaving the filtration system for hydrocarbons to ensure it is functioning correctly and absorbing the oil ahead of disposal.
- 28. Any contaminated soil being stored / stockpiled, should be segregated, situated on an impermeable membrane and covered. If no on-site treatment is to be undertaken then this should be removed from site at the earliest opportunity. Options for on site remediation and treatment of contaminated soils should be considered by the site team (see Waste Reductionand Reuse Procedure for information).
- 29. It must be ensured that end disposal facilities accepting hazardous waste and contaminated soil are legally able to do so (see Hazardous Waste Management Procedure for more information).
- 30. All skips and waste containers should be stored away from site boundaries, any nearby or on site watercourses or other sensitive receptors. Housekeeping around these should be of a good standard.
- 31. Waste arising from road sweeper activities must be disposed of appropriately, with no tipping on site. Please see Road Sweeping and Wheel Washing (Wash water) Procedure for more information.
- 32. The production team should ensure that correct segregation and management of waste on site is communicated to operatives during the site induction and periodic Toolbox Talks.

Additional Information

- 33. There are a number of documents and records that need to be obtained and maintained by all Berkeley Group projects; including the Form: Waste Data Tool, see the Waste Paperwork procedure for more information. The Waste Data Tool requires all waste streams to be reported, including those placed in mixed skips. Where project specific waste stream reports are not available, visual estimations of the waste stream breakdown within mixed waste skips should be noted as the skip leaves site.
- 34. Note: As a good practice measure, periodic checks should be undertaken to confirm waste is being taken to the stated location. This could include following the waste carrier and/or telephoning the disposal site to confirm receipt of a waste load.
- 35. A specific procedure has been drafted relating to Hazardous Waste Management.

Documentation and Records

The following documentation and records should be kept by the project:

- Form:Project Waste Management Plan
- Form: Waste Data Tool
- Waste Transfer Notes/ Waste Carriers License's/ End Destination Permits.

Supporting Documentation

The following SMS documents support this procedure:

- Hazardous Waste Management procedure
- Waste Reduction Procedure











- Waste Paperwork Procedure
- **Demolition Procedure**
- Completing the Project Waste Management Plan
- Introduction to Resource Consumption
- Road Sweeping and Wheel Washing (Wash water)

Further Information

Further information can be found:

- Government Guidance on the Waste Hierarchy (https://www.gov.uk/government/publications/guidance-on-applying-the-waste-hierarchy)
- Government Guidance Note (WEEE Waste Regulations 2013)
- Government guidance on Waste Management (https://www.gov.uk/topic/environmentalmanagement/waste).

Revision Register

Date	Section	Description	Version
July 2017	All	Procedure Written	1.0











The draft consultation version of the template has been updated as follows:

Template tab	Details
	Principle 1 expanded to require further details on pre-construction demolition
Pre-app information	and options explored for retaining existing buildings/structures.
	Removal of Y/N option next to each WLC reduction principle.
	Confirmation of operational modelling process used
	Confirmation relating to proportion of material quantities included relating to cost
	Confirmation of third party mechanisms
	Confirmation that the assessment has or can be submitted to the Built
	Environment Carbon Database
	Updated assessment summary results to align with new WLC benchmarks
Outline and Detailed alexanics of Change & Deat	Addition of selection of most comparable WLC benchmark selection
Outline and Detailed planning Stage & Post-	Addition of details relating to retention of existing structures and buildings
construction result	Updated note/example text for module B assumptions and end of life scenarios
	in the 'Material Quantity and End of Life Scenarios' table
	Addition of details relating to refrigerants to 'Material Quantity and End of Life
	Scenarios' table
	Addition of option in assessment table to report A5 emissions as a single
	number or A5 emissions not related to a building element category
	Removal of assessment 2
	Colour coding to reflect cells that require inputs and cells which are updated
	automatically
	Addition of confirmation relating to post-construction evidence submission
Post-construction result	Addition of list of product specific EPDs from products installed in the building

Greater London Authority - Whole Life-Cycle Carbon (WLC) Assessment template

HOW TO USE THIS SPREADSHEET

This template should be used by planning applicants to fulfil the requirements of the Mayor's Whole Life-Cycle Carbon (WLC) Assessment policy set out in London Plan Policy SI 2. Before completing and submitting this spreadsheet to the GLA, applicants should read the Whole Life-Cycle Carbon Assessment guidance:

https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/london-plan-guidance/whole-life-cycle-carbon-assessments-guidance

Applicants are required to submit a WLC assessment to the GLA at the following three stages: pre-application, outline/detailed planning submission and post-construction. Separate tabs are provided in this spreadsheet for each stage. An outline of the information required at each stage and how to submit it is provided below.

1. Pre-application stage

At pre-application stage, applicants are required to complete the pre-application information tab of this template to confirm various details about the site and to provide details of the WLC principles which are informing the development of the site. This should be submitted to the GLA along with all other pre-application material.

2. Outline/detailed planning submission stage

At this stage, applicants are required to complete the outline or detailed planning stage tab of this template (whichever is relevant) and submit it to the GLA along with their planning application. This stage of the process requires a baseline WLC assessment against each life-cycle module to be undertaken.

3. Post-construction stage

At the final stage of the WLC assessment process, applicants should complete the post-construction result tab of this template and submit it to the GLA prior to occupation of the development. This will require an update of the information provided at planning submission stage and for the actual WLC carbon emission figures to be reported using actual material quantities and site emissions during construction. Information should be submitted to:

ZeroCarbonPlanning@london.gov.uk

QUERIES

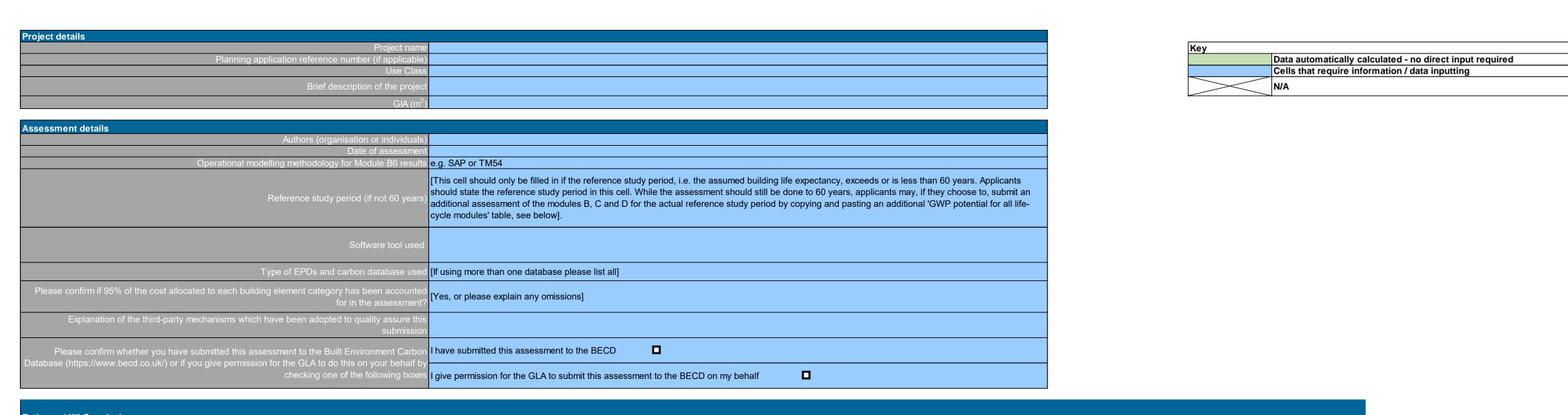
Any queries or feedback on this template should be submitted to:

ZeroCarbonPlanning@london.gov.uk

Project details	
Project name	
Planning application reference number (if applicable)	
Use Type	
Brief description of the project	
GIA (m ²)	
Authors (organisation or individuals)	
Date of assessment	

	WLC reduction principles	Key benefits	Provide examples of how reduction princ	iple has been used, or give reasons why it cannot be used.
			Confirmation that options for retaining existing buildings and structures have been fully explored before considering substantial demolition	[Outline the options that have been considered - plus an explanation of opportunities and limitations, and why demolition outweighs the benefits of retaining existing buildings/structures where applicable]
1	Reuse and retrofit of existing buildings	Significant retention and reuse of structures is carbon efficient and reduces construction costs.	Carbon emissions associated with pre- construction demolition (kgCO ₂ e)	[If estimates are not possible, please apply standard assumption of 50kgCO ₂ e/m ² of the existing building/s]
			Estimate of the percentage of the new build development which will be made up of existing elements	[e.g. X% existing facades; Y% existing foundations; Z% superstructures etc.]
2	Use repurposed or recycled materials	Reduces waste and carbon emissions.		
3	Material selection	Appropriate material choices are key to carbon reduction. Ensuring that materials are selected with consideration of the planned life expectancy of the building reduces waste, the need for replacements and the in-use costs.		
4	Minimise operational energy use	A 'fabric first' approach should be prioritised to minimise energy demand and reduce carbon and in-use costs.		
5	Minimise the carbon emissions associated with operational water use	Choice of materials and durability of systems, which help to avoid leakage and subsequent building damage, contribute to reducing the carbon emissions of water use.		
6	Disassembly and reuse	Designing for future disassembly ensures that products do not become future waste and that they maintain their environmental and economic value.		
7	Building shape and form	Compact efficient shapes help minimise both operational and embodied carbon emissions from repair and replacement for a given floor area. This leads to a more efficient building overall resulting in lower construction and in use costs.		
8	Regenerative design	Removing carbon emissions from the atmosphere through materials and systems absorbing it makes a direct contribution to carbon reduction.		

9	Designing for durability and flexibility	Durability means that repair and replacement is reduced which in turn helps reduce life-time building costs. A building designed for flexibility can respond with minimum environmental impact to future changing requirements and a changing climate, thus avoiding obsolescence which also underwrites future building value.	
10	Optimisation of the relationship between operational and embodied carbon	Optimising the relationship between operational and embodied carbon contributes directly to resource efficiency and overall cost reduction.	
11	Building life expectancy	Defining building life expectancy gives guidance to project teams as to the most efficient choices for materials and products. This aids overall resource efficiency, including cost efficiency and helps future proof asset value.	
12	Local sourcing	Sourcing local materials reduces transport distances and supply chain lengths and has associated local social and economic benefits.	
13	Minimising waste	Waste represents unnecessary and avoidable carbon emissions. Buildings should be designed to minimise construction waste, and to ease repair and replacement with minimum waste, which helps reduce initial and in-use costs.	
14	Efficient construction	Efficient construction methods (e.g. modular systems, precision manufacturing and modern methods of construction) can contribute to better build quality, reduce construction phase waste and reduce the need for repairs in the post completion and the defects period (snagging).	
15	Lightweight construction	Lightweight construction uses less material which reduces the carbon emissions of the building as there is less material to source, fabricate and deliver to site.	
16	Circular economy	The circular economy principle focusses on a more efficient use of materials which in turn leads to carbon and financial efficiencies.	



imated WLC emissions 3. This forms the WLC baseline for the development. The green cells will automatically populate from the tables below										
	Module A1-A5 (excluding sequestered carbon)	Modules B-C (excl B6 & B7)	Modules A-C (excluding B6-B7; including sequestered carbon)	Module B1-B5	Module B6-B7	Module C1-C4	Module D			
TOTAL kg CO₂e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	#VALUE!	0 kg CO2e	0 kg CO2e			
TOTAL kg CO₂e/m² GIA	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#VALUE!	#DIV/0!	#DIV/0!			
Please select most appropriate benchmark from drop-down menu		Residential								
WLC Benchmark	<850	<350	<1200							
Aspirational WLC Benchmark	<500	<300	<800							

etention of existing buildings and structures		
	[Outline the options that have been considered - plus an explanation of opportunities and limitations, and why demolition retaining existing buildings/structures where applicable]□	outweighs the benefits of
Carbon emissions associated with pre-construction demolition (kgCO₂e)	[If estimates are not possible, please apply standard assumption of 50kgCO ₂ e/m ² of the existing building/s]	
Estimate of the percentage of the new build development which will be made up of existing elements	[e.g. X% existing facades; Y% existing foundations; Z% superstructures etc.]	
	Actions included in WLC assessment results reported	WLC reduction (kg CO₂e/m² GIA)
, <u>,</u>	[This list does not need to be exhaustive but should identify the actions with the biggest impacts. Insert more lines if needed]	
	Further potential opportunities	WLC reduction potential (kg CO₂e/m² GIA)
pecify further opportunities to reduce the development's whole life-cycle carbon missions, including the WLC reduction potential	[Insert more lines as needed]	

ATERIAL QU	UANTITY AND END OF LIFE SCENARIOS	Product and Construct	tion Stage (Module A)	Assumptions made with respect to		Benefits and load boundary	s beyond the system (Module D)	
uilding elem	nent category	Material type	Material quantity (kg)	maintenance, repair and replacement cycles (Module B)	Material 'end of life' scenarios (Module C)	Estimated	Estimated recyclable materials (kg)	
	Note/example	e.g. Concrete	65000 kg	For all primary building systems (structure, substructure, envelope, MEP services, internal finishes) including assumed material/product lifespans and annual	Declare 'end of life' scenario as per project's Circular Economy Statement, and used in the WLC assessment to produce Module C results		25 kg	
		e.g. Reinforcement e.g. Formwork	5000 kg 250 kg	maintenance/repair %	1.55	2 kg 0 kg	8 kg 0 kg	
0.1	Demolition: Toxic/Hazardous/Contaminated Material Treatment							Please add rows where more than 1 material type exists per building element cat
0.2	Major Demolition Works							
0.3	Temporary Support to Adjacent Structures							
0.4	Specialist Ground Works							
1	Substructure							
2.1	Superstructure: Frame							
2.2	Superstructure: Upper Floors							
2.3	Superstructure: Roof							
2.4	Superstructure: Stairs and Ramps							
2.5	Superstructure: External Walls							
2.6	Superstructure: Windows and External Doors							
2.7	Superstructure: Internal Walls and Partitions							
2.8	Superstructure: Internal Doors							
3	Finishes							
4	Fittings, furnishings & equipment (FFE)							
5	Services (MEP)							
6	Prefabricated Buildings and Building Units							
7	Work to Existing Building							
8	External works							
efrigerants		Refrigerant name	Initial quantity/charge (kg)	Assumed annual leakage rate %	Refrigerant GWP (kgCO₂e/kg) End of Life recovery rate %			
а	Refrigerants Type 1 (if applicable) - please see CIBSE TM65 for methodology							Please add rows if required
b	Refrigerants Type 2 (if applicable) - please see CIBSE TM65 for methodology							
С	Refrigerants Type 3 (if applicable) - please see CIBSE TM65 for methodology							
		TOTAL	0 kg			0 kg	0 kg	_
		Material intensity (kg/m2 GIA)	#DIV/0!			#DIV/0!	#DIV/0!	

GWP POTENTIAL FOR ALL LIFE-CYCLE MODULES (kgCO₂e) (See Note 1 below if you entered a reference study period in cell C12)	Sequestered (or biogenic) carbon	Product stage (kgCO₂e)	Construction process	ss stage (kgCO₂e)				Use stage (kgCO₂e))			End of L	ife (EoL) stage (kgCO₂e)	TOTAL Modules A-C	Benefits and loads beyond the system boundary (kgCO ₂ e)
	(negative value) (kgCO₂e)		Module A					Module B					Module C	kgCO₂e	
Building element category		[A1] to [A3]	[A4]	[A5]	[B1]	[B2]	[B3]	[B4]	[B5]	[B6]	[B7]	[C1]	[C2] [C3] [C4	ıj	Module D
0.1 Demolition: Toxic/Hazardous/Contaminated Material Treatment												[Where only a single C1- C4 is known, please		0 kg CO2e	
0.2 Major Demolition Works												[Where only a single C1- C4 is known, please		0 kg CO2e	
0.3 Temporary Support to Adjacent Structures											/	[Where only a single C1- C4 is known, please		0 kg CO2e	
0.4 Specialist Ground Works												[Where only a single C1- C4 is known, please		0 kg CO2e	
0.5 Temporary Diversion Works												[Where only a single C1- C4 is known, please		0 kg CO2e	
1 Substructure												[Where only a single C1- C4 is known, please		0 kg CO2e	
2.1 Superstructure: Frame												[vvnere only a single C1- C4 is known, please		0 kg CO2e	
2.2 Superstructure: Upper Floors												where only a single C1- C4 is known, please		0 kg CO2e	
2.3 Superstructure: Roof												include it here! [where only a single C1- C4 is known, please		0 kg CO2e	
2.4 Superstructure: Stairs and Ramps												where only a single C1- C4 is known, please		0 kg CO2e	
2.5 Superstructure: External Walls												include it here? [where only a single C1- C4 is known, please		0 kg CO2e	
2.6 Superstructure: Windows and External Doors												Where only a single C1- C4 is known, please		0 kg CO2e	
2.7 Superstructure: Internal Walls and Partitions												[Where only a single C1- C4 is known, please		0 kg CO2e	
												[Where only a single C1-		0 kg CO2e	
2.8 Superstructure: Internal Doors												C4 is known, please [Where only a single C1-			
3 Finishes												C4 is known, please include it here! where only a single C1-		0 kg CO2e	
4 Fittings, furnishings & equipment												C4 is known, please include it here! [Where only a single C1-		0 kg CO2e	
5 Services (MEP)										Regulated emissions Unregulated emissions	Operational Water	C4 is known, please [where only a single C1-		0 kg CO2e	
6 Prefabricated Buildings and Building Units												C4 is known, please include it here! [Where only a single C1-		0 kg CO2e	
7 Work to Existing Building												C4 is known, please [vvnere only a single C1-		0 kg CO2e	
8 External works												C4 is known, please		0 kg CO2e	
Other site construction impacts or overall construction stage [A5] carbon emissions not specific individual building element cate	to an egory													0 kg CO2e	
TOTAL kg (CO₂e 0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	#VALUE!	Operational Water	0 kg CO2e	0 kg CO2e 0 kg CO2e 0 kg C	0 kg CO2e	0 kg CO2e
TOTAL kg CO ₂ e/m ²	² GIA #DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#VALUE!	#VALUE!	#DIV/0!	#DIV/0! #DIV/0! #DIV	//0! #DIV/0!	#DIV/0!

Notes:

1 If you have entered a reference study period in cell C12 because the assumed building life expectancy is greater or less than 60 years, then you will need to fill in this table using a 60 year building life expectancy. If you choose to, you may create a second table below and complete it using the actual assumed life expectancy. This should be clearly labelled.

End of Life (EoL) stage (kgCO₂e) Module C	TOTAL Modules A-C kgCO₂e	Benefits and loads beyond to system boundary (kgCO₂e
Module C [C1] [C2] [C3]	Modules A-C kgCO ₂ e [C4] 0 kg CO2e	Benefits and loads beyond to system boundary (kgCO ₂ e) Module D
Module C [C1] [C2] [C3]	Modules A-C kgCO₂e [C4] 0 kg CO2e 0 kg CO2e 0 kg CO2e 0 kg CO2e	Module D
Module C [C1] [C2] [C3]	Modules A-C kgCO ₂ e	Module D
Module C [C1] [C2] [C3]	Modules A-C kgCO ₂ e	Module D
Module C [C1] [C2] [C3]	Modules A-C kgCO₂e [C4] 0 kg CO2e 0 kg CO2e	Module D
Module C [C1] [C2] [C3]	C4]	Module D
Module C [C1] [C2] [C3]	C4] Modules A-C kgCO ₂ e	Module D
Module C	Modules A-C kgCO ₂ e	Module D
C1] C2] C3	C4]	Module D
reconly a single C1- 4 is known, please include it bargle C1- 4 is known please include it bargle C1- 4 is known please	C4]	Module D Module D
Col	C4]	Module D Module D
GC1] [C2] [C3] Pere only a single C1- It is known, please Include it baral	C4]	Module D Module D
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Data automatically calculated - no direct input required

Cells that require information / data inputting

Estimated WLC emissions N.B. This forms the WLC baseline for the development. The green cel	ls will automatically populate from the tables below						
	Module A1-A5 (excluding sequestered carbon)	Modules B-C (excl B6 & B7)	Modules A-C (excl B6 & B7; including sequestered carbon)	Module B1-B5	Module B6-B7	Module C1-C4	Module D
TOTAL kg CO₂e	34,279,776 kg CO2e	20,542,656 kg CO2e	53,153,126 kg CO2e	18,038,384 kg CO2e	23,729,981 kg CO2e	2,504,272 kg CO2e	-11,687,835 kg CO2e
TOTAL kg CO ₂ e/m ² GIA	578.864	346.893	897.569	304.605	400.716	42.288	-197.366
Please select most appropriate benchmark from drop-down menu		Residential					
WLC Benchmark	<850	<350	<1200				
Aspirational WLC Benchmark	<500	<300	<800				
	The proposed development is performing better than G on current information available	LA benchmarks for all modules and is therefor	re compliant with London Policy SI 2. The results de	emonstrate that the development	has taken account of relevant pol	icy and reduced emissions as far as	reasonably possible based

Confirmation that options for retaining existing buildings and structures have been fully explored before considering substantial demolition have been fully explored before considering substantial demolition.

Carbon emissions associated with pre-construction demolition (kgCO₂e)

Estimate of the percentage of the new build development which will be made up of existing elements

		Actions included in WLC assessment results reported	WLC reduction (kg CO ₂ e/m ² GIA)
	Summary of <u>key actions</u> to reduce whole life-cycle carbon emissions that have informed this assessment, including the WLC reductions	All end of life scenarios for concrete and bricks to be reused where possible	2
		90% recycled steel content in floor constructions	13.24
		Ahead of issuing is with relevant project information, the stuctural engineer undertook optimisation workshops to ensure all substructure and framing elements were as low as possible in terms of embodied carbon. When compared to a standard baseline the savings of this optimisation are significant.	68.87
		Use of pre-fab balconies opposed to in situ concrete	9.1

Specify further opportunities to reduce the development's whole lifecycle carbon emissions. including the WLC reduction potential

Reducing transport procurement to within 50km of the site
Use of a brick with 90% recycled content in place of the standard red brick

WLC reduction potential (kg
CO₂e/m² GIA)

Reducing transport procurement to within 50km of the site
Use of a brick with 90% recycled content in place of the standard red brick

30.53

ATERIAL OU	ANTITY AND END OF LIFE SCENARIOS	Product and Construction St	tage (Module A)			Benefits and loads beyond the sys	etem houndary (Module I
uilding eleme		Material type	Material quantity (kg)	Assumptions made with respect to maintenance, repair and replacement cycles (Module B)	Material 'end of life' scenarios (Module C)	Estimated reusable materials (kg)	Estimated recyclable materials (kg)
	Note/examp	Breakdown of material type in each category [Insert more lines if needed] e.g. Concrete e.g. Reinforcement	65000 kg 5000 kg	For all primary building systems (structure, substructure, envelope, MEP services, internal finishes) including assumed material/product lifespans and annual maintenance/repair %	Declare 'end of life' scenario as per project's Circular Economy Statement, and used in the WLC assessment to produce Module C results	0 kg 2 kg	25 kg 8 kg
0.1	Demolition: Toxic/Hazardous/Contaminated Material	e.g. Formwork	250 kg			0 kg	0 kg
0.2	Treatment Major Demolition Works Temporary Support to Adjacent Structures						
0.4	Specialist Ground Works	Ready-mix concrete, low-strength, generic, C12/15			Consents awahad to assure sate (for sub-lease laways). Doubless		
1	Substructure	(1700/2200 PSI), 0% recycled binders in cement (220 kg/m3 / 13.73 lbs/ft3) Aggregate (crushed gravel), generic, dry bulk density,	552,750 kg	60	Concrete crushed to aggregate (for sub-base layers), Portland Cement 200 kg / m3	552,750 kg	0 kg
		1600 kg/m3 Reinforcement steel (rebar), generic, 90% recycled content, A615	1,920,000 kg 520,250 kg	60	Steel recycling	0 kg 0 kg	0 kg 520,250 kg
		Ready-mix concrete, normal-strength, generic, C30/37 (4400/5400 PSI), 10% (typical) recycled	1,945,684 kg	60	Concrete crushed to aggregate (for sub-base	1,945,684 kg	0 kg
		binders in cement (300 kg/m3 / 18.72 lbs/ft3) EPS Insulation, T: 10-2400 mm, 600 x 1200 mm,	193,118 kg	60	layers), Portland Cement 300 kg / m3 Plastic-based material	0 kg	0 kg
		0.031 W/m2K, 16 kg/m3 (EPS-gruppen) EPS Insulation, T: 10-2400 mm, 600 x 1200 mm, 0.031 W/m2K, 16 kg/m3 (EPS-gruppen)	376,909 kg	60	incineration Plastic-based material incineration	0 kg	0 kg
		Ready-mix concrete, normal-strength, generic, C30/37 (4400/5400 PSI), 10% (typical) recycled	3,618,000 kg	60	Concrete crushed to aggregate (for sub-base layers), Portland Cement 300	3,618,000 kg	0 kg
		binders in cement (300 kg/m3 / 18.72 lbs/ft3) Plastic vapour control layer, 0.2 mm (Tommen Gram)	930 kg	30	kg / m3 Plastic-based material incineration	0 kg	0 kg
		Self levelling mortar, for floors, walls and overhead appl., 3-50 mm, 1400 kg/m3, Pericret (PCI Augsburg)	140,700 kg	60	Cement/mortar use in a backfill	140,700 kg	0 kg
		Reinforcement steel (rebar), generic, 90% recycled content, A615	135,675 kg	60	Steel recycling	0 kg	135,675 kg
2.1	Superstructure: Frame	Reinforcement steel (rebar), generic, 90% recycled content, A615 Reinforcement steel (rebar), generic, 90% recycled	58,320 kg	60	Steel recycling	0 kg	58,320 kg
		content, A615 Ready-mix concrete, normal-strength, generic,	337,680 kg	60	Steel recycling Concrete crushed to aggregate (for sub-base	0 kg	337,680 kg
		C40/50 (5800/7300 PSI), 10% (typical) recycled binders in cement (400 kg/m3 / 24.97 lbs/ft3)	703,080 kg	60	layers), Portland Cement 400 kg / m3	703,080 kg	0 kg
		Ready-mix concrete, normal-strength, generic, C40/50 (5800/7300 PSI), 10% (typical) recycled binders in cement (400 kg/m3 / 24.97 lbs/ft3)	4,142,880 kg	60	Concrete crushed to aggregate (for sub-base layers), Portland Cement 400	4,142,880 kg	0 kg
2.2	Superstructure: Upper Floors	Ready-mix concrete, normal-strength, generic, C30/37 (4400/5400 PSI), 10% (typical) recycled	1,929,600 kg	60	kg / m3 Concrete crushed to aggregate (for sub-base layers), Portland	1,929,600 kg	0 kg
		binders in cement (300 kg/m3 / 18.72 lbs/ft3) Carpet tiles, 5.1mm, 3.765 kg/m2, TESSERA STRUKTUR 1 (Forbo Flooring)	75,300 kg	15	Cement 300 kg / m3 Plastic-based material incineration	0 kg	0 kg
		STRUKTUR 1 (Forbo Flooring) Ready-mix concrete, normal-strength, generic, C30/37 (4400/5400 PSI), 10% (typical) recycled	20,259,648 kg	60	Concrete crushed to aggregate (for sub-base	20,259,648 kg	0 kg
		binders in cement (300 kg/m3 / 18.72 lbs/ft3) Laminated skirting board, biogenic CO2 not	_0,_00,010 Ng		layers), Portland Cement 300 kg / m3		V NY
		subtracted (for CML), 1.05 kg/m, 10-14 mm, height 70- 100 mm, sustainable management, DONNEE PAR DEFAUT (DED)	68,250 kg	15	Plastic-based material incineration	0 kg	0 kg
		Reinforcement steel (rebar), generic, 90% recycled content, A615	96,480 kg	60	Steel recycling	0 kg	96,480 kg
2.2	Cura water rational Daniel	Reinforcement steel (rebar), generic, 90% recycled content, A615 EPS Insulation, T: 10-2400 mm, 600 x 1200 mm,	1,012,982 kg	60	Steel recycling	0 kg	1,012,982 kg
2.3	Superstructure: Roof	0.031 W/m2K, 16 kg/m3 (EPS-gruppen) Glass wool insulation panels, unfaced, generic, L = 0.031 W/mK, R = 3.23 m2K/W (18 ft2°Fh/BTU), 25	6,029 kg	60	Plastic-based material incineration	0 kg	0 kg
		kg/m3 (1.56 lbs/ft3), (applicable for densities: 0-25 kg/m3 (0-1.56 lbs/ft3)), Lambda=0.031 W/(m.K)	28,268 kg	60	Landfilling (for inert materials)	0 kg	0 kg
		Plastic vapour control layer, 0.2 mm (Tommen Gram)	930 kg	30	Plastic-based material incineration Concrete crushed to	0 kg	0 kg
		Ready-mix concrete, normal-strength, generic, C40/50 (5800/7300 PSI), 10% (typical) recycled binders in cement (400 kg/m3 / 24.97 lbs/ft3)	2,894,400 kg	60	aggregate (for sub-base layers), Portland Cement 400	2,894,400 kg	0 kg
		Concrete roof tiles, Avg. thickness per m2: 22.4 mm, 334x420 mm, 2100 kg/m3 (Eternit)	236,376 kg	60	kg / m3 Rebar separated (2 %), concrete to aggregate	236,376 kg	0 kg
		Reinforcement steel (rebar), generic, 90% recycled content, A615 Ready-mix concrete, normal-strength, generic,	144,720 kg	60	Steel recycling	0 kg	144,720 kg
2.4	Superstructure: Stairs and Ramps	C30/37 (4400/5400 PSI), 10% (typical) recycled binders in cement (300 kg/m3 / 18.72 lbs/ft3)	242,400 kg	60	Concrete crushed to aggregate (for sub-base layers), Portland Cement 300 kg / m3	242,400 kg	0 kg
		Ready-mix concrete, normal-strength, generic, C30/37 (4400/5400 PSI), 10% (typical) recycled binders in coment (200 kg/m ³ / 18 73 lbc/ft ³)	496,000 kg	60	Concrete crushed to aggregate (for sub-base layers), Portland Cement 300	496,000 kg	0 kg
		binders in cement (300 kg/m3 / 18.72 lbs/ft3) Stainless steel handrail, diam. 45mm, Donnee par default (MDEGD)	345 kg	60	kg / m3 Reuse as material	0 kg	345 kg
		Prefabricated steel balcony with steel railings, W: 380 cm H: 120 cm D: 140 cm, 561 kg/unit, Steel grade:	352,308 kg	60	Steel recycling	0 kg	352,308 kg
		S235/S275/S355 (CSK Stålindustri AS) Reinforcement steel (rebar), generic, 90% recycled content, A615	10,055 kg	60	Steel recycling	0 kg	10,055 kg
		Reinforcement steel (rebar), generic, 90% recycled content, A615 Masonry mortar/facing wall mortar/mortar with special	28,980 kg	60	Steel recycling	0 kg	28,980 kg
2.5	Superstructure: External Walls	properties, 1500 kg/m3, EPD coverage: >1500 kg/m3 (IWM)	489,555 kg	60	Cement/mortar use in a backfill	489,555 kg	0 kg
		Masonry mortar/facing wall mortar/mortar with special properties, 1500 kg/m3, EPD coverage: >1500 kg/m3 (IWM)	598,179 kg	60	Cement/mortar use in a backfill	598,179 kg	0 kg
		Red brick, average production, UK, 215 mm x 102.5 mm x 65 mm, 2.13 kg/unit, 1485 kg/m3 (Brick	1,588,866 kg	60	Brick/stone crushed to aggregate (for sub-base	1,588,866 kg	0 kg
		Development Association (BDA) Ltd (2019)) Lightweight concrete block, with expanded clay			layers) and reuse of approx 25% Concrete crushed to		
		aggregate, generic, 650 kg/m3 (40.6 lbs/ft3), 18 kg/block (39.7 lbs/block), 0.5x0.3x0.185 mm (0.019x0.012x0.007 in)	1,717,490 kg	60	aggregate (for sub-base layers), Portland Cement 300 kg / m3	1,717,490 kg	0 kg
		Rock wool insulation panels, unfaced, generic, L = 0.037 W/mK, R = 2.70 m2K/W (15 ft2°Fh/BTU), 150 kg/m3 (9.36 lbs/ft3) (applicable for densities: 100-150 kg/m3 (6.24-9.36 lbs/ft3)), Lambda=0.037 W/(m.K)	632,678 kg	60	Landfilling (for inert materials)	0 kg	0 kg
		Gypsum plaster board, regular, generic, 6.5-25 mm (0.25-0.98 in), 10.725 kg/m2 (2.20 lbs/ft2) (for 12.5	301,586 kg	60	Gypsum recycling	0 kg	301,586 kg
		mm/0.49 in), 858 kg/m3 (53.6 lbs/ft3) Gypsum plaster, 1100 kg/m3 (Bundesverband der Gipsindustrie)	92,793 kg	30	Landfilling (for inert materials)	0 kg	0 kg
2.6	Superstructure: Windows and External Doors	Mixed PVC/aluminium frame windows and patio doors, double glazed, 1.23 m x 1.48 m, 27.011 kg/m2, AM-X Hybride (ATLANTEM)	1,093,593 kg	40	Glass-containing product recycling (80 % glass)	0 kg	3,093,593 kg
		Multifunctional steel door, product group 1, 1000mm x 2125 mm, H 3 D, H 3 OD, H 3 VM, H 3 KT, RS 55, D	172,023 kg	30	Metal-containing product recycling (90 % metal)	0 kg	172,023 kg
		65 OD, D 65 (Hörmann) Sliding door, per unit, 780 x 2250 mm, 1.755 m2, 272.08 kg/unit, Sliding Door 30 (KONE)	1,190,864 kg	40	Glass-containing product recycling (80 % glass)	0 kg	3,690,864 kg
		External wood door Water-borne interior paints, 1.36 kg/L, average coverage 8-10 m2/L, Biora, Ekora, Kolibri Sand,	133,046 kg	40	Reuse as material	0 kg	133,046 kg
2.7	Superstructure: Internal Walls and Partitions	Paneelikattomaali, Ranch, Superlateksi, Tapettipohjamaali, Teknospro, Tela, Timantti, Trend	11,782 kg	15	Landfilling (for inert materials)	0 kg	0 kg
		(Teknos) Gypsum plaster board, regular, generic, 6.5-25 mm (0.25-0.98 in), 10.725 kg/m2 (2.20 lbs/ft2) (for 12.5	490,502 kg	60	Gypsum recycling	0 kg	490,502 kg
		mm/0.49 in), 858 kg/m3 (53.6 lbs/ft3) Gypsum plaster board, regular, generic, 6.5-25 mm (0.25-0.98 in), 10.725 kg/m2 (2.20 lbs/ft2) (for 12.5	490,502 kg	60	Gypsum recycling	0 kg	490,502 kg
		mm/0.49 in), 858 kg/m3 (53.6 lbs/ft3) Glass wool insulation panels, unfaced, generic, L =			- J. F. Saill . So J. Silling	_	100,002 kg
		0.031 W/mK, R = 3.23 m2K/W (18 ft2°Fh/BTU), 25 kg/m3 (1.56 lbs/ft3), (applicable for densities: 0-25 kg/m3 (0-1.56 lbs/ft3)), Lambda=0.031 W/(m.K)	109,935 kg	60	Landfilling (for inert materials)	0 kg	0 kg
		Structural steel profiles, generic, 60% recycled content, I, H, U, L, and T sections, S235, S275 and S355	121,677 kg	60	Steel recycling	0 kg	121,677 kg
2.8	Superstructure: Internal Doors	vvooden and engineered wood interior doors, biogenic CO2 not substracted, 485-1360 mm x 1597- 2735 mm, min. thickness 39 mm, 41 kg/m² (VHI)	865,091 kg	40	Reuse as material	865,091 kg	0 kg
3	Finishes	Vinyl flooring, Be Natural Be Different Be easy Be Smart (DICKSON-CONSTANT) Waterproof, protective, flexible coating, 1.5 kg/l,	700,750 kg	25	Plastic-based material recycling	0 kg	700,750 kg
		Lastogum (PCI Augsburg) Tile adhesive, all round, for ceramics, 1-5 mm, 1400 kg/m3, Verlegemörtel (PCI Augsburg)	66,706 kg 12,600 kg	20 60	Landfilling (for inert materials) Cement/mortar use in a backfill	0 kg 12,600 kg	0 kg 0 kg
		Ceramic wall tiles, 7.5 mm, 3000 kg/m2 (Seranit Granit Seramik)	382,301 kg	30	Brick/stone crushed to aggregate (for sub-base	382,301 kg	0 kg
		Carpet tiles, 5.1mm, 3.765 kg/m2, TESSERA STRUKTUR 1 (Forbo Flooring)	519,446 kg	20	layers) Plastic-based material recycling	0 kg	519,446 kg
		Massive wooden flooring/parquet, 22-450 x 44-7000 x 8-35 mm, 11.71 kg/m2 (Verband der Deutschen Parkettindustrie)	302,807 kg	60		0 kg	0 kg
		Laminated skirting board, biogenic CO2 not subtracted (for CML), 1.05 kg/m, 10-14 mm, height 70-	490,212 kg	20	Plastic-based material	0 kg	0 kg
		100 mm, sustainable management, DONNEE PAR DEFAUT (DED) Emulsion paint for allround interior use, Pigment:	100,212 Ng	20	recycling	U Ng	U Ng
		Lightfast Pigments, binder: Acrylic Copolymer Dispersion , solvent: Water, 1.444 kg/l, 17 m2/l, 0.17	240,601 kg	17	Landfilling (for inert materials)	0 kg	0 kg
4	Fittings, furnishings & equipment (FFE)	kg/m2, Vinyl Matt White (Dulux Trade) Bathroom vanity unit, biogenic CO2 not subtracted (for CML), 17.55 kg/unit, DONNEE PAR DEFAUT	140,163 kg	17		0 kg	0 kg
		(DED) Double particleboard wardrobe, 1800 x 1000 x 600					

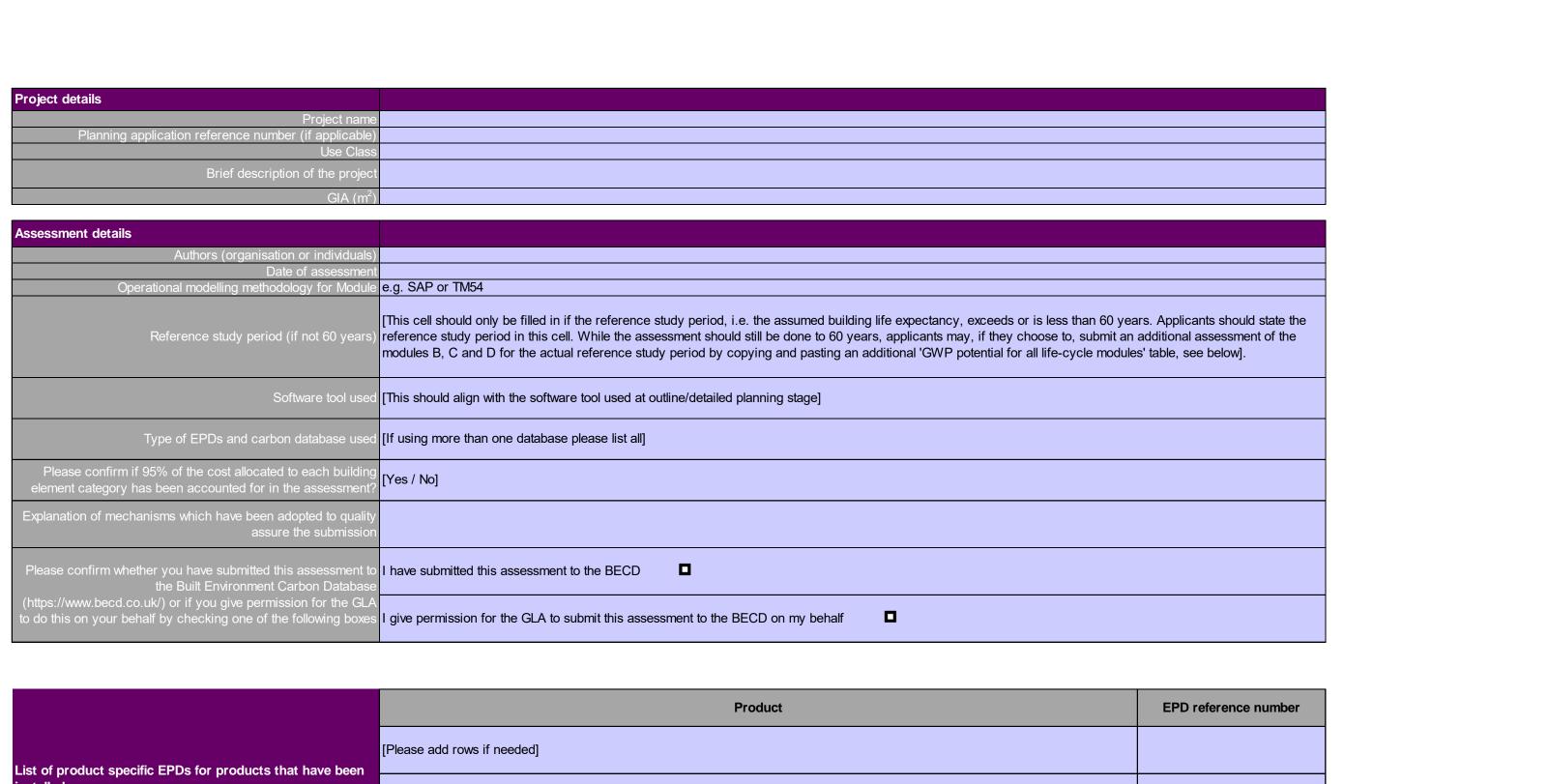
Please add rows where more than 1 material type exists per building element category

	Glass shower screen with aluminium frame, 21.2						
	kg/m2, DONNEE PAR DEFAUT (MINISTERE DE			Glass-containing product			
	L'ENVIRONNEMENT, DE L'ENERGIE ET DE LA MER	150,372 kg	60	recycling (80 % glass)	0 kg	150,372 kg	
	- MINISTERE DU LOGEMENT ET DE L'HABITAT DURABLE)						
	Composite material consisting of acrylic resin and						-
	natural minerals for interior use (kitchen worktop, bar			Brick/stone crushed to			
	counter), 12 mm, 20.4 kg/m2, 1700 kg/m3, Corian®	586,040 kg	30	aggregate (for sub-base	586,040 kg	0 kg	
	Solid Surface (PERFORMANCE SPECIALTY			layers)			
	PRODUCTS FRANCE SAS)						
	Wall mounted, hanging cupboards, per m3 storage space, 1200mm x 761mm x 501mm, 0.39m3, 57.68kg	427,282 kg	20	Wood-containing product	0 kg	0 kg	
	(Wesemann GmbH)	421,202 kg	20	incineration (80% wood)	0 kg	0 kg	
5 Services (MEP)	Acrylic bathtub, 20.8 kg/unit	132,225 kg	60		0 kg	0 kg	
	Porcelain sink with column stand, 29.6 kg/unit	43,566 kg	60		0 kg	0 kg	
	Porcelain WC kit (toilet and tank), 37.4 kg/unit	55,662 kg	60		0 kg	0 kg	
	Escalator basic component (dependent on lifting	52,169 kg	40	Metal-containing product	0 kg	52,169 kg	
	height), 800 kg/m Fluide frigorigène R32 (MDEGD)	762,310 kg	25	recycling (90 % metal)	0 kg		
	Expansion tank/vessel, V = 200L, DONNEE PAR			Metal-containing product		000 law	
	DEFAUT (DED)	808 kg	35	recycling (90 % metal)	0 kg	808 kg	
	Gas condensing boiler, for collective heating, per kW,			Metal-containing product			
	187.1kg (masse totale du produit), Pcal=102kW	124 kg	35	recycling (90 % metal)	0 kg	124 kg	
	(Uniclima)			Metal-containing product			
	Sprinkler system, room area m2	170,518 kg	35	recycling (90 % metal)	0 kg	170,518 kg	
	Pipesystem, hot and cold water supply, PEX/Alu/PEX,	986,243 kg	35		0 kg	0 kg	1
	per m2 GFA, 0.13 kg/m2	900,240 kg	33		U Kg	U kg	
	Air handling unit, with heat recovery through plate	400 404 1	05	Metal-containing product	0.1	400 404 1	
	heat exchanger, 10 000 m3/h (5885.8 ft3/min), 1256 kg/unit (2769 lbs/unit)	493,191 kg	25	recycling (90 % metal)	0 kg	493,191 kg	
		4		Metal-containing product	•	/22	
	Ventilation ducting, per m linear, D: 63 mm (2.48 in)	122,501 kg	60	recycling (90 % metal)	0 kg	122,501 kg	
	LED lighting, P = 40W, DONNEE PAR DEFAUT	1,054,813 kg	20	Metal-containing product	0 kg	1,054,813 kg	
	(DED)			recycling (90 % metal)	39	1,001,0101.8	
	10-place-setting dishwasher, 82 x 45 x 55 cm (32 x 18 x 22 in), 47.77 kg/unit (105.30 lb/unit)	466,393 kg	15	Metal-containing product recycling (90 % metal)	0 kg	466,393 kg	
	Electric built-in oven, 60 x 60 x 56 cm (24 x 24 x 22			Metal-containing product		200 1	
	in), 28.42 kg/unit (62.66 lb/unit)	223,757 kg	15	recycling (90 % metal)	0 kg	223,757 kg	
	Electric socket	1,114 kg	45	Metal-containing product	0 kg	1,114 kg	
	2,000,10 000,101	.,		recycling (90 % metal)	3 .tg	.,	
	Electricity cabling, room area m2	402,160 kg	45	Metal-containing product recycling (90 % metal)	0 kg	402,160 kg	
	Solar panel photovoltaic system, 3 000 Wp (Gaia	004 500 1	0.5	Metal-containing product	0.1	204 500 1	
	Solar)	364,508 kg	25	recycling (90 % metal)	0 kg	364,508 kg	
	Air/air heat pump, ducted, 152 kg/unit, P= 16 kW,	6,395,983 kg	25	Metal-containing product	0 kg	6,395,983 kg	
	DONNEE PAR DEFAUT (DED)			recycling (90 % metal)	3 Ng	5,655,655 Ng	
	Electricity distribution system, cabling and central, for all building types, per m2 GFA	2,430,887 kg	35	Metal-containing product recycling (90 % metal)	0 kg	2,430,887 kg	
	Drinking water supply piping network, per m2 GIFA			Metal-containing product			
	(residential buildings)	106,778 kg	35	recycling (90 % metal)	0 kg	106,778 kg	
	Sewage water drainage piping network, per m2 GIFA	53,204 kg	35	Metal-containing product	0 kg	53,204 kg	
	(residential buildings)		-	recycling (90 % metal)	5 Ng	30,20 : 1.9	
6 Prefabricated Buildings and Buildings	ding Units						
7 Work to Existing Building							
	Wooden bench, 13.5 kg/unit, OVO Bench Collection			Wood-containing product			-
8 External works	(Benchmark)	890 kg	12	incineration (80% wood)	0 kg	0 kg	
	Galvanized steel bicycle shelters, 76.7 kg/unit,						1
	DONNEE PAR DEFAUT (DED)	269,675 kg	60	Steel recycling	0 kg	269,675 kg	
	Aggregate (crushed gravel), generic, dry bulk density,			Asphalt reuse via			
	Aggregate (Crushed graver), generic, dry bulk density,	3,318 kg	60	reprocessing	0 kg	0 kg	
				Asphalt reuse via			
	Asphalt road - Cold construction method	215,789 kg	30	reprocessing	215,789 kg	0 kg	
	Gravel, dry bulk density, 1680 kg/m3	34,513 kg	60	Backfilling (for inert materials)	34,513 kg	0 kg	
	Concrete paving, 15.4 m2/m3, 96 units/m3, Andover						
	Textured (Aggregate Industries)	774,661 kg	60	Rebar separated (2 %), concrete to aggregate	774,661 kg	0 kg	
irigorante		Initial Object (III)	Ammoral India	Refrigerant GWP			1
rigerants	Refrigerant name	Initial Charge(kg)	Annual leakage rate %	(kgCO₂e/kg) End of Life recovery rate %			
Refrigerants Type 1 (if applicable	e) - please see CIBSE	200		700.04			Places add rever if an
a TM65 for methodology	R32	330	2	700.01			Please add rows if requ
Refrigerants Type 2 (if applicable	e) - please see CIBSE						1
b TM65 for methodology							
Refrigerants Type 3 (if applicable	e) - please see CIBSE						1
TM65 for methodology							
	TOTAL	70.070.704			44.400.004.1	05 470 740 les	I
	TOTAL	72,878,784 kg			44,426,601 kg	25,170,740 kg	
		4 004 1 4 0 014			7501 / 0.011	1051 / 0.511	1
	Material intensity (kg/m2 GIA)	1,231 kg/m2 GIA			750 kg/m2 GIA	425 kg/m2 GIA	

GWP POTENTIAL FOR ALL LIFE-CYCLE MODULES (kgCO₂e) (See Note 1 below if you entered a reference study period in cell C12)	Sequestered (or biogenic) carbon (negative value) (kgCO₂e)	Product stage (kgCO₂e)	Construction process	stage (kgCO₂e)				Use stage (kgCO₂e)					End of Life (EoL) sta	ge (kgCO₂e)		TOTAL Modules A-C	Benefits and loads beyond the system boundary (kgCO ₂ e)
iii ceii ciz)			Module A					Module B					Module (;		kgCO₂e	
Building element category		[A1] to [A3]	[A4]	[A5]	[B1]	[B2]	[B3]	[B4]	[B5]	[B6]	[B7]	[C1]	[C2]	[C3]	[C4]		Module D
0.1 Demolition: Toxic/Hazardous/Contaminated Material Treatment				•	•											0 kg CO2e	
0.2 Major Demolition Works												35,700 kg CO2e				35,700 kg CO2e	
0.3 Temporary Support to Adjacent Structures																0 kg CO2e	
0.4 Specialist Ground Works																0 kg CO2e	
0.5 Temporary Diversion Works																0 kg CO2e	
1 Substructure	0 kg CO2e	4,319,853 kg CO2e	1,386,943 kg CO2e	257,960 kg CO2e			0 kg CO2e	24,963 kg CO2e	0 kg CO2e				117,921 kg CO2e	141,051 kg CO2e		6,248,691 kg CO2e	-1,011,480 kg CO2e
2.1 Superstructure: Frame	0 kg CO2e	3,572,815 kg CO2e	142,035 kg CO2e	161,970 kg CO2e			0 kg CO2e						106,150 kg CO2e	9,162 kg CO2e		3,992,133 kg CO2e	-896,796 kg CO2e
2.2 Superstructure: Upper Floors	0 kg CO2e	3,933,806 kg CO2e	186,924 kg CO2e	209,641 kg CO2e			0 kg CO2e				,		125,552 kg CO2e	11,292 kg CO2e		4,467,214 kg CO2e	-1,025,156 kg CO2e
2.3 Superstructure: Roof	0 kg CO2e	456,328 kg CO2e	8,568 kg CO2e	17,826 kg CO2e		106,200 kg CO2e	0 kg CO2e	168,508 kg CO2e	0 kg CO2e				9,212 kg CO2e	63,324 kg CO2e	814 kg CO2e	830,779 kg CO2e	-180,558 kg CO2e
2.4 Superstructure: Stairs and Ramps	0 kg CO2e	216,788 kg CO2e	8,848 kg CO2e	8,630 kg CO2e			0 kg CO2e						5,219 kg CO2e	495 kg CO2e		239,980 kg CO2e	-66,277 kg CO2e
2.5 Superstructure: External Walls	0 kg CO2e	4,288,148 kg CO2e	29,655 kg CO2e	334,569 kg CO2e		154,344 kg CO2e	0 kg CO2e	17,986 kg CO2e	0 kg CO2e				45,545 kg CO2e	4,272 kg CO2e	2,557 kg CO2e	4,877,077 kg CO2e	-173,266 kg CO2e
2.6 Superstructure: Windows and External Doors	-143,605 kg CO2e	2,878,416 kg CO2e	6,228 kg CO2e	0 kg CO2e			1,255,250 kg CO2e	2,917,138 kg CO2e	0 kg CO2e				31,759 kg CO2e	143,919 kg CO2e	420 kg CO2e	7,089,525 kg CO2e	-321,508 kg CO2e
2.7 Superstructure: Internal Walls and Partitions	0 kg CO2e	1,178,607 kg CO2e	5,693 kg CO2e	108,526 kg CO2e			0 kg CO2e	228,500 kg CO2e	0 kg CO2e				47,928 kg CO2e	1,695 kg CO2e	487 kg CO2e	1,571,435 kg CO2e	-165,832 kg CO2e
2.8 Superstructure: Internal Doors	-495,972 kg CO2e	430,286 kg CO2e	2,259 kg CO2e	0 kg CO2e			0 kg CO2e	432,546 kg CO2e	0 kg CO2e					495,972 kg CO2e		865,092 kg CO2e	-872,074 kg CO2e
3 Finishes	-763,426 kg CO2e	1,038,844 kg CO2e	4,603 kg CO2e	85,096 kg CO2e		48,144 kg CO2e	150,093 kg CO2e	1,431,473 kg CO2e	0 kg CO2e				3,481 kg CO2e	765,085 kg CO2e	175 kg CO2e	2,763,566 kg CO2e	-1,145,685 kg CO2e
4 Fittings, furnishings & equipment	-216,099 kg CO2e	670,849 kg CO2e	3,981 kg CO2e	38,539 kg CO2e			135,725 kg CO2e	1,061,191 kg CO2e	0 kg CO2e				2,532 kg CO2e	219,176 kg CO2e	171 kg CO2e	1,916,064 kg CO2e	-737,157 kg CO2e
5 Services (MEP)	0 kg CO2e	4,608,742 kg CO2e	19,953 kg CO2e	17,748 kg CO2e	762,311 kg CO2e	48,144 kg CO2e	2,209,458 kg CO2e	6,671,610 kg CO2e	0 kg CO2e	11,011,226 kg CO2e 11,392,600 kg CO2e	1,326,155 kg CO2e		26,532 kg CO2e	2,383 kg CO2e	180 kg CO2e	38,097,041 kg CO2e	-4,785,892 kg CO2e
6 Prefabricated Buildings and Building Units																0 kg CO2e	
7 Work to Existing Building																0 kg CO2e	
8 External works	-50,204 kg CO2e	1,127,730 kg CO2e	28,599 kg CO2e	7 kg CO2e	0 kg CO2e	106,200 kg CO2e	0 kg CO2e	108,601 kg CO2e	0 kg CO2e				25,394 kg CO2e	58,719 kg CO2e	0 kg CO2e	1,405,046 kg CO2e	-306,154 kg CO2e
Other site construction impacts or overall construction stage [A5] carbon emissions not specific to an individual building element category				2,483,764 kg CO2e												2,483,764 kg CO2e	
TOTAL kg CO ₂ e	-1,669,306 kg CO2e	28,721,212 kg CO2e	1,834,288 kg CO2e	3,724,276 kg CO2e	762,311 kg CO2e	463,032 kg CO2e	3,750,526 kg CO2e	13,062,516 kg CO2e	0 kg CO2e	22,403,826 kg CO2e	1,326,155 kg CO2e	35,700 kg CO2e	547,224 kg CO2e	1,916,544 kg CO2e	4,803 kg CO2e	76,883,107 kg CO2e	-11,687,835 kg CO2e
TOTAL - kg CO ₂ e/m ² GIA	-28 kg CO2e/m2 GIA	485 kg CO2e/m2 GIA	31 kg CO2e/m2 GIA	63 kg CO2e/m2 GIA	13 kg CO2e/m2 GIA	8 kg CO2e/m2 GIA	63 kg CO2e/m2 GIA	221 kg CO2e/m2 GIA	0 kg CO2e/m2 GIA	378 kg CO2e/m2 GIA	22 kg CO2e/m2 GIA	1 kg CO2e/m2 GIA	9 kg CO2e/m2 GIA	32 kg CO2e/m2 GIA	0 kg CO2e/m2 GIA	1,298 kg CO2e/m2 GIA	-197 kg CO2e/m2 GIA

Notes:

1 If you have entered a reference study period in cell C12 because the assumed building life expectancy is greater or less than 60 years, then you will need to fill in this table using a 60 year building life expectancy. If you choose to, you may create a second table below and complete it using the actual assumed life expectancy. This should be clearly labelled.



Data automatically calculated - no direct input required

Cells that require information / data inputting

N/A

Please confirm the following post-construction evidence has been submitted with this WLC assessment		
Site energy (including fuel) use record	[Yes / No]	

Please confirm the following post-construction evidence has been submitted with this WLC assessment	
Site energy (including fuel) use record	[Yes / No]
Contractor confirmation of as-built quantities and specifications	[Yes / No]
Record of material delivery including distance travelled and transportation mode	[Yes / No]
Waste transportation record include waste quantity, distance travelled and transportation mode	[Yes / No]

WLC emissions baseline (automatically populated from the 'detailed planning stage' tab)

TOTAL kg CO₂e	34,279,776 kg CO2e	20,542,656 kg CO2e	20,542,656 kg CO2e 53,153,126 kg CO2e		23,729,981 kg CO2e	2,504,272 kg CO2e	-11,687,835 kg CO2e				
TOTAL kg CO₂e/m² GIA	578.864	346.893	897.569	304.605	400.716	42.288	-197.366				
Post-construction WLC emissions											
	Module A1-A5	Modules B-C (excl B6 & B7)	Modules A-C (excl B6-B7; including sequestered carbon)	Module B1-B5	Module B6-B7	Module C1-C4	Module D				
TOTAL kg CO₂e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	#VALUE!	0 kg CO2e	0 kg CO2e				
TOTAL kg CO₂e/m² GIA	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#VALUE!	#DIV/0!	#DIV/0!				
Please select most appropriate benchmark from drop-down menu											
WLC Benchmark	#N/A	#N/A	#N/A								
Aspirational WLC Benchmark	#N/A	#N/A	#N/A								
Commentary comparing the post-construction results against the WLC emissions baseline above	(Explain the reasons for any divergences from the results against the WLC emissions baseline above)										
Commentary comparing the post-construction results against the WLC benchmarks (see Appendix 2)	[Explain the reasons for any divergences from WLC benchmarks, including against the WLC aspirational benchmarks]										

have been implemented		
Actual carbon emissions associated with pre-construction demolition (kgCO ₂ e)		
Estimate of the percentage of the new build development which is made up of existing elements	[e.g. X% existing facades; Y% existing foundations; Z% superstructures etc.]	
Summary of <u>key actions</u> undertaken to reduce whole life-	Action undertaken	WLC reduction achieved (k CO ₂ e/m ² GIA)
cycle carbon emissions, including the reductions achieved	[This list does not need to be exhaustive but should identify the actions with the biggest impacts. Insert more lines if needed]	
	i.e. Design options or materials that could be used, design principles that could be applied.	
Lessons learnt from the process of undertaking a WLC	Insert more lines if needed!	

ATERIAL QUANTITY AND END OF LIFE SCENARIOS	Product and Construc	etion Stage (Module A)	Accumuntions made with respect to		Benefits and loads beyon (Modu	d the system boundary le D)	
uilding element category	Material type Material quantity (kg)		Assumptions made with respect to maintenance, repair and replacement cycles (Module B)	Material 'end of life' scenarios (Module C)	Estimated reusable materials (kg)	Estimated recyclable materials (kg)	
Note/evample	Breakdown of material type in each category [Insert more lines if needed] e.g. Concrete	65000 kg	For all primary building systems (structure substructure, envelope, MEP services, internal finishes) including assumed material/product lifespans and annual maintenance/repair %	Declare 'end of life' scenario as per project's Circular Economy Statement, and used in the WLC assessment to produce Module C results	0 kg	25 kg	
	e.g. Reinforcement e.g. Formwork	5000 kg 250 kg			2 kg 0 kg	8 kg 0 kg	
0.1 Demolition: Toxic/Hazardous/Contaminated Material Treatment		200 %			o ng	- Ng	Please add rows where more than 1 material type exists per building ele
0.2 Major Demolition Works							
0.3 Temporary Support to Adjacent Structures							
0.4 Specialist Ground Works							
1 Substructure							_
Superstructure: Frame 2.1							
2.2 Superstructure: Upper Floors							
2.3 Superstructure: Roof							
2.4 Superstructure: Stairs and Ramps							
2.5 Superstructure: External Walls							
2.6 Superstructure: Windows and External Doors2.7 Superstructure: Internal Walls and Partitions							
2.8 Superstructure: Internal Doors							
3 Finishes							
4 Fittings, furnishings & equipment (FFE)							
5 Services (MEP)							
6 Prefabricated Buildings and Building Units							
7 Work to Existing Building							-
8 External works							
efrigerants Contract Contrac	Refrigerant name	Initial Charge(kg)	Annual leakage rate %	Refrigerant GWP (kgCO₂e/kg) End of Life recovery rate %			
Retrigerants Type 1 (if applicable) - please see CIBSE TM65 for methodology Refrigerants Type 2 (if applicable) - please b							Please add rows if required
see CIBSE TM65 for methodology Refrigerants Type 3 (if applicable) - please c see CIBSE TM65 for methodology							
	TOTAL	0 kg			0 kg	0 kg	

GWP POTENTIAL FOR ALL LIFE-CYCLE MODULES (kgCO ₂ e) (See Note 1 below if you entered a reference study period in cell C12)		Sequestered (or biogenic) carbon	Product stage (kgCO₂e)	Construction process	s stage (kgCO₂e)				Use stage (kgCO₂e)				End of Life	(EoL) stage (kgCO₂e))	TOTAL Modules A-C	Benefits and loads beyond the system boundary (kgCO₂e)
study period in cell C12)		(negative value) (kgCO₂e)		Module A					Module B					Module C		kgCO₂e	Ma Auto D
element			[A1] to [A3]	[A4]	[A5]	[B1]	[B2]	[B3]	[B4]	[B5]	[B6]	[B7]	[C1]	[C2] [C	C3] [C4]		Module D
0.1	Demolition: Toxic/Hazardous/Contaminated Material Treatment												[Where only a single C1-C4 is known, please include it here]			0 kg CO2e	
0.2	Major Demolition Works												[Where only a single C1-C4 is known, please include it here]			0 kg CO2e	
0.3	Temporary Support to Adjacent Structures											/	[Where only a single C1-C4 is known, please include it here]			0 kg CO2e	
0.4	Specialist Ground Works												[Where only a single C1-C4 is			0 kg CO2e	
0.5	Temporary Diversion Works												known, please include it here] [Where only a single C1-C4 is			0 kg CO2e	
0.5													known, please include it here] [Where only a single C1-C4 is			0 kg CO2e	
'	Substructure											/	known, please include it here] [Where only a single C1-C4 is				
2.1	Superstructure: Frame												known, please include it here] [Where only a single C1-C4 is			0 kg CO2e	
2.2	Superstructure: Upper Floors												known, please include it here]			0 kg CO2e	
2.3	Superstructure: Roof												[Where only a single C1-C4 is known, please include it here]			0 kg CO2e	
2.4	Superstructure: Stairs and Ramps												[Where only a single C1-C4 is known, please include it here]			0 kg CO2e	
2.5	Superstructure: External Walls												[Where only a single C1-C4 is known, please include it here]			0 kg CO2e	
2.6	Superstructure: Windows and External Doors												[Where only a single C1-C4 is known, please include it here]			0 kg CO2e	
2.7	Superstructure: Internal Walls and Partitions												[Where only a single C1-C4 is known, please include it here]			0 kg CO2e	
2.8	Superstructure: Internal Doors												[Where only a single C1-C4 is known, please include it here]			0 kg CO2e	
3	Finishes												[Where only a single C1-C4 is			0 kg CO2e	
4	Fittings, furnishings & equipment												known, please include it here] [Where only a single C1-C4 is known, please include it here]			0 kg CO2e	
											Pagulated emissions Unregulated emissions	Operational Water	known, please include it here] [Where only a single C1-C4 is			0 kg CO2e	
5	Services (MEP)										Regulated emissions Unregulated emissions	Operational water	known, please include it here] [Where only a single C1-C4 is				
6	Prefabricated Buildings and Building Units												[Where only a single C1-C4 is known, please include it here]			0 kg CO2e	
7	Work to Existing Building												[Where only a single C1-C4 is known, please include it here]			0 kg CO2e	
8 Uither site	External works construction impacts or overall construction stage												[Where only a single C1-C4 is known, please include it here]			0 kg CO2e	
	oon emissions not specific to an individual building															0 kg CO2e	
	TOTAL kg CO₂e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e		Operational Wate			CO2e 0 kg CO2e		0 kg CO2e
Notes:	TOTAL - kg CO ₂ e/m ² GIA	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#VALUE!	#VALUE!	#DIV/0!		OIV/0! #DIV/0!	#DIV/0!	#DIV/0!



Available benchmarks							
Offices							
Residential							
Schools, Universities etc.							
Retail							

WLC benchmark	A1-A5	B-C (excl B6 & B7)	A-C (excl B6 & B7)
Offices	<950	<450	<1400
Residential	<850	<350	<1200
Schools, Universities etc.	<750	<250	<1000
Retail	<850	<200	<1050

Aspirational WLC benchmark	A1-A5	B-C (excl B6 & B7)	A-C (excl B6 & B7)
Offices	<600	<370	<970
Residential	<500	<300	<800
Schools, Universities etc.	<500	<175	<675
Retail	<550	<140	<690

GREATER LONDON AUTHORITY

Water Memo: Stage I Comments

Mitcham Gasworks Site 27/02/2023

To / Case officer:

From:

Case name: Mitcham Gasworks Site

London Borough: Merton

Case number: 2023/0107/S1

Applicant: St Williams Homes LLP

Flood Risk Document: Flood Risk Assessment and drainage Strategy/December

2022/JNP Group Consulting Engineers

Drainage Document: Flood Risk Assessment and drainage Strategy/December

2022/JNP Group Consulting Engineers

Sustainability Document: Sustainability Statement/08 December 2022/Hodkinson

Proposal

Full planning application for the erection of new buildings to provide residential accommodation (Class C3) and flexible commercial/community space (Class E and/or Class F2), with associated access, parking and landscaping arrangements, including the demolition of the existing telecommunications mast and re-provision of new telecommunications mast

N.B - the applicant's proposals as currently submitted are for a scheme comprising 595 flats in 6 blocks ranging between 5 and 9 storeys with 135 parking spaces, vehicle access from Western road and Portland road and with 363 sq.m of flexible community/commercial floorspace

Summary of Comments

<u>Section</u>	Compliant
Flood Risk	Yes (further information needed)
Sustainable Drainage	No
Water Efficiency	No

Flood Risk Management (The London Plan 2021 Policy SI.12)

Flood Source	Flood Risk
Rivers and the sea	Flood Zone 1
Surface water	Very Low
Reservoir	No
Groundwater	Medium
Sewer	Low

- 1. The site is in Flood Zone 1 and is greater than 1 hectare in area. A Flood Risk Assessment (FRA) has been submitted as required under the National Planning Policy Framework (NPPF).
- 2. The FRA states that the groundwater flood risk to the site is Medium, and this risk will be managed by directing emerging overland flows away from proposed buildings. Further information on the existing and proposed levels should be provided.
- 3. The FRA adequately assesses the risk of flooding from fluvial/tidal, pluvial, sewer, and reservoir flooding, which is considered to be low.
- 4. Conclusion: The FRA provided for the proposed development generally complies with The London Plan 2021 Policy SI.12.

Sustainable Drainage (The London Plan 2021 Policy SI.13)

- 5. It is not clear from Paragraph 6.2.4 whether the impermeable area is 1.63 ha or 1.56 ha. From the microdrainage calculations it is understood that the positively drained area is 1.614 ha. This needs to be clarified/amended.
- 6. Calculations showing how the greenfield rates have been obtained need to be provided.
- 7. The drainage strategy proposes to restrict runoff to 3 times the QBAR greenfield rate for the 100-year event plus 40% climate change. (7.5 l/s) This should be further reduced to achieve the greenfield QBAR rate, or robust justification should be provided.
- 8. In terms of SuDS, the drainage strategy proposes green/blue roofs, rain gardens and filter drains, which is welcomed. The location and dimension of all SuDS proposed should be clearly shown on the drainage plan.
- 9. The sustainability Statement notes that a rainwater harvesting system for irrigation will be installed. This should also be included on the drainage strategy for consistency across reports.
- 10. The direction of the exceedance flood flow routes above the 100-year event plus 40% climate change should be shown on the plan.

- 11. The Applicant should ensure that the London Borough of Merton's version of the London Sustainable Drainage Proforma is completed and accompanies the planning application. The proformas for all Local Authorities can be found here: https://www.london.gov.uk/what-we-do/environment/climate-change/surface-water/london-sustainable-drainage-proforma.
- 12. <u>Conclusion</u>: The surface water drainage strategy for the proposed development generally complies with The London Plan 2021 Policy SI.13.

Water Efficiency (The London Plan 2021 Policy SI.5)

- 13. The Sustainability Statement notes that the proposed dwellings will target a maximum indoor water consumption of 105 l/person/day, in line with the optional standard in Part G of the Building Regulations, and is compliant with The London Plan 2021 Policy SI.5.
- 14. No information is provided as to the targeted Wat 01 credits for the non-residential uses on site.
- 15. Water efficient fittings and fixtures are proposed, which is welcomed. Water meters and a leak detection system should also be provided.
- 16. The Sustainability Statement notes that a rainwater harvesting system for irrigation will be installed. This should also be included on the drainage strategy for consistency across reports.
- 17. <u>Conclusion:</u> The proposed development does not currently meet the requirements of The London Plan 2021 Policy SI.5.