

From: [REDACTED] [REDACTED]
Sent: 20 November 2020 09:59
To: [REDACTED]
Subject: RE: Noise & Vibration comments 4309/19 Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford

Hello [REDACTED]

Condition D is firm and relevant as the vibration from the railway has to be accounted for. Condition A is still relevant – however the Lmax element of it has to be deleted, i.e.

Condition A

The building has to be been designed to meet the following internal criteria:

- **Living Rooms: 35 dB LAeq,16hr (between 07:00 and 23:00 hrs)**
- **Bedrooms: 30 dB LAeq,8hr (between 23:00 and 07:00 hrs)**

The scheme shall be fully implemented in accordance with the approved details.

Condition D – definitely pre-commencement condition.

Feel free to come back to me if you need to speak.

Regards,

From: [REDACTED]
Sent: 20 November 2020 09:02
To: [REDACTED] <[REDACTED] redbridge.gov.uk>
Subject: RE: Noise & Vibration comments 4309/19 Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford

Hello [REDACTED]

Thank you for clarifying. Would condition A (which you now want excluded) not ensure what you want in condition D?

We are seeking to minimise conditions that need discharging on this (and all) applications, so if a prescriptive condition (like your condition A) can do the job, then that is what we would go for.

With regards to suggested condition D, can you confirm, that if we go with this one, it will be a pre-commencement condition?

Kind regards,

From: [REDACTED] [REDACTED]
Sent: 10 November 2020 16:10

To: [REDACTED] <[\[REDACTED\]@redbridge.gov.uk](mailto:[REDACTED]@redbridge.gov.uk)>

Subject: RE: Noise & Vibration comments 4309/19 Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford

Hello [REDACTED]

I hope you are well. They make a fair point. I should have excluded from condition A "**Bedroom: 45 dB LAFmax to be exceeded no more than 15 times per night-time between 23:00 and 07:00 hours from sources other than emergency sirens.**" Please exclude the above that so condition D becomes relevant.

Also, to make more of a point, allowing for the appropriate degree of uncertainty, which is inherently high at this stage of the development process, and taking account of reasonably foreseeable worst case assumptions, there will be areas within the development that require mitigation if they are to meet the recommended re-radiated noise criterion (35 dB LAmax,s). It is therefore highly recommend that further detailed analysis in the form of the development of a 3D numerical model, in order to estimate the vibration transfer across the site in more detail, and to adequately inform the mitigation measures.

An appropriate mitigation strategy will potentially be based on the use of elastomeric bearings; detailed design of the mitigation strategy will heavily depend on the proposed structural design. The results of the detailed vibration analysis and proposed mitigation strategy should be submitted to LBR.

Please come back to me if you require any clarification to this email.

Many thanks,

[REDACTED]

Ps.. I have not forgotten the delivery conditions I still have to send you. I should "deliver" that next week to you.

From: [REDACTED]

Sent: 10 November 2020 15:42

To: [REDACTED] <[\[REDACTED\]@redbridge.gov.uk](mailto:[REDACTED]@redbridge.gov.uk)>

Subject: RE: Noise & Vibration comments 4309/19 Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford

Dear [REDACTED]

Further to your comments below, the applicant team has come back to me with regards to suggested condition D.

Whilst the accept Conditions A, B, and C, the applicant queries the necessity of Condition D, as satisfactory living conditions would be demonstrated through your suggested Conditions A, B and C [below] and applicable Building Regulations.

Please could you clarify the need for Condition D?

Kind regards,

[REDACTED]

From: [REDACTED] [REDACTED]

Sent: 08 October 2020 17:18

To: [REDACTED]

Cc: Liz Sullivan

Subject: Noise & Vibration comments 4309/19 Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford

Demolition of all existing buildings including petrol filling station. Redevelopment of the site to provide a replacement food retail store (use class A1, now superseded by use class E), a series of apartment blocks ranging between 4 and 23 storeys in height to provide 1,280 residential units (use class C3), flexible use floorspace for commercial/community uses (within use classes A1/A2/A3/B1/D1, all now superseded by use classes F1, F.2 and E), a 3-form entry primary school (use class D1, now superseded by use class F.1), public open space, car and cycle parking, associated landscaping and infrastructure works, and provision of pedestrian and vehicular access. (Summary). This application is accompanied by an Environmental Statement. (Amended plans and documents.)

Dear [REDACTED]

I have perused the application and I have the following comments to make:

The supporting document, chapter 9, unless I am mistaken, makes no reference to noise and vibration with respect to the close proximity of the proposed to the over ground railway.

To ensure that new occupiers are not affected by external noise and vibration you may wise to consider the below drafted conditions in bold or **refuse the planning application unless or until the following is confirmed by the applicant in a supplementary acoustic report**. Also included below is comments without suggested conditions that will assist you in making a cogent decision with respect to this major application. Naturally, I am happy to collaborate with applicants appointed consultants going forward.

1. Internal noise level – noise ingress

Guidance on acceptable internal noise levels in residential dwellings is given in BS 8233:2014 Sound insulation and noise reduction for buildings, and is also provided by the World Health Organisation.

Condition A

The building has to be been designed to meet the following internal criteria:

- Living Rooms: 35 dB LAeq,16hr (between 07:00 and 23:00 hrs)**
- Bedrooms: 30 dB LAeq,8hr (between 23:00 and 07:00 hrs)**
- Bedroom: 45 dB LAFmax to be exceeded no more than 15 times per night-time between 23:00 and 07:00 hours from sources other than emergency sirens.**

The scheme shall be fully implemented in accordance with the approved details.

Condition B

Prior to occupation of residential elements of the scheme, acoustic commissioning testing shall be undertaken by a UKAS/ANC accredited organisation at the most noise exposed habitable room of each acoustic facade specification to demonstrate compliance with the noise level criteria of Condition A. The testing shall be carried out over a period of minimum 24 hours and the results shall be submitted to and approved in writing by the Local Planning Authority prior to occupation of residential units.

2. Tactile vibration

Tactile vibration is that which is perceived as mechanical motion. BS 6472-1: 2008 Guide to Evaluation of Human Exposure to Vibration in Buildings Part 1: Vibration Sources Other Than Blasting provides procedures for assessing the potential human response to vibration.

Condition C

The Vibration Dose Values (VDV) should be calculated and assessed from the measured acceleration levels in accordance with BS 6472-1:2008 (revised). For residential development, the VDV (m/s^{1.75}) should not exceed 0.2-0.4 during the day and 0.1-0.2 at night.

3. Re-radiated noise

There is currently no international or British Standard which provides guidance on assessing the impact of ground-borne noise from railways on the occupants of a building. The Association of Noise Consultants (ANC) guidelines 'Measurement and assessment of ground borne noise and vibration', 2nd edition published in 2012, is generally used as the basis of assessments such as this.

Condition D

Re-radiated noise, within habitable residential rooms, as a result of vibration from adjacent railways and other sources, should not exceed L_{ASmax} 35 dB. Where it is predicted that noise from this source, after allowing for predictive uncertainty, is likely to exceed L_{ASmax} 35 dB, proposals to mitigate re-radiated noise to acceptable levels shall be submitted to and approved in writing by the Group Manager of Environmental Health.

Also, the construction phase needs to be critiqued. Furthermore, if this application is approved, then a condition will be required for the submission of a Construction Environmental Management Plan (CEMP). The CEMP should detail management measures to minimise environmental impact from the construction phase of the development. The CEMP, should set out to ensure compliance with current legislation and effectively minimise any potential adverse environmental effects during construction or deconstruction. They need to adhere to British Standard 5228 Code of practice for noise and vibration control on construction and open sites. Part 1 – Noise and Part 2 – Vibration (as amended, BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014). The type of piling proposed will have to be clarified in the piling operations chapter of the CEMP. The Pollution team would not support diesel or air driven impact or drop hammer piling due to its adverse noise and vibration affects. In fact we would advocate that press-in method is deployed, also known as 'silent press'.

4. **Flexible use floorspace for commercial/community uses.** To ensure the acoustic acceptability of new fixed building services plant that may be introduced as part of the Development you may wish to consider the below drafted condition:

Condition E

Noise emitted from any new fixed building services plant and equipment shall be designed to a level at least 10 dB below the lowest representative existing background noise level when assessed in accordance with BS 4142:2014 at a position 1 m from the window of the nearest noise sensitive premises (i.e. Plant L_{Ar,Tr} = -10 dB LA_{90,T}). This criterion applies to the total contribution of noise from all new plant items associated with the Proposed Development that may run during any particular period.

5. **Flexible use floorspace for commercial/community uses.** The hours of operation, loading, unloading and deliveries needs to be controlled to prevent any residential loss of amenity.

6. **Flexible use floorspace for commercial/community uses.** I am seeking to effectively control and manage environmental, neighbour and neighbourhood noise with respect to classes E, F1 and F2. To avoid significant adverse impacts on health and quality of life, mitigate and minimise adverse impacts on health and quality of life, and where possible, contribute to the improvement of health & quality of life, the sooner I know what **exact** business will be operating the better I can stipulate noise levels, good design, engineering and administrative approaches to managing noise.

7. **F1 class.** The government published a performance document, Building Bulletin 93 (BB93) Acoustic Design of Schools, in 2003 to aid the design and construction of new education buildings. The Guides state the acceptable levels of sound and reverberation that are appropriate in various types of room (depending on their function) and

provide advice on how to design the spaces effectively for their function. Maximum levels of impact sound (such as footfall from a room above), and airborne sound from both inside and outside the building, are specified. The standards laid out in BB93 don't just focus on protecting and helping students, but also teachers and other staff as well.

I would request that the applicant engage an acoustic consultant to meet all the criteria of BB93. Also, new schools in the United Kingdom are now required to comply with Part E of the Building Regulations (Approved Document D); this also includes new educational premises that are being created through changing the function of an existing building. I would infer from this that the new building for teaching and educational purposes (Use Class D1) must comply with this too. Happy to discuss with noise consultant.

Please come back to me if you require any further clarification.

Regards,

[REDACTED]

From: [REDACTED] [REDACTED]
Sent: 02 October 2020 14:29

To: [REDACTED] <[\[REDACTED\]@redbridge.gov.uk](mailto:[REDACTED]@redbridge.gov.uk)>
Cc: [REDACTED] <[\[REDACTED\]@redbridge.gov.uk](mailto:[REDACTED]@redbridge.gov.uk)>

Subject: FW: London Borough of Redbridge - 4309/19 Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford

FYI [REDACTED]

Best Regards

[REDACTED] Principal Planner
Regeneration & Culture
London Borough of Redbridge
11th floor, Lynton House, 255-259 High Road, Ilford, Essex IG1 1NN

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Email: [REDACTED] [redbridge.gov.uk](mailto:[REDACTED]@redbridge.gov.uk)

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From: Community Safety (Env Health Planning Consultations)

Sent: 02 October 2020 14:27

To: Planning Consultations

Cc: [REDACTED] [REDACTED]

Subject: FW: London Borough of Redbridge - 4309/19 Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford

I am looking to get Noise comments in by the end of next week for this.

Let me know if that is okay for you.

Regards,

From: Planning Consultations

Sent: 09 September 2020 14:56

Subject: London Borough of Redbridge - 4309/19 Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford

Application: 4309/19

Location: Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford

Demolition of all existing buildings including petrol filling station. Redevelopment of the site to provide a replacement food retail store (use class A1, now superseded by use class E), a series of apartment blocks ranging between 4 and 23 storeys in height to provide 1,280 residential units (use class C3), flexible use floorspace for commercial/community uses (within use classes A1/A2/A3/B1/D1, all now superseded by use classes F1, F.2 and E), a 3-form entry primary school (use class D1, now superseded by use class F.1), public open space, car and cycle parking, associated landscaping and infrastructure works, and provision of pedestrian and vehicular access. (Summary). This application is accompanied by an Environmental Statement. (Amended plans and documents.)

Please see details attached from the London Borough of Redbridge Development Management department relating to the above planning submission.

Regards,

Development Management

Planning and Building Control

Regeneration & Culture

London Borough of Redbridge

Lynton House, 255-259, High Road, Ilford, IG1 1NY

Email: Planning.Consultations@Redbridge.gov.uk

Web: www.redbridge.gov.uk

Twitter: @RedbridgeLive

Facebook: www.facebook.com/redbridgelive

IMPORTANT INFORMATION

To help address the high number of applications that are invalid on receipt, Redbridge Planning will be introducing an administration charge for applications submitted from 3 June 2019 that are made invalid. For more details about the charges please go to: <https://www.redbridge.gov.uk/planning-and-building/planning/make-a-planning-application/>

We have also streamlined our local validation checklist requirements. This is available to view on our website.

If you have any questions about the scheme please email planning.enquiry@redbridge.gov.uk



From: [REDACTED]
Sent: 10 December 2020 10:39
To: [REDACTED]
Subject: RE: Application: 4309/19 - Tesco Goodmayes Site

Hi [REDACTED]

Thank you for your email and sorry for the slow response. I am happy to accept this as you are, please let me know if you need anything further from me.

Have a good day.

[REDACTED]
[REDACTED]
Waste & Recycling Collections Officer
Environmental Services
London Borough of Redbridge
WREN Centre, Ley Street Depot, Ley Street, Ilford IG2 7QZ

[REDACTED] redbridge.gov.uk
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From: [REDACTED]
Sent: 03 December 2020 14:55
To: [REDACTED] <[REDACTED] redbridge.gov.uk>
Subject: FW: Application: 4309/19 - Tesco Goodmayes Site

Afternoon [REDACTED]

Thank you for your updated comments which I sent on to the applicant.

They've come back seeking clarification of the approach of refuse storage allocation and applying the formula to the proposal. They are hoping that it can be agreed as compliant but should it be considered necessary to for one particular block to provide additional bins, they can accommodate this. However, please see text below to clarify the allocation per block:

Housing Design Supplementary Planning Document (SPD) Adopted September 2019

Estimated waste equation: (Unit number x 0.2)/ 1.1 = Bin Quantity

Total number of flats x 0.2, this figure is then divided by the litre capacity of bin/s to be used (e.g. 1100 litre bin = 1.1) which will give you total number of bins required for the development.

To ensure the bin provision was calculated correctly we have calculated the bin provision per block to ensure that there are enough bins per block. Eg Block A1, Block A1/A2 Link, Block A2 etc....

This ensures the right amount of bins are located within a sensible walking distance for each resident. Rather than having one large communal bin store. This reinforces the design strategy that each block has its own front door and thus its own accompanying bin and cycle store.

Should you run the calculations on a block total this doesn't provide you with a per block basis. Coupled with the margin of +/- for decimal places the numbers do vary.

From the most recent feedback it would appear that Blocks A (6 bins) & C (5 bins) are short, and Blocks B (7 bins) & D (6 bins) are over. However, hopefully the above clarifies the approach and when reviewed against the bin per block schedule and waste strategy it can be considered sufficient.

I am happy to accept above, but would of course follow your lead. Could you please let me know if you agree/any further comment you may have.

Kind regards,

[REDACTED]

From: [REDACTED] [REDACTED]
Sent: 12 November 2020 09:00
To: [REDACTED] <[REDACTED] redbridge.gov.uk>
Subject: RE: Application: 4309/19 - Tesco Goodmayes Site

Morning [REDACTED]

Please see attached, this is based on page 20 of the document provided.

Regards

[REDACTED]

[REDACTED] [REDACTED]
Waste & Recycling Collections Officer
Environmental Services
London Borough of Redbridge
WREN Centre, Ley Street Depot, Ley Street, Ilford IG2 7QZ

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From: [REDACTED]
Sent: 03 November 2020 12:28
To: [REDACTED] [REDACTED] <[REDACTED] redbridge.gov.uk>
Subject: FW: Application: 4309/19 - Tesco Goodmayes Site

Dear [REDACTED]

Sorry to trouble you with this one again.

I've forwarded your comments (attached for ease of reference) to the applicant team, and they have come back to say that the comments do not correspond with unit numbers per block as indicated in the submitted Waste Management & Servicing Strategy (page 20). (The table on page 20 shows the breakdown and compliance per block - attached for ease of reference).

Are you able to let me know the source of the numbers per block you used in your comments?

Kind regards,

[REDACTED]

From: [REDACTED]
Sent: 02 November 2020 09:51
To: [REDACTED]
Subject: RE: Application: 4309/19 - Tesco Goodmayes Site

Hi [REDACTED]

[REDACTED] . Please see attached, this were my original comments.

Regards

[REDACTED]

[REDACTED] Waste & Recycling Collections Officer
Environmental Services
London Borough of Redbridge
WREN Centre, Ley Street Depot, Ley Street, Ilford IG2 7QZ

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From: [REDACTED]
Sent: 22 October 2020 13:13
To: [REDACTED] <[\[REDACTED\]@redbridge.gov.uk](mailto:[REDACTED]@redbridge.gov.uk)>
Subject: RE: Application: 4309/19 - Tesco Goodmayes Site

Thanks [REDACTED]

If possible, could you please let me have the breakdown per store/block).

I'll then go back to the applicant.

Kind regards,

From: [REDACTED] [REDACTED]
Sent: 22 October 2020 11:49
To: [REDACTED] <redbridge.gov.uk>
Subject: RE: Application: 4309/19 - Tesco Goodmayes Site

Hi

I've had a look again at the development and the D & A statement states that the site will require 233 X 1100s for Refuse and 35 X 1100s for Recycling. In my original estimate (Below) this is slightly different as the figures are worked on a number of properties that use each refuse store and not an accumulative total.

Calculations show that the minimum amount of 1100 Litre Eurobins required to contain household waste for 1,280 residential units would be 231 in number with 38 X 1100 Litre Eurobins for Recycling which are split into 16 pairs of bins (1 for paper and card and the other for mixed recycling). Please see below for breakdown.

So this will need to be looked at, (I can provide the breakdown per store/block if you need this).

My only other concerns are road widths/height clearances and ramps angles. The vehicle needs a 4M height clearance to access any areas which are undercover and will also need to navigate the roadways without obstruction (has a swept path analysis been undertaken as I was unable to locate this?). We do also have issues with vehicle approach and departure angles, if the collections are not at ground level. These should not 11 degrees approach and 12 degrees departure.

I am away from the office now until Monday and if you would like to discuss anything further please let me know.

Regards

Waste & Recycling Collections Officer
Environmental Services
London Borough of Redbridge
WREN Centre, Ley Street Depot, Ley Street, Ilford IG2 7QZ

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From: [REDACTED]
Sent: 21 October 2020 13:49
To: [REDACTED] [REDACTED] <[REDACTED]redbridge.gov.uk>
Subject: Application: 4309/19 - Tesco Goodmayes Site

Dear [REDACTED]

I hope you are well.

Thank you for your consultee response (attached for ease of reference) on the above proposal.

I note your comments and suggestions, but are you able to conclude whether you are satisfied/not satisfied with the proposal?

For ease of reference, here is the link to the application documents and plans:

<http://planning.redbridge.gov.uk/swiftlg/apas/run/WPHAPPDETAIL.DisplayUrl?theApnID=4309/19>

Give me call if you need to discuss.

Kind regards,

[REDACTED]

[REDACTED]
Principal Planner
Regeneration, Property and Planning
Regeneration and Culture Directorate
London Borough of Redbridge
11th Floor (Front), Lynton House 255-259 High Road, Ilford IG1 1NY

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Air Quality Review (V2) for Amended Scheme; Proposed Redevelopment at 822 High Road, Goodmayes (LPA ref: 4309/19).

Prepared by the Centre for Health Services Studies, 29/09/2020,
Professor [REDACTED] Peckham & Dr Ashley Mills. Contact:
[REDACTED]

Site	Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford
Applicant	Weston Homes PLC
Redbridge reference	4309/19

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1. Summary

Careful consideration of Aether's new AQAv6 response leads us to conclude the following:

- Uncertainty is introduced into Aether's model in the form of measurement inputs based on diffusion tubes which have a +/-25% accuracy and are classified as "indicative" according to Defra.
- The bias-correction applied (0.92) to these inputs is derived as an orthogonal average from data points from the same laboratory and tube preparation method, that has a range 0.73-1.12 (+/- 25% approx relative to 0.92), and we do not know what the actual bias is here.
- The model produced has school receptor heights at 2.8m and 2.6m, and ground floor site receptors are at 2.625m far above the human breathing zone. This is upto 86% higher than the nominal receptor height of 1.5m. NO₂ typically reduces with height.
- The model produced has an RMSE of 4.5 ug/m³ for NO₂ which is more than 10% of the reference objective 40 ug/m³.
- Accordingly these errors may compound to paint a picture that under-represents the true risk to health.
- Children at the new school, and residents of the new development, are therefore on-balance at considerable risk of damaging exposure to air pollution and the development should not be approved in its current form.

2. Introduction

1. This document has been prepared by Professor Stephen Peckham and Dr Ashley Mills. Stephen is Professor of Health Policy and Director of the University of Kent's Centre for Health Services Studies and Professor of Health Policy at the London School of Hygiene and Tropical Medicine. He has been working with local residents groups, Parish Councils and voluntary groups on air quality issues in Kent and Essex to undertake air quality monitoring and support submissions to planning consultations.
2. Dr Ashley Mills is a published air quality expert with a doctorate in Systems Engineering. He has 16 years of experience of mathematical modeling of complex physical systems and statistical analysis of them.
3. The Centre for Health Services Studies at the University of Kent was commissioned by the "Stop the Tesco Toxic Towers" campaign group [1] to provide an independent review of air quality and air quality assessments submitted in relation to the proposed development at the former Tesco Extra site in High Road, Chadwell Heath, Romford (Redbridge planning application 4309/19 [2]). This was submitted to London Borough of Redbridge (LBR) planning department under the title "Air Quality Review for 4309/19" [3]. The review referenced the following documents:
 - The air quality chapter (Chapter 4) of the developer's Environmental Statement (ES) prepared by Aether Ltd which has the title "*Goodmayes ES Chapter 4: Air quality*" [4]. This is dated October 2019.
 - The air quality technical appendix (Appendix C) of the developer's Environmental Statement (ES) prepared by Aether Ltd which has the title "*Goodmayes Environmental Statement Technical Appendix C: Air Quality*" [5]. This is dated October 2019. This is referred to later as AQA V5.

- An air quality monitoring survey conducted by Aether Ltd in the geographical area of the proposed development [6]. Note that this has a publication date of January 2020 post that of the developer's Environmental Statement. This was promised as a follow-up to the October 2019 ES documents.

4. Since this time, and in response to consultation feedback, the applicant has made several amendments to the original submission, which are summarised in a document titled "Planning Supporting Statement - ADDENDUM" [7] which summarises the main changes as follows:

- Amendments to block structure including reconfiguration of height across the site in response to technical input
- Architectural approach refined including revisions to elevational treatment across the site
- New entrances added and street frontage appearance enhanced (north and south facing)
- Housing mix amended (N.B. 1,280 total new homes provision and 35% affordable housing retained)
- Revised landscaping strategy including increases to and quality of public and communal spaces, and improvements to pedestrian permeability
- Improved internal living environment achieved for future occupiers • Residential and retail car parking spaces reduced
- Improved servicing access for refuse and recycling collection
- Revised energy strategy
- Advanced detail progressed for safeguarded station entrance
- Basement height reduced to improve landscape transitions within the public realm
- Increased size of internal podiums

5. A new Air Quality Appraisal has been written by Aether Ltd titled "*ES Technical Appendix C1 Air Quality Assessment V6: for Amended Scheme*" [8] to address these changes as well as claiming to address comments submitted by LBR's EIA consultants, LBR's Environmental Health Officer, and The Centre for Health Services Studies at the University of Kent (our submission [3]).

6. The purpose of this document is to address this new AQAv6 and the comments therein.

7. Appendix E of Aether's V6 AQA states that "*The London Borough of Redbridge have provided comments on AQA v5 and the monitoring report and these are outlined below along with Aether's responses* ". And yet inspection reveals that the comments Aether addresses are taken from our previous submission, not from the LBR. It isn't clear how this misappropriation has occurred, but we have addressed these comments in the next section.

8. Appendix F of Aether's V6 AQA contains comments on our Air Quality Appraisal V1 and we will address these comments in the section after.

3. Comments on Aether's V6 AQA

3.1. The development does not “reduce pollution in and around schools” it increases pollution in and around schools

On page 18 of Redbridge’s 2020-2025 AQAP [9], a list of priorities are provided under the section header “*Redbridge Air Quality Priorities and Air Quality in Context*”, top of this list is “*Reducing pollution in and around schools*”. On page 34 they state that “*In Redbridge, children in schools that are situated on or near to busy roads may be exposed to higher levels of air pollution from congestion and idling.*”

In Aether’s AQAv6 model, school receptor T2 shows an objective breach for the scenario “no improvement in the vehicle Fleet” for 2026 (Table 6).

In every scenario Aether modeled, at least one school receptor site shows an increase in air pollution with the development, relative to without the development. Thus the development is antagonistic to the goal of “*reducing pollution in and around schools*”.

Building a new school on the High Road, one of the most polluted roads in the borough is antagonistic to the goal of “*reducing pollution in and around schools*”. It introduces a new vulnerable cohort to air pollution.

3.2. School exposure is likely higher than modeled

Appendix C on page 53 of Aether’s AQAv6 [8] provides details of all modeled receptors.

The receptor heights for the school locations T, U, and N are given respectively as 2.8m, 2.6m, and 2.8m.

LAQM TG(16) [10], when referring to the siting of monitoring equipment and the inlet for said equipment stipulates height requirements and refers to 1.5m as “*the breathing zone*” (para 7.132)

Even without this point pinned to the guidance, it should be obvious to anyone reading that 2.8m and 2.6m are heights that far exceed the breathing zone of normal adult humans and children.

It is known that NO₂ concentration decreases with height relative to emission (see for example [11]) and therefore actual exposure is likely to be higher than modeled.

3.3. Air quality model error is large

In Appendix A on page 51 of Aether's AQAv6 [8], Aether declares that their model has an RMSE of 4.5 ug/m³ for NO₂

Box 7.17 on page 7-133 of the LAQM TG(16) guidance [10] defines the the RMSE mathematically and provides the comment:

“RMSE is used to define the average error or uncertainty of the model. The units of RMSE are the same as the quantities compared. “

This means that on average Aether's predictions are likely to be out by +- 4.5 ug/m³. This is more than 10% of the objective limit value 40ug/m³.

Box 7.14 on page 7-130 of the LAQM TG(16) guidance provides guidance for assessing model accuracy and has this to say:

“In order to provide more confidence in the model predictions and the decisions based on these, the majority of results should be within 25% of the monitored concentrations as a minimum, preferably within 10%”

Thus the model error provided by Aether is not preferable according to the guidance, and there is an admission of further uncertainty here.

3.4. Bias-correction introduces further uncertainty

In V6 of Aether's AQA [8], a predictive air quality model is constructed based on diffusion tube measurements that they took. Aether bias corrects these measurements in accordance with LAQM.TG(16) guidance [10] and uses a bias factor of 0.92. This value is taken from Defra's diffusion tube bias factor spreadsheet [12] and uses the value for 2019 for 20% TEA in Water and Gradko as the laboratory.

This represents the “orthogonal” average of 30 co-location studies, submitted to Defra from different local authorities.

This average is taken to be representative of Redbridge and yet examination of the 30 studies reveals that the bias factors of individual contributing authorities has a spread from a minimum of 0.73 to a maximum of 1.12.

Taking Aether's raw annualised diffusion tube results from Table 3 on page 10 of Aether's diffusion tube survey [6] from the column with the heading “*Unadjusted annualised mean (ug/m3)*”. We apply the minimum (0.73), orthogonal mean as used by Aether (0.92) and the maximum (1.12) to these values to illustrate how much the choice of bias factor affects the results. This is shown in Table 1 below.

Tube	Unadjusted annualised	Bias corrected	Bias corrected	Bias corrected
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	mean ($\mu\text{g}/\text{m}^3$)	Low (0.73)	Orth mean (0.92)	High (1.12)
A1	39.7	29.0	36.5	44.5
A2	36.5	26.6	33.6	40.9
A3	36.0	26.3	33.1	40.3
B1	34.4	25.1	31.6	38.5
B2	39.8	29.1	36.6	44.6
B3	41.4	30.2	38.1	46.4
C1	39.2	28.6	36.1	43.9
C2	40.0	29.2	36.8	44.8
C3	38.5	28.1	35.4	43.1
D1	32.2	23.5	29.6	36.1
D2	31.7	23.1	29.2	35.5
D3	32.6	23.8	30.0	36.5
E1	33.0	24.1	30.4	37.0
E2	30.5	22.3	28.1	34.2
E3	32.1	23.4	29.5	36.0
F1	33.0	24.1	30.4	37.0
F2	33.6	24.5	30.9	37.6
F3	34.3	25.0	31.6	38.4

Table 1 - The effect of applying different bias factor adjustments to unadjusted annualised mean results from diffusion tube as reported by Aether. Objective violations are shown in bold with a red background. Results within 10% of the objective are given an orange background.

We have demonstrated previously in a peer-reviewed journal article [13] that applying a bias factor degraded accuracy by more than 10% for 30% of the 2329 submissions that made up the bias correction spreadsheet in 2017.

There is currently no way to tell whether the bias correction tool will degrade accuracy for a given location. But if we take Table 1 above, we can see that it is completely possible that the unknown actual bias factor (that would correctly adjust relative to a chemiluminescent) for 20% TEA/Water and Gradko could in fact be 1.12, we simply don't know.

The point is, bias correction actually illustrates that there is a large degree of uncertainty in diffusion tube results and individual correction may not help the accuracy of a model that predicts individual results.

3.5. Receptor heights on the high road do not reflect human exposure

Aether modeled the High Road at 2.85m to account for idiosyncrasies in the site layout. Appendix C on page 53 of Aether's AQAv6 [8] provides details of all modeled receptors.

All the ground floor receptors are given as 5.475m, thus accounting for the road-offset, these receptors are modeled at 2.625m.

This is above the breathing zone of normal adults.

It is known that NO_2 concentration decreases with height relative to emission (see for example [11]) and therefore actual exposure is likely to be higher than modeled.

4. Addressing Aether V6 AQA Appendix D comments toward LUC clarifications

9. Appendix D of Aether Ltd's V6 AQA [8] addresses various concerns raised by LUC, Ricardo Energy & Environment, and Cleowlow Consulting on behalf of LBR. Whilst these are not addressed toward us, there are some points which we believe are misleading that warrant comment, these follow. We have replicated the comments below for readability

- 10.

Ref.	LUC clarification request	Applicant's response
AQ6	Clarification should be provided on the PM2.5 air quality objective that the development has been assessed against. The response should expand upon the significance of the proposed development's contribution at existing and new receptors.	TG16 states that LAs in England have to 'work towards reducing emissions / concentrations of fine particulate matter (PM2.5)' and no particular objective is provided. However, the Mayor of London's Environmental Strategy has stated an aim of meeting the WHO limit of 10 $\mu\text{g}/\text{m}^3$ by 2030, but this is acknowledged by the Mayor to be beyond his control, being dependent on the Government, and in respect of transboundary pollution, <i>inter alia</i> , the EU, which the UK has left since the LES publication. PM2.5 was therefore not assessed against a statutory objective as such but was compared against the WHO limit
CHSS comment		
The applicant dismisses the Environmental Strategy aim of meeting the WHO limit of 10 $\mu\text{g}/\text{m}^3$ by stating that <i>"this is acknowledged by the Mayor to be beyond his control".</i> Page 41 of the Environmental Strategy [14] still lists reducing PM2.5 to WHO levels as a goal:		

“establishing and achieving new, tighter air quality targets for a cleaner London, meeting World Health Organization (WHO) health-based guidelines by 2030 by transitioning to a zero emission London”

It does not follow that acknowledging transboundary pollution exists, or that getting the government backing for policies would be useful, means that having an impact on PM2.5 is “beyond his control”. This isn’t grounds to dismiss the target.

11.

Ref.	LUC clarification request	Applicant's response
AQ5	Clarification is required on whether RMSE introduces a risk of annual mean NO ₂ concentrations being at risk of exceedance. In addition, if interpretation of RMSE causes some locations to go into exceedance mitigation should be proposed to offset these exceedances in their entirety. See para. 5.9 for further information.	Guidance provided in LAQM-TG16 states that model behaviour is acceptable if an RMSE of 25% of the objective being assessed is achieved. In this case an RMSE of under 10µg/m ³ identifies an acceptable model, which was achieved. While there is uncertainty within the uncorrected model outputs, it is important to note that bias adjustment was also undertaken and included in the results. Additionally, the updated modelling, undertaking verification using the 6 month diffusion tube survey results, has lead to a reduction in modelled concentrations at the Development Site. Modelled concentrations are now 38% below the annual mean objective.
CHSS comment		
<p>LAQM-TG(16) [10] para 7.542 page 7-134 states that models with an RMSE equal to or over 25% <i>“should be revisited in order to make improvements”</i>, but also states that:</p> <p><i>“Ideally an RMSE within 10% of the air quality objective would be derived, which equates to 4µg/m³ for the annual average NO₂ objective.”</i></p> <p>This makes it clear that the RMSE gives a measure of model accuracy which must be taken into account on its own, not as a binary selector of acceptable/not-acceptable as implied.</p> <p>Aether’s RMSE is 4.5µg/m³, which is greater than 10%, and any predicted values within 4.5 µg/m³ of 40µg/m³ are at risk of breaching the objective under the error bounds of the model.</p> <p>Aether goes on to make the statement <i>“While there is uncertainty within the uncorrected model outputs, it is important to note that bias adjustment was also undertaken and included in the results.”</i></p> <p>This doesn’t have anything significant to do with the RMSE of the resultant model since bias correction is applied linearly to the input values (with a near-linear transformation to</p>		

NOx) before the model is constructed. You could have perfectly accurate inputs and still have a bad model. So the statement is misleading as it implies that this has a bearing, or offsets, the poor RMSE of the model, which it doesn't. (see also our criticism of bias factors in the previous section)

5. Addressing Aether V6 AQA Appendix E comments toward our V1 Air Quality Review submission

12. Appendix E of Aether Ltd's V6 AQA [8], claims to be addressing "*London Borough of Redbridge's Comments on the AQA V5*", but the comments are in fact taken verbatim from our (CHSS) previously submitted comments [3] toward Aether's V5 AQA [5].
13. Aether addresses 24 issues we raised in a point-by-point fashion. In several instances shortfalls we pointed out have been rectified in their AQAv6:
 - The diffusion tube survey results are used to construct the air quality model in AQAv6 (we pointed out that they stated they would use them in the survey but did not until now)
 - Exact locations and heights for receptors are now provided
 - Receptor nomenclature has been normalised and additional receptors added
 - Page numbers have been added
 - Model verification has been performed against the diffusion tube survey sites
 - The ADMS-Roads version has been upgraded to 5 from 4.1.1
 - The High Road is now modelled at 2.85m to align with the reality of the ground floor (it still isn't clear what was done before), and High Road receptor heights changed accordingly.
14. There are however a few of Aether's comments that require rebuttal because they either misrepresent our position, or their own position, these follow.
15. In point 23 we state that two diffusion tube sites in their survey (A and C) had annualised individual tube results of 39.7 $\mu\text{g}/\text{m}^3$ (tube A1) and 40.0 $\mu\text{g}/\text{m}^3$ (tube C2). Aether falsely states in response to point 23 that:

"The values you refer to are raw results from a single diffusion tube for a month"

This is not true. The value of 39.7 $\mu\text{g}/\text{m}^3$ for tube A1 is from table 3 on page 10 of Aether's diffusion tube survey [6] from the column with the heading "*Unadjusted annualised mean ($\mu\text{g}/\text{m}^3$)*". This row has a full six months of data, and the value represents the annualised but not bias corrected result. It is not therefore from a single month as claimed above, but an annualisation derived from 6 months of data. The same is true for tube C2 and the result of 40.0 $\mu\text{g}/\text{m}^3$.

16. In point 12 Aether responds to our call for caution given the high values observed with the statement (referring to AQAv6):

“There are no predicted exceedances of the annual mean NO₂ objective across the development site”

This isn't strictly true as it really depends on the scenario modeled. Table 6 on pages 24-26 of Aethers' AQAv6, predictions are given for a (no improvement in vehicle fleet) scenario. This gives predicted values of 40.4 µg/m³ 40.5 µg/m³ for the school location DT T for respectively the without and with development cases, which exceed the annual mean NO₂ objective.

6. Addressing Aether V6 AQA Appendix F comments on our V1 Air Quality Review submission

17. In Appendix F of Aether Ltd's V6 AQA [8], Aether provides a point-by-point rebuttal of our (CHSS) previously submitted comments [3] toward Aether's V5 AQA [5]. In this section we address those criticisms (where relevant), since there are some misunderstandings that need clarification.

18. It is difficult to do this without repeating the format of Aether's document because the context of our original comments and Aether's criticisms need to be visible for our response here to make sense. Please therefore excuse the necessary duplication that follows. Note that the absence of a response to a point does not necessarily imply acceptance of the criticism on our part. We were unable to address some points owing to being timed-out on the project.

19.

Comment in Peckham and Mills' report	Aether's response
6. The proposed development is located in Redbridge where air quality is so poor on average that the entire borough has been designated an AQMA. Despite this, a development is proposed that will worsen air pollution.	As the comment states “air quality is so poor on average”. There are locations within the borough where the air quality objectives are met and locations where they are not. The 2019 monitoring survey that was undertaken across the Development site showed that the annual mean objective was met at all locations monitored once annualisation and bias correction was undertaken
CHSS Response	
Our comments referred to Aether's AQAv5 in which they did not carry out bias correction,	

but did annualise. Tubes B2 and C2 had values of 41.4 µg/m³ and 40.0 µg/m³ as annualised means for NO₂. Aether's statement above is misleading because it implies that the 2019 monitoring survey contained bias corrected results (which it didn't).

In Aether's AQAv6 an annualisation factor of 0.92 is applied which brings the values for B2 and C2 down to 38.1 µg/m³ and 36.8 µg/m³, both within 10% of the objective limit. Annualisation factors are a highly error prone method of adjusting diffusion tubes [13] and cannot be relied upon to produce values which reflect reality.

Given that Defra classifies diffusion tubes as "indicative" and have a stated accuracy of +/- 25%, these figures are still cause for concern. Aether only performed monitoring for only 6 months and for some tubes, due to missing data, only monitored for 2 months (Note that under LAQM.TG(16) you can only annualise data with a minimum of 3 months).

It isn't reasonable for Aether to make strong statements therefore about the levels of NO₂ without additional monitoring being performed.

It is fair to say that the levels of NO₂ as indicated by the diffusion tubes are cause for concern and warrant further investigation.

20.

Comment in Peckham and Mills' report	Aether's response
7. Objective pollution limits in the UK are set far above the levels at which harms occur	Local Authorities are only obliged to consider compliance with the UK air quality objectives. The results set out in this AQA V6 indicate that with or without Fleet improvements, the pollution levels modelled for 2026 at the development site are well below the statutory objectives for the UK.
CHSS Response	
Local Authorities should take a balanced approach and are required to give due weight to policies outlined in the NPPF which para 180 states " <i>Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health</i> "	
The UK government provides a flowchart "Air Quality Flowchart" [15] to assist decision makers as to whether air quality is likely to be an issue and it poses the question " <i>Will the proposed development (including mitigation): • lead to an unacceptable risk from air pollution;</i> ". This makes it clear that overall risk must be considered, not just measured or modeled values.	

21.

Comment in Peckham and Mills' report	Aether's response
10. A DT survey found dangerously high values of NO ₂	The objective of concern for NO ₂ is the annual mean objective. The monitoring survey was carried out for a period of 6 months and it appears that Peckham and Mills are referring to individual monthly results for selected DT that have not been

	averaged for the site location, annualised or bias corrected. Once this has been undertaken, all monitoring locations show no exceedances of the air quality objectives across the development site.
CHSS Response	
<p>We are not referring to individual monthly results. Table 3 on page 10 of Aether's Air Quality Monitoring Survey [6] provides both individual monthly results and a column titled "<i>Unadjusted annualised mean</i>" which represents the annualised value for each tube.</p> <p>Aether did not bias-correct these results and states in paragraph 3 on page 12 that "<i>The results have not been adjusted for bias, which introduces uncertainty. However, this uncertainty is considered insignificant in terms of the report</i>".</p> <p>Tubes B3 and C2 in Table 3 are each from different co-located tube triplicates (B1,B2,B3) and (C1,C2,C3) respectively. B1 has only 4 months of data, whereas B2 and B3 have only 2 months of data. The dataset for the C tubes is complete (full 6 months).</p> <p>The annualised figure for site B3 given in Table 3 of Aether's report is 41.4 $\mu\text{g}/\text{m}^3$ and the annualised figure for site C2 is given as 40.0 $\mu\text{g}/\text{m}^3$.</p> <p>An obvious (and misleading) counter-argument to this claim is that the triplicate readings should be averaged, and that the average of a triplicate location is its "true" value.</p> <p>This is a weak argument, and highlights the uncertainty inherent to diffusion tubes since so often a single tube is exposed and claimed as representative. Yet in this case within the B triplicate, one reading exceeds the objective and the others don't. Demonstrating that chance plays a role in determining whether a location is considered an "exceedance" or not.</p> <p>B3 and C2 both show exceedances (or equivalence) to the objective for NO_2 when considered as independent diffusion tubes and this highlights the need for caution, especially given that diffusion tubes have a stated accuracy of +/-25% by Defra and are classed as "indicative".</p>	
22.	

Comment in Peckham and Mills' report	Aether's response
57. The results however show two diffusion tube sites (B and C) with single tubes of the triplicate showing exceedances. All three tubes at site A are within 10% of the objective limit	Following LAQM TG16 guidance the average value obtained at each site should be used. Therefore, reference to single tubes is not appropriate. In addition, regard should be had to the fact that the objective is an annual mean and therefore annualisation must be undertaken as well as a correction for bias. When these steps are undertaken, no exceedances are found at any of the locations monitored.

CHSS Response

LAQM TG(16) [10] refers to the use of triplicate tubes in the context of assessing tube precision and accuracy, and the average is used in this context. LAQM TG(16) doesn't make any reference to using triplicate (or multiple) tubes for general monitoring.

Having said that it obviously makes sense to average co-located diffusion tubes for general measurement.

The idea however that "*reference to single tubes is not appropriate*" is ridiculous, as the majority of locations measured and reported on by local authorities in ASRs are from single exposed tubes. Just so there is no confusion, we are talking about annualised values for single tubes.

If it were the case that "*reference to single tubes is not appropriate*" then every ASR from every year and for local authority in the country would be inappropriate too, since they routinely report annualised values for single tubes.

Aether's response above is again misleading in implying we were not referring to annualised values, but in fact all the values we reference are from Table 3 on page 10 of Aether's diffusion tube survey [6] from the column with the heading "*Unadjusted annualised mean (µg/m³)*" where annualisation (but not bias correction) has already been performed.

So it is still the case, and a valid point to make, that some of the annualised values reported by Aether, for single tubes, exceed the annual objective for NO₂.

23.

Comment in Peckham and Mills' report	Aether's response
82 to 84. The developer makes claims about hourly NO ₂ levels using a rule of thumb rather than direct empirical evidence. They also quote as reported in Table E on page 12 of the Council's ASR that there was an hourly mean breach in 2013 at site CM1 despite the NO ₂ annual mean for 2013 being 35.4µg/m ³ .	LAQM TG 16, Section 7.91 states "Previous research carried out on behalf of Defra and the DAs identified that exceedances of the NO ₂ 1-hour mean are unlikely to occur where the annual mean is below 60µg/m ³ . This assumption is still considered valid". Therefore this is an appropriate assumption to make and is in line with the guidance. With regard to the reference to the Council's ASR, in 2013 there was one hour in which a concentration above 200µg/m ³ was recorded. 18 hourly exceedances are allowed per year and therefore this statement is highly misleading and in fact proves the point that no exceedances of the hourly objective are expected at any of the receptor locations modelled.

CHSS Response

Aether has correctly identified a mistake here but there was no intent to mislead because the point is actually valid (just not from this data). This also illustrates that the Defra guidance is badly worded here because it should refer to "more than 18 exceedances of

the NO₂ 1-hour mean”, not “exceedances of the NO₂ 1-hour mean”.

That aside, more than 18 hourly exceedances of the 200 µg/m³ can occur when the NO₂ annual mean is below 60 µg/m³ and this is illustrated in the original work [19] from which the heuristic was first derived.

In fact in the original work, the heuristic is literally derived on the basis that “*Likely is taken to be a 50% chance of the exceedance occurring*” (paragraph 4.1). Which indicates the actual error margin of the heuristic as derived.

The broader point here is that relying on the 60 ug/m³ as a proxy for exceedances of the hourly objective (single or multiple) introduces uncertainty.

24.

Comment in Peckham and Mills' report	Aether's response
90 to 91. Development is not air quality neutral	<p>The text provided by Peckham and Mills does not refer to the official Air Quality Neutral Guidance, but just makes an assumption that because a negligible impact is predicted in terms of air pollutant concentrations that it is not AQN. If the AQN guidance is followed (see: https://www.london.gov.uk/what-wedo/planning/implementing-londonplan/supplementary-planning-guidance/sustainabledesign-and) then the Development is deemed to be AQN, as set out in this AQA V6 at Section 3.8.</p>
CHSS Response	
<p>Aether is correct that there are a series of benchmarks to be used as guidance to assess developments against the target of “air quality neutral”. These are presented in a document titled “<i>Sustainable Design and Construction (April 2014)</i>” [16].</p> <p>Paragraph 4.3.14 of this document states:</p> <p><i>“Developments that do not exceed these benchmarks will be considered to avoid any increase in NOx and PM emissions across London as a whole and therefore be ‘air quality neutral’.”</i></p> <p>It is worth considering however that the same paragraph ends with stating that (benchmarks):</p> <p><i>“will be kept under review and will be updated in line with technological and commercial advances.”</i></p> <p>That was written in 2014 so it may be that revision is necessary.</p> <p>The Sustainable Design and Construction document itself defers (para 4.3.19 “further details on how to apply these benchmarks”) to a previous document produced by Air</p>	

Quality Consultants called “GLA AQ Neutral Policy Final Report” [17], also written in 2014.

It is important to point out to public observers of the planning process that “air quality neutral” is currently interpreted in a way that a material increase in air pollution is considered “neutral”.

It is our view that language used to communicate with the public should be clear and use vernacular understanding of words wherever possible. Neutral should mean neutral and not “a slight increase”.

Numerically speaking it is a fact that the development is not air quality neutral since it increases pollution.

25.

Comment in Peckham and Mills’ report	Aether’s response
102 to 104. People are “regularly present” on public streets	LAQM TG16 clearly states that the annual mean objective does not apply to busy shopping streets as people do not spend substantial periods of time in those locations. Only the hourly objective applies on busy streets.
CHSS Response	
<p>LAQM TG(16) [10] is a guidance document, it is not a legal instrument.</p> <p>LAQM TG(16) is not clear about the point above at all. First of all para 1.52 on page 1-9 states</p> <p><i>“1.52 For the purpose of assisting local authorities, some examples of where the objectives should, and should not apply, are summarised in Box 1.1. These examples are not intended to be comprehensive, and it is expected that local knowledge will often be required.”</i></p> <p>And in Box 1.1, the column listing exclusions is titled “<i>Objectives should generally not apply at:</i>”</p> <p>The qualifier “<i>generally not apply</i>” implies that there are exceptions. And if we look back at previous versions of the Defra guidance we can start to understand what this means. For example, the same paragraph as above used to include a qualifier, from LAQM TG(03) [18] para 1.21 reads:</p> <p><i>“ For the purpose of assisting local authorities, some examples of where the objectives should, and should not apply, are summarised in Box 1.4. However it should be borne in mind that it is not possible to be prescriptive in this matter, and authorities should bear local circumstances in mind when considering the application of the objectives. The examples given in the table are not intended to be a comprehensive list, and it is expected that local judgement will often be required. ”</i></p> <p>Referring back to LAQM TG(16), “<i>generally not apply</i>” allows for interpretation, otherwise a phrase such as “<i>must not apply</i>” would have been used.</p>	

The law states that the objectives apply where “*where members of the public are regularly present*”. In vernacular, this certainly seems to mean streets in our interpretation. And the guidance is also ambiguous.

It is still our view that the correct interpretation of the legal paragraph “*where members of the public are regularly present*”, means just what it says and does apply to streets and pavements that the public walk on.

26.

Comment in Peckham and Mills' report	Aether's response
92 to 101. The new primary school is in a highly polluted area	Please see the Results section of this AQA V6 report, which shows that no exceedances of the air quality objectives are predicted at the primary school on the Development Site
CHSS Response	
Our statement is still true. The new primary school is in a highly polluted area and given the margins for error in measurement and modeling, there is a high risk of damaging exposure to children using the school.	

27.

Comment in Peckham and Mills' report	Aether's response
105 to 108. Annual exposure targets don't protect human health	For the purpose of deciding whether the Development has a material impact on air pollutant concentrations, reference can only be made to the current UK air quality objectives as no further improvements are required by law.
CHSS Response	
<p>Local Authorities should take a balanced approach and are required to give due weight to policies outlined in the NPPF which para 180 states “<i>Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health</i>”</p> <p>The UK government provides a flowchart “Air Quality Flowchart” [15] to assist decision makers as to whether air quality is likely to be an issue and it poses the question “<i>Will the proposed development (including mitigation): • lead to an unacceptable risk from air pollution;</i>”. This makes it clear that overall risk must be considered, not just measured or modeled values.</p>	

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Air Quality Review for 4309/19 - Development Site

At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford

Prepared by the Centre for Health Services Studies, 06/07/2020,
Professor Stephen Peckham & Dr Ashley Mills. Contact:
[REDACTED]

Site	Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford
Applicant	Weston Homes PLC
Redbridge reference	4309/19

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1. Introduction

1. The Centre for Health Services Studies at the University of Kent has been commissioned by the “Stop the Tesco Toxic Towers” campaign group [1] to provide an independent review of air quality and air quality assessments submitted in relation to the proposed development at the former Tesco Extra site in High Road, Chadwell Heath, Romford (Redbridge planning application 4309/19 [2]).
2. This document has been prepared by Professor Stephen Peckham and Dr Ashley Mills. Stephen is Professor of Health Policy and Director of the University of Kent’s Centre for Health Services Studies and Professor of Health Policy at the London School of Hygiene and Tropical Medicine. He has been working with local residents groups, Parish Councils and voluntary groups on air quality issues in Kent and Essex to undertake air quality monitoring and support submissions to planning consultations.
3. Dr Ashley Mills is a published air quality expert with a doctorate in Systems Engineering. He has 16 years of experience of mathematical modeling of complex physical systems and statistical analysis of them.
4. The main developer documents referenced in this report are:

- The air quality chapter (Chapter 4) of the developer's Environmental Statement (ES) prepared by Aether Ltd which has the title "*Goodmayes ES Chapter 4: Air quality*" [3]. This is dated October 2019.
- The air quality technical appendix (Appendix C) of the developer's Environmental Statement (ES) prepared by Aether Ltd which has the title "*Goodmayes Environmental Statement Technical Appendix C: Air Quality*" [4]. This is dated October 2019.

5. Collectively these are referred to as "the developer's air quality assessment" where doing so makes reading of this document easier. We also make reference to:

- An air quality monitoring survey conducted by Aether Ltd in the geographical area of the proposed development [5]. Note that this has a publication date of January 2020 post that of the developer's Environmental Statement. This was promised as a follow-up to the October 2019 ES documents.

2. Summary of Key Observations

6. The proposed development is located in Redbridge where the air quality is so poor on average that the entire borough has been designated an Air Quality Management Area. Despite this, a development is being proposed that will worsen air pollution.

7. Objective pollution limits in the UK are set far above the levels at which harms occur, which means that objective limits are divorced from the legal duty of care that a local authority has for residents. It is estimated that 77 excess deaths occurred due to PM2.5 in 2010 despite the PM2.5 average being below the objective limit across the borough. It is our view that planning decisions should uphold this duty of care.

8. All but one of the developer's PM10 predictions for the operational phase of the development are within 10% of the WHO health guideline for PM10, and all the developer's PM2.5 predictions exceed the WHO health guideline for PM2.5. The developer's predictions for NO₂ far exceed the level at which strong correlations with mortality occur according to contemporary research.

9. Air pollution is already extremely high outside local primary schools, and in some cases exceeds legal limits. The developer states that the development will increase air pollution further, and wants to build a new three-form primary school at the site. This implies that not only will the development negatively impact the health of local children further, but will introduce a fresh cohort of children to damaging levels of air pollution.

10. A diffusion tube survey carried out by the developer at the request of Redbridge Council, with a view to obtaining more relevant local data, found dangerously high values of NO₂: half the sites surveyed had the majority of tubes within 10% of the legal threshold and two sites had tubes exceeding the legal threshold.

11. Despite Redbridge Council's commissioned aim of the diffusion tube report being to reflect back on the developer's (previously published) air quality model, the results of the report are not used to create a more representative air quality model and the report provides no explicit reference to the findings of the previous air quality model. Thus the developer has not delivered what was asked of it by the Council and the Council has not addressed this omission.
12. The developer's air quality modeling relies on a superficial appraisal of "*cumulative impact*" that neglects key sites under consideration as well as some committed development. The air quality modeling is missing key information needed to make a direct numerical comparison with a third party model, and may be making optimistic assumptions about receptor heights relative to the road (needs clarification from the developer's AQ contractor Aether).

3. COVID-19 and air quality

13. Poor air quality is strongly linked to a range of respiratory and cardiovascular morbidities [6] causing damage and inflammation to the lungs. COVID-19 is one of a range of viruses that can cause acute respiratory distress syndrome which is characterised by inflammation and damage to the lungs.
14. Poor air quality and COVID-19 both being causal agents in lung tissue inflammation and damage increases the likelihood of negative interactions between these two agents. Despite being a relatively new disease, research has already found strong associations between air pollution and COVID-19. One study found a direct spatial relationship between tropospheric NO₂ concentration across Europe and mortality [7].
15. A more detailed study conducted on US data, and which adjusted for 20 compounding variables such as age, socio-economic, and various health conditions found that a 1 µg/m³ increase in PM2.5 annual average was associated with an 8% increase in COVID-19 death rate [8]
16. Another looked at England specifically and, controlling for population density, found that NO₂, NO, and O₃ were all significant predictors of COVID-19 death rate. The study also looked at infectivity and found that PM2.5 and PM10 were both significant predictors [9].
17. Whilst this research is at the pre-print stage, and not currently peer-reviewed the analysis appears sound. We can conclude that poor air quality not only has a direct effect on population health, but has the potential to exacerbate the mortality and spread of lung-inflaming airborne infectious diseases, and in particular COVID-19.

18. New housing should, in our opinion, seek to be mindful of the COVID-19 pandemic and ensure adequate access to green space and clean air.

4. Public Health Context

19. Local authorities are required under part IV of the Environment Act 1995 [10] to assess their compliance to the national AQS objectives by engaging in Local Air Quality Management (LAQM). This requires them to identify areas of concern, known as Air Quality Management Areas (AQMA), that either exceed or are likely to exceed national limits for PM10, O₃ or NO₂. These AQMAs once identified must then be the subject of a defined Air Quality Action Plan (AQAP) whose goal is to eliminate the identified concerns.
20. The law states that both the AQMA and associated AQAPs must be regularly reviewed and the local authority must submit an Annual Status Report (ASR).
21. The National Planning Policy Framework [11] (NPPF) lists air quality as a direct material consideration, requires that the effects of pollution on health are considered (NPPF para 180), and requires that air quality must be considered whenever there is a likely impact on an AQMA or on the observance of limit values, and a local authority should ensure that developments are consistent with its AQAP.
22. There is robust evidence linking exposure to air pollution to a variety of negative health outcomes [6], [12], and the emerging evidence base reviewed in [13] indicates that the harms attributed to air pollution may apply to a wider variety of health indicators and diseases than is currently assumed.
23. In the UK, the Committee on the Medical Effects of Air Pollutants (COMEAP), managed by Public Health England, is tasked with regularly reviewing the health effects of air pollution [14]. The implementation of the LAQM regulations discussed above, as enacted through Defra technical guidance [15], relies heavily on NO₂ measurement. Whilst the specific effects of NO₂ are hard to untangle from co-varying pollutants such as PM mass, it is clear that annual NO₂ measurements are a marker for pollution severity and the associated severity of health effects [16].
24. It is important therefore that the air quality impact assessment methodology used by local authorities, produces outputs which reflect the actual risks to health, so that appropriate mitigation may be sought, or in the worst cases, planning refused.
25. The annual regulatory limits for NO₂, PM10, and PM2.5 in the UK (and EU) are 40 µg/m³, 40 µg/m³, and 25 µg/m³ respectively [17]. The World Health Organisation reviewed the health risks associated with key pollutants in 2005 [18] and, adopted 40 µg/m³ as a guideline for NO₂, the same as the UK limit, but adopted 10 µg/m³ for PM2.5 and 20 µg/m³ for PM10, that is half the respective UK limits for PM10 and 40% of the UK limit for PM2.5.

26. Since 2005 the research picture has changed significantly, and a 2016 comprehensive review by the Royal College of Physicians [6] concluded that:

“Neither the concentration limits set by government, nor the World Health Organisation’s air quality guidelines, define levels of exposure that are entirely safe for the whole population.”

27. Fundamentally, the air quality regulatory framework in the UK does not protect population health. There are an estimated 40,000 annual deaths attributed to air pollution in the UK [6] under the current regulatory regime. However, both the NPPF (Paras 103, 181) and the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 guidelines refer to the need to protect population health. Furthermore Para 202(d) of the NPPF states that development should also seek to include: *“... appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains”*.

28. Following the Appeals Court ruling in the summer of 2019 which upheld refusal of planning permission on inadequate mitigation for air quality [19], planning guidance is also explicit that *“Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact.”* [20]. The meeting of air quality directives alone does not ensure full compliance with the NPPF or EIA regulations.

29. Public Health England and the National Institute for Health and Care Excellence have published guidance, which have helped to highlight the health impacts of air pollution with compelling evidence of a significant impact from both short-term roadside and longer term exposure on the burden of disease and mortality [16], [21], [22], [23], [24], [25]. Significant associations with hospital admissions for a variety of respiratory and cardiovascular diseases (including ischaemic heart disease, cerebrovascular disease and heart failure) have been found with levels of PM below WHO limits and therefore significantly below current UK limits [26].

30. The evidence of significant adverse health impacts from low levels of poor air quality is now well established with children and older people being particularly at risk. NO₂ and low level ozone (O₃) are strongly associated with respiratory and cardiovascular diseases with the effects occurring from both short- and long-term exposure. There is strong evidence that daily (24-hour average) exposures to PM are associated with both mortality and morbidity immediately and in subsequent days. Repeated (multiple day) exposures may result in larger health effects than the effects of single days [26]. Both epidemiological and clinical studies have demonstrated that sub-daily exposures to elevated levels of PM can lead to adverse physiological changes in the respiratory and cardiovascular systems [26].

31. A recent international study concluded that an increase of 10 µg/m³ of PM10 concentration compared to the previous day, was associated with increases of 0.44% in daily all-cause mortality, 0.36% in daily cardiovascular mortality, and 0.47% in daily respiratory mortality. For the same change in PM2.5 concentration the mortality impacts were 0.68%, 0.55%, and 0.74% respectively [27]. The associations remained significant after adjustment for other

gaseous pollutants. The results showed a consistent increase in daily mortality with increasing PM concentration with the impact worse in areas of lower PM concentrations.

32. In 2015, Public Health England estimated the impact of PM2.5 levels on early death in England [23]. They estimated that in Redbridge that 77 annual excess adult deaths arise from PM2.5 exposure with an estimated 897 years of life lost [23]. The relevant data is reproduced below in Table 1 for convenience:

Table 1 - Baseline population, modelled population-weighted mean concentrations ($\mu\text{g}/\text{m}^3$) and estimated effects on annual mortality in 2010 of anthropogenic PM2.5 air pollution.						
Area	Population age 25+ ($\times 10^3$)	Deaths age 25+	Mean anthropogenic PM2.5 ($\mu\text{g}/\text{m}^3$)	Attributable fraction (%)	Attributable Deaths age 25+	Associated life-years lost
Redbridge	133.5	1144	12.0	6.8	77	897

33. A core element of any proposed development must therefore consider how further excess deaths and years of life lost can be avoided. In particular, there should be focus on reductions in PM levels. Any increase in PM has been shown by Public Health England and the WHO to lead to a wide range of health problems and additional health and social care costs [23], [28].

34. The developer predicts levels of Nitrogen Dioxide above $10\mu\text{g}/\text{m}^3$ that has been shown to lead to the permanent damage of children's lungs [6]. There is no local data on O_3 levels but the evidence clearly shows that levels of O_3 from $80\ \mu\text{g}/\text{m}^3$ in 6-8 hour period causes respiratory and cardiovascular morbidity.

5. Development context

5.1. Governing authorities and development location

35. According to the ES site description [29] the development comprises 4.37 ha between Chadwell Heath and Seven Kings near Romford in the borough of Redbridge, London. The site sits between the A118 (High Road) and the railway line and is next to Goodmayes station. The proposal is to redevelop the existing Tesco Extra superstore, associated car park, and petrol station. Figure 1 shows the location of the development site within the borough of Redbridge and Figure 2 shows the development site in outline.



Figure 1 - Location of proposed development relative to the borough of Redbridge administrative district.

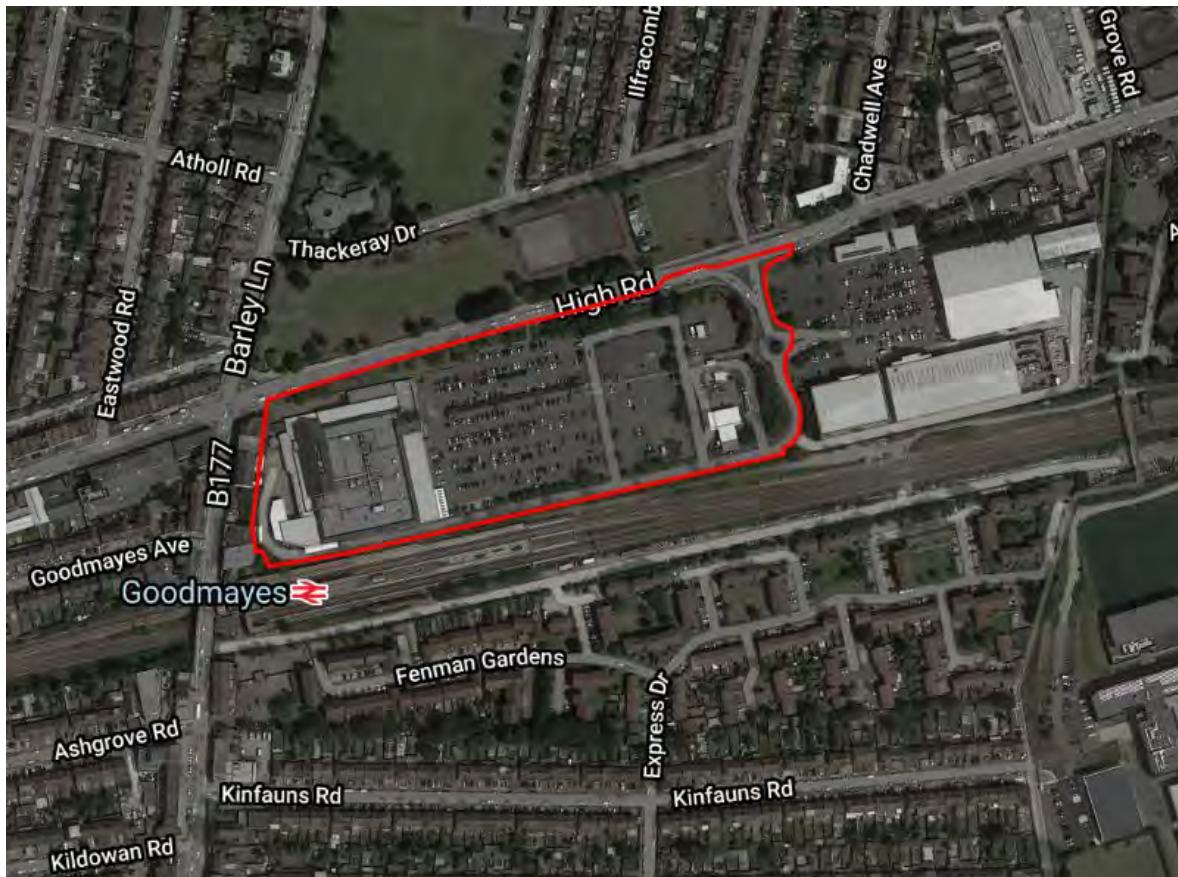


Figure 2 - Outline of the proposed development which covers a Tesco Extra site and petrol station. Image © Google 2020.

36. The proposed development occurs in a neighborhood (Redbridge 022A) which according to the 2019 Index of Multiple Deprivation (IMD) is among the 40% most deprived neighbourhoods in the country and the A118 to which this development will contribute air pollution intersects neighborhoods which are among the 30% most deprived neighborhoods in the country [30].

5.2. Air Quality Management Areas (AQMAs)

37. Local authorities are required under part IV of the Environment Act 1995 [10] to assess their compliance to the national AQS objectives by engaging in Local Air Quality Management (LAQM). This requires them to identify areas of concern, known as Air Quality Management Areas (AQMA), that either exceed or are likely to exceed national limits for PM10, O₃ or NO₂. These AQMAs once identified must then be the subject of a defined Air Quality Action Plan (AQAP) whose goal is to eliminate the identified concerns.

38. The entire borough of Redbridge was designated an AQMA in 2003 [31] and has remained so ever since. All of the neighboring boroughs: Waltham Forest, Newham, Barking and Dagenham, and Havering with the exception of Epping Forest are also designated AQMAs.

5.3. Redbridge 2019 Annual Status Report

39. The law states that both the AQMA and associated AQAPs must be regularly reviewed and the local authority must submit an Annual Status Report (ASR). The last ASR submitted by Redbridge was for 2019 [32], which contains data for 2018 as data is always a year in arrears.

5.4. NO₂ Diffusion tube data from Annual Status Report

40. Table D2 on pages 9-10 of Redbridge's 2019 ASR [32] lists the diffusion tube results for 2018. These are shown in Figure 3 and those close to the development are shown in Figure 4. Unfortunately the borough to the East of Redbridge, covering Chadwell Heath (Barking and Dagenham) ceased its diffusion tube program in 2018 so there is no additional data for that area.

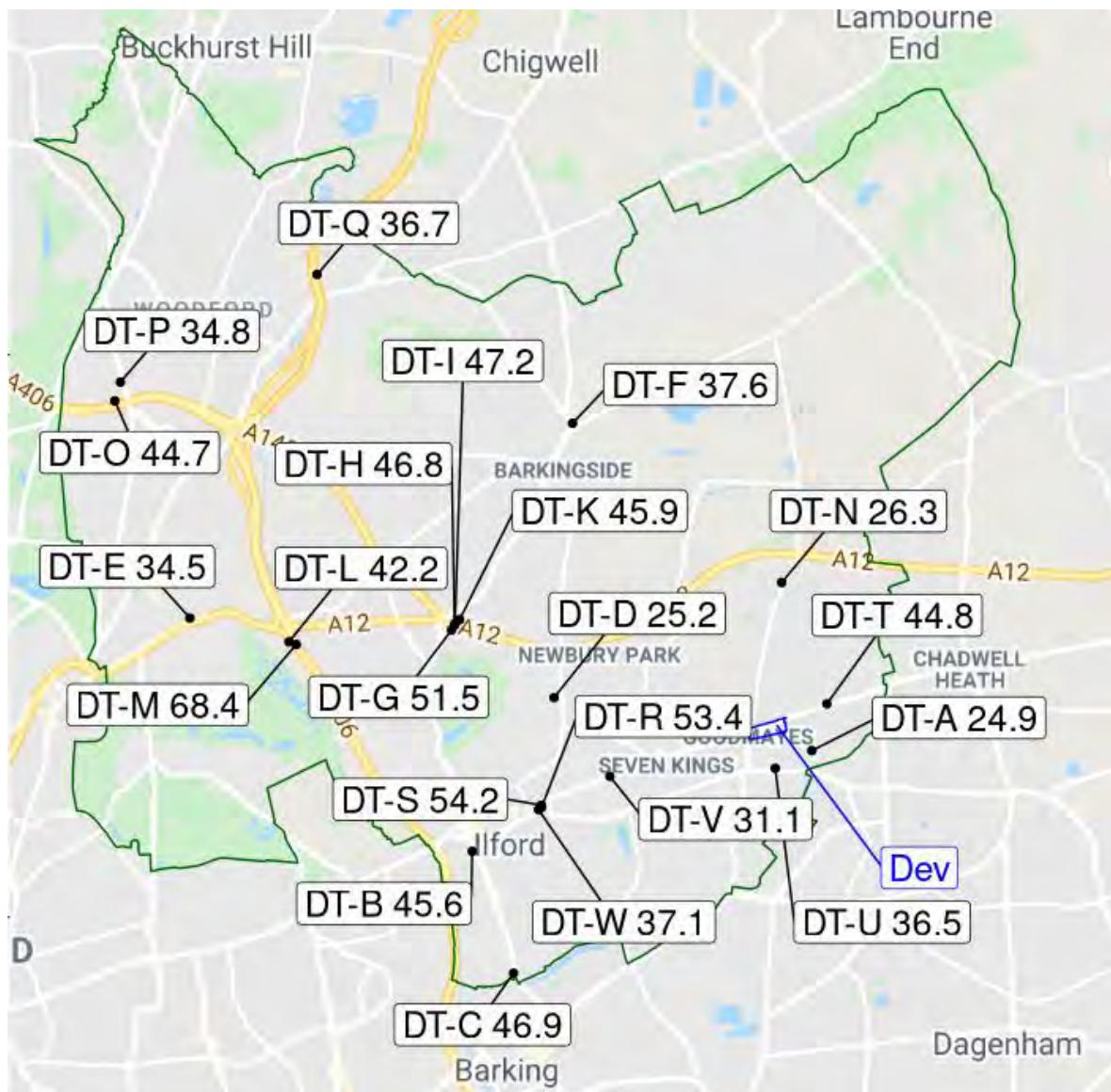


Figure 3 - Redbridge borough NO₂ diffusion tube annual means (bias and distance corrected) for 2018 (2019 ASR). Labels show diffusion tube alphabetical prefix followed by the annual mean for NO₂ in µg/m³

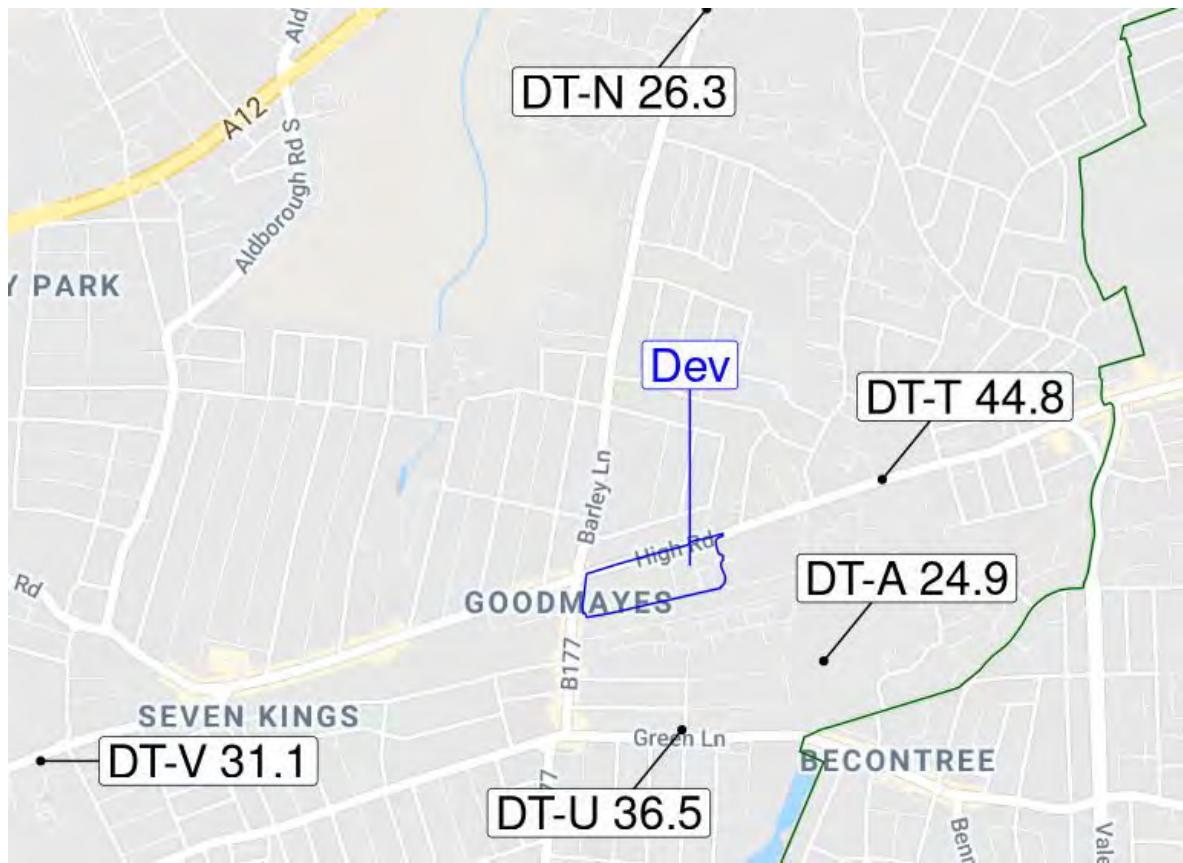


Figure 4 - Redbridge borough NO₂ diffusion tube annual means (bias and distance corrected) for 2018 (2019 ASR) close to the proposed development. Labels show diffusion tube alphabetical prefix followed by the annual mean for NO₂ in µg/m³

5.5. Automatic monitoring site data from 2019 Annual Status Report

41. Figure 5 shows the NO₂, PM10, and PM2.5 annual averages for the Redbridge automatic monitoring sites from the 2019 ASR (2018 data).

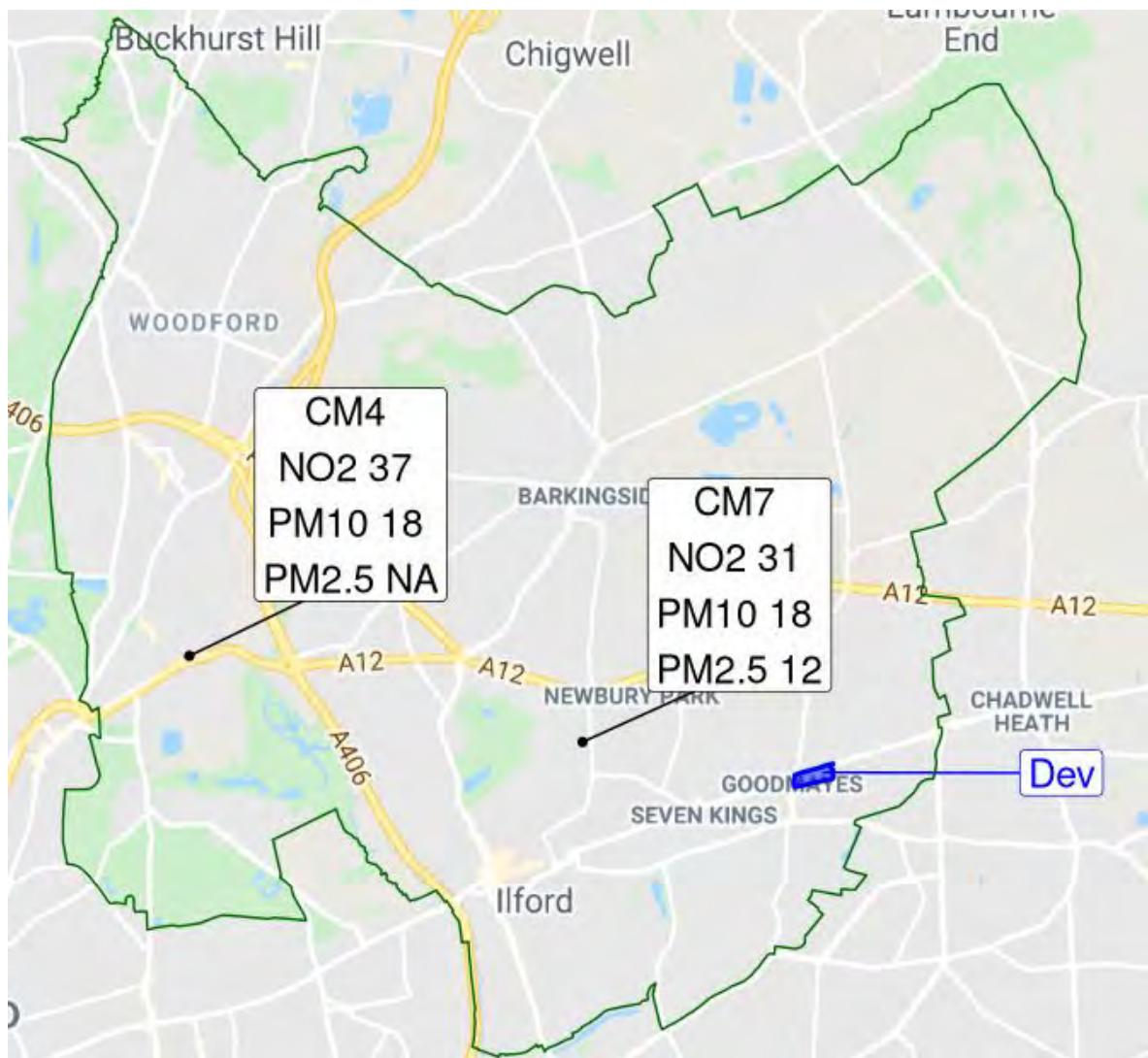


Figure 5 - 2019 ASR (2018 data) annual means for NO₂, PM10, and PM2.5 for Redbridge automatic monitoring sites CM4 and CM7. All values are in µg/m³

5.6. Pollution around primary schools

42. It is noteworthy that several Redbridge diffusion tube sites that have high pollution readings are also outside (and in one case inside) primary schools. In the subsections below we identify where these readings are taken and show the values in Figure 6 and Figure 7 for Winston Way Primary School, Figure 8 for Chadwell Heath Primary School, and Figure 9 for Goodmayes Primary School.
43. For Winston Way Primary School and Chadwell Heath Primary School the NO₂ readings for 2018 exceed the national objective limit of 40 µg/m³. For Winston Way Primary School this is true even *within* the school grounds! For Goodmayes Primary School, the measurements are within 10% of the objective limit. Note that in each case these measurements are between 2.6m and 3m above the ground. NO₂ at the ground level could be 10% higher [33].

5.6.1. Winston Way Primary School



Figure 6 - NO₂ for a diffusion tube mounted on a lamp-post 2.8m above the ground outside Winston Way Primary School is 53.4 $\mu\text{g}/\text{m}^3$ - 33% above the legal objective limit of 40 $\mu\text{g}/\text{m}^3$. Image © Google 2020.



Figure 7 - Even inside Winston Way Primary School grounds, at a height of 3m annual NO_2 readings are still $37.1 \text{ }\mu\text{g}/\text{m}^3$ - within 10% of the objective limit of $40 \text{ }\mu\text{g}/\text{m}^3$. Image © Google 2020.

5.6.2. Chadwell Heath Primary School



Figure 8 - NO₂ for a diffusion tube mounted on a lamp-post 2.8m above the ground outside Chadwell Heath Primary School is 44.8 µg/m³ - more than 10% above the legal objective limit of 40 µg/m³. Image © Google 2020.

5.6.3. Goodmayes Primary School



Figure 9 - NO₂ for a diffusion tube mounted on a lamp-post 2.6m above the ground outside Chadwell Heath Primary School is 36.5 µg/m³ - within 10% of the legal objective limit of 40 µg/m³. Image © Google 2020.

6. Developer's Air Quality Predictions

44. Aether Ltd carried out an air quality assessment for the developer to inform the air quality chapter of the ES [3], and the details of the modeling performed are given in Technical Appendix C [4]. Aether makes predictions for NO₂, PM10, and PM2.5 for the construction year (2025) and the operational year (2026) of the development.
45. Unfortunately Aether does not specify the exact locations of the receptors so it is impossible to precisely examine their predictions. We have transcribed the approximate location of the

receptors A-D in the below figures from Figure 4 of Aether's AQ Appendix [4] and we have transcribed the approximate location of the receptors R1-R3 in the below figures from Figure 4.1 of Chapter 4 of the ES [3].

46. Figure 10 shows Aether's predictions for NO₂ for the with-development scenario in the operational year 2026, Figure 11 shows the predictions for the same scenario for PM10, and Figure 12 shows the predictions for PM2.5.

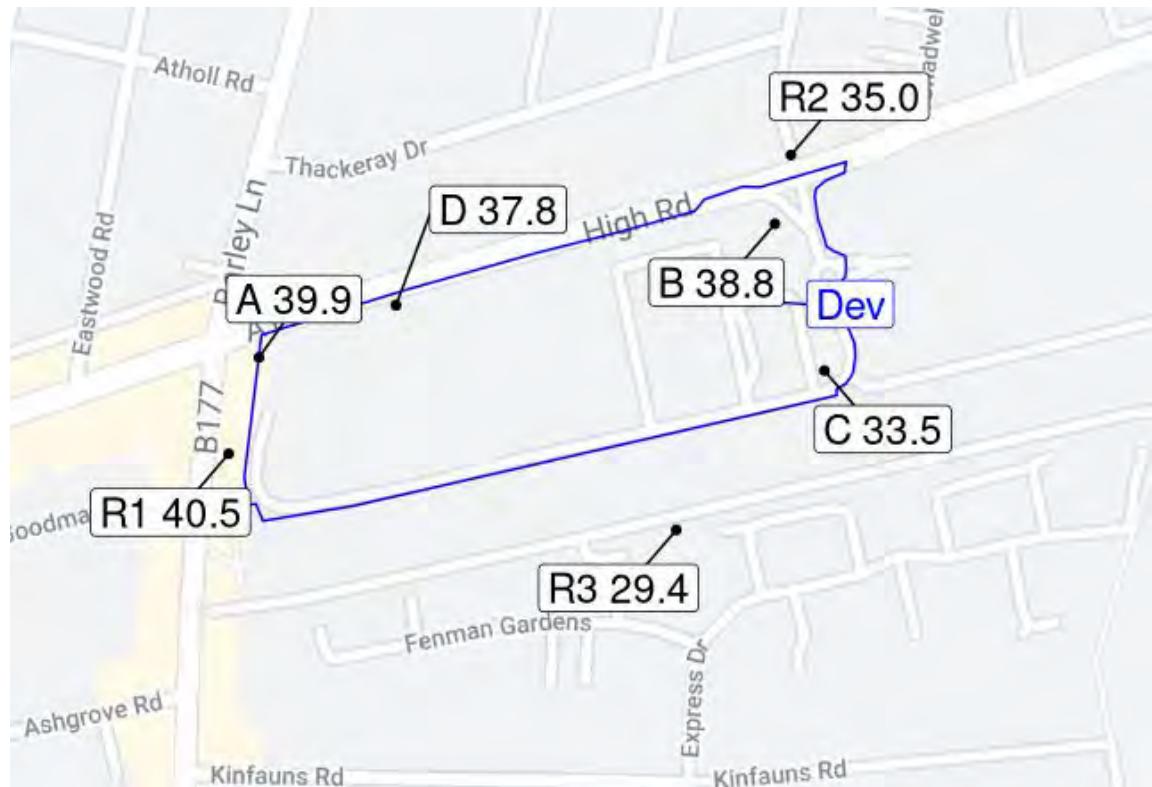


Figure 10 - Developer NO₂ predictions for 2026 (With Development) scenario. Values shown are in $\mu\text{g}/\text{m}^3$.

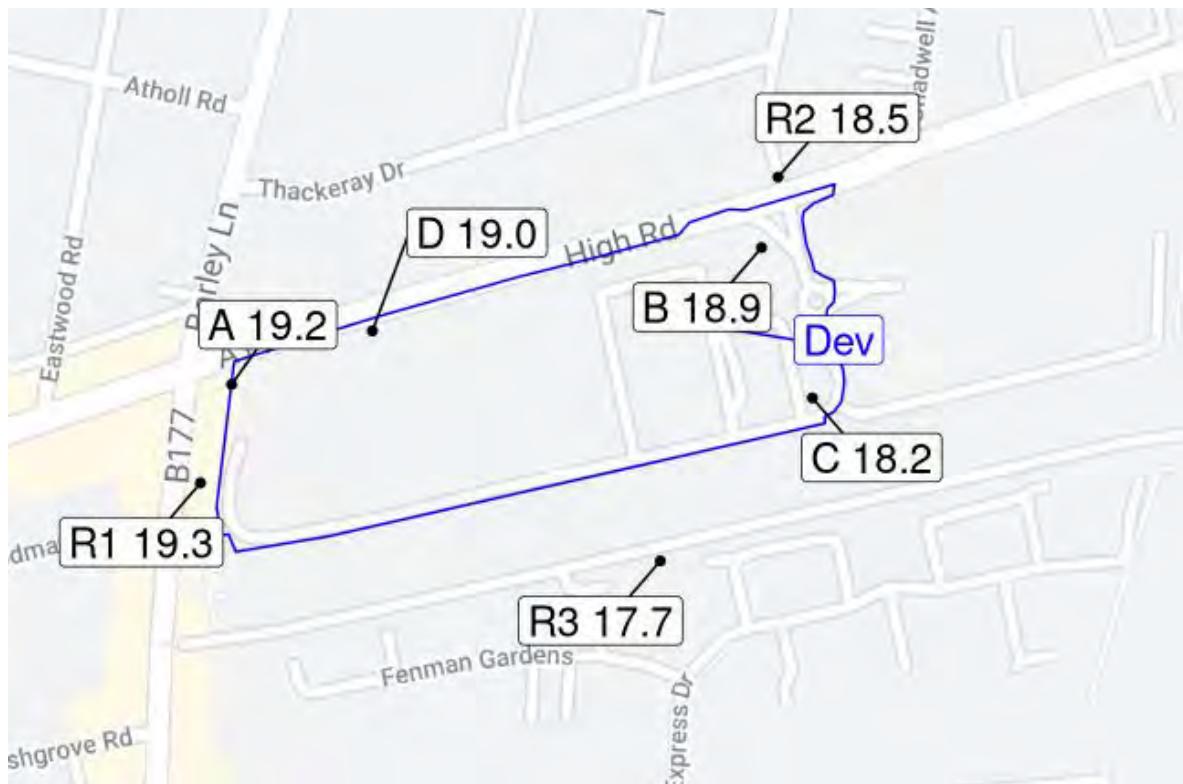


Figure 11 - Developer PM10 predictions for 2026 (With Development) scenario. Values shown are in $\mu\text{g}/\text{m}^3$.

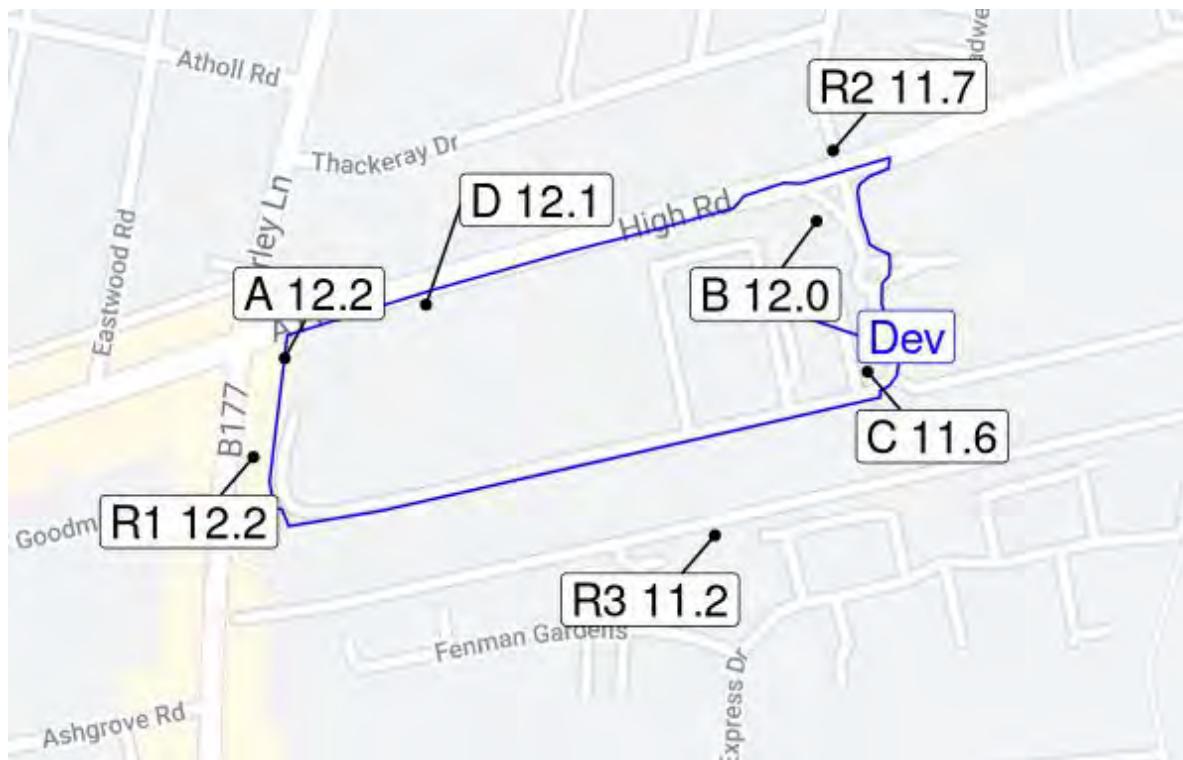


Figure 12 - Developer PM2.5 predictions for 2026 (With Development) scenario. Values shown are in $\mu\text{g}/\text{m}^3$.

7. Developer's diffusion tube measurements

47. Paragraph 4.15 on page 4-4 of the Air Quality chapter of the ES [3] states that

"In response to comments received from the LBR's environmental health officer prior to the submission of the planning application, a six-month diffusion tube monitoring survey is being undertaken. Monitoring is due to be completed in January 2020. Once the survey is complete the conclusion of the air quality assessment (technical appendix C) and this ES chapter will be reviewed to ensure the assessed baseline is reflective of the results of the site specific survey."

48. The monitoring survey report [5] states that six locations were chosen to monitor NO_2 for using diffusion tubes. Unfortunately exact locations in the form of grid references are not provided for these sites, so we have reconstructed the locations based on the diagrams and photographs in the report. Note therefore that the locations in the figure below are only approximate but should be accurate to within 1-2m.

49. At each location, Aether mounted three tubes. Figure 13 plots the six diffusion tube locations A-F along with the annualised results for each of the three tubes (Table 3 on page 10 of Aether's survey document).

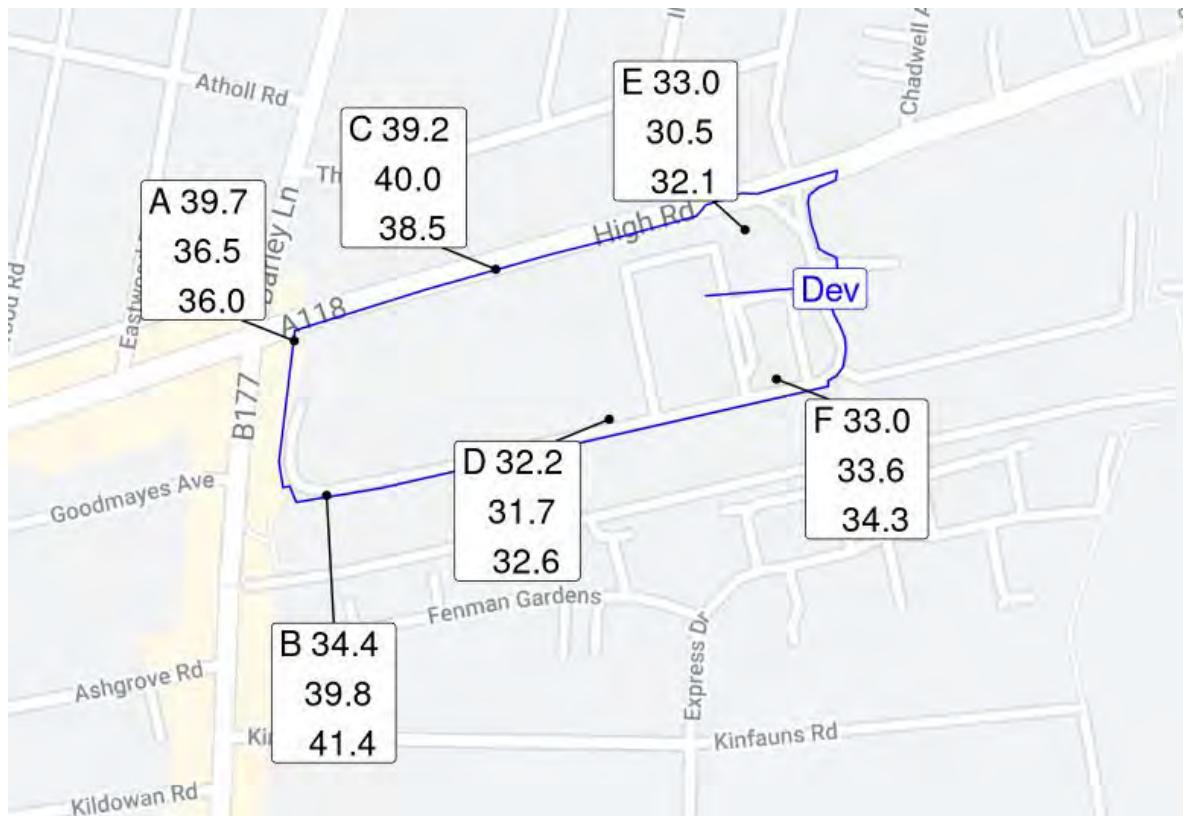


Figure 13 - Locations and annualised results from diffusion tube monitoring by Aether for 6 months in 2019 / early 2020. Values shown are in $\mu\text{g}/\text{m}^3$.

50. Figure 14 shows a picture of monitoring location A to illustrate that it is in a recessed location relative to the road and yet still shows very high values.

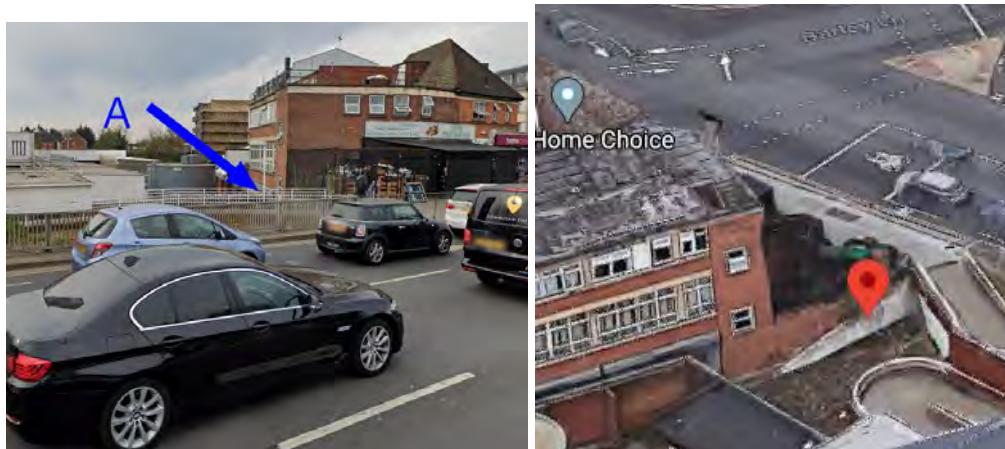


Figure 14 - Monitoring location A is shielded from the road in a recessed location.

8. Critique of developer's AQA

8.1. AQA is not transparent with information

51. Section 6.2 on page 19 of the Institute for Air Quality Management (IAQM)s guidance for air quality assessment in the context of land-use planning [34] states that

“Where a development requires an air quality assessment, this should be undertaken using an approach that is robust and appropriate to the scale of the likely impacts. One key principle is that the assessment should be transparent and thus, where reasonable, all input data used, assumptions made, and the methods applied should be detailed in the report (or appendices)”.

Unfortunately Aether's AQA falls short in this regard in several instances:

- In both Aether's Air Quality Technical Appendix [4], and Aether's separate air quality monitoring survey [5] no exact location information is given for receptor and diffusion tube sites. This makes it impossible to perform, for example, direct comparison of predictions if we wanted to run our own modeling experiments.
- In Chapter 4 of the developer's ES [3], results are only reported for receptors R1-R3, and there is no mention of the additional receptors A-D which are modeled in the technical appendix, this is confusing.
- In Chapter 4 of the developer's ES [3], no mention is made of the fact that R1 is a first-floor site, which might mislead the reader into thinking the high value observed was at the ground floor since all the other sites, including the diffusion tubes on the included map are ground floor locations.
- There are no page numbers on the Technical appendix which makes it difficult to reference.

8.2. Diffusion tube survey does not refer back to ES as claimed it would

52. Paragraph 4.15 on page 4-4 of the Air Quality chapter of the ES [3] states that

“In response to comments received from the LBR's environmental health officer prior to the submission of the planning application, a six-month diffusion tube monitoring survey is being undertaken. Monitoring is due to be completed in January 2020. Once the survey is complete the conclusion of the air quality assessment (technical appendix C) and this ES chapter will be reviewed to ensure the assessed baseline is reflective of the results of the site specific survey.

53. The diffusion tube survey makes no reference back to the Air Quality Chapter of the ES or the technical appendix for any kind of review. This is confusing and seems to be against the spirit of carrying out a survey in the first place.

8.3. Diffusion tube survey results not used in modeling

54. When modeling the site Aether used only three sites for verification, and used the nearest local authority diffusion tube sites. No explanation has been given as to why the new diffusion tube results, taken by Aether, were not used to re-run and verify the model. It doesn't make sense to take those measurements, in an area directly relevant to the development, and then not use them.
55. Some criticism should be shared by Redbridge Council who have failed to identify this lack of follow-up.

8.4. Diffusion tube survey results indicate possible objective limit breaches but the survey claims otherwise

56. In the Summary and Conclusions section on page 14 of the diffusion tube survey Aether writes:

“The results indicate that NO₂ concentrations are likely to be below the annual mean objective at the development site”

57. The results (as presented in Figure 10 of this document) do however show two diffusion tube sites (B and C) with single tubes of the triplicate showing exceedances. All three tubes at site A are within 10% of the objective limit.
58. Caution should be applied here as it may be that there are already breaches of the objective limit at the development site, given the high values seen combined with the inherent uncertainty of diffusion tubes.

8.5. Modeling does not consider cumulative impact in a meaningful way

59. Paragraph 181 on page 52 of the National Planning Policy Framework [11] highlights the need to take cumulative impact from multiple individual sites into account when it states that:

“Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.”

60. Section 4.49 on page 4-10 of the developer's air quality ES [3] states that:

“The traffic data used in the post-construction emissions modelling includes traffic arising from committed developments in the area. Therefore, the potential cumulative post-construction effects are included in the modelling and no additional cumulative effects are envisaged.”

61. Section 6 on page 29 of the technical appendix of the developer's Traffic Assessment Report [35] (Prepared by Motion Consultants Ltd), lists the three developments that are considered as part of the “cumulative effects” outlined in the air quality ES. These are:

- (reference 1444/16) - A 35 bedroom hotel
- (reference 3399/13) - A 95 bedroom hotel
- (reference 4984/16) - A 1260 place academy for 4 - 19 yr olds

62. For the first of these, Motion Ltd argues it will contribute nothing since it is car free, and that the second will contribute an “imperceptible” amount in the vicinity of the application site. Motion Ltd acknowledges that the third could lead to 80 new trips during both peak hours, but speculates that *“Given the number of junctions along Barley Lane, it is likely that a proportion of these trips would not travel into the current study network.”* It isn't explained how the latter caveat translates into the number used in the final traffic figures.

63. Motion Ltd also point out in paragraph 6.5 that:

“it is noted that extensive multi-modal modelling has been undertaken in relation to the Crossrail scheme, which is expected to have a material influence on traffic growth and patterns in the area.”

But go on to say they have not been able to obtain this data from TfL. This is an implicit admission that there is potentially a better source of data available.

64. There are several local developments that have not been accounted for in the cumulative impacts:

- Three schemes setup by Redbridge Living Ltd, a Redbridge Council owned company [36]. The schemes are:

- 94 homes at Clements Road (Redbridge Council application reference (4124/19), which the application states is car-free (apart from 4 disabled spaces).
- A proposal for approximately 300 houses at the former Seven Kings Car Park [37] which again is claimed as car-free, but contains a proposal for a Community & Health Hub and a Business & Enterprise Hub.
- Loxford Lane, a currently unknown number of homes listed as a “*mix of flats and houses*”.
 - A proposal for a development at the Homebase store in Seven Kings, only 300m away from the Tesco site [38].
 - Construction of a 42 storey block of flats with 370 residential units (Redbridge Council reference 4557/18, planning approved) at the former Bodgers shop in Ilford. The application is listed as car free.
 - Redbridge’s general commitment to build 600 new council homes by 2022 [39]

65. Some of the listed developments are committed, some are not. The fact that none of them are even mentioned is concerning.
66. There is no restriction as far as we are aware which prevents residents of the developments which are built with no parking spaces, from applying for resident’s parking permits. The Seven Kings development will also have a community hub and a business hub.
67. Given the total number of proposed and committed buildings in Ilford, Seven Kings, and Goodmayes listed above, it seems infeasible that these will not have an impact on traffic at the proposed Tesco site. Even if no resident at any site owned a car, there will still be effects on traffic from delivery vehicles and pressures on public transport which need to be considered properly.
68. Thus we would challenge the claim that “cumulative impact” has really been considered at the Tesco site, and would caution that much more work is needed to understand the broader picture.

8.6. Modeling of receptor heights in the tesco depression relative to the road height is not explained, and in the worst case might lead to under-estimation of pollution

69. In the developer’s technical air quality appendix (prepared by Aether Ltd) [4], eleven receptors are modeled. The exact height information is not provided for these receptors but we are informed in Section 2.3 on page 15 that “*Exposure has been assumed to be represented at the mid-point of each floor.*“
70. From paragraph 2.34 on page 2-5 of the site description [29] we learn that “*The school building will comprise of four storeys (total height of 17.5m).*“ Taking this as an example, we can assume the midpoint of the ground and first floors are respectively 2.18m and 6.56m

(illustrative, if the actual values are different this doesn't detract from the argument being made in this section).

71. Aether used the software ADMS-Roads [40] to model pollutant dispersal from roads modeled as line sources. Note that Aether use ADMS-Roads version 4.1.1 whereas the latest version is 5. ADMS-Roads is primarily a flat-terrain model.
72. ADMS-Roads has a module for complex terrain [41] but according to the manual (page 2):

"In line with the assumptions on which the model is based, terrain should have no more than moderate slopes (up to 1:3) although the model is useful even when this criterion is not met (say up to 1:2). It is not recommended that the model be used unless hill slopes are greater than about 1:10."

73. We have illustrated these gradients in Figure 15 for clarity.

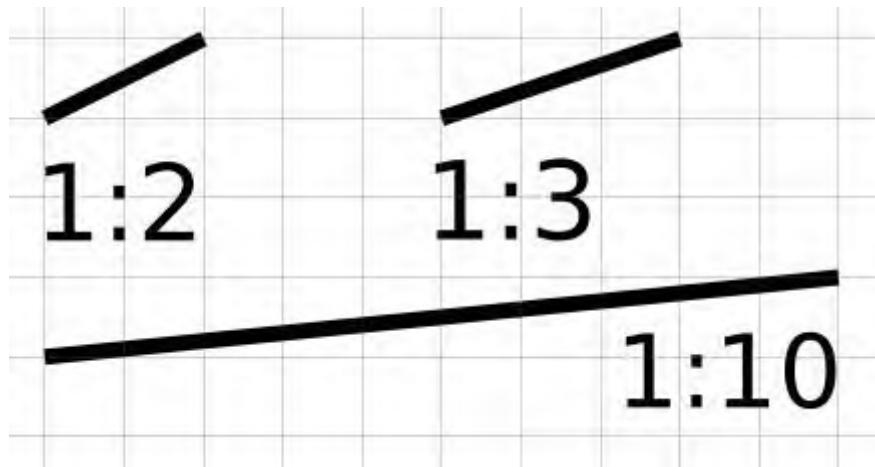


Figure 15 - Illustration of gradients. ADMS-Roads complex terrain module is designed for no more than 1:3 and no less than 1:10.

74. The Tesco site is sunken relative to the High Road as is illustrated in Figure 16



Figure 16 - Sunken aspect of Tesco site relative to High Road at the top.

75. Clearly the Complex Terrain module of ADMS-Roads is not suitable for the kinds of drop-offs and walls shown above. Reading the manual of the Complex Terrain module one can understand in anycase that it is really designed for macro features such as hills etc, and is more useful for plume dispersion modeling. From this we can conclude that Aether is unlikely to have modeled the sunken aspect of the Tesco site using the Complex Terrain module.
76. ADMS-Roads also has a street-canyon module but from the figure above, we can see that this doesn't apply here.
77. So the question remains, how did Aether model the sunken aspect of the Tesco site with regard to air pollution? The evidence seems to indicate that they used a flat-terrain model. We can make this assumption to continue the argument here, and are happy to stand corrected if further information is provided by Aether to the contrary.
78. If a flat-terrain model has been used to model the High Road and the site, then if we consider the midpoint of the ground floor at 2.18m, what height is this in the air quality model? We know that ADMS-Roads can't model the actual topology of the site with accuracy, so how did Aether manage to get an accurate prediction for the ground floor?
79. What about the first floor? If the midpoint of the school's first floor is ~6.56m then what does this mean relative to the High Road? Has Aether modeled the first floor of the school as being 6.56m above the High Road? Or has the sunken aspect of the site been taken into consideration, which would put the first floor much closer to the road?
80. It is particularly important to establish the truth of this matter, because we learned from looking at the developer's diffusion tube measurements that even in the sunken location A (see Figure 14 of this document), that one tube returned a value of $39.7 \mu\text{g}/\text{m}^3$. One of the location C tubes on the High road measured $40.0 \mu\text{g}/\text{m}^3$.
81. Aether calibrated it's model against local authority diffusion tube measurements, which have heights relative to the road, not relative to the sunken aspect of the Tesco site. If Aether has

not properly accounted for the sunken aspect of the Tesco site when determining modeled receptor sites, then in the worst case they could be under-estimating the actual pollution at the ground and first floors.

8.7. The developer makes claims about hourly NO₂ levels using a rule of thumb rather than direct empirical evidence

82. Section 4.24 on page 4-5 of the developer's AQ chapter of the ES [4] states that

"Diffusion tube monitoring data does not provide information on hourly exceedances, but research (as set out in the LAQM Guidance) identifies a relationship between the annual and 1 hour mean objectives, such that exceedances of the latter is considered unlikely where the annual mean was below 60 µg/m³. Therefore, no exceedances of the hourly mean NO₂ objectives are expected at the diffusion tube monitoring sites."

83. The cited work used to justify this rule of thumb actually includes examples of sites where the annual mean for NO₂ was below 60 µg/m³ and there were still breaches of the hourly mean objective for NO₂. From the boroughs own automatic stations, as reported in the Redbridge ASR [32] we can see from Table E on page 12 that there was an hourly mean breach in 2013 at site CM1 despite the NO₂ annual mean for 2013 being 35.4 µg/m³ which is even below the objective limit.

84. Claims about hourly NO₂ based on a rule of thumb reflect only the underlying statistics of the analysis that derived the rule of thumb, they do not necessarily reflect actual conditions. It is therefore fair to say we simply don't know if there will be any exceedances of hourly limits, but there could be.

9. General objections and concerns

9.1. Redbridge Council leader Jas Athwal expouses views on current and modeled air quality at the site that are inconsistent with objective evidence

85. The UK government issues guidance for elected members for determining a planning application [42]. Paragraph: 018 Reference ID: 21b-018-20140306 states that:

Members must not have a closed mind when they make a decision, as decisions taken by those with pre-determined views are vulnerable to successful legal challenge. At the point of making a decision, members must carefully consider all the evidence that is put before them and be prepared to modify or change their initial view in the light of the arguments and

evidence presented. Then they must make their final decision at the meeting with an open mind based on all the evidence.

86. In a Cabinet meeting on the 19th May 2020 Redbridge Council leader Jas Athwal had this to say in response to concerns about air quality regarding the development [43] (audio for quote starts at 4 minutes 52 seconds in and is transcribed below):

"annual mean levels of NO2 and PM10 above 40 micrograms per cubic meter sir would be absolutely unacceptable if they could not be successfully mitigated, however these measures are not relevant to the Tesco site where the modeling has clearly indicated that the current and the occupation levels of NO₂ and PM10 concentrations will be well below the annual mean level"

87. From Figure 10, which shows the developer's modeling for the with-development scenario, location R1 has a mean of 40.5 $\mu\text{g}/\text{m}^3$, and location A is at 39.9 $\mu\text{g}/\text{m}^3$, furthermore two other locations (B and D) are within 10% of the objective limit. So the levels are not only not "well below the annual mean level" but in one case exceed it.

88. This is backed up by the developer's air quality survey, whose results are shown in Figure 13, show that one of the tubes at the triplicated site show values above 40 $\mu\text{g}/\text{m}^3$, and some of the tubes at sites B and C are within 10% of the objective limit. Again not only not "well below the annual mean level" but in one case in excess of it.

89. Whilst Jas Athwal is not currently on the planning committee, it is discouraging to see him make statements about current and modeled air quality at the site that are demonstrably false and may predispose others.

9.2. Development is not "air quality neutral"

90. Policy 7.14 entitled "Improving Air Quality" of the 2016 London Plan (the new plan has not yet been fully ratified) states that developments:

"B-c - be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as Air Quality Management Areas (AQMAs))."

91. Clearly this statement applies to Redbridge since the entire borough is designated an AQMA. From the developer's ES we can see that even the developer's modeling (see critique above) establishes that the development will increase overall NO₂, PM2.5, and PM10 levels. Therefore the development is not air quality neutral.

9.3. Development sites a new primary school in a highly polluted area (NICE guideline violation)

92. According to the developer's site description document [29] the proposed development will contain (paragraph 2.13, page 2-2) a:

"Three form entry primary school accommodating up to 630 pupils"

93. The National Institute for Health and Care Excellence (NICE) has created guidelines for outdoor air quality with respect to health (NG70) [21], the guidance is specifically targeted towards local authorities as the following bullet points, quoted verbatim under the "Who is it for?" section of the document:

- *Local authority staff working in: planning, local air quality management and public health, including environmental health*
- *Staff working in transport and highways authorities*

94. Broadly the guidelines recommend (Section 1.1.1) to:

"include air pollution in 'plan making' by all tiers of local government, in line with the Department for Communities and Local Government's National Planning Policy Framework"

95. In Section 1.1.2 the guidelines explicitly mention that when 'plan making', all levels of government should consider:

"minimising the exposure of vulnerable groups to air pollution by not siting buildings (such as schools, nurseries and care homes) in areas where pollution levels will be high"

96. From Figure 2.7b on page 25 of the developer's site description [29] we can see that the new school fronts onto High Road. The relevant part of the developer's figure is reproduced in Figure 17 below and pointed out with an arrow.



Figure 17 - Proposed location of new three form primary school, fronting onto High Road.

97. From Figure 13 in our document we can see that the developer's own diffusion tube measurements for this stretch of High Road vary between $36 \mu\text{g}/\text{m}^3$ and $40 \mu\text{g}/\text{m}^3$ as an annualised average, and from Figure 10 we can see that the developer predicts an operational value of $37.8 \mu\text{g}/\text{m}^3$ at location D for the facade of a residential block fronting the High Road.
98. The developer freely admits (Section 2.5 of AQ Appendix [4]) with regard to model verification that:

"It is worth noting however though that none of these sites are in close proximity to the development site. Therefore, there will be some uncertainty in the modelled results."
99. Coupled with the developer's current diffusion tube measurements, one of which gave a value of $40 \mu\text{g}/\text{m}^3$ on the high road, it is entirely feasible therefore that we could see post-development values at or above $40 \mu\text{g}/\text{m}^3$ on the high road.
100. Looking at local authority diffusion tube measurements in the area, depending where they come from pupils travelling to-and-from the school are likely to experience NO_2 values in range of $30\text{--}50 \mu\text{g}/\text{m}^3$ as an annual average and will undoubtedly experience much higher peak values.
101. Notwithstanding the fact that children in Redbridge are and will continue to be exposed to very high annual averages of air pollution, we know from research that annual averages are not representative of actual pedestrian exposure profiles: for example a study that measured black carbon exposure for children walking to school [44] found that children obtained 20% of their black carbon daily dose (according to US EPA regulations) over a time period that accounted for only 6% of the day. Despite this relatively short period of exposure, air

pollution was found to negatively correlate with the children's cognitive performance at school.

9.4. People are “regularly present” on public streets in common English interpretation of language and therefore the annual limit applies to public streets

102. In Section 1.2 of the AQ technical appendix [4], Aether outline the legal conditions under which the air quality objectives apply. They list these conditions correctly as:
 - Outside of buildings or other natural or man-made structures above or below ground
 - Where members of the public are regularly present.
103. Aether go on to present their interpretation of this legislation as follows:

“Using these definitions, the annual mean objectives will apply at locations where members of the public might be regularly exposed such as building façades of residential properties, schools and hospitals and will not apply at the building façades of offices or other places of work, where members of the public do not have regular access.”

104. We argue that this interpretation goes against the common English understanding of the statement “regularly present”, as it excludes the streets that people walk on. It is our position that the term “regularly present” and thus the law should apply at public places of congregation and pedestrian heavy pavements adjacent to busy roads. And that therefore the annual limits should apply in these places.

9.5. Annual exposure targets don't protect human health and current pollutant levels at the development site harm health

105. Planning and other local authority decisions are currently being made based on comparison to limit values first enacted into law [45] in 2008. The limit for NO₂ is defined as an annual average of 40 µg/m³ but Public Health England, in a 2018 review [16] of the long-term health effects of NO₂ states that long-term mortality associations have been found in “cohorts in which the range of outdoor levels reaches as low as 5 µg/m³ annual average NO₂ concentration.” The author committee was divided on whether to extrapolate mortality coefficients to zero but the report provides mortality coefficients defined per 10 µg/m³. In addition, the authors estimate that by reducing mean NO₂ by 1 µg/m³ that “1.6 million life years could be saved in the UK over the next 106 years, associated with an increase in life expectancy of around 8 days.”

106. Similarly for PM2.5 and PM10, the limits are defined as annual values of 25 $\mu\text{g}/\text{m}^3$ and 40 $\mu\text{g}/\text{m}^3$ respectively, whereas the World Health Organisation's 2005 air quality exposure guidelines [18] despite acknowledging that "*there is little evidence to suggest a threshold below which no adverse health effects would be anticipated*" arrives at guidelines of 10 $\mu\text{g}/\text{m}^3$ and 20 $\mu\text{g}/\text{m}^3$ annual averages for PM2.5 and PM10 respectively. This is challenged by a Royal College of Physicians review [6] which concludes that "*Neither the concentration limits set by government, nor the World Health Organisation's air quality guidelines, define levels of exposure that are entirely safe for the whole population*".

107. In its 2019 Clean Air Strategy [46] the UK government states that it will "*reduce PM2.5 concentrations across the UK, so that the number of people living in locations above the WHO guideline level of 10 $\mu\text{g}/\text{m}^3$ is reduced by 50% by 2025.*".

108. All but one of the developer's PM10 predictions are within 10% of the WHO guideline for PM10, and all the developer's PM2.5 predictions exceed the WHO guideline for PM2.5. The developer's predictions for NO_2 far exceed the level at which strong correlations with mortality occur.

10. Appendix A - UK Objective limits

109. The current UK (excluding Scotland) objective limits for NO_2 , PM10, and PM2.5 as defined by Defra [17] are shown in Table 2 below.

Pollutant	Annual mean limit	24hr mean limit	1hr mean limit
NO_2	40 $\mu\text{g}/\text{m}^3$	-	200 $\mu\text{g}/\text{m}^3$ no more than 18 times
PM10	40 $\mu\text{g}/\text{m}^3$	50 $\mu\text{g}/\text{m}^3$ no more than 35 times	-
PM2.5	25 $\mu\text{g}/\text{m}^3$	-	-

Table 2 - Annual, 24hr, and hourly objective limits for NO_2 , PM10, and PM2.5 for the UK (excluding Scotland)

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Dear Councillor Jones

Please find attached responses to your constituent's questions.

Q1. How is the climate committee measuring the impact of climate change or pollution in the area when most of the pollution monitors have been removed?

We measure pollution in accordance to the standards set out in the National Air Quality Objectives and the Air Quality Standards Regulations 2010. These set out the concentrations for key pollutants NO₂ and Particulates in ambient air to protect human health. We have a network of diffusion tubes spread out across the borough to measure NO₂ spatial trends and reference monitors to measure particulates. Climate change is a global issue of changing temperatures due to CO₂ greenhouse gas emissions. Scientists and Meteorologists use a combination of modelling and tropospheric temperature measurement to assess temperature trends. Local and National Governments are charged with implementing policies which reduce CO₂ emissions which consequently will contribute to reducing global warming.

Q2. There seems to be a disconnect between the multiple developments in Ilford South and the data you have re residential units producing most of the pollution. Would it not be sensible to lower the heights of these towers and spread the builds more evenly across the borough?

There's no evidence, scientific or otherwise, to suggest that lowering the height of a development has any bearing on the pollution load it may bring into an area or reduce climate change.

Proposed major tall buildings are required to submit a Tall Buildings Impact Assessment which should include the variety of impacts a tall building will have on the surrounding area. The assessment should include an urban design analysis, as per Redbridge Local Plan Policy LP27: Tall Buildings, and follow the criteria set out in LP26: Promoting High Quality Design. Other important elements to consider include, but not confined to, the following:

- Visual Impact using realistic visualisations from ground level from key points in the vicinity of the area at far, medium and nearby distances
- Physical Impact
- Daylight/Sunlight Report and impact from glare
- Transport/Movement Strategy
- Microclimate (wind levels at ground floor level)
- Any other associated impact (site dependant)

Buildings can be designed to help mitigate the effects of climate change allowing for optimal ventilation, cooling and heating. Improving energy efficiency in new builds, installing renewable energy and decarbonising heat in buildings using heat pumps can all help in tackling climate change impacts. The Council is looking into green electricity to further reduce carbon emissions.

Major developments are required to submit a Sustainability and Energy Assessment which should include the following:

- Cooling and use of passive ventilation to minimise energy use;
- Design to minimise energy use otherwise (ie. orientation and materials, variation in window size and landscaping);
- Use of renewable energy (eg. photovoltaic, solar thermal, geothermal)
-

Redbridge Local Plan Policy LP32: Sustainable Design and Construction and LP19-25 contain further information.

All major applications are required to submit a BREEAM assessment and we aim for a BREEAM excellent rating.

It is important to note that Redbridge is facing a housing shortage and has an annual target for a net 1123 homes in accordance with the London Plan 2016. Tall and large buildings will be supported in Tall Building Zones which include the designated growth areas of the Crossrail Corridor, the Ilford Metropolitan Town Centre and Gants Hill as stated in the Redbridge Local Plan. This is important for Redbridge in meeting its housing targets and is necessary to ensure comprehensive development of all sites.

Q3. What can we do to stop the council approving anymore builds until we are clear on where the worst hit areas are and whether it is wise to allow more housing in those areas?

Proposed major new developments in areas of poor air quality and in the Air Quality Focus Areas as identified in the Council's Air Quality Action Plan, are required to submit an Air Quality Assessment (AQA). All applications which require an AQA should therefore be supported by such information as is necessary to allow a full consideration of the impact of the proposal on the air quality of the area and the impact of existing air quality on the proposed development. Where Air Quality Management Areas (AQMAs) cover regeneration areas, developers should provide an air quality assessment as part of their planning application. The whole of Redbridge is designated as an AQMA.

Developments are assessed using Redbridge Local Plan Policy 24: Pollution and our Sustainable Design and Construction SPD (2010) as well as London Plan Policy 7.4, and the Mayor of London's Sustainable Design and Construction SPG.

The Council's Environmental Health, Air Pollution Team are consulted on major applications and review submitted AQAs and provide comments to the Planning Development Management Team. The Development Management Team consider these comments and may add conditions relating to air quality in their decisions. In certain cases the Council may enter into a S106 agreement with the developer where they will contribute (financial) planning obligations to mitigate harm from the development including air pollution.

Q4. Where are the climate pollution figures for Redbridge specifically?

Climate change is very different to air pollution standards set by UK law. If one wants to see the trends in temperature across Redbridge, it would be best to contact the MET office. Pollution trends can be seen in our ASR reports which are on our website.

Q5. Shouldn't "climate effects" be top of the list of material considerations for the council planning committee if most climate effects come from buildings?

The impacts on air quality are considered by the Development Management Team in the decision-making process. They routinely add air quality planning conditions to decisions. Additionally, they enter into S106 agreements and require planning obligations to help offset any negative impacts such as carbon emissions. On major developments where carbon reduction targets cannot entirely be met on site, a payment may be required to the Carbon Offset Fund, which, when operational, will invest in carbon reduction throughout the borough and elsewhere as appropriate.

The Mayor of London is proposing to introduce increased sustainability requirements in the New London Plan.

Q6. Planning committee has done nothing to pre-empt combined pollution impacts on the high road developments. Is the committee concerned about this and do they think such a report is critical to the planning decisions in Ilford South going forwards?

Cumulative effects are considered and minimised by the application of the Government's Air Quality Neutral Policy on planning applications.

On the major sites developers may be required to produce an Environmental Impact Assessment. The aim of Environmental Impact Assessment is to protect the environment by ensuring that a local planning authority

when deciding whether to grant planning permission for a project, which is likely to have significant effects on the environment, does so in the full knowledge of the likely significant effects, and takes this into account in the decision-making process.

Q7. If we don't know the gravity of what we are dealing with why are we approving plans (or passing them to the GLA for approval)? Is this not effectively kicking the can down the road?

Proposed major new developments in areas of poor air quality and in the Air Quality Focus Areas as identified in the Council's Air Quality Action Plan, are required to submit an Air Quality Assessment (AQA). All applications which require an AQA should therefore be supported by such information as is necessary to allow a full consideration of the impact of the proposal on the air quality of the area and the impact of existing air quality on the proposed development. Where Air Quality Management Areas (AQMAs) cover regeneration areas, developers should provide an air quality assessment as part of their planning application. The whole of Redbridge is designated as an AQMA.

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The Council's Environmental Health, Air Pollution Team are consulted on major applications and review submitted AQAs and provide comments to the Planning Development Management Team. The Development Management Team consider these comments and may add conditions relating to air quality in their decisions. In certain cases the Council may enter into a S106 agreement with the developer where they will contribute (financial) planning obligations to mitigate harm from the development including air pollution.

Q8. What is this committee doing to speak to the planning dept and what impact do you think this will have?

Planning officers in their assessment of applications and the planning committee in their subsequent assessment and decision of whether to agree with officer's assessments are considering applications against the National and Local Planning Policy Framework which is in place to ensure that developments do not have an unacceptable impact.

Q9. Does the committee agree we should not be allowing dispensations to developers to offset their own costs at the sacrifice of affordable housing. (Re: Seven Kings development where 11% social housing was allowed due to the high cost of insulation). Would you agree it is up to the developer to risk assess and plan costs and not for the council to subsidise just to hit housing figures?

It is common practice for developers of major schemes and the Council to enter into pre-application negotiations and to request viability and feasibility studies at this early stage. The Council is facing a stark housing crisis and so must reach a balance regarding housing provisions and other factors.

Viability and deliverability are significant considerations which must be given weight along with all other material planning considerations.

Q10. The Local plan has explicitly stated that high rises are a good idea and more so in the Ilford South area. The data you have shows this is not the case for the environment or the general health of people. In light of Redbridge council's declaration of a climate emergency and the recent pandemic, combined with the knowledge that pollution impacts the least well off in our community the most; Should we be rethinking the dictats from the Local Plan and reassess what we should be doing going forwards?

Owing to the new London Plan and the Planning White Paper, The Local Plan will be reviewed in the near future and will account for the Council's Climate Emergency declaration. This has to be carefully considered accounting for the borough's acute requirement for housing.

Q11. In light of climate change effects, would you agree that the "Local Plan" which effectively green lit the developers to build high rises anywhere along the Crossrail corridor is no longer fit for purpose?

The Local Plan when next reviewed will account for the Council's Climate Emergency declaration. This has to be carefully considered accounting for the borough's acute requirement for housing. A review of the Local Plan will involve consideration of the overall distribution of new housing across the borough, subject to the location of suitable sites and material planning considerations.

Q12. Reclaim Redbridge have commissioned a private air quality report paid for by residents. It is quite scathing about the lack of scrutiny that was applied to the Tesco planning application and the lack of data any decisions were based on. Our concern is that this becomes (or already is) the norm for planning applications?

The application at Tesco, Goodmayes is a live planning application which is still under consideration.

Q13. Are you able to provide the socio-economic and demographic data correlating to who is most effected by pollution and climate change in Redbridge by ward? If not can this be something that can be produced as there is data to suggest that the bottom 30% of society financially are the most likely to suffer from pollution related illness?

Unfortunately, this is not something the Council can provide at present due to staff returning to substantive posts following a period of redeployment supporting front line services impacted by Covid-19.

Kind regards

[REDACTED]

[REDACTED]

[REDACTED]

Regeneration, Property and Planning

Regeneration and Culture Directorate

London Borough of Redbridge

Thank you for your very lengthy and detailed response. There are some follow up questions (directly related to your responses) below which I hope you can offer clarity on. To help I have put the key questions in bold and offered some supporting data where possible;

Q1. How is the climate committee measuring the impact of climate change or pollution in the area when most of the pollution monitors have been removed?

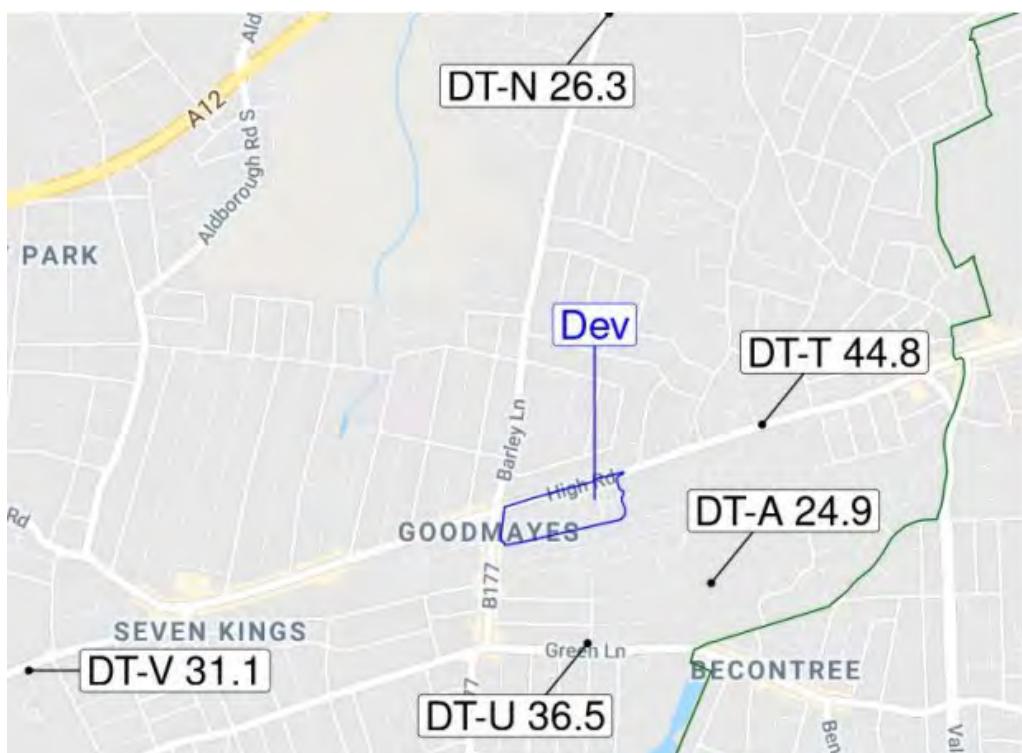
Diffusion tube data is inferior to the pollution monitors that used to be located across Redbridge and have now been removed. Regardless, here is a plotting of the diffusion tubes you reference. Barely any can be seen on the High road where the Tesco site is being proposed (blue box with one of the busiest junctions in the area) yet there are some areas miles away from it with three in close proximity (see red box).

- **Can you tell me if the pollution monitors that used to be located in the area were removed to avoid any further penalty for air quality degradation or some other reason?**

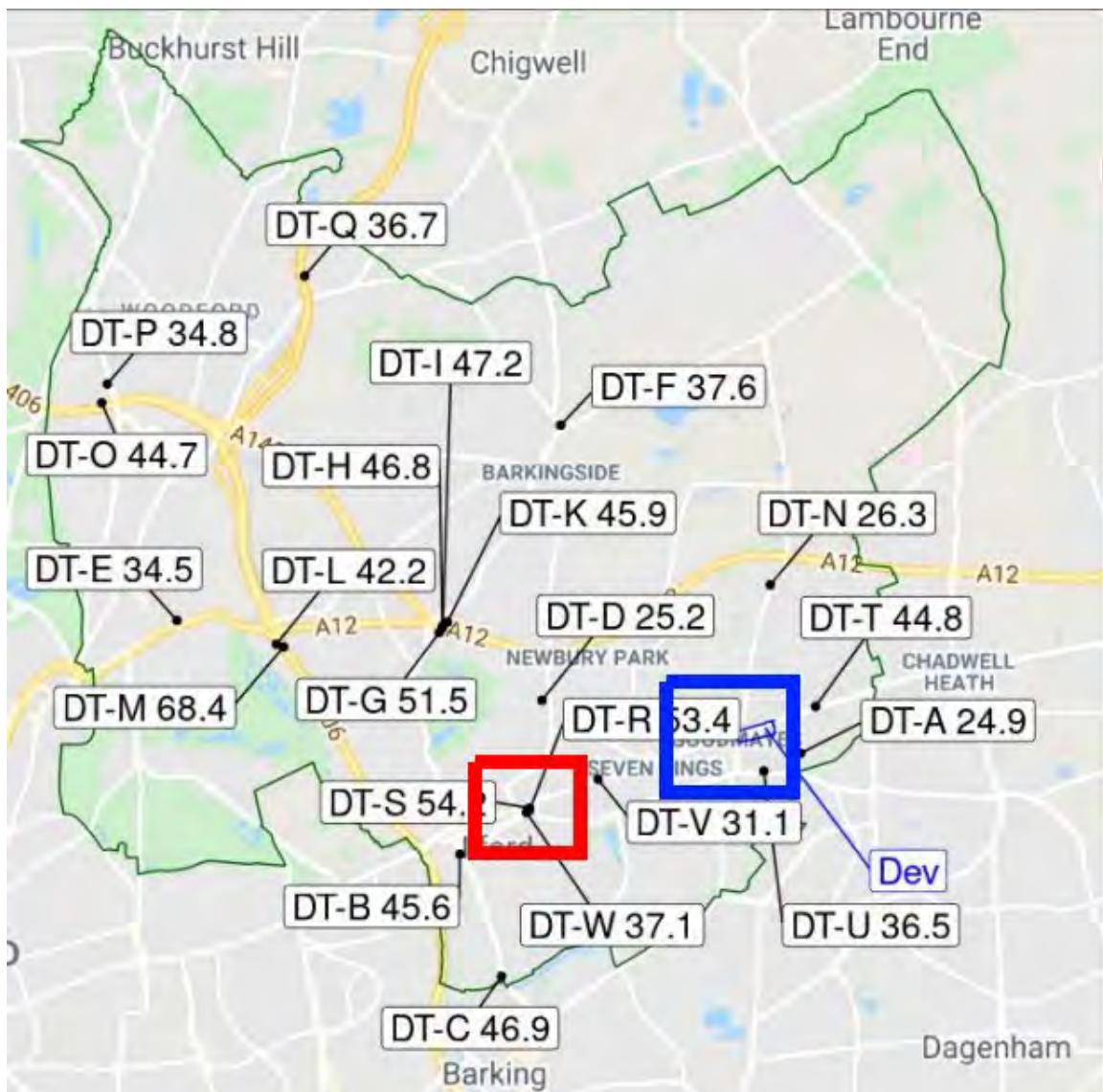
The data I have for diffusion is 2 years out of date.

- **Where can I find the latest data for the diffusion tubes and the latest Annual Status Report (ASR)?**

Diffusion Tube data with with mean NO2 data – Barely anything is located where the developments are planned along the crossrail corridor and more specifically the Tesco site where there is regular traffic (blue box). Yet there are three located in close proximity to the the Ilford roundabout (red box)? This will heavily skew the AQMA figures.



“The law states that both the AQMA and associated AQAPs must be regularly reviewed and the local authority must submit an Annual Status Report (ASR). The last ASR submitted by Redbridge was for 2019, which contains data for 2018 as data is always a year in arrears.”



You have quoted all the things a developer “should” be doing and all the things the council “requires” of a developer but it is clear neither of these were followed up by the Planning committee or the council as they have seen fit to pass on the development to the GLA even though it is flawed at the most basic levels;

When modelling the site Aether used only three sites for verification, and used the nearest local authority diffusion tube sites. No explanation has been given as to why the new diffusion tube results, taken by Aether, were not used to re-run and verify the model. It doesn’t make sense to take those measurements, in an area directly relevant to the development, and then not use them.

- Does the Council think this sort of selective modelling by developers is appropriate?
- Would the Council agree that the Tesco planning application is deficient if the data in it is not accurate or skewed?

Q2. There seems to be a disconnect between the multiple developments in Ilford South and the data you have re residential units producing most of the pollution. Would it not be sensible to lower the heights of these towers and spread the builds more evenly across the borough?

I'm slightly confused by your response and even more concerned by the veracity of it. It is common sense that if there is one flat (one level high) vs 1300 flats (22 levels high) then there will be a difference in their combined pollution contribution to the environment. Are you suggesting there is evidence to the contrary? I have enclosed a Scientific model (a) which refutes this. Also, your own website cites figures relating to residential properties producing 49% of the air pollution in Redbridge;

a. The below article cites a direct link between tall buildings, airflow and pollution:

<https://www.sciencedirect.com/science/article/pii/S0269749117319322?via%3Dihub>

b. High-Rise Apartments and Urban Mental Health—Historical and Contemporary Views

<https://www.mdpi.com/2078-1547/10/2/34/htm>

c. “Buildings account for 49% of the borough’s greenhouse gas emissions”

<https://www.redbridge.gov.uk/media/8155/corporate-panel-property-and-energy-report.pdf>

d. “As it is seen from the results, simply changing the height of a single building can have negative effects on pollution levels on-site.“

<https://www.sciencedirect.com/science/article/pii/S0269749117319322>

e. Wasteful, damaging and outmoded: is it time to stop building skyscrapers?

<https://www.theguardian.com/artanddesign/2020/jul/11/skyscrapers-wasteful-damaging-outmoded-time-to-stop-tall-buildings>

- In light of the above, is the Council willing to accept that high rises produce more pollution than lower form factor builds (not as a percentage but as a total figure) i.e. 1 house produces 1 NO₂ unit so it stands to reason 1300 units will produce 1300 NO₂ units?**
- After reading the article (a), would you still say tall buildings are less impactful on pollution than smaller ones?**

Q3. What can we do to stop the council approving any more builds until we are clear on where the worst hit areas are and whether it is wise to allow more housing in those areas?

Policy 7.14 entitled “Improving Air Quality” of the 2016 London Plan (the new plan has not yet been fully ratified) states that developments: “B-c - be at least ‘air quality neutral’ and not lead to further deterioration of existing poor air quality (such as areas designated as Air Quality Management Areas (AQMAs)).”

Clearly this statement applies to Redbridge since the entire borough is designated an AQMA. From the developer’s ES we can see that even the developer’s modeling (see critique above) establishes that the development will increase overall NO2 , PM2.5, and PM10 levels.

- **Therefore the development is not air quality neutral. So why has the council (knowing this) seen fit to pass the planning decision to the GLA when it should have been critiqued, remedied or rejected at the Council stage?**

The National Institute for Health and Care Excellence (NICE) has created guidelines for outdoor air quality with respect to health (NG70) section 1.1.2 explicitly mentions that when ‘plan making’, all levels of government should consider:

“minimising the exposure of vulnerable groups to air pollution by not siting buildings (such as schools, nurseries and care homes) in areas where pollution levels will be high”

Not only will the developments effect the schools in the area with increased pollution but there will be a school in the middle of the Tesco site which will effectively be ignoring these recommendations completely.

- **Do you believe it was prudent and correct for the Council planning committee to have ignored the NICE guidelines and keep the school on the plans when they passed them to the GLA for assessment?**

Q4. Where are the climate pollution figures for Redbridge specifically?

You may have misunderstood the question or I may have phrased it incorrectly.

- **Where is the “Annual Status Report (ASR)” for 2019-2020?**

Currently it only shows 2018 and we are a year in arrears. This is even more important in light of the large number of developments the council is assessing with out of date data.

- **There is plenty of NO² data available for 2018, can we also have the CO² figures for 2018 onwards?**

Q5. Shouldn't "climate effects" be top of the list of material considerations for the council planning committee if most climate effects come from buildings?

Carbon offset funds are limited in scope and once funding has run out it does nothing for the longer term decrease/stabilisation of pollution effects which leaves the council (and ultimately residents) to bare the burden.

- **Can you point me to any documentation that can;**
 - **Show that S106 money has been used in previous builds over the last 5 years (or ever) to reduce pollution effects in the area?**
 - **Where those developments were built?**
 - **And the figures to show positive/negative effects this has had on said pollution in that area?**

Q6. Planning committee has done nothing to pre-empt combined pollution impacts on the high road developments. Is the committee concerned about this and do they think such a report is critical to the planning decisions in Ilford South going forwards?

The EIA and AQA offered by the developer clearly states that the development is NOT carbon neutral and will in fact add to the degradation of the environment in the area.

- **With a backdrop of the council trying to become “zero carbon”, how can the Council say it has taken this into account when it is clear there will be an increased impact to the environment?**

Q7. If we don't know the gravity of what we are dealing with why are we approving plans (or passing them to the GLA for approval)? Is this not effectively kicking the can down the road?

There seems to be a slight disconnect between the policy you have referenced and the reality of what we are seeing. I am finding it difficult to correlate the decision from the council to ratify the Tesco development (or any development) when the data the council has is limited at best and seems wholly reliant on the developer to provide insight (which we know is deficient).

Professor Peckham (Centre for Health Services Kent University) has analysed the developer/Aethers reports and finds them lacking in many areas.

- **Can you please provide access to the councils “Environmental Health, Air Pollution Team” report associated with the Tesco Goodmayes development in which they have made their assessments?**

Q8. What is this committee doing to speak to the planning dept and what impact do you think this will have?

- This was a question for Cllr Bert Jones' new “Pollution and Climate Change” council. I would like to know if they will have a direct say on whether planning applications are passed based on what we know and have yet to learn about pollution in Redbridge?

Q9. Does the committee agree we should not be allowing dispensations to developers to offset their own costs at the sacrifice of affordable housing. (Re: Seven Kings development where 11% social housing was allowed due to the high cost of insulation). Would you agree it is up to the developer to risk assess and plan costs and not for the council to subsidise just to hit housing figures?

Historically the council has not fared well in negotiations with developers and on most developments in the five years pre 2019 (possibly even earlier) have failed to secure any affordable/social housing at all.

There seem to be some contradictions that need clarification;

- Earlier you spoke of asking the developer to contribute S106 money and here you say “negotiations” must be done.
- Also you speak of a housing “crisis” yet these new developments will be unaffordable for those most in crisis and will do little to draw down on those in need of housing

Developers are acutely aware of how the rules can be flexed to their advantage and I am disappointed the council fails to get more value from them. The council seems more than willing to take residents to court re planning decisions yet I am unaware of any developers facing this tact when they have failed to deliver on their commitments on housing or CIL/S106 financing.

- **Why is this?**
- **If this is not the case please can you provide examples of where a large developer has had legal action taken against them by the Council for not providing their promised unit quotas?**

I put it to the Council that you are setting a very dangerous precedent here for other developers to follow. I very much doubt the cost of insulation is going to outweigh the value of several £300k+ flats that the developer will benefit from by allowing this decision. The council will struggle to defend this legally or otherwise.

- **Hypothetically would the council entertain Tesco providing 11% affordable housing in lieu of their need to add extra insulation?**

Q10. The Local plan has explicitly stated that high rises are a good idea and more so in the Ilford South area. The data you have shows this is not the case for the environment or the general health of people. In light of Redbridge council's declaration of a climate emergency and the recent pandemic, combined with the knowledge that pollution impacts the least well off in our community the most; Should we be rethinking the dictats from the Local Plan and reassess what we should be doing going forwards?

“Owing to the new London Plan and the Planning White Paper, The Local Plan will be reviewed in the near future and will account for the Council’s Climate Emergency declaration. This has to be carefully considered accounting for the borough’s acute requirement for housing.”

I welcome the above statement to a degree. I am very aware that there is a need for more housing but mainly for the 6000 on the Council register. The proposals in the Local Plan are grossly biased towards building over 60% (10k out of 17k) of the new developments along the Crossrail corridor thus further contributing to the densification of one of the most densely populated areas of the borough.

Also, putting a play area for children on top of a 22 storey building should not ever be considered sufficient to remedy green space issues. Rather than treating developments as a box ticking exercise (eg. Green space is available even though it is on top of a building), it would be great to see the Council apply a level of practicality and pragmatism so that whatever is delivered is sustainable and useful to the residents of Redbridge.

In light of covid (health and mental wellbeing), the BLM movement (socio-demographic) and the impending recession (financial) I would hope the reassessment of the Redbridge Local Plan is more than just moving pieces around on a chess board. A complete rethink needs to happen.

- **Can you provide any provisional dates for when this review of the Local Plan will take place? And what will the remit be?**

Q11. In light of climate change effects, would you agree that the "Local Plan" which effectively green lit the developers to build high rises anywhere along the Crossrail corridor is no longer fit for purpose?

“The Local Plan when next reviewed will account for the Council’s Climate Emergency declaration. This has to be carefully considered accounting for the borough’s acute requirement for housing. A review of the Local Plan will involve consideration of the overall distribution of new housing across the borough, subject to the location of suitable sites and material planning considerations.”

- This response is very welcome and I hope it is soon. No further questions on this point.

Q12. Reclaim Redbridge have commissioned a private air quality report paid for by residents. It is quite scathing about the lack of scrutiny that was applied to the Tesco planning application and the lack of data any decisions were based on. Our concern is that this becomes (or already is) the norm for planning applications?

I am fully aware the application is live. My point is that it should never have gone to the GLA in the state it is in. There are glaring holes in the data, no ratification of figures by the council and obvious issues such as “increased pollution effects from the build during and post build” should be unacceptable.

If a few residents can find these errors/omissions then the qualified planners should be able to. These sorts of decisions can devastate the dynamic of a community and there is no margin for error when decisions are made.

- **How can this be justified?**
- **In your senior Council position would you not agree that better oversight should be provided to the councillors who I would argue do not have the level of training nor time to look over a planning application that is 2500+ pages long?**

Q13. Are you able to provide the socio-economic and demographic data correlating to who is most effected by pollution and climate change in Redbridge by ward? If not can this be something that can be produced as there is data to suggest that the bottom 30% of society financially are the most likely to suffer from pollution related illness?

I note your job title in your signature contains “Regeneration and Culture Directorate”. I would have assumed the diversity of Redbridge dictates that you would have had socio/economic/demographic/earnings/etc data available pre-covid and on an *ongoing* basis. I am disappointed to hear that Covid is being used as an excuse for no data being available historically and it also leads me to believe that none of these factors are part of the planning committee decision making process.

- **My assumption from what you say is that you have no idea if the council has been building in the poorest, ethnically diverse or jobless areas of the borough. Is this correct?**

Ultimately the Council runs the risk of aggravating a problem they don’t even know they have until it is too late. Artificially inflating the populous and elevating the price of housing in an area that is already at the lower end of income or employment can have a multitude of detrimental effects.

In light of growing evidence (from the pandemic) that space is a crucial requirement in both mental and physical health, I think it would be deficient of the council to ignore this as a “*material consideration*” for new builds.

- **If you do not have demographic data then how will you know the true impact of the planning decisions you are making?**
- **Are there plans to get this data available any time soon so we (and others) may use it to reinforce our voices against the mass of developments (particularly Tesco)?**
- **Historically, how has the council made any decisions relating to finance/health/policing/etc if they do not have the demographic data which should feed into these decisions?**

Freedom of Information Act 2000 (FOIA)

Decision notice

Date: **5 February 2021**

Public Authority: **Barking, Havering and Redbridge University Hospitals NHS Trust**

Address: **Queen's Hospital
Rom Valley Way
Romford
Essex RM7 0AG**

Complainant: **Andy Walker**

Address: **andy.walker@talk21.com**

Decision (including any steps ordered)

1. The complainant has requested information about death rates. The position of Barking, Havering and Redbridge University Hospitals NHS Trust ('the Trust') is that it does not hold the requested information.
2. The Commissioner's decision is as follows:
 - On the balance of probabilities, the Trust does not hold the information the complainant has requested and has complied with section 1(1)(a) of the FOIA.
3. The Commissioner does not require the Trust to take any remedial steps.

Request and response

4. On 19 September 2019 the complainant had written to the Trust and requested information in the following terms, as part of a wider request:

"G) Please can you supply me with the updated table containing 6 conditions which is attached called "death rates"

I seek the information in the same format but for 12 months. So this means 12 tables commencing September 2018 finishing August 2019. I recognise this may take unusually high resources, but it must be in the public interest to find out if higher death rates are associated with Queens due to patients waiting longer for type 1 care at Queens than King George.

If such a correlation exists, as <https://www.nhsimas.nhs.uk/ist/how-to-stabilise-emergency-care-in-england/> suggests there will be, it will support the argument that BHRUT management should act to equalise type 1 performance at both sites."

5. The Trust had responded on 17 October 2019. With regard to part G of the request, the Trust asked the complainant to identify the source of the table he had sent to it so that the Trust could make further enquiries.
6. Following the Commissioner's intervention, on 17 August 2020 the complainant communicated to the Trust the source of the table he had referred to in his request. This is discussed below.
7. On 2 September 2020 the Trust provided a response to this part of the request. It discussed the situation regarding information published on NHS Digital's website and directed the complainant to that website. The Trust indicated that it does not hold the specific information the complainant has requested – a breakdown of death rates by month.
8. The Trust provided a review on 13 October 2020. It maintained its position that it does not hold the specific information the complainant has requested. The Trust advised the complainant that the FOIA does not oblige it to create a new dataset in order to respond to a request.

Scope of the case

9. The complainant first contacted the Commissioner on 16 December 2019 to complain about the way his request for information had been handled.
10. The Commissioner's investigation has focussed on whether, on the balance of probabilities, the Trust holds the information the complainant has requested and has complied with section 1(1) of the FOIA.

Reasons for decision

Section 1 – right of access to information held by public authorities

11. Under section 1(1) of the FOIA anyone who requests information from a public authority is entitled under subsection (a) to be told if the authority holds the information and, under subsection (b), to have the information communicated to them if it is held and is not exempt information.
12. In its submission to the Commissioner the Trust has explained that the table shared by the complainant was identified as Summary Hospital-Level Mortality Indicator (SHMI) data from July 2015 to June 2016. It had been made available as part of a response to an FOI request in December 2016.
13. The Trust has told the Commissioner that the complainant had referred to SHMI and Hospital Standardised Mortality Ratio (HSMR) data in the course of his various communications with the Trust. It had explained to him the difference between two data sets in its response to an earlier request from the complainant in February 2019.
14. The Trust goes on to say that in its communications with the complainant over the years, it has referred to two separate tables shared in its published Board papers (SHMI – December 2016, HSMR – October 2018). Both mortality data sets are taken from the Hospital Evaluation Data (HED) website, to which the Trust is subscribed.
15. Following discussions as a result of this investigation, the Trust has told the Commissioner that a member of Trust staff has confirmed that the data provided to the complainant in 2016 was taken from the HED – the website portal above, to which the Trust and other NHS Trusts are subscribed. The Trust confirmed that the data was not at any point in time taken from a Trust-based system or database.
16. The Trust has broadly outlined for the Commissioner how the NHS Digital reporting portals work, how SHMI is calculated and what the Trust shares with the portals in order for these calculations to be made.
17. The Trust says it securely shares a large amount of confidential patient activity, including “personal information”, diagnosis, dates of admittance and discharge, procedures and outcomes ie death, amongst other factors. Details are securely shared with two NHS Digital portals: the Hospital Episode Statistics (HES) and Secondary Uses Service (SUS).

18. Data is not submitted once but undergoes a number of submissions to allow for changes in diagnosis, dates and outcomes amongst other factors. In essence, any results are normally deferred to take account of updates and for data to be validated. This then provides a true reflection of patient statistics.
19. In a third step, the third NHS Digital portal – HED – uses this information, correlates it with data taken from the Office for National Statistics (ONS) and uses its own statistical methods to calculate the SHMI data. The Trust has confirmed that it does not calculate the SHMI data itself.
20. The Trust has provided the following definition of SHMI data:

“...The SHMI is the ratio between the actual number of patients who die following hospitalisation at the trust and the number that would be expected to die on the basis of average England figures, given the characteristics of the patients treated there.”
21. It has also noted that NHS Digital has published the following statement alongside the SHMI data that is on its website:

“The SHMI is not a measure of quality of care...The SHMI cannot be used to directly compare mortality outcomes between Trusts and it is inappropriate to rank trusts according to their SHMI...”
22. For reporting purposes, or as required, the Trust says it is able to log in to the HED portal as a subscribed user to identify information for planning and reporting purposes. The HED website is not simply used by NHS Trusts to extract mortality data when needed but allows reporting on a whole range of areas. This allows services to be analysed and allows future planning. The Trust has confirmed that it does not commission the production of SHMI data.
23. The Trust has noted it appears that the complainant may have a theory or presumption about the standards of healthcare that the Trust provides and is seeking data to support that theory. In the Trust's view, it is not required to create a data set to respond to the complainant's request. The only element of the information in the table the complainant shared that it would hold, the Trust says, would be number of deaths. However, the Trust notes that the request is for death rates ie SHMI data, which the Trust confirms it neither produces nor holds.
24. The Commissioner understands that 'death rate' is a measure of the number of deaths (in general or due to a specific cause) in a particular population, scaled to the size of that population, per unit of time ie it is distinct from number of deaths. The Commissioner has reviewed part G

of the complainant's wider request, which is the focus of this investigation. He had named the table about which his request in part G is focussed, "death rates" and that table concerns SHMI data (ie information about death rates). The complainant also says in his request that he considers there is a public interest in "death rates" and has requested SHMI data for 12 months. As such the Commissioner is satisfied that the request is a request for information about death rate / SHMI information and not information about number of deaths.

25. The Commissioner has considered the Trust's explanation of how it manages certain information and its interaction with NHS Digital. The Trust says that it submits particular information to two NHS Digital portals, re-submitting this information to ensure it is up to date. A third portal – HED – then takes the information, correlates it with ONS data, and calculates SHMI data. Along with other Trusts, the Trust subscribes to the HED portal and can log in to it to gather the SHMI data and other information.
26. The Trust has confirmed that it does not calculate SHMI data itself, that it does not hold this data and that it does not commission the HED portal to produce the SHMI data. In the absence of any evidence to the contrary, the Commissioner accepts that this is the case ie that the Trust does not hold the SHMI data the complainant has requested itself.
27. The Commissioner is also satisfied that NHS Digital - through the HED portal - does not hold the SHMI data 'on behalf of' the Trust. If the HED portal *did* hold the SHMI data on behalf of the Trust, then the Trust could be said to hold it. As it is, the HED portal takes information that the Trust submits to the HES and SUS portals, applies its own statistical methods to this information and correlates it with ONS data. This generates SHMI data. As above, while the Trust can access the SHMI data and has an interest in it, its access is controlled by NHS Digital (through the subscription) and the Trust does not help create, record, file or remove the information at its own discretion. The Commissioner is therefore satisfied that the HED portal holds the SHMI data on its own behalf and not on behalf of the Trust, or any other Trust.
28. The Commissioner has considered all the circumstances and is satisfied that, on the balance of the probabilities, the Trust does not hold the information requested in part G of the complainant's request and has complied with section 1(1)(a) of the FOIA.

29. The Trust has explained that it is possible to access NHS Digital's website¹ to see information within scope of the complainant's request. It says that the only breakdown not possible on this interactive tool is the ability to break this information down by month, but the site does provide SHMI data by site and time period and split by diagnosis.

¹ <https://digital.nhs.uk/data-and-information/publications/statistical/shmi>

Right of appeal

30. Either party has the right to appeal against this decision notice to the First-tier Tribunal (Information Rights). Information about the appeals process may be obtained from:

First-tier Tribunal (Information Rights)
GRC & GRP Tribunals
PO Box 9300
LEICESTER
LE1 8DJ

Tel: 0300 1234504
Fax: 0870 739 5836
Email: grc@justice.gov.uk
Website: www.justice.gov.uk/tribunals/general-regulatory-chamber

31. If you wish to appeal against a decision notice, you can obtain information on how to appeal along with the relevant forms from the Information Tribunal website.

32. Any Notice of Appeal should be served on the Tribunal within 28 (calendar) days of the date on which this decision notice is sent.

Signed



Pamela Clements
Group Manager
Information Commissioner's Office
Wycliffe House
Water Lane
Wilmslow
Cheshire
SK9 5AF



Neutral Citation Number: [2021] EWHC 336 Admin

Case No: CO/4745/2019

IN THE HIGH COURT OF JUSTICE
QUEEN'S BENCH DIVISION
PLANNING COURT

The Civil Justice Centre Manchester

Date: 19 February 2021

Before :

His Honour Judge Bird sitting as a Judge of this Court

Between :

The Queen **Claimant**
(on the application of GEMMA CAMERON)

- and -

MANCHESTER CITY COUNCIL **Defendant**

Mr John Hunter and Mr Piers Riley-Smith (instructed by **Nexa Law**) for the **Claimant**
Mr Christopher Katkowski QC and Miss Kate Olley (instructed by the **City Solicitor**) for
the **Defendant**

Hearing dates: 8 January 2021

Approved Judgment

I direct that pursuant to CPR PD 39A para 6.1 no official shorthand note shall be taken of this Judgment and that copies of this version as handed down may be treated as authentic.

.....
HIS HONOUR JUDGE BIRD SITTING AS A JUDGE OF THE COURT

His Honour Judge Bird :

1. This is an application for judicial review of the Defendant's grant of planning permission for the use of land adjoining Great Ancoats Street in Manchester as a 24-hour public pay-and-display 440-space car park for 2 years ("the Car Park"). Permission was granted in October 2019 and will expire on 17 October 2021.

The Site

2. The relevant site is in Manchester, adjacent to New Islington and Ancoats. These areas have seen high levels of development activity in recent years as part of the delivery of the Ancoats and New Islington Neighbourhood Development Framework (NDF).
3. The site comprises 1.5 hectares and was the former car park of the "Central Retail Park". The retail park outlets have been demolished and the land they occupied hoarded off. The totality of the site is identified as strategically important in planning terms and it is anticipated that permanent development plans will be submitted in due course.
4. In terms of layout, the site forms an "L" with the longest element fronting Great Ancoats Street wrapping round to form the shortest element along the Rochdale Canal. It is bounded by Old Mill Street, Great Ancoats Street, the Rochdale Canal, New Islington Free School and New Islington Marina. The New Islington medical practice is also close by.
5. The site is within an Air Quality Management Area ("AQMA"). As paragraph 12.80 of the Core Strategy (see below) makes plain, the AQMA is in place by reason of high NO₂ concentrations:

"in terms of Lead, Particulate Matter, Sulphur Dioxide, 1,3 Butadiene, Benzene and Carbon Monoxide, Manchester meets both current and future air quality targets. In Manchester, therefore, the AQMA is for NO₂ only"

The planning process.

6. Following consultation some 320 objections were received. The common thread running through each is, broadly, environmental harm and in particular the risk of air pollution. The Free School registered objections which included "*the detrimental impact on pupils experiencing respiratory problems*". The Defendant adopted a screening opinion and determined that the development was not likely to give rise to significant environmental effects. No Environmental Statement was therefore prepared.
7. The Development Plan insofar as relevant to this application consists of the Manchester Core Strategy (2012). The relevant policies within the Core Strategy include *S06* Environment and *EN16* air quality which requires the Defendant to:

"seek to improve the air quality within Manchester, and particularly within Air Quality Management Areas"

8. The NPPF (2019) at paragraphs 170(e), 180 and 181 provide that:

“Development should, wherever possible, help to improve local environmental conditions such as air quality”.

“[planning decisions should] ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development”

“[planning decisions should] sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones....

Opportunities to improve air quality or mitigate impacts should be identified”.

9. Every AQMA must have an Air Quality Action Plan (see para.2.3.1 of the Redmore assessment) the aim of which is to *“develop a clear, robust and meaningful set of actions which will deliver real changes in terms of air quality”* and which allows councils within Greater Manchester to carry out their statutory duties under Part IV of the Environment Act 1995. The defendant has adopted, as best practice, IAQM Development and Planning Control Guidance to deal with those obligations.

10. The relevant IAQM Guidance was published in January 2017. It notes at para.3.4 that NO₂ can play:

“an adverse role in exacerbating asthma, bronchial symptoms (even in healthy individuals), lung inflammation and reduced lung function. [there] is also an increasing awareness of evidence, as summarised in the HRAPIE review by the WHO, that chronic exposure to NO₂ may be important for premature mortality effects.... when applied on a national basis, use of these functions suggests that the national premature mortality burden for long term exposure to NO₂ is equivalent to 23,000 deaths annually”.

11. Section 4 of the IAQM Guidance deals with planning matters. Paragraph 4.3 sets out a reminder that planning authorities need to pay particular attention to a number of matters when considering the grant of planning permission including whether the development will *“materially affect any air quality action plan or strategy”* and the overall *“degradation (or improvement) in local air quality”*. Section 6 deals with the mechanics of undertaking an air quality assessment.

12. At para.6.8, the Guidance notes that it would be reasonable to have an air quality assessment where the development brings with it *“a risk of a significant air quality effect”*. Where an assessment is required (see para.6.9, 6.13 and 6.14) it may be either a simple assessment (relying on already published information and without quantification of impacts) or a detailed assessment (completed with the aid of a predictive technique, such as a dispersion model). A simple assessment *“may be*

appropriate, where it will clearly suffice for the purposes of reaching a conclusion on the significance of effects on local air quality.”

13. Paras.6.13 and 6.14 deal with a screening process. There are 2 stages: the first screens out developments if certain criteria relating to size are not met. The second helps to identify the likelihood that an air quality impact assessment should be carried out. The present development was not screened out at stage 1. Stage 2 suggests (bearing in mind the nature of the proposed development) that if it would not result in an AADT (annual average daily traffic flow) increase in the number of cars of more than 100 an assessment is unlikely to be required (in the sense that positive indicative factors are lacking).

14. At paragraphs 6.16 and 6.18 the following guidance appears:

“The principle underlying this guidance is that any assessment should provide enough evidence that will lead to a sound conclusion on the presence, or otherwise, of a significant effect on local air quality. A Simple Assessment will be appropriate, if it can provide this evidence”

“The intent of an air quality assessment is to demonstrate the likely changes in air quality or exposure to air pollution, as a result of a proposed development.... Ultimately, the planning authority has to use this information to form its own view on the “significance” of the effects of air quality impacts, and thereby the priority given to air quality concerns in determining the application. The assessment therefore needs to provide sufficient information to allow this decision to be made.”

15. It is clear from para.6.20 that the key point for an air quality assessment to address (“the basis of the assessment”) is a comparison of air quality if the development takes place (described as “with development” and generally considered – see para.6.23 – for the first year of use) and if it does not take place (described as the “future baseline”). That exercise is comparative and necessarily involves a degree of informed speculation. The Guide suggests that *“Comparison with existing conditions will also be required, as current conditions are those with which people are familiar”* (this is the “existing baseline”).

Mott McDonald - Traffic

16. Mott McDonald have prepared an amended “Technical Note” on traffic (or a “summary Transport Note”) dated 26 September 2019. It is a short note set out like an office memo rather than a report. It is not signed. The aim of the note is to provide: *“estimated peak hour traffic movements to and from the car park and commentary on the integration with the surrounding highway network”*. The methodology adopted is this:
 - i) first, it considers the traffic flow generated by the site when it was “fully operational” (effectively serving the car parking needs of 15,143 m² of retail space).
 - ii) Then it considers traffic flows post completion of the proposed development.

17. The conclusion is that traffic flows arising from the new development are likely to be lower than traffic flows experienced when the retail park was operating.
18. The conclusion is: "*The proposed car park is a 'meanwhile' use for the former Central Retail Park site as masterplans are developed for the site. The extant use is for 15,000 sqm of retail warehousing which, it is estimated, generated up to 600 two-way trips in the PM peak hour. The new car park turnover rates are likely to be much lower than a typical retail car park, as commuters will park on site for up to 10 hours per day. This will result in less movement throughout the day and lower impacts in the PM network peak hour. However, AM peaks are likely to be marginally more traffic intensive than the previous use.*"
19. The parties agree that this reference to "extant use" is in error. The note ends with this conclusion: "*The proposed development will therefore not have a significant impact on the local highway network, during the short period it will be operational. Therefore, it is respectfully concluded that the application should not be refused on highway or traffic grounds*"

Redmore - Air Quality

20. On 26 September 2019 Redmore provided an air quality assessment. Section 3 of the report identifies the "existing baseline" by considering the annual mean for NO₂ concentrations in 2018. At Great Ancoats Street (immediately at the site) the levels were given as 46.1. That is above the relevant limit, as would be expected in an AQMA. The report notes that although the number of retail units at the retail park decreased between 2016 and 2017 (there were 4 units in 2015 and 2016 and 2 units in 2017 and 2018) there was no real reduction in levels of NO₂ at Great Ancoats Street (see para.4.3.2). This leads to the conclusion that "*vehicle movements from the site were not significantly affecting local air quality, possibly as the number of trips was relatively low when compared to overall flows on Great Ancoats Street*".
21. In other words, the flow of traffic into and away from the site when it was operating as a car park and the retail site was open, had no real effect on NO₂ levels in the area because there was so much traffic using Great Ancoats Street that any flow attributable to the site was not material. The conclusion then is that: "*vehicle trips associated with the historical retail use of the site did not have a significant effect on local air quality. As the proposals are predicted to produce only a marginal increase in movements from those during 2017 and 2018, and a reduction in trips compared to 2015 and 2016, it is concluded that these are also unlikely to have a significant impact on air quality*" (emphasis added).
22. There is no information in the 2019 report about NO₂ levels beyond 2018 and therefore (because there were 2 open units in 2018) no indication of levels when the retail park was closed.
23. At para.4.2.1 Redmore calculate that the new use will result in a net change in traffic flow when compared to the usage of the site in 2018 (when there were 2 occupied units until April or May 2018) of +269 based on approximately 1600 projected daily vehicle movements (taken from the Mott Macdonald report). To arrive at that figure the authors of the report have calculated the equivalent vehicle movements "based on historical occupancy rates". The report goes on to conclude that "*the number of additional daily*

vehicle movements on any individual link with associated receptors is not anticipated to exceed 100”.

24. The report then at para.4.4.1 looks at the criteria set out in the IAQM Guidance for when an air quality impact assessment might be needed. It concludes (because there will be no increase in the flow of cars of greater than 100) that there is no need for an air quality assessment and that the air quality impacts will be “not significant”. The report concludes: “*Potential air quality impacts associated with vehicles travelling to and from the site were considered through comparison of historical and future trip generation, review of local monitoring results and use of the IAQM screening criteria. This indicated that impacts were predicted to be not significant.*” Thus, a comparison of the “historical” use of the site and the “future” use of the site if development were to be permitted leads to the conclusion that the development will have little impact.

The Officer’s Report

25. The report refers to a “trip generation exercise” and the conclusion that no highways remodelling, or upgrade works will be required to accommodate the development. That appears to a reference to the Mott Mcdonald note.
26. Reference is made to relevant planning policies and in particular to **S06** and **EN16** within the core strategy. The conclusion in each case, based on the Redmore report, is that the development would have a neutral impact on air quality.
27. The officer’s report deals with traffic and access by reference to the Mott Mcdonald report and concludes in this way: “*Given the previous use of the site as a 440-space car park, which was accommodated into the local highway network, it is not considered that the proposal would have a significant impact on the local highways during the temporary two-year period the site is operational*”.
28. The air quality section of the report notes the site is in an AQMA and refers to the Redmore air quality report conclusion that the proposal would not have a “significant material impact on local air quality conditions”. The report also notes:

“Although the retail use had been in decline, air quality monitoring saw no reduction in real terms in pollution around the site. This would indicate that vehicle movements from the site were not significantly affecting local air quality. More recent figures show that there has been a marginal reduction in air quality conditions which was mirrored in other nearby locations and therefore, this reduction could not be directly attributed to the low number of trips visiting the retail park.

As such, it appears that vehicle trips associated with the previous use did not have a significant impact on local air quality. As vehicle movements would increase only marginally during peak times, it would not affect local air quality conditions.”

Grounds of Review

29. I turn to the three grounds of review in respect of which permission has been granted:

- i) The defendant erred in treating the previous use as the ‘baseline’ for assessing the impact of the proposed use
- ii) The defendant erred in concluding that the impact of the development on air quality would be the same as or comparable to the previous use in any event
- iii) The defendant failed to have due regard to the Public Sector Equality Duty (‘PSED’)

Ground 1

30. Mr Hunter who appeared with Mr Riley-Smith for the claimant emphasised that a proper assessment of the impact the proposed development would have on (amongst other things) air quality, lay at the heart of the planning process in this case. That seems to follow from the Core Strategy, the NPPF and the IAQM guidance adopted by the defendant. Without an accurate assessment of the impact the development would have on air quality it would not be possible to determine how relevant policies should be applied (see *Mooreland* below at paragraph 36).

31. Mr Hunter’s criticism is based squarely on the fact that Mott Macdonald (and he submits Redmore) proceed on the basis that the site has existing (or “extant”) planning permission for car park use. If it had the benefit of such permission and if there was a real possibility of the permission being acted upon, then it would be acceptable to take the historic use of the site as the “future baseline”. I accept however that it does not have such permission, and that this assumption is an error.

32. The officer’s report importantly picks up and compounds the error and, in any event, refers more than once to historic (and in essence unrepeatable, save with the grant of planning permission) use as a car park.

33. The assessment of impact is a comparative exercise as can be seen from the IAQM guidance which highlights the need to identify a “future baseline” (without development) and then compare it to the position that would prevail if the development went ahead. Although the Guidance also refers to the “existing baseline” in the present case there is no reason to suspect that the “future baseline” and the “existing baseline” are not exactly the same. I note that in *Bibb v Bristol CC* [2012] JPL 565, that Ouseley J described the “real baseline” as the position without development. The problem identified by Mr Hunter is that (given the absence of any extant permission to use the site as a car park) neither the future baseline nor the existing baseline is in fact identified.

34. The Redmore report devotes some time to identifying the “existing air quality conditions” (the existing baseline) at the site. It relies on “recent NO₂ results recorded in the vicinity of the proposed site” from 2018 when the retail park was open, and the site was being used as a car park. To examine the position “with development” Redmore assumes (by reference to the Mott Macdonald note) 1600 car movements per day (at least between 7am and 7pm) but sets off against that number, trips that would have been taken to the retail units on site, giving a net difference of 269. The report then informs the defendant that post development, some 269 more car journeys would be made than would have been made when 2 units were operating on the retail

park and the site was lawfully used as a car park up to May 2018. Mr Hunter submits that the netting off of historical journeys is wrong in principle.

35. The report goes on to conclude (as described above) that because NO₂ levels at the site and in the area do not appear to have been affected by the reduction in the number of operating units at the site (before May 2018) that there is no causal link between NO₂ levels in the locality and the number of cars that use the car park and that one is not directly proportionate to the other.
36. Mr Hunter submitted (by reference to *Bibb v Bristol City Council* [2011] EWHC 3057) that the correct baseline would involve a consideration of the position if there was no planning permission. I was also referred to the Northern Ireland decision in the *Matter of an application by Mooreland and Owenvaragh Residents' Association* [2014] NIQB 130 and to paragraphs 54 onwards dealing with the “fallback position”. In that case Horner J pointed out (paragraph 55) that if a key element in the assessment of the proposed development is misunderstood, the planning authority could not “*have lawfully carried out the balancing exercise of all the material considerations, which it accepts is crucial to its final decision. It precluded the decision-maker from fairly weighing in the balance, for example, the adverse impact on the road network and on residential amenity of [the development] because the effect had not been lawfully and adequately assessed.*”
37. In answer to these points Mr Katkowski QC for the defendant submits that the defendant was entitled to take account of the past use of the site as a car park. I accept that submission. It does not however deal with Mr Hunter’s argument. The point raised by the claimant is very specific: there has been no proper assessment of the impact the development would have on air quality because there has been no examination of the difference between the “future baseline” and the position with development. It seems to me that the defendant accurately summarises the meat of the claimant’s argument at paragraph 43 of its skeleton argument. It seems to me that the proposition there cited and advanced by the claimant is exactly what the IAQM guidance requires.

Discussion

38. In my view a proper assessment of the impact the development would have on air quality is required before the defendant can consider if relevant policies are met (or if not, if they should be departed from). A proper assessment of the impact on air quality is the subject of guidance published by the IAQM and adopted by the defendant. The assessment can take a number of forms (it can be simple or detailed). Whichever form it takes it must meet the minimum standard of providing: “*enough evidence that will lead to a sound conclusion on the presence, or otherwise, of a significant effect on local air quality*”
39. In my view the air quality assessment provided by Redmore is not capable of providing evidence that would allow the defendant to come to a sound conclusion about the impact of the development on air quality. Insofar as the report concludes (at section 4.4) that the IAQM’s “indicative criteria” for an air quality assessment are not reached, I find that conclusion is wrong. Redmore are therefore wrong to conclude that it follows that impacts associated with the scheme will not be significant.

Paragraph 6.14 of the IAQM Guidance is perhaps to blame. In my view, the underlined words (my added emphasis) relate to stage 1 criteria set out in table 6.1. It appears that Redmore have (wrongly) applied them to the stage 2 “criteria” set out in table 6.2. says this:

“Stage 1 requires any of the criteria under (A) coupled with any of the criteria under (B) in Table 6.1 to apply before it is considered appropriate to proceed to Stage 2. If none of the criteria are met then there should be no requirement to carry out an air quality assessment for the impact of the proposed development on the local area, and the impacts can be considered to have insignificant effects”

40. In dealing with air quality assessment the Redmore report concludes either (a) that an air quality assessment is not needed (see paragraph 24 above) or (b) (because historically the gradual closure of retail units did not affect the levels of NO₂) there is no causal link between the use of the car park and NO₂ levels that the impact of the development on air quality is insignificant. In either case the assessment in my judgment does not do what an assessment should do; it fails to compare the future baseline with the position that would prevail if the development was in place.
41. The report itself notes that potential air quality impacts associated with vehicles travelling to and from the site were considered “*through comparison of historical and future trip generation, review of local monitoring results and use of the IAQM screening criteria*”. In my view this makes the point and reveals the inadequacy of the report: a comparison made between historical and future trip generation is not an appropriate assessment of the impact the development will have on air quality. The review of local monitoring results does not indicate what the future (or present) baseline is and for the reasons given it seems to me that the IAQM screening criteria have been misunderstood.

I accept Mr Katkowski’s submission that I am not directly concerned with the correctness of the expert reports. But in the present case those reports have been effectively adopted by the officer’s report. The report notes when considering policy *EN06* that given the previous use of the site there would be a neutral impact on air quality and when looking at policy *EN16* there the impact would be neutral because “*there has been a 440-space car park on this site for many years*”. Looking at Planning Practice Guidance the report concludes that “*the impact on air quality in the local area will not be material when measured against the operations of the car park when in association with the retail park.*” Dealing with the impact on air quality the report states: “*The use of the site as a 440-space car park forms the baseline from which the proposal should be assessed*”; it refers to “*an air quality report*” which “*notes that any air quality impacts would be from exhaust emissions and confirms that the proposal would not have a significant material impact on local air quality conditions. The assessment concludes that the differences in trip generation between the previous and proposed use are negligible and would not warrant refusal of this planning application*”. The conclusion notes: “*The operations of the car park would be comparable with the previous parking use.*”

42. The parties remind me that I must not read the officer's report “*with undue vigour but with reasonable benevolence and bearing in mind that they are written for councillors with local knowledge*” (*Morge v Hants* [2011] UKSC 2). He also reminds me in the absence of evidence to the contrary (there is none here) it can reasonably be assumed that by following the officer's recommendations the members were accepting the advice proffered (see *Palmer v Herefordshire* [2016] EWCA Civ 1061). I am satisfied that on a fair reading of the report as a whole, the officer has materially misled the members on a matter bearing upon their decision, and the error has gone uncorrected before the decision was made (*Mansell v Tonbridge Borough Council* [2017] EWCA Civ 1314 per Lindblom LJ at [42]).

43. With that guidance in mind, I have come to the conclusion that it is clear that the officer's report proceeded expressly on the (wrong) basis that use of the site as a car park was the correct baseline. For the reasons given above I am satisfied that is an error. In summary:

- i) The correct future (and present) baseline would be to treat the site as an abandoned car park or an empty piece of land.
- ii) There is no relevant air quality assessment. Rather there is a comparison of resultant air quality when the site was a car park and if it becomes a car park again. It is perhaps unsurprising that the conclusion was that there would be no material change.

44. Unsurprisingly in the facts of this case, it is not suggested that the outcome of the planning decision would have been the same if the members had been properly advised. It follows that I find ground 1 to be made out and will quash the decision to grant planning permission.

Ground 2

45. Having reached that conclusion ground 2 in my judgment (and as I understood the parties to accept) falls away.

46. There appears to be a clear overlap between the first and second grounds. Ground 2 attacks the substance of the reports and relies on some of the points I have set out above. I have dealt with some of those points above. I would only add that the purported air quality assessment in this case (relying as it does on historical use and future use and missing out any analysis of the present position) is such that it precludes any meaningful consideration of how air quality might be improved (as required in appropriate circumstances by *EN16* and *S06*).

Ground 3

47. Ground 3 started out as a wide-ranging allegation of a failure on the part of the officer to provide adequate advice. A failure to deal with the Public Sector Equality Duty (“PSED”) was only one of a number of complaints. Paragraph 69 of the Statement of Facts and Grounds sets out the following:

“The Defendant was also obliged to take into account the effects on children’s health as a primary consideration and pay “due regard” to effects on the

disabled people in accordance with the Public Sector Equality Duty in section 149 of the Equality Act 2010. However, no consideration (or no proper consideration) was given to whether the approval of an application for a major new car park was consistent with the above".

48. The Defendant joined issue with this ground and in particular complained that there was an absence of detail as to how the PSED might arise.
49. In the reply to the summary grounds of resistance the claimant included this at paragraph 21 (emphasis added):

"Paragraph 62 of the SGR denies that being a child is a protected characteristic under the Equality Act 2010. However, 'age' as well as 'disability' is explicitly a relevant protected characteristic (see s.149(7)). Therefore, since s.149(1) and (3) of the Act require "due regard" to be had to, amongst other things, advancement of equality between those sharing a relevant protected characteristic and those who do not (including by taking steps to remove or minimise disadvantages suffered by the former which are connected to that characteristic), the Defendant was obliged to consider the potential for the development to have a greater/more disadvantageous impact on children living locally and/or attending the school, on the basis that they share a relevant protected characteristic. For essentially the same reasons set out above in relation to the children's best interests, it is submitted that the Defendant similarly failed to pay 'due regard' to the need to avoid/minimise particular harm/disadvantage to them."

50. The reference to children's best interests is rehearsed at paragraph 20 (emphasis added):

"The Defendant does not dispute that the best interests of children had to be treated as a primary consideration, but appears to claim that this duty was satisfied by the Committee Report (SGR, paragraphs 60-61). However, the requirement to treat them as a 'primary consideration' means that the Defendant had to give proper and lawful consideration to them and ensure that they were not treated as inherently less important than any other consideration. One issue of particular concern to objectors, however, was the impact on children's health from a reduction in air quality due to the proposed use, as it is well-known that children are at risk of particular harm in this respect and there is a school is directly adjacent to the site, as well as children living locally and/or attending that school with respiratory conditions. Thus, the issue was fairly and squarely raised before the Defendant. Despite this, there is simply nothing in the Air Quality Report which addresses the potential impact on children. It appears, therefore, that the Defendant did not ask Redmore to consider it (and may not even have made them aware of the existence of the school or its proximity to the site). This was a major omission because, as the IAQM guidance makes clear that, "in certain circumstances, it may be necessary to consider whether the site itself is suitable for the introduction of new emission sources. This

could be because the neighbouring land use has particular sensitivities to increased exposure to air pollutants". It follows that the Defendant failed to treat the best interests of the children (which obviously include their health and physical development) as a 'primary consideration'."

51. In the claimant's skeleton argument Mr Hunter argues that no steps were taken to consider the impact the grant of permission would have on children in the school with respiratory conditions. This is in effect an amalgam of the 2 separate points raised at paragraphs 20 and 21 of the reply.
52. Because I have already found for the claimant on ground 1 it seems to me that this ground is of little practical relevance. However, given that it is of some real importance to the claimant I will deal with it, albeit shortly. It seems to me that the defendant understood the argument in respect of PSED to be that the defendant had failed to have due regard to the rights of children as a class. In my view the claimant is entitled to take a wider view and to argue the point as it was put in her skeleton argument.
53. I accept that there is no reference in the officer's report to the PSED. Nonetheless, I bear in mind that the failure to make such specific reference will not of itself necessarily mean that the decision maker has failed to comply with its statutory duty (see the decision of Lewis J as he then was in *R (Buckley) v Bath and North East Somerset Council & Curo* [2018] EWHC 1551).
54. Section 149 of the Equality Act 2010 requires a public authority to "have regard to" the public sector equality duty.
55. There was some suggestion by the defendant (it seems to me because the argument was taken to apply to children as a class) that the duty might not apply in the present case. I am satisfied that it does. It was found by the Court of Appeal to apply in the case of *Gathercole v Suffolk* [2020] EWCA Civ 1179 to children with protected characteristics. I do not see therefore why it could not apply here.
56. In that case, permission was sought to develop a Primary School in Lakenheath close to an American Airforce Base and therefore in an area exposed to aircraft noise. The officer's report referred to the presence of excessive noise and a noise impact assessment. Outside teaching at the school would be interrupted by the noise. It was accepted that granting permission for the development would amount to a breach of policy by reason of the noise levels. The breach could not be mitigated but the effects of noise would be sporadic. The officer's report recommended that adverse impacts were outweighed by the benefits of having a school.
57. The Court of Appeal found that the defendant had not had due regard to the needs of children with protected characteristics (in particular those with hearing impairment and ADHD) when considering the effect of noise in the outside areas of the school. There was therefore a breach of the PSED (as it turned out the Court of Appeal concluded this made no difference and so rejected the claim). It was notable in that case that an environmental statement made specific reference (at chapter 7 under the heading of noise) to the PSED and made it plain that different acoustic criteria would apply to spaces for use by students with special hearing or communication needs. The

officer had nonetheless failed to make any mention of the particular needs of children with these protected characteristics in the report. Thus, Coulson LJ felt that the failure to raise the issue in the officer's report was a serious matter which could not be overlooked.

58. In the present case, Mr Hunter points out (in his skeleton argument at paragraphs 76 and 77) that objections made specific reference to the detrimental impact the development would have on children at the school with respiratory problems (see paragraph 6 above) and that this was ignored. He points out that the New Islington Free School is only 26 metres away from the proposed development (as was briefly acknowledged in the officer's report) and that children are identified as a sensitive population group in the Air Quality Directive.
59. The defendant had no information on which it could sensibly assess the extent to which the car park would impact on the health of those children at the school with respiratory conditions. It was under a duty to make inquiries and so be properly informed to ensure that it was in a position to consider the discharge of its duty (see *R (Hurley & Moore) v Secretary of State for Business, Innovation and Skills* [2012] EWHC 201 (Admin)).
60. In my judgment the present case raises the same issues that were raised in *Gathercole*. The defendant did not take me to any other authorities on this question and argued that point very briefly. If I had rejected ground 1 and so in essence found that the officer was entitled to advise members that the impact on air quality was negligible it is possible (as the defendant argued at paragraph 76 of its skeleton argument) that this ground would probably also have fallen away. It is perhaps understandable that the defendant did not concentrate its fire on this point, preferring instead to fight the main battle on ground 1.
61. For all of those reasons, I have come to the conclusion that the defendant failed to have regard to the PSED. The finding adds nothing to my conclusion, but it does stand as a reminder that when development within an AQMA is under consideration the obligation to consider the PSED is likely to arise because of the potentially disproportionate impact some types of development might have on those who suffer from respiratory conditions. This is particularly the case when the AQMA is in place because of the high presence of NO₂ because it is well understood that NO₂ is capable of playing an "*adverse role in exacerbating asthma, bronchial symptoms (even in healthy individuals), lung inflammation and reduced lung function*" (see paragraph 10 above and the IAQM guidance) and particularly the case when there is a school (because on any view children are more susceptible to the effect of NO₂ see for example Air Quality Directive 2008/50/EC Art.23.1) in the close vicinity to the area of potential development. In such cases the duty may well be discharged by a careful consideration of the issue noted in the officer's report and backed by expert evidence. In my view this approach would be entirely in line with the defendant's clear commitment (see policies *EN16* and *SO6*) to improve air quality.

Conclusion

62. I am grateful to counsel for their helpful and focussed submissions. If an order can be agreed in the light of this judgment I will hand down without the parties in attendance.

London Borough of Redbridge

Review of University of Kent report produced in response to
previous Ricardo report relating to 4309/19 – Development Site
At Tesco Extra 822 High Road, High Road, Chadwell Heath,
Romford

Customer:

London Borough of Redbridge

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5 March 2021

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1 Introduction

This document provides a short response to a report produced by the Centre for Health Services Studies (CHSS) at the University of Kent entitled “Response to Ricardo’s “*Review of University of Kent report “Air Quality Review for 4309/19 – Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford”*”, dated 22 February 2021.

In relation to matters raised by CHSS regarding report timing, the chronology of producing our reports to LB Redbridge was as follows:

- 28 August 2020: Review of CHSS July 2020 report
- 5 February 2021: Reproduction of 28 August report, with additional Appendix identifying whether the recommendations of the 28 August report had been addressed in additional information submitted by the applicant.

2 The difference between air quality objectives and the harm caused by air pollution

The CHSS February 2021 report starts with a heading: “*2. Ricardo does not understand the difference between air quality objectives and the harm caused by air pollution.*”

The report seeks to evidence this by quoting Ricardo’s August 2020 review, which said:

“It is misleading to say that the development would ‘introduce a fresh cohort of children to damaging levels of air pollution.’ The new school was specifically included in the assessment (Sensitive Receptor H), and it was shown that levels of air pollutants at the school would comply with the air quality objectives at this location in the opening year of the scheme (2026). The proposed development would therefore not introduce children attending the school to damaging levels of air pollution.”

The CHSS report goes on to interpret this as follows:

“The clear implication here is that Ricardo believes that air containing poisons in concentrations below air quality objectives cannot be damaging to children.”

In fact, Ricardo does not consider that air containing pollutants at concentrations below air quality objectives cannot be damaging to children. This is evident from reading on to page 4 of our August 2020 review, which states:

“It [CHSS July 2020 Report] goes on to highlight that exposure to air pollutants can have effects on health at levels below the air quality objectives. Data published by Public Health England on the number of deaths brought forward by exposure to air pollution in the borough of Redbridge are presented. This is not new information: these impacts are taken into account at a national level when setting national air quality standards and objectives.”

This paragraph specifically acknowledges the point that the University of Kent report accuses Ricardo in graphic terms of failing to understand. We do understand the potential effects of air pollution at levels below air quality objectives, and we evidently took account of this in our advice to London Borough of Redbridge. In the paragraph quoted above, and elsewhere in our August 2020 report, we go on to explain how this effect should be considered by Redbridge Council when considering the application.

In making its criticism of our August 2020 report, the CHSS report interprets our comments beyond their natural and intended meaning. The passage quoted states: “*the proposed development would therefore not introduce children attending the school to damaging levels of air pollution.*” The problem is in interpretation of the term “*damaging*.” This statement in the Ricardo August 2020 report reflects the way that evidence on the effects of air pollution on health informs policy and guidance relating to air quality assessment. The levels of pollution that should be considered as “*damaging*” are set at a national level, as described throughout our August 2020 report. Of course, this does not mean that exposure to levels of air pollution which comply with the national air quality objectives are completely

free of the potential for damage to the health of children or others. In setting national air quality objectives, the Government has specified a level at which the damage caused by air pollution should be viewed as a cause for concern, and should prompt action to mitigate the impacts. These national air quality objectives remain under review, as highlighted in the Government's Clean Air Strategy (2019) and the Environment Bill (2020).

Ricardo cannot see that there is any disagreement between CHSS and Ricardo on the question of whether exposure to air pollution at levels below air quality standards can have an effect on health. Both CHSS and Ricardo agree that there can be effects on health at levels below the air quality objectives. If there is disagreement, it lies in how this should be addressed through the planning process. Our advice on this matter to London Borough of Redbridge was clear in our August 2020 report:

"London Borough of Redbridge as the local planning authority is obliged to judge the significance of the proposed development against the currently applicable air quality standards. National and local policy and guidance is clear on this. It would be irresponsible to do anything else – for example, refusing planning permission for the proposed development on the grounds suggested in the [CHSS July 2020] report would be likely to lead to an appeal. If, as is highly likely, the Council should lose an appeal, this would result in associated costs to cover legal expenses for both the Council and the applicant. In our view, this would not be a responsible course of action for London Borough of Redbridge."

3 The tragic death of Ella Kissi-Debrah and location of the new primary school

The CHSS February 2021 report goes on to cite the recent coroner's report into the tragic early death of Ella Kissi Debrah. CHSS seeks to compare the air quality conditions which contributed to Ella's early death with the conditions forecast to occur in the vicinity of the proposed development.

The Record of Inquest states:

"Air pollution was a significant contributory factor to both the induction and exacerbations of her asthma. During the course of her illness between 2010 and 2013 she was exposed to levels of Nitrogen Dioxide and Particulate Matter in excess of World Health Organization guidelines. The principal source of her exposure was traffic emissions. During this period there was a recognized failure to reduce the level of NO₂ to within the limits set by EU and domestic law which possibly contributed to her death."

Source: https://www.innersouthlondoncoroner.org.uk/assets/attach/86/mnizari_16-12-2020_10-28-00.pdf

Although limited details of the reasoning behind this conclusion are available, Ricardo understands from the Record of Inquest and other reporting that the incidents which were found to correlate with triggering Ella's asthma attacks on multiple occasions were related to levels of air pollution which were above the UK air quality objectives. We do not know if these findings are based on the data considered in the CHSS report or on other data. It seems unlikely that the long-term average data presented by CHSS were those used to reach the conclusions set out in the Record of Interest, in view of the reported focus of evidence presented at the inquest on episodes of high levels of air pollution (e.g. see <https://www.theguardian.com/environment/2020/dec/08/cumulative-pollution-from-london-traffic-may-have-led-to-girls-death>)

The excessive levels of air pollution experienced by Ella Kissi-Debrah is in contrast to the situation at the proposed development, where air pollution levels are forecast to comply with the UK air quality objectives. There appears to be agreement between CHSS and Ricardo that air pollution levels at the proposed new school itself would comply with national air quality objectives.

As regards potential for exposure on the route to school, one location was forecast to be marginally above the UK air quality objective for annual mean nitrogen dioxide concentrations in the original ES, although this is no longer the case in the updated ES. Even using the earlier data in the original ES,

no exceedance of the air quality objective for short-term mean nitrogen dioxide concentrations were forecast to occur (Ref. 2019 ES Technical Appendix C Section 3.1, 4th paragraph), in contrast to the excessive levels of air pollution reportedly experienced by Ella Kissi-Debrah in 2010 - 2013. Based on the updated ES, short-term concentrations of nitrogen dioxide levels would be lower still.

We conclude that the findings of the inquest into the death of Ella Kissi-Debrah are very important in highlighting the individual health consequences of excessive levels of air pollution. We consider that these findings should be carefully considered in development of national policy and guidance in relation to air quality and public health. We do not consider that these findings affect our advice to London Borough of Redbridge in relation to the proposed development, for the following reasons.

- Firstly, the situation of the proposed school is substantially different to the excessive levels of air pollution experienced by Ella Kissi-Debrah during the period 2010 to 2013.
- Secondly, any relevant findings of the inquest need to be brought through into updated policy and guidance in relation to air quality assessment

Having carefully considered the information in the CHSS February 2021 report and the available information from the inquest into the death of Ella Kissi-Debrah, we conclude that our previous advice to London Borough of Redbridge, as reproduced below, does not require any amendment.

“It is misleading to say that the development would ‘introduce a fresh cohort of children to damaging levels of air pollution.’ The new school was specifically included in the assessment (Sensitive Receptor H), and it was shown that levels of air pollutants at the school would comply with the air quality objectives at this location in the opening year of the scheme (2026). The proposed development would therefore not introduce children attending the school to damaging levels of air pollution.”

For the avoidance of doubt, the term “damaging levels of air pollution” refers to levels of air pollution above the air quality objectives. While exposure to airborne pollutants at levels below these objectives could have adverse effects on health which might be observable at a population level, compliance with the air quality objectives represents the current national policy view of a level of air pollution that does not warrant further action to improve air quality.

4 CHSS February 2021 report

Whatever the merits or otherwise of the points made in the CHSS February 2021 report, in our view, it is unfortunate and unhelpful to the decision-making process that CHSS has chosen to write its report in aggressive and accusatory terms.

Ricardo does not propose to respond further to the CHSS report at this stage, but asks London Borough of Redbridge to note that we may consider pursuing alternative avenues of redress if such reports continue to be produced by CHSS.



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Response to Ricardo's "Review of University of Kent report "Air Quality Review for 4309/19 - Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford"

Prepared by the Centre for Health Services Studies, 22/02/2021,

Professor Stephen Peckham & Dr Ashley Mills. Contact:

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Site	Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford
Applicant	Weston Homes PLC
Redbridge reference	4309/19

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1. Introduction

Ricardo Ltd was commissioned by Redbridge Borough Council to produce a report [1] to independently review a previous air quality review produced by CHSS [2].

Before Ricardo published this document, CHSS had published another report [3] to address amendments to the original planning application.

For this reason we will not provide a point-by-point rebuttal of Ricardo's work, since their comments are not addressed to the most recent evidence submitted by us.

However, Ricardo fails in one respect which is impossible to ignore: they conflate objective legal limits with health limits. This is a dangerous and misleading approach to public health that requires specific comment, and which will be the subject of this report.

2. Ricardo does not understand the difference between air quality objectives and the harm caused by air pollution

First of all it is worth noting that in the quote below, Ricardo is referring to the developer's V5 AQA [4] and not the developer's latest V6 AQA [5] For the sake of our argument here, this is immaterial since we are passing comment on Ricardo's interpretation of the data. It does beg the question however, why is Ricardo not commenting on both the latest documents submitted by the developer [5], and the latest rebuttal submitted by us [2]?

Notwithstanding this, on page 2 of Ricardo's review [1], Ricardo states the following:

"It is misleading to say that the development would "introduce a fresh cohort of children to damaging levels of air pollution." The new school was specifically included in the assessment (Sensitive Receptor H), and it was shown that levels of air pollutants at the school would comply with the air quality objectives at this location in the opening year of the scheme (2026). The proposed development would therefore not introduce children attending the school to damaging levels of air pollution."

In Table 5 of Aether's original report [4] predictions for 2026 (with development) were given for Sensitive Receptor H. The value given was 34.1 $\mu\text{g}/\text{m}^3$ (upper ground floor). From the same table we can see that many of Aether's original predictions for 2026 were within 10% of the objective and that "Nearby residential receptor" R1 has a prediction of 40.5 $\mu\text{g}/\text{m}^3$. We give these values so that the reader understands the overall pollution context within which Ricardo is making its claims.

Ricardo makes the inference that because "*it was shown that levels of air pollutants at the school would comply with the air quality objectives*" that it follows that "*The proposed*

development would therefore not introduce children attending the school to damaging levels of air pollution”.

The clear implication here is that Ricardo believes that air containing poisons in concentrations below air quality objectives cannot be damaging to children.

This is a ridiculous position that demonstrates a bewildering ignorance of publicly available facts and cannot go unchecked.

There are many studies looking at associations between mortality and mean annual NO₂ exposure. Examining a recent meta-analysis looking at associations between NO₂ and mortality [6], the majority of the 41 studies showed positive associations, relative risk increases were quantifiable per 10ug/m³, and pollutant ranges contained inputs below annual objectives. In a 2018 Public Health England review [7] of the long-term health effects of NO₂ they state that long-term mortality associations have been found in:

“cohorts in which the range of outdoor levels reaches as low as 5 µg/m³ annual average NO₂ concentration.”

It seems clear that there is a dose-response for negative outcomes for NO₂ at the annual measurement level, and that this dose-response occurs below objective limits for NO₂.

Daily variation also matters: a meta analysis of 204 time-series studies [8] found associations between 24h NO₂ and daily mortality and hospital admissions for a variety of morbidity and age groups. A study looking at 18 french cities [9] found that relative risk increases for NO₂ at lags of 0-1 days and greater risks associated with cumulative exposures over 0-5 days.

At even shorter timescales one study that looked at children walking to school [10] estimated that children obtained 20% of their black carbon daily dose (according to U.S EPA regulations) over a time period that accounted for only 6% of the day.

To summarise this material: daily changes in NO₂ can impact health and roadside exposure can contribute disproportionately to an individual's cumulative daily exposure.

We will now examine a specific example, which happened in a neighboring borough of Redbridge that highlights the real world consequences of maintaining a view of air pollution focused on objective limits at specific locations rather than human exposure.

3. The tragic death of Ella Kissi-Debrah

Ella Kissi-Debrah was a 9 year old girl who died after acute respiratory failure on 15/02/2013, with “Air pollution exposure” listed as a medical cause of death [11]. Ella had severe asthma and lived within 25m of London’s South Circular (A205, Brownhill Rd).

Ella went to Holbeach Primary School and the inquest heard that Ella regularly walked along Brownhill Rd to arrive there. The road has a high degree of traffic generated air pollution.

Ella was taken to hospital 27 times between 2010 and her death in 2013.

Taking 2011 as a representative year for her exposure to air pollution, Figure 1 shows the Lewisham diffusion tube data for 2011 [12] as well as data from the automatic monitoring station [13] at catford (named Automatic 1 below).

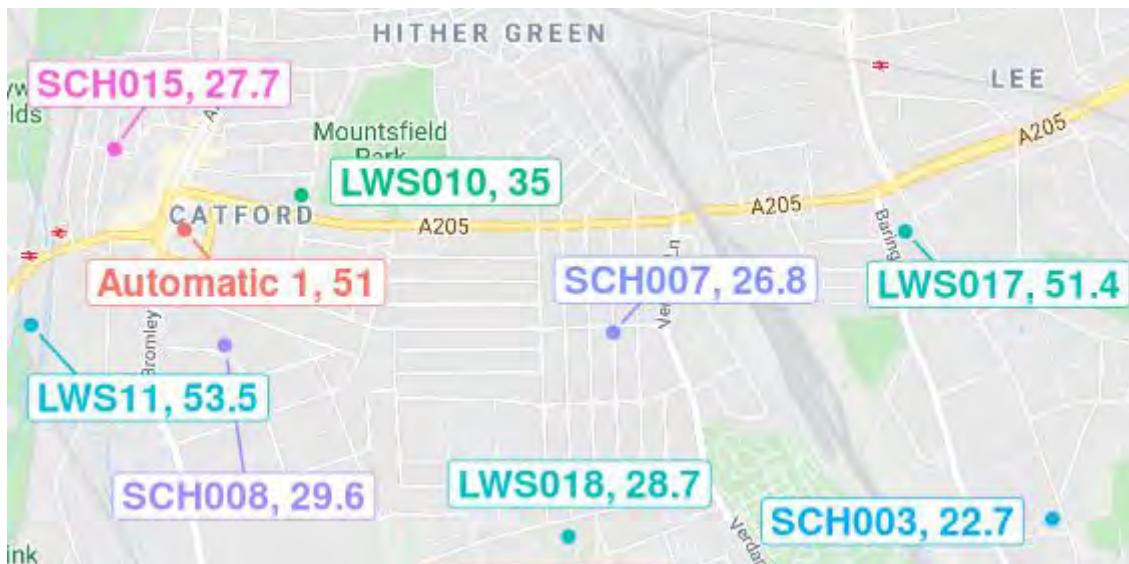


Figure 1 - Diffusion tube NO₂ measurements and Catford automatic station NO₂ measurement for 2011. Ella's school is SCH015, and the road she walked along is the A205.

Ella's school has a diffusion tube assigned to it called SCH015 seen in the figure and in 2011 had a value of 27.7 µg/m³. The automatic monitor at Catford had an annual average of 51 µg/m³ in 2011 and had no exceedances of the 200 µg/m³ objective in 2011.

Although no measurement was made, it seems unlikely that the objective for NO₂ of 40 µg/m³ was exceeded in 2011 directly outside of Ella's home. Therefore her exposure mainly came from being outside her house in the local area, not all of which exceeds national objectives for annual NO₂. For example, the school receptor had an annual mean of 27.7 µg/m³.

It has been established as a medical cause of death, that Ella's exposure to air pollution was a direct material influence.

4. A dangerous place for a new primary school

Now compare the map shown in the last section, with that of the predictions of NO₂ for the proposed development in Goodmanes in 2026 (as set out in Aether's V5 AQA [4] which is the document that Ricardo's comments pertain). These are plotted in Figure 2.

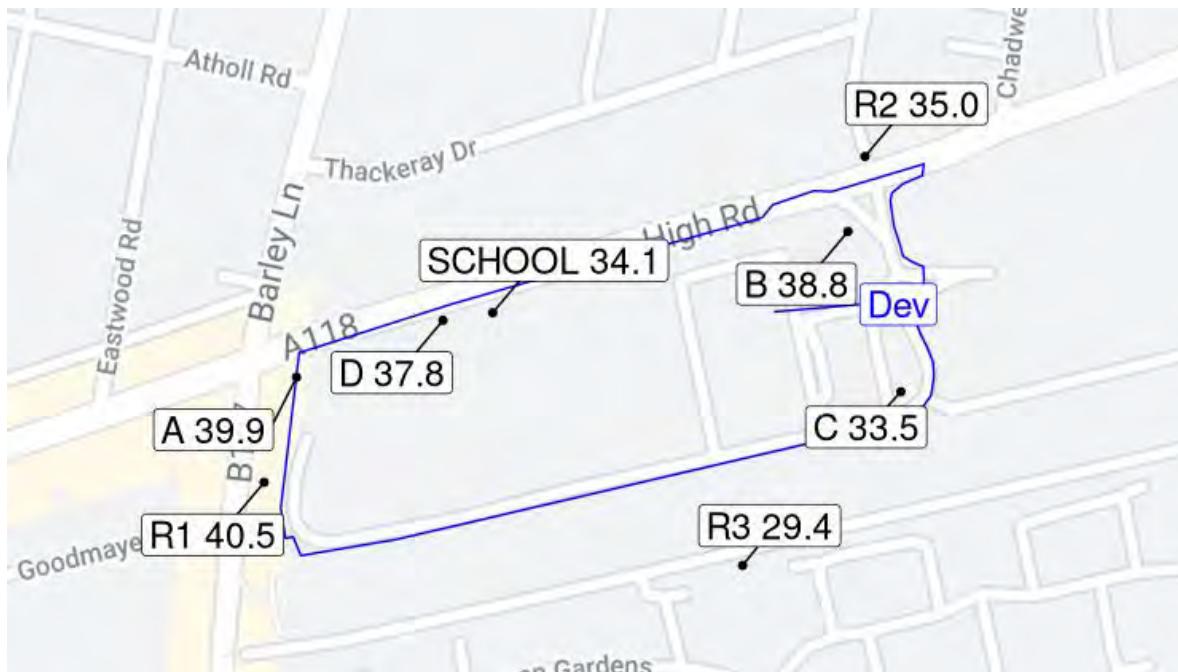


Figure 2 - Developer NO₂ predictions for 2026 (With Development) scenario. Values shown are in $\mu\text{g}/\text{m}^3$.

We can see that air pollution at the school was predicted in Aether's AQA V5 [4] to be higher than that around Ella's school shown in the last section. Bearing in mind that the SCHOOL receptor above is on the upper ground floor.

We can see many points with high values close to the objective limit, and location R1 above the objective limit.

The overall picture is one of a school surrounded by areas where NO₂ pollution is high.

Any child walking to this school from the surrounding residential area is for certain going to be exposed to damaging levels of air pollution.

Thus, it is not *“misleading to say that the development would “introduce a fresh cohort of children to damaging levels of air pollution.”* as Ricardo claims.

Rather, it is absolutely reasonable to claim, on the evidence of Aether's AQA V5 [4] and contemporary medical evidence on the harms of air pollution that the school will introduce a fresh cohort of children to damaging levels of air pollution.

Note that we are not using Ella's death as the main argument for this. Her tragedy serves to illustrate that air pollution is not just damaging to children, but can be fatally so. It also serves to illustrate that exposure outside the home is a major contributing factor.

As we have already discussed there is plenty of medical evidence showing the harms of NO₂ below objective limits.

It would require an extraordinary level of ignorance of the scientific body to make an argument to the contrary.

5. References

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Objection To The Goodmayes Tesco Development

(Redbridge Planning Ref 4309/19)



Submission on Behalf of:
Reclaim Redbridge
&
Stop the Tesco Toxic Towers
Campaign Groups

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1.0 Introduction

1.0.1 Reclaim Redbridge (RR) and Stop the Tesco Toxic Towers (STTT) objects to planning application 4309/19 (the Application) for the demolition of all existing buildings including petrol filling station. The planning application proposes redevelopment of the site to provide a replacement food retail store (use class A1, now superseded by use class E), and a series of apartment blocks ranging between 4 to 23 storeys in height. The apartment blocks would contain 1,280 residential units.

1.0.2 Both Reclaim Redbridge and Stop The Tesco Towers (STTT) are non-party political community associations representing local people and businesses situated in the local area where the development is proposed. We are in favour of sustainable and proportionate levels of development in our local area but are opposed to developments that will have detrimental consequences for maintaining adequate infrastructure and access to services and the health and well being of residents , all essential factors to sustain a thriving and cohesive community that we are proud to be a part of.

1.0.3 These submissions have been drafted with the help and input of legal and academic counsel along with research from concerned residents.

1.0.4 Document Authors

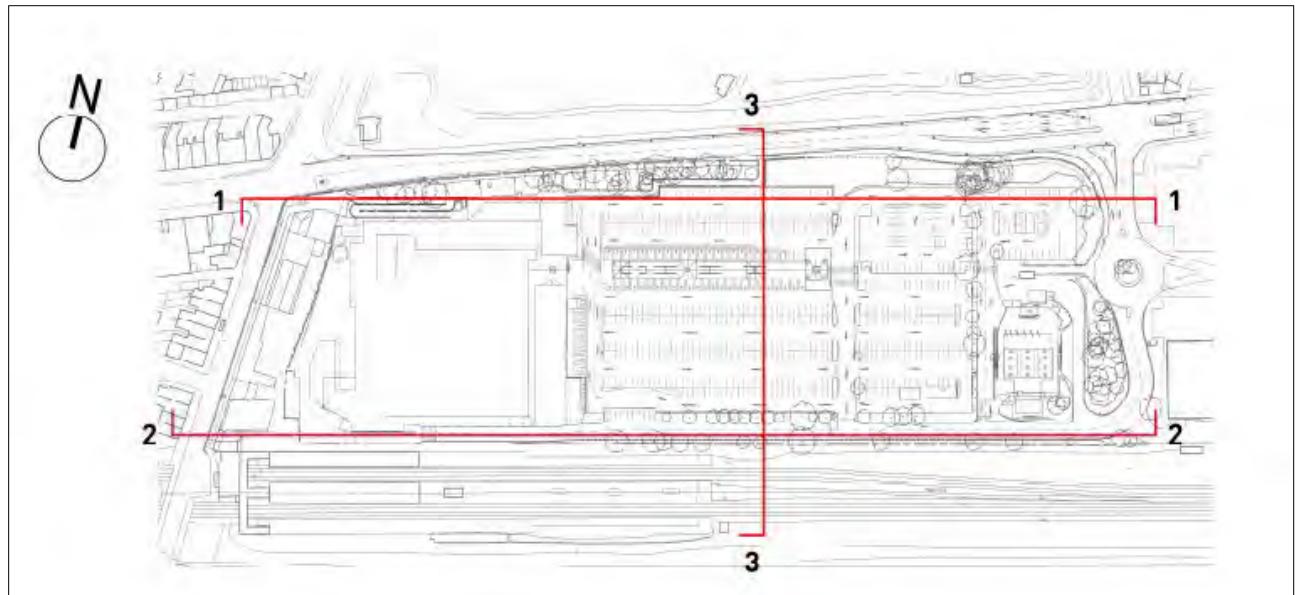
This document was authored and contributed to, for submission, by multiple residents. The below residents can be contacted for queries with this document:

- Andy Walker
- Geetha Nathan
- Paul Scott
- Af Mussa

2.0 The Site

2.0.1 The site is 4.37 hectares at the corner of High Road and Goodmayes Road at 822 High Road (Tesco Goodmayes). The plan proposes that the major frontage of the development looks on to the High Road. See figs 1&2 below ¹;

¹ Taken from “Design and access statement” Redbridge planning application 4309/19



(Fig 1 & 2)

2.0.2 The Site is reported to have a Public Transport Accessibility Level (PTAL) of 2 (bad) which should be rising when the Elizabeth Line opens (currently due in 2021)². It is located approximately 200m north of Goodmayes railway station, which links Ilford South to Central London (20mins) via Elizabeth Line (Crossrail).

² <https://data.london.gov.uk/dataset/public-transport-accessibility-levels>

3.0 Representations/Objections

3.1 The Petition³

At the time of writing this document local residents have formed a Petition 2931 signatures objecting to the Tesco Extra Site (Ref 4309/19)

3.2 Council website⁴

The Redbridge Council website Planning Applications , for Tescos Extra Site (Ref 4309/19) 234 individual representations have been made to date by residents. From the 234 representations made , 230 of these are objections.

3.3 Sam Tarry (MP) letter to residents

Sam Tarry sent letters to approximately 3000 constituents, living by Goodmayes Tesco, to request their views about the planning application and proposed development. He received over 500 individual responses and the majority of these were negative towards the planning application. This is a significant number of responses (general response rates are 10%) and **it would be deficient of the Council to ignore the weight of this opposition.**

3.4 Schools

Both **Chadwell Heath School⁵** and **Barley Lane Primary School⁶** are in close proximity to the development and have **filed objections to the development on multiple grounds. These include:**

- Placement and justification for new school
- Health issues / Increased pollution
- Increased danger to pupils and parents (due to traffic)
- Overcrowding / Over-Population
- Future Covid19 impacts
- Pressure on health services
- Disparity of builds between areas of Redbridge

³ <https://www.change.org/p/goodmayes-tesco-development-objection-redbridge-planning-application-ref-4309-19>

⁴ <https://planning.redbridge.gov.uk/redbridge/application-details/177762>

⁵ <https://stopthetescotoxic towers.blogspot.com/2020/10/chadwell-primary-objects-to-tesco.html>

⁶ <https://stopthetescotoxic towers.blogspot.com/2020/10/barley-primary-school-objects-to-tesco.html>

4.0 Key Policy Documents

4.0.1 The development plan for the purposes of the Application comprises:

- (a) The London Plan (2016)⁷ updated to 2021⁸ (IPLP)
- (b) The Redbridge Local Plan 2017⁹ (RLP)
- (c) Independent Air Quality Review (Peckham Report)^{10 11}

4.0.2 The London Plan (Dec 2021) is also a material consideration. The weight to be given to it depends on its stage of preparation, the extent to which there are unresolved objections, and the degree of consistency with the Redbridge Local Plan.

5.0 Submissions

5.0.1 We are not opposed to the principle of redevelopment itself in the Tesco Extra location. However we believe the current application comprises over-development of the Tesco Extra Site for the reasons we will outline below. The Development is not in accordance with the development plan, and no other material considerations justify the grant of planning permission.

5.1 Affordability of the proposed flats

5.1.1 Much is made of the claim that the Development will provide 35% affordable housing. RR and STTT makes two points to this claim;

5.1.2 First, to the extent that it is considered a third of all flats are to be affordable, it is not disputed that it is a planning benefit to create affordable housing, or that there is a policy imperative to do so. However, the fact that a development may provide affordable housing in compliance with some policies does not mean that other policies in the Local Plan or indeed other material considerations can be relegated to insignificance. The development plan must be read as a whole, and there is nothing in any of development plan documents that would justify ignoring or marginalising (for example) the detrimental impact of tall buildings. Accordingly, affordable housing is only one factor that has to be weighed in the mix of planning considerations, and in this case is outweighed by other conflicts with development plan policy.

5.1.3 There has been **no new social rented accommodation** provided by new builds in the last five years. The new developments will not be providing any genuine

⁷ <https://www.london.gov.uk/what-we-do/planning/london-plan/past-versions-and-alterations-london-plan/london-plan-2016/london-plan-2016-pdf>

⁸ <https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan/london-plan-2021>

⁹ https://www.redbridge.gov.uk/media/4934/10-redbridge-local-plan_070318_web-1.pdf

¹⁰ <https://redbridgetradeunionparty.files.wordpress.com/2020/07/tesco-towers-aqa.pdf>

¹¹ Addendum 1 - Independent Air Quality Review

housing for those who most require it in the community, i.e social rents are needed rather than more affordable rent.

5.1.4 Secondly ,the weight to be given to the provision of affordable housing should be reduced in this case because it is not policy compliant. The Development proposes 1280 residential units split;

- (a) 866 – Market value (68%)
- (b) 171 – Affordable Social Housing (14%)
- (c) 243 – Intermediate Housing (18%)

However, policy 3.10 of the London Plan splits affordable housing into

- (a) socially rented housing
- (b) affordable rented housing
- (c) intermediate housing.

There is no full breakdown provided as to how “social and intermediate” housing be split. It is only those able to afford “Affordable rents” that are eligible for products such as shared ownership. The Development therefore does not contribute at all to those areas where the housing need is greatest i.e. households who cannot afford London Living Rent, nor to the need for social rented housing.

5.2 Tall Buildings

5.2.1 The Development includes a tall building and granting permission for the Development would be in conflict with the various tall buildings policies in the development plan and the IPLP.

5.2.2 The RLP (LP27) states (emphasis)¹²;

¹² https://www.redbridge.gov.uk/media/4934/10-redbridgelocal-plan_070318_web-1.pdf

LP27: Tall Buildings

- 1 As part of a strategy to adopt a plan-led approach towards overall growth in the borough, planning applications for the development of Tall and Large Buildings will be supported in the following Tall Building Zones, as identified on the Local Plan Policies Map:
 - (a) Ilford Metropolitan Town Centre Investment and Growth Area;
 - (b) East Ilford, Seven Kings Local Centre, and Goodmayes Local Centre, in the Crossrail Corridor Investment and Growth Area; and
 - (c) Gants Hill Investment and Growth Area.
- 2 Planning applications for tall and large buildings will only be considered on sites in Investment and Growth Areas and in town centres:
 - (a) Which have good public transport;
 - (b) Where the character of the surrounding area would not be harmed or adversely affected by the scale, mass or height of the building;
 - (c) Where it relates well to the urban layout, streets, open spaces, heritage assets and public realm of the surrounding area; and
 - (d) Where the proposals make a significant contribution to local regeneration.

There are no developments in the area of the scale, mass and heights being proposed by the Development thus by definition “doesn’t relate well to the urban street layout”.

5.2.3 The tallest part of the Development, at 20+ floors, is substantially taller than its neighbours. The neighbouring buildings are at most 5 storeys tall and spaced evenly or above current retail facilities. The Development would materially change the skyline and can be viewed from many angles and approaches to the Site rising six times as high as the majority of neighbouring housing. The Tesco’s Development is completely out of character aesthetically with the existing architecture of Victorian and Edwardian buildings in the vicinity. It would dominate the skyline and as is the case with recent new flat developments further along the High Road would have a substantial affect on levels of natural light along the main road. Another adverse factor that is of concern to residents is that such high level building with balconies would impact on the privacy of residents living in the immediate area , the majority of whom live in 2 storey accommodation.

5.2.4 The approach to tall buildings is set out in the following policies. Policy 7.7 of the London Plan states:

Policy
Strategic
A. Tall and large buildings should be part of a plan-led approach to changing or developing an area by the identification of appropriate, sensitive and inappropriate locations. Tall and large buildings should not have an unacceptably harmful impact on their surroundings.
Planning decisions
B. Applications for tall or large buildings should include an urban design analysis that demonstrates the proposal is part of a strategy that will meet the criteria below. This is particularly important if the site is not identified as a location for tall or large buildings in the borough's LDF.
C. Tall and large buildings should:
a. generally be limited to sites in the Central Activity Zone, opportunity areas, areas of intensification or town centres that have good access to public transport
b. only be considered in areas whose character would not be affected adversely by the scale, mass or bulk of a tall or large building
c. relate well to the form, proportion, composition, scale and character of surrounding buildings, urban grain and public realm (including landscape features), particularly at street level.
d. individually or as a group, improve the legibility of an area, by emphasising a point of civic or visual significance where appropriate, and enhance the skyline and image of London
e. incorporate the highest standards of architecture and materials, including sustainable design and construction practices
f. have ground floor activities that provide a positive relationship to the surrounding streets
g. contribute to improving the permeability of the site and wider area, where possible
h. incorporate publicly accessible areas on the upper floors, where appropriate
i. make a significant contribution to local regeneration.
D. Tall buildings:
a. should not affect their surroundings adversely in terms of microclimate, wind turbulence, overshadowing, noise, reflected glare, aviation, navigation and telecommunication interference
b. should not impact on local or strategic views adversely

5.2.5 Additionally the RLP (LP27) sets out additional criteria (emphasis):

“All proposals for tall and large buildings in all parts of the borough will be assessed against the design criteria set out in Local Plan policy LP26, as well as criteria set out in London Plan policy 7.7, and should:

- (a) **integrate well with the site and surroundings, in terms of how buildings fit in with the street, and how they affect the day and night time skyline;**
- (b) **relate well to the architectural and historic context of the surrounding area of the building, and not impact adversely on heritage assets and their settings;**
- (c) **not impact adversely on the views having regard to the natural topography of the area;**

- (d) **not impact adversely on other buildings, public spaces, open spaces, and watercourses, by reason of overshadowing;**
- (e) contribute to improving way-finding, pedestrian permeability and improved access for the public;
- (f) incorporate the highest standards of architecture and materials, including sustainable design and construction practices;
- (g) incorporate an appropriate public realm setting and ground floor active uses;
- (h) **Ensure effective management regimes for the continued maintenance of the building and shared areas etc.; and**
- (i) Use the highest standards of design and construction for redeveloped and refurbished tall buildings.”

5.2.6 There are multiple conflicts between the RLP/London Plan and the Development. The Development area is surrounded by residential homes and a small local park. The mass and height of the building will greatly contrast with the current theme of the area where buildings are mostly between two and four storeys. Overshadowing (blocking of light) of current residential homes as well as the park directly opposite the Development does not seem to have been duly considered. Additionally, there is evidence to show that taller building increase the effects of turbulent airflow and pollution¹³.

STTT submits that both the local plan and material considerations such as IPLP Policy D9 requires tall buildings to both (a) be in a specific identified location; and (b) not harm the character and amenity of the area. As the Development is not on a site allocated for tall buildings it would not be in accordance with Policy D9 of the IPLP.

5.3 Character of the neighbourhood

5.3.1 STTT further submits that the Development does not complement the character of the neighbourhood, and will have a negative effect on the amenity of neighbours. It therefore further conflicts with the development plan.

5.3.2 The local plan emphasises that any development should respect the character of the neighbourhood. The opportunity sites¹⁴ document, which allocates the Site for redevelopment, states (emphasis added):

¹³<https://www.sciencedirect.com/science/article/pii/S0269749117319322>

¹⁴<https://www.redbridge.gov.uk/media/4935/appendix-1-web.pdf>

*“Comprehensive redevelopment of this **underutilised site** is proposed including housing, retail and education uses. The site could provide a gateway to Goodmayes Local Centre, make a more effective use of land, and respond to local context and public transport accessibility. As part of comprehensive redevelopment the Council seeks improvements to the surrounding public realm particularly where they support links to Goodmayes Station, town centre, and Barley Lane. There is potential to link development with the neighbouring site at Goodmayes Retail Park (Site 58). **The Council seeks a comprehensive Masterplan to be prepared for the whole site**”*

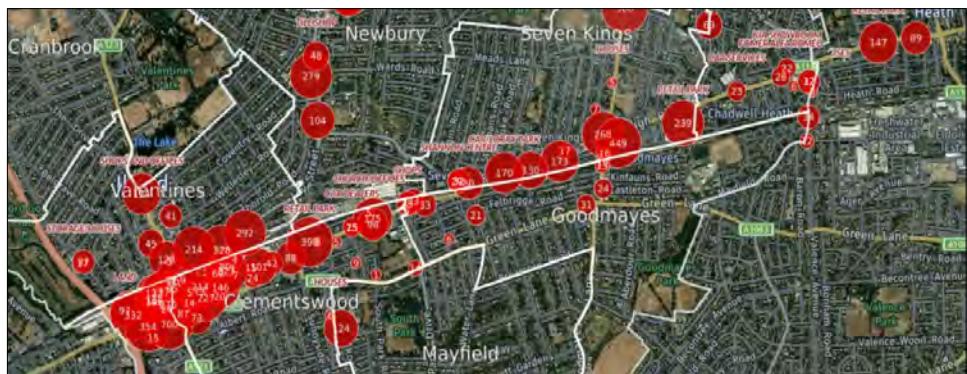
5.3.3 The Development is patently not complimentary to the street sequence, building pattern, scale, materials or detailing of the surrounding area. The surrounding area is predominantly of low 2/3 storey Edwardian and Victorian terraces, some three storey buildings and with footprints typical of residential homes or local shops. None are overlooked by a building quite as tall as the Development. A Development approved by the council which have recently been built close to the Development (adjacent to the Goodmayes Retail Park) should be noted as it's impact cannot be overstated. The Tesco Development could have taken advantage of a natural fall in ground level which would have lowered the impact to the area by not dominating the skyline. In contrast:

- (1) The Development's footprint will be significantly larger than surrounding buildings, extending a considerable way along High Road.
- (2) The Development's height will dwarf all other development in the local area and tower over the updated Goodmayes station instead of complementing it.
- (3) The combination of the Development's footprint and height result in a development of a significant scale which would be wholly incongruous with the architecture/character of housing in the vicinity.
- (4) The Development is completely different in style and architecture to other buildings in the vicinity. The supporting planning documents go into some detail about how the building is 'purportedly complementary' but we can find no evidence to support this statement looking at all the factors we have mentioned above.

5.3.4 In summary, the Development is entirely out of keeping with its surroundings. It will dominate the neighbouring buildings and not complement them. By dwarfing the surrounding area, the Development is not in keeping with this part of Ilford South. Accordingly, the Development is also in conflict with original estimates in the Redbridge Opportunity site document and policies 3.5, 7.4 and 7.6 of the London Plan. It thereby conflicts with the development plan as a whole

5.3.5 It also conflicts with the **design led approach** required by Policy D3 of the IPLP, and the requirements in Policy D9 that attention be paid to the cumulative impacts of tall buildings. This is predominantly a residential area, in danger of being overshadowed by the Development particularly when read alongside other recent taller buildings.

5.3.6 Here is a heat map of all the opportunity sites identified in the 2019 by Redbridge Council. Over 50% of the opportunity sites are along the High Road where there are already plans to build further high density housing development (these are minimum numbers). This needs to be reassessed to spread the builds more fairly and/or evenly to avoid a **tunnel of darkness**.



5.4 Amenity of the development

5.4.1 STTT further submits that the Development does not provide adequate amenity to the proposed residents contrary to policy. This is particularly important in the light of COVID-19 and the increased importance put on homes as places where residents can spend extended periods of time.

5.4.2 NICE guidelines¹⁵¹⁶ state:

“(a) minimising the exposure of vulnerable groups to air pollution by not siting buildings (such as schools, nurseries and care homes) in areas where pollution levels will be high

(b) siting living accommodation **away from roadsides**"

The Tesco proposal is in complete contravention of both of these as are the many other applications that are pending review or due to be proposed by the council.

5.4.3 There also seems to be substantial evidence to show that the council has surplus school spaces in the borough¹⁷. In actual fact the surplus school spaces are increasing

¹⁵ <https://www.nice.org.uk/guidance/ng70/chapter/Recommendations>

<https://www.nice.org.uk/guidance/qs181>

<https://www.whatdotheyknow.com/request/743097/response/1780981/attach/html/2/FOI%202011591921.docx.html>

year upon year which eludes to a new school not being required in what is already a poor location next to the High Road.

		No on roll	Planned Admission Number	Surplus places
Oct-18	R-Y6	29514	30720	1206
	Y7-11	19114	19680	566
Oct-20	R-Y6	29781	31520	1739
	Y7-11	19610	20310	700

5.5 Noise, air quality, and aspect/sunlight

5.5.1 Due to the proximity of the railway line, a convincing case would need to be presented that proposals for residential accommodation would have a satisfactory level of amenity. Any residential use on the site must be designed to adequately shield residents from the noise and vibrations coming from the adjacent railway through proper insulation and ventilation. Residential development must provide adequate levels of communal and private garden space for residents; any balconies fronting the railway must achieve acceptable quality and usability standards particularly with regards to noise and air quality, and the provision of accessible roof space or terraces incorporating biodiversity features will be expected. Residential units should be dual aspect (north facing single aspect units should be deemed as not acceptable).

5.5.2 The London Plan 2011 encourages consideration of the home as a place of retreat, and residential uses have particular need for privacy and quiet. This obligation is reciprocal both to new development which will impact upon adjacent residential uses and to new residential developments themselves.

5.5.3 Reference should also be made to the Housing SPG (2017)¹⁸. This provides:

“Standard 26 - A minimum of 5sqm of private outdoor space should be provided for 1-2 person dwellings and an extra 1sqm should be provided for each additional occupant.

Standard 27 - The minimum depth and width for all balconies and other private external spaces should be 1500mm.”

¹⁸ https://www.london.gov.uk/sites/default/files/housing_spg_revised.pdf

5.5.4 Policy D4 of the IPLP relates to delivering good design and the supporting text states (emphasis added):

“- 3.4.8 For residential development it is particularly important to scrutinise the qualitative aspects of the development design described in Policy D6 Housing quality and standards. The higher the density of a development the greater this scrutiny should be of the proposed built form, massing, site layout, external spaces, internal design and ongoing management. This is important because these elements of the development come under more pressure as the density increases. The housing minimum space standards set out in Policy D6 Housing quality and standards help ensure that as densities increase, quality of internal residential units is maintained.

- 3.4.9 Higher density residential developments should demonstrate their ongoing sustainability in terms of servicing, maintenance and management. Specifically, details should be provided of day-to-day servicing and deliveries, longer-term maintenance implications and the long-term affordability of running costs and service charges (by different types of occupiers).”

- **Do we know what the Service charges / Ground rents will be as all will be leasehold properties?**
- **Do we know the length of the leases?**
- **Will socially housed residents (if any) ever be able to own their flat?**

5.5.5 The explanatory text continues:

“- 3.6.4 Dual aspect dwellings with opening windows on at least two sides have many inherent benefits. These include better daylight, a greater chance of direct sunlight for longer periods, natural cross-ventilation, a greater capacity to address overheating, pollution mitigation, a choice of views, access to a quiet side of the building, greater flexibility in the use of rooms, and more potential for future adaptability by altering the use of rooms.

- 3.6.5 Single aspect dwellings are more difficult to ventilate naturally and are more likely to overheat, and therefore should normally be avoided. Single aspect dwellings that are north facing, contain three or more bedrooms or are exposed to noise levels above which significant adverse effects on health and quality of life occur, should be avoided. The design of single aspect dwellings must demonstrate that all habitable rooms and the kitchen are provided with adequate passive ventilation, privacy and daylight, and that the orientation enhances amenity, including views. It must also demonstrate how they will avoid overheating without reliance on energy intensive mechanical cooling systems.”

5.5.6 In this case, it is submitted the amenity of future residents is not adequate in circumstances where:

- (a) The attached plans demonstrate a number of single aspect north facing
- (b) It will not be possible to open the windows of the residential units and keep within the recommended noise limits, as is made clear from the SES report¹⁹. In lieu of this failing, ventilation units will need to be installed thus further reducing amenity.

To meet the required rates of background ventilation without the need for windows to be opened, the inclusion of acoustic treated vents will be required to the habitable rooms, as a minimum, to allow for suitable air changes in the dwellings.

4.3 Ventilation

Part F of the Building Regulations specifies required rates of background ventilation to domestic properties. These requirements must be achieved without compromising internal noise levels. When a window is opened for ventilation, it will only give 10-15dB reduction in noise.

Given the noise levels, when a window is open, the BS8233 standards will not be achieved for either the day or night-time periods and therefore attenuated ventilators with a $D_{n,e,w}$ of 39dB will be required on the railway elevation and a $D_{n,e,w}$ of 32dB will be required for the remaining units.

5.5.7 The balconies and rooftop gardens are likely to be noisy. The supporting Noise Assessment notes a high level of background noise. Although it considers that the proposed “screens” are capable of achieving a required sound reduction, that does not apply to the balconies which provide residents with their only private outdoor amenity space.

5.5.8 The NLA²⁰ survey found that tall buildings are better suited to those not in a family, yet this cramped provision is still clearly intended for family occupation.

5.5.9 Accordingly, there is a clear conflict with the development plan policies and IPLP policies intended to protect residential amenity.

5.6 Space Standards

5.6.1 It is also submitted that the Development is deficient both in terms of space and amenity space.

5.6.2 With regard to amenity space, London Plan Policy 3.6 provides:

¹⁹ <https://planningdocs.redbridge.gov.uk/NorthgatePublicDocs/00685300.pdf>

²⁰ <https://nla.london/insights/londons-tall-buildings-survey-2021>

“Planning decisions

B Development proposals that include housing should make provision for play and informal recreation, based on the expected child population generated by the scheme and an assessment of future needs.”

5.7 Socio-economics / Demographics

5.7.1 The council (Bert Jones) was asked to provide socio-economic and demographic data for the area of/surrounding the development. It was unable to do so using Covid-19 as the excuse. However there was no Covid-19 pre 2019 so this data should be available;

“Unfortunately, this is not something the Council can provide at present due to staff returning to substantive posts following a period of redeployment supporting front line services impacted by Covid-19”

“I would have assumed the diversity of Redbridge dictates that you would have had socio/economic/demographic/earnings/etc data available pre-covid and on an ongoing basis. I am disappointed to hear that Covid is being used as an excuse for no data being available historically and it also leads me to believe that none of these factors are part of the planning committee decision making process”

5.7.2 Based on the lack of this data from Redbridge Council it can be assumed that the Council has no idea of the impact it is having on the community in which it approved developments. **This is an untenable position** and shows a wider issue of accountability for problems caused by the approval of these developments;

“My assumption from what you say is that you have no idea if the council has been building in the poorest, ethnically diverse or jobless areas of the borough. Is this correct?”

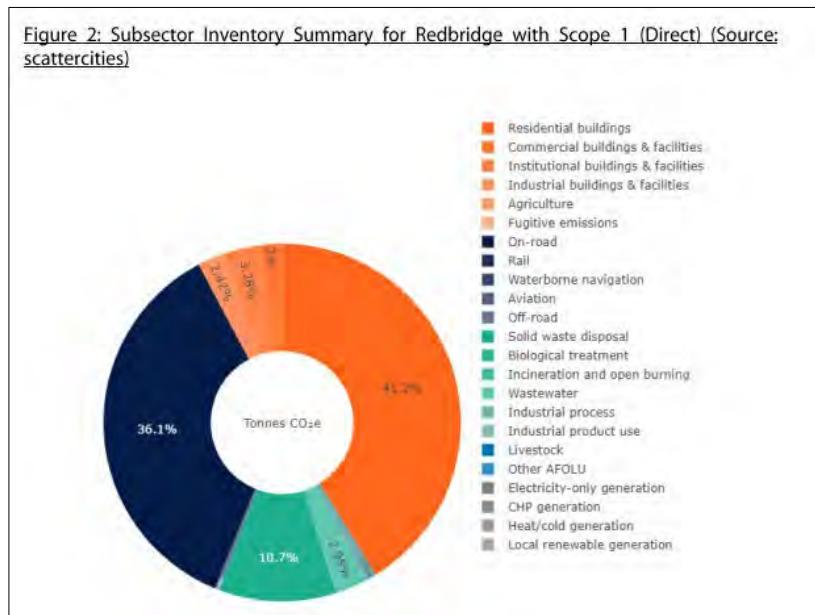
“Ultimately the Council runs the risk of aggravating a problem they don’t even know they have until it is too late. Artificially inflating the populous and elevating the price of housing in an area that is already at the lower end of income or employment can have a multitude of detrimental effects.”

5.7.3 In light of growing evidence (from the pandemic) that space is a crucial requirement in both mental and physical health, it would be deficient of the council to ignore socio-demographic data as a “material consideration” for new builds;

“If you do not have demographic data then how will you know the true impact of the planning decisions you are making?

Historically, how has the council made any decisions relating to finance/health/policing/etc if they do not have the demographic data which should feed into these decisions?”

5.7.4 Redbridge Council’s own data²¹ shows that **49% of the borough’s greenhouse gas emissions are from buildings**. Without knowing the socio-economic breakdown of who is being affected, alongside placing developments in a single area of the borough, will indirectly mean those who are already affected will have those issues further compounded.



5.8 Density

5.8.1 Policy 3.4 of the London Plan provides:

“OPTIMISING HOUSING POTENTIAL

Strategic, LDF preparation and planning decisions

A Taking into account local context and character, the design principles in Chapter 7 and public transport capacity, development should optimize housing output for different types of location within the relevant density Page | 31 range shown in Table 3.2. Development proposals which compromise this policy should be resisted.”

5.8.2 Units per hectare

²¹<https://www.redbridge.gov.uk/media/8155/corporate-panel-property-and-energy-report.pdf>

Table 3.2 Sustainable residential quality (SRQ) density matrix (habitable rooms and dwellings per hectare)

Setting	Public Transport Accessibility Level (PTAL)		
	0 to 1	2 to 3	4 to 6
Suburban	150–200 hr/ha	150–250 hr/ha	200–350 hr/ha
3.8–4.6 hr/unit	35–55 u/ha	35–65 u/ha	45–90 u/ha
3.1–3.7 hr/unit	40–65 u/ha	40–80 u/ha	55–115 u/ha
2.7–3.0 hr/unit	50–75 u/ha	50–95 u/ha	70–130 u/ha
Urban	150–250 hr/ha	200–450 hr/ha	200–700 hr/ha
3.8–4.6 hr/unit	35–65 u/ha	45–120 u/ha	45–185 u/ha
3.1–3.7 hr/unit	40–80 u/ha	55–145 u/ha	55–225 u/ha
2.7–3.0 hr/unit	50–95 u/ha	70–170 u/ha	70–260 u/ha
Central	150–300 hr/ha	300–650 hr/ha	650–1100 hr/ha
3.8–4.6 hr/unit	35–80 u/ha	65–170 u/ha	140–290 u/ha
3.1–3.7 hr/unit	40–100 u/ha	80–210 u/ha	175–355 u/ha
2.7–3.0 hr/unit	50–110 u/ha	100–240 u/ha	215–405 u/ha

According to the 2016 London plan, PTAL 2-3 areas are assigned a maximum of 120 units per hectare. On an urban site with 4.37 hectares, this would be a maximum of 524 units. This development is far in excess of this number²²:

Additionally Appendix 1²³ of the same document estimated the Development site was suitable for 723 units in 2018. The current application is for almost double this number (1280 units). There is no justification offered as to why the Council believes the site is suitable for such a vast number of units.

5.8.3 The importance of appropriate development density is also present in the IPLP. Policy D2 outlines infrastructure requirements for sustainable densities. Policy D3 (which deals with optimising development) has been quoted above. Policy D4 outlines how good design is to be delivered. This is made clear by the supporting text:

3.3.1 For London to accommodate the growth identified in this Plan in an inclusive and responsible way every new development needs to make the most efficient use of land. The design of the development must optimise site capacity. Optimising site capacity means ensuring that the development takes the most appropriate form for the site and that it is consistent with relevant planning objectives and policies. The optimum capacity for a site does not mean the maximum capacity; it may be that a lower density development – such as Gypsy and Traveller pitches – is the optimum development for the site.

3.3.2 A design-led approach to optimising site capacity should be based on an evaluation of the site's attributes, its surrounding context and its capacity for growth to determine the appropriate form of development for that site.

²²https://www.london.gov.uk/sites/default/files/the_london_plan_2016_jan_2017_fix.pdf

²³<https://www.redbridge.gov.uk/media/4935/appendix-1-web.pdf>

5.8.4 The following material points emerge:

- (1) There is a requirement to optimise site capacity through the “design-led” approach. This requires determining the “most appropriate” form of development. What is “most appropriate” must respond both to a site’s context, and infrastructure capacity, and best deliver part B requirements. These part B requirements include, for example, enhancing the local context, responding to the existing character of the neighbourhood, and being of high quality;
- (2) It follows that the fact that a site has good infrastructure does not automatically mean it is suitable for a high density development. The other considerations must still be weighed in the balance.
- (3) It is assumed this design led approach will feature, where a tall building is in issue, thorough scrutiny and an early stage design review.
- (4) In any case, the imperative to optimise development must be subject to the restrictions set out in the tall buildings policy D9. Policies D2-4 apply to all development. If it were the case that a tall building in conflict with Policy D9 could be permitted based on the considerations in Policies D2-4, there would be no need for Policy D9.

5.8.5 In this case, the applicant has failed to provide any calculations as to the density of the Development in terms of habitable rooms per hectare based on the net residential area see para. 3.31 of the London Plan taking into account the policy imperative of ensuring that the pavement and roadway remain at their current width. The Proposed Schedule of Accommodation calculates 1280 habitable rooms in 4.3 hectares. This is more than double the upper limit of Urban accommodation with a PTAL rate of 2-3. When the pavement and roadway are excluded (Planning Statement para. 3.2.). Following the same calculation, that would create a density well over the upper limit expressed in Table 3.2. that is far too dense for this location.

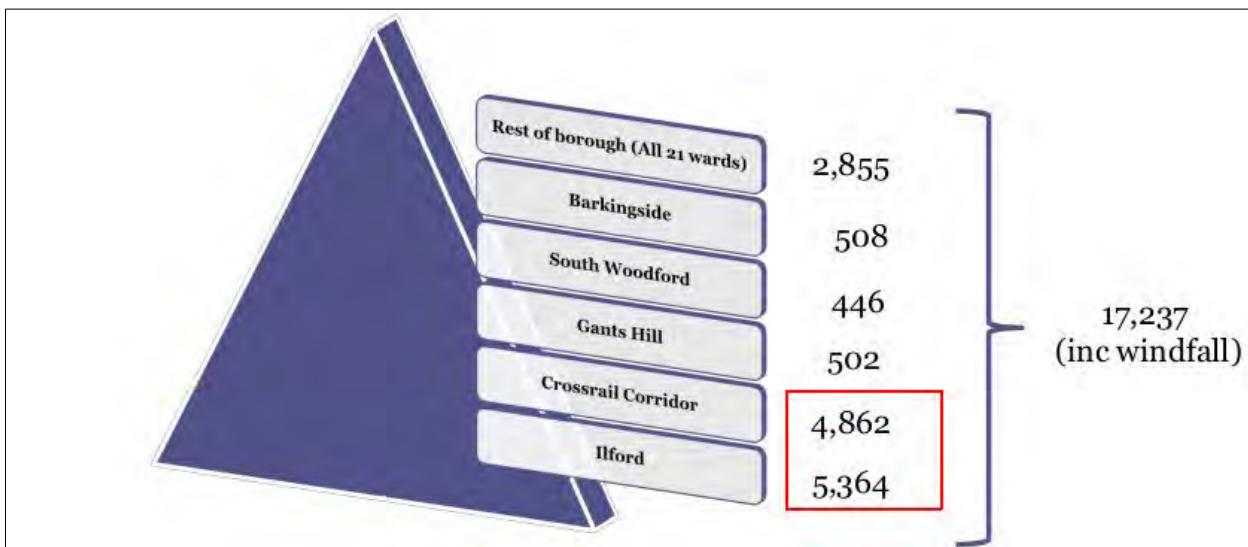
5.8.6 In any case, even though what is an appropriate density does not stop with the application of Table 3.2, as noted in para 3.28 of the London Plan, taking into account the local context and design factors shows that the proposed density for this location is simply too great.

5.8.7 Current statistics show that there is an imbalance between population density vs hectares in Redbridge. The below diagram shows Goodmayes/SevenKings/Chadwell (all served by the High Road) have some of the highest population densities per hectare. In the absence of a cumulative impact report, it is fair to estimate this single Development will increase local population by 3000 to 4000 people. Combined with

the unlisted developments, this will make Goodmayes the most densely populated wards in Redbridge²⁴;

2011 ward	All usual residents	Area Hectares	Density (number of persons per hectare)
E05000507 : Loxford	16,544	126.43	130.9
E05000501 : Clementswood	14,666	127.12	115.4
E05000498 : Chadwell	14,257	151.43	94.1
E05000514 : Valentines	14,123	150.25	94.0
E05000496 : Barkingside	12,609	152.66	82.6
E05000505 : Goodmayes	13,069	164.60	79.4
E05000510 : Newbury	16,760	211.69	79.2
E05000499 : Church End	11,516	149.15	77.2
E05000512 : Seven Kings	15,164	208.22	72.8
E05000508 : Mayfield	13,672	188.38	72.6
E05000513 : Snaresbrook	11,865	198.57	59.8
E05000504 : Fullwell	12,910	218.55	59.1
E05000500 : Clayhall	13,241	249.15	53.1
E05000502 : Cranbrook	12,780	240.61	53.1
E05000511 : Roding	12,044	234.40	51.4
E05000497 : Bridge	11,658	257.90	45.2
E05000503 : Fairlop	12,630	359.36	35.1
E05000509 : Monkhams	10,422	307.48	33.9
E05000506 : Hainault	12,953	564.18	23.0
E05000515 : Wanstead	11,543	519.78	22.2
E05000495 : Aldborough	14,544	861.23	16.9

5.8.8 Below is a visual breakdown of “opportunity sites” identified by Redbridge Council in 2018. There is a clear bias towards situating the majority of builds in the Ilford South area. As per above, Ilford South already has some of the highest populated wards per hectare. Assuming another 10,000 flats (estimate 20,000 more people) are accommodated in such a small footprint, this is not only negligent but also dangerous to the residents of the borough. Note the “windfall” figure has not yet been announced but it can be assumed the percentage allocations per ward are unlikely to change:



²⁴http://search3.openobjects.com/mediamanager/redbridge/fsd/files/qs102ew_-_population_density.xls

5.9 Mental Health

5.9.1 There is much evidence to show that high rise towers are detrimental to mental health leading to suicide, isolation and anxiety²⁵²⁶²⁷. Many high rises were demolished in the 1990's due to their known detrimental impacts on residents. It is noted that "mental health" is not a material consideration on the Council's planning criteria but in lieu of Covid-19 it should be highlighted as a very real issue.

5.9.2 Newham Council released a study of high rise buildings in 2011²⁸ citing the below as problem areas:

- Suicide
- Strain / Distress / Mental health / Isolation
- Social relations and reduced community cohesion
- Children living in high rise developments have reduced access to outdoor space which has a direct correlation with reduced mental and physical health.
- Fear of Crime (even if it doesn't exist) perceived or real

5.9.3 There is also evidence to support that cognitive development of children can be impaired due to the effects of increased pollution thus compounding the earlier stated effects²⁹. Further studies show the impact of pollution on children's cognitive development and performance³⁰. The Barcelona study looks into effects on children with greater exposure to traffic related air pollution³¹.

5.10 Supporting Infrastructure

5.10.1 The Local GP/Patient ratio is 1:2600. There is no sign of this changing any time soon. In fact such a vast number of dwellings in such a compact space will only serve to stretch services further.

Redbridge Council's own research states the disparity of Health provision in the Borough. Yet there has been little or no weight drawn to this issue:

- 2600 patients for each GP
- Average visits to a GP = 4 times a year
- Any positive impact from building more surgeries will be counteracted by having an increased population in the area potentially at greater risk of ill health from exposure to polluted environments

²⁵ <https://citymonitor.ai/fabric/it-s-time-we-recognise-how-harmful-high-rise-living-can-be-residents-3549>

²⁶ <https://www.mdpi.com/2078-1547/10/2/34/htm>

²⁷ <https://www.smartcitiesdive.com/ex/sustainablecitiescollective/7-reasons-why-high-rises-kill-livability/561536/>

²⁸ [https://www.newham.gov.uk/Documents/Environment and planning/The Consequences of Living in High Rise Buildings.pdf](https://www.newham.gov.uk/Documents/Environment%20and%20planning/The%20Consequences%20of%20Living%20in%20High%20Rise%20Buildings.pdf)

²⁹ <https://www.theguardian.com/environment/2021/may/03/air-pollution-spikes-may-impair-older-mens-thinking-study-finds>

³⁰ <https://www.bmjjournals.org/content/363/bmjj.k4904>

³¹ <https://journals.plos.org/plosmedicine/article?id=10.1371%2Fjournal.pmed.1001792>

- People are less likely to be able to seek timely help where there are increased waiting times and opportunity to make GP appointments, unless there is proper planning for adequate number of GP surgeries to meet the demands of an increased population.
- How can you diagnose respiratory issues over the phone? Increased risk of respiratory complaints correlates with increased need to have face to face medical diagnosis and care, thus increasing the burden on local GP surgeries
- “Preventing the need for future health and social care demand is essential in managing the cost of these services in the long term.”
- The Covid19 crisis has shown the importance of having more outdoor and green spaces (not less) for residents to exercise and improve their health and well being. Surely the consequence of the Council proposal to increase the number of people living in high density areas within this part of the Borough is in direct contradiction to their statement above and their commitment towards reducing or preventing health and social care demands and its ensuing costs.

5.10.2 Suggestions that the Crossrail link and buses will take the extra load of those who do not have cars doesn't seem to be backed by any substantial data. It is evident that Goodmayes station rail links, even with the arrival of the Queen Elizabeth line, regularly suffers overcrowding. Introducing a bus lane may help local commuters but it is unlikely to offer any benefit to those with families or those that need to travel further and/or must use a vehicle.

5.10.3 Barley Lane park (situated directly opposite the Development) is already very busy at the peak of the Summer and is not able to provide for thousands more individuals. The latest plans do not provide sufficient recreational space for new residents. The Developer is expecting to use the current space to provide for thousands more people which will drastically reduce the green space per person. It is pertinent to reference a recent Evening Standard article refers to the need for tighter controls after the death of a child³².

5.11 Pollution

5.11.1 The local residents have a small park they can use directly opposite the Development. The expectation (as per Tesco's own analysis) is that pollution will increase due to more cars on the road and carbon emissions from the buildings. It is unlikely this is going to be a place where people will want to assemble or put their children.

³² <https://www.standard.co.uk/news/uk/rosamund-kissidebrah-world-health-organisation-government-road-george-eustice-b930855.html>

5.11.2 The Times newspaper published an article on May 19th 2021 noting the rise in child visits to the GP related to pollution³³. This was backed by a similar article in the Guardian³⁴. Both these articles support the arguments against increasing pollution around recreational areas.

5.11.3 There Weston Homes EIA clearly indicates that there is likely to be an increase in pollutants post construction. Redbridge has AQM (air quality management) issues³⁵ and adding 1280 new flats to an area that regularly sees traffic build up will only serve to compound this issue:

Component	Potential construction effect?	Potential post-construction effect?	Comments
Local air quality (criteria pollutants)	Yes	Yes 	Increased road traffic emissions during and post-construction
Dust	Yes	No	Potential generation of dust during demolition and construction
Odour	No	Yes	The nature of the proposed development suggests that there will be limited potential for significant odour effects (e.g. from restaurants and cafes)
Local climatic effects	No	No	The nature of the proposed development suggests that there will be no localised effects on temperature or the moisture content of the air
Transboundary air quality	No	No	The location and nature of the proposed development mean that there is no potential for significant transboundary effects
Global climate	No	No	The nature and scale of the proposed development suggest that there is no potential for significant global climate effects
Climate adaptation and vulnerability to climate change	No	Yes 	There is the potential for increased risk from flooding due to increased rainfall as a result of climate change post-construction
Carbon dioxide emissions	Yes	Yes 	Emissions from traffic during and post-construction, use of materials in construction, energy use in buildings post-construction

Table 5.1: Initial air quality and climate scoping checklist

5.11.4 The latest Redbridge action plan continues to be very vague as to where the air quality issues are. There is a general pointer to the “South West” of the borough and “areas with busy main roads”. It can be assumed the High Road fits this category. This is yet more reason to stop any further development until empirical evidence can be provided eg: an updated Air Quality report and Cumulative Impact Report. STTT believe that it would be a breach of care to the Residents of the Borough to approve large scale developments without the relevant due diligence.

³³ <https://www.thetimes.co.uk/article/air-pollution-causes-big-increase-in-child-visits-to-gp-0cnkxxzzv>

³⁴ <https://www.theguardian.com/environment/2021/may/18/air-pollution-linked-to-huge-rise-in-child-asthma-gp-visits>

³⁵ <https://www.redbridge.gov.uk/media/7646/aqap-2020-to-2025.pdf>

The data from our monitoring stations shows that we are still failing to meet the national annual average limit for the gas Nitrogen Dioxide (NO₂) and modelling indicates it is being breached at a number of other locations across the borough, most typically areas with heavy traffic.

Levels for Particulate Matter (PM₁₀ and PM_{2.5}) are lower, but there are still some exceedances, most

⁴ LLAQM Policy and Technical Guidance. <https://www.london.gov.uk/what-we-do/environment/pollution-and-air-quality/working-boroughs>

London Borough of Redbridge Updated Air Quality Action Plan (AQAP) 2020-2025

notably in the south west of the borough, around the Wanstead area and busy main roads in the borough. As particulate matter can be damaging to health at any level, this remains a pollutant of concern that is subject to a number actions in this plan to continuously reduce concentrations.

5.11.5 An FOI request to Barley Lane, Goodmayes and Chadwell Heath schools show a high number of children requiring inhalers and/or are under an Asthma care plan. This must be given due consideration when adding a development of this size to the area;

- Barley Lane School children with;
 - Inhalers = 52 / Asthma care plans = 10
- Goodmayes Primary School
 - Inhalers = 50 / Asthma care plans = 7
- Chadwell Heath Primary School (Estimated by ICO)
 - Inhalers = 37 / Asthma care plans = <5

5.11.6 The Local plan has explicitly stated that high rises are a good idea and more so in the Ilford South area. The data you have shows this is not the case for the environment or the general health of people. In light of Redbridge council's declaration of a climate emergency and the recent pandemic, combined with the knowledge that pollution impacts the least well off in our community the most; **Should we be rethinking the directives from the Local Plan and reassess what we should be doing going forwards?**

5.12 Safety (Grenfell) / Emergency Services

In light of the Grenfell disaster, there needs to be consideration for those who reside in new developments. Will the Redbridge Fire services be able to cope with a fire at the heights proposed by this development? At a meeting with residents, one resident

implied she had spoken to the Seven Kings fire department and they said they do not have equipment to fight fires at the heights being proposed. If this transpires to be the case then approval of this development will be negligent and dangerous in the event of fire emergencies. It is not sufficient that local residents will have to wait for fire services from outside the area who are better equipped³⁶.

6.0 Cumulative Impact Report

6.1 Cumulative Impact Report Not Produced³⁷

6.1.1 Redbridge has failed its duty set in the London plan to produce a meaningful cumulative impact assessment. The duty of Redbridge is set out in the Mayor's letter to Redbridge dated planning report GLA/5001/01 dated 13 January 2020 quoting from paragraph 63.

“London Plan Policy 7.7, and new London Plan Policy D9 set out the Mayor’s requirements for tall buildings, identifying that boroughs should determine locations where tall buildings may be appropriate; and that visual, functional, environmental and cumulative impacts should be considered.”

6.1.2 At the June Redbridge cabinet, Cllr Athwal was asked by Andy Walker whether he would commission a cumulative impact into the pollution caused by three developments close to each other at the Tesco Goodmayes site, Seven Kings Homebase, and the Seven Kings Car Park.

Cllr Athwal said that he had asked for such a report and implied that it would not be limited to air quality impacts alone³⁸

The promised report has not been published, this is a serious omission and we submit that this application should be refused on as a consequence.

6.2 Peckham Air Quality Report

6.2.1 The air quality cumulative impact is addressed in reports written by Professor Peckham & Dr Mills which are addressed in the air quality section³⁹.

6.2.2 Peckham makes several criticisms of the Tesco EIA (section 9):

- (a) Development is not “air quality neutral”

³⁶<https://uknip.co.uk/breaking/news-262288/updated-thirty-firefighters-called-to-clad-covered-high-rise-in-canning-town-after-balcony-is-ablaze/>

³⁷Addendum 4 – ICO Judgement

³⁸<https://www.youtube.com/watch?v=R4EzTgMJkJY>

³⁹<https://redbridgetradeunionparty.files.wordpress.com/2020/07/tesco-towers-aqa.pdf>

- (b) Development sites a new primary school in a highly polluted area (NICE guideline violation)
- (c) Annual exposure targets don't protect human health and current pollutant levels at the development site harm health

6.3 Bodgers Tower Cumulative Impact Report (CIR)

6.3.1 The Tesco application, **does not estimate the cumulative impact** of this development on our local NHS.

6.3.2 However the Bodgers Tower planning application⁴⁰ cumulative impact assessment is contained within the November 2018 application “Volume 1: Environmental Statement Main Report”⁴¹. In the absence of the Tesco CIR, we shall refer to the Bodgers application as a benchmark:

“To address this, the cumulative assessment of this EIA has been split into a Tier 1 and Tier 2 assessment, whereby:

- *Tier 1 assesses the combined effects of the One Station Road proposals in combination with those at the Recorder House site; and*
- *Tier 2 assesses the combined effects of the One Station Road proposals and Recorder House proposals and other cumulative developments within 1km of each of these sites.”*

<p>1.39 To address this, the cumulative assessment of this EIA has been split into a Tier 1 and Tier 2 assessment, whereby:</p> <ul style="list-style-type: none"> ▪ Tier 1 assesses the combined effects of the One Station Road proposals in combination with those at the Recorder House site; and ▪ Tier 2 assesses the combined effects of the One Station Road proposals and Recorder House proposals and other cumulative developments within 1km of each of these sites.
<p>1.40 The Tier 1 assessment has been informed by the standalone environmental technical reports that are prepared in relation to the Recorder House Proposed Development. These include:</p> <ul style="list-style-type: none"> ▪ Air Quality – this is considered further in the Tier 1 cumulative assessment of Volume 1, Chapter 7, Air Quality; ▪ Archaeology – given that there are no likely significant effects from Station Road and the distance between the two sites, there is no potential for cumulative effects; ▪ Contamination – given the distance between the sites there is no potential for cumulative effects; ▪ Drainage – given that there are no likely significant effects from Station Road and the distance between the two sites, there is no potential for cumulative effects; ▪ Daylight, Sunlight and Overshadowing – this is considered further in the Tier 1 cumulative assessment of Volume 1, Chapter 10, Daylight, Sunlight, Overshadowing and Solar Glare; ▪ Noise – this is considered further in the Tier 1 cumulative assessment of Volume 1, Chapter 8, Noise and Vibration; ▪ Ecology – given that there are no likely significant effects from Station Road and the distance between the two sites, there is no potential for cumulative effects; and ▪ Townscape and Visual – this is considered further in the Tier 1 cumulative assessment of Volume 2, (Built) Heritage, Townscape and Visual Impact Assessment.

6.3.3 The impact report also makes clear there will be insufficient medical infrastructure;

⁴⁰<https://planning.redbridge.gov.uk/redbridge/application-details/171937>

⁴¹<https://planningdocs.redbridge.gov.uk/NorthgatePublicDocs/00603962.pdf>

6.130 The baseline figures show that the average ratio of registered patients per GP across the 11 GP practices that lie within one mile of the Proposed Development is 2,725, which is significantly above the benchmark list size of 1,800 patients per FTE GP. If all the residents of the Proposed Development register with the GPs assessed in the baseline, the additional residents and workers would require an extra 0.5FTE GPs, and the ratio of patients to GPs would rise to 2,753 patients per FTE GP, an increase of just one percent, but making the GP ratio 53% above the target list size of 1,800.

Table 6.32 Impact on Health Provision

	Patient list size	FTE GPs	Patient/FTE GP
Current baseline	81,485	29.9	2,725
Baseline plus 635 additional residents at the Proposed Development and up to 200 additional workers	82,320	29.9	2,753

6.131 Under a worst-case scenario, in which all residents from the Proposed Development register with the GPs assessed in the baseline, the Proposed Development is expected to have a small magnitude of impact, on a high sensitivity receptor, which is expected to result in a long-term adverse effect that is **moderate** in scale at the local level. The **moderate adverse effect is significant**.

6.3.4 The report continues at 6.134 noting an increase in A&E admissions even though it doesn't feel it is "significant"

6.134 The Proposed Development is expected to result in an increase of 260 annual A&E visits to the King George Hospital, equivalent to an increase of 0.1% in annual attendances. It is therefore likely to have a low magnitude of impact, on a medium sensitivity receptor, that results in a long term, adverse effect of **minor** scale at a local level. The **minor adverse effect** is not considered to be significant.

6.3.5 The Bodgers Tower report also has a detailed report into the impact of the local schools; both the impact of the population increase on local schools and h6.3.4 The impact report also makes clear there will be insufficient medical infrastructure;

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6.3.7 The Bodgers Tower report also has a detailed report into the impact of the local schools; both the impact of the population increase on local schools and health provision is not contained with the Tesco application.

6.3.8 The Bodgers Tower report states that there are 18 surrounding developments included in the cumulative impact report. Why has this not been done for the Tesco application? This application should be rejected until cumulative effects can be known:

CUMULATIVE EFFECTS WITH ALL OTHER DEVELOPMENTS

7.139 A total of 18 developments have been identified as cumulative schemes and outlined in **ES Volume 1 Chapter 2: EIA Methodology**.

6.3.9 There has been consideration for a cumulative impact report as the document titled “Redevelopment of Tesco Extra Site”⁴² requests projects that should be included in it:

17.2 Consultees are requested to suggest projects that should be covered in the cumulative effects assessment. To-date the following schemes have been identified for possible inclusion:

- 4326/16 – Redbridge – 193-207 High Road, Ilford (Harrison & Gibson) - Major mixed-use development. Demolition of existing buildings to provide 323 residential, 2,277 sqm flexible non-residential floor space, village hall, and 534 cycle storage spaces
- 5988/16 – Redbridge – Masala 302-910 Eastern Avenue, Newbury Park, Ilford, IG2 7HZ 1 - Demolition of existing buildings and the erection of part two and half, six, seven, eight and 12 storey blocks providing a total of 181 x Class C3 units
- 4499/15 – Redbridge – Sainsbury's Supermarkets Ltd, 55 Roden Street, Ilford, IG1 2AA - Demolition of existing buildings for 683 residential, replacement Sainsburys store 4,745 sqm, 951 sqm flexible commercial floorspace, 410 retail spaces
- 4265/15 – Redbridge - Development above six storey car park comprising an additional 20 floors, extending the existing structure to a part 7, part 11 and part 26 storey building, consisting of the provision of 214 residential units on the sixth to 26th floors
- 12/00146/FUM – Stratford - Leyton Road, London E15 1DH - Zone 1 (detailed) 173 residential, 1,161 sqm commercial; Zone 2-5 (outline) 863 residential, up to 6900 sqm commercial. Up to 1100 residential units in total
- 0141/09 – Redbridge (amended by 2434/12 variation of condition) - Britannia Music, 60-70 Roden Street and land between Chapel Road and Roden Street, Ilford - Major mixed-use redevelopment proposal comprising 332 apartments, office space, A1 to A3 uses
- 4557/18 – Redbridge – 1-17 Station Road and 16-26 Cranbrook Road, Ilford - Demolition of existing building and redevelopment to provide a 42 storey building with basement comprising 380 residential units with ancillary facilities (class C3), retail (class A1-A3), office (class B1), public realm works and all other incidental works

⁴² <https://planningdocs.redbridge.gov.uk/NorthgatePublicDocs/00685284.pdf>

6.3.10 Chapter 3 of the Tesco Environmental Statement references the February report listed in (9) above at 3-1 and lists the same 7 applications to be judged on a cumulative basis, **neither the Homebase or Seven Kings Car Park are to be part of the cumulative assessment.**

6.3.11 **The officer report before you for your decision on the 27th May, excludes the cumulative impacts of the proposed high rise towers at the Seven Kings Homebase and the Seven Kings Car Park sites.**

6.3.12 **BHRUT, the Trust which manages King George & Queens Hospitals reported a 90 bed shortfall at their 25th November 2020 board meeting. This bed shortfall will be a factor in BHRUT having some of the worst type 1 A&E statistics in England.**

6.3.13 **The NHS A&E 4 hour waits for type 1 A&E (the more seriously ill patients) taken from the NHS were 78.8%. The safety benchmark is 95%, the lower the percentage drops, the greater the risk of patient suffering poor care.**

6.3.14 The April 2021 BHRUT Type 1 four hour statistic was 51.4%, the worst in England. This is not the first time BHRUT has had the worst performance, January, February and March 2021 also saw BHRUT having the worst A&E type 1 A&E performance in England.

6.3.15 At the May 2021 Tony Chambers, the BHRUT Chief Executive said Patients had “very high levels” of length of stay in comparison with other hospitals. Academic research shows very high length of stay is to be expected with very long waits at A&E⁴³. An example of such research is at <https://emj.bmj.com/content/37/12/781> an article in the BMJ titled “Waiting times in emergency departments: exploring the factors associated with longer patient waits for emergency care in England using routinely collected daily data” by Steven Paling et al.

6.3.16 The article above and substantial research elsewhere also shows long waiting times at A&E cause higher mortality rates in Hospitals. This begs the question of whether BHRUT has higher than expected death rates to match the higher length of stay.

6.3.17 Andy Walker, a local resident has been trying for years to find death statistics at BHRUT. A decision notice from the Information Commissioners Office is attached showing a judgment that “on the balance of probabilities” that BHRUT did not keep the information that BHRUT sought.

⁴³ <https://emj.bmj.com/content/37/12/781>

6.3.18 Andy has a outstanding freedom of information request with University Hospitals Birmingham NHS Foundation Trust who collocate English NHS hospital statistic as below

- The period is 1st January 2020 to 31st December 2020. The hospitals are King George in Redbridge & Queens in Havering. I seek in total 24 tables, 12 for each hospital.
- 1st Column is the Diagnostic Group
- 2nd Column is the Summary Hospital-level Mortality Indicator
- 3rd Column is the Number of patients discharged who died in hospital or within 30 days
- 4th Column is the Number of mortalities occurring in the hospital
- 5th Column is the crude mortality rate

I seek the six diagnostic groups for each month that the worst outliers as a whole for BHRUT which will be of most interest to the board, press, elected representatives and the public.

6.3.19 Redbridge Council are bound under the Public Sector Equality Duty to have made enquiries as outlined in the Gemma Cameron v Manchester Council case⁴⁴ to have collected data relating to pollution, health and educational infrastructure to judge the cumulative impact of this and other developments. Redbridge has failed to do this and as a consequence this application must be rejected or at least deferred until adequate reports are presented to this committee.

6.3.20 Should the application be passed on the 27th May, the campaign team may argue that any evidence provided in freedom of information requests made before the 27th May be admitted in any court as evidence.

6.4 Waiver of EIA on Seven Kings Car Park

6.4.1 In September 2020 Redbridge Council waived the Environmental Impact Assessment for planning application 2354/20. This is believed to be an unjustified decision to which no response was received.

6.4.2 An email sent September 11th (appendix 1) by RR to the head of Planning, Brett Leahy, further shows a failure from the council to properly assess cumulative impact as well as ignoring the threshold for which an EIA should be undertaken:

- [REDACTED] (case officer) has assessed it as “NOT REQUIRED” citing the build as “not in a sensitive area and impacts could be appropriately mitigated”.

⁴⁴ Addendum 5 - Cameron v Manchester Council judgment

However in the same sentence he accepts that “it is above the relevant (number of units) threshold”.

- No empirical evidence as to why this decision was reached has been provided
- The only published environmental data the council has currently is almost two years old and using diffusion data that is incomplete and irrelevant to the major build sites proposed along the High Road/Crossrail Corridor.

6.5 Climate Change Emergency

6.5.1 The campaign paid for legal advice which is copied below.

“We have taken advice from counsel and it would appear that the Council does not have sufficient information before it to be satisfied that the proposed development will be in compliance with the development plan – in particular, LP19 and especially taking into account that this is a ‘major development’ as defined in the local plan. You are reminded that the Council is bound by the *Tameside* duty to make sufficient inquiries. We maintain that in the absence of detailed carbon emissions calculations, the Council is not able to make an informed decision on compliance with the local plan policies.”

6.5.2 Section 20 in the council report before you this evening claims Redbridge has done its duty under climate change regulations. While the national government has set national home building targets, it has not set meaningful targets for CO2 emissions caused by home building. In particular we can find no analysis comparing CO2 emissions caused by high rise as against traditional low rise construction at national level or in the document before you this evening provided by Redbridge Council.

7.0 Air Quality

7.1 Arguments

7.1.1 There have been several reports on air quality regarding this application. Aether was commissioned by the developer, Ricardo⁴⁵ was commissioned by Redbridge Council and Dr Peckham & Dr Mills of Kent University were commissioned by our campaign. All these reports are on council planning website pages for this application.

7.1.2 For ease of reference for Councillors attending the hearing on the 27th May the Professor Peckham and Dr Mills report “Response to Ricardo’s “*Review of University of Kent report “Air Quality Review for 4309/19 – Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford”*”, dated 22 February 2021

7.1.3 Ricardo accept that the location of the school means there can be effects on health at levels below air quality standards per the extract below from their report at section “**2 The difference between air quality objectives and the harm caused by air pollution**”

“Ricardo cannot see that there is any disagreement between CHSS and Ricardo on the question of whether exposure to air pollution at levels below air quality standards can have an effect on health. Both CHSS and Ricardo agree that there can be effects on health at levels below the air quality objectives. If there is disagreement, it lies in how this should be addressed through the planning process.”

Notwithstanding, the claim that our campaign disagrees with Ricardo about the levels of pollution and prefers the analysis of Professor Peckham & Dr Mills, air pollution below the legal limits is still grounds to refuse this application⁴⁶.

7.1.4 Both the Gemma Cameron v Manchester Council & the Gladman judgements did not rely solely on the statutory pollution limits to refuse permission for developments.

⁴⁵ Addendum 6 - Ricardo Report commissioned by LBR

⁴⁶ Addendum 7 - Ricardo Response from Kent University

7.1.5 In Gladman (Neutral Citation Number: [2019] EWCA Civ 1543)⁴⁷ the test was “moderate adverse impact on air quality” per paragraph 38 of the judgment below:

“38. The salient features of the evidence were that local monitoring showed exceedances of the annual mean objective for NO₂ in both the Newington and Rainham Air Quality Management Areas, as the inspector recognized in paragraph 93, and that the proposed development would be likely to bring about a worsening of those exceedances through increased vehicle emissions, though the extent of that worsening was a matter for debate – as he explained in paragraphs 94 to 104. As he said in paragraph 102, “moderate adverse” and “substantial adverse” impacts could be expected to have “a significant effect on human health ...”. He therefore took a cautious approach, concluding that the financial contributions put forward “may well not reflect the true impacts of the developments” (paragraph 103), and that the adequacy of the proposed mitigation had not been satisfactorily demonstrated (paragraph 104). His ultimate conclusion, in paragraph 105, was that it was “more probable than not” that each of these developments would have “at least a moderate adverse impact on air quality in the Newington and Rainham AQMAs, and thus a Judgment Approved by the court for handing down (subject to editorial corrections) Gladman Developments Ltd v SSCLG significant effect on human health”, and that the proposed mitigation had not been shown to be effective by “clear evidence”.

7.1.6 The latest Redbridge Air Quality report on the Council website reports (at page 55) 2019 NO₂ statistics for Chadwell Heath primary, which is the closest monitor to the Tesco store as below:

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
µg m ⁻³	51.0	59.4	48.5	39.4	38.2	39.3	35.1	35.2	48.5	34.8	52.2	49.8

The biased figure for the year is 39.4 µg m⁻³, just under the limit of 40 µg m⁻³.

7.1.7 A FOI request⁴⁸ dated September 2020 shows a correlation between asthma attacks in children and living close to busy roads. This fits in with a substantial body of research showing the closer to roads, the increased chance of poor child health⁴⁹.

⁴⁷ <https://cornerstonebarristers.com/cmsAdmin/uploads/gladman-developments-ltd-v-ssclg-judgment-12-september-2019.pdf>

⁴⁸ <https://stopthetescotoxic towers.blogspot.com/2020/09/bhrut-asthma-statistics-confirms-living.html>

⁴⁹ <https://www.bbc.co.uk/news/health-50467700#:~:text=Children%20exposed%20to%20roadside%20air,%25%2C%20the%20paper%20also%20found>

7.1.8 The developer accepts the site is unsuitable for human health. This is shown in the October 2019 Weston Homes Heath sustainability statement available on the Redbridge Council Website. Page 15 states:

“Local air quality has been assessed using ADMS-Roads, a dispersion model that can be used to predict concentrations of pollutants in the vicinity of roads and small industrial sources. Based on the ADMS results, it is recommended that mechanical ventilation or NOx/NO2 filters are installed at the ground to second floor facades of the western building facing High Road.”

7.1.9 The application should be refused because of its toxic location and the, at the very least, moderate adverse impact the proposed development would have on existing residents during the construction phase and thereafter due to additional traffic and increasing congestion.

7.1.10 In the Gemma Cameron v Manchester Council case (2021)^{50 51} EWHC 336 admin listed three grounds to oppose Manchester's decision to pass an application for a car park close to a school.

7.1.11 The third ground was an alleged failure by Manchester to carry out their Public Sector Equality Duty. The court found in favour of Cameron on this point. In the Tesco application no detailed analysis of whether the proposed school or schools nearby will suffer adverse impacts. This is clear breach of the Council's Public Sector Equality Duty.

7.1.12 The breach is clear because the Council has not provided benchmarks as to what will happen to child health should the development go ahead. For example, no data has been collected by the Council about how many children in local schools have asthma and how many hospital admissions have taken place. No attempt has been made to calculate the numbers of children at the proposed school who will arrive with asthma and what policies will be in place to safeguard their health.

⁵⁰ <https://www.theguardian.com/uk-news/2021/feb/20/manchester-council-loses-legal-fight-to-build-car-park-next-to-school>

⁵¹ Addendum 5 - Cameron v Manchester Council judgment

7.1.13 Other parts of the borough have schools with air filter systems, such as William Torbit and other schools have road closures or no-idling zones. Redbridge is in breach of its Public Sector Equality Duty by not conducting an in-depth analysis of how children with respiratory illness will be impacted upon as a consequence of this development being passed.

(a) Redbridge Council say in the papers published on 19th May

“Legal advice has also been sought on the ‘Cameron judgement’ and the advice has confirmed that the factual matrix in that judgement is to be distinguished to the current applicant”

It is puzzling why the officers have accepted this advice. Of course, the “factual matrix” is different, there are different boroughs, one is in Manchester the other is in Redbridge, the development in Manchester is a car park, the development in Redbridge is residential etc.

(b) The Cameron judgment is attached as an appendix. Ground 3 which addresses the public sector equality duty covers paragraphs 47-61. At paragraph 59 the judge states why Manchester and by implication Redbridge too, has a duty to make enquiries about the health of children with respiratory disease.

(c) Redbridge has made a superficial investigation of the impact of the development on child health nearby and the children in the school. The air quality monitors are not at child height, despite research showing pollution is higher than at child height rather than at the 2M height used by the monitors. death

(d) Redbridge in section 8 of the Redbridge report this evening, the officer report says

“While exposure to airborne pollutants at levels below these objectives could have adverse effects on health which might be observable at a population level”

This shows Redbridge accepts damage may be done to child health at lower levels than the statutory limits. Redbridge breach their Public Sector Equality Duty by making any attempt to quantify what this damage is nor what can Redbridge do to mitigate it.

(e) Ricardo in section 8 of the air quality report of the Redbridge report before you as being critical of Professor Peckham & Dr Mills using “aggressive and accusatory terms”

The language used by the academics is completely proportionate when compared with baffling indifference to child health displayed in the reports paid for by the developer and the council.

(f) The omission of a detailed cumulative impact report on nearby developments such as Homebase and the Seven Kings car park along with other developments on increased pollution on child health is another breach of the Council’s Public Sector Equality Duty.

(g) There are locations in England suitable for human habitation which have far lower levels of toxic pollution. Safeguarding child health requires they be built there.

7.1.14 This application should be failed on air quality grounds alone. Or in the alternative it should be referred to the Secretary of State because of a school being proposed by a busy polluting road. As a consequence, the location of new schools is down to the discretion of local councils. This cannot be right as it means children at new schools will have no maximum safety limit for pollution levels. This injustice requires a referral to the Secretary of State to issue statutory regulations to local authorities on the location of schools close to roads. Nice Quality Statement 181 mentioned below is merely guidance which council can and do ignore.

7.1.15 Nice Quality Statement 181 lists its aims to improve outcomes such as:

- prevalence of cardiovascular disease
- prevalence of respiratory disease
- prevalence of lung cancer
- A&E attendances (for respiratory and cardiovascular conditions)
- hospital admissions (for respiratory and cardiovascular conditions)

- mortality (from respiratory and cardiovascular conditions & listed in strategic plans)

“minimising the exposure of vulnerable groups to air pollution by not siting buildings (such as schools, nurseries and care homes) in areas where pollution levels will be high”

7.1.16 In an email response to the “NO2 school monitoring petition”⁵², Cllr Jas Athwal was quoted as saying:

“The email of 10th of March 2020 to Mr Walker does highlight that monitoring will be undertaken at the four schools identified however based upon further analysis this was not considered ultimately necessary under the relevant regulations because the levels of no2 was so low Mr Walker it did not warrant any further investigation and certainly the air quality monitoring report extended to the boundary of the site and confirm the no2 levels across the site these are considered sufficient to indicate ambient air quality in the vicinity of the site which would also include the schools identified as generally within 350 m of the site offers officers will be writing to you Mr walker to clarify at the monitoring regime”

It is argued that the Cameron judgment places a duty on Redbridge to do this monitoring thus a further reason for deferment or rejection of the planning application.

7.2 Statement from Dr Mills^{53 54} Re Pollution

At the time of writing this report, the London Borough of Redbridge had restricted speakers from making statements via virtual conference, insisting they must attend personally. Unfortunately one of the key speakers, Dr Mills (Public Health Data Scientist and Researcher at The University of Kent), was unable to do so but prepared a statement that makes a very good case⁵⁵ in favour of stopping the Development. A few of his points are mentioned below;

“In your last Annual Status Report, Chadwell Primary School’s measured Nitrogen Dioxide outside the school gates at 44.8 ug/m3, that’s more than 10% above the legal limit of 40. And that was on a lamppost, at 2.6m in the air, not at child breathing height!”

⁵² <https://www.change.org/p/redbridge-council-no2-monitoring-for-schools-to-stop-the-tesco-toxic-towers-in-goodmayes>

⁵³ https://www.facebook.com/andywalker19/videos/10225754603839593/?notif_id=1621941292407702¬if_t=video_processed&ref=notif

⁵⁴ Appendix 2 – Dr Mills Statement

⁵⁵ Appendix 2 – Dr Mills Statement

“At Chadwell Primary School you are already above the legal limit, but the legal limit is far above the healthy limit, far above the levels at which permanent damage to children’s lungs occurs. Or sometimes even worse. I needn’t remind you of a recent coroners report in a neighbouring borough.”

“Inputs that are only accurate to a ¼ of their measured value, outputs with a 10% margin on top of that. Garbage in, gospel out.”

“On balance, this development poses too much risk”

8.0 Further Considerations

STTT and RR have been in communication with the council and have asked several pertinent questions⁵⁶. The responses are at best speculative, poorly researched or citing general planning law to very specific queries. A summary of the questions outstanding are below:

- How is the climate committee measuring the impact of climate change or pollution in the area when most of the pollution monitors have been removed?
- There seems to be a disconnect between the multiple developments in Ilford South and the data you have re residential units producing most of the pollution. Would it not be sensible to lower the heights of these towers and spread the builds more evenly across the borough?
- What can we do to stop the council approving any more builds until we are clear on where the worst hit areas are and whether it is wise to allow more housing in those areas?
- Where are the climate pollution figures for Redbridge specifically?
- Shouldn’t “climate effects” be top of the list of material considerations for the council planning committee if most climate effects come from buildings?
- Planning committee has done nothing to pre-empt combined pollution impacts on the high road developments. Is the committee concerned about this and do they think such a report is critical to the planning decisions in Ilford South going forwards?
- If we don’t know the gravity of what we are dealing with why are we approving plans (or passing them to the GLA for approval)? Is this not effectively kicking the can down the road?

⁵⁶ Addendum 2 & 3 - Questions and Responses to Council

- Does the committee agree we should not be allowing dispensations to developers to offset their own costs at the sacrifice of affordable housing. (Re: Seven Kings development where 11% social housing was allowed due to the high cost of insulation). Would you agree it is up to the developer to risk assess and plan costs and not for the Council to subsidise just to hit housing figures?
- The Local plan has explicitly stated that high rises are a good idea and more so in the Ilford South area. The data you have shows this is not the case for the environment or the general health of people. In light of Redbridge council's declaration of a climate emergency and the recent pandemic, combined with the knowledge that pollution impacts the least well off in our community the most; Should we be rethinking the dictats from the Local Plan and reassess what we should be doing going forwards?
- In light of climate change effects and Covid-19 data, would you agree that the "Local Plan" which effectively green lit the developers to build high rises anywhere along the Crossrail corridor is no longer fit for purpose?
- Covid-19 data shows more and more people are leaving London. Should the council be building for a future that no longer looks like the past? Or no longer reflects the current situation or housing needs ?
- Reclaim Redbridge have commissioned a private air quality report paid for by residents. It is quite scathing about the lack of scrutiny that was applied to the Tesco planning application and the lack of data any decisions were based on. Our concern is that this becomes (or already is) the norm for planning applications?
- Are you able to provide the socio-economic and demographic data correlating to who is or instead write which cohorts or groups of people are most affected by pollution and climate change in Redbridge by Ward? If not, can this be something that can be produced as there is data to suggest that put instead the poorest 30% instead of bottom 30% of society financially are the most likely to suffer from pollution related illness?
- **Is the local plan fit for purpose in light of climate and pandemic data?**
- **The lack of a cumulative impact report prevents a full and proper analysis of the Development**

- **The Development does not provide relevant cost effective social housing for those that need it the most**

9.0 Summary and Conclusion

9.1 Firstly, it must be noted that the data contained within this document has had to be limited for brevity and coherency. There are pages of comments, articles and research from Residents that have been accumulated over the last two years; it was not possible to include them all in this document.

9.2 At the heart of STTT's and RR's objection is that the Development height is disproportionate with the surroundings,. It is inappropriate for the site resulting in a scheme which is too dense and has adverse impacts to the character, aesthetics and environment (including but not exclusively pollution related). Furthermore, the residential units will not be affordable to those most in need in the borough and fail to provide future residents with adequate residential amenity in terms of noise, thermal comfort and space. The development is also inadequate in terms of providing parking facilities or meeting the needs of families. The demonstrable harm greatly outweighs the benefits of the scheme and on these grounds there is a strong case that planning permission should be refused.

9.3 We ask:

- I. **The Redbridge planning committee at their meeting of 27th May to reject the planning application for the reasons given above**
- II. **If the committee will not reject the application, we seek a deferment for a detailed Cumulative Impact report for the reasons outlined above**
- III. **If the committee reject (i) and (ii) we request that this application is referred to the Secretary of State. We say the this issue of the location of school in relation to air pollution is a national issue which needs central government legislation**

9.4 It seems pertinent to close on a very relevant quote from a newspaper article in The Guardian, which sums up the feeling of the residents and how having a short term vision (to remedy historical lack of housing without a full assessment of the risks) will bring long term problems to this vibrant community.

“In Britain, tall buildings are signs of failed planning, which finds it hard to discover the space for more sustainable and humane ways of building homes⁵⁷.”

We urge the planning committee to stand with the desire of the residents and reject application 4309/19.

⁵⁷ <https://www.theguardian.com/artanddesign/2020/jul/11/skyscrapers-wasteful-damaging-outmoded-time-to-stop-tall-buildings>

Appendix 1 – Letter to Brett Leahy (Planning Head)

Dear [REDACTED]

I hope you are well during these exceptional and uncertain times.

We are quite concerned as to the recent decision regarding the Environmental Impact Assessment (EIA) for planning application 2354/20 (Car park at 706-720 High Road Goodmayes). [REDACTED] (case officer) has assessed it as “NOT REQUIRED” citing the build as “not in a sensitive area and impacts could be appropriately mitigated”. However in the same sentence he accepts that “it is above the relevant (number of units) threshold”. No empirical evidence as to why this decision was reached has been provided nor is it factually correct from the data we have e.g: a correlation between postcodes with the highest asthma cases and proximity to the High Road where the builds are proposed (see attached).

The only published environmental data the council has currently is almost two years old and using diffusion data that is incomplete and irrelevant to the major build sites proposed along the High Road/Crossrail Corridor.

Moreover, it has already been shown (as per the Tesco Goodmayes application 4309/19) that the decision to approve the Tesco EIA was deficient including a lack of diffusion data in the affected areas (see attached showing no monitors close to the major developments).

Finally, I have been made aware that there is a “Combined Development Site EIA Report” being conducted by the council, if this is the case then it would seem even more incorrect to draw any environmental conclusions until this report is made available.

Taking all these points into account, I would suggest the council does not have sufficient data to draw any conclusive assertions regarding the environmental impacts and ask;

1. You consider reversing the above decision by [REDACTED] for the non requirement of an EIA for application 2354/20
2. No further major planning applications are approved by the planning committee or Council until there is a higher degree of confidence the data being supplied by the applicant's correlates with independently produced data; ideally by looking at the combined EIA from the Council, the Annual Status Report 2019 when it is eventually produced and any professionally commissioned reports from campaign groups

Thank you for your time. I look forward to your response.

CC: Sam Tarry MP, Cllr Bob Littlewood, Cllr's from the Redbridge Planning Committee (<http://moderngov.redbridge.gov.uk/mgCommitteeMailingList.aspx?ID=776>)

Appendix 2 – Dr Mills Statement

The National Planning Policy Framework requires that developments are consistent with a borough's Air Quality Action Plan.

Your 2020-2025 Air Quality Action Plan, contains a bullet point list of key priorities.

At the very top is “Reducing pollution in and around schools”.

In your last Annual Status Report, Chadwell Primary School's measured **Nitrogen Dioxide** outside the school gates **at 44.8 ug/m3, that's more than 10% above the legal limit of 40**. And that was on a lamppost, at 2.6m in the air, not at child breathing height!

Chadwell Primary School is only 600m from the proposed development, on the same road, fronting onto the same road that you want to build a new primary school!

Chadwell Primary School has 52 students with asthma! Barley Lane has 50. Both schools are concerned about air quality and object to your development. Air pollution is one of the primary causes of asthma.

At Chadwell Primary School you are **already above the legal limit**, but **the legal limit is far above the healthy limit**, far above the levels at which permanent damage to children's lungs occurs. Or sometimes even worse. I needn't remind you of a recent coroners report in a neighbouring borough.

The developer will try and assure you, with fancy arguments, that everything is and will be fine. This is a house of cards. **Inputs that are only accurate to a ¼ of their measured value**, outputs with a 10% margin on top of that. **Garbage in, gospel out.**

On balance, this development poses too much risk: risk to your AQAP compliance with regard to NO2, risk to compliance with the London Air Strategy for PM2.5. Risk for compliance with the governments' clean air strategy for PM2.5, and most of all: risk to the health of new and existing residents, and in particular the most vulnerable: children.

On that basis you should reject this proposal.

Addendum List

- 1. Independent Air Quality Review**
- 2. Questions to Council**
- 3. Response to Questions to Council**
- 4. Information Officers judgment on BHRUT**
- 5. Cameron v Manchester Council judgment**
- 6. Ricardo Report commissioned by LBR**
- 7. Ricardo Response from Kent University**

Response to Ricardo's "Review of University of Kent report "Air Quality Review for 4309/19 - Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford"

Prepared by the Centre for Health Services Studies, 22/02/2021,
Professor Stephen Peckham & Dr Ashley Mills. Contact:
[REDACTED]

Site	Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford
Applicant	Weston Homes PLC
Redbridge reference	4309/19

1. Introduction	2
2. Ricardo does not understand the difference between air quality objectives and the harm caused by air pollution	2
3. The tragic death of Ella Kissi-Debrah	3
4. A dangerous place for a new primary school	4
5. References	6

1. Introduction

Ricardo Ltd was commissioned by Redbridge Borough Council to produce a report [1] to independently review a previous air quality review produced by CHSS [2].

Before Ricardo published this document, CHSS had published another report [3] to address amendments to the original planning application.

For this reason we will not provide a point-by-point rebuttal of Ricardo's work, since their comments are not addressed to the most recent evidence submitted by us.

However, Ricardo fails in one respect which is impossible to ignore: they conflate objective legal limits with health limits. This is a dangerous and misleading approach to public health that requires specific comment, and which will be the subject of this report.

2. Ricardo does not understand the difference between air quality objectives and the harm caused by air pollution

First of all it is worth noting that in the quote below, Ricardo is referring to the developer's V5 AQA [4] and not the developer's latest V6 AQA [5] For the sake of our argument here, this is immaterial since we are passing comment on Ricardo's interpretation of the data. It does beg the question however, why is Ricardo not commenting on both the latest documents submitted by the developer [5], and the latest rebuttal submitted by us [2]?

Notwithstanding this, on page 2 of Ricardo's review [1], Ricardo states the following:

"It is misleading to say that the development would "introduce a fresh cohort of children to damaging levels of air pollution." The new school was specifically included in the assessment (Sensitive Receptor H), and it was shown that levels of air pollutants at the school would comply with the air quality objectives at this location in the opening year of the scheme (2026). The proposed development would therefore not introduce children attending the school to damaging levels of air pollution."

In Table 5 of Aether's original report [4] predictions for 2026 (with development) were given for Sensitive Receptor H. The value given was 34.1 $\mu\text{g}/\text{m}^3$ (upper ground floor). From the same table we can see that many of Aether's original predictions for 2026 were within 10% of the objective and that "Nearby residential receptor" R1 has a prediction of 40.5 $\mu\text{g}/\text{m}^3$. We give these values so that the reader understands the overall pollution context within which Ricardo is making its claims.

Ricardo makes the inference that because "*it was shown that levels of air pollutants at the school would comply with the air quality objectives*" that it follows that "*The proposed*

development would therefore not introduce children attending the school to damaging levels of air pollution”.

The clear implication here is that Ricardo believes that air containing poisons in concentrations below air quality objectives cannot be damaging to children.

This is a ridiculous position that demonstrates a bewildering ignorance of publicly available facts and cannot go unchecked.

There are many studies looking at associations between mortality and mean annual NO₂ exposure. Examining a recent meta-analysis looking at associations between NO₂ and mortality [6], the majority of the 41 studies showed positive associations, relative risk increases were quantifiable per 10ug/m³, and pollutant ranges contained inputs below annual objectives. In a 2018 Public Health England review [7] of the long-term health effects of NO₂ they state that long-term mortality associations have been found in:

“cohorts in which the range of outdoor levels reaches as low as 5 µg/m³ annual average NO₂ concentration.”

It seems clear that there is a dose-response for negative outcomes for NO₂ at the annual measurement level, and that this dose-response occurs below objective limits for NO₂.

Daily variation also matters: a meta analysis of 204 time-series studies [8] found associations between 24h NO₂ and daily mortality and hospital admissions for a variety of morbidity and age groups. A study looking at 18 french cities [9] found that relative risk increases for NO₂ at lags of 0-1 days and greater risks associated with cumulative exposures over 0-5 days.

At even shorter timescales one study that looked at children walking to school [10] estimated that children obtained 20% of their black carbon daily dose (according to U.S EPA regulations) over a time period that accounted for only 6% of the day.

To summarise this material: daily changes in NO₂ can impact health and roadside exposure can contribute disproportionately to an individual's cumulative daily exposure.

We will now examine a specific example, which happened in a neighboring borough of Redbridge that highlights the real world consequences of maintaining a view of air pollution focused on objective limits at specific locations rather than human exposure.

3. The tragic death of Ella Kissi-Debrah

Ella Kissi-Debrah was a 9 year old girl who died after acute respiratory failure on 15/02/2013, with “Air pollution exposure” listed as a medical cause of death [11]. Ella had severe asthma and lived within 25m of London’s South Circular (A205, Brownhill Rd).

Ella went to Holbeach Primary School and the inquest heard that Ella regularly walked along Brownhill Rd to arrive there. The road has a high degree of traffic generated air pollution.

Ella was taken to hospital 27 times between 2010 and her death in 2013.

Taking 2011 as a representative year for her exposure to air pollution, Figure 1 shows the Lewisham diffusion tube data for 2011 [12] as well as data from the automatic monitoring station [13] at catford (named Automatic 1 below).

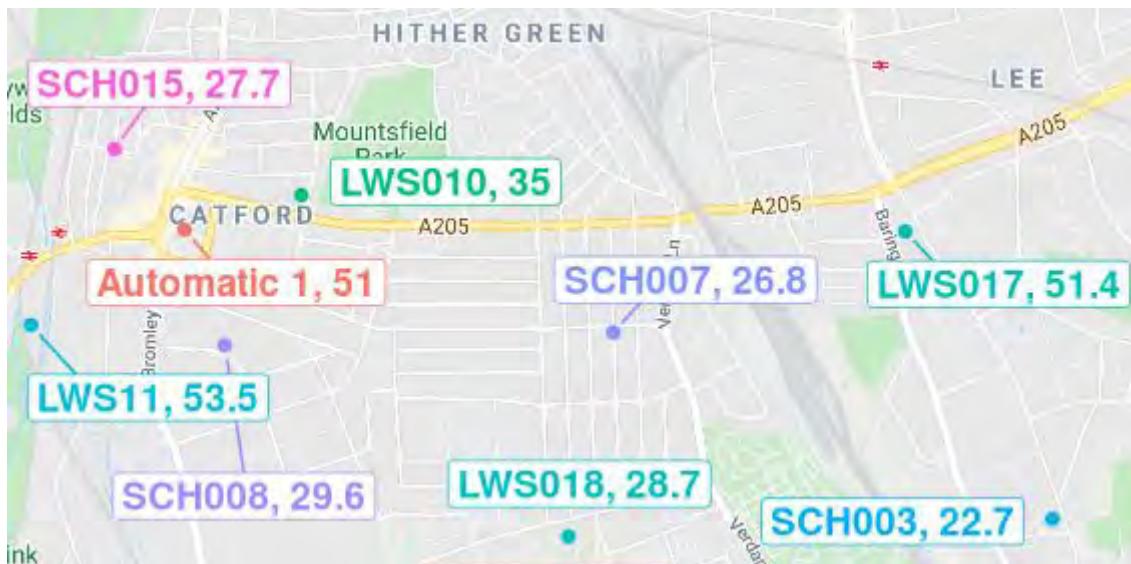


Figure 1 - Diffusion tube NO₂ measurements and Catford automatic station NO₂ measurement for 2011. Ella's school is SCH015, and the road she walked along is the A205.

Ella's school has a diffusion tube assigned to it called SCH015 seen in the figure and in 2011 had a value of 27.7 µg/m³. The automatic monitor at Catford had an annual average of 51 µg/m³ in 2011 and had no exceedances of the 200 µg/m³ objective in 2011.

Although no measurement was made, it seems unlikely that the objective for NO₂ of 40 µg/m³ was exceeded in 2011 directly outside of Ella's home. Therefore her exposure mainly came from being outside her house in the local area, not all of which exceeds national objectives for annual NO₂. For example, the school receptor had an annual mean of 27.7 µg/m³.

It has been established as a medical cause of death, that Ella's exposure to air pollution was a direct material influence.

4. A dangerous place for a new primary school

Now compare the map shown in the last section, with that of the predictions of NO₂ for the proposed development in Goodmanes in 2026 (as set out in Aether's V5 AQA [4] which is the document that Ricardo's comments pertain). These are plotted in Figure 2.

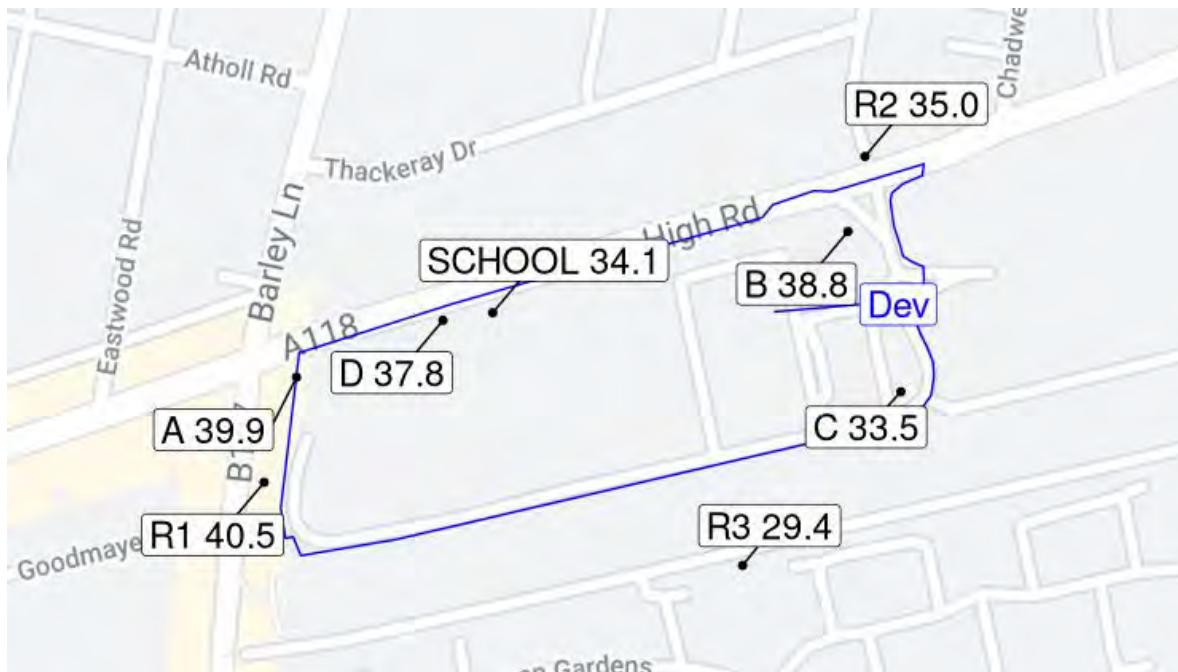


Figure 2 - Developer NO₂ predictions for 2026 (With Development) scenario. Values shown are in $\mu\text{g}/\text{m}^3$.

We can see that air pollution at the school was predicted in Aether's AQA V5 [4] to be higher than that around Ella's school shown in the last section. Bearing in mind that the SCHOOL receptor above is on the upper ground floor.

We can see many points with high values close to the objective limit, and location R1 above the objective limit.

The overall picture is one of a school surrounded by areas where NO₂ pollution is high.

Any child walking to this school from the surrounding residential area is for certain going to be exposed to damaging levels of air pollution.

Thus, it is not *“misleading to say that the development would “introduce a fresh cohort of children to damaging levels of air pollution.”* as Ricardo claims.

Rather, it is absolutely reasonable to claim, on the evidence of Aether's AQA V5 [4] and contemporary medical evidence on the harms of air pollution that the school will introduce a fresh cohort of children to damaging levels of air pollution.

Note that we are not using Ella's death as the main argument for this. Her tragedy serves to illustrate that air pollution is not just damaging to children, but can be fatally so. It also serves to illustrate that exposure outside the home is a major contributing factor.

As we have already discussed there is plenty of medical evidence showing the harms of NO₂ below objective limits.

It would require an extraordinary level of ignorance of the scientific body to make an argument to the contrary.

5. References

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From: .Box.SiteVisits [REDACTED]
Sent: 27 November 2019 11:21
To: Planning Consultations
Subject: Your Ref: 4309/19 (JP) Our Ref: NL_GE4A_3NWP_021143

Planning,

Should you be minded to approve this application please can the following notes be included an informative note for the Applicant

****PLEASE NOTE – the below information is related to Low and Medium Pressure Assets. You may be contacted separately by our engineers regarding High/Intermediate Pressure Pipelines.*****

Considerations in relation to gas pipeline/s identified on site:

Cadent have identified operational gas apparatus within the application site boundary. This may include a legal interest (easements or wayleaves) in the land which restricts activity in proximity to Cadent assets in private land. The Applicant must ensure that proposed works do not infringe on Cadent's legal rights and any details of such restrictions should be obtained from the landowner in the first instance.

If buildings or structures are proposed directly above the gas apparatus then development should only take place following a diversion of this apparatus. The Applicant should contact Cadent's Plant Protection Team at the earliest opportunity to discuss proposed diversions of apparatus to avoid any unnecessary delays.

If any construction traffic is likely to cross a Cadent pipeline then the Applicant must contact Cadent's Plant Protection Team to see if any protection measures are required.

All developers are required to contact Cadent's Plant Protection Team for approval before carrying out any works on site and ensuring requirements are adhered to.

Email: plantprotection@cadentgas.com Tel: 0800 688 588

Kind regards

Plant Protection

Cadent Gas Ltd

Block 1, Floor 1, Brick Kiln Street, Hinckley LE10 0NA

T 0800 688 588

plantprotection@cadentgas.com

cadentgas.com

Self Service for Plant Enquiries:

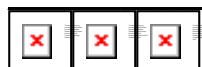
www.beforeyoudig.nationalgrid.com

 please consider the environment - do you really need to print this email?

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Please ensure you have adequate virus protection before you open or detach any documents from this transmission. Cadent Gas Limited does not accept any liability for viruses. An e-mail reply to this address may be subject to monitoring for operational reasons or lawful business practices.

Cadent Gas Limited is a limited liability company, registered in England and Wales (registered no. 10080864) with its registered office at Ashbrook Court, Prologis Park, Central Boulevard, Coventry CV7 8PE.



Plant Protection
Cadent
Block 1; Floor 1
Brick Kiln Street
Hinckley
LE10 0NA
E-mail: plantprotection@cadentgas.com
Telephone: +44 (0)800 688588

London Borough of Redbridge

National Gas Emergency Number:
0800 111 999*

National Grid Electricity Emergency Number:
0800 40 40 90*

* Available 24 hours, 7 days/week.
Calls may be recorded and monitored.

www.cadentgas.com

Date: 13/07/2020

Our Ref: NL_GE4A_3NWP_024633

Your Ref: 4309/19 IP

RE: Formal Planning Application, RM6 4HY Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford

Thank you for your enquiry which was received on 13/07/2020.

Please note this response and any attached map(s) are valid for 28 days.

An assessment has been carried out with respect to Cadent Gas Limited, National Grid Electricity Transmission plc's and National Grid Gas Transmission plc's apparatus. Please note it does not cover the items listed in the section "Your Responsibilities and Obligations", including gas service pipes and related apparatus.

For details of Network areas please see the Cadent website (<http://cadentgas.com/Digging-safely/Dial-before-you-dig>) or the enclosed documentation.

Are My Works Affected?

Searches based on your enquiry have identified that there is apparatus in the vicinity of your enquiry which may be affected by the activities specified.

Can you please inform Plant Protection, as soon as possible, the decision your authority is likely to make regarding this application.

If the application is refused for any other reason than the presence of apparatus, we will not take any further action.

Please let us know whether Plant Protection can provide you with technical or other information that may be of assistance to you in the determination of the application.

Due to the presence of Cadent and/or National Grid apparatus in proximity to the specified area, the contractor should contact Plant Protection before any works are carried out to ensure the apparatus is not affected by any of the proposed works.

Your Responsibilities and Obligations

The "Assessment" Section below outlines the detailed requirements that must be followed when planning or undertaking your scheduled activities at this location.

It is your responsibility to ensure that the information you have submitted is accurate and that all relevant documents including links are provided to all persons (either direct labour or contractors) working for you near Cadent and/or National Grid's apparatus, e.g. as contained within the Construction (Design and Management) Regulations.

This assessment solely relates to Cadent Gas Limited, National Grid Electricity Transmission plc (NGET) and National Grid Gas Transmission plc (NGGT) and apparatus. This assessment does **NOT** include:

- | Cadent and/or National Grid's legal interest (easements or wayleaves) in the land which restricts activity in proximity to Cadent and/or National Grid's assets in private land. You must obtain details of any such restrictions from the landowner in the first instance and if in doubt contact Plant Protection.
- | Gas service pipes and related apparatus
- | Recently installed apparatus
- | Apparatus owned by other organisations, e.g. other gas distribution operators, local electricity companies, other utilities, etc.

It is **YOUR** responsibility to take into account whether the items listed above may be present and if they could be affected by your proposed activities. Further "Essential Guidance" in respect of these items can be found on either the [National Grid](#) or [Cadent](#) website.

This communication does not constitute any formal agreement or consent for any proposed development work; either generally or with regard to Cadent and/or National Grid's easements or wayleaves nor any planning or building regulations applications.

Cadent Gas Limited, NGGT and NGET or their agents, servants or contractors do not accept any liability for any losses arising under or in connection with this information. This limit on liability applies to all and any claims in contract, tort (including negligence), misrepresentation (excluding fraudulent misrepresentation), breach of statutory duty or otherwise. This limit on liability does not exclude or restrict liability where prohibited by the law nor does it supersede the express terms of any related agreements.

If you require further assistance please contact the Plant Protection team via e-mail ([click here](#)) or via the contact details at the top of this response.

Yours faithfully

Plant Protection Team

ASSESSMENT

Affected Apparatus

The apparatus that has been identified as being in the vicinity of your proposed works is:

- | Low or Medium pressure (below 2 bar) gas pipes and associated equipment. (As a result it is highly likely that there are gas services and associated apparatus in the vicinity)

Requirements

BEFORE carrying out any work you must:

- | Carefully read these requirements including the attached guidance documents and maps showing the location of apparatus.
- | Contact the landowner and ensure any proposed works in private land do not infringe Cadent and/or National Grid's legal rights (i.e. easements or wayleaves). If the works are in the road or footpath the relevant local authority should be contacted.
- | Ensure that all persons, including direct labour and contractors, working for you on or near Cadent and/or National Grid's apparatus follow the requirements of the HSE Guidance Notes HSG47 - 'Avoiding Danger from Underground Services' and GS6 – 'Avoidance of danger from overhead electric power lines'. This guidance can be downloaded free of charge at <http://www.hse.gov.uk>
- | In line with the above guidance, verify and establish the actual position of mains, pipes, cables, services and other apparatus on site before any activities are undertaken.

GUIDANCE

Excavating Safely - Avoiding injury when working near gas pipes:

http://www.nationalgrid.com/NR/rdonlyres/2D2EEA97-B213-459C-9A26-18361C6E0B0D/25249/Digsafe_leaflet3e2finalamends061207.pdf

Standard Guidance

Essential Guidance document:

<http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=8589934982>

General Guidance document:

<http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=35103>

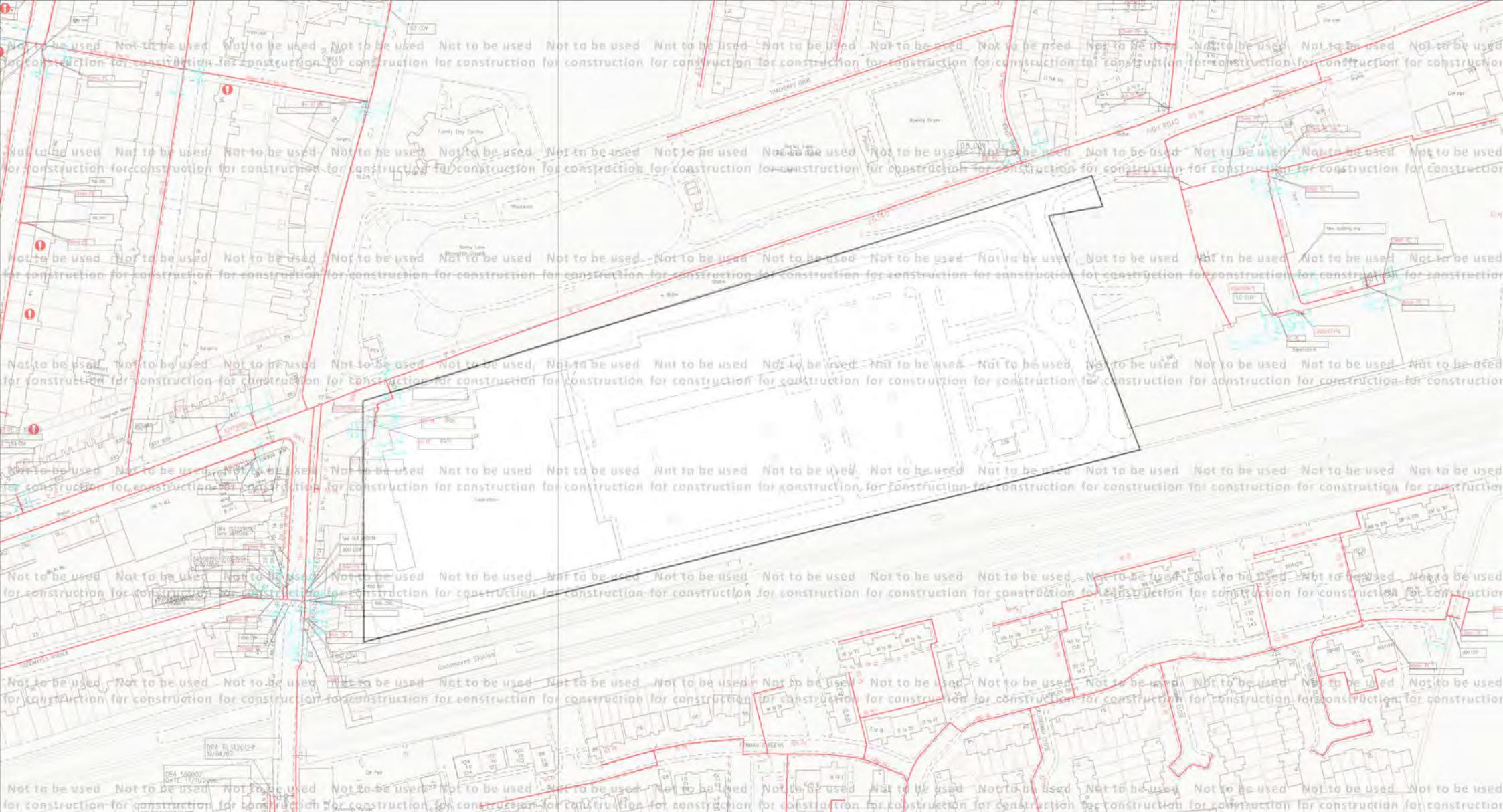
Excavating Safely in the vicinity of gas pipes guidance (Credit card):

<http://www.nationalgrid.com/NR/rdonlyres/A3D37677-6641-476C-9DDA-E89949052829/44257/ExcavatingSafelyCreditCard.pdf>

Excavating Safely in the vicinity of electricity cables guidance (Credit card):

<http://www.nationalgrid.com/NR/rdonlyres/35DDEC6D-D754-4BA5-AF3C-D607D05A25C2/44858/ExcavatingSafelyCreditCardelectricitycables.pdf>

Copies of all the Guidance Documents can also be downloaded from the [National Grid](#) and [Cadent](#) websites.



ID: NL_GE4A_3NWP_024633 View extent: 723m, 393m

USER:

DATE: 13/07/2020

DATA DATE: 12/07/2020

REF: 4309/19 IP

MAP REF: TQ4687

CENTRE: 546593, 187436

0m 50m

Approximate scale 1:2500
on A4 Colour Landscape

Some examples of Plant Items:



Do not proceed without further consultation

This plan shows those pipes owned by Cadent Gas Limited in its role as a Licensed Gas Transporter (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regard to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy thereof cannot be guaranteed. Service pipes, valves, siphons, stub connections, etc., are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Cadent Gas Limited or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with HS(G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue.

Map 1 of 1 (GAS)

MAPS Plot Server Version 1.11.0

Cadent

Your Gas Network

Requested by: London Borough of Redbridge

This plan is reproduced from or based on the OS map by Cadent Gas Limited, with the sanction of the controller of HM Stationery Office. Crown Copyright Reserved.

Ordnance Survey Licence number 100024886

ENQUIRY SUMMARY

Received Date

13/07/2020

Your Reference

4309/19 IP

Location

Centre Point: 546593, 187436

X Extent: 374

Y Extent: 225

Postcode: RM6 4HY

Location Description: RM6 4HY Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford

Map Options

Paper Size: A4

Orientation: LANDSCAPE

Requested Scale: 2500

Actual Scale: 1:2500 (GAS)

Real World Extents: 723m x 393m (GAS)

Recipients

pprsteam@cadentgas.com

Enquirer Details

Organisation Name: London Borough of Redbridge

Description of Works

P/A Demolition of all existing buildings including petrol filling station. Redevelopment of the site to provide a replacement food retail store (use class A1), a series of apartment blocks ranging between 4 and 23 storeys in height to provide 1,280 residential units (use class C3), flexible use floor space for commercial/community uses (within use classes A1/A2/A3/B1/D1), a 3-form entry primary school (use class D1), public open space, car and cycle parking, associated landscaping and infrastructure works, and provision of pedestrian and vehicular access. (Summary). This application is accompanied by an Environmental Statement. W/L

Enquiry Type

Formal Planning Application

Development Types

Development Type: Development for use by General Public

London Borough of Redbridge
Development Management
Planning and Building Control
Lynton House
255-259 High Road
Ilford
London

National Gas Emergency Number:
0800 111 999*

National Grid Electricity Emergency Number:
0800 40 40 90*

* Available 24 hours, 7 days/week.
Calls may be recorded and monitored.

www.cadentgas.com

Date: 26/11/2019

Our Ref: NL_GE4A_3NWP_021143

Your Ref: 4309/19 (JP)

RE: Formal Planning Application, RM6 4HY, Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford

Thank you for your enquiry which was received on 19/11/2019.

Please note this response and any attached map(s) are valid for 28 days.

An assessment has been carried out with respect to Cadent Gas Limited, National Grid Electricity Transmission plc's and National Grid Gas Transmission plc's apparatus. Please note it does not cover the items listed in the section "Your Responsibilities and Obligations", including gas service pipes and related apparatus.

For details of Network areas please see the Cadent website (<http://cadentgas.com/Digging-safely/Dial-before-you-dig>) or the enclosed documentation.

Are My Works Affected?

Searches based on your enquiry have identified that there is apparatus in the vicinity of your enquiry which may be affected by the activities specified.

Can you please inform Plant Protection, as soon as possible, the decision your authority is likely to make regarding this application.

If the application is refused for any other reason than the presence of apparatus, we will not take any further action.

Please let us know whether Plant Protection can provide you with technical or other information that may be of assistance to you in the determination of the application.

Due to the presence of Cadent and/or National Grid apparatus in proximity to the specified area, the contractor should contact Plant Protection before any works are carried out to ensure the apparatus is not affected by any of the proposed works.

Your Responsibilities and Obligations

The "Assessment" Section below outlines the detailed requirements that must be followed when planning or undertaking your scheduled activities at this location.

It is your responsibility to ensure that the information you have submitted is accurate and that all relevant documents including links are provided to all persons (either direct labour or contractors) working for you near Cadent and/or National Grid's apparatus, e.g. as contained within the Construction (Design and Management) Regulations.

This assessment solely relates to Cadent Gas Limited, National Grid Electricity Transmission plc (NGET) and National Grid Gas Transmission plc (NGGT) and apparatus. This assessment does **NOT** include:

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- | Recently installed apparatus
- | Apparatus owned by other organisations, e.g. other gas distribution operators, local electricity companies, other utilities, etc.

It is **YOUR** responsibility to take into account whether the items listed above may be present and if they could be affected by your proposed activities. Further "Essential Guidance" in respect of these items can be found on either the [National Grid](#) or [Cadent](#) website.

This communication does not constitute any formal agreement or consent for any proposed development work; either generally or with regard to Cadent and/or National Grid's easements or wayleaves nor any planning or building regulations applications.

Cadent Gas Limited, NGGT and NGET or their agents, servants or contractors do not accept any liability for any losses arising under or in connection with this information. This limit on liability applies to all and any claims in contract, tort (including negligence), misrepresentation (excluding fraudulent misrepresentation), breach of statutory duty or otherwise. This limit on liability does not exclude or restrict liability where prohibited by the law nor does it supersede the express terms of any related agreements.

If you require further assistance please contact the Plant Protection team via e-mail ([click here](#)) or via the contact details at the top of this response.

Yours faithfully

Plant Protection Team

ASSESSMENT

Affected Apparatus

The apparatus that has been identified as being in the vicinity of your proposed works is:

- | Low or Medium pressure (below 2 bar) gas pipes and associated equipment. (As a result it is highly likely that there are gas services and associated apparatus in the vicinity)

Requirements

BEFORE carrying out any work you must:

- | Carefully read these requirements including the attached guidance documents and maps showing the location of apparatus.
- | Contact the landowner and ensure any proposed works in private land do not infringe Cadent and/or National Grid's legal rights (i.e. easements or wayleaves). If the works are in the road or footpath the relevant local authority should be contacted.
- | Ensure that all persons, including direct labour and contractors, working for you on or near Cadent and/or National Grid's apparatus follow the requirements of the HSE Guidance Notes HSG47 - 'Avoiding Danger from Underground Services' and GS6 – 'Avoidance of danger from overhead electric power lines'. This guidance can be downloaded free of charge at <http://www.hse.gov.uk>
- | In line with the above guidance, verify and establish the actual position of mains, pipes, cables, services and other apparatus on site before any activities are undertaken.

GUIDANCE

Excavating Safely - Avoiding injury when working near gas pipes:

http://www.nationalgrid.com/NR/rdonlyres/2D2EEA97-B213-459C-9A26-18361C6E0B0D/25249/Digsafe_leaflet3e2finalamends061207.pdf

Standard Guidance

Essential Guidance document:

<http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=8589934982>

General Guidance document:

<http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=35103>

Excavating Safely in the vicinity of gas pipes guidance (Credit card):

<http://www.nationalgrid.com/NR/rdonlyres/A3D37677-6641-476C-9DDA-E89949052829/44257/ExcavatingSafelyCreditCard.pdf>

Excavating Safely in the vicinity of electricity cables guidance (Credit card):

<http://www.nationalgrid.com/NR/rdonlyres/35DDEC6D-D754-4BA5-AF3C-D607D05A25C2/44858/ExcavatingSafelyCreditCardelectricitycables.pdf>

Copies of all the Guidance Documents can also be downloaded from the [National Grid](#) and [Cadent](#) websites.

ENQUIRY SUMMARY

Received Date

19/11/2019

Your Reference

4309/19 (JP)

Location

Centre Point: 546583, 187440

X Extent: 366

Y Extent: 228

Postcode: RM6 4HY

Location Description: RM6 4HY, Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford

Map Options

Paper Size: A4

Orientation: LANDSCAPE

Requested Scale: 2500

Actual Scale: 1:2500 (GAS)

Real World Extents: 723m x 393m (GAS)

Recipients

pprsteam@cadentgas.com

Enquirer Details

Organisation Name: London Borough of Redbridge

Contact Name: [REDACTED]

Email Address: Planning.Consultations@Redbridge.gov.uk

Telephone: 0208 708 4708

Address: Development Management , Planning and Building Control , Lynton House, 255-259 High Road, Ilford, London, IG1 1NY

Description of Works

P/A Demolition of all existing buildings including petrol filling station. Redevelopment of the site to provide a replacement food retail store (use class A1), a series of apartment blocks ranging between 4 and 23 storeys in height to provide 1,280 residential units (use class C3), flexible use floorspace for commercial/community uses (within use classes A1/A2/A3/B1/D1), a 3-form entry primary school (use class D1), public open space, car and cycle parking, associated landscaping and infrastructure works, and provision of pedestrian and vehicular access. (Summary). This application is accompanied by an Environmental Statement. Email

Enquiry Type

Formal Planning Application

Development Types

Development Type: Development for use by General Public

DOCUMENT TRANSMITTAL

Job Title:	822 High Road, Goodmayes																		
Job No:	2822				26	16	10	12	27	01	04	11	14	17	25	29	13	14	21
APA File Ref:	2822-TR-01				06	08	09	09	09	10	10	10	10	10	10	10	11	11	1
Sheet No:	I	Page No:	I		19	19	19	19	19	19	19	19	19	19	19	19	19	20	20
Drawing Title		Paper Number	Size	Scale															
Landscape Strategy for planning	2822-RE-01	A3	NTS		J	K	L	M	N	O	P	Q	R	S					
Landscape Strategy Version A	2822-RE-05	A3	NTS															*	A
Barley Lane Park Vision	2822-RE-02	A3	NTS					A										B	C
Public realm section for DAS (internal use by architect only)	2822-RE-03	A3	NTS							A									
Landscape response for DRp no.3	2822-RE-04	A3	NTS															A	B
Landscape Key plan	2822-LA-00	A1	NTS																
Graphic Landscape Masterplan	2822-LP-01	A1	1:500			A					C	D	E	E				F	F
Landscape GA Plan overall	2822-LA-01	A1	1:500	*		*		A	B				C	D	E				
Surface finishes Layout GF 1	2822-LA-02	A1	1:250	*		*				A	B		C	C	D				
Surface finishes Layout GF 2	2822-LA-03	A1	1:250	*		*				A	B		C	D					
Surface finishes Layout Podium Block A	2822-LA-04	A1	1:250	*		*				A	B		C	C					
Surface finishes Layout Podium Block B & C	2822-LA-05	A1	1:200	*		*				A	B		C	D					
Surface finishes Layout Podium Block D	2822-LA-06	A2	1:100	*		*				A	B		C	C					
Surface finishes Layout Roofs block A1/A2	2822-LA-07	A3	1:100	*		*				A	B		C	D					
Surface finishes Layout Roofs block A2/A3	2822-LA-08	A3	1:100	*		*				A	B		C	C					
Surface finishes Layout Roofs block A3/A4	2822-LA-09	A3	1:100	*		*				A	B		C	C					
Surface finishes Layout Roofs block B1/B2	2822-LA-10	A1	1:100	*		*				A	B		C	C					
Surface finishes Layout Roofs block B3/B4	2822-LA-11	A2	1:100	*		*				A	B		C	D					
Surface finishes Layout Roofs block C1/C2	2822-LA-12	A2	1:100	*		*				A	B		C	D					
Surface finishes Layout Roofs block C3/C4	2822-LA-13	A3	1:100	*		*				A	B		C	C					
Surface finishes Layout Roofs block C3/B4	2822-LA-14	A3	1:100	*		*				A	B		C	C					
Surface finishes Layout Roofs block D1/D2	2822-LA-15	A3	1:100	*		*				A	B		C	D					
surface finishes Layout Roofs block e4	2822-LA-16	A3	1:100							A									
Landscape composite plan	2822-LA-17	A1	1:500				*			A	B		C	D					
Surface finishes Layout Roofs block C3	2822-LA-18	A3	1:100							B			C	D					
Surface finishes Layout Roofs block D1	2822-LA-19	A3	1:100							B			C	C					
Surface finishes Layout Roofs block B3/A4	2822-LA-20	A3	1:100							*			*	A					
Surface finishes Layout Roofs block D2	2822-LA-21	A3	1:100							B			C	D					
Landscape GA Plan Ground Barley Lane Park	2822-BLP-LA-01	A1	1:500							A									
Landscape GA Plan Ground School	2822-SCH-LA-01	A1	1:200																
Landscape GA Plan Level 1 School	2822-SCH-LA-02	A3	1:200																
Landscape GA Plan Level 2 School	2822-SCH-LA-03	A3	1:100																
Landscape CAD plan - Ground Floor	2822-LA-01-03	E	TRANS																
Landscape CAD plan - Podiums	2822-LA-04-06	E	TRANS																
Landscape CAD plan - Roofs	2822-LA-07	E	TRANS																
Landscape Sections - School Sketch Elevation	2822-DT-02	A1											*						
Landscape Section - Plaza Sketch elevation	2822-DT-03	A1											*						
Planting Plan Ground Floor Sheet 1	2822-PP-01	A1	1:250										*		A	B			
Planting Plan Ground Floor Sheet 2	2822-PP-02	A1	1:250										*		A	A			
Planting Plan Ground Floor Sheet 3	2822-PP-03	A1	1:250										*		A	A			
Planting Plan Block A Podium	2822-PP-04	A1	1:200										*						
Planting Plan Block A-B Podium	2822-PP-05	A1	1:200										*						
Planting Plan Block D Podium	2822-PP-06	A1	1:100										*						
Planting Plan - Roof Sheet 1	2822-PP-07	A1	1:250										*		A				
Planting Plan - Roof Sheet 2	2822-PP-08	A1	1:250										*		A				
Planting Schedule	2822-PS-01	A4	NTS										*		A	A			
Play Calculation Layout	2822-SK-11	A1	1:500																
Play Calculation Layout	2822-SK-12	A1	1:500																
Play Calculation Layout	2822-SK-13	A1	1:500																
Play Calculation Layout West	2822-SK-14	A1	1:250										*		A	A	B		
Play Calculation Layout East	2822-SK-15	A1	1:250										*		A	B	C		
Planning documents for Client Comment																			
FINAL PLANNING SUBMISSION DOCUMENTS																			
POST SUBMISSION VERSION A SUBMISSION																			

Distribution

P=Paper; D=Dyeline; T=Tracing;
E=Email/Electronic; C=Colour

I = Information, T = Tender, C =

I = Information, T = Tender, C = Construction, P = Planning

P = Planning

Location: Development Site at Tesco Extra 822 High Road, Chadwell Heath, Romford

Domestic Waste

Calculations show that the minimum amount of 1100 Litre Eurobins required to contain household waste for 1,280 residential units would be 231 in number with 38 X 1100 Litre Eurobins for Recycling which are split into 16 pairs of bins (1 for paper and card and the other for mixed recycling). Please see below for breakdown.

Please note the refuse vehicle dimensions below and the required width and Height clearance for the RV to access the site for collections.

Block A – 382 Flats

Calculations show that the minimum amount of 1100 Litre Eurobins required to contain household waste for 382 Apartments/Flats would be 69 in number, recycling for this block would require 10 X 1100 Litre Eurobins and would be in addition to the refuse containers.

Block B – 354 Flats

Calculations show that the minimum amount of 1100 Litre Eurobins required to contain household waste for 354 Apartments/Flats would be 64 in number, recycling for this block would require 10 X 1100 Litre Eurobins and would be in addition to the refuse containers.

Block C1 – 41 Flats

Calculations show that the minimum amount of 1100 Litre Eurobins required to contain household waste for 41 Apartments/Flats would be 7 in number, recycling for this block would require 2 X 1100 Litre Eurobins and would be in addition to the refuse containers.

Block C2 – 39 Flats

Calculations show that the minimum amount of 1100 Litre Eurobins required to contain household waste for 39 Apartments/Flats would be 7 in number, recycling for this block would require 2 X 1100 Litre Eurobins and would be in addition to the refuse containers.

Block C3 – 79 Flats

Calculations show that the minimum amount of 1100 Litre Eurobins required to contain household waste for 79 Apartments/Flats would be 14 in number, recycling for this block would require 2 X 1100 Litre Eurobins and would be in addition to the refuse containers.

Block C4 – 137 Flats

Calculations show that the minimum amount of 1100 Litre Eurobins required to contain household waste for 137 Apartments/Flats would be 25 in number, recycling for this block would require 4 X 1100 Litre Eurobins and would be in addition to the refuse containers.

Block D1 – 100 Flats

Calculations show that the minimum amount of 1100 Litre Eurobins required to contain household waste for 100 Apartments/Flats would be 18 in number, recycling for this block would require 4 X 1100 Litre Eurobins and would be in addition to the refuse containers.

Block D2 – 148 Flats

Calculations show that the minimum amount of 1100 Litre Eurobins required to contain household waste for 148 Apartments/Flats would be 27 in number, recycling for this block would require 4 X 1100 Litre Eurobins and would be in addition to the refuse containers.

Refuse containers would need to be provided by the agent/developer of the site. The use of any area of land for storing waste containers assumes that you have permission/right to do so and from the waste management point of view, any comments on how the waste may be handled assumes that such permission/right exists.

Container sizes are listed below

Further consideration should also be given for the accommodation of additional bins in case of an increase in the volume of refuse and recycling. This will also provide extra capacity for storage of bulky items awaiting collection.

The London Borough of Redbridge refuse collection service currently uses Steel Refuse containers/Eurobins for waste collections. All containers are required to be compatible with the bin lifting mechanism of the Councils Refuse fleet. All Refuse containers would need to be provided by the builder/managing agent and be to the authorities current specification. If plastic Eurobins are provided for refuse collections, the Authority will not be held responsible for damage to any such containers.

Commercial Waste

The business and school at the proposed site are required to have all commercial waste produced at their premises removed by a registered waste carrier. This is a paid for service and they would need to enter in to a contract with the disposal company.

If the proposed business and school are to dispose of food waste or are to be A3/A5 use. I recommend that all waste be contained within a commercial container (360/660/1100 Litre Eurobin, dependant on the amount of waste produced weekly). This container is required to be sited within the boundary of the property and not on the public highway or in any other public place.

Paths from bins stores should be constructed to a smooth finish and level unless the gradient falls away from the bin chamber, if so this should not exceed 1 in 12, Paths and door openings are required to be a minimum width of 1.8m. Dropped kerbs are to be provided as required.

Distance to pull bins to the Refuse Vehicle that is parked within the boundary of the site should not exceed 25 metres and should be as near as possible to where the vehicle is parked. If the collection vehicle is to stop on the highway for collections then the number of bins should not exceed 2 in number and the distance to pull bins should not exceed 10 metres.

Turning circles to accommodate a RCV with a turning circle of 17 Meters or a hammer head of 6 Meters will need to be provided in some cases to ensure that refuse vehicles can drive in & out of the site.

Sizes of 1100 Euros in mm's;

Height	1380	Height with lid fully open just over 2.3 metres
Width	1270	
Depth	1000	

Sizes of Refuse Vehicles, maximum dimensions;

Height	4.00 metres	Turning circle 16.5 metres
Length	10.01 metres	
Width	2.86 metres	

The weight of a laden refuse vehicle of the type used is 27 tonnes. Covers over manholes, gully gratings and the like shall, in private roads which the refuse vehicle is required to use, be of the heavy duty highway type. The Council shall not be held responsible for any damage to access ways, road surfaces, parking areas, footways, kerbs etc. resulting from the weight or size of the waste collection vehicles. Any arch, under which the refuse vehicle must pass must allow a minimum 4 metres clearance from high point of camber or cross fall.

The Councils Refuse Dept will need to be informed in advance of the development being completed to ensure that refuse collections can be commenced when the estate becomes occupied. This will also ensure the correct sighting of containers for refuse and recycling collection. Please contact The Cleansing Teams at Ley Street Depot, Ley Street, Ilford, Essex IG2 7QZ for the relevant officer.

g/admin/Comm Waste/New Planning Document 2011.doc

DRAFT DECISION

TOWN AND COUNTRY PLANNING ACT 1990

Major Application (EIA)

Application Number

4309/19

Location of development

Development Site At Tesco Extra 822 High Road,High Road,Chadwell Heath,Romford

Description of Development

Demolition of all existing buildings including petrol filling station. Redevelopment of the site to provide a replacement food retail store (use class A1,now superseded by use class E),a series of apartment blocks ranging between 4 and 23 storeys in height to provide 1,280 residential units (use class C3),flexible use floorspace for commercial/community uses (within use classes A1/A2/A3/B1/D1,all now superseded by use classes F1, F.2 and E),a 3-form entry primary school (use class D1,now superseded by use class F.1),public open space,car and cycle parking,associated landscaping and infrastructure works, and provision of pedestrian and vehicular access. (Summary). This application is accompanied by an Environmental Statement. (Amended plans and documents.)

The National Planning Policy Framework 2021 and the following Redbridge Local Plan and Mayor of London Policies were used in the consideration of this application: LP1 (Spatial Development Strategy),LP10 (Managing Town Centres and Retail Uses),LP12 (Night-Time Economy),LP14 (Stimulating Business and the Local Economy),LP15 (Managed Workspace),LP16 (Skills and Training),LP17 (Delivering Community Infrastructure),LP18 (Health and Well-Being),LP19 (Climate Change Mitigation),LP1B (Crossrail Corridor Investment and Growth Area),LP20 (Low Carbon and Renewable Energy),LP21 (Water and Flooding),LP22 (Promoting Sustainable Transport),LP23 (Cycle and Car Parking),LP24 (Pollution),LP26 (Promoting High Quality Design),LP27 (Tall Buildings),LP29 (Amenity and Internal Space Standards),LP3 (Affordable Housing),LP32 (Sustainable Design and Construction),LP33 (Heritage),LP35 (Protecting and Enhancing Open Spaces),LP37 (Green Infrastructure and Blue Ribbon Network),LP38 (Protecting Trees and Enhancing the Landscape),LP39 (Nature Conservation and Biodiversity),LP41 (Delivery and Monitoring),LP5 (Dwelling Mix),LP9 (Ensuring the Future Vitality and Viability of Town Centres);

GG1 (Building strong and inclusive communities), GG2 (Making the best use of land), GG3 (Creating a healthy city), GG4 (Delivering the homes Londoners need), GG5 (Growing a good economy), GG6 (Increasing efficiency and resilience), SD1 (London's form, character and capacity for growth), D2 (Infrastructure requirements for sustainable densities), D3 (Optimising site capacity through the design-led approach), D4 (Delivering good design), D5 (Inclusive design), D6 (Housing quality and standards), D7 (Accessible housing), D8 (Public Realm), D9 (Tall buildings), D11 (Safety, security and resilience to emergency), D12 (Fire safety), D14 (Noise) H1 (Increasing housing supply), H4 (Delivering affordable housing), H5 (Threshold approach to applications), H6 (Affordable housing tenure), H7 (Monitoring of affordable housing), H10 (Housing size mix), S1 (Developing London's social infrastructure), S3 (Education and childcare facilities), S4 (Play and Informal Recreation), E3 (Affordable workspace), E9 (Retail, markets and hot food takeaways), E11 (Skills and opportunities for all), HC1 (Heritage conservation and growth), HC3 (Strategic and designated views), G1 (Green infrastructure), G5 (Urban Greening) , G6 (Biodiversity and access to nature), G7 (Trees and woodlands), SI 1 (Improving air quality), SI 2 (Minimising greenhouse gas emissions), SI 3 (Energy Infrastructure),

SI 4 (Managing heat risk), SI 5 (Water Infrastructure), SI 7 (Waste capacity and supporting the circular economy), SI 12 (Flood risk management), SI 13 (Sustainable drainage), T1 (Strategic approach to transport), T2 (Healthy Streets), T3 (Transport capacity), T4 (Assessing and mitigating transport impacts), T5 (Cycling), T6 (Car parking), T6.1 (Residential parking), T6.3 (retail parking), T6.5 (Non-residential disabled persons parking), T7 (Deliveries, servicing and construction), DF1 (Delivery of the Plan and planning obligations).

Decision

In pursuance of the powers exercised by them as Local Planning Authority the Council of the London Borough of Redbridge having considered your application, do hereby give notice of their decision to

1. **(Time limit for Full Permission):** The development hereby permitted shall be begun not later 3 years from the date of this permission.

Reason: In order to comply with the requirements of Section 91 of the Town and Country Planning Act 1990.

2. **(Strictly in accordance with approved plans):** The development hereby permitted shall be carried out in accordance with the following plans and documents:

Existing

P001 dated 14.11.09; P002 dated 14.11.09; and P003 dated 14.11.09.

Proposed

Site

P010 dated 14.08.09.

Plans

P100 dated 14.08.09; P102 dated 14.08.09; P103 dated 14.08.09; P104 dated 14.08.09; P105 dated 14.08.09; P106 dated 14.08.09; P107 dated 14.08.09; P108 dated 14.08.09; P109 dated 14.08.09; P110 dated 14.08.09; P111 dated 14.08.09; P113 dated 14.08.09; P114 dated 14.08.09; P115 dated 14.08.09; P116 dated 14.08.09; P117 dated 14.08.09; P118 dated 14.08.09; P150 Rev. A dated 14.08.09; P152 dated 14.08.09; P153 dated 14.08.09; P154 dated 14.08.09; P155 dated 14.08.09; P156 dated 14.08.09; P157 dated 14.08.09; P158 dated 14.08.09; P159 dated 14.08.09; P160 dated 14.08.09; P161 dated 14.08.09; P162 dated 14.08.09; P163 dated 14.08.09; P164 dated 14.08.09; P165 dated 14.08.09; P166 dated 14.08.09; P167 dated 14.08.09; P168 dated 14.08.09; P169 dated 14.08.09; P170 dated 14.08.09; P171 dated 14.08.09; P172 dated 14.08.09; P173 dated 14.08.09; P174 dated 14.08.09;

Site/street Elevations

P201 dated 14.08.09; & P202 dated 14.08.09

Elevations

P210 dated 14.08.09; P211 dated 14.08.09; P212 dated 14.08.09; P213 dated 14.08.09; P214 dated 14.08.09; P215 dated 14.08.09; P216 dated 14.08.09; P217 dated 14.08.09; P218 dated 14.08.09; P219 dated 14.08.09; P220 dated 14.08.09; P221 dated 14.08.09; P222 dated 14.08.09; P223 dated 14.08.09; P224 dated 14.08.09; P224 dated 14.08.09; P226 dated 14.08.09; P227 dated 14.08.09; P228 dated 14.08.09; P229 dated 14.08.09; P230 dated 14.08.09; P231 dated 14.08.09; Proposed Surface Water Drainage Strategy SK03-F dated 02.07.19; & Indicative Foul Water SK05.

Documents

Planning Statement dated October 2019; Planning Supporting Statement dated August 2020; Affordable Housing Statement Rev. A dated August 2020; Design and Access Statement, with Tall Building Assessment dated October 2019; Design and Access Statement - Addendum dated August 2020; Environmental Statement dated 10/2019 (including Non-Technical Summary, Technical Appendices A, B, C, D, E, F, G,

H, & I); Terence O'Rourke Environmental Statement Addendum dated August 2020 (including Annex 1:Replacement chapter 4: air quality; Annex 2: Replacement chapter 7: ground conditions and water environment; Annex 3: Replacement chapter 10: traffic and transport; Technical appendix C1: Replacement air quality assessment; Technical appendix E1: Replacement ground conditions and water environmental report; Technical appendix H: Supplementary traffic and transport documents); Allen Pyke Associates Landscape Strategy Version A Submission 2822-RE-05 Rev D dated August 2020; Landscape Masterplan 2822-LP-01 Rev. F dated 30.07.20; Hayden's Arboricultural Consultants Tree Survey, Arboricultural Impact Assessment, Arboricultural Method Statement & Tree Protection Plan Project no. 7200 Rev. A dated 02/10/2019; Vanguardia Lighting Report VC-102939-LI-RP-0002 dated 23 October 2019; Cushman & Wakefield Pre-application Scoping Note for Retail Impact Assessment dated June 2019; Point 2 Surveyors Daylight & Sunlight Assessment P1996 V2 dated August 2020; EAS Foul Water Drainage Strategy dated October 2019; EAS/Weston Homes Flood Risk Assessment and Drainage Strategy Rev. A dated August 2020; MLM Group (Part of Sweco) Utility Services Report ref. 7152178-MLM-ZZ-XX-RP-U-0001 Rev. I dated 26.09.19; Meinhardt Health Impact Assessment Issue V.4 dated 4 September 2020; Newington Statement of Community Involvement dated October 2019; West Group Waste and Management Servicing Strategy Rev. A dated August 2020; Meinhardt Energy Assessment and Sustainability Strategy (Amended Scheme Planning Issues) – Issue P4 dated 16 February 2021; Ecology Solutions Ecological Assessment 8058.EcoAS.vf3 dated August 2020; Architectural Aerodynamics (ARCAERO) Wind and Microclimate Assessment 0730058rep2v2 dated 13 August 2020; Trium TV and Radio Interference Technical Memo dated 28.20.2019; Draft Residential Travel Plan October 2019; Draft School Travel Plan October 2019; Draft Retail Travel Plan October 2019; Motion Pedestrian Level of Service dated 20 Augustus 2020; Bin Schedule dated 14.08.20; Schedule of Accommodation Rev. A dated 17 December 2020; GIA Schedule AP237 dated 14.08.20; GEA Schedule dated 14.08.20; Bike Schedule dated 14.08.20; Cycle Store and Locations and Calculations Phase 1 & 2; GLA Carbon Emissions Reporting Spreadsheet dated February 2021; & MLM Group (Part of Sweco) Fire Strategy Overview 622230-MLM-ZZ-XX-RP-YF-0001 dated 29 October 2019.

Reason: For the avoidance of doubt and in the interests of proper planning.

3. **(Phasing Plan):** Prior to any part the development hereby permitted commences at the site, a Phasing Plan setting out the delivery of the phases across the whole site shall be submitted to and approved in writing by the local planning authority. The Phasing Plan shall confirm the order and timing of the delivery of each of the Phases.

Reason: To ensure the scheme is delivered as proposed in accordance with Policies D2, D3, and D4 of the London Plan, and Policies LP1B and LP26 of the Local Plan.

PRE-COMMENCEMENT CONDITIONS (of each Relevant Phase)

4. **(Construction Management & Logistics Plan):** Prior to the commencement of the relevant Phase identified on Phasing Plan submitted under condition 3 above a Demolition & Construction Management and Logistics Plan shall be submitted to and approved in writing by the Local Planning Authority. The Plan shall include details of:
 - a) Demolition Plans;
 - b) The location of notice board/s on the site to include details of the site manager, including contact details (phone, facsimile, email, postal address);
 - c) A strategy for the parking of vehicles of site operatives and visitors;
 - d) A strategy for the loading and unloading of plant and materials;

- e) A strategy for the storage of plant and materials used in constructing the development;
- f) Details of the erection and maintenance of security hoarding including decorative displays and facilities for public viewing, where appropriate;
- g) Details of any means of protection of services such as pipes and water mains within the road;
- h) Measures to be adopted to maintain the site in a tidy condition in terms of disposal/storage of rubbish, storage and unloading of building materials and similar construction activities;
- i) Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
- a) Measures to be adopted to ensure that pedestrian access past the site on the public footpaths is safe and not obstructed during construction works;
- b) Location of workers' conveniences (e.g. toilets, showers);
- c) Reasonable measures to be adopted, such as a restriction on the size of construction vehicles and machinery accessing the site, to minimise any potential damage occurring to adjacent streets throughout the construction period;
- d) Location of vehicle and construction machinery access during the period of site works including identification of any works necessary to the public highway necessary to provide a means of access during the construction and/or operation of the development;
- e) Numbers and timing of truck movements throughout the day and the proposed routes broken down by size of trucks;
- f) Vehicle holding areas;
- g) Construction traffic routes;
- h) Procedures including wheel washing for controlling sediment runoff, dust and the removal of soil, debris and demolition and construction materials from public roads or places;
- i) Plan Site layout so that machinery and dust causing activities are located away from receptors, as far as possible;
- j) Site Hoarding - Erect solid screens or barriers around dusty activities or the Site boundary that are at least as high as any stockpiles on site;
- k) Ensure all vehicles switch off engines when stationary – no idling vehicles;
- l) Avoid the use of diesel and petrol-powered generators and use mains electricity or battery powered equipment where practicable;
- m) Ensure an adequate water supply on the Site. Water suppression should be used to damp down dust and other debris that could generate dust, and, where practical, manual or mechanical demolition techniques should be used.
- n) Ensure all loads entering and leaving the Site are covered.
- o) Communication with other high-risk construction sites within 500 m radius of the site
- p) A Construction Dust Management Plan, including details of mitigation measures for dust and emissions during demolition and construction along with a monitoring regime
- q) (including dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections) for the same;
- a) A Demolition and Construction Site Waste Management Plan (SWMP) which includes details of managing demolition and construction waste having regard to the site waste hierarchy (prevention, reuse, recycling, recovery, safe disposal), preferred options for storage and management (placed in segregated skips to be provided, target monitoring, any deviations from waste procedures shall be documented and remedial action carried out by the contracts manager; and

b) An assessment of construction phase piling vibration (to also take account of any partial occupation of the dwellings during the construction).

The development hereby permitted shall only be carried out in accordance with the approved details.

Reason: In order to ensure that the construction of the development is undertaken in a manner which minimises its' effect on the local environment and to comply with Policies LP22, LP24 and LP26 of the Local Plan. The objectives and purposes of this condition are such that it is required to be complied with before commencement of development. As such, those objectives and purposes would not be met if the condition were to be expressed other than as a pre-commencement condition.

5. **(Demolition and Construction Environmental Management Plan):** Prior to the commencement of the relevant Phase identified on the Phasing Plan submitted under condition 3 above a to the commencement of any part of the development hereby approved, including demolition and site clearance, a Construction Environmental Management Plan (DCEMP) shall be submitted to and approved in writing by the Local Planning Authority. The method statement shall include details of the following:

- Works of demolition and construction shall be carried out during normal working hours, i.e. 08:00 to 18:00 hours Monday to Friday, and 08:00 to 13:00 hours on Saturdays, with no noisy working audible at the site boundary being permitted on Sundays or Bank Holidays.

Construction Vehicle Access Strategy to be submitted and agreed by LBR to include:

- a) Likely noise levels to be generated from plant.
- b) Details of any noise screening measures.
- c) Proposals for monitoring noise and procedures to be put in place where agreed noise levels are exceeded.
- d) Where works are likely to lead to vibration impacts on surrounding residential properties, proposals for monitoring vibration and procedures/mitigation to be put in place if agreed vibration levels are exceeded. Note: it is expected that vibration over 1mm/s measured as a peak particle velocity would constitute unreasonable vibration.
- e) The method statement shall make reference to, and comply with, The Mayor of London's supplementary planning guidance (SPG) 'The control of dust and emissions from construction and demolition'.

In particular the applicant shall:

- f) Submit for approval a Construction Dust Management Plan, including details of mitigation measures (with specific reference to the mitigation measures included in Table 4.6 of Chapter 4 of the Environmental Statement submitted with the application) for dust and emissions during demolition and construction along with a monitoring regime for the same;
- g) Submit a for approval Dust Monitoring Programme.
- h) Submit a Detailed Construction Noise Assessment based on, but not limited to, the demolition and construction timetable, sub-phasing within the two main construction phases, and technical specification of plant being used, and include mitigation required.
- i) Equipment and plant used on site shall comply with the requirements for 'Non-Road Mobile Machinery' (NRMM).

- j) Shall clarify the type of piling proposed within the operations chapter of the CEMP.
- k) Shall describe what measures will be put in place to communicate with other high-risk construction sites within 500m radius of the development site.
- l) Include a copy of an asbestos survey.
- m) Include a copy of the Unexploded Ordnance Survey.
- n) Include a copy of the Risk Assessment and Method Statement for the decommissioning of the petrol filling station.
- o) Include a copy of the SWMP
- p) Shall submit details on storage and stockpiling of wastes at the site.

All the above submissions shall have regard to the Mayor's SPG 'The control of dust and emissions from construction and demolition'.

Reference shall be made to:

- BRE four part Pollution Control Guides 'Controlling particles and noise pollution from construction sites'.
- British Standard 5228 Code of practice for noise and vibration control on construction and open sites, Part 1 – Noise and Part 2 – Vibration (as amended, BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014).

Reason: To ensure considerate construction and to protect the amenities of the nearby residents from excessive noise and dust and to comply with Policies LP22, LP24, and LP26 of the Local Plan, and Policy SI 1 of the London Plan and the GLA NRMM LEZ. The objectives and purposes of this condition are such that it is required to be complied with before commencement of development. As such, those objectives and purposes would not be met if the condition were to be expressed other than as a pre-commencement condition.

6. **(CHSEP):** Prior to the commencement of the relevant Phase identified on the Phasing Plan submitted under condition 3 above, a Construction Health and Safety Environmental Management Plan (CHSEMP) shall be submitted to and approved in writing by the Local Planning Authority. The CHSEMP shall be informed by the result of the site investigations and include detailed method statements on:

- a) Dust control;
- b) Stockpile management to control run-off;
- c) Personal Protection Equipment (PPE);
- d) Safe storage of hazardous chemicals;
- e) Spill response;
- f) Procedures for training and equipment.

The CHSEP shall include copies of:

- a) Shall include a copy of an asbestos survey.
- b) Shall include a copy of the Unexploded Ordnance Survey.
- c) A copy of the Risk Assessment and Method Statement for the decommissioning of the petrol filling station.

The CHSEP shall include all mitigation measures identified in the ES, including the Table 12.2 – Secondary Mitigation Measures of Chapter 12 of the ES Addendum submitted with the application

Reason: To ensure the development is undertaken in a way to minimise the risk to the health of on-site workers/staff, residents, visitors to the retail food store, and the public, in accordance with Policy LP24 of the Local Plan.

7. (Land contamination – New Food Retail Store): The following shall be carried out by suitably qualified persons in accordance with Environment Agency: Land Contamination Risk Management (LCRM) guidance and British Standard 10175:2011 + A2:2017 'Investigation of Potentially Contaminated Sites – Code of Practice'.

1. Prior to commencement of the development of the relevant Phase identified on the Phasing Plan submitted under condition 3 above:
 - a) A Preliminary Risk Assessment (PRA) with an outline conceptual site model (CSM) shall be submitted in a report to the LPA for approval. The desk-top study shall include a search by London Fire Brigade with the history and details of the underground storage tanks at the Petrol Filling Station. The Report shall include site reconnaissance and a methodology for proposed intrusive works to characterise the potential risks identified in the PRA.
 - b) A suitable and sufficient site investigation shall be undertaken to evaluate risks to potential contaminant linkages identified in the PRA. A Report detailing the findings from intrusive works and a quantitative risk assessment (RA), with evaluation criteria and any underlying assumptions, shall be produced and submitted to the LPA for approval prior to an Options Appraisal.
 - c) Where unacceptable risks have been confirmed, an Options Appraisal (OA) shall be undertaken. The OA shall include all feasible remediation methods to address the relevant contaminant linkages in the updated Conceptual Site Model; an evaluation of these options and the final remediation method(s) selected to reduce or control the risks associated with the site development shall be given. The OA shall be submitted to the LPA for approval prior to any remediation works being undertaken at the site. The scheme once completed must ensure that the site will not qualify as 'Contaminated Land' under Part 2A of the Environmental Protection Act 1990 in relation to its intended use.
 - d) A verification plan shall provide details of the data that will be collected to demonstrate that the works set out in the remediation strategy in (c) are complete and identify any requirements for longer-term monitoring of pollutant linkages, maintenance and arrangements for contingency action.
2. Prior to commencement of the super-structure, all fuel tanks, fuel lines, oil interceptors and associated drain connections should be decommissioned and removed from site, including the removal of any obviously polluted soil. The contractor shall provide:
 - a) Waste transfer notes from the decommissioned fuel tanks and associated underground services and contents (e.g. hydrocarbon contaminated water, waste oil, etc);
 - b) Photographic evidence of the redundant tanks, fuel lines and associated infrastructure, in the form of a report to the LPA for review by the Council's Environmental Health team.
3. After development commences in the relevant Phase and prior to occupation / use of the food retail store:
 - a) If during the course of development any contamination is discovered that was not previously identified, it must be reported without delay to the LPA. The development shall not proceed further until an assessment of that contamination and the preferred remedial measure to reduce or control the risks, has been submitted to, and approved in writing by the LPA. If no contamination is found, then this shall be detailed in the remediation Verification Report.
 - b) A Verification Report, confirming completion and adequacy of the remediation scheme, shall be submitted to and approved in writing by the LPA before any part

of the retail store is first used. The report shall include results of sampling and monitoring carried out, or required longer-term, in accordance with the approved verification plan in (Part 1 d) to demonstrate that the site remediation criteria have been met.

Reason: In the interests of future health of users of the development and to protect the development from unacceptable risk from or be adversely affected by, unacceptable levels of water pollution, in accordance with Policy LP24.

8. Land contamination – All Structures, Except the Food Retail Store: The following shall be carried out by suitably qualified persons in accordance with Environment Agency: Land Contamination Risk Management (LCRM) guidance and British Standard 10175:2011 + A2:2017 'Investigation of Potentially Contaminated Sites – Code of Practice'.

1. Prior to commencement of relevant Phases identified on the Phasing Plan submitted under condition 3 above:
 - a) A Preliminary Risk Assessment (PRA) with an outline conceptual site model (CSM) shall be submitted in a report to the LPA for approval. The Report shall include site reconnaissance and a methodology for proposed intrusive works to characterise the potential risks identified in the PRA.
 - b) A suitable and sufficient site investigation shall be undertaken to evaluate risks to potential contaminant linkages identified in the PRA. A Report detailing the findings from intrusive works and a quantitative risk assessment (RA), with evaluation criteria and any underlying assumptions, shall be produced and submitted to the LPA for approval prior to an Options Appraisal.
 - c) Where unacceptable risks have been confirmed, an Options Appraisal (OA) shall be undertaken. The OA shall include all feasible remediation methods to address the relevant contaminant linkages in the updated Conceptual Site Model; an evaluation of these options and the final remediation method(s) selected to reduce or control the risks associated with the site development shall be given. The OA shall be submitted to the LPA for approval prior to any remediation works being undertaken at the site. The scheme once completed must ensure that the site will not qualify as 'Contaminated Land' under Part 2A of the Environmental Protection Act 1990 in relation to its intended use.
 - d) A verification plan shall provide details of the data that will be collected to demonstrate that the works set out in the remediation strategy in (c) are complete and identify any requirements for longer-term monitoring of pollutant linkages, maintenance and arrangements for contingency action.
2. After development commences and prior to occupation of the development (having regard to the relevant Phases), except the food retail store:
 - a) If during the course of development any contamination is discovered that was not previously identified, it must be reported without delay to the LPA. The development shall not proceed further until an assessment of that contamination and the preferred remedial measure to reduce or control the risks, has been submitted to, and approved in writing by the LPA. If no contamination is found, then this shall be detailed in the remediation Verification Report.
 - b) A Verification Report, confirming completion and adequacy of the remediation scheme, shall be submitted to and approved in writing by the LPA before any part of the development is first occupied, having regard to the relevant Phases. The report shall include results of sampling and monitoring carried out, or required

longer-term, in accordance with the approved verification plan in (Part 1 d) to demonstrate that the site remediation criteria have been met.

Reason: In the interests of future health of occupiers of the development and to protect the development from unacceptable risk from or be adversely affected by, unacceptable levels of water pollution, in accordance with Policy LP24.

9. **(Long-term monitoring):** Prior to the commencement of the relevant Phase identified on the Phasing Plan submitted under condition 3 above a monitoring and maintenance plan in respect of contamination, including a timetable of monitoring and submission of reports to the local planning authority, has been submitted to, and approved in writing by, the local planning authority. Reports as specified in the approved plan, including details of any necessary contingency action arising from the monitoring, shall be submitted to, and approved in writing by the local planning authority.

Reason: To ensure that the site does not pose any further risk to human health or the water environment by managing any ongoing contamination issues and completing all necessary long-term remediation measures, in accordance with Local Plan Policy LP24 and line with paragraph 170 of the National Planning Policy Framework. The objectives and purposes of this condition are such that it is required to be complied with before commencement of development. As such, those objectives and purposes would not be met if the condition were to be expressed other than as a pre-commencement condition.

10. **(UXO Risk Assessment):** Prior to the commencement of the relevant Phase identified on the Phasing Plan submitted under condition 3 above, an UXO Risk Assessment shall be submitted to and agreed in writing by the Local Planning Authority. The Risk Assessment shall consist of the following steps:

- a) Hazard Identification;
- b) Assessing the risk of hazard being detonated by the planned development works; and
- c) Assessing the risk benefit of any mitigation.

Any mitigation measures identified shall be put in place prior to the development first commencing.

Reason: To ensure there is no risk of accidental explosion of unexploded ordinance as a result of the development. The objectives and purposes of this condition are such that it is required to be complied with before commencement of development. As such, those objectives and purposes would not be met if the condition were to be expressed other than as a pre-commencement condition.

11. **(Piling/boreholes):** No piling and other foundation designs using penetrative methods shall be carried out within the relevant Phase of the development identified on the Phasing Plan submitted under condition 3 above other than with the written consent, in consultation with the EA, of the local planning authority in accordance with the following:

- (a) A Piling Study and Method Statement which shall have regard to EA guidance document *"Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention"*.
- (b) A Piling Risk Assessment. Piling shall be undertaken in accordance with the Foundation Works Risk Assessment approved under condition 3 below.

The details required under (a) and (b) above shall be submitted to the Council prior to commencement of the development

The development shall be carried out in accordance with the approved details.

Reason: To ensure that the proposed development, does not harm groundwater resources in line with paragraph 170 of the National Planning Policy Framework. The objectives and purposes of this condition are such that it is required to be complied with before commencement of development. As such, those objectives and purposes would not be met if the condition were to be expressed other than as a pre-commencement condition.

12. **(Foundations Works Risk Assessment):** Prior to the commencement of the relevant Phase identified on the Phasing Plan submitted under condition 3 above, a Foundation Works Risk Assessment shall be submitted to and approved in writing, in consultation with the EA, by the Local Planning Authority. Any piling shall be undertaken in accordance with the approved Foundation Works Risk Assessment.

Reason: To ensure that foundation construction works do not create a new contamination migration pathway groundwater, and to consider impacts on the ground gas regime, and to accord with Local Plan Policy LP24. The objectives and purposes of this condition are such that it is required to be complied with before commencement of development. As such, those objectives and purposes would not be met if the condition were to be expressed other than as a pre-commencement condition.

13. **(Tree Protection):** Notwithstanding the details submitted with the application listed under condition 2 above, no site clearance, preparatory work or development within the relevant Phase identified on the Phasing Plan submitted under condition 3 above shall take place until a scheme (Tree Protection Plan) for the protection of all the trees located adjacent to the southern boundary of the within the railway SINC and the appropriate working methods (the Arboricultural Method Statement) in accordance with British Standard BS5837 – 201 - Trees in Relation to design, demolition and construction - Recommendations has been submitted to and agreed in writing by the local planning authority.

Reason: To ensure the well-being of the trees and in the interest of biodiversity at the railway SINC in accordance with Policies LP38 and LP39 of the Local Plan. The objectives and purposes of this condition are such that it is required to be complied with before commencement of development. As such, those objectives and purposes would not be met if the condition were to be expressed other than as a pre-commencement condition.

14. **(Habitat Creation Management Plan):** Prior to the commencement of the relevant Phase identified on the Phasing Plan submitted under condition 3 above, a Habitat Creation Management Plan (HCMP) shall be submitted to and approved in writing by the Local Planning Authority and include:

- a) Ecological Watching Brief;
- b) Measures to protect any habitats and protected species present/retained at the site during demolition and construction activities
- c) Planting of trees and shrubs in the public spaces, covering a variety of species, including those of benefit to wildlife;
- d) Location of proposed habitat, bird and bat boxes;
- e) Details of biodiverse roofs; and
- f) Tree protection measures for all trees on the adjacent SINC to the southern boundary of the site.

- g) Details of dust prevention;
- h) Details of noise minimisation; and
- i) Details of drainage and pollution management.

Approved details are to be implemented and maintained as approved. Any clearance of scrub and trees within the site should be timed to avoid the bird nesting season (March to August).

Prior to the start of works on site the contractor should receive a 'toolbox' talk/training to describe the ecological features and species present, their legal protection and responsibilities towards them and what to do if wildlife is encountered.

Reason: To comply with Policy G6 in the London Plan, and Policy LP39 of the Local Plan. The objectives and purposes of this condition are such that it is required to be complied with before commencement of development. As such, those objectives and purposes would not be met if the condition were to be expressed other than as a pre-commencement condition.

15. **(Circular Economy):** Prior to the commencement of the relevant Phase identified on the Phasing Plan submitted under condition 3 above hereby approved, a 'Circular Economy Statement and Operational Waste Management Strategy in line with the GLA's Circular Economy Guidance' shall be submitted to and approved in writing by the Local Planning Authority to demonstrate how the development would promote circular economy outcomes to aim to be net zero-waste. The 'Circular Economy Statement' shall demonstrate:

- a) How all materials arising from demolition and remediation works will be re-used and/or recycled;
- b) How the proposal's design and construction will reduce material demands and enable building; materials, components and products to be disassembled and re-used at the end of their useful life; opportunities for managing as much waste as possible on site;
- c) Adequate and easily accessible storage space and collection systems to support recycling and re-use;
- d) How much waste the proposal is expected to generate, and how and where the waste will be managed in accordance with the waste hierarchy; and
- e) How performance will be monitored and reported.

Reason: To demonstrate how the development will reduce waste and support the circular economy in accordance with London Plan Policy SI 7. The objectives and purposes of this condition are such that it is required to be complied with before commencement of development. As such, those objectives and purposes would not be met if the condition were to be expressed other than as a pre-commencement condition.

16. **(Materials Management):** Prior to the commencement of the relevant Phase identified on the Phasing Plan submitted under condition 3 above a Materials Management Plan for any excavation waste shall be submitted to and approved in writing by the Local Planning Authority. The Materials Management Plan shall comply with the CL:AIRE protocol.

The development shall be undertaken in accordance with the findings and recommendations of the approved Materials Management Plan.

Reason: In order to prevent harm to human health and pollution of the environment as a result of any excavation waste re-used at the site. The objectives and purposes of this condition are such that it is required to be complied with before commencement of development. As such, those objectives and purposes would not be met if the condition were to be expressed other than as a pre-commencement condition.

17. **(Asbestos):** Prior to the commencement of the relevant Phase identified on the Phasing Plan submitted under condition 3 above, the developer must either submit evidence that the site building(s) were built post 2000, or provide an intrusive pre-demolition and refurbishment asbestos survey in accordance with HSG264 supported by an appropriate mitigation scheme to control risks to construction staff, shoppers to the retail store, future occupiers of the development, existing residents, soil quality, controlled waters, natural underground water sources, and ecological systems. The scheme must be written by a suitably qualified person and submitted to the Local Planning Authority (LPA) for approval and agreement in writing. The scheme as submitted shall identify potential sources of asbestos contamination and detail removal or mitigation appropriate for the proposed uses.

Reason: To ensure the risks from land contamination to future users of the land and neighbouring land are minimised, together with those to controlled waters, soil quality, property and ecological systems, and to ensure that the development can be carried out safely without unacceptable risks to workers, neighbours and other offsite receptors in accordance with Policy LP24 of the Local Plan. The objectives and purposes of this condition are such that it is required to be complied with before commencement of development. As such, those objectives and purposes would not be met if the condition were to be expressed other than as a pre-commencement condition.

18. **(Petrol Filling Station):** Prior to the commencement of the relevant Phase identified on the Phasing Plan submitted under condition 3 above, a Risk Assessment and Method Statement for the decommissioning of the petrol filling station and removal of associated tanks shall be submitted to and approved in writing by the Local Planning Authority.

The removal of the petrol filling station and associated underground tanks shall be carried out strictly in accordance with the approved details.

Reason: To protect the health of adjoining occupiers and the amenities in the surrounding area, and in the interests of future health of occupiers of the development, soil condition, and water condition, in accordance with Policy LP24 of the Council's Local Plan. The objectives and purposes of this condition are such that it is required to be complied with before commencement of development. As such, those objectives and purposes would not be met if the condition were to be expressed other than as a pre-commencement condition.

PRE-COMMENCEMENT (EXCLUDING SITE CLEARANCE, DEMOLITION AND PREPARATORY CONSTRUCTION WORKS)

19. **(Railway Vibration):** Notwithstanding the details submitted with the application, prior to the commencement of the relevant Phase identified on the Phasing Plan submitted under condition 3 above (excluding site clearance and demolition) a detailed Railway Vibration and Re-radiated Noise Assessment, including any necessary mitigation measures, shall be submitted to and approved in writing by the Local Planning Authority. The Assessment shall accord with the specifications set out in BS 6472 and shall be complemented by an assessment of potential amplification and/or attenuation

by the proposed building structure, as well as re-radiated noise from train events in line with good practice guidance.

Re-radiated noise, within habitable residential rooms, as a result of vibration from the adjacent railway and other sources, shall not exceed L_{ASmax} 35 dB. Where it is predicted that noise from this source, after allowing for predictive uncertainty, is likely to exceed L_{ASmax} 35 dB, proposals to mitigate re-radiated noise to acceptable levels shall be included in the Vibration and Re-radiated Noise Assessment.

Any mitigation measures shall be put in place prior to first residential occupation of the development.

Reason: In order to ensure that the residential accommodation to be provided are suitably protected from any source of noise and vibration disturbance, and to accord with Policies LP24, and LP26 of the Local Plan and Policy D14 of the London Plan.

20. **Fire Safety:** Prior to the commencement of the relevant Phase identified on the Phasing Plan submitted under condition 3 above, (excluding demolition, site clearance and preparatory ground works), an updated Fire Statement shall be submitted to and approved in writing by the Local Planning Authority. The statement should detail how the development proposal will function in terms of:

- a) The building's construction: methods, products and materials used;
- b) The means of escape for all building users: stair cores, escape for building users who are disabled or require level access, and the associated management plan approach;
- c) Access for fire service personnel and equipment: how this will be achieved in an evacuation situation, water supplies, provision and positioning of equipment, firefighting lifts, stairs and lobbies, any fire suppression and smoke ventilation systems proposed, and the ongoing maintenance and monitoring of these. A minimum of at least one lift core (or more subject to capacity assessments) will be a suitably sized fire evacuation lift suitable to be used to evacuate people who require level access from the building/s;
- d) How provision will be made within the site to enable fire appliances to gain access to the building. The development shall be implemented in accordance with the approved details and retained as such for the lifetime of the development; and
- e) Features which reduce the risk to life: fire alarm systems, passive and active fire safety measures and associated management and maintenance plans;
- f) Ensuring that any potential future modifications to the building will take into account and not compromise the base build fire safety/protection measures.

The development shall be implemented in accordance with the approved details and retained as such for the lifetime of the development.

Reason: In order to protect the living conditions and safety and security of the occupants in line with London Plan Policy D12.

21. **(Re-radiated Noise):** Re-radiated noise, within habitable residential rooms, as a result of vibration from the adjacent railway and other sources, shall not exceed L_{ASmax} 35dB. Where it is predicted that noise from this source, after allowing for predictive uncertainty, is likely to exceed L_{ASmax} 35 dB, proposals to mitigate re-radiated noise to acceptable levels shall be submitted to and approved in writing by the Local Planning Authority prior to the commencement of the relevant Phase identified on the Phasing Plan submitted under condition 3 above (excluding site clearance, demolition and preparatory construction works), hereby permitted..

Any mitigation measures shall be put in place prior to first residential occupation of the relevant Phase.

Reason: In order to protect the health and ensure quality of life enjoyed by future occupants of the development and to comply with Policies LP24 and LP26, and Policy D14 of the London Plan.

22. **(Facing Materials):** Notwithstanding the details submitted with the proposal hereby approved, prior to the commencement of the relevant Phase identified on the Phasing Plan submitted under condition 3 above (excluding site clearance, demolition and preparatory construction works), details (samples, including specifications, and plans as appropriate) of all facing materials, shall be submitted to and approved in writing by the Local Planning Authority. The details shall also include:

- a) Brickwork;
- b) Cladding;
- c) Windows and doors (including reveals and frames);
- d) balconies and privacy screens;
- e) Canopies;
- f) External guttering;
- g) Details of all rooftop structures including flues, satellite dishes, plant, lift overruns, cleaning cradles;
- h) Plant enclosures;

The development shall be carried out in accordance with the approved details.

Reason: To ensure that the external appearance of the building is satisfactory in accordance with the requirements of Policy LP26 of the Local Plan.

23. **(Slab level depths):** Prior to the commencement of the relevant Phase identified on the Phasing Plan submitted under condition 3 above (excluding site clearance, demolition and preparatory construction works) detailed construction specification of the newly created at grade level, all podium levels and all roof levels slab depths shall be submitted to and approved in writing by the local planning authority to demonstrate how the tree species planting specified in the Allen Pyke Landscape Strategy Rev. A dated August 2020 hereby approved will be achievable and sustainable at the site. The Development shall take place in accordance with the approved details.

Reason: To ensure a satisfactory appearance, to ensure long-term health of trees, and to take opportunities to enhance biodiversity, within the development, and to accord with Policies LP26, LP38, and LP 39 of the Local Plan.

24. **(Decommission of investigative boreholes):** prior to commencement of the development (excluding site clearance, demolition and preparatory construction works) hereby approved, a scheme for managing any borehole installed for the investigation of soils, groundwater or geotechnical purposes shall be submitted to and approved in writing, in consultation with the EA, by the local planning authority. The scheme shall provide details of how redundant boreholes are to be decommissioned and how any boreholes that need to be retained, post-development, for monitoring purposes will be secured, protected and inspected. The scheme as approved shall be implemented prior to the occupation of any part of the permitted development.

Reason: To ensure that redundant boreholes are safe and secure, and do not cause groundwater pollution or loss of water supplies in line with paragraph 170 of the National Planning Policy Framework.

25. **(Erection of Cranes):** No cranes shall be erected on the site unless and until a construction methodology including details of the use of cranes in relation to location, maximum operating height of crane/s and start/finish dates for the relevant Phase identified on the Phasing Plan submitted under condition 3 above has been submitted to and approved in writing, in consultation with London City Airport Ltd the Local Planning Authority.

Reason: The use of cranes or tall equipment in this area has the potential to impact London City Airport operations. To ensure compliance with London Plan Policy D11.

26. **(Cycle Parking provision):** Notwithstanding any details of cycle parking shown in approved plans, prior to the commencement of the relevant Phase identified on the Phasing Plan submitted under condition 3 above (excluding site clearance, demolition and preparatory construction works), details of all cycle parking for the residential users, school users, and commercial users, shall be submitted to approved in writing by the Local Planning Authority in consultation with TfL. The cycle parking details shall demonstrate how:

- a) no less than 5% of all provision within each cycle store is available on Sheffield stands with wide spacing (1.8m spacing, or 900mm side space if wider cycles are expected just on one side of a stand) for larger/wider cycles;
- b) no less than 20% of all residential cycle parking spaces, 100% of school cycle parking spaces, and 10% of commercial cycle parking spaces are provided on Sheffield stands at a minimum of 1.0m spacing;
- c) any two-tier racks used are mounted with a minimum of 2.5m clear aisle width, and no other style of stand is used; and
- d) all other matters to be in accordance with the London Cycling Design Standards.

The cycle parking thereby approved shall be installed as per the approved details and retained, not used for any other purpose and be maintained in good working order.

Reason: To ensure appropriate support facilities for cyclists are provided in the scheme and to comply with policy T5 of the London Plan.

27. **(Electric vehicle charging Points (ESVP):** Prior to the commencement of the relevant Phase identified on the Phasing Plan submitted under condition 3 above (other than demolition, enabling and groundworks and development below DPC level) and notwithstanding any indication on the submitted drawings or supporting documents, details of electric vehicle charging point locations and technical specifications shall be submitted to and approved in writing by the Local Planning Authority. The development shall be implemented in accordance with the approved details and retained as such thereafter for the lifetime of the development unless otherwise agreed in writing by the Local Planning Authority.

The details shall also show:

- a) The 100% active ESVP provision for residential parking; and
- b) The 4 (four) active ESVP and one (1) rapid charge ESVP for retail parking.

The ESVP as approved shall be operational prior to the first occupation/use of the residential and retail store elements of the relevant Phase.

Reason: In the interest of effective provision of safe and well designed parking facilities in accordance with Local Plan Policy LP23 and Policy T6 of the London Plan.

ABOVE GRADE WORKS CONDITIONS

28. **(Bird Management 1):** Notwithstanding any details submitted with the application, no construction works within the relevant Phase, identified in the Phasing Plan submitted under condition 3 above, shall take place or carried out above roof slab level in respect of any building (for that relevant Phase) hereby approved unless and until a detailed scheme for slab and/or brown/green roofs and associated aggressive bird management strategy has been submitted to and approved in writing, in consultation with London City Airport Ltd., by the Local Planning Authority.

All green and/or brown roofs shall be designed to make them unattractive to birds so as not to have an adverse effect on the safety of operations at London City Airport by encouraging bird roosting and creating sources of food for birds, and thereby presenting a bird strike threat to aircraft operating at the Airport.

The scheme shall include:

1. A bird strike risk statement (the statement shall demonstrate that the development comprised within the relevant Phase or Development Plot (as applicable) does not increase the risk of bird strike hazard to aircraft using London City Airport when measured against the conditions existing on the whole development site at the time of the submission of the statement).
2. A Bird Hazard Management Plan (BHMP). This document should layout a methodology which will ensure the level of risk to aircraft is not elevated above the baseline level established in the bird strike risk statement.

Reason: This site's location is within London City Airport's area of concern with respect to bird strikes. To ensure that there will be no elevated risk to aircraft through bird strike and to accord with Policy D11 of the London Plan.

29. **(Façade Specific Glazing Assessment):** Notwithstanding condition 2 of this permission, prior to the carrying out of above grade work for any of the relevant Phase identified on the Phasing Plan submitted under condition 3 above, a Façade Specific Glazing Assessment for the flats facing onto High Road Goodmayes, the Railway line, and eastern Access Road into the site, shall be submitted to and approved in writing, by the Local Planning Authority.

The development shall be completed strictly in accordance with the details of the Assessment

Reason: In order to ensure that the residential accommodation to be provided are suitable for habitation protected from overheating and to accord with Policies LP24, LP26, and LP32 of the Local Plan.

30. **(Landscape Strategy & Management Plan):** Notwithstanding condition 2 of this permission, prior to the carrying out of above grade works of development hereby approved, a Landscape Strategy and Management Plan for the whole site, including a scheme for prior to the commencement of the relevant Phase identified on the Phasing Plan submitted under condition 3 above, a hard and soft landscaping which shall incorporate the principles of the indicative Allen Pyke Landscape Strategy Rev. A dated August 2020 (hereby approved for shall be submitted to and agreed in writing by the Local Planning Authority).

A. The soft landscaping scheme shall include:

- a) A planting plan;

- b) A written specification (including cultivation and other operations associated with trees, plants and grass);
- c) A Schedule of plants, shrubs and trees, setting out the species, sizes, numbers/densities and soil depths, A Schedule of plants, shrubs and trees, setting out the species, sizes, numbers/densities and soil depths, having regard to mitigation outlined in Section 4.2 of the Arcaero Wind and Microclimate Assessment 0730058rep2v2 (Rev. A) dated 13 August 2020 submitted with the application.;
- d) Irrigation details;
- e) Details of the proposed time of planting of all trees, shrubs and plants to be planted;
- f) Detailed design and planting schedule of the 'brown roofs';
- g) Detailed design and planting schedule of the 'green roofs';
- h) A programme setting out how the plan will be put into practice including measures for protecting plants and trees both during and after development has finished; and
- i) Landscape Management Plan, which includes long term design objectives, management responsibilities and maintenance schedules for all soft landscape areas.

The new planting shall be carried out in the first planting and/or seeding season following the first commercial and residential occupation of the relevant Phase or the substantial completion of the relevant Phase et, whichever is the sooner and shall comply with the requirements specified in BS3936:1992, BS4043:1989, BS4428:1989, BS8545:2014 and current Arboricultural best practice. None of the new trees, plants or shrubs planted shall be lopped or topped within a period of five years from the completion of the relevant Phase.

Any trees, plants or shrubs, which, within a period of five years from the completion of the relevant Phase die, are removed, or become seriously damaged or diseased, shall be replaced in the next planting season, in accordance with the approved scheme. The approved landscaping scheme shall be maintained thereafter.

The scheme shall achieve an Urban Greening Factor (UGF) of (at least) 0.41 as set out in the approved indicative Allen Pyke Landscape Strategy Rev. A dated August 2020.

B. The hard landscaping scheme shall include:

- a) Finished levels, materials, any signage, furniture/sitting areas and a maintenance plan to demonstrate how the hard landscaping features will be repaired/replaced (as appropriate) over time, the placing of furniture/sitting areas shall have regard to the mitigation outlined in Section 4.2 of the Arcaero Wind and Microclimate Assessment 0730058rep2v2 (Rev. A) dated 13 August 2020 submitted with the application;
- b) Drainage details;
- c) Details of demarcation between private land (the site) and the highway along the Goodmayes High Road frontage of the site;
- d) Details of demarcation the pedestrian path and service road along the southern boundary of the site;
- e) A Stage 3 Road Safety Audit; and
- f) A programme setting out how the plan will be put into practice.

The hard landscaping scheme shall be installed prior to first occupation of the relevant Phase or the substantial completion of the relevant Phase, whichever

is the sooner and maintained thereafter in accordance with the maintenance plans hereby approved.

Reason: To ensure a satisfactory appearance, to take opportunities to enhance biodiversity, to ensure that there is appropriate communal and publicly accessible space within the development, in the interest of road safety, and to accord with Policies LP22, LP26, LP38, and LP 39 of the Local Plan.

31. **(Wildlife housing):** Prior to the carrying out of above grade works of the relevant Phase identified on the Phasing Plan submitted under condition 3 above a detailed scheme, building on the indicative Allen Pyke Landscape Strategy Rev. A dated August 2020 submitted, with the application for the specific number and specific placement/positioning of bat tubes, bat boxes, house sparrow terraces, swift bricks, black redstart bricks, hedgehog habitat boxes, invertebrate hotels/boxes (in particular for pollinators and bumblebees) and general bird boxes around the site shall be submitted to and agreed in writing by the local planning authority. The details shall include height and direction of the housing, as well as details of the habitat box product specified.

The approved habitat provision shall be installed prior to first occupation of the relevant Phase identified under condition 3 above and shall thereafter be maintained in accordance with the approved details in perpetuity.

Reason: To promote and ensure biodiversity at the, and to comply with Policy LP39 of the Local Plan and Policy G6 of the London Plan.

32. **(Walls and Fences):** Prior to the construction of roof slab level, of the relevant Phase identified on the Phasing Plan submitted under condition 3 above, details relating to the siting, design and height and finish of all new walls, gates, fencing, railings and other means of enclosure shall be submitted to and approved in writing by the Local Planning Authority.

The development shall be carried out solely in accordance with the approved details, prior to the first occupation of the use of the relevant Phase and thereafter shall be fully retained and maintained accordingly for the lifetime of the development.

Reason : In the interest of general visual amenity, and amenity of neighbouring occupants, in accordance with Local Plan Policy LP26.

33. **(Security):** Prior to the carrying out of above grade works of the relevant Phase identified on the Phasing Plan submitted under condition 3 above details relating to the entrances, including gates, entry control system, display of postal numbers and position of letter box facilities shall be submitted to and agreed in writing by the Local Planning Authority. The agreed measures shall be fully implemented prior to first occupation of the relevant Phase and thereafter maintained for the lifetime of the development.

Reason: In the interest of security and sustainable development, in compliance Policies LP26 and LP32 of the Local Plan.

34. **(Wheelchair Dwellings 1):** Prior to the carrying out of above grade works of the relevant Phase identified on the Phasing Plan submitted under condition 3 above, and notwithstanding the details shown within the submitted Design and Access Statement and Design and Access Statement Addendum submitted with the application, detailed plans, to a scale of 1:50, shall be submitted to and approved in writing by the Local Planning Authority to identify the location and size of the wheelchair user dwellings

for that Phase, with a provision of (no less than) 128 (one hundred and twenty eight) wheelchair user dwellings across the development

The wheelchair user dwellings shall comply Approved Document M 2015, M4 Category 3: Wheelchair user dwellings, category M4(3)(2)(a) 'Adaptable'. Circulation areas in blocks with M4(3) dwellings will be built in full accordance with Part M4(3), as referred to in paragraph 3.7.2 of the London Plan. This includes the entrance and circulation area doors which will have to be fully compliant with the relevant sections of Approved Document M. Details which are to be submitted to and approved in writing by the Local Planning Authority prior to commencement of development. All wheelchair user dwellings must provide sufficient footprint and drawings must demonstrate that they can achieve a fully accessible layout.

The development shall be carried out in accordance with the approved details and evidence of compliance shall be notified to the building control body appointed for the development in appropriate Full Plans Application, or Building Notice, or Initial Notice to enable the building control check compliance.

Reason: In order to ensure the development complies with the terms of the application and to secure the provision of visitable and adaptable homes appropriate to meet diverse and changing needs, in accordance with Policies LP5, LP26 and LP32 of the Local Plan, and Policy D7 of the London Plan 2016.

35. **(Wayfinding):** Prior to practical occupation/use of the relevant Phase identified on the Phasing Plan submitted under condition 3 above, a wayfinding strategy will be submitted to and approved in writing by the Local Planning Authority in conjunction with LBR Highways. All wayfinding will be paid for by the developer whether on private land or on public highway. Wayfinding on public highway will form part of the S278 and S38 agreements.

The wayfinding measures as approved shall be provided at the site for the relevant Phase prior to first use/occupation of the development and shall be retained in perpetuity unless otherwise agreed in writing by the Local Planning Authority.

Reason: To ensure the safe movement of pedestrians and cyclists in accordance with Policy LP22 and LP26 of the Local Plan.

36. **(Overheating and Cooling Control Strategy):** Overheating and cooling of the development hereby approved shall be attained through the implementation of the strategies/mitigation measures set out in Section 9 – Overheating and Cooling, of the Meinhardt Energy Assessment and Sustainability Strategy Issue P4 – 16 February 2021, and shall be installed and operational prior to first occupation or use of the relevant Phase identified in the Phasing Plan submitted under condition 3 above.

The strategies/mitigation measures shall be installed, maintained and retained in perpetuity.

Reason: In order to ensure that the residential accommodation to be provided are suitably protected from any source of disturbance, and overheating and to accord with Policies LP24, LP26, and LP32 of the Local Plan.

37. **(Balconies & Roof Gardens balustrading):** Notwithstanding condition 2, prior to the carrying out of above grade works of the relevant Phase identified on the Phasing Plan submitted under condition 3 above, detailed drawings (at a scale of 1:50) illustrating the detailing of balustrades to all balconies (in-set, semi-inset, and cantilevered) and roof gardens shall be submitted to and approved in writing by the local planning

authority.

The development shall be carried out in accordance with the approved details.

Reason: To ensure that the external appearance of the building is satisfactory in accordance with the requirements of Policies LP26 and LP27 of the Local Plan.

38. **(Mechanical Ventilation System):** prior to the carrying out of above grade works of the relevant Phase identified on the Phasing Plan submitted under condition [] above, details of the mechanical ventilation system to be provided within the underground car parks shall be submitted to and approved in writing by the Local Planning Authority.

The development shall only be occupied in accordance with the approved details.

Reason: In order to ensure the development meets local, regional and national air quality objectives, and in accordance with Policy LP24 of the Local Plan.

39. **(Design Quality):** Prior to the carrying out of above grade works of the relevant Phase identified on the Phasing Plan submitted under condition 3 above, details of how the Corridors of Blocks A (levels 4 and below), Blocks B (levels 7 and below), and Block D (levels 6 and below) have been compartmentalised to reduce the core to unit ratio shall be submitted to and approved in writing by the Local Planning Authority.

The development shall be carried out and be occupied in accordance with the approved details.

Reason: In order to avoid the risk of creating an institutional environment, and to comply with Policy LP26 of the Local Plan and Policy D6 of the London Plan.

PRIOR TO OCCUPATION/USE CONDITIONS

40. **(Acoustic Commissioning Testing):** Prior to first occupation of any residential units of the relevant Phase identified on the Phasing Plan submitted under condition 3 above, acoustic commissioning testing shall be undertaken by a UKAS/ANC accredited organisation at the most noise exposed habitable room of each acoustic facade specification to demonstrate compliance with the noise level criteria of set out in condition 77 below. The testing shall be carried out over a period of minimum 24 hours and the results shall be submitted to and approved in writing by the Local Planning Authority prior to occupation of the residential units.

Reason: In order to protect the health and ensure quality of life enjoyed by future occupants of the development and to comply with Policies LP24 and LP26, and Policy D14 of the London Plan.

41. **(PV Array):** Notwithstanding the details under condition 2 of this permission, and prior to the first occupation of the residential element of the relevant Phase identified on the Phasing Plan submitted under condition 3 above, development details shall be submitted to and approved in writing by the Local Planning Authority to demonstrate how the proposed PV array will be maximised to assist output and electricity generation to the development. The details shall include the exact location of the PV array and provide confirmation the estimated area, output and electricity generation.

The approved details shall be installed and be operational before first occupation of the relevant Phase and retained in perpetuity.

Reason: In order to ensure the development complies with the terms of the application

and in the interests of reducing carbon emissions in accordance with Local Plan Policies LP19 and LP20 and London Plan Policies SI 1, SI 2 and SI 3.

42. **(CO2 reduction):** Prior to occupation of the relevant Phase identified on the Phasing Plan submitted under condition 3 above, the energy efficiency measures/features and renewable energy technologies [solar PV and Air Source Heat Pumps], which shall provide for no less than 61.7% (residential element) and 37% (commercial element) on-site CO2 reduction as detailed within the Meinhardt Energy Assessment and Sustainability Strategy Issue P4 – 16 February 2021, shall be installed and operational.

Details of the air-to-water, and water-to- water source heat pump technologies shall be submitted to and approved in writing by the Local Planning Authority prior to practical completion of the relevant Phase. The details shall include:

- a) The resulting scheme, together with any flue/stack details, machinery/apparatus location, specification and operational details;
- b) A management plan and maintenance strategy/schedule for the operation of the technologies;
- c) A servicing plan including times, location, frequency, method (and any other details the Local Planning Authority deems necessary);
- d) Investigation of whether heat pump systems in the commercial element and the wider development can be integrated, in order to allow reuse of waste heat from cooling in the commercial element to serve the wider development;
- e) Monitoring details for the post-construction performance of the heat pump system to demonstrate that it achieves (at least) 45.6% expected performance;
- f) Further investigation of the heat pump specification and performance, with a particular emphasis on the potential to increase the percentage contribution of the heat pumps, beyond the 45.6% of total heat demand originally proposed.

The energy efficiency measures/features and renewable energy technology(s) shall be provided/carried out strictly in accordance with the details so approved and shall be maintained as such thereafter.

Reason: In the interest of sustainability, energy efficiency and to provide a high quality development in accordance with Policy LP32 of the Local Plan and Policy SI 3 of the London Plan

43. **(Delivery & Service Management Plan – Large Retail Store (DSMP):** Notwithstanding the details submitted with the application, prior to the first use of the large retail store hereby approved, a commercial Delivery and Service Management Plan (DSMP) for the large retail store, in accordance with Transport for London best practice guidance shall be submitted to and approved in writing by the Local Planning Authority.

The DSMP shall describe the means by which servicing of the large retail store are to be provided including means of provision for servicing and delivery vehicles. The DSMP shall identify how and what types of vehicles are anticipated to service the buildings. The number of spaces available for servicing vehicles and their delivery times shall also be detailed to demonstrate that the proposed system would work within the available space. The DSMP shall further provide detail of hours of delivery and service for the large retail store.

Any measures described in the DSMP shall be implemented within the time period identified within the DSMP and maintained thereafter in accordance with the approved details.

Reason: In order to ensure the development accords with Policy LP22 of the Local Plan.

44. (Delivery & Service Management Plan – For all uses other than the large retail store(DSMP)):

Notwithstanding the details submitted with the application, prior to the first occupation/use of the relevant Phases identified on the Phasing Plan submitted under condition 3 above, a Delivery and Service Management Plan (DSMP) for the residential, school, flexible uses commercial units, Community Hub, and Village Hall (as provided within the relevant Phase) in accordance with Transport for London best practice guidance shall be submitted to and approved in writing by the Local Planning Authority.

The DSMP shall show the location of an on-site vehicular service and delivery bay along with its associated lighting and shall describe the means by which servicing of the uses described above are to be provided. The DSMP shall identify how and what types of vehicles are anticipated to service the buildings/uses. The number of spaces available for servicing vehicles and their delivery times/booking slots shall also be detailed to demonstrate that the proposed system would work within the available space. The DSMP shall further provide detail of hours of delivery and service for the uses described above.

Any measures described in the DSMP shall be implemented within the time period identified within the DSMP and maintained thereafter in accordance with the approved details.

Reason: In order to ensure the development accords with Policy LP22 of the Local Plan.

45. (Waste Management): Notwithstanding the details submitted with the application, prior to the first occupation/use of the relevant Phases identified on the Phasing Plan submitted under condition 3 above, a Waste Management Strategy (for residential, school, large retail store, flexible uses commercial units, Community Hub, and Village Hall), which sets out a scheme for the storage and disposal of waste and recycling, including details of methods for collection and enclosures, shall be submitted to and approved in writing by the Local Planning Authority.

The development shall be implemented in accordance with the approved details and the refuse stores brought into use prior to first occupation of any of the dwellings/non-residential) hereby permitted for the relevant Phase and shall be retained as such together with the approved Waste Management Strategy being operated for the lifetime of the development.

Reason: To ensure the development accord with the terms of the application and to comply with Policy LP26 of the Local Plan.

46. (Volume Limiting): Prior to first use of the Village Hall hereby approved, details shall be submitted to and agreed in writing by the local planning authority to demonstrate how volume-limiting devices will be fitted to any amplifiers. The details shall agree the level of sound performance that will be achieved through the fitting for the volume-limiting devices.

The volume-limiting devices shall be installed prior to first use of the Village Hall and not be removed or adjusted at any time without further express permission from the local planning authority

Reason: To ensure that the development does not result in undue noise disturbance to residents, and to accord with Policies LP24 and LP26 of the Local Plan.

47. **(Car Parking Management Plan – Large Retail):** Prior to first occupation of the large retail store hereby approved, a Car Parking Management Plan shall be submitted to and approved in writing by the Local Planning Authority. The Car Parking Management Plan shall include, but not be limited to the following:

- a) Details of the charging schedule and permitted length of stay of retail car park users;
- b) Details on how enforcement will manage the authorised bays;
- c) Details on how enforcement will manage unauthorised parking and loading;
- d) Details on how customers will be charged for the use of the electric vehicle charge points, which should be an individual charge for each use of the charge point, in line with other public network charges.
- e) Details on provision of bays/ to blue badge holders visiting the school.
- f) 'Pay at the till' details to demonstrate how parents will be prevented from using the retail store car park to drop-off/pick up children associated with the school provided as part of this development.
- g) Details of how 'larger parking spaces' could be provided within the car park.
- h) Details of how existing retail parking provision would be reviewed and reduced overtime and alternative use of any identified redundant car park spaces.

The blue badge car parking space/s shall be laid out and allocated in accordance with the approved Management Plan and shall be made available for the purposes of parking vehicles in association with the development and for no other purpose. The development shall be implemented in accordance with the approved details and retained as such for the lifetime of the development.

Reason: In the interests of highway and pedestrian safety in accordance with Policies LP22 and LP23 of the Local Plan.

48. **(Car Parking Management Plan – Residential):** Prior to first occupation of the residential dwellings within the relevant Phase/s identified on the Phasing Plan submitted under condition 3 above, a Car Parking Management Plan for the relevant Phase/s shall be submitted to and approved in writing by the Local Planning Authority. The Car Parking Management Plan shall include, but not be limited to the following:

- a) Outline the process for allocating bays to blue badge holders (including passive bays should they be required);
- b) Details on how enforcement will manage the authorised bays;
- c) Details on how enforcement will manage unauthorised parking and loading;
- d) Details on how loading will be managed, including what happens if any parked vehicles become blocked in;
- e) Details of provision of active electric vehicle charging points for 100% of all the residential car parking spaces and,
- f) Details on how residents will be charged for the use of the electric vehicle charge points, which should be an individual charge for each use of the charge point, in line with other public network charges.
- g) Details of how further provision for Blue Badge holder parking would be provided if and when needed.

The blue badge car parking spaces shall be laid out and allocated in accordance with the approved Management Plan and shall be made available for the purposes of parking vehicles in association with the development and for no other purpose. The development shall be implemented in accordance with the approved details and retained as such for the lifetime of the development.

Reason: In the interests of highway and pedestrian safety in accordance with Policies LP22 and LP23 of the Local Plan.

49. **(External Lighting):** Prior to the completion of roof slab level of buildings within any relevant Phase identified on the Phasing Plan submitted under condition 3 above, details of any form of external illumination and / or external lighting on the buildings and around the site for relevant Phase/s, including any street lighting, shall be submitted to and approved in writing by the Local Planning Authority.

The detailed design for external lighting shall also demonstrate:

- a) that external lighting placement will not impact on any installed habitat boxes installed;
- b) that external lighting placement and luminance will not impact on the nightscape;
- c) that external lighting placement will not result in unacceptable light pollution/spillage to both existing residents in the surrounding area of new residents of the development; and
- d) the use of low wattage amber LED luminaires around site, in particular around the perimeter of the development along the south boundary/railway line side.

The approved details shall be fully implemented prior to the first occupation/use of any part of the relevant Phase/s and retained as such for the lifetime of the development.

Reason: In the interest of health and to protect the living conditions of existing and future residents in the locality, and in the interest of protecting wildlife, including at the railway SINC to the south of the site, in accordance with Policies LP24, LP26 and LP39 of the Local Plan.

50. **(Children's play):** (A) Prior to first occupation of the relevant Phase/s identified on the Phasing Plan submitted under condition 3 above, details of the proposed children's play equipment shall be submitted to and approved in writing by the local planning authority. The plans must demonstrate that playspace and equipment within the development is available to all, including disability play, and is not segregated by tenure. As per the approved plans, 5,105sqm of children's play space shall be provided across the site.

- (B) All children's play equipment will be installed in accordance with the information approved under part A and retained and maintained in perpetuity for the lifetime of the development.
- (C) The location of the play areas shall have regard to the mitigation measures set out in Section 4.2 of the Arcaero Wind and Microclimate Assessment 0730058rep2v2 (Rev. A) dated 13 August 2020 submitted with the application.

Reason: In order to ensure adequate and appropriate children's play equipment is provided in accordance with Policy 3.6 of the London Plan (March 2016).

51. **(Estate Management Plan):** Prior to first occupation/use of the relevant Phase/s identified on the Phasing Plan submitted under condition 3 above, an Estate Management Strategy, including details of CCTV, to clarify the access and a management arrangements for the public access routes through the site, shall be submitted to and approved in writing by the Local Planning Authority. The development shall be implemented in accordance with the approved details maintained for the lifetime of the development.

Reason: To ensure the development complies with the terms of the application, and to ensure inclusive development in accordance with Local Plan Policy LP26 and London Plan Policy D5.

52. **(Hours of Operation – flexible uses):** Prior to first occupation/use of any of the Village Hall, Community Hub, and commercial flexible use units (excluding the large retail store) within the relevant Phase/s identified on the Phasing Plan submitted under condition 3 above, details of hours of operation shall be submitted to and approved in writing by the Local Planning Authority. Such details as approved shall be retained unless otherwise agreed in writing by the Local Planning Authority

Reason: To protect the amenities of adjoining occupiers in order to comply with Policies LP24 and LP26 and LP26 of the Local Plan.

53. **(Final Residential Travel Plan):** Notwithstanding the details submitted under condition 2 above, prior to first occupation of any of the residential units within the relevant Phase/s identified on the Phasing Plan submitted under condition 3, a Residential Travel Plan shall be submitted to and approved in writing by the Local Planning Authority. The Plan shall describe the means by which resident and residential visitors shall be encouraged to travel to the site by means other than the private car. The Plan as approved shall be implemented, monitored and reviewed on an annual basis and a copy of that annual review and action plan arising shall be submitted in writing to the Local Planning Authority. The measures described in the action plan shall be implemented in the time period identified in the action plan.

Reason: In order to ensure all future residents are aware of all means of travel in the vicinity of the application site and to minimize unnecessary vehicular movements to and from the site in accordance with Policy LP22 of the Local Plan.

54. **(Final School Travel Plan):** Notwithstanding the details submitted under condition 2 above, prior to first occupation of School within the relevant Phase identified on the Phasing Plan submitted under condition 3, a Final School Travel Plan shall be submitted to and approved in writing by the Local Planning Authority within six (6) months of the commencement of that use. The Plan shall describe the means by which staff, parents/pupils shall be encouraged to travel to the site by means other than the private car. The Plan as approved shall be implemented, monitored and reviewed on an annual basis and a copy of that annual review and action plan arising shall be submitted in writing to the Local Planning Authority. The measures described in the action plan shall be implemented in the time period identified in the action plan.

Reason: In order to ensure all future users of the School are aware of all means of travel in the vicinity of the application site and to minimize unnecessary vehicular movements to and from the site in accordance with Policy LP22 of the Local Plan.

55. **(Final Large Retail Store Travel Plan):** Notwithstanding the details submitted under condition 2 above, prior to first use of the large retail store within the relevant Phase identified on the Phasing Plan submitted under condition 3, a Final Retail Travel Plan shall be submitted to and approved in writing by the Local Planning Authority. The Plan shall describe the means by which users and staff of the retail store shall be encouraged to travel to the site by means other than the private car. The Plan as approved shall be implemented, monitored and reviewed on an annual basis and a copy of that annual review and action plan arising shall be submitted in writing to the Local Planning Authority. The measures described in the action plan shall be implemented in the time period identified in the action plan.

Reason: In order to ensure all future users of the retail store are aware of all means of

travel in the vicinity of the application site and to minimize unnecessary vehicular movements to and from the site in accordance with Policy LP22 of the Local Plan.

56. **(Shopfronts and Advertisements):** Prior to completion of the relevant Phases identified on the Phasing Plan submitted under condition 3 above, a shopfront and signage strategy for the flexible use commercial units and large retail store within the development shall be submitted to and approved in writing by the Local Planning Authority. The agreed strategy shall thereafter be included in any sale or lease documents issued in relation of the units and any signage displayed shall accord with the approved strategy and shall be retained in accordance with the strategy for as long as it is displayed.

Reason: To ensure that the development is not detrimental to the character and appearance of the site in accordance with Policy LP28 of the Local Plan.

57. **(Ventilation/Filtration/Extraction):** Prior to the first occupation/use of the large retail store hereby approved, the following details shall be submitted to and approved in writing by the Local Planning Authority for the relevant use:

(a) Details of any associated extraction/flue/filtration/ventilations systems to be installed, including details of any other external plant or machinery (including ventilation units and air intake louvers), together with details of its method of construction, appearance, finish and acoustic performance. The measures shall be in accordance with the relevant DEFRA guidance on the control of piling and noise from commercial kitchen exhaust systems (January 2005).

The large retail store shall only be occupied in accordance with the approved details.

Reason: In order to ensure that the commercial uses respect the amenities enjoyed by occupants of neighbouring properties and that they do not suffer an unreasonable loss of amenity from the operation of the uses hereby permitted and to comply with Policies LP24 and LP26 of the Local Plan.

58. **(Ventilation/Filtration/Extraction):** Prior to the first occupation/use of the school hereby approved, the following details shall be submitted to and approved in writing by the Local Planning Authority for the relevant use:

(a) Details of any associated extraction/flue/filtration/ventilations systems to be installed, including details of any other external plant or machinery (including ventilation units and air intake louvers), together with details of its method of construction, appearance, finish and acoustic performance. The measures shall be in accordance with the relevant DEFRA guidance on the control of piling and noise from commercial kitchen exhaust systems (January 2005).

The school shall only be occupied in accordance with the approved details.

Reason: In order to ensure that the commercial uses respect the amenities enjoyed by occupants of neighbouring properties and that they do not suffer an unreasonable loss of amenity from the operation of the uses hereby permitted and to comply with Policies LP24 and LP26 of the Local Plan.

59. **(Energy Network):** Notwithstanding condition 2 above, prior to the first occupation of the relevant Phase/s identified on the Phasing Plan submitted under condition 3 above, details of measures to be implemented to ensure the development is safeguarded to allow future connection to a decentralised energy network, should one

become available, shall be submitted to and approved in writing by the Local Planning Authority. The details shall include:

- (a) Confirmation that a communal heating system will be used and not individual gas boilers;
- (b) Internal heating systems designed so they can be connected to a heat network with minimal retrofit; and
- (c) Pipe work routes to be safeguarded to the boundary of the plot where connection to the heat network is likely to be made.

The energy safeguarding measures as approved shall be implemented prior to first occupation of the relevant Phase/s and maintained as such thereafter.

Reason: In order to safeguard connection of the development to a future decentralised energy network, and to comply with Policy SI 3 of the London Plan and Policy LP20 of the Local Plan.

60. **(Odour Impact Assessment):** Prior to occupation/use of each of the flexible commercial units or large retail store within the relevant Phase/s identified on the Phasing Plan submitted under condition 3 above, , and applicable only in the event the unit/s/use will be occupied for restaurant and/or café/ and/or hot food preparation use, an Odour Impact Assessment, including mitigation measures, in line with the "Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems" prepared by Netcen on behalf of the Department for Environment, Food and Rural Affairs (Defra) dated January 2005 shall be undertaken and submitted to and approved in writing by the local planning authority for any/all of the commercial units falling under Land Use class E (café or restaurant).

The development shall be carried out in accordance with the approved details, and the measures thereby approved shall be retained thereafter.

Reason: To safeguard the amenity of surrounding residents and to ensure the development complies with Policies LP10, LP24 and LP26 of the Local Plan.

61. **(Buildings Management Plan):** Prior to the first occupation of the residential blocks within the relevant Phase/s identified on the Phasing Plan submitted under condition 3 above, a Buildings Management Plan which shall include details of a maintenance schedule of the nitrogen dioxide abatement measures provided in accordance with condition 62 below to ensure its effective on-going use shall be submitted and approved in writing by the local planning authority.

This Buildings Management Plan shall be implemented prior to any residential occupation at floors 7 and below for all the blocks directly facing onto the High Road Goodmayes to the north, the railway line/service road to the south, and the existing Access Road into the site to the east and be retained thereafter unless otherwise agreed in writing with the local planning authority.

Reason: In order to ensure the development meets local, regional and national air quality objectives, and in accordance with Policies LP24 and LP26 of the Local Plan.

62. **(Air Ventilation):** All the residential dwellings located at floors seven (7) and below for all the residential blocks directly facing onto the High Road Goodmayes to the north, the railway line/service road to the south, and the existing Access Road into the site to the east shall be fitted/ ventilated with either air obtained from elevated locations

within the development and/or the use of nitrogen dioxide filters, both of which shall utilise closed mechanical ventilation to ensure national objectives with respect to air quality are met for future residential occupiers of the development.

This mitigation shall be to be operational prior to any occupation by residents at floors seven (7) and below in the locations described above and with regard to the relevant Phase/s indentified on the Phasing Plan submitted under condition 3 above, and shall be retained and maintained thereafter unless otherwise agreed in writing with the local planning authority.

Reason: In order to ensure the development meets local, regional and national air quality objectives, and in accordance with Policy LP24 of the Local Plan and Policy SI 1 of the London Plan.

63. (**Village Hall Management Plan**): Prior to first use of the Village Hall, a Village Hall Management Plan hereby approved shall be submitted to and agreed in writing by the local planning authority, and which shall include details of, but not limited to:

- (a) Type of events to take place;
- (b) Days and Hours of use;
- (c) Number of visitors; and
- (d) Number of staff.

The Village Hall shall be inclusive and accessible for use by all residents (both from within and outside the site) during operational times of the Village hall.

The Village Hall Management Plan as approved shall be implemented upon first use of the Hall and shall not be altered without written permission from the local planning authority.

Reason: In order to ensure the development complies with the terms of the application and accord with Policy LP26 of the Local Plan, and Policy D5 of the London Plan.

CONTINGENT CONDITIONS

64. (**SuDS Infiltration of surface water into ground**): No drainage systems for the infiltration of surface water to the ground are permitted other than with the written consent, in consultation with the EA, of the local planning authority. Any proposals for such systems must be supported by an assessment of the risks to controlled waters. The development shall be carried out in accordance with the approved details.

Reason: To ensure that the development does not contribute to, and is not put at unacceptable risk from or adversely affected by, unacceptable levels of water pollution caused by mobilised contaminants, in line with paragraph 170 of the National Planning Policy Framework.

65. (**Ventilation/Filtration/Extraction**): No food hot food preparation shall take place at any of the flexible use commercial unit or Village Hall hereby approve until the following details have been submitted to and approved in writing by the Local Planning Authority for the relevant use:

Details of any associated extraction/flue/filtration/ventilations systems to be installed, including details of any other external plant or machinery (including ventilation units and air intake louvers), together with details of its method of construction, appearance, finish and acoustic performance. The measures shall be in accordance with the relevant DEFRA guidance on the control of piling and noise from commercial kitchen exhaust

systems (January 2005).

The flexible commercial units and Village Hall shall only be occupied in accordance with the approved details.

Reason: In order to ensure that the commercial uses respect the amenities enjoyed by occupants of neighbouring properties and that they do not suffer an unreasonable loss of amenity from the operation of the uses hereby permitted and to comply with Policies LP24 and LP26 of the Local Plan.

COMPLIANCE CONDITIONS

66. **(BREEAM):** The School and large retail (Tesco) store hereby permitted shall be constructed to achieve not less than BREEAM 'Very Good' in accordance with the submitted Energy Meinhardt Assessment and Sustainability Strategy Issue 4 – 16 February 2021 (or the equivalent standard in such measure of sustainability for non-residential building design which may replace that scheme). The School and large retail (Tesco) store shall not be occupied until formal certification has been issued confirming that not less than 'Very Good' has been achieved and this certification has been submitted to, and approved in writing by, the Local Planning Authority.

Reason: In the interest of sustainability, energy efficiency and to provide a high quality development in accordance with the aims of Policy LP32 of the Local Plan.

67. **(Fixed Building Services Plant):** Noise emitted from any new fixed building services plant/mechanical plant and equipment shall be designed to a level at least 10 dB below the lowest representative existing background noise level when assessed in accordance with BS 4142:2014 at a position 1 m from the window of the nearest noise sensitive premises (i.e. Plant LAr,Tr = -10 dB LA90,T). This criterion applies to the total contribution of noise from all new plant items associated with the development hereby approved that may run during any particular period.

Reason: In order to protect the health and ensure quality of life enjoyed by future occupants of the development and to comply with Policies LP24 and LP26, and Policy D14 of the London Plan.

68. **(Building Regulations):** All of the dwellings (with the exception of units to be constructed in accordance with condition 34 above, shall comply with Building Regulations Optional Requirement Approved Document M4 (2) Category 2: Accessible and adaptable dwellings (2015 edition).

Reason: In order to ensure that the development provides (or can be adapted to provide) satisfactory accommodation for people whose mobility is impaired, and to accord with Policies LP5, LP26 and LP32 of the Local Plan.

69. **(Water efficiency):** The development hereby approved shall be designed to meet water consumption target of 105 litres per person per day, with an additional 5 litres per person per day for external water use.

Reason: To comply with London Plan Policy SI 5.

70. **(Bicycle Spaces – residential):** The development hereby approved shall provide residential cycle parking for 2567 (two thousand and sixty five) long-stay bicycle spaces for future occupiers of the residential development, and 33 (thirty three) short stay bicycle spaces for visitors, and shall be provided in accordance with, and prior to, residential occupation of the relevant Phase/s identified on the Phasing Plan

submitted under condition 3 above . The residential cycle parking spaces shall thereafter be made permanently available and maintained for the relevant users of and visitors to the development, in accordance with the approved plans and details.

Reason: In order to ensure the development complies with the terms of the application and with Policy LP23 of the Local Plan and Policy T5 of the London Plan.

71. (Bicycle Spaces – school): The development hereby approved shall provide school cycle parking for 76 (seventy-six) long-stay bicycle spaces for future users of the school, and 5 (five) short stay bicycle spaces for visitors to the school and shall be shall be provided in accordance with, and prior to, use of the the school within the relevant Phase/s identified on the Phasing Plan submitted under condition 3 above . The school cycle parking spaces shall thereafter be made permanently available and maintained for the relevant users of and visitors to the development in accordance with the approved plans and details.

Reason: In order to ensure the development complies with the terms of the application and with Policy LP23 of the Local Plan and Policy T5 of the London Plan.

72. (Bicycle Spaces – Commercial): The development hereby approved shall provide for 135 (hundred and thirty five) long-stay bicycle spaces for future users of the large retail store and flexible commercial space, and 52 (fifty two) short stay bicycle spaces for visitors to these uses, and shall be provided within the relevant Phase/s identified on the Phasing Plan submitted under condition 3 above. The commercial cycle spaces shall be provided as shown on the plans approved plans and details. and thereafter be made permanently available and maintained for the relevant users of and visitors to the development.

Reason: In order to ensure the development complies with the terms of the application and with Policy LP23 of the Local Plan and Policy T5 of the London Plan.

73. (Communal Spaces): All communal amenity spaces shown on/in the drawings and documents approved under condition 2 above shall be accessible at all times to all future residents and shall not be segregated by tenure.

Reason: To ensure an inclusive development and to accord with Policy LP26 of the Local Plan, and Policy S4 of the London Plan.

74. (Lifts): Prior to the first residential occupation of such building/s or part of a building, in the relevant Phase/s identified on the Phasing Plan submitted under condition [] above , all lifts shown on the approved plans (for the relevant Phases) shall be installed and be fully operational.

The lifts shall be appropriately maintained and permanently retained as approved.

Reason: To ensure that adequate step-free access is provided to all accessible floors, in accordance with Policy D7 of the London Plan 2016.

75. (Non-Road Mobile Machinery): No NRMM shall be used on the site unless it is compliant with the NRMM Low Emission Zone requirements (or any superseding requirements) and until it has been registered for use on the site on the NRMM register (or any superseding register).

Reason: To ensure that air quality is not adversely affected by the development in line with London Plan policy SI 1 and the Mayor's SPG: The Control of Dust and Emissions during Construction and Demolition.

76. **(Vibration Dose Values):** The Vibration Dose Values (VDV) shall be calculated and assessed from the measured acceleration levels in accordance with BS 6472-1:2008 (revised). For residential development, the VDV (m/s²) shall not exceed 0.2-0.4 during the day and 0.1-0.2 at night.

Reason: In order to protect the health and ensure quality of life enjoyed by future occupants of the development and to comply with Policies LP24 and LP26, and Policy D14 of the London Plan.

77. **(Internal noise criteria - residential):** The residential buildings hereby approved shall be designed to meet the following internal noise level criteria:

- Living Rooms: 35 dB LAeq,16hr (between 07:00 and 23:00 hrs)
- Bedrooms: 30 dB LAeq,8hr (between 23:00 and 07:00 hrs)

The scheme shall be fully implemented in accordance with the approved details.

Reason: In order to protect the health and ensure quality of life enjoyed by future occupants of the development and to comply with Policies LP24 and LP26, and Policy D14 of the London Plan.

78. **(Residential Hub):** Residential Hub hereby permitted shall operate and be laid out and implemented in accordance with the approved plans and documents and shall not be used for any other purpose.

Reason: To encourage inclusive and mixed communities in accordance with Local Plan Policy LP17 and London Plan Policy S1.

79. **(Secure by Design):** Each building, or part of a building, shall obtain a 'Secured By Design' Accreditation prior to first occupation of each building or part of a building, or use of each relevant Phase identified on the Phasing Plan submitted under condition [] above. The development shall only be carried out in accordance with the approved details and maintained thereafter.

Reason: To ensure that Secured by Design principles are implemented into the development as far as reasonable and in accordance with Policy LP26 of the Local Plan and Policy D11 of the London Plan.

80. **(Boilers):** Any non-CHP gas fired boilers installed in this development must achieve dry NOx emission levels no greater than 40 mg/kWh.

Reason: To protect air quality and health in accordance with the aims of the Redbridge Local Plan and Air Quality Action Plan and Local Plan Policy LP24.

81. **(Hours of operation – large retail food store):** The large food retail store hereby permitted shall not be open to users (including all visitors and staff) outside the following times:-

- Monday 0600hrs through to Saturday 0000hrs (midnight)
- Sunday 1000hrs to 1700hrs

Reason: In order to prevent the use causing an undue disturbance to occupants of neighbouring property at unreasonable hours of the day, and to accord with Policies LP9 and LP26 of the Council's Local Plan.

82. **(Maintenance Access to Safeguarded Land):** Prior to any vehicular access being provided through the site to support the future maintenance of the use of the safeguarded land, having regard to the relevant Phase identified on the Phasing Plan submitted under condition 3 above, details shall be submitted to and approved in writing by the LPA including details of timings and bollard controls.

Reason: To ensure appropriate management and to avoid conflict with the operation of the neighbouring uses.

83. **(Air Quality Positive Statement):** Prior to the commencement of each phase of development, an Air Quality Positive Statement (AQPS) shall be submitted to and approved in writing by the local planning authority. The AQPS shall set out measures that can be implemented across the phase that improve local air quality as part of an air quality positive approach, in line with the latest GLA Air Quality Positive Guidance. The measures set out with the AQPS for each phase shall be implemented in accordance with the details so approved, and thereafter retained, unless otherwise agreed in writing by the local planning authority.

Reason: To protect and improve local air quality, in compliance with Local Plan Policy LP24 and London Plan Policy SI 1.

84. **(Whole Life Carbon):** Prior to the occupation of each building the post-construction tab of the GLA's whole life carbon assessment template should be completed accurately and in its entirety in line with the GLA's Whole Life Carbon Assessment Guidance. This should be submitted to the GLA at: ZeroCarbonPlanning@london.gov.uk, along with any supporting evidence as per the guidance. Confirmation of submission to the GLA shall be submitted to, and approved in writing by, the local planning authority, prior to occupation of the relevant building.

Reason: In the interests of sustainable development and to maximise on-site carbon dioxide savings, in accordance with Local Plan Policy LP19 and London Plan Policy SI 2.

85. **(Digital connectivity):** Prior to relevant phase (excluding demolition, site clearance and preparatory ground works), detailed plans shall be submitted to and approved in writing by the local planning authority demonstrating the provision of sufficient ducting space for full fibre connectivity infrastructure within the development. The development shall be carried out in accordance with these plans and maintained as such in perpetuity.

Reason: To provide high quality digital connectivity infrastructure to contribute to London's global competitiveness, in accordance with London Plan Policy SI 6.

86. **(Post-completion report):** Prior to the occupation of the Relevant Phase a Post Completion Report setting out the predicted and actual performance against all numerical targets in the relevant Circular Economy Statement shall be submitted to the GLA at: CircularEconomyLPG@london.gov.uk, along with any supporting evidence as per the GLA's Circular Economy Statement Guidance. The Post Completion Report shall provide updated versions of Tables 1 and 2 of the Circular Economy Statement, the Recycling and Waste Reporting form and Bill of Materials. Confirmation of submission to the GLA shall be submitted to, and approved in writing by, the local planning authority, prior to occupation.

Reason: In the interests of sustainable waste management and in order to maximise the re-use of materials, in accordance with London Plan Policy SI 7.

Draft Produced: 13 December 2021

DRAFT

Document reference	Comment
R02-Scoping and Transport Baseline Report-2019-01-15	Request received from LBR for a full draft Transport assessment report rather than a scoping report
R03-Draft Transport Assessment Report – 2019-03-11	
Comments from TfL regarding: “ <i>R02-Scoping and Transport Baseline Report-2019-01-15</i> ”	LBR did not comment on this report rather gave their comments verbally to report “ <i>R03-Draft Transport Assessment Report – 2019-03-11</i> ” at a meeting held on 19 th March 2019.
TN07 traffic generation 2019-06-21	
LBR correspondence dated 5 th September 2020 setting out their position on suitable proxy sites for trip generation.	Sites noted and incorporated in submission transport assessment report.
LBR correspondence dated 10 th October 2020 setting out their position regarding car parking reductions and traffic generation.	Advice noted and no alteration to traffic generation forecasts is included in the submission transport assessment to reflect reduced car parking levels.



Redevelopment of Tesco Extra Site,
Goodmayes

Draft Scoping and Transport
Baseline Report

For
Weston Homes

Document Control Sheet

Draft Scoping and Transport Baseline Report
Redevelopment of Tesco Extra Site, Goodmayes
Weston Homes

This document has been issued and amended as follows:

Date	Issue	Prepared by	Approved by
14/12/2018	1 st Draft	MF	JNR
15/01/2019	Draft Issue	JNR	JNR

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R	LinSig Output – High Road/Goodmayes Retail Park and Tesco Junction
S	LinSig Output – High Road/Goodmayes Road/Barley Lane Junction



Redevelopment of Tesco Extra Site,
Goodmayes

Draft Transport Assessment Report

For

Weston Homes

Document Control Sheet

Draft Transport Assessment Report

Redevelopment of Tesco Extra Site, Goodmayes

Weston Homes

This document has been issued and amended as follows:

Date	Issue	Prepared by	Approved by
12/02/2019	1 st Draft	MF	JNR
11/03/2019	2 nd Draft	JNR	JNR

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Our ref: RDBG/19/234

[REDACTED]
Motion

BY E-MAIL ONLY

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5th April 2019

Dear [REDACTED]

Redevelopment of Tesco Extra Site, Goodmayes. Redbridge - TfL Pre-application advice

Please note that these comments represent the views of Transport for London (TfL) officers and are made entirely on a "without prejudice" basis. They should not be taken to represent an indication of any subsequent Mayoral decision in relation to a planning application based on the proposed scheme. These comments also do not necessarily represent the views of the Greater London Authority (GLA).

The new draft London Plan was published on 29 November 2017 and sets out an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years. It is expected that all planning decisions within London should follow London Plan policies. As such, TfL will be expecting all new planning applications to look to be compliant with the policies as set out within the new draft London Plan.

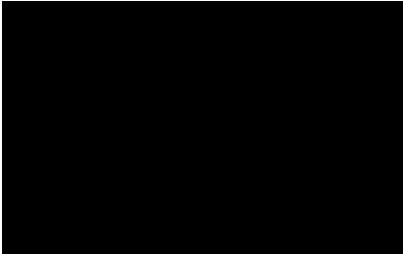
General

Firstly, I would take this opportunity to thank you for taking advantage of the TfL pre-application service, the aim of which is to ensure that development is successful in transport terms and in accordance with relevant London Plan policies. This letter follows the pre-application meeting to discuss the

development proposals with the GLA (held on 23rd January) followed by this TfL pre-app. Prior to the meeting, a site visit was undertaken on 11th March and the applicant provided TfL with a Transport Statement and various proposed drawings.

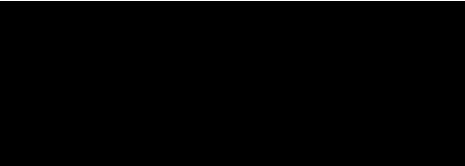
The TfL pre-application meeting was held on the 19th March 2019 and included the following attendees:

TfL Attendees:



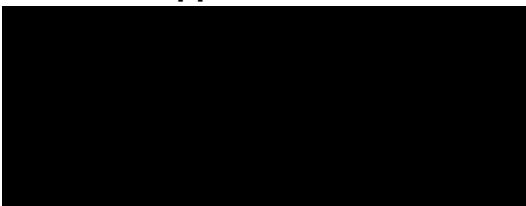
TfL City Planning, Spatial Planning (Chair)
TfL City Planning, Spatial Planning
TfL City Planning, Spatial Planning
TfL City Planning, London Plan
TfL Public Transport Service Planning – Bus
TfL Asset Operations

Borough Attendees:



Principle Planner, LB Redbridge
Urban Design Manager, LB Redbridge
Urban Design, LB Redbridge
Transport, LB Redbridge

Applicant Attendees:



Motion
Motion
Terence O'Rourke
Weston Homes
Weston Homes

TfL will continue to provide transport technical advice through the pre-application period and welcome the opportunity to provide further advice on specific matters, as and when appropriate. The applicant should note that if further meetings are required they might need to pay a follow up pre-application fee.

Site Context

The site of the proposed development is located on High Road A118 which is part of the Strategic Road Network (SRN). While the Local Planning Authority is also the Highway Authority for those roads, TfL is the Traffic Authority and has a

duty under the Traffic Management Act 2004 to ensure that any development does not have an adverse impact on the SRN.

The nearest section of the Transport for London Road Network (TLRN) is approximately 2km to the north. The nearest station is Goodmayes directly south of the site which provides access to TfL Rail and future Elizabeth Line services. Bus routes 86 and N86 serve High Road with services 364 and EL3 run along Goodmayes Road, stopping close to the site.

As such, it has been estimated by the Webcat tool <https://tfl.gov.uk/info-for/urban-planning-and-construction/planning-with-webcat> that the application site has a Public Transport Accessibility Level (PTAL) ranging from 3 - 4 which indicates a moderate/good level of public transport accessibility on a scale of 0 to 6b where 6b is the most accessible.

Development Overview

At the time of the pre-application meeting, the proposed development site comprised the following principal elements:

- the demolition of the existing Tesco foodstore
- its replacement with ("the Proposed Development") circa 1,400 residential units and its associated petrol filling station
- a replacement 9,000sqm Tesco foodstore
- 2,000sqm B1 'flexible commercial space'
- a 3-form primary school (600 students)
- car and cycle parking

The development is in the 'Crossrail Growth Corridor' as identified by Redbridge. The entire corridor is expected to support/deliver 6,000 new homes in total, in addition to other uses including education and health.

Healthy Streets and Vision Zero

TfL has adopted the Healthy Streets Approach, which aims to reduce vehicle dominance, improve air quality, increase walking and cycling, and make attractive places to live, work and do business. There are ten Healthy Streets indicators which put people and their health at the heart of decision making, and aim to result in a more inclusive city where people choose to walk, cycle and use public transport. TfL expects all developments to deliver improvements that should be assessed against the Healthy Streets policy indicators, in line with draft London Plan Policy T2.

The development proposals and associated public realm should support the aims of the Mayor's Transport Strategy (MTS) including that all Londoners undertake 20 minutes of active travel each day, and for at least 80% of trips across London to be made by active, efficient, and sustainable modes by 2041, i.e. walking, cycling and public transport. It should also be demonstrated how the development connects to the wider walking and cycling network and links to local destinations including public transport stops and stations. An Active Travel Zone (ATZ) assessment should also form part of the transport assessment. Guidance on how to undertake an ATZ assessment is set out on TfL's website: <https://tfl.gov.uk/info-for/urban-planning-and-construction/transport-assessment-guide/transport-assessments>

The MTS sets out the goal that, by 2041, all deaths and serious injuries will be eliminated from London's transport network. TfL's Vision Zero Action Plan includes the Safe System Approach which should be taken into account when designing for new development. The transport assessment should support the Vision Zero approach, consider the road safety environment in the direct vicinity of the site and provide appropriate safety mitigation for any issues identified through the ATZ assessment.

Examples of good design for cycle lanes, cycle tracks, bus bypasses and other potential design options for the site are set out in TfL's Streets Toolkit, available to view at <https://tfl.gov.uk/corporate/publications-and-reports/streets-toolkit>.

Car Parking

The site is accessible by public transport, in an area of PTAL 3-4. The applicant also suggests that the site will have a true PTAL of 5 once the Elizabeth Line is operational.

The applicant proposes 600 car parking spaces for the residential element and 450 car parking spaces for the retail element. There are no car parking spaces proposed for the school or the flexible commercial space.

In general, as the first site to come forward along the Redbridge Crossrail corridor the site should aim to be ambitious and aim for car-free to create a sustainable site that is highly accessible for residents, pupils, employees and visitors to the site.

A CPZ should form part of the parking strategy to help avoid any parking on local roads by customers of the Tesco or any other element of the site. The Mayor, and by extension TfL, will assess the site partly on whether it meets our ambition to meet the MTS targets and it should embed sustainable modes as

the natural choice for travel from the outset. In practice, this means planning for car-free growth as the starting point, and only providing car parking that is absolutely necessary, based on robust evidence.

Residential Parking

The applicant has provided evidence to suggest that the proposed development will have a PTAL of 5. In line with the draft London Plan standards, this means that no parking should be provided for the residential element of the site, except blue badge parking. It is considered that with the Elizabeth Line station adjacent to the site as well as several bus services which provide good access to destinations in the surrounding area, car ownership is not required. Car parking for residents should not be based on historical data.

In line with Draft London Plan standards, blue badge parking should be provided for 3% of residential units from the outset. The developer should also identify space where an additional 7% blue badge parking could be facilitated, should the demand arise.

To comply with the draft London Plan, 20% of car parking spaces should be provided with an active electric vehicle charging point with all remaining car parking spaces subject to passive parking provision in accordance with the draft London Plan Policy T6.1C.

Supermarket Parking

Retail is a significant trip attractor, and many retail trips are walkable. New development should encourage and enable trips to be made by walking and cycling through appropriate design, public realm improvements, and improvements to local walking and cycling routes. Many longer journeys can be made by public transport. The Elizabeth line will provide improved local and regional connectivity.

The retail element exists as part of a mixed use development. Mixed use developments can enable a high mode share for walking, cycling and public transport. Any proposed retail car parking should reflect this.

Tesco have stated that they require at least 450 car parking spaces to operate this store. This is well beyond the standards set out in draft London Plan Policy T6 – Car Parking which seeks maximum car parking standards for retail would be a maximum of 171 car parking spaces for a retail store of this size meaning car parking should be reduced and is not considered acceptable. It is further noted that during the construction of the site (which is expected to take several years) the store is proposed to operate with fewer spaces.

At the moment the car parking “requirement” of 450 spaces is not justified especially given that the applicant indicates that the site’s true PTAL is 5. Any car parking proposed for the retail part of the development should be justified. TfL would want evidence of calculations undertaken to support the proposed level of car parking. Basing car parking provision on existing levels of car parking is not appropriate, as it does not take an ambitious approach to encouraging and enabling mode shift to walking, cycling and public transport.

TfL also consider that the case for linked trips to the town centre within the scoping note is weak, given it is a linear centre and that there is potential the Car Park will be used by parents dropping at school which will increase AM Peak congestion and discourage active travel.

Furthermore, the currently proposed level of ground floor car parking results in an inefficient use of space within the scheme, which could potentially be allocated to more retail, plant, residential or other facilities.

Disabled persons parking should be provided as set out in Policy T6.5 Non-residential disabled persons parking with 6 per cent (of total parking provision) for designated bays alongside 4 per cent for enlarged bays. Where car parking is provided for the retail development, provision for rapid electric charging vehicles should be made.

School Parking

No dedicated car parking will be provided for the proposed primary school. However, as noted during the meeting, the 450-space Tesco car park is likely to be mostly empty at school drop-off times. It is considered likely that due to its position next to the school this availability will encourage student drop-off by car, therefore increasing the number of vehicle trips to and from the site and making the site less attractive for all users to walk, cycle or scooter to the school. This is not in line with draft London Plan Policy T2 – Healthy Streets. TfL request the applicant provide a strategy to discourage drop-off and pick-up by car.

Cycle parking

The applicant has stated that the number of cycle parking spaces at the site will be in line with Draft London Plan standards. This is welcomed, but it should be ensured that all cycle parking is in line with the London Cycle Design Standards (LCDS), which set out specific recommended and minimum standards for the length, width, and height of spaces, the amount of space required between stands, aisle widths, and access requirements.

Cycle parking should be viewed as an important element of the proposed development. As the applicant is proposing significant numbers of car parking spaces on-site TfL will expect cycle parking design to the recommended highest standards, and not just to the minimum standards. This includes providing a good provision of non two-tier stands and sufficient (5% minimum) provision for larger bikes including tricycles, cargo bikes, and bikes used by people with a disability.

Any public realm cycle parking, for example for visitors, will need to be designed to avoid any fly-parking around the site which may impede pedestrian or vehicular flows and building entrances. Cycle parking should preferably be on ground floor level for easy access. However, if cycle parking is proposed on a lower level, given the level differences on site, the developer should consider step-free ramped access into the main cycle parking area. If the use of lifts to access the cycle parking area is proposed, the applicant should consider the capacity of lifts compared to the number of cycle parking spaces they serve and show the calculation made to ensure that lifts will have sufficient capacity to take bicycles from the bike store outside. Depending on the number of spaces accessed by lift, it may be appropriate to provide stairs with cycle rail to allow people to choose how they transport their bicycle up and down.

Attention should also be paid to the new TfL Streets Toolkit and Streetscape Guidance document, which is available to view on TfL's website (<https://tfl.gov.uk/corporate/publications-and-reports/streets-toolkit>), when designing their street layout.

Accessibility

TfL would expect to see more detailed consideration of how people access various parts of the site by all modes, focusing particularly on the access from the Goodmayes station to the site. Pedestrian and cycle desire lines should be identified and appropriate routes designed to accommodate them.

The applicant is encouraged to design the site in such a way as to make it as easy, safe and convenient as it possibly can be to walk and use a bicycle to get around the area. The Transport Assessment and designs should include detailed information on access arrangements and distribution of cycle parking within the site to be able to understand the likely circulation of cyclists. This is particularly important at the two access routes proposed which appear to narrow on exit and it is unclear how the proposed route leads onto the surrounding pathways.

In order to support the aspiration for more people cycling both shorter local journeys and longer trips, the application should contain some analysis of local cycling and walking conditions compounded by the walk and cycle to the nearest bus stops, railway stations and other local facilities being in whole or in part along the High Road with its poor pedestrian and cycle environment.

It is recommended that the applicant undertakes a Healthy Streets Check for Designers of the study area and an assessment of the nearest bus stops, the scope to be agreed by the applicant and TfL, to determine any necessary improvements in order to encourage sustainable trips associated with the development and address current deficiencies.

Given the constrained nature of the site, new connections are needed to integrate the site satisfactorily into the wider urban environment, improving access to public transport and encouraging walking and cycling, particularly for short local trips. We believe not only that the proposal to provide an eastern entrance to Goodmayes station directly into the site is essential for delivering Good Growth on this site, but also that a bridge needs to be extended to the area south of the railway line. It would help overcome the severance caused by the railway line, alleviate passenger congestion at the existing Goodmayes station entrance, connect communities to the north and south of the railway line and allow for through-movement on foot and by cycle through the area in a way that avoid the busier main roads. Without this, the site is compromised and the prospects for encouraging people to walk, cycle and take public transport are much reduced.

The proposed connection to Goodmayes Road and the existing Goodmayes station entrance at the south-western corner of the site is also needed to improve overall connectivity. This should not be regarded as a substitute for the second station connection further east.

It is also essential to break down the barrier that High Road currently represents, and to open up access to open spaces beyond the site such as Barley Lane Park. While there is public space proposed within the site, there is a need to provide good, safe access to other kinds of open space, particularly larger areas for recreation. The desire lines and crossings should ideally be reflected in the proposal. Clarity is needed about where controlled pedestrian and/or pedestrian/cycle crossings are proposed. Were there to be only one crossing, this would not be adequate to meet the likely pedestrian crossing

demand from and to the development. In particular, a controlled crossing on the western arm of the High Road / Retail Park Access Road junction is needed.

The applicant proposes providing a new footway and cycleway along the northern perimeter of the site which TfL welcomes. It is recommended that the proposed cycle route be segregated from motorised traffic and that appropriate provisions are made to allow easy access to the bus stop on the southern side of High Road. For example, by using a bus stop bypass

<http://content.tfl.gov.uk/bus-stop-design-guidance.pdf>

The applicant mentioned widening the High Road at the TfL Pre-application Meeting. Increased capacity on the road network needs to be carefully managed to avoid wider negative impacts on the road network and on other road users, including bus users and people walking and cycling. Increased capacity should mitigate impacts on air quality, noise and public health. Any improvements to streets should be made in accordance with the Healthy Streets Approach and should help meet the London-wide aim of 80 per cent of all journeys being made by walking, cycling and public transport by 2041, as set out in the MTS. This includes the need to encourage and enable shorter trips to be made by walking and cycling, and longer trips by public transport.

TfL request clarity as to whether a new potential access to the Elizabeth line will form part of this application. Any new access should be designed to be fully integrated into the public realm, and should be accessible by all (step-free).

It was stated at the TfL Pre-application meeting that 2-3 articulated lorry movements are expected per day. The applicant should demonstrate how these movements can be made safely, both in accessing the site from the High Road and internally within the new development itself.

High Road Public Realm

Providing a footway on the southern side of High Road is welcome, but little information has been provided about this. Although the highway is beyond the site boundary, the character and function of it is fundamental to the kind of place that will be created by the new development – more detail on how the road will change and how the public realm will look and feel is therefore required. Significant improvements to pedestrian and cycle facilities must be part of this. In line with the MTS, the proposal should set out how changing High Road can help to achieve both mode share targets and Vision Zero objectives. High Road will have a residential and town centre retail frontage and the kind of

movement it accommodates should change accordingly – in the future, this will be more about people movement along and across High Road than about vehicular through-movement.

The relationship between ground floor uses and the public realm on High Road needs further development should be explored further. High Road could and should become an extension of the Goodmayes town centre area, capable of generating significant footfall and able to support ground floor retail and other non-residential uses that can help enliven the public realm and transform High Road into a mixed-use street. The set-back of building frontages at the north-western corner of the site is welcome, but needs to go further, with more consideration given to how this works as a public space, capable of hosting different types of activity, which might include rest, relaxation and play, and also offer commercial opportunities. The form and dimensions of the space, and the way it is bounded currently appear to limit the potential of this important part of the public realm.

The proposal should generally demonstrate how High Road could become a Healthy Street. A clear vision and a strategy are therefore needed for tackling the High Road corridor, one that goes beyond the immediate area of the site. This should have reference to the prospect of linking to the proposed Cycle Future Route 6, which is currently proposed to end at Seven Kings but which could be extended further east along the A118. This would require dedicated, safe and comfortable cycle provision in place of the current narrow advisory cycle lanes and lack of provision at junctions. TfL would expect to see proposed cross-sections and more detailed elevations, showing how the current carriageway space should be relocated in order to provide a better balance between vehicles and people, and more developed proposals for how trees and landscaping can help support a positive relationship between ground floor uses and the street.

Southern boundary and car park / servicing accesses

As a new part of Goodmayes, and a place many people are going to call home, the most problematic part of the site in the current proposal is the portion along the southern boundary, which is highway-dominated and treated as a backland area. Given that it will be on the doorstep of people's homes and will be experienced by many people seeking to move to and through the site from the south, east and west (if all proposed new connections can be secured) then it is unacceptable that highways are not treated as streets, where people are going to be walking and cycling.

Rationalising car parking will help reduce demand for vehicular movement in this area. Given the need for servicing of residential uses across the site, we would question the strategy of doing so from only one point of access – this is leading to the convoluted highways arrangements along the southern boundary. Alternative strategies should be explored, or revisited as appropriated, which could include a second vehicular access from High Road. Although this may be seen to compromise the proposed pedestrianised spaces within the western part of the site, it may be a more balanced approach. Any vehicular access in this area could be designed as a people-friendly street, with no access for through-traffic.

Rethinking the highways in the southern part of the site would also open up the opportunity to create a more positive relationship between buildings, railway line and the urban area to the south, which would help to support a new station entrance.

Trip generation, Distribution and Transport Assessment

The Transport Assessment report submitted in support of the application should be in line with TfL's 'Transport Assessment Best Practice Guidance':

<http://www.tfl.gov.uk/info-for/urban-planning-and-construction/transport-assessment-guidance>.

The estimated mode split of the development could be determined by several factors including existing mode share trends in the area, the amount of car parking proposed to be provided, and the proposed improvements to walking and cycling by the developer. TfL will expect the developer to provide the impact of the development on bus and Elizabeth Line services in the AM and PM peak split by direction and therefore the applicant should evidence the likely origins and destinations of the future residents, employees, visitors and customers who will travel to each of the residential, educational and commercial elements of the site. The use of the Redbridge 022 MSOA in the context of trip generation can be considered robust for the assessment of vehicle trips and can be used for that purpose if the applicant would wish to do so.

However, as with the car ownership, TfL consider that the Ilford town centre MSOA or a combination of OAs around Goodmayes Station below the A118 High Road within similar walking distance of the Station would be more representative and would want the applicant to use one of these options to determine Public Transport and Cycling/Walking trip generation.

When looking at the number of walking and cycling trips generated by the proposals, the applicant should bear in mind that all public transport trips (except those that start on a bicycle) start and end on-foot. The impact of the scheme on the High Road and Goodmayes Road footways and cycle facilities should therefore not be underestimated.

Residential Trip Generation criteria

- Only Greater London sites should be used;
- Only Sites with a PTAL of 4+ should be used;
- The range of units selected should more closely resemble the provision on-site.
- Affordable housing flats should also be included if sufficiently relevant sites are available and these should be proportionally added in line with the split (35% affordable and 65% private);
- The total people trip rate looks to be very low, with only 18% of residents departing from the site in the AM peak.

Retail/Petrol Filling Station (PFS)

The search criteria for the PFS are too generic. Travel patterns for food superstores (with or without PFSs) across the UK are highly unlikely to be similar to travel patterns for a Tesco located less than 300m from a mainline railway station in London. The applicant should only use sites in London and for the weekdays only Friday should be used to provide a worst-case scenario.

If the above does not produce sufficiently relevant survey sites, the applicant should undertake their own survey of the Tesco and PFS showing the number of trips it generates and compare this to a survey of a Tesco superstore with a similar location (i.e. similar PTAL and car park to floorspace ratio) without a PFS. Alternatively, the survey of the existing Tesco could capture vehicles that visit both the Tesco store and/or other retail accessed via the Goodmayes Retail/High Road junction and the PFS, as these trips would be unlikely to disappear once the PFS is removed.

Junction Capacity Assessment

The junction capacity assessment will likely need to be adjusted following the amendments above. However, it should be noted that with the current trip generation assessment the Tesco and Goodmayes Retail Park/High Road Signalised Junction has a DoS of 85.7 in the 2018 baseline scenario, which in London means that a junction operates at capacity given fluctuations in traffic.

Therefore, it is considered likely that this junction, as well as potentially the High Road/Goodmayes Road/Barley Lane Signalised Junction will operate at or over capacity in 2024, even without the development in place.

Additionally, it appears that the Tesco and Goodmayes Retail Park/High Road Signalised Junction, while seemingly operating at or within capacity, has average queues up the Retail Park access arm of 6 vehicles on a Friday peak and 10 on a Saturday peak. However, as the Retail Park access arm is less than 30m long between its stop line and the Tesco/Goodmayes Retail Park Roundabout Junction, this level of queueing, assuming 6m length for each queuing car (car + buffer space in front and back) could affect the operation of the roundabout.

TfL request further evidence of how the models have been validated. It is stated that queue length surveys were undertaken, but it is not stated how the queues were measured. This is especially important for the signalised junctions. TfL guidance states: *"To try and collect maximum queue length data on-street, it is best to stand at the back of the queue at the start of green. Considering the case where vehicles will start discharging at the front of the queue and vehicles are joining the back of the discharging queue, the maximum length of the queue occurs at the point where an arriving vehicle is no longer delayed by the back of the discharging queue. If there are no arriving vehicles, then the queue length remains the queue at the start of green."*

Impact on the Transport Network

The full impact of the development on the public transport network can only be determined when the application is submitted. It is dependant on a number of factors including the number of car parking spaces provided and measures which will improve uptake of active travel modes.

Impact on Bus Network

Directionality of bus trips should be outlined in the transport assessment to allow TfL to fully understand the impact of the development on the local bus network.

TfL would strongly support bus priority, i.e. a bus lane, being provided westbound on the A118 approaching the Barley Lane junction. This is a congestion hotspot that causes delays to bus passengers and increases run-time variability, meaning passengers journey times can vary considerably, while also making the route hard to control. LB Redbridge advised that they are

considering a project to improve the entire A118 High Road corridor. TfL would expect bus priority to feature highly in any such study, so a bus lane at this location would support this development, and the wider network.

TfL are currently looking at how the 6000+ new dwellings expected along the Crossrail intensification corridor (Ilford to Goodmayes), of which this development is a significant element, will impact bus routes in the area. It is likely to generate a large number of trips, and intervention will probably be required (e.g. enhancements to frequencies of existing routes). TfL would normally request funding of any intervention over a 5 year period with payment at a specified point in the build, e.g. completion of 50% of the units, which allows us to forward fund the bus service improvements so they are in place from when developments are delivered, rather than reacting after usage increases.

Impact on Elizabeth Line

Based solely on the information currently provided in the transport scoping note of an additional 16 passengers per train in the peak hour using the Elizabeth Line, it is envisaged that there will not be a significant impact on the network. However, TfL can only make full comment on the total impact to the Elizabeth Line and other public transport network after reviewing the full application and supporting documents.

Access to Public Transport, Goodmayes Station and Local Services

As stated previously, it is expected of the applicant to be ambitious for this scheme as it will help to set the standard of future schemes in the area. LB Redbridge and the applicant have taken advice on a potential new station entrance to the south side of the site at Goodmayes which would enable easier access to the station. TfL would need to consider how passenger numbers accessing the station are managed, particularly those entering the station on platform 1, which is normally out of use with trains passing at high speed. TfL and Crossrail would hope the applicant continues to engage as plans progress on the potential for a new station entrance.

Mitigation

TfL is unable to comment on expected mitigations fully at this stage. Providing a robust trip generation, public transport, and active travel impact assessment will help determine whether additional mitigation is required. The applicant should mitigate as much of its impact as possible through good design of the scheme

in line with draft London Plan and the MTS including the Healthy Streets approach.

Delivery and Servicing Plans (DSP) and Construction Logistics Plans (CLP)

Although details are still being developed, TfL welcomes the intention to provide for all servicing within the site. Deliveries to and collections from the development will need to be carefully considered. This includes trying to separate HGV vehicle movements as much as possible from vulnerable road users. Residential deliveries will generate a significant number of trips to the site and the DSP will need to show how these deliveries will be received to minimise failed deliveries (e.g. concierge services) which generate even more vehicle trips. Furthermore, the applicant should look at innovative delivery solutions for the commercial element of the site, such as cargo bike deliveries. Guidance on producing a DSP is available here:

<http://content.tfl.gov.uk/delivery-and-servicing-plans.pdf>

TfL will expect the applicant to provide an Outline CLP in line with TfL's 2017 CLP guidance. This should include a construction phasing plan, site layout plans for each construction phase showing locations of vehicle loading areas, tower cranes, and welfare facilities, an estimate of the likely number of construction vehicles per day for each month of construction, a review of all likely construction vehicles that will be present at the site and swept path analysis showing how vehicles will access and egress the site in forward gear.

Summary

In summary, there are a number of strategic issues which need to be adequately addressed as part of the submission for TfL to confirm its 'in principle' support.

- Detailed justification and clarification of car parking numbers, allocations and locations (including Blue Badge parking and EVCPs);
- Clarification of Cycle parking numbers, allocations and locations (including 5% of provision be suitable for larger models of cycle);
- Details of the provision of pedestrian and cycling links and local connectivity in the area;
- Further details on trip generation rates and modal split measures of similar sites to ensure a robust assessment of the impacts to all transport networks;

- Clarification of the walking and cycling improvements proposed at the site along and across High Road; and
- Demand management through Construction Logistics Plans and Delivery and Servicing Plans.

This letter has set out a number of strategic issues that need to be addressed as part of the forthcoming submission. If you have any queries, further questions or seek clarification please contact the case officer Matthew Foreman [REDACTED] [@tfl.gov.uk\) or myself.](mailto:@tfl.gov.uk)

Technical Note 07: Residential Traffic Generation

Project: Redevelopment of Tesco Extra Site, Goodmayes
Prepared by: JNR
Approved by: JNR
Date: 21/06/2019

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1.0 Introduction

Preamble

1.1 This paper is prepared in relation to proposals to redevelop land at the Tesco Extra Site located at 822 High Road, Goodmayes ("the Site"). The Site is located within the London Borough of Redbridge (LBR). The paper is prepared to discuss approaches to, and data sources for, forecasting traffic associated with the residential elements of the redevelopment of the Site.

Development proposals

1.2 The redevelopment proposals ("the Proposed Development") for the Site comprises the following main elements.

Land Use	Existing Quantum	Proposed Quantum	Change in Quantum
Food retail	5,180m ² net sales area	4,617m ² net sales area	Reduction of 563m ² net sales area
Residential	None	1,280 units	1,280 units
Education	None	3-form entry primary school (540 pupils)	3-form entry primary school (540 pupils)
Petrol filling station (PFS)	12 pump PFS and small convenience store	None	Loss of 12 pump PFS and small convenience store

Table 1.1: Land use and quantum

1.3 The table above shows that the main changes in land use caused by the Proposed Development will be the **provision of new residential dwellings and a primary school. No change to the existing foodstore's gross floor area is proposed. The existing PFS and convenience store will be demolished during the build programme and not replaced.**

Parking Provision

1.4 Parking provision within the Proposed Development is the subject of a separate paper. However the principle underlying the provision of car parking at the Site is to significantly reduce and restrict car parking provision compared to other development in similar locations.

1.5 For the purposes of this paper the following table sets out the maximum number of car parking spaces that will be provided for each new land use alongside the currently adopted London Plan car parking space guidance and the draft London Plan guidance. This forms the basis for the traffic generation calculations discussed in this paper.

Land Use	Existing Car Parking Quantum	Proposed Car Parking Quantum	Adopted London Plan guidance (PTAL 4)	Draft London Plan guidance (PTAL 4)
Residential	None	390	1,280	640
Education	None	None	No guidance	No guidance

Table 1.2: Car Parking provision guidance

1.6 The table above shows that residential car parking at the Site will be only 30% of the car parking levels currently recommended in the London Plan and will continue to be significantly lower (only 60%) than the draft London Plan guidance. This restriction on residential car parking compared to what was until recently considered to be the norm is expected to result in a significant reduction in car ownership levels at the Site and through this car usage.

Context

1.7 It is common practice in transport planning to analyse the travel characteristics (for example timing, number and mode choice of trips) of the established population in the vicinity of a proposed development site and use this to predict the travel characteristics of the new population that will occupy the proposed development.

1.8 In the case of the Site, the established development to the north of High Road is characterised by 2-3 bedoomed houses with front and rear gardens and off-street parking. To the south of the Site the predominant characteristic is 3-4 bedoomed late Victorian / Edwardian terrace housing. In contrast, the Proposed Development will predominantly comprise of 1 and 2 bedoomed apartments, will have restrictions on car parking, will be designed to a much higher density than the existing residential development either to the north or to the south of the Site and will have a direct access to Goodmayes railway station.

1.9 Given the significant differences between the characteristics of the Proposed Development and those of existing development to the north and south of the Site, it is unlikely that the travel characteristics of the new population will be the same as those of the existing population. The extension of the travel characteristics of the existing population to the new population is therefore unlikely to result in a good fit when predicting how and when new residents will travel.

1.10 This point was specifically raised by officers of Transport for London (TfL) during a pre-application meeting held on 19th March 2019 who did not consider it appropriate to be forecasting future residential travel patterns associated with the Proposed Development by determining the local, historic travel patterns and projecting these forward.

Structure of Report

1.11 In addition to this section, the paper is structured as follows:

- ▶ Section 2 considers the use of the TRICS database to establish trip rates by all modes then application of mode split based on a variety of census data assumptions;
- ▶ Section 3 considers specific similar sites in Greater London for which data is contained in the TRICS database; and
- ▶ Section 4 reviews the approach to residential traffic generation taken by LBR in assessing the impact of the adopted Redbridge Local Plan which was found at examination in public to be sound.

1.12 A summary is provided at Section 5 together with the recommended approach to residential traffic forecasting.

2.0 Census Data

2.1 Reference has been made to the TRICS database in order to arrive at a total person trip rate for all modes per dwelling. The search parameters used are:

- ▶ Land use – Residential (flats privately owned): 65% of trip rates;
- ▶ Land use – Residential (affordable): 35% of trip rates;
- ▶ Regions – Greater London PTAL 4+
- ▶ Date Range – 01/01/10 – 03/07/18; and
- ▶ Number of Units – 9 - 493.

2.2 The outcome of this analysis is presented in Table 2.1 below for the weekday assessment. The residential TRICS outputs are included for reference at [Appendix A](#).

	AM Peak Hour		PM Peak Hour		Daily Movements	
	Arr	Dep	Arr	Dep	Arr	Dep
Total Person Trip Rates	0.095	0.459	0.318	0.193	2.326	2.513
Total Person Trips	122	588	408	247	2,977	3,217

Table 2.1: Weekday Trips for 1,280 mixed Private / Affordable Flats

2.3 Table 2.1 shows that a residential development of 1,280 dwellings has the potential to generate around 710 movements by all modes during the weekday AM peak hour (08:00-09:00) and 655 during the weekday PM peak hour (17:00-18:00 as this represents the higher of the two TRICS hours that the PM peak hour was observed on site as being in). A residential development of 1,280 dwellings has the potential to generate around 6,195 movements by all modes across the average weekday (07:00-21:00).

2.4 In order to quantify the potential level of traffic arising from the residential element of the Proposed Development, reference has been made to the 2011 Census data. As referred to above, there are significant differences between the characteristics of the Proposed Development and those of existing development to the north and south of the Site such that direct reference to the Census area MSOA022 (in which the Site is located) would not provide a good representation of the characteristics of future residents of the Proposed Development.

2.5 Following discussions with officers of TfL and LBR, the Census MSOA areas for Goodmayes to the south of the railway and also in the centre of Ilford have been considered. The rationale is the characteristics of people living in these areas are considered more likely to be similar to those of residents of the Proposed Development because these areas are within similar walking distance to a railway station as the Proposed Development would be. The chosen method of travel to work for residents in these two areas are presented below in Table 2.2 alongside those of residents of MSOA022 in which the Site is located.

Method of Travel to Work	MSOAs between railway and Green Lanes	Ilford town centre. MSOAs 029, 030, 032	MSOA 022
Underground, metro, light rail, tram and Train	47.1%	42.0%	39.8%
Bus, minibus or coach	7.6%	14.1%	9.7%
<i>Sub-total All PT</i>	54.7%	56.1%	49.5%
Taxi	0.3%	0.3%	0.6%
Motorcycle, scooter or moped	0.9%	0.4%	0.7%
Driving a car or van	32.2%	30.3%	36.8%
Passenger in a car or van	2.3%	2.2%	2.2%
Bicycle	0.7%	0.8%	0.8%
On foot	8.6%	9.1%	8.6%
Other method of travel to work	0.4%	0.9%	0.9%
TOTAL	100%	100%	100%

Table 2.2: Census Modal Split

2.6 Table 2.2 shows that the number of people driving a car as the main method of travel to work in the MSOA022 area is slightly higher than for locations in closer proximity to railway stations. This is countered by fewer people using public transport as the main mode of travel in the MSOA022 compared to areas in closer proximity to public transport. The number of people using the remaining methods of travel to work are consistent across the three MSOAs.

2.7 A more detailed analysis of car availability data has been undertaken in order to identify patterns between car availability and car use within the areas outside of MSOA022. This analysis is summarised in Table 2.3 below.

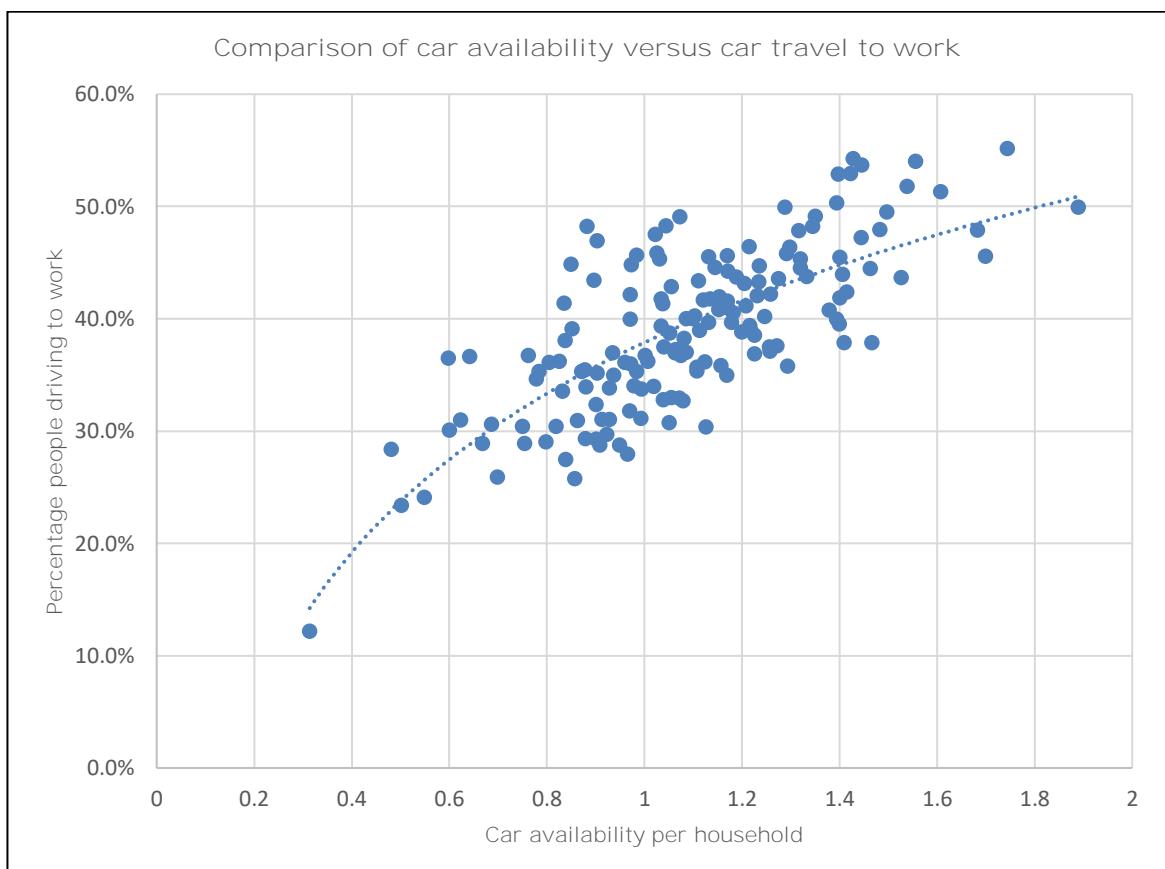
Output Area reference	Car availability per household	Travel to work driving a car
E00018707	0.58	24.00%
E00018704	0.65	26.40%
E02000779	0.72	29.00%
E02000782	0.65	29.80%
E02000780	0.81	32.00%
E00018708	1.24	36.20%
E00018706	1.39	42.00%

Table 2.3: Car availability per household versus car use (local area)

2.8 Table 2.3 shows that as car availability per household reduces, the percentage of people driving to work also reduces.

2.9 The data in Table 2.3 however shows that even in the areas in which it was considered that the characteristics of people would be more likely to be similar to those of residents of the Proposed Development because of a similar walking distance to a railway station, the minimum car availability is still 0.58 vehicles per household. This is more than double what the car availability per household would be at the Proposed Development.

2.10 The study area has therefore been extended to include all lower level super output areas (LSOA) within the Borough of Redbridge. Data from the Census regarding car availability per household and associated percentage of people driving to work has been extracted and analysed. The analysis is shown on the graph below.



Graph 2.1: Comparison of car availability versus car travel to work

2.11 The graph above demonstrates that as car availability per household decreases there is a general trend towards a lower propensity to travel to work by driving a car.

2.12 The data points are quite spread however a trend line has been fitted to the data in order to seek to quantify general trends between car availability and car usage. This shows that the relationship between car availability and car use is not linear. Instead the rate of decrease of car usage starts to increase as the car availability drops below around 0.6 cars per household. This suggests that people living in areas with low car availability have a greater propensity not to use the car to drive to work – even when a car is available – than people living in areas with a high car availability.

2.13 Analysis of the trend curve suggests a relationship of:

$$y = 0.2041\ln(x) + 0.3789$$

where 'x' is the car availability per household

2.14 Applying the trend line formula to the 30% car parking provision at the Proposed Development results in a potential of 13.6% of people travelling to work as car driver.

2.15 Of particular note is LSOA 30H which is located on the eastern side of Ilford Town Centre as shown below.



Figure 2.1: Location of LSOA 30H

2.16 According to the 2011 census there were 660 households in the area of which 207 had a car available. This equates to 31.3% which is just higher than the 30% which would be provided with the Proposed Development. Within LSOA 30H, 12.2% of people used the car to travel to work.

2.17 The above outcomes have been applied to the total trips by all modes obtained from TRICS and presented in Table 2.1. The outcome is presented below.

Method of Travel to Work	AM Peak Hour		PM Peak Hour		Daily Movements	
	Arr	Dep	Arr	Dep	Arr	Dep
All modes	122	588	408	247	2,978	3,218
LSOA30H car drivers (12.2%)	15	72	50	30	363	392
Trend line analysis car drivers (13.6%)	17	80	56	34	406	439

Table 2.4: Proposed Development traffic generation based on Census and TRICS data

2.18 Table 2.4 above shows that, based on the assumptions set out above, during the morning peak hour, a total of between 87 and 97 two-way vehicle movements might be expected to arise from the Proposed Development. This reduces to between 80 and 90 two-way vehicle movements during the evening peak hour with between 755 and 845 two-way vehicle movements over the course of a day.

3.0 Specific TRICS Sites with similar characteristics to the Proposed Development

3.1 A review of the TRICS database identifies four sites that meet the requirements for flatted development within Greater London and which are located in areas with public transport accessibility levels of 4 and above. These are summarised in the table below.

TRICS Site reference	Location	No. Units	Unit Sizes	Car Parking Spaces	Parking Ratio	PTAL
BT-03-C-02	WEMBLEY	472	240 1-bed, 217 2-bed, 15 3-bed	151	0.3	5 Very Good
IS-03-C-04	ISLINGTON	157	80 1-bed, 77 2-bed	42	0.3	6a Excellent
KI-03-C-02	KINGSTON UPON THAMES	132	32 1-bed, 100 2-bed	149	1.1	6a Excellent
KN-03-C-02	SOUTH KENSINGTON	294	277 2-bed, 13 3-bed, 4 4+bed	290	1	6a Excellent

Table 3.1: TRICS flatted development: PTAL value greater than 4

3.2 Peak hour and 12-hour traffic generation rates have been extracted from the TRICS database for the above sites and is presented in the table below together with the car parking provision rate at each. The sites have been ranked in order of highest 12-hour two-way traffic flow first.

Location	AM Peak Hour	PM Peak Hour	12-hour	Parking ratio
SOUTH KENSINGTON	0.232	0.132	1.46	0.99
KINGSTON UPON THAMES	0.136	0.181	1.36	1.13
ISLINGTON	0.019	0.012	0.40	0.27
WEMBLEY	0.03	0.043	0.25	0.32

Table 3.2: Ranked traffic generation rates per unit for flatted development: PTAL value greater than 4

3.3 Table 3.2 shows that the developments located at South Kensington and Kingston-upon-Thames have the highest parking ratios at circa 1 space per dwelling. They also have the highest traffic generation rates per unit. In contrast the sites located at Wembley and Islington have substantially lower car parking ratios at circa 0.3 spaces per dwelling and similarly substantially lower traffic generation rates per dwelling than the South Kensington and Kingston-upon-Thames sites.

3.4 As the parking ratio at the Proposed Development will be 0.3 spaces per dwelling, its is considered that the South Kensington and Kingston-upon-Thames sites do not provide developments with sufficiently close characteristics to those of the Proposed Development. As shown above, as parking ratio falls not only does car use reduce but the propensity to travel by car – even when one is available – also reduces. An average of the Wembley and Islington sites (weighted on number of units at each) has therefore been taken and applied to the Proposed Development. This is summarised below.

Site	AM Peak Hour		PM Peak Hour		Daily Movements	
	Arr	Dep	Arr	Dep	Arr	Dep
Wembley (<i>vehicles per dwelling</i>)	0.011	0.019	0.03	0.013	0.13	0.12
Islington (<i>vehicles per dwelling</i>)	0.013	0.006	0.006	0.006	0.19	0.20
Weighted average of Wembley and Islington (<i>vehicles per dwelling</i>)	0.011	0.016	0.024	0.011	0.143	0.143
Proposed Development (<i>vehicles</i>)	15	20	31	14	183	183

Table 3.3: Proposed Development traffic generation for similar flatted development: PTAL value greater than 4

3.5 Table 3.3 above shows that, based on the assumptions set out above, during the morning peak hour, a total of 35 two-way vehicle movements might be expected to arise from the Proposed Development. This increases to 45 two-way vehicle movements during the evening peak hour with 366 two-way vehicle movements over the course of a day.

4.0 London Borough of Redbridge Local Plan evidence

4.1 LBR's Local Plan ("the LBR Plan") was adopted in March 2018. The transport evidence base for the LBR Plan comprised the following documents of relevance to the Site:

- ▶ 'LB Redbridge Local Plan, Transport Evidence'. *AECOM. March 2017*; and
- ▶ 'Oakfields and Goodmayes High Level Transport Study, London Borough of Redbridge'. *Atkins. October 2015*.

4.2 Both documents provide high level transport assessments of potential changes in link flows arising from the LBR Local Plan. These high level transport assessments are predicated on forecast assumptions on trip generation for differing types of development at different locations in the Borough.

4.3 The table below provides a summary of the traffic generation rates used by LBR to support the LBR Plan.

Source	AM Peak Hour			Pm Peak Hour			Car parking assumptions
	Arr	Dep	Two-way	Arr	Dep	Two-way	
Measured traffic generation rates at Bramley Crescent development. Taken from Table 5-6 of: 'LB Redbridge Local Plan, Transport Evidence'.	0.008	0.025	0.033	0.016	0.008	0.025	0.51 spaces per dwelling
Table 5-7 of: 'LB Redbridge Local Plan, Transport Evidence'.	0.053	0.151	0.204	0.123	0.054	0.177	Adopted London Plan Standards which are: 1 - 1.5 Spaces per dwelling
Table 5-2 of: 'Oakfields and Goodmayes High Level Transport Study, London Borough of Redbridge'.	0.043	0.101	0.144	0.104	0.066	0.170	Adopted London Plan Standards which are: 1 - 1.5 Spaces per dwelling

Table 4.1: LBR Plan evidence traffic generation rates

4.5 What is clear from the table above is that there is a lack of consistency in the traffic generation rates referred to in the transport evidence base for the LBR Plan and how they have been derived to take into consideration PTAL value and car parking restrictions. The suitability of using each of the above to forecast traffic generation arising from the residential elements of the Proposed Development is considered below.

Measured traffic generation rates at Bramley Crescent development.

4.6 The 'LB Redbridge Local Plan, Transport Evidence' report provides observed traffic generation rates at the fully occupied new' **local** development at Bramley Crescent, Gants Hill which is located in an area with a PTAL value of 5 and parking restricted to 0.51 spaces per dwelling. These characteristics are similar to the Proposed Development although it is noted that car parking would be further restricted at the Proposed Development to a rate of 0.3 spaces per dwelling.

4.7 The table below sets out the forecast traffic generation arising from the Proposed Development when applying LBR's **locally observed traffic generation rates for the Bramley Crescent development.**

Source	AM Peak Hour		PM Peak Hour		Daily Movements	
	Arr	Dep	Arr	Dep	Arr	Dep
LBR recorded traffic generation rate per dwelling	0.011	0.019	0.03	0.013	0.13	0.12
Proposed Development (vehicles)	14	24	38	17	166	154

Table 4.2: Proposed Development traffic generation based on LBR observed data

4.8 Table 4.2 above shows that, based on traffic generation data observed by LBR, during the morning peak hour, a total of 38 two-way vehicle movements might be expected to arise from the Proposed Development. This increases to 55 two-way vehicle movements during the evening peak hour with 320 two-way vehicle movements over the course of a day. It is noteworthy that the peak hour traffic volumes observed locally in Redbridge are slightly higher than those obtained from the TRICS database for sites in other London Boroughs. Notwithstanding this total daily traffic movements recorded in Redbridge are lower than in the other London Boroughs for which data is available.

Generic traffic generation rates from LB Redbridge Local Plan, Transport Evidence

4.9 The LBR Plan goes on to base the transport assessment traffic generation on forecast traffic generation data submitted to LBR for a series of permitted schemes. The traffic generation data for the permitted schemes is not adjusted for differences in parking provision. A coarse adjustment is made for differing PTAL values which is loosely based on the observed data collected. This results in the generic traffic generation rates presented in table 5-7 of the 'LB Redbridge Local Plan, Transport Evidence'.

4.10 The Proposed Development is located within an area which has a PTAL value of 4-5 and would have car parking restricted to 0.3 spaces per dwelling. In contrast the traffic generation rates derived for the 'LB Redbridge Local Plan, Transport Evidence' rely on traffic generation data that is assumed to be in line with LBR car parking standards which are the same as the London Plan and so significantly higher than 0.3 spaces per dwelling. These rates are then coarsely adjusted to make some allowance for a site being in an area with a higher PTAL value.

4.11 Given these differences between the assumptions underlying the generic traffic generation rates in the 'LB Redbridge Local Plan, Transport Evidence' and the characteristics of the Proposed Development, it is considered that the 'LB Redbridge Local Plan, Transport Evidence' rates would not be reflective of car usage at the Proposed Development.

Generic traffic generation rates from the Oakfields and Goodmayes High Level Transport Study, London Borough of Redbridge

4.12 The 'Oakfields and Goodmayes High Level Transport Study, London Borough of Redbridge' report refers to the TRICS database to derive a traffic generation rate for flatted development. There is no supporting evidence provided with the 'Oakfields and Goodmayes High Level Transport Study, London Borough of Redbridge' to understand the characteristics of the TRICS sites selected in the study. It is noted that in the 'Oakfields and Goodmayes High Level Transport Study, London Borough of Redbridge' it is assumed that car parking is provided in line with LBR standards which are the adopted London Plan standards.

- 4.13 The traffic generation makes no adjustments for differences in parking provision at individual sites and no adjustment of differing levels of PTAL. The 'Oakfields and Goodmayes High Level Transport Study, London Borough of Redbridge' does however claim that the TRICS sites selected have comparable PTAL values to the Oakfields and Goodmayes sites considered which are in the range of 0-3 (defined as ranging from "worst" accessibility to "moderate" accessibility).
- 4.14 The Proposed Development is located within an area which has a PTAL value of 4-5 and would have car parking restricted to 0.3 spaces per dwelling. In contrast the traffic generation rates derived for the 'LB Redbridge Local Plan, Transport Evidence' rely on traffic generation data that is assumed to be in line with LBR car parking standards which are the same as the London Plan and so significantly higher than 0.3 spaces per dwelling. The traffic generation rates assume that the sites they relate to are located in areas with a range of PTAL values of between 0 and 3 making them significantly less accessible than the Proposed Development.
- 4.15 Given these differences between the assumptions underlying the generic traffic generation rates in the 'Oakfields and Goodmayes High Level Transport Study, London Borough of Redbridge' and the characteristics of the Proposed Development, it is considered that the 'Oakfields and Goodmayes High Level Transport Study, London Borough of Redbridge' rates would not be reflective of car usage at the Proposed Development.

5.0 Summary and Conclusions

- 5.1 This paper is prepared in relation to proposals to redevelop land at the Tesco Extra Site located at 822 High Road, Goodmayes ("the Site"). The Site is located within the London Borough of Redbridge (LBR). The paper is prepared to discuss approaches to, and data sources for, forecasting traffic associated with the residential elements of the redevelopment of the Site.
- 5.2 It is common practice in transport planning to analyse the travel characteristics (for example timing, number and mode choice of trips) of the established population in the vicinity of a proposed development site and use this to predict the travel characteristics of the new population that will occupy the proposed development.
- 5.3 In the case of the Site, the established development to the north of High Road is characterised by 2-3 bedrooomed houses with front and rear gardens and off-street parking. To the south of the Site the predominant characteristic is 3-4 bedrooomed late Victorian / Edwardian terrace housing. In contrast, the Proposed Development will predominantly comprise of 1 and 2 bedrooomed apartments, will have restrictions on car parking, will be designed to a much higher density than the existing residential development either to the north or to the south of the Site and will have a direct access to Goodmayes railway station.
- 5.4 Given the significant differences between the characteristics of the Proposed Development and those of existing development to the north and south of the Site, it is unlikely that the travel characteristics of the new population will be the same as those of the existing population. The extension of the travel characteristics of the existing population to the new population is therefore unlikely to result in a good fit when predicting how and when new residents will travel.
- 5.5 In this context the paper considers the following approaches to forecasting traffic generation:
 - ▶ the use of the TRICS database to establish trip rates by all modes then application of mode split based on a variety of census data assumptions;
 - ▶ specific similar sites in Greater London for which data is contained in the TRICS database; and
 - ▶ the approach to residential traffic generation taken by LBR in assessing the impact of the adopted Redbridge Local Plan which was found at examination in public to be sound.
- 5.6 Table 5.1 below provides a summary of the total traffic generation arising from the Proposed Development considering each of the approaches to forecasting traffic generation set out above.

Ref	Source	AM Peak Hour		PM Peak Hour		Daily Movements	
		Arr	Dep	Arr	Dep	Arr	Dep
A	Mode choice characteristics from Census area LSOA30H applied to TRICS total trips (see Table 2.5)	15	72	50	30	363	392
B	Mode choice characteristics from analysis of all Redbridge census areas applied to TRICS total trips (see Table 2.5)	17	80	56	34	406	439
C	Weighted average of similar sites in Greater London contained in the TRICS database (see Table 3.3)	15	20	31	14	183	183
D	LBR recorded traffic generation rate per dwelling used in the Local Plan evidence base (see Table 4.2)	14	24	38	17	166	154
	Average	15	49	44	24	280	292

Table 5.1: Proposed Development traffic generation summary

5.7 Table 5.1 shows that during the morning peak hour, between 35 and 97 vehicle movements are expected to arise from the residential element of the Proposed Development with the average being 64 vehicle movements. During the evening peak hour the range is 45-90 vehicle movements with an average of 68 vehicle movements and finally between 320 and 845 vehicle movements expected over the course of a day averaging out at 572.

5.8 Of note is that source references A and B both rely on census data. Census data is a record of the trend of how people stated they travelled at a snapshot in the past with the current dataset looking back eight years to 2011. Source references C and D in contrast are more recent datasets which are based on objectively observing how people travel.

5.9 With this in mind, the table below provides a comparison of the two-way traffic movement forecasts reached using each of the approaches to forecasting traffic generation set out above.

Ref	Source	AM Peak Hour		PM Peak Hour		Daily Movements	
		Two-way	Two-way	Two-way	Two-way	Two-way	Two-way
A	Mode choice characteristics from Census area LSOA30H applied to TRICS total trips (see Table 2.5)	87		80		755	
B	Mode choice characteristics from analysis of all Redbridge census areas applied to TRICS total trips (see Table 2.5)		97		90		845
C	Weighted average of similar sites in Greater London contained in the TRICS database (see Table 3.3)		35		45		366
D	LBR recorded traffic generation rate per dwelling used in the Local Plan evidence base (see Table 4.2)		38		55		320

Table 5.2: Comparison of two-way traffic movements

5.10 It is apparent from Table 5.2 that the traffic forecasts arising from source references A and B are very similar and that those from source references C and D are very similar. However there is a significant difference between the forecasts arising from A and B (which are based on historic travel patterns) and the forecasts arising from C and D (which are based on more recently completed development).

5.11 Having regard to pre-application meetings with officers of LBR and TfL in which the inappropriateness of forecasting future residential travel patterns associated with the Proposed Development by determining the local, historic travel patterns and projecting these forward was discussed, it is concluded that source references C and D represent the most appropriate sources of data for assessing the potential impact of traffic arising from the residential elements of the Proposed Development on the transport network.

Appendix A

TRICS Datasheets

TRICS 7.5.4

Trip Rate Parameter: Number of dwellings

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use	03 - RESIDENTIAL
Category	C - FLATS PRIVATELY OWNED
MULTI-MODAL VEHICLES	

Selected regions and areas:

1. GREATER LONDON	
BT	BRENT 1 days
IS	ISLINGTON 1 days
KI	KINGSTON 1 days
KN	KENSINGTON AND CH 1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter:	Number of dwellings
Actual Range:	132 to 472 (units:)
Range Selected by User:	100 to 493 (units:)

Public Transport Provision:

Selection by: Include all surveys

Date Range: 01/01/10 to 03/07/18

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	1 days
Tuesday	1 days
Wednesday	1 days
Thursday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	4 days
Directional ATC Count	0 days

This data displays the number of the total adding up to the overall whilst ATC surveys are undertaking using machines.

Selected Locations:

Town Centre	0
Edge of Town Centre	3
Suburban Area (PPS6 Out of Cen	1
Edge of Town	0
Neighbourhood Centre (PPS6 Lc	0
Free Standing (PPS6 Out of Tow	0
Not Known	0

This data displays the number of Edge of Town Suburban Area Neighbourhood Edge of Tr Town Centre and Not Known.

Selected Location Sub Categories:

Industrial Zone	0
Commercial Zone	0
Development Zone	2
Residential Zone	1
Retail Zone	0
Built-Up Zone	0
Village	0
Out of Town	0
High Street	0
No Sub Category	1

This data displays the number of Industrial Zone Development Zone Residential Zon Retail Zon Built-Up Z Village Out of Tov High Street and No Sub Category.

Secondary Filtering selection:

Use Class:	
C3	4 days

This data displays the number of which can be found within the Library module of TRICS®.

Population within 1 mile:

25,001 to 50,000	2 days
50,001 to 100,000	1 days
100,001 or More	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

500,001 or More	4 days
-----------------	--------

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.5 or Less	1 days
0.6 to 1.0	2 days
1.1 to 1.5	1 days

This data displays the number of within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	1 days
No	3 days

This data displays the number of and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

5 Very Good	1 days
6a Excellent	3 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

Site(1):	BT-03-C-02	Site area:	0.94 hect
Development Name:	BLOCKS OF FLATS	Number of dwellings:	472
Location:	WEMBLEY	Housing density:	549
Postcode:	HA9 0NH	Total Bedrooms:	719
Main Location Type:	Suburban Area (PPS6 Out of Centr	Survey Date:	30/11/2016
Sub-Location Type:	Development Zone	Survey Day:	Wednesday
PTAL:	5 Very Good	Parking Spaces:	151
Site(2):	IS-03-C-04	Site area:	0.21 hect
Development Name:	BLOCK OF FLATS	Number of dwellings:	157
Location:	ISLINGTON	Housing density:	924
Postcode:	EC1V 1AD	Total Bedrooms:	234
Main Location Type:	Edge of Town Centre	Survey Date:	14/07/2016
Sub-Location Type:	Development Zone	Survey Day:	Thursday
PTAL:	6a Excellent	Parking Spaces:	42
Site(3):	KI-03-C-02	Site area:	0.72 hect
Development Name:	BLOCK OF FLATS	Number of dwellings:	132
Location:	KINGSTON UPON THAMES	Housing density:	455
Postcode:	KT2 5AQ	Total Bedrooms:	232
Main Location Type:	Edge of Town Centre	Survey Date:	14/06/2010
Sub-Location Type:	No Sub Category	Survey Day:	Monday
PTAL:	6a Excellent	Parking Spaces:	149
Site(4):	KN-03-C-02	Site area:	0.71 hect
Development Name:	BLOCK OF FLATS	Number of dwellings:	294
Location:	SOUTH KENSINGTON	Housing density:	588
Postcode:	W14 8TR	Total Bedrooms:	609
Main Location Type:	Edge of Town Centre	Survey Date:	15/06/2010
Sub-Location Type:	Residential Zone	Survey Day:	Tuesday
PTAL:	6a Excellent	Parking Spaces:	290

This section provides a list of all it displays a unique site reference the selected trip rate the day of the w. and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 03 - RESIDENTIAL/C - FLATS PRIVATELY OWNED

Calculation Factor: 1 DWELLS

Count Type: VEHICLES

Time Range	No. Days	Ave. DWELLS	ARRIVALS		DEPARTURES		TOTALS		
			Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:00	4	264	0.009	4	264	0.036	4	264	0.045
08:00-09:00	4	264	0.031	4	264	0.066	4	264	0.097
09:00-10:00	4	264	0.031	4	264	0.032	4	264	0.063
10:00-11:00	4	264	0.018	4	264	0.026	4	264	0.044
11:00-12:00	4	264	0.033	4	264	0.024	4	264	0.057
12:00-13:00	4	264	0.017	4	264	0.025	4	264	0.042
13:00-14:00	4	264	0.028	4	264	0.028	4	264	0.056
14:00-15:00	4	264	0.025	4	264	0.027	4	264	0.052
15:00-16:00	4	264	0.027	4	264	0.025	4	264	0.052
16:00-17:00	4	264	0.035	4	264	0.033	4	264	0.068
17:00-18:00	4	264	0.048	4	264	0.032	4	264	0.08
18:00-19:00	4	264	0.046	4	264	0.042	4	264	0.088
19:00-20:00	3	308	0.026	3	308	0.025	3	308	0.051
20:00-21:00	3	308	0.024	3	308	0.021	3	308	0.045
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.398			0.442		0.84	

TRIP RATE for Land Use 03 - RESIDENTIAL/C - FLATS PRIVATELY OWNED

Calculation Factor: 1 DWELLS

Count Type: TAXIS

Time Range	No. Days	Ave. DWELLS	ARRIVALS		DEPARTURES		TOTALS		
			Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:00	4	264	0.004	4	264	0.004	4	264	0.008
08:00-09:00	4	264	0.01	4	264	0.01	4	264	0.02
09:00-10:00	4	264	0.005	4	264	0.005	4	264	0.01
10:00-11:00	4	264	0.003	4	264	0.003	4	264	0.006
11:00-12:00	4	264	0.005	4	264	0.005	4	264	0.01
12:00-13:00	4	264	0.001	4	264	0.001	4	264	0.002
13:00-14:00	4	264	0.004	4	264	0.004	4	264	0.008
14:00-15:00	4	264	0.003	4	264	0.003	4	264	0.006
15:00-16:00	4	264	0.003	4	264	0.003	4	264	0.006
16:00-17:00	4	264	0.006	4	264	0.006	4	264	0.012
17:00-18:00	4	264	0.003	4	264	0.003	4	264	0.006
18:00-19:00	4	264	0.005	4	264	0.005	4	264	0.01
19:00-20:00	3	308	0.003	3	308	0.003	3	308	0.006
20:00-21:00	3	308	0.008	3	308	0.008	3	308	0.016
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.063			0.063		0.126	

TRIP RATE for Land Use 03 - RESIDENTIAL/C - FLATS PRIVATELY OWNED

Calculation Factor: 1 DWELLS

Count Type: OGVS

TRIP RATE for Land Use 03 - RESIDENTIAL/C - FLATS PRIVATELY OWNED

Calculation Factor: 1 DWELLS

Count Type: CYCLISTS

Time Range	No. Days	Ave. DWELLS	ARRIVALS		DEPARTURES		TOTALS			
			Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS		
00:00-01:00										
01:00-02:00										
02:00-03:00										
03:00-04:00										
04:00-05:00										
05:00-06:00										
06:00-07:00										
07:00-08:00		4	264	0.002	4	264	0.005	4	264	0.007
08:00-09:00		4	264	0	4	264	0.004	4	264	0.004
09:00-10:00		4	264	0	4	264	0.002	4	264	0.002
10:00-11:00		4	264	0.001	4	264	0.001	4	264	0.002
11:00-12:00		4	264	0.001	4	264	0.003	4	264	0.004
12:00-13:00		4	264	0.003	4	264	0.003	4	264	0.006
13:00-14:00		4	264	0	4	264	0	4	264	0
14:00-15:00		4	264	0	4	264	0	4	264	0
15:00-16:00		4	264	0	4	264	0.001	4	264	0.001
16:00-17:00		4	264	0.002	4	264	0	4	264	0.002
17:00-18:00		4	264	0.005	4	264	0.001	4	264	0.006
18:00-19:00		4	264	0.009	4	264	0.005	4	264	0.014
19:00-20:00		3	308	0.005	3	308	0.007	3	308	0.012
20:00-21:00		3	308	0.004	3	308	0	3	308	0.004
21:00-22:00										
22:00-23:00										
23:00-24:00										
Daily Trip Rates:				0.032			0.032		0.064	

TRIP RATE for Land Use 03 - RESIDENTIAL/C - FLATS PRIVATELY OWNED

Calculation Factor: 1 DWELLS

Count Type: VEHICLE OCCUPANTS

Daily Trip Rates:

0.476

0.54

1.016

TRIP RATE for Land Use 03 - RESIDENTIAL/C - FLATS PRIVATELY OWNED
Calculation Factor: 1 DWELLS
Count Type: PEDESTRIANS

Time Range	No. Days	Ave. DWELLS	ARRIVALS			DEPARTURES			TOTALS	
			Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	
00:00-01:00										
01:00-02:00										
02:00-03:00										
03:00-04:00										
04:00-05:00										
05:00-06:00										
06:00-07:00										
07:00-08:00		4	264	0.027	4	264	0.059	4	264	0.086
08:00-09:00		4	264	0.027	4	264	0.132	4	264	0.159
09:00-10:00		4	264	0.028	4	264	0.049	4	264	0.077
10:00-11:00		4	264	0.043	4	264	0.069	4	264	0.112
11:00-12:00		4	264	0.088	4	264	0.058	4	264	0.146
12:00-13:00		4	264	0.073	4	264	0.063	4	264	0.136
13:00-14:00		4	264	0.056	4	264	0.091	4	264	0.147
14:00-15:00		4	264	0.067	4	264	0.076	4	264	0.143
15:00-16:00		4	264	0.087	4	264	0.065	4	264	0.152
16:00-17:00		4	264	0.106	4	264	0.077	4	264	0.183
17:00-18:00		4	264	0.101	4	264	0.073	4	264	0.174
18:00-19:00		4	264	0.078	4	264	0.045	4	264	0.123
19:00-20:00		3	308	0.068	3	308	0.03	3	308	0.098
20:00-21:00		3	308	0.059	3	308	0.035	3	308	0.094
21:00-22:00										
22:00-23:00										
23:00-24:00										
Daily Trip Rates:				0.908			0.922			1.83

TRIP RATE for Land Use 03 - RESIDENTIAL/C - FLATS PRIVATELY OWNED
Calculation Factor: 1 DWELLS
Count Type: BUS/TRAM PASSENGERS

Time Range	No. Days	Ave. DWELLS	ARRIVALS		DEPARTURES		TOTALS			
			Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS		
00:00-01:00										
01:00-02:00										
02:00-03:00										
03:00-04:00										
04:00-05:00										
05:00-06:00										
06:00-07:00										
07:00-08:00		4	264	0.003	4	264	0.041	4	264	0.044
08:00-09:00		4	264	0.011	4	264	0.073	4	264	0.084
09:00-10:00		4	264	0.009	4	264	0.031	4	264	0.04
10:00-11:00		4	264	0.011	4	264	0.028	4	264	0.039
11:00-12:00		4	264	0.013	4	264	0.025	4	264	0.038
12:00-13:00		4	264	0.012	4	264	0.03	4	264	0.042
13:00-14:00		4	264	0.022	4	264	0.02	4	264	0.042
14:00-15:00		4	264	0.02	4	264	0.03	4	264	0.05
15:00-16:00		4	264	0.03	4	264	0.016	4	264	0.046
16:00-17:00		4	264	0.047	4	264	0.03	4	264	0.077
17:00-18:00		4	264	0.052	4	264	0.022	4	264	0.074
18:00-19:00		4	264	0.056	4	264	0.023	4	264	0.079
19:00-20:00		3	308	0.028	3	308	0.013	3	308	0.041
20:00-21:00		3	308	0.02	3	308	0.012	3	308	0.032
21:00-22:00										
22:00-23:00										
23:00-24:00										
Daily Trip Rates:				0.334			0.394		0.728	

TRIP RATE for Land Use 03 - RESIDENTIAL/C - FLATS PRIVATELY OWNED
Calculation Factor: 1 DWELLS
Count Type: TOTAL RAIL PASSENGERS

22:00-23:00

23:00-24:00

Daily Trip Rates:

0.02

0.02

0.04

Parameter summary

Trip rate parameter range selec 132 - 472 (units:)

Survey date date range: 01/01/10 - 03/07/18

Number of weekdays (Monday-

4

Number of Saturdays:

0

Number of Sundays:

0

Surveys automatically removed

0

Surveys manually removed from

0

This section displays a quick summary followed by the range of minimum and maximum survey days, the total number of surveys, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure, and the number of survey days that have been automatically removed from the selected set outside of the standard filtering procedure.

Weekday Private

Site	Location	No. Units	Unit Sizes	Car Parking	Parking Ratio	PTAL	AM Peak (8-9)		PM Peak (5-6)		Daily	
							Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
BT-03-C-02	WEMBLEY	472	240 1-bed, 217 2-bed, 15 3-bed	151	0.3	5 Very Good	5	9	14	6	64	68
IS-03-C-04	ISLINGTON	157	80 1-bed, 77 2-bed	42	0.3	6a Excellent	2	1	1	1	35	37
KI-03-C-02	KINGSTON UPON THAMES	132	32 1-bed, 100 2-bed	149	1.1	6a Excellent	7	11	13	11	86	93
KN-03-C-02	SOUTH KENSINGTON	294	277 2-bed, 13 3-bed, 4 4+bed	290	1	6a Excellent	19	49	23	16	230	262

Saturday Private

Site	Location	No. Units	Unit Sizes	Car Parking	Parking Ratio	PTAL	AM Peak (8-9)		PM Peak (5-6)		Daily	
							Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
HO-03-C-01	HOUNSLOW	15	15 2-bed	15	1	6a Excellent	0	2	1	1	8	14

Weekday Affordable

Site	Location	No. Units	Unit Sizes	Car Parking	Parking Ratio	PTAL	AM Peak (8-9)		PM Peak (5-6)		Daily	
							Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
HG-03-D-03	WOOD GREEN	90	90 2-bed	73	0.8	4 Good	1	11	4	1	46	49
IS-03-D-02	ISLINGTON	250	250 2-bed	72	0.3	5 Very Good	8	20	10	10	83	94

Site reference: BT-03-C-02 Survey date ##### Day of week Wednesday

Multi-Modal survey site

Vehicles surveyed: Total vehicles

Survey type: Manual Count

AM weather: Cold and Clear

PM weather: Cold and Clear

Initial car park occupancy: Final car park occupancy:

BRACKETED ACCUMULATION FIGURES ARE NOT ABSOLUTE

Parking Capacity

Data proportions in %

Motor cars	89	Motor cycl	1	Public serv	0
Light goods	6	OGV (1)	2	OGV (2)	0
Taxis	2				

Servicing/Standard Vehicle percentages

	Vehicles	Vehicles	% Standard	%
OGV (1)	2	100	0	
OGV (2)	0			
Light Goods	7	57	43	
Motor Car	98	16	84	

Time Arr 64 Dep 68 Totals 132 Parking Accum

00:00-01:00

01:00-02:00

02:00-03:00

03:00-04:00

04:00-05:00

05:00-06:00

06:00-07:00

07:00-08:00 1 5 6 (-4)

08:00-09:00 5 9 14 (-8)

09:00-10:00 4 5 9 (-9)

10:00-11:00 6 7 13 (-10)

11:00-12:00 3 2 5 (-9)

12:00-13:00 1 4 5 (-12)

13:00-14:00 7 7 14 (-12)

14:00-15:00 7 4 11 (-9)

15:00-16:00 1 2 3 (-10)

16:00-17:00 5 6 11 (-11)

17:00-18:00 14 6 20 (-3)

18:00-19:00 6 1 7 -2

19:00-20:00 1 4 5 (-1)

20:00-21:00 3 6 9 (-4)

21:00-22:00

22:00-23:00

23:00-24:00

Comments

No PSV's or pedal cycles visited the site during this survey.

The difference in total people arrivals or departures can be explained by the fact that this site is 24-hour in nature.

Site reference: IS-03-C-04 Survey date 14/07/2016 Day of week Thursday

Multi-Modal survey site

Vehicles surveyed: Total vehicles

Survey type: Manual Count

AM weather: Mild and Clear

PM weather: Mild and Clear

Initial car park occupancy: Final car park occupancy:

BRACKETED ACCUMULATION FIGURES ARE NOT ABSOLUTE

Parking Capacity

Data proportions in %

Motor cars	17	Motor cycl	6	Public serv	0
Light goods	25	OGV (1)	0	OGV (2)	0
Taxis	52				

Servicing/Standard Vehicle percentages

Vehicles Vehicles % Standard %

OGV (1)				
OGV (2)				
Light Goods	18	100	0	
Motor Car	12	0	100	

Time Arr 35 Dep 37 Totals 72 Parking Accum

00:00-01:00

01:00-02:00

02:00-03:00

03:00-04:00

04:00-05:00

05:00-06:00

06:00-07:00

07:00-08:00 2 2 4 0

08:00-09:00 2 1 3 -1

09:00-10:00 1 3 4 (-1)

10:00-11:00 1 2 3 (-2)

11:00-12:00 5 4 9 (-1)

12:00-13:00 2 2 4 (-1)

13:00-14:00 6 7 13 (-2)

14:00-15:00 1 1 2 (-2)

15:00-16:00 1 1 2 (-2)

16:00-17:00 6 6 12 (-2)

17:00-18:00 1 1 2 (-2)

18:00-19:00 2 2 4 (-2)

19:00-20:00 2 2 4 (-2)

20:00-21:00 3 3 6 (-2)

21:00-22:00

22:00-23:00

23:00-24:00

Comments

Construction traffic has been excluded from the count.

No OGV's or PSV's visited the site during this survey.

The difference in total people arrivals and departures can be explained by the fact that the site is 24-hour in nature.

Site reference: KI-03-C-02 Survey date ##### Day of week Monday

Multi-Modal survey site

Vehicles surveyed: Total vehicles

Survey type: Manual Count

AM weather: Mild and Cloudy

PM weather: Mild and Light Rain

Initial car park occupancy: 80 Final car park 73

BRACKETED ACCUMULATION FIGURES ARE NOT ABSOLUTE

Parking Capacity 50% (149 On-Site Spaces)

Data proportions in %

Motor cars	83	Motor cycl	5	Public serv	0
------------	----	------------	---	-------------	---

Light goods	9	OGV (1)	2	OGV (2)	0
-------------	---	---------	---	---------	---

Taxis	1				
-------	---	--	--	--	--

Time	Arr	86	Dep	93	Totals	179	Parking Accum
------	-----	----	-----	----	--------	-----	---------------

00:00-01:00

01:00-02:00

02:00-03:00

03:00-04:00

04:00-05:00

05:00-06:00

06:00-07:00

07:00-08:00	1	14	15	67
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08:00-09:00	7	11	18	63
-------------	---	----	----	----

09:00-10:00	6	3	9	66
-------------	---	---	---	----

10:00-11:00	1	1	2	66
-------------	---	---	---	----

11:00-12:00	8	5	13	69
-------------	---	---	----	----

12:00-13:00	1	2	3	68
-------------	---	---	---	----

13:00-14:00	5	3	8	70
-------------	---	---	---	----

14:00-15:00	7	9	16	68
-------------	---	---	----	----

15:00-16:00	11	6	17	73
-------------	----	---	----	----

16:00-17:00	11	12	23	72
-------------	----	----	----	----

17:00-18:00	13	11	24	74
-------------	----	----	----	----

18:00-19:00	15	16	31	73
-------------	----	----	----	----

19:00-20:00

20:00-21:00

21:00-22:00

22:00-23:00

23:00-24:00

Comments

No PSV's entered or exited the site during the survey.

It was noted that many of the reside hence the difference between the number of arrivals and departures in the 1

Site reference: KN-03-C-0: Survey date ##### Day of week Tuesday

Multi-Modal survey site

Vehicles surveyed: Total vehicles

Survey type: Manual Count

AM weather: Mild and Clear

PM weather: Mild and Clear

Initial car park occupancy 172 Final car park 155

BRACKETED ACCUMULATION FIGURES ARE NOT ABSOLUTE

Parking Capacity 56% (290 On-Site Spaces)

Data proportions in %

Motor cars	75	Motor cycl	4	Public serv	0
Light goods	8	OGV (1)	0	OGV (2)	0
Taxis	13				

Time	Arr 230	Dep 262	Totals 492	Parking Accum
------	---------	---------	------------	---------------

00:00-01:00

01:00-02:00

02:00-03:00

03:00-04:00

04:00-05:00

05:00-06:00

06:00-07:00

07:00-08:00	6	17	23	161
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08:00-09:00	19	49	68	131
-------------	----	----	----	-----

09:00-10:00	22	23	45	130
-------------	----	----	----	-----

10:00-11:00	11	17	28	124
-------------	----	----	----	-----

11:00-12:00	19	14	33	129
-------------	----	----	----	-----

12:00-13:00	14	18	32	125
-------------	----	----	----	-----

13:00-14:00	12	13	25	124
-------------	----	----	----	-----

14:00-15:00	11	15	26	120
-------------	----	----	----	-----

15:00-16:00	15	17	32	118
-------------	----	----	----	-----

16:00-17:00	15	11	26	122
-------------	----	----	----	-----

17:00-18:00	23	16	39	129
-------------	----	----	----	-----

18:00-19:00	26	25	51	130
-------------	----	----	----	-----

19:00-20:00	21	17	38	134
-------------	----	----	----	-----

20:00-21:00	16	10	26	140
-------------	----	----	----	-----

21:00-22:00

22:00-23:00

23:00-24:00

Comments

No PSV's visited the site during this survey.

From: [REDACTED] <[REDACTED]@redbridge.gov.uk>
Sent: 05 September 2019 15:59
To: [REDACTED]
Cc: [REDACTED]
Subject: RE: Goodmayes Tesco

Hello [REDACTED]

I understand you are away from the office in an inquiry for the rest of the week. I have had a helpful conversation with Mark about TRICS site selection and am now writing to set-out a selection of TRICS sites, which I think are worthy of consideration.

The concern we have over the two sites that I understand you are proposing to use, is that although clearly they share some important characteristics with your site, the survey results do not align with the prevailing travel patterns in the Goodmayes area, where c35% of residents drive to work. We want to use TRICS sites that are more reflective of this.

With that in mind I have selected the following sites for discussion/consideration. At this stage I am not saying that these are definitely the sites you have to use, but rather I would like to have a discussion with you about them and if you previously considered them, why they were discounted. I hope to be in a position where we can finalise the TRICS sites, by the end of next week.

- HO-03-C-04
- IS-03-C-07
- BM-03-C-01
- EG-03-M-06

Regards,

[REDACTED]
Principal Engineer Development Management
Civic Pride
London Borough of Redbridge
10th Floor Front, Lynton House, 255-259 High Road, Ilford, IG1 1NY

Tel: [REDACTED]
Email: [REDACTED] [redbridge.gov.uk](mailto:[REDACTED]@redbridge.gov.uk)

From: [REDACTED]
Sent: 05 September 2019 08:50
To: [REDACTED] <[REDACTED]@motion.co.uk>; [REDACTED] <[REDACTED]@redbridge.gov.uk>
Cc: [REDACTED] <[REDACTED]@motion.co.uk>; [REDACTED] <[REDACTED]@torltd.co.uk>
Subject: RE: Goodmayes Tesco

Many thanks [REDACTED]

Please send through the TRICS sites you are proposing to use also.

Regards,

From: [REDACTED] <[REDACTED]@redbridge.gov.uk>
Sent: 10 October 2019 09:22
To: [REDACTED]
Cc: [REDACTED]
Subject: Tesco Goodmayes - Trip Rate Assessment

Hello [REDACTED]

It was good to meet you and your colleagues on Tuesday. I know that I found the meeting to be very productive.

To make sure that everyone is proceeding on the same basis, I thought that it would be worth following up on the discussion we had about residential trip rates. As you know, the Council's position is that at sites with good access to public transport (once you get away from Car Free schemes) a variation in parking ratio of 0.25 to 0.5 spaces per dwelling, would not on average result in any material difference in mode share in the AM and PM peaks. On that basis, we would see the use of TRICS data to forecast vehicle trips, with no adjustment based on parking ratios, as the best approach.

As I understood it, your view is that a variation in parking ratio of 0.25 spaces per dwelling, would on average be likely to affect mode share in the AM and PM peaks. You therefore suggested running two assessments, one as above and the second adjusting the figures based on parking ratios. That is fine, but if you are to do that, please do provide supporting evidence from TRICS demonstrating that variations in parking ratios, in the order of 0.25 spaces per dwelling, will on average result in a proportionate change in mode share in the AM/PM peaks. I expect that you would do this anyway, but as this is a point that we would want to discuss with TfL, we need to be able to provide evidence.

Regards,

[REDACTED]
Principal Engineer Development Management
Civic Pride
London Borough of Redbridge
10th Floor Front, Lynton House, 255-259 High Road, Ilford, IG1 1NY

Tel: [REDACTED]
Email: [REDACTED] [redbridge.gov.uk](mailto:[REDACTED]@redbridge.gov.uk)

Web: www.redbridge.gov.uk
Twitter: @RedbridgeLive
Facebook: www.facebook.com/redbridgelive

Save time, go online: www.redbridge.gov.uk



From: [REDACTED]
Sent: 03 December 2019 11:38
To: Planning Consultations
Subject: 4309/19: Development site at Tesco Extra, 822 High Road, RM6 4HY

Proposal

Demolition of all existing buildings including petrol filling station. Redevelopment of the site to provide a replacement food retail store and a series of apartment blocks ranging between 4 and 23 storeys in height to provide 1,280 residential units.

I have reviewed the plans and Phase 1 report submitted in support of the above application:

- Phase 1 Desk Study and Preliminary Risk Assessment (version 3), prepared by Stansted Environmental Services Ltd dated 8 Oct 2019 [Ref: CON01-GOOD-060]

The key points I take from the documents are:

- The existing Petrol Filling Station (PFS) will be removed as part of the proposed development
- The existing store will be demolished and a replacement store will be built first (towards the eastern end of the site)
- A new 'ground level' will be created by introducing a slab that aligns with the existing pavement along the High Road. The slab will form a new street level 'podium' beneath which all store and residential car parking will be located
- The Phase 1 report concludes that the risk to human health from identified sources is low to moderate
- It was concluded that the ground gas regime will need to be assessed.

Environmental Health would like two separate but similar land contamination conditions to be attached to the planning permission, for the two distinct phases of construction. This will allow use of the food retail store prior to residential occupancy. Any ground remediation and approval of the verification report for the new store could be sought before or during the construction of the residential and school buildings.

LAND CONTAMINATION CONDITION: NEW FOOD RETAIL STORE (Construction Phase 1)

The following shall be carried out by suitably qualified persons and in accordance with Environment Agency guidance, Land Contamination: Risk Assessment (2019) and British Standard 10175:2011+A2:2017 'Investigation of Potentially Contaminated Sites - Code of Practice', or subsequent updates.

1. Before the development hereby permitted commences at the site:

- a) A desk-top study including a search by London Fire Brigade with the history and details of the underground storage tanks at the Petrol Filling Station shall be submitted to the Local Planning Authority (LPA) for approval. A site reconnaissance and site investigation assessment methodology shall be undertaken to further characterise risks to receptors at the site. The findings shall be included in a Report and submitted to the LPA for approval prior to any site investigation work being undertaken.
- b) A Site Investigation Report detailing the findings of the intrusive works shall be produced and submitted to the LPA for approval prior to any remediation works being undertaken at the site.
- c) A detailed Remediation Strategy, where this has been identified as necessary from the findings of the site investigation, shall be submitted to the LPA for approval prior to any remediation works being undertaken at the area of the new food retail store. This scheme shall include an appraisal of remediation options, implementation timetable, works schedule, site management objectives, monitoring proposals and a remediation validation methodology. The scheme once completed must ensure that the site will not qualify

as 'Contaminated Land' under Part 2A of the Environmental Protection Act 1990 in relation to its intended use.

2. Prior to commencement of the super-structure, all fuel tanks, fuel lines, oil interceptors and associated drain connections should be decommissioned and removed from site, including the removal of any obviously polluted soil. The contractor shall provide:

- i) waste transfer notes from the decommissioned fuel tanks and associated underground services and contents (e.g. hydrocarbon contaminated water, waste oil, etc);
- ii) photographic evidence of the redundant tanks, fuel lines and associated infrastructure in the form of a report to the LPA for review by the Council's Environmental Health Team.

3. After development commences and prior to occupation / use of the food retail store:

a) A Verification Report confirming completion and adequacy of the remediation scheme shall be submitted to and approved in writing by the LPA before any part of the retail store is first used.

b) If during the course of development any contamination is discovered that was not previously identified, then this shall be reported to the LPA together with revised remediation proposals. If no contamination is found, then this shall be detailed in the remediation Verification Report.

Reason:

To protect the health of adjoining occupiers and the amenities in the surrounding area, and in the interests of future health of occupiers of the retail food development in accordance with Policy LP24 of the Council's Local Plan.

LAND CONTAMINATION CONDITION: ALL STRUCTURES , EXCEPT THE FOOD RETAIL STORE (Construction Phase 2)

The following shall be carried out by suitably qualified persons and in accordance with Environment Agency guidance, Land Contamination: Risk Assessment (2019) and British Standard 10175:2011+A2:2017 'Investigation of Potentially Contaminated Sites - Code of Practice', or subsequent updates.

1. Before the development hereby permitted commences at the site:

a) A desk-top study including a ground gas risk assessment, a site reconnaissance and site investigation assessment methodology shall be undertaken to further characterise risks to receptors at the site. The findings shall be included in a Report and submitted to the LPA for approval prior to any site investigation work being undertaken.

b) A Site Investigation Report detailing the findings of the intrusive works shall be produced and submitted to the LPA for approval prior to any remediation works being undertaken at the site.

c) A detailed Remediation Strategy, where this has been identified as necessary from the findings of the site investigation, shall be submitted to the LPA for approval prior to any remediation works being undertaken at the residential areas of the site. This scheme shall include an appraisal of remediation options, implementation timetable, works schedule, site management objectives, monitoring proposals and a remediation validation methodology. The scheme once completed must ensure that the site will not qualify as 'Contaminated Land' under Part 2A of the Environmental Protection Act 1990 in relation to its intended use.

2. After development commences and prior to occupation of the development, except the food retail store:

a) A Verification Report confirming completion and adequacy of the remediation scheme shall be submitted to and approved in writing by the LPA before the development is first occupied.

b) If during the course of development any contamination is discovered that was not previously identified, then this shall be reported to the LPA together with revised remediation proposals. If no contamination is found, then this shall be detailed in the remediation Verification Report.

Reason:

In the interests of future health of occupiers of the development in accordance with Policy LP24 of the Council's Local Plan.

In addition, could you please attach the following **INFORMATIVE**:

The Site lies within an area of the borough that has been identified as being at potential risk from buried explosive ordnance due to wartime bombing. It is recommended that professional advice is obtained and a detailed risk assessment undertaken to identify and analyse any threat posed by ordnance before works commence.

Regards

[REDACTED]
Environmental Health Enforcement Officer
(Contaminated Land Lead)
10th Floor/Front Lynton House
Ext. 85783 (Except Wednesdays)





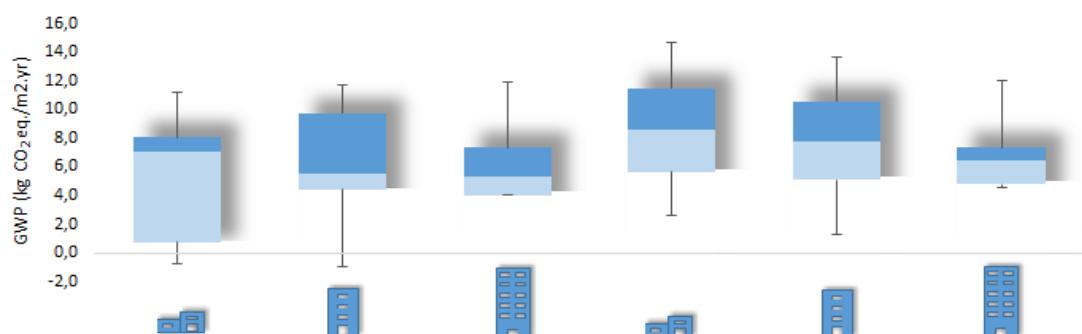
JRC TECHNICAL REPORTS

Environmental benchmarks for buildings

*EFI Resources:
Resource Efficient
Construction towards
Sustainable Design*

Gervasio, H. & Dimova, S.

2018



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Authors

Helena Gervasio, Silvia Dimova

Abstract

The research project *EFIResources: Resource Efficient Construction towards Sustainable Design*, supports European policies related to the efficient use of resources in construction and its major goal is the development of a performance based approach for sustainable design, enabling to assess resource efficiency of buildings in the early stages of building design.

In the proposed approach for sustainability design, the performance of a building, focussing on resource use, is benchmarked against standard and/or best practices. Therefore, benchmarks for the environmental performance of buildings are developed, providing a consistent and transparent yardstick for the assessment of the environmental performance of buildings and striving towards an effective reduction of the use of resources and relative environmental impacts in the building sector.

This report focusses on the framework for the development of benchmarks for the life cycle performance of buildings and provides a preliminary set of benchmarks for residential buildings, which may be considered to be representative of the existing residential building stock in Europe.

1 Introduction

The built environment is responsible for a high global share of environmental, economic and social impacts. An enhanced construction in the EU would influence 42% of our final energy consumption, about 35% of our greenhouse gas emissions, more than 50% of all extracted materials and enable savings of water up to 30% [1]. Therefore, the standard way in which construction of buildings is currently performed is jeopardizing the chances for future generations to meet their own needs.

The research project *EFIResources: Resource Efficient Construction towards Sustainable Design*, launched in September 2016, aims to support European policies related to the efficient use of resources in construction and its major goal is the development of a performance based approach for sustainable design, enabling to assess resource efficiency of buildings in the stage of building design.

The results of this project will facilitate the incorporation of sustainability criteria in construction practice in consistency with the safety requirements of the design standards, thus providing building designers with a tool for safe and clean construction.

The work plan of the project is organized into four main tasks:

- Task 1: Development of a life cycle model for the assessment of buildings, which will enable to perform the life cycle analysis of the cases studies and benchmarking;
- Task 2: Identification of best practices and development of a set of benchmarks for residential and office buildings;
- Task 3: Development of an approach for sustainable design consistent with the reliability approach of the Eurocodes;
- Task 4: Recommendations for standardization and guidelines for sustainable design.

This report corresponds to the work developed in the 2nd task of the project and aims to establish the general framework for the development of benchmarks and to provide a set of preliminary benchmarks for the life cycle analysis (LCA) of buildings. The benchmarks are evaluated based on the LCA model developed in the 1st task of the project [2].

Hence, the report is organized into the following sections: Section 2 provides a brief background on the benchmarking for buildings and establishes the general framework for the development of benchmarks; in Section 3, available benchmarks from a literature review are provided; a preliminary set of benchmarks calculated based on the model developed in the 1st task of the project is provided in Section 4 and these values are compared with the values from the literature review; finally, in Section 5 conclusions are drawn in relation to the set of values provided in this report and on potential improvements of these values, which will be addressed in the next task of the project.

2 Background and framework for benchmarking

2.1 Why the benchmarking of buildings?

The project *EFIResources* focus on resource efficiency in the building sector. In this project, resource efficiency is understood as a reduction of the use of resources in buildings and relative environmental impacts, over the complete life cycle of the building [2]. Therefore, in order to measure such reduction and thus assess the efficiency of buildings, reference values or benchmarks are needed. Hence, a benchmark is here understood as a point of reference to enable comparisons; while benchmarking is the process that assesses and compares the performance of a building against the benchmarks.

Benchmarks are used to monitor the changes and/or progress in the different sectors induced by EU directives. For instance, in relation to the energy consumption of buildings, during the use stage (the operational energy), the EU has adopted a number of measures to improve the energy efficiency of buildings. Following the implementation of such measures, energy efficiency certificates are now mandatory for the sale and rental of buildings, which benchmarks the energy consumption of buildings during the operation stage. This was a crucial step towards the effective reduction of the operational energy of buildings and to enable the setting of ambitious targets for energy efficiency by 2020 and onwards [3].

Moreover, a benchmarking initiative in the US [4], for the energy consumption of buildings, enables building owners and occupants to benchmark the energy consumption of their properties, based on the monthly energy bill, with other similar properties. This has been leading to significant reductions in terms of the energy consumption but also to an increased awareness and demand for energy-efficient properties. Thus, in this case, benchmarking is used as a policy tool for forcing the real estate market to properly value energy efficiency.

Benchmarking is also commonly used in rating systems for the ecological labelling of buildings such as LEEDS, BREEAM, HQE, SBTool, DGNB, etc. In these tools, the evaluation of the performance of a building, based in selected criteria, is compared with pre-defined thresholds or reference values. Quantitative and qualitative indicators are then translated into grades that are further aggregated into a final score. The main drawbacks of these systems were highlighted in [2], but the most relevant one is that these systems do not enable comparability due to disparities in scope of analysis and methodologic choices.

Hence, the main goal for the development of the benchmarks is to develop a consistent and transparent yardstick to assess the environmental performance of buildings, striving towards an effective reduction of the use of resources and relative environmental impacts in the building sector.

2.2 General framework for the benchmarks

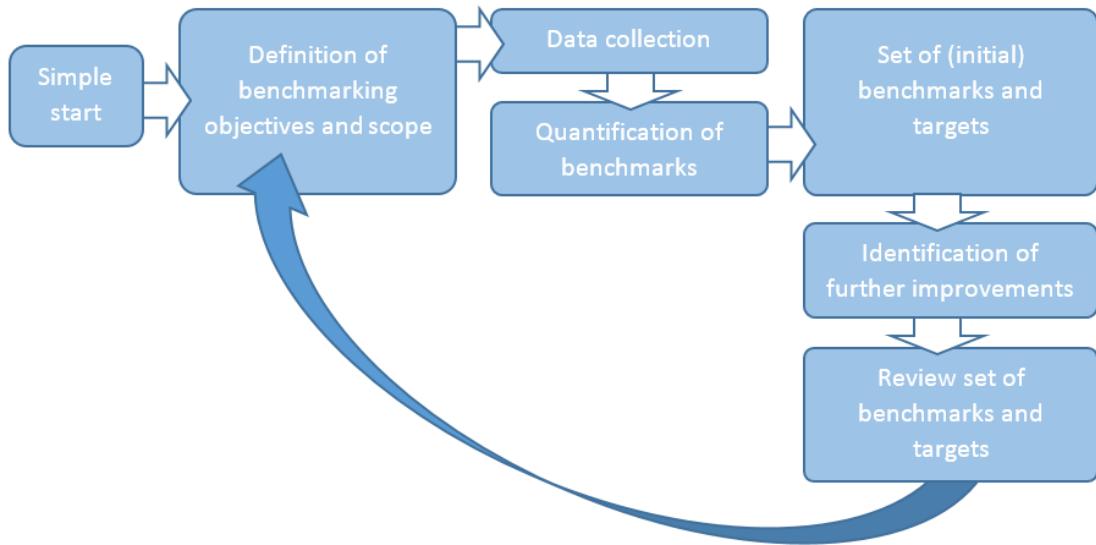
2.2.1 Graduated approach

One of the key steps in the development of benchmarks is the collection of accurate, consistently measured and verifiable data [5]. However, as stressed out in [2], in relation to buildings, data availability and collection are usually limiting the scope and accuracy of the life cycle assessment of buildings.

Thus, following guidance in [5], a graduated approach is herein adopted for the benchmarks, starting on a simple basis and being refined and increasing in complexity over time, as data collection on buildings and relative processes becomes more complete and precise.

Hence, the benchmarking of buildings is an evolving process in sophistication and complexity, starting from simple data and improving the initial set of benchmarks with time, as illustrated in Figure 1.

Figure 1. Graduated approach for benchmarking of buildings (based in [5])



In the follow-up of this project, a database is foreseen for the collection of building data (e.g. Bill-of-Materials of buildings, plans, etc.), which will enable to continuously update the values that will be provided by the end of the current project, thus increasing the accuracy of these values and the reliability of the approach over time.

2.2.2 Definition of objectives and scope

The sustainable design approach proposed in the project *EFIResources* aims for the harmonization between environmental criteria and structural criteria in the design of buildings, leading to an enhanced building design that copes with required safety demands, but with lower pressure on the environment and on the use of natural resources.

In the European codes for structural design, the Eurocodes, a limit state approach is adopted, in which the actual performance of the structure (S) is compared to an acceptable or targeted performance (R), and failure is expressed by $R < S$.

To be in line with the above approach, a similar procedure is proposed in this project, which relates the environmental performance of a building (S_{env}) to values referring to standard and/or best practices (R_{env}). Hence, the main goal of the benchmarks is to enable such comparison. Furthermore, target values may be defined taking into account that the final goal of the approach is the improvement of the performance of the building in terms of the use of resources and relative environmental impacts.

The assessment of the environmental performance of buildings, which is based on life cycle analysis entailing all stages throughout the lifetime of buildings, is limited to the structural system or frame of the building, including the foundations. Moreover, currently only two types of buildings are addressed: residential and office buildings.

However, the scope of the analysis may be expanded in the future, in order to account for the complete building and other building typologies.

2.2.3 Data collection

The definition of benchmarks entails the collection of two different types of data: (i) the collection of building data, which includes quantities of materials and list of processes

considered in the scope of the analysis, throughout the life cycle of the building; and (ii) the collection of environmental data for the quantification of potential environmental impacts.

In relation to the first type of information, data is preferably collected from design offices or building promoters, and consists on the Bill of Materials (BoM) produced for bidding purposes. This data can be provided directly from software platforms like BIM. Additional information for the definition of realistic scenarios that are needed for the assessment of the different life cycle stages of the building, should preferably be provided and/or discussed with building professionals.

In this project, building data was collected from design offices, building promoters and research centres, acknowledged in this report, but also from other sources in the literature.

However, the preliminary set of benchmarks provided in this report is based on building data from the *IMPRO-Building* project [6]. This project aimed for the identification of environmental improvement potentials of residential buildings in the EU-25 and therefore, all relevant types of residential buildings were taken into account: single-family (SI) houses, multi-apartment buildings (MF) and high-rise buildings (HR). Building data provided in this project represented 53%, 37% and 10%, respectively for SI, MF and HR, of the existing EU-25 building stock.

Since, the data provided in the *IMPRO* project is mostly referring to existing buildings in the EU, the construction year varies from second half of the 20th century (although a few cases are from the beginning of the century) to the beginning of the 21st century, the preliminary set of benchmarks provided in this report may be considered to be representative of the existing residential building stock in Europe.

On the other hand, building data collected from design offices, building promoters and research centres, is referring to recent buildings, and this data will be used to improve the preliminary set of benchmarks provided in this report and to identify best practices in the building sector. The analysis of this data is not included in this report.

In relation to the second type of information, data for the environmental assessment of buildings may be collected from generic databases for LCA and from Environmental Product Declarations (EDPs). In the project *EFIResources*, both sources of data are used in the calculation of the benchmarks. Both sources of data and respective quality requirements were described in [2].

2.2.4 Quantification of the environmental performance of buildings

To assure consistency in the development of the benchmarks it is crucial that all calculations are based on the same methodological choices and on the same quality of data.

Hence, the model developed for the life cycle assessment of buildings, leading to the definition of the set of benchmarks, is based on the standardized framework for LCA developed by CEN TC 350 for the sustainability assessment of construction works. In this case, as the assessment is made at the building level, the most relevant standard is EN 15978 [8].

The adoption of a standardized procedure ensures the use of a consistent approach, which was developed specifically for the assessment of construction works, thus enabling comparability and benchmarking.

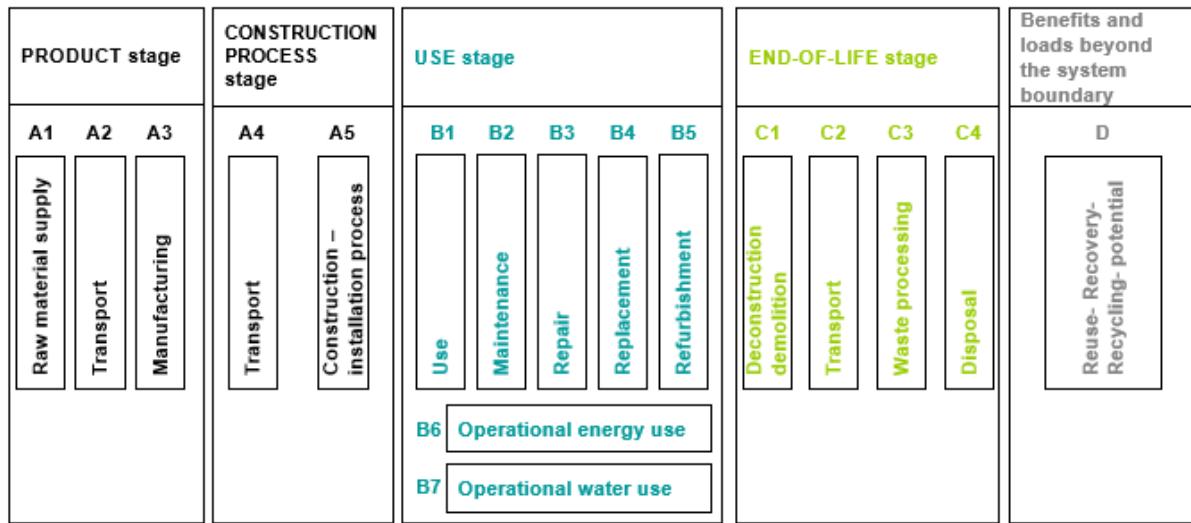
A description of this model and its implementation into a professional software for LCA, are fully provided in [2]. Therefore, in this sub-section, only the most relevant aspects are addressed.

As already referred, the scope of the analysis takes into account the complete life cycle of the building, from the product stage to the end-of-life stage. To provide full transparency of the results, data is not aggregated throughout the life cycle of the

building. As illustrated in Figure 2, the potential environmental impacts occurring over the life cycle of the building are allocated to the stage in which they occur, according to EN 15978.

Hence, a set of benchmarks will be defined for each Module in the scope of LCA of buildings, although life cycle aggregated results will also be provided. It is noted that usually Modules A1 to A3, corresponding to a cradle-to-gate analysis (C2Gt) are usually aggregated in LCA communications and reports, and this will also be the case in this report.

Figure 2. Scope of the LCA of buildings according to CEN TC350 standards [8]



The benchmarks for the assessment of the environmental performance of buildings are based on two types of environmental indicators [8]: (i) indicators focussing on impact categories using characterisation factors, and (ii) indicators focussing on environmental input and output (I/O) flows. Both types of indicators are indicated in Table 1.

The list of indicators provided in Table 1, covers most flows and environmental problems that are currently considered in other similar approaches for LCA, as discussed in [2].

The framework for the assessment of the environmental performance of buildings, briefly described in the above paragraphs, provides a consistent and transparent basis for the definition of benchmarks. However, it is observed that this framework is flexible enough to allow the extension of its scope and the inclusion of other indicators that might become relevant for the performance of buildings, including economic and social aspects.

2.2.5 Setting of benchmarks

For the development of benchmarks, quantitative information is needed related with the environmental performance of buildings, to enable the definition of reference values or sustainability levels. Different information sources may be considered, which depend on the purpose of the benchmarks [7]:

- Hence, when the purpose is to establish political targets or strategies, then target values are pursued, which are often related to economic, technical or environmental optimum considerations;
- On the other side, when the purpose is to establish limit values to be prescribed by codes and standards, then limit values may be defined by the lowest acceptable value, representing the minimum acceptable performance;
- When the aim is to promote an improved environmental building design, then reference values and/or best values may be provided by the statistical analysis of an appropriate set of data.

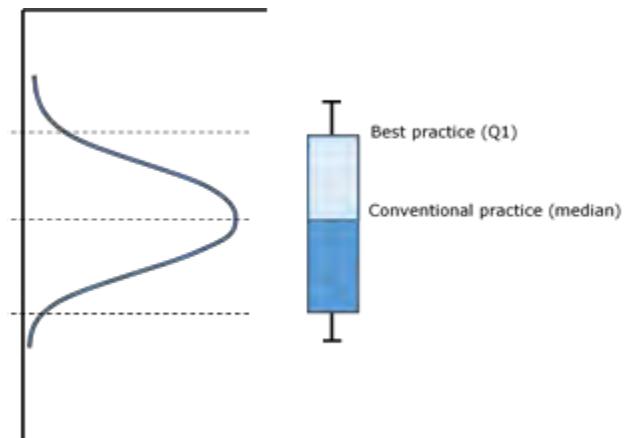
Table 1. Indicators describing environmental impacts and I/O flows [8]

Input/Output flows	Unit	
(I) Use of renewable primary energy excluding energy resources used as raw material	MJ, net calorific value	
(I) Use of renewable primary energy resources used as raw material	MJ, net calorific value	
(I) Use of non-renewable primary energy excluding primary energy resources used as raw material	MJ, net calorific value	
(I) Use of non-renewable primary energy resources used as raw material	MJ, net calorific value	
(I) Use of secondary material	kg	
(I) Use of renewable secondary fuels	MJ	
(I) Use of non-renewable secondary fuels	MJ	
(I) Net use of fresh water	m ³	
(O) Hazardous waste disposed	kg	
(O) Non-hazardous waste disposed	kg	
(O) Radioactive waste disposed	kg	
(O) Components for re-use	kg	
(O) Materials for recycling	kg	
(O) Materials for energy recovery (not being waste incineration)	kg	
(O) Exported energy	MJ for each energy carrier	
Environmental impacts	Abbreviation	Unit
Global Warming Potential	GWP	kg CO ₂ eq.
Depletion potential of the stratospheric ozone layer	ODP	kg CFC 11 eq.
Acidification potential of land and water	AP	kg SO ₂ ⁻ eq.
Eutrophication potential	EP	kg PO ₄ ³⁻ eq.
Formation potential of tropospheric ozone photochemical oxidants	POCP	kg C ₂ H ₄ eq.
Abiotic Resource Depletion Potential for elements	ADPelements	kg Sb eq.
Abiotic Resource Depletion Potential of fossil fuels	ADP _{fossil fuels}	MJ, net calorific value

In the scope of the project *EFIResources*, benchmarks will be developed, based on the statistical analysis of a sample of buildings collected in the project.

Moreover, 'conventional' practice (also known as 'business as usual') is assumed to be given by the median value of the environmental performance of the buildings (represented by any of the indicators in Table 1); while, 'best practice' is assumed to be given by the value of the environmental performance that is achieved by only 25% of the buildings, i.e., the upper limit of the first quartile, as illustrated in Figure 3.

Figure 3. 'Conventional' and 'best' values



It is important to highlight that the quality and robustness of benchmarks based on a statistical analysis is strongly dependent on the quality and representativeness of the **sample in relation to the 'basic population'**.

2.3 Differentiation factors for benchmarking

The design of a building depends of local conditions, technical and functional requirements from safety regulations and/or client's specific requirements. Therefore, the environmental performance of buildings will also be influenced by the same factors and the definition of benchmarks should also take into account these differentiation factors.

In the following paragraphs, the main aspects that may influence the design of a building and the respective environmental performance are discussed.

2.3.1 Building typology and other characteristics

Although, in special cases, general benchmarks set for large groups of buildings (e.g. residential buildings) are useful, it is important that benchmarks are defined for smaller groups, with more specific characteristics (e.g. single houses or apartment blocks).

Thus, to enable the definition of benchmarks at more specific levels of detail, the following information was collected for each building (whenever available):

- Type of building;
- Location of building;
- Total Gross Floor Area (in m²);
- Number of floors;
- Number of occupants/working places;
- (Estimated) design working life (in years);
- Building ref. year;
- Location of building;
- Seismic area;
- Climatic area.

In relation to building typology, in the scope of this project, the focus is given to residential and office buildings. Moreover, for residential buildings, three different types of buildings are considered: single family houses, multi-family houses (≤ 5 storeys) and multi-storey buildings (> 5 storeys).

In case of a residential building, the number of occupants refers to the number of people living inside the building on a permanent basis; while, in case of an office building, the number of occupants or working places refers to the number of people working in the building or the number of the respective working places.

The (estimated) design working life corresponds to the reference period for the life cycle analysis, and the building reference year is the year corresponding to the design of the building or to the construction of the building (when applicable).

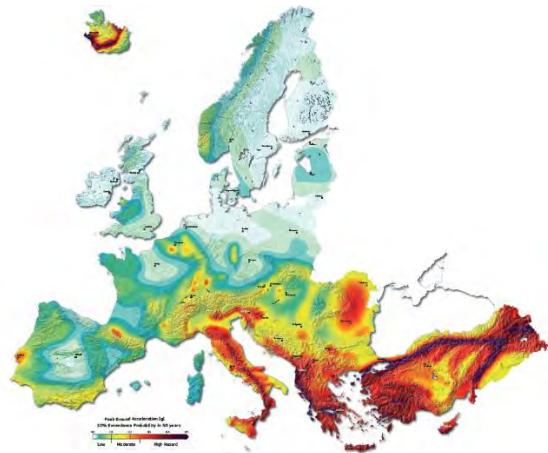
The seismic area may be identified by the reference ground acceleration of the location of the building, see sub-section 2.3.2; while, the climatic area may be identified by the *Köppen-Geiger* climate classification, see sub-section 2.3.3.

2.3.2 Seismic loading constraints

One of the design loads prescribed in the structural codes for building design is the seismic load. The severity of this load depend on the building location. In locations prone to seismic events, the seismic load may be governing the design of the building. In such

locations, structures are required to bear proper stiffness and load-bearing capacity to resist frequent earthquakes, and possess proper ductility and energy-dissipating capacity to avoid collapse, in case of rare earthquakes [9]. Hence, the seismic design influences the way the structure is conceived and consequently, the quantities of materials that are required.

Figure 4. European seismic hazard map [10]



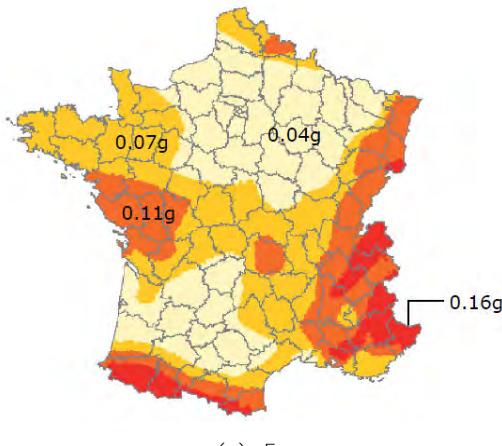
Therefore, the definition of benchmarks for buildings should take this into account, as the vulnerability of buildings to seismic hazards varies across European countries, as observed from Figure 4.

The hazard map in Figure 4 displays the Peak Ground Acceleration (PGA) (with a period of return of 475 years) in Europe for buildings [10].

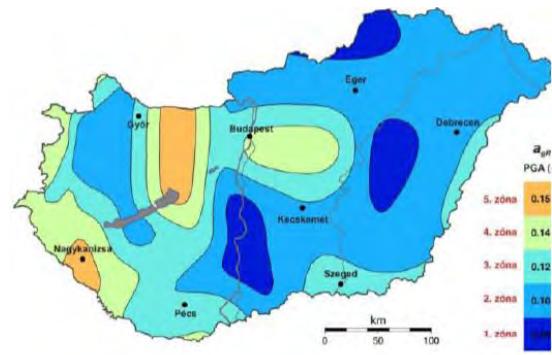
In this case, low hazard areas ($\text{PGA} \leq 0.1\text{g}$) are coloured in blue-green, moderate hazard areas in yellow-orange and high hazard areas ($\text{PGA} > 0.25\text{g}$) in red.

The reference standard in Europe for the seismic design of buildings is the Eurocode 8 [11], which establishes the requirements for structures to ensure that, in the event of earthquakes, human lives are protected and damage is limited. This code recommends to map the seismic zones of Member State (MS) countries in terms of the reference ground acceleration, and most MS have already complied with this recommendation, as illustrated in Figure 5 for some countries.

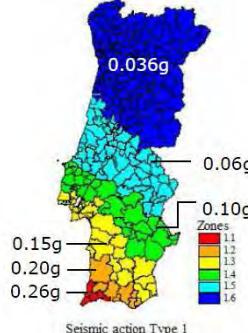
Figure 5. Seismic zone maps adopted by EU Member States [12]



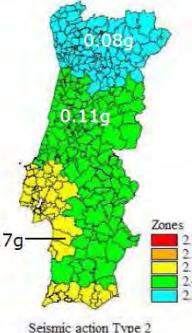
(a) France



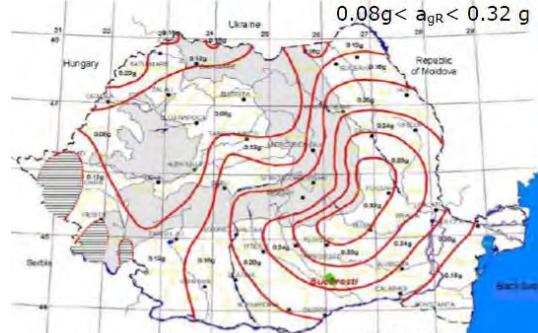
(b) Hungary



(c) Portugal



Seismic action Type 2



(d) Romania

Hence, in the quantification of the benchmarks for the buildings, the information about the location of the building should be specified, according to the respective national seismic map (when available).

2.3.3 Climatic constraints

The climate is a key-factor for the energy consumption of buildings. Besides the direct influence of the climate on the energy needs for heating and cooling, the specific location of the building is also responsible for other types of energy consumption, like the increased energy requirements for building illumination when the number of daylight hours decreases [13].

The design of a building should take into account the climatic characteristics where the building is supposed to be built, in order to comply with normative energy requirements.

Taking as example the Köppen-Geiger climate classification [14], in Europe four general climatic regions may be identified, as illustrated in Figure 6: (i) regions with lower latitudes (below 45°N) of southern Europe, in which the climate is labelled as Csa and Csb; (ii) western central European countries, where the climate is mainly classified as Cfb; (iii) eastern central European countries, classified as Dfb; and (iv) regions with higher latitudes (above 55°N), the Nordic European countries, in which the climate is mostly frequently labelled as Dfc.

As observed in Figure 6, a building designed for a southern European country has to cope with warm temperatures, dry and hot summers; whereas, buildings in northern countries have to cope with low temperatures, humidity and cool summers. Therefore, in general, a building designed for a southern country is not appropriate for a northern country and vice-versa.

These differences are illustrated by the example provided in the following paragraphs.

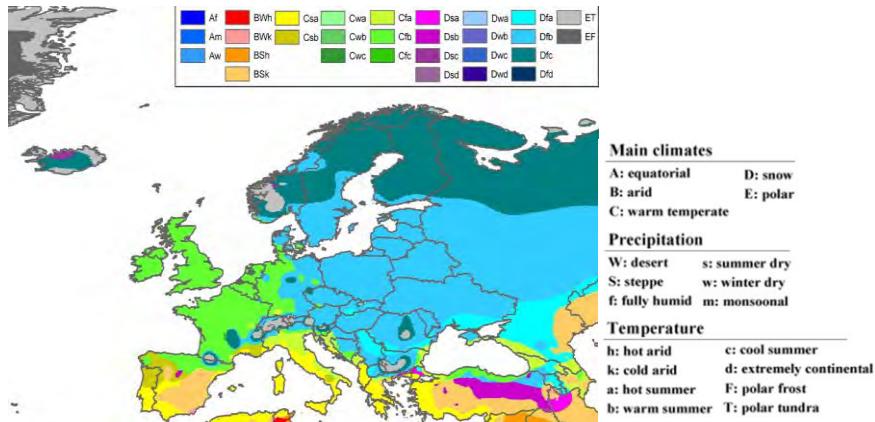
A LCA was performed for 76 buildings located in 3 main climatic zones in Europe, according to the respective heating degree days (HDD): zone Z1 – South European countries (564 to 2500 HDD), zone Z2 – Central European countries (2501 to 4000 HDD), and zone Z3 – North European countries (4000 to 5823 HDD). Data for these buildings was retrieved from a previous project IMPRO buildings [6] (further details about these buildings are provided in Section 4 of this report).

Two indicators were considered: Global Warming Potential (GWP) and Primary Energy (PE). Moreover, these two impacts are divided into embodied and operational impacts. The latter refer to the impacts due to the consumption of energy for heating and cooling the building during its service life; while the former refer to the impacts due to the production, use and ultimately disposal of the materials.

The results are normalized by the area of each building and per year (taking into account the working life considered for each building). Furthermore, the LCA results are split into

embodied impacts and impacts due to the use of energy during the operational stage of the building, operational impacts.

Figure 6. Köppen-Geiger climate classification in Europe [14]



The importance of embodied energy and embodied global warming potential, in relation to the global LCA results, is indicated in Table 2. It is observed that embodied global warming and embodied energy have a higher contribution in climatic zone Z1 than in climatic zone Z3. In the latter, the importance of the impacts due to the use of energy are naturally higher.

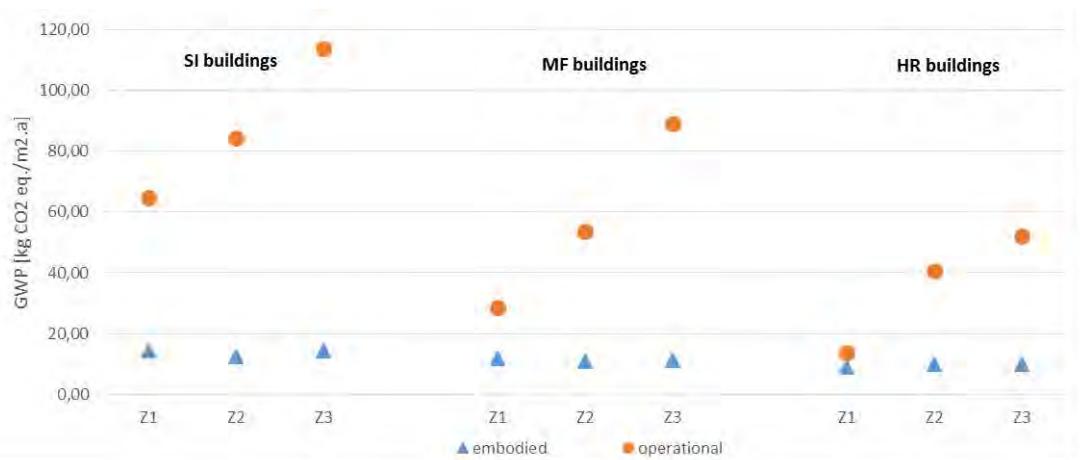
Table 2. Share of embodied GWP and embodied PE in relation to global impacts

Climatic area		Z1			Z2			Z3	
Building type	SI	MF	HR	SI	MF	HR	SI	MF	HR
Embodied Global warming	24%	31%	40%	10%	15%	19%	10%	12%	16%
Embodied energy	16%	23%	27%	12%	12%	14%	7%	8%	10%

The comparison between the different values is better illustrated in Figure 7 for the impact category of global warming potential. It is observed that the values of embodied global warming have not a significant variation within each climatic area and even with the building type, although a slight increase is observed from climate area Z1 to Z3.

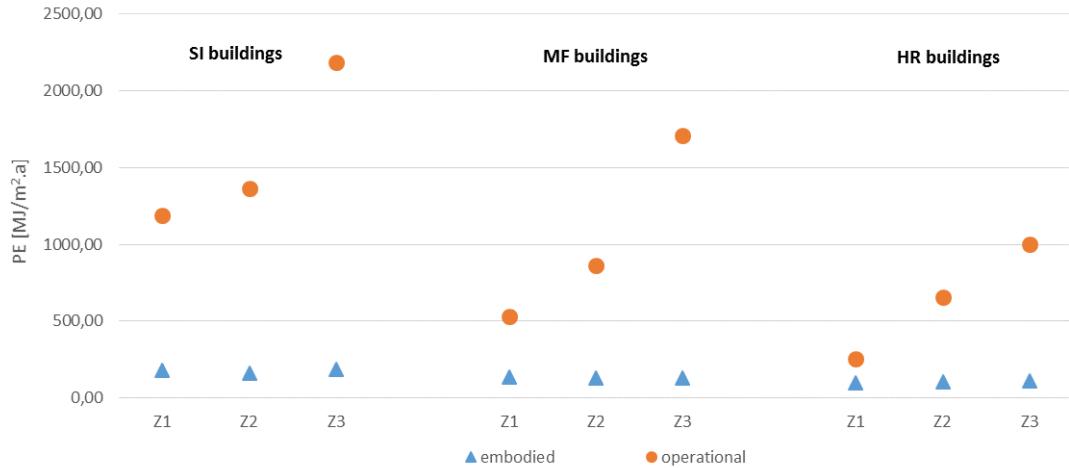
On the other hand, the values for the operational carbon have a much higher variation within each climatic area, increasing from climatic area Z1 to Z3. In terms of building type, the values for high-rise buildings are lower than multi-family buildings and much lower than single-family houses.

Figure 7. Mean embodied and operational GWP values (in $kg\ CO_2\ eq./m^2\cdot yr$) for all buildings in the three climatic areas



In relation to primary energy, the comparison between the different values is illustrated in Figure 8. Likewise, it is observed that the values of embodied primary energy have not a significant variation within each climatic area and building type, although slightly higher values are found for climatic area Z3. On the other hand, the values for the operational primary energy have a much higher variation within each climatic area, increasing from Z1 to Z3, and building type.

Figure 8. PE values (in $MJ/m^2.yr$) for all building



As observed from the previous example, the climatic region where the building is located has a huge influence in the operational energy of the building and related impacts. Thus, benchmarks for the global performance of buildings should not neglect this important factor.

However, its influence in terms of embodied impacts is reduced, particularly when only the structural system of the building is considered, which is the case in this project.

2.3.4 Vulnerability to climatic changes

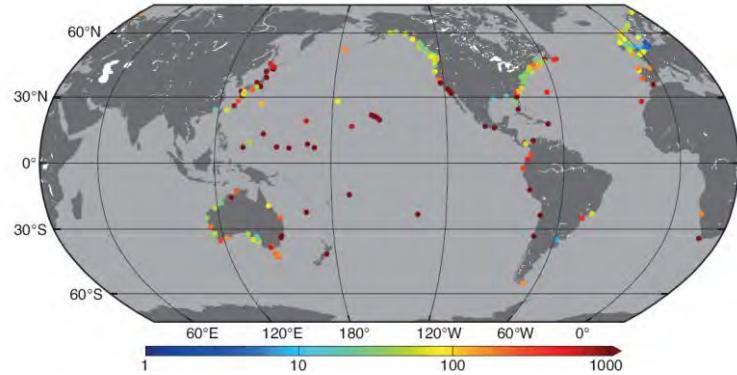
Climate changes due to the increased anthropogenic greenhouse gas concentrations in the atmosphere will have significant detrimental effects on buildings and infrastructures.

Moreover, today we have to face a sad reality: most aspects of climate change will persist for many centuries even if CO_2 emissions are stopped [15]. Thus, the adaptation of existing buildings and the design of new buildings, mainly in vulnerable areas, has to tackle higher structural and functional demands due to the consequences of climate change, both extreme events and longer-term processes.

For instance, coastal areas are the most vulnerable locations in the case of sea rise, which is one of major and inevitable consequences of climate change according to the 5th report from the IPCC [15]. It is estimated that the level of the sea will rise by an average value of 0.52 m by the end of this century compared with values of today. Although inundations of low-lying areas by the sea rise, over the 21st century, will be a problem, the most devastating impacts are likely to be associated with changes in extreme sea levels resulting from storms, which are expected to become more intense. The estimated multiplication factor, by which the frequency of flooding events increases for a mean sea level rise of 0.5 m, is represented in Figure 9 [15].

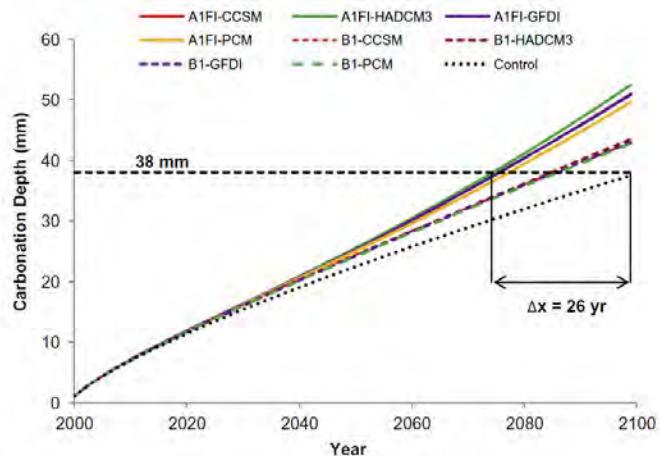
On the other side, variations in temperature, humidity and CO_2 concentrations may affect directly or indirectly the long-term performance of concrete structures due to enhanced corrosion induced by increased rates of carbonation and chlorination.

Figure 9. Frequency of flooding events for a mean sea level rise of 0.5 m [15]



Some studies available in the literature suggest that, in most vulnerable locations, concrete structures designed according to current regulations will experience carbonation and chlorination depths that are beyond the cover thickness currently recommended by the codes, thus requiring extensive repairs [16][17][18], as illustrated in Figure 10, for a concrete building located in the metropolitan area of Boston [18].

Figure 10. Estimated carbonation depth for a building in Boston constructed in 2000, according to different climatic scenarios (extracted from [18])



However, currently, there is a high level of uncertainties in future climatic scenarios and the relation between the effects of climate change on the degradation of materials and structures is hard to be established with an acceptable level of reliability [19][20]. Therefore, in this project, the quantification of benchmarks will not take into account the vulnerability of buildings to climatic changes. Nevertheless, it is highlighted that this may become a differentiator for benchmarks in the near future.

3 Benchmarks from literature review

Before the attempt to establish a preliminary set of reference values, an extensive literature review was carried out, in order to collect reference values for the environmental assessment of buildings.

Although values are available in the literature for different building typologies, in the following, the focus will be on residential and office buildings.

The values are organized according to the following:

- Reference values for embodied impacts and global impacts;
- Reference values according to different building typologies;
- Reference values according to different structural systems.

3.1 Embodied vs. global values

Most reference values found in the literature are referring to the operational stage of buildings, thus referring to the energy needed for heating and cooling the building, over its service life. In a review made by Peng et al. [21], based in more than 100 buildings across different countries, the life cycle energy consumption of residential and commercial buildings is in the range of 40-400 kwh/m².yr and 120 - 550 kwh/m².yr, respectively. For life cycle CO₂ emissions the values are 50 kg CO₂ eq./m².yr and 30 - 230 kg CO₂ eq./m².yr, respectively for residential and commercial buildings. The share of embodied energy and embodied CO₂ emissions in these global values, is up to 80% for residential buildings and about 20% for commercial buildings.

In another study [22], the assessment of buildings with different typologies was carried out for different indicators and for two life spans: 50 years and 100 years. In this study, the values are normalized by the net floor area of each building. In terms of the global performance of buildings, the life cycle primary energy is in the range of 170-380 kwh/m².yr, with a median value of 210 kwh/m².yr, for a life span of 50 years. For a life span of 100 years, the median value is reduced to 200 kwh/m².yr. For life cycle GHG emissions and a life span of 50 years, the range is 15-23.5 kg CO₂ eq./m².yr, with a median value of 19 kg CO₂ eq./m².yr. In this case, for a life span of 100 years, the median value is reduced to 10.5 kg CO₂ eq./m².yr. The shares of embodied impacts are about 25% for primary energy and about 55% for GHG emissions.

The share of embodied impacts in relation to life cycle impacts, depends not only of the type of building but also on the options taken for the design. For instance, in terms of energy consumption, buildings that are designed to be energy efficient tend to have a higher share of embodied energy in relation to the whole energy. In a review performed by Sartori and Hestnes [23], the share of embodied energy in conventional buildings was in the range of 2% - **38%**, while, in 'low-energy' buildings the share ranged between 9% - 46%.

3.2 Buildings with different typologies

As already indicated in the previous sub-section, the building typology has a strong influence in the life cycle performance of the building and consequently, in the reference values obtained for each type of building.

In the following paragraphs, reference values are provided for different building typologies.

3.2.1 French survey from HQE

In a statistical analysis made by the French Association HQE and *Centre Scientifique et Technique du batiment* (CSTB) [22], the performance of 63 buildings was carried out

based on an approach developed by HQE for the assessment of the environmental performance buildings.

Three types of buildings were considered: individual houses (MI), collective buildings (IC) and office buildings (BB). The analysis took into account two time frames: 50 and 100 years.

The results for Primary Energy and Climate Change are indicated in Table 3, taking into account the global performance of the buildings (including the values related to operational energy consumption). The values in bold are the median values and the minimum and maximum values correspond to the 1st and 3rd quartiles, respectively. In all cases, the values are normalized by the net floor area.

Table 3. Global results of life cycle analysis for a time period of 50 years [22]

Type of building	Primary energy (kwh/m ² .yr)	Climate change (kg CO ₂ eq./ m ² .yr)
BB	170-300-380	17-20-25
IC	205-225-240	21.5-23-26
MI	170-180-210	11-15-18

Office buildings have a higher value for primary energy in relation to other buildings; although for climate change, the value for collective buildings is slightly higher. In all cases, the range of values is significant.

Taking into account only the building component of 'construction products and equipment', the results are indicated in Table 4. In this case, office buildings present the higher values, both for primary energy and climate change

Table 4. Results of life cycle analysis for 'Construction products and equipment', for a time period of 50 years [22]

Type of building	Primary energy (kwh/m ² .yr)	Climate change (kg CO ₂ eq./ m ² .yr)
BB	53-62.8-78	11-13-16
IC	45-49.7-60	8.5-10.5-12
MI	44-51.4-58	6-8.4-10

The building component of 'Construction products and equipment' was further divided into: (i) main construction works, which included accesses and general infrastructure (Lot 1), foundations of sub-structure (Lot 2) and superstructure (Lot 3); (ii) secondary construction works and (iii) equipment.

Focussing on the structural system (lots 2 and 3), the results are indicated in Table 5.

Table 5. Results of life cycle analysis for the structural system, for a time period of 50 years

Type of building		Primary energy (kwh/m ² .yr)	Climate change (kg CO ₂ eq./ m ² .yr)
BB	Lot 2	7.09	2.66
	Lot 3	10.30	3.88
IC	Lot 2	4.42	1.41
	Lot 3	10.96	3.87
MI	Lot 2	3.28	1.04
	Lot 3	7.99	2.00

The weight of the performance of the structural system in relation to 'construction products and equipment' and to the complete the building, are highlighted in Table 6, for each building typology.

In relation to the performance of the global building, the weight of the structural system is below 10% for the environmental category of 'primary energy', for all buildings, but it is higher than 20% for 'climatic change' for IC and MI and higher than 30% for BB.

Naturally, the importance of the structural system to the component 'Construction products and equipment' increases. In this case, for primary energy, IC has the highest contribution with 31% and MI the lowest with 22%. In relation to 'climatic change', the minimum and maximum shares are 36% for MI and 50% for the other typologies.

Table 6. Importance of the structure (lots 2 and 3) in relation to 'construction products and equipment' and global building [22]

	Primary energy		Climatic change	
	construction products and equipment	global building	construction products and equipment	global building
BB	28%	6%	50%	33%
IC	31%	7%	50%	23%
MI	22%	6%	36%	20%

The results indicated above are referring to a life span of 50 years. However, the conclusions for a life span of 100 years are similar to the ones obtained for the time span of 50 years, with slight reductions found for the global performance of the building: about -5% for 'primary energy' and about -15% for 'climatic change'.

The influence of different construction systems is indicated in Table 7, taking into account the environmental indicator of 'primary energy – non-renewable energy' and the building component of 'construction products and equipment'.

Table 7. Results for different construction systems – non-renewable energy (in kwh/m².yr) [22]

	MI	IC	BB
Clay brick	32-36-40	34-36-38	-
Concrete Block	37-41-53	38-41-42	26-34-42.5
Cellular concrete	36-41-45	-	-
Reinforced concrete	-	39-40-46	40-49-64
Wood/concrete frame	28-32-39	37-38-39	-
Steel/concrete frame	-	-	43-44-53

However, when only the building component of 'construction products and equipment' is considered, no significant differences were found between the construction systems.

3.2.2 Annex 57 (International Energy Agency)

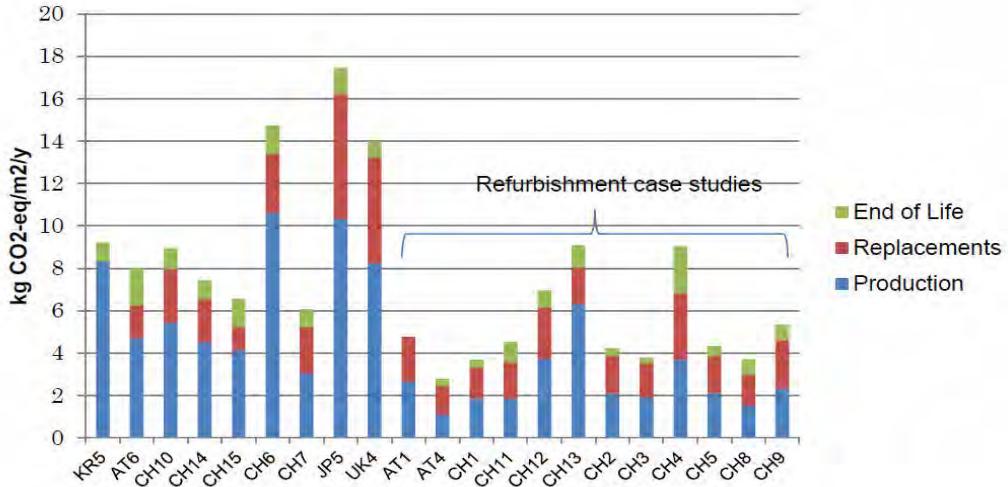
In a different survey, this time performed by the International Energy Agency, about 80 buildings from different countries, were evaluated in terms of the embodied energy and embodied CO₂ [24].

Contrary to the previous survey, the results of this survey are not truly comparable as most of the collected case studies were analysed based on different methodologies, databases and system settings, thus leading to some inconsistencies in the results.

The results of the case studies are indicated in Figure 11 and Figure 12, for embodied carbon and embodied energy, respectively. It is noticed that some of the case studies are referring to refurbishment. The scope of the analysis included production (Modules A1-A3), replacements over the service life of the building (Module B4) and end-of-life (Modules C3-C4).

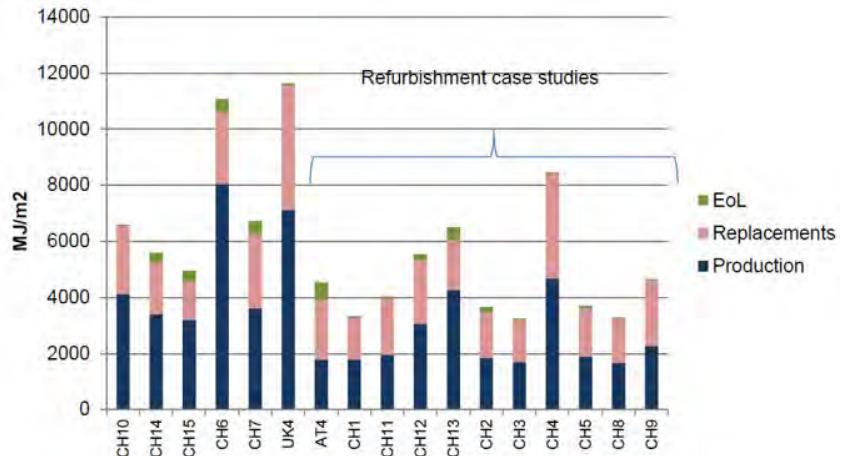
In relation to embodied carbon, the production stage is dominant for all case studies referring to new buildings; in the case of refurbishment, the contribution of the production stage is, in some cases, similar to the contribution of the replacements. The contribution of the end-of-life stage varies from 5% to 25%.

Figure 11. Embodied carbon from Annex 57 case studies (extracted from [24])



The degree to each different methodological options may influence the results of the analysis is observed from Figure 11. In this case, the result of a case study from Japan (JP5) is higher than the remaining cases studies and this is not only due to additional seismic requirements but also because an input-output approach was considered, which usually generates higher results due to wider boundaries.

Figure 12. Embodied energy from Annex 57 case studies (extracted from [24])



In relation to embodied energy (see Figure 12), similar conclusions may be drawn, except in relation to the contribution of the end-of-life stage, which in this case is lower than 10%.

3.2.3 Summary of the values for building typologies

Reference values for embodied carbon and embodied energy, found in the literature for residential and office buildings, are summarized in Table 8. It is noted that some of the sources indicated in the table, provide values also for other building typologies.

As already stressed out, these values are not comparable, not only due to different methodological choices but also due to the lack of information in some of the reviewed sources, which naturally increases the inconsistency of the values. For instance, in many cases the results are normalized by the area of the building but no information is given about the type of area considered (e.g., net floor area - NFA or gross floor area - GFA). Likewise, the scope of the analysis and the building components considered in the analysis are often not clear (e.g., cradle-to-gate - C2Gt or cradle-to-grave - C2G). In cases no information was provided, this is indicated in Table 8 by 'n.a'.

Nevertheless, the aim of the following table is to show the huge variability of the values that are currently found in the literature in relation to residential and office buildings, which do not enable to establish a trend between residential and office buildings.

Table 8. Reference values according to different building typologies

	Sub-type	Area	Scope	Building components	Embodied GWP (kg CO ₂ eq./m ²)	Embodied energy (MJ/m ²)	Ref.
Residential buildings	MF	n.a.	C2G	Building materials	435-1162	2817-7837	[21]
	SI	n.a.	C2Gt	Structure	243-267-286	-	[25]
	MF _I	n.a.	C2Gt	Structure	131-159-202	-	
	MF _m	n.a.	C2Gt	Structure	150-168-397	-	
	MF _h	n.a.	C2Gt	Structure	206-257-342	-	
	MF	NFA	C2Gt	Building materials	164-173	-	[26]
	MF	NFA	C2Gt	Building materials and repair materials	176-186	-	
	DA	GFA	C2Gt	Building materials	1158	-	[27]
	MF	GFA	C2Gt	Building materials	704	-	[27]
	SI	n.a.	C2G	Building materials & equipment	-	25-515 ^(*)	[28]
Office buildings	MF	n.a.	C2G	Building materials & equipment	-	79-126 ^(*)	[28]
	SI	NFA	C2G	Building materials & equipment	300-420-500 ^(**)	7920-9252-10440 ^(***)	[22]
	MF	NFA	C2G	Building materials & equipment	425-525-600 ^(**)	8100-8946-10800 ^(***)	[22]
	-	n.a.	C2G	Building materials	731-1053	5540-7157	[21]
	-	n.a.	C2Gt	Structure	227-330-418	-	[25]
	-	GFA	C2Gt	Building materials	674	-	[27]
	-	n.a.	C2G	Building materials & equipment	-	119-500 ^(*)	[28]
	-	n.a.	C2Gt	Building materials & equipment	843-1033	7743-11939	[29]
	-	NFA	C2G	Building materials & equipment	550-650-800 ^(**)	9540-11304-14040 ^(***)	[22]

(^{*}) values are given in MJ/m².yr

(^{**}) values were multiplied by 50 years

(^{***}) values were converted to MJ and multiplied by 50 years

3.3 Buildings with different structural systems

The importance of the structural system of a building in relation to the global environmental performance of a building is considered to be small by some authors. However, the weight of the structure accounts for the highest share of the weight of the building, thus contributing to a significant share of impacts [30] and costs [31]. For instance, the structural systems of office buildings may account for 60%-67% of the total embodied energy [32]; while, the embodied carbon of structures may reach shares of 20% to 40% [22][33].

The structural system of a building is the main focus of the research project *EFIResources* and therefore, this sub-section summarizes reference values for embodied carbon and embodied energy found in the literature for different structural systems. These values are provided in Table 9. Likewise, emphasis is given only to residential and office buildings.

It is noticed once again that the following values are not truly comparable as they are based on different methodological choices and, in some cases, information about important parameters is omitted in the reviewed sources.

Table 9. Reference values according to different structural systems

	Building type	Area	Scope	Building components	Embodied GWP (kg CO ₂ eq./m ²)	Embodied energy (MJ/m ²)	Ref.
Steel	various	n.a.	C2Gt	Structure	229-385-534	-	[25]
	OF	GFA	C2Gt	Structure + foundation	473 (*)	4869	[29]
	n.a.	GFA	C2G	Structure	152-209	-	[34]
	RE	n.a.	C2G	Building materials	241	-	[35]
	RE	n.a.	n.a.	Building materials	278	-	[36]
	RE	GFA	C2Gt	Building materials	354	1800	[37]
	OF	GFA	C2Gt	Structure	530-550 (*)	5595-5770	[31]
Reinforced Concrete	various	n.a.	C2Gt	Structure	277-361-434	-	[25]
	OF	GFA	C2Gt	Structure + foundation	497 (*)	4366	[29]
	OF	GFA	C2G	All building materials	491	-	[38]
	n.a.	GFA	C2G	Structure	159-242	-	[34]
	OF	GFA	C2Gt	Structure	390-410 (*)	4090-4321	[31]
	RE	n.a.	C2G	Building materials	332	-	[35]
	RE	n.a.	n.a.	Building materials	338	-	[36]
	RE	GFA	C2Gt	Building materials	433	2602	[37]
	OF	NFA	C2Gt	Building materials + equipment	-	7200-8820-11520 (**)	[22]
	RE	NFA	C2Gt	Building materials + equipment	-	7020-7200-8280 (**)	[22]
Wood	various	n.a.	C2Gt	Structure	174-244-293	-	[25]
	RE	n.a.	C2G	Building materials	108	-	[35]
	RE	n.a.	n.a.	Building materials	172	-	[36]
	RE	GFA	C2Gt	Building materials	288	1181	[37]
Masonry	various	n.a.	C2Gt	Structure	243-265-281	-	[25]
	RE	NFA	C2Gt	Building materials + equipment	-	6120-6480-6840 (**)	[22]
Steel & Concrete	various	n.a.	C2Gt	Structure	245-381-523	-	[25]
	OF	GFA	C2Gt	Structure + foundation	744 (*)	7616	[29]
	OF	NFA	C2Gt	Building materials + equipment	-	7740-7920-9540 (**)	[22]

(*) Based in I/O

(**) Only non-renewable energy is considered

Table 9 shows a huge variability for each structural system and it is not possible to establish a trend between the different systems. Among the reasons indicated above, the scope of the life cycle analysis is of particular importance for construction materials, as discussed in [2]. The consideration of a cradle-to-gate (C2Gt) analysis or a cradle-to-grave (C2G) analysis has a huge influence for some materials, which obviously leads to inconsistencies in comparative assertions.

To illustrate this, the cradle-to-grave results for some construction materials are indicated in Table 10, from different sources. It is noted that these values are not representative of each material. Furthermore, it is observed that comparisons, at the product level, are meaningless.

As observed from Table 10, for some materials (such is the case of concrete), cradle-to-gate values (Modules A1-A3) are not substantially changed when the complete life cycle

is taken into account. However, for other construction products, this is not usually the case.

Taking into account the case of steel reinforcement indicated in Table 10, when only cradle-to-gate values are considered, the production 1 kg of steel leads to 3.20 kg CO₂ eq. However, when the complete life cycle (cradle-to-cradle) is considered than the value of GWP is reduced to 2.21 kg CO₂ eq.

Table 10. Examples of GWP values (in kg CO₂ eq./declared unit) for different construction materials

Material	Declared unit	GWP	A1-A3	C1-C4	D	Total	Source of data
C40 concrete mix	1 kg	-	0.13 ^(a)	0.0043 ^(b)	-0.0053 ^(b)	0.13	^(a) GaBi database [39] ^(b) data from [40]
Steel reinforcing	1 kg	-	3.20	0.0079 ^(*)	-1.00	2.21	EPD reg. no.: S-P-00855 [41]
Softwood timber (sawn)	1 m ³	GWPT	-760	906 ^(**)	-585 ^(**)	-439	EPD reg. no.: S-P-00560 [41]
		GWPF	128	5.59 ^(**)	-586 ^(**)	-452	
		GWPB	-887	900 ^(**)	1.41 ^(**)	14.41	

(*) only Modules C3-C4 were considered

(**) only Module C3 was considered and the end-of-life scenario includes shredding (module C3) and combustion with recovered energy offset against average thermal energy from natural gas (module D)

Similarly, for wood products, the scope of the analysis has a huge influence on the results of the LCA. However, in this case, there is an additional question to be considered: the biogenic carbon sequestration. The carbon that is absorbed from the atmosphere by biomass as it grows is temporarily stored into wood materials, but at the end-of-life stage of these materials, through decomposition or incineration, the carbon emissions that were temporarily stored are released. Therefore, the omission of end-of-life stages in the scope of the analysis could lead to bias results.

Moreover, biogenic carbon should only be considered in Module A1-A3, when the wood is originated from a sustainably managed forest¹, which is the case of the wooden material indicated in Table 10, according to the information provided by the source. In this case, the results for the softwood timber are reported as a total GWP (GWPT), as well as biogenic carbon (GWPB) and fossil carbon (GWPF). In all cases, the values from Modules A1-A3 alone are completely different from the overall values (Modules A1-D).

For a matter of transparency, in the developed model for LCA [2], the environmental category of GWP was divided into GWP including biogenic carbon and GWP excluding biogenic carbon.

¹ A sustainable forest 'is carbon and climate neutral and preserves biodiversity to support fundamental functionalities and ecosystems services on a landscape level' [42]

4 Preliminary set of benchmarks for residential buildings

4.1 Introduction

The preliminary set of benchmarks is based on the assessment of the environmental performance of the case studies included in the project *Environmental Improvement Potentials of Residential Buildings* (IMPRO-Building) [6]. The LCA model used for the assessment of the buildings is fully described in [2].

The goal of the IMPRO-Building project was the analysis of the potential environmental improvements of residential buildings in the EU-25. The project took into account all relevant types of residential buildings, from single-family houses to multi-apartment buildings, including existing and new buildings.

Hence, in the framework of the referred project, data was collected to define relevant building models with enough representativeness of the building stock at the EU-25 level. The buildings were divided into three building types (single-family houses (SI), multi-family buildings (MF) and high-rise buildings (HR)), representing 53%, 37% and 10% of SI, MF and HR buildings, respectively, of the existing EU-25 building stock.

In addition, the buildings cover the three main climate zones in Europe according to heating degree days (HDD): zone Z1 – South European countries (564 to 2500 HDD), zone Z2 – Central European countries (2501 to 4000 HDD), and zone Z3 – North European countries (4000 to 5823 HDD).

Therefore, 72 building models (53 existing buildings and 19 new building types) were considered, as indicated in Table 11. A full description of each building, including the bill of the main materials, is provided in the final report of the IMPRO project [6].

Table 11. Number of buildings and types in each zone [6]

	Single-family house		Multi-family house		High-rise building	
Climatic zones	existing	new	existing	new	existing	new
Zone 1: South European countries	8	3	8	3	2	1
Zone 2: Central European countries	8	3	8	3	2	1
Zone 3: North European countries	7	2	8	2	2	1
TOTAL	31		32		9	

The list of buildings, including the information about the type of structure, is provided in Annex 1 of this report. Following the notation used in the previous project, each building is identified by the following reference: “**Zone type (ZX)_Building type (XX)_Number (XXX)**”. **Zone type refers to the three climatic regions: Z1** – southern European countries, Z2 – central European countries and Z3 – northern European countries; while, building type refers to: SI – single-family houses, MF – multi-family houses and HR – high-rise buildings.

4.2 Statistical analysis of LCA results

The methodology that is used to establish the preliminary set of benchmarks (“best” and “conventional” values) is based on the statistical evaluation of the results obtained for each European area.

The life cycle environmental assessment of each building is based on the functional equivalent, which includes the type of use of the building, the total gross floor area and a reference period of time [2]. Thus, the result for each indicator is normalized by the area and number of years considered for each building.

In this case, the type of use refers to residential buildings, although a subdivision is made in terms of single family houses (SI), multi-family houses (MF) and high-rise

buildings (HR). The reference period is taken as the service life considered for each building in the IMPRO project.

The life cycle analysis of each building is limited to the structural system [2], hence insulation materials and other non-structural elements were not considered in the analysis. The scope of the LCA comprehends Modules A1-A3, Module B4, Modules C1-C4 and Module D.

The analysis was performed for all indicators in Table 1. However, in this report, emphasis is given to two indicators: Global Warming Potential (in kg CO₂ eq./m².yr) and Primary Energy (in MJ/m².yr). Global Warming Potential is further divided in order to include biogenic carbon (GWP1) and exclude (GWP2).

As previously referred, in the following statistical analysis it is assumed that the conventional practice is given by the median of the values and the best practice given by the first quartile (25%), i.e., the boundary of the 25% lowest values. In the sample of values, no discrepancy values (outliers) were found.

4.2.1 Statistical analysis of European area Z1

The results are represented in Table 12 for European area Z1. The results presented in this table are aggregated over the life cycle of each building.

Table 12. Statistical analysis for life cycle aggregated results [GWP (kg CO₂ eq./m².yr) and PE (MJ/m².yr)] in Z1

		Mean value	Median	Standard deviation	Quartile 25%	Quartile 75%
SI	GWP1	7.61	7.19	4.16	5.16	9.34
	GWP2	9.87	9.32	4.81	8.17	14.03
	PE	162.12	154.00	57.22	117.62	205.55
MF	GWP1	7.40	7.03	3.31	4.82	10.44
	GWP2	8.62	8.06	3.89	5.15	12.66
	PE	124.58	112.45	52.33	85.26	168.50
HR	GWP1	7.07	5.58	2.94	4.46	11.18
	GWP2	7.51	6.21	2.68	5.08	11.24
	PE	100.86	82.25	37.41	67.27	153.05

The values obtained for GWP2 are, in general, higher than the values for GWP1 due to the contribution of structural elements in wood.

The lowest values correspond to high-rise buildings and the highest values are for single-family houses.

4.2.2 Statistical analysis of European area Z2

The aggregated results for European area Z2 are represented in Table 13.

Table 13. Statistical analysis for life cycle aggregated results [GWP (kg CO₂ eq./m².yr) and PE (MJ/m².yr)] in Z2

		Mean value	Median	Standard deviation	Quartile 25%	Quartile 75%
SI	GWP1	5.39	7.20	2.55	2.53	7.54
	GWP2	6.77	7.40	2.58	3.94	9.27
	PE	134.65	131.83	20.95	126.60	148.61
MF	GWP1	6.46	5.64	3.19	4.67	7.30
	GWP2	7.28	7.26	3.10	4.79	9.32
	PE	112.53	105.25	41.90	85.16	125.36
HR	GWP1	5.55	5.53	1.10	4.22	6.91
	GWP2	6.17	6.57	0.85	4.98	6.94
	PE	83.86	88.89	11.64	67.77	94.92

Likewise, the lowest median values correspond to high-rise buildings and the highest values are for single-family houses.

4.2.3 Statistical analysis of European area Z3

For the European area Z3, the results are represented in Table 14, and also in this case the lowest median values correspond to high-rise buildings and the highest values are for single-family houses

Table 14. Statistical analysis for life cycle aggregated results [GWP (kg CO₂ eq./m².yr) and PE (MJ/m².yr)] in Z3

		Mean value	Median	Standard deviation	Quartile 25%	Quartile 75%
SI	GWP1	7.00	7.88	4.18	1.91	10.67
	GWP2	9.17	8.94	4.23	4.53	13.84
	PE	180.00	133.89	66.32	124.95	246.23
MF	GWP1	6.64	5.71	4.62	3.74	10.57
	GWP2	7.69	8.07	4.49	4.64	11.12
	PE	124.82	116.86	50.71	79.75	175.95
HR	GWP1	5.55	5.53	1.11	4.19	6.91
	GWP2	6.17	6.57	0.85	4.99	6.94
	PE	84.36	88.91	10.97	69.24	94.93

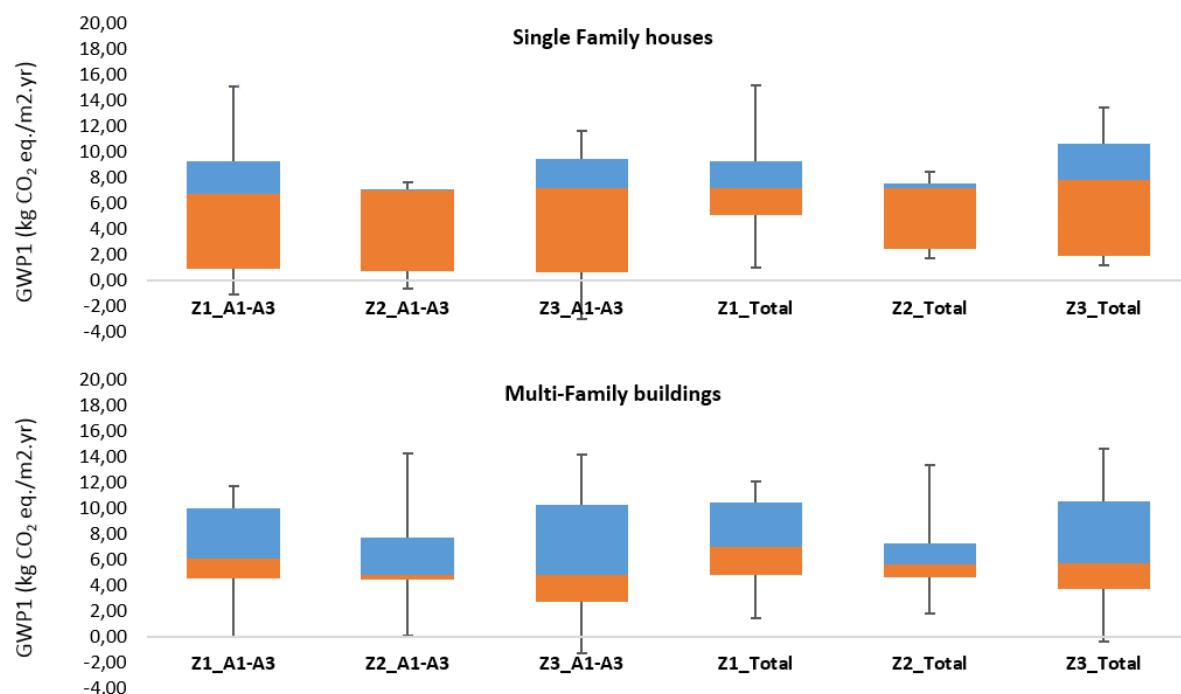
4.2.4 Statistical analysis for all areas

The previous results were aggregated over the complete life cycle of the buildings. In Figure 13 to Figure 15, the results are provided for the results of Modules A1-A3 and for the corresponding aggregated results, and for each European area.

The results for GWP1 are indicated in Figure 13. It is observed that, in all three areas, in terms of median values, the results for Modules A1-A3 and respective aggregated results are very close, both for single houses and multi-family buildings.

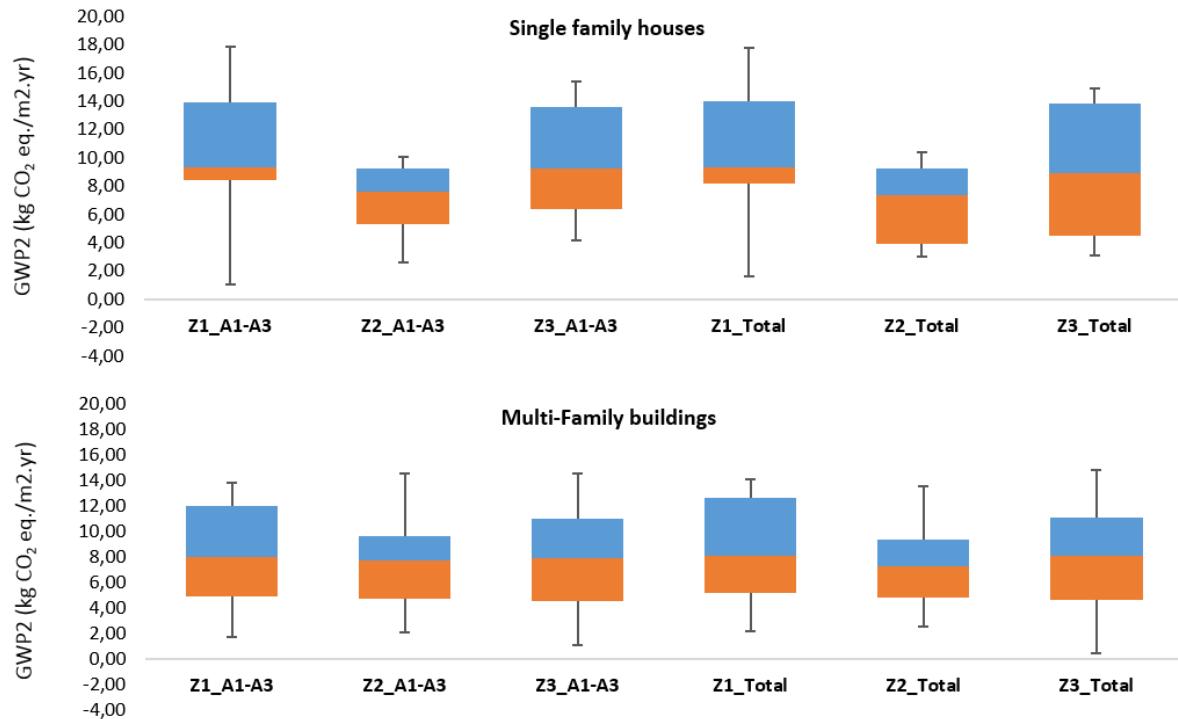
The scatter of values found for each area is not related to the climatic area but with the different types of structures in each area.

Figure 13. GWP1 (kg CO₂ eq./m².yr) for single family houses (SI) and multi-family buildings (MF)



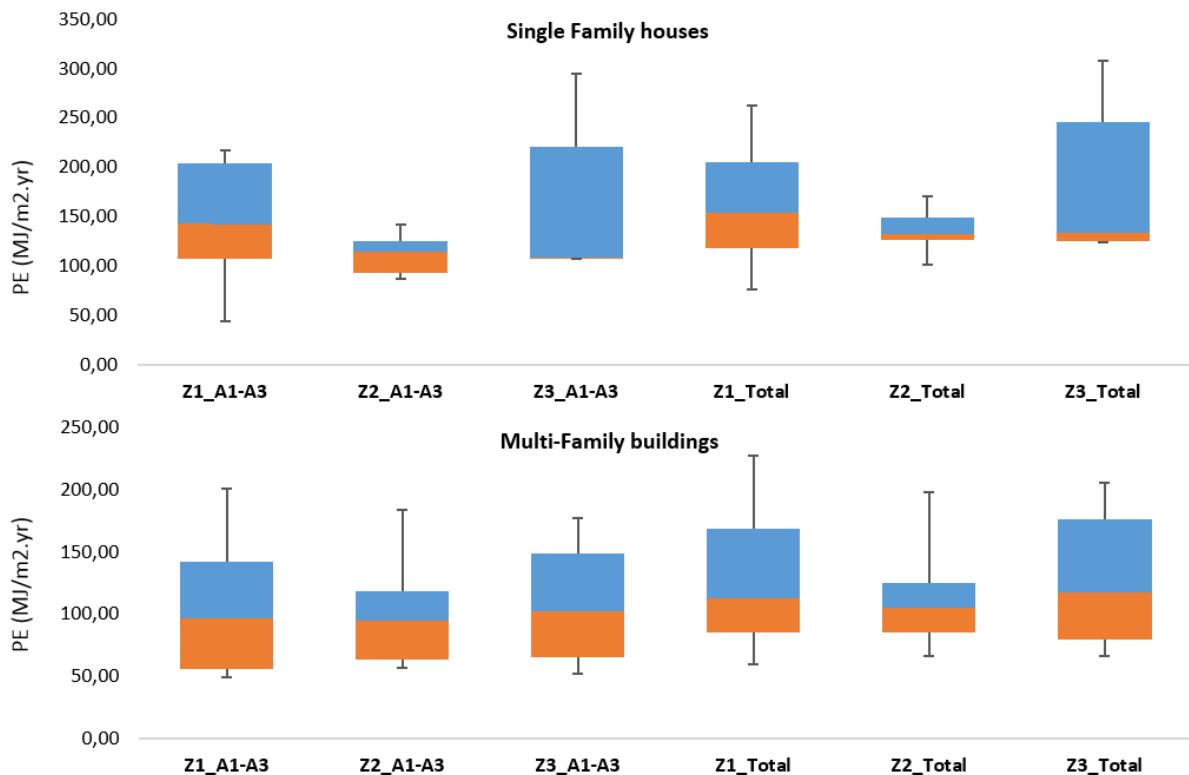
The results for GWP2 are indicated in Figure 14. In this case, for single family houses, the median values for area Z2 are slightly lower than the other 2 areas, but again this due to the different types of structures in the 3 areas.

Figure 14. GWP2 (kg CO₂ eq./m².yr) for single family houses (SI) and multi-family buildings (MF)



Finally, for PE, the results of Modules A1-A3 and respective aggregated results are indicated in Figure 15.

Figure 15. PE (MJ/m².yr) for single family houses (SI) and multi-family buildings (MF)



Likewise, there are no significant differences in the results, particularly in relation to multi-family buildings, in terms of median values. For single family houses, the scatter of results is higher and this trend is also noticeable for the previous indicators.

Another conclusion from Figure 13 to Figure 15 is that, in all cases, Modules A1-A3 have a dominant contribution towards the respective aggregated result.

4.2.5 Statistical analysis for all building types

Taking into account the aggregated life cycle result from the three climatic areas, the results for each building type are indicated in Table 15.

Table 15. Statistical analysis for each building type [GWP (kg CO₂ eq./m².yr) and PE (MJ/m².yr)]

		Mean value	Median	Standard deviation	Quartile 25%	Quartile 75%
SI	GWP1	6.65	7.22	3.80	2.53	8.71
	GWP2	8.57	8.94	4.20	5.01	11.27
	PE	157.56	139.25	54.17	124.19	186.18
MF	GWP1	6.84	6.30	3.76	4.88	9.94
	GWP2	7.87	7.32	3.89	5.37	10.75
	PE	120.51	105.60	48.80	84.50	159.77
HR	GWP1	6.06	5.53	2.05	4.34	6.91
	GWP2	6.61	6.57	1.81	5.03	6.94
	PE	89.69	88.89	24.78	68.51	94.93

Both in terms of median values, taken as 'conventional practices' and lower quartile values, considered as 'best practices', single family houses have the higher values, followed by multi-family buildings and high-rise buildings. The values obtained for GWP1 are slightly biased due to the higher contribution of wooden structural elements.

Finally, taking into account only Modules A1-A3, the median, lower and upper quartiles, and minimum and maximum values are illustrated in Figure 16 and Figure 17, for GWP and PE, respectively.

Figure 16. GWP1 and GWP2 (in kg CO₂ eq./m².yr) for all types of buildings (Modules A1-A3)

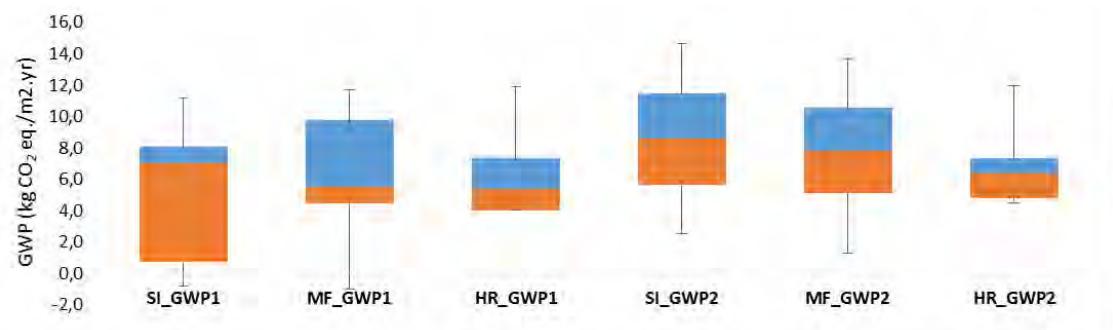
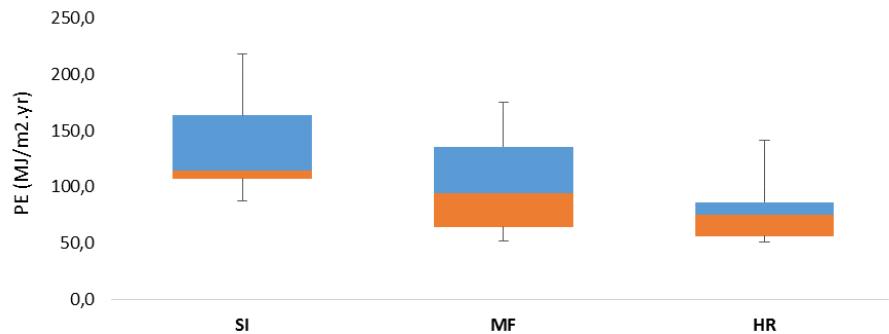


Figure 17. PE (in MJ/m².yr) for all types of buildings (Modules A1-A3)



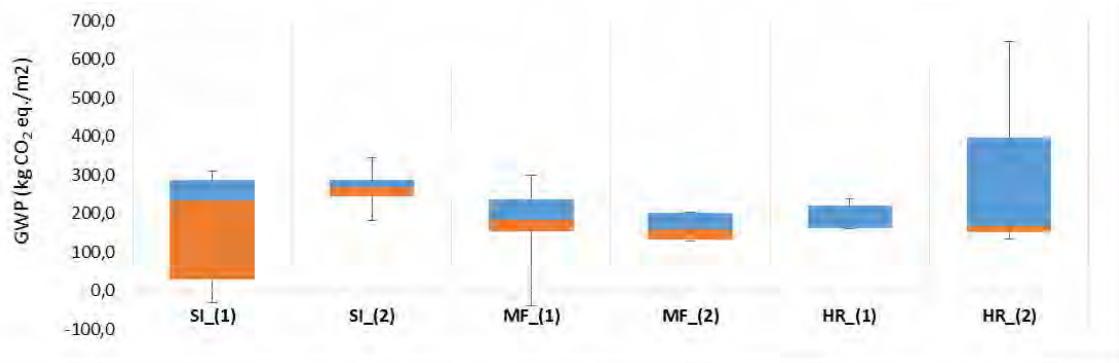
As Modules A1-A3 have a dominant contribution towards the aggregated result, the trend in Figure 16 and Figure 17 is similar to the one observed in Table 15.

4.3 Comparison with available benchmarks

In this section, an attempt is made to compare the values quantified in the previous subsection to similar values available in the literature. However, as previously referred, the importance of this comparison is only limited since different scopes and assumptions on the respective calculations and different data lead to different results. Therefore, the values are not easily comparable. The main goal of this comparison was simply to understand how the reference values obtained in this chapter are positioned in the range of values available in the literature.

In the first comparison, the results of the analysis are compared with the values available in the database deQo [25]. The comparison is presented in Figure 18 for the impact category of GWP including biogenic carbon, considering only the results from Modules A1-A3.

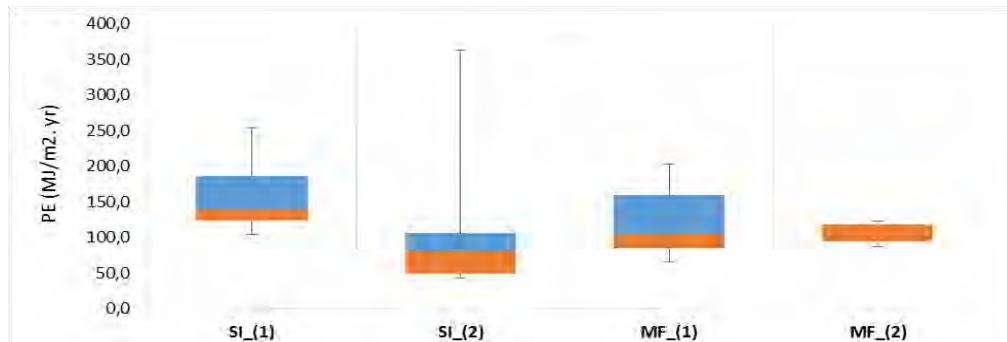
Figure 18. Comparison of benchmarks for GWP ($\text{kg CO}_2 \text{ eq./m}^2$)



In terms of the median values, only slight variations are found, about 15% for single-family houses and multi-family houses; while for high-rise building the variation is lower than 5%. In terms of the lower quartile, the values are also quite similar, except for single-family houses. However, there is a huge variation in terms of the range of values for the two groups of results.

In relation to PE, the comparison is made with results from a literature review [28]. For the impact category of PE, the comparison is represented in Figure 19. In this case, life cycle aggregated results are used in the comparison.

Figure 19. Comparison of benchmarks for PE ($\text{MJ/m}^2.\text{yr}$)



In this case, a higher variation is found for the median value of single-family houses, about 40%; while for multi-family houses, the variation is much lower, close to 12%. Likewise, there is a huge variation in terms of the range of values for the two groups of results.

5 Conclusions

The research project *EFIResources: Resource Efficient Construction towards Sustainable Design*, aims to support European policies related to the efficient use of resources in construction and its major goal is the development of a performance based approach for sustainable design, enabling to assess resource efficiency of buildings in the stage of design.

In the proposed approach for sustainability design, the performance of a building, focussing on resource use, is benchmarked against standard and/or best practices. Therefore, the main goal on the development of benchmarks is to provide a consistent and transparent yardstick for the assessment of the environmental performance of buildings, striving towards an effective reduction of the use of resources and relative environmental impacts in the building sector.

The adopted framework for the development of benchmarks is based on a graduated approach, starting on a simple basis and being refined and increasing in complexity over time, as data collection on buildings and relative processes will become more complete and precise.

A preliminary set of reference values for residential buildings was established based on the assessment of the environmental performance of 76 case studies provided by a previous research project. These values are based on data referring to representative buildings in the EU and may be considered to be representative of the existing residential building stock in Europe. The values were compared with values from other sources in the literature and, in terms of median values, a good agreement was found. It is observed that the relevance of this comparison is only limited due to the reasons explained in the text.

In the follow-up of this project, a database is foreseen for the collection of building data, which will enable to continuously update the values that will be provided by the end of the current project, thus increasing the accuracy of the values and the reliability of the approach over time.

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List of abbreviations and definitions

ADP _{elements}	Abiotic Resource Depletion Potential for elements
ADP _{fossil fuels}	Abiotic Resource Depletion Potential of fossil fuels
AP	Acidification potential
BoM	Bill of Materials
C2G	Cradle-to-grave
C2Gt	Cradle-to-gate
EDP	Environmental Product Declaration
EP	Eutrophication potential
FW	Use of net fresh water
GFA	Gross Floor Area
GWP	Global Warming Potential
GWP1	Global Warming Potential including biogenic carbon
GWP2	Global Warming Potential excluding biogenic carbon
HR	High Rise buildings
HWD	Hazardous waste disposed
LCA	Life Cycle Analysis/Assessment
MF	Multi-Family buildings
NFA	Net floor area
NHWD	Non-hazardous waste disposed
ODP	Depletion potential of the stratospheric ozone layer
PE	Primary Energy
PEF	Product Environmental Footprint
PENRM	Non-renewable primary energy resources used as raw materials
PENRT	Total use of non-renewable primary energy resources
PERM	Primary energy resources used as raw materials
PERT	Total use of renewable primary energy resources
POCP	Formation potential of tropospheric ozone photochemical oxidants
RWD	Radioactive waste disposed
SI	Single family houses

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Annex 1. List of buildings used in the preliminary set of benchmarks

Table 16. Description of buildings from IMPRO project [6]

	Notation	Description of Building Construction System
1	Z1_SI_001	Brick masonry with wooden flooring
2	Z1_SI_002	Limestone/fieldstone masonry with wooden flooring
3	Z1_SI_003	Limestone/fieldstone masonry, wooden flooring, flat roof
4	Z1_SI_004	Brick masonry, hollow brick flooring, pitched roof
5	Z1_SI_005	Brick cavity wall, reinforced concrete flooring, pitched roof 20°
6	Z1_SI_005(*)	Brick cavity wall, reinforced concrete flooring, pitched roof 20° with ins. (new building)
7	Z1_SI_006	Brick cavity wall, reinforced concrete flooring, flat roof
8	Z1_SI_006(*)	Brick cavity wall, reinforced concrete flooring, flat roof with insulation (new building)
9	Z1_SI_007	Brick masonry insulated, reinforced concrete flooring, pitched roof 20° with insulation
10	Z1_SI_007(*)	Brick masonry insulated, reinforced concrete flooring, pitched roof 20° (new building)
11	Z1_SI_008	Wooden frame with stone filler, reinforced concrete flooring, pitched roof
12	Z1_MF_001	Brick masonry with wooden flooring
13	Z1_MF_002	Limestone/fieldstone masonry with wooden flooring
14	Z1_MF_003	Brick cavity wall, reinforced concrete flooring, pitched roof 20°
15	Z1_MF_004	Breeze concrete, reinforced concrete flooring, pitched roof
16	Z1_MF_004(*)	Breeze concrete, reinforced concrete flooring, pitched roof with insulation (new building)
17	Z1_MF_005	Concrete wall, reinforced concrete flooring, flat roof
18	Z1_MF_006	Brick cavity wall insulated, reinforced concrete flooring, flat roof
19	Z1_MF_006(*)	Brick cavity wall ins., reinforced concrete flooring, flat roof with ins. (new building)
20	Z1_MF_007	Concrete wall, reinforced concrete flooring, flat roof
21	Z1_MF_008	Brick cavity wall insulated, reinforced concrete flooring, flat roof
22	Z1_MF_008(*)	Brick cavity wall ins., reinforced concrete flooring, flat roof with ins. (new building)
23	Z1_HR_001	Brick cavity wall insulated, reinforced concrete flooring, flat roof
24	Z1_HR_001(*)	Brick cavity wall ins., reinforced concrete flooring, flat roof with ins. (new building)
25	Z1_HR_002	Concrete wall, reinforced concrete flooring, flat roof
26	Z2_SI_001	Brick masonry with wooden flooring and pitched roof
27	Z2_SI_002	Rubble masonry with wooden flooring and pitched roof
28	Z2_SI_003	Wooden frame with stone filler, reinforced concrete flooring, pitched roof
29	Z2_SI_004	Brick masonry, hollow brick flooring, pitched roof
30	Z2_SI_005	Brick wall, reinforced concrete flooring, pitched roof
31	Z2_SI_006	Brick wall, reinforced concrete flooring, pitched roof

32	Z2_SI_006	Brick wall, reinforced concrete flooring, pitched roof with insulation (new building)
33	Z2_SI_007	Sand lime wall, reinforced concrete flooring, pitched roof
34	Z2_SI_007(*)	Sand lime wall, reinforced concrete flooring, pitched roof with ins. (new building)
35	Z2_SI_008	Wooden frame insulated, wooden flooring, pitched roof
36	Z2_SI_008	Wooden frame insulated, wooden flooring, pitched roof with insulation (new building)
37	Z2_MF_001	Brick masonry with wooden flooring
38	Z2_MF_002	Rubble stone masonry with wooden flooring
39	Z2_MF_003	Wooden frame with stone filler, wooden flooring, pitched roof
40	Z2_MF_004	Brick masonry, reinforced concrete flooring, pitched roof
41	Z2_MF_005	Breeze concrete insulated, reinforced concrete flooring, pitched roof
42	Z2_MF_005(*)	Breeze concrete ins., reinforced concrete flooring, pitched roof with ins. (new building)
43	Z2_MF_006	Brick masonry insulated, reinforced concrete flooring, pitched roof
44	Z2_MF_006(*)	Brick masonry ins., reinforced concrete flooring, pitched roof with ins. (new building)
45	Z2_MF_007	Sand lime wall insulated, reinforced concrete flooring, pitched roof
46	Z2_MF_007(*)	Sand lime wall ins., reinforced concrete flooring, pitched roof with ins. (new building)
47	Z2_MF_008	Concrete wall, reinforced concrete flooring, pitched roof
48	Z2_HR_001	Concrete wall, reinforced concrete flooring, flat roof
49	Z2_HR_002	Brick cavity wall insulated, reinforced concrete flooring, flat roof
50	Z2_HR_002(*)	Brick cavity wall ins., reinforced concrete flooring, flat roof with ins. (new building)
51	Z3_SI_001	Brick masonry with wooden flooring and pitched roof
52	Z3_SI_002	Brick wall, reinforced concrete flooring, pitched roof
53	Z3_SI_003	Wooden wall, wooden flooring, pitched roof
54	Z3_SI_004	Wooden wall and brick facade, reinforced concrete flooring, pitched roof
55	Z3_SI_005	Breeze concrete wall, breeze concrete block flooring, pitched roof
56	Z3_SI_006	Brick wall, reinforced concrete flooring, pitched roof
57	Z3_SI_006(*)	Brick wall, reinforced concrete flooring, pitched roof with insulation (new building)
58	Z3_SI_007	Wooden frame insulated, wooden flooring, pitched roof
59	Z3_SI_007(*)	Wooden frame insulated, wooden flooring, pitched roof with insulation (new building)
60	Z3_MF_001	Brick masonry with wooden flooring
61	Z3_MF_002	Breeze concrete insulated, reinforced concrete flooring, pitched roof
62	Z3_MF_003	Wooden wall brick façade, reinforced concrete flooring, pitched roof
63	Z3_MF_004	Brick masonry, reinforced concrete flooring, pitched roof
64	Z3_MF_005	Breeze and reinforced concrete wall, reinforced concrete flooring, pitched roof

65	Z3_MF_006	Wooden wall insulated, wooden flooring, pitched roof
66	Z3_MF_006 ^(*)	Wooden wall insulated, wooden flooring, pitched roof with insulation (new building)
67	Z3_MF_007	Brick masonry insulated, reinforced concrete flooring, pitched roof
68	Z3_MF_007 ^(*)	Brick masonry insulated, reinforced concrete flooring, pitched roof with ins. (new building)
69	Z3_MF_008	Concrete wall insulated, reinforced concrete flooring, flat roof
70	Z3_HR_001	Concrete wall, reinforced concrete flooring, flat roof
71	Z3_HR_002	Brick cavity wall insulated, reinforced concrete flooring, flat roof
72	Z3_HR_002 ^(*)	Brick cavity wall insulated, reinforced concrete flooring, flat roof with ins. (new building)

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From: [REDACTED] <[REDACTED]@redbridge.gov.uk>
Sent: 02 December 2021 15:51
To: [REDACTED]
Cc: [REDACTED]
Subject: FW: Stage 2 referral - 4309/19 - Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford

Importance: High

Hi [REDACTED]

As requested, the stage 2 e-mail referral below.

FYI, and to note: [REDACTED] has separately asked earlier today (after being notified of the stage 2 submission) to be provided with a copy of the draft S106 prior to your validation, but I will let him know that he can only have a copy once the referral has been formally validated.

Kind regards,

[REDACTED]

From: [REDACTED]@redbridge.gov.uk>
Sent: 01 December 2021 16:12
To: [REDACTED]t@london.gov.uk>
Cc: [REDACTED] <[REDACTED]@redbridge.gov.uk>
Subject: Stage 2 referral - 4309/19 - Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford
Importance: High

To whom it may concern,

Please see below WeTransfer link containing documents for the stage 2 referral for planning application:

4309/19 - Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford
Demolition of all existing buildings including petrol filling station. Redevelopment of the site to provide a replacement food retail store (use class A1, now superseded by use class E), a series of apartment blocks ranging between 4 and 23 storeys in height to provide 1,280 residential units (use class C3), flexible use floorspace for commercial/community uses (within use classes A1/A2/A3/B1/D1, all now superseded by use classes F1, F.2 and E), a 3-form entry primary school (use class D1, now superseded by use class F.1), public open space, car and cycle parking, associated landscaping and infrastructure works, and provision of pedestrian and vehicular access. (Summary). This application is accompanied by an Environmental Statement.

<https://we.tl/t-k5es7VsdRG>

As the stage 1 pre-dated your new portal I understand this stage 2 must also come by email.

Should you require any further information regarding this, please contact the case officer [REDACTED] (copied in).

Kind regards,

Principal Technical Officer
Regeneration and Culture
London Borough of Redbridge
11th Floor Front, Lynton House, 255-259 High Road, Ilford, IG1 1NY

@redbridge.gov.uk

Web: www.redbridge.gov.uk

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From: [REDACTED]@tfl.gov.uk>
Sent: 18 December 2019 10:22
To: Planning Consultations
Cc: [REDACTED]
Subject: RE: London Borough of Redbridge - 4309/19 Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford

Application: 4309/19

Location: Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford
Demolition of all existing buildings including petrol filling station. Redevelopment of the site to provide a replacement food retail store (use class A1), a series of apartment blocks ranging between 4 and 23 storeys in height to provide 1,280 residential units (use class C3), flexible use floorspace for commercial/community uses (within use classes A1/A2/A3/B1/D1), a 3-form entry primary school (use class D1), public open space, car and cycle parking, associated landscaping and infrastructure works, and provision of pedestrian and vehicular access. (summary). This application is accompanied by an Environmental Statement.

Thank you for your consultation.

I can confirm that TfL comments will be incorporated within the comments being submitted by Network Rail.

This response is made as TfL Railway Infrastructure Manager under the "Town and Country Planning (Development Management Procedure) Order 2015". It therefore relates only to railway engineering and safety matters. Other parts of TfL may have other comments in line with their own statutory responsibilities.

Kind regards

[REDACTED]
Safeguarding Engineer (LU+DLR)
Infrastructure Protection -TfL Engineering
Email: locationenquiries@tube.tfl.gov.uk

Find out more about Infrastructure Protection - <https://youtu.be/0hGoJMTBOEg>

From: Planning Consultations [mailto:planning.consultations@redbridge.gov.uk]
Sent: 19 November 2019 15:57
To: Location Enquiries
Subject: London Borough of Redbridge - 4309/19 Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford

Application: 4309/19

Location: Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford
Demolition of all existing buildings including petrol filling station. Redevelopment of the site to provide a replacement food retail store (use class A1), a series of apartment blocks ranging between 4 and 23 storeys in height to provide 1,280 residential units (use class C3), flexible use floorspace for commercial/community uses (within use classes A1/A2/A3/B1/D1), a 3-form entry primary school (use class D1), public open space, car and cycle parking, associated landscaping and infrastructure works, and

provision of pedestrian and vehicular access. (Summary). This application is accompanied by an Environmental Statement.

Please see details attached from the London Borough of Redbridge Development Management department relating to the above planning submission.

Regards,

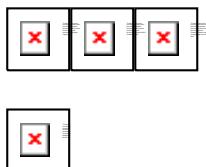
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IMPORTANT INFORMATION

To help address the high number of applications that are invalid on receipt, Redbridge Planning will be introducing an administration charge for applications submitted from 3 June 2019 that are made invalid. For more details about the charges please go to: <https://www.redbridge.gov.uk/planning-and-building/planning/make-a-planning-application/>

We have also streamlined our local validation checklist requirements. This is available to view on our website.

If you have any questions about the scheme please email planning.enquiry@redbridge.gov.uk



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GLA Carbon Emission Reporting Spreadsheet

BACKGROUND AND PURPOSE

The GLA has decided that from **January 2019** and until central Government updates Part L with the latest carbon emission factors, planning applicants are encouraged to use the SAP 10.0 emission factors for **referable applications** when estimating CO₂ emission performance against London Plan policies. This is a new approach being taken by the GLA to reflect the decarbonisation of the electricity grid, which is not currently taken into account by Part L of Building Regulations. This approach will remain in place until Government adopts new Building Regulations with updated emission factors.

This GLA Carbon Emission Reporting Spreadsheet facilitates the use of the SAP 10.0 emission factors and ensures a consistent and transparent process for updating Part L 2013 CO₂ emission performance. In particular, the approach has been developed to ensure that SAP 10.0 results can still be validated against supporting Part L 2013 BRUKL and SAP outputs.

From **January 2019** all GLA referable applications (including refurbishments) are expected to use this spreadsheet to report the anticipated carbon performance of a development. This includes planning applicants who are continuing to use SAP 2012 emission factors; although doing so will need to be supported by sufficient justification in line with the Energy Assessment Guidance. Applicants are required to submit this spreadsheet to the GLA alongside the energy assessment. It should be used for both domestic and non-domestic uses. The GLA will not accept the use of alternative methodologies or tools. This is to ensure consistency and to minimise the need for clarifications during the determination period.

Planning applicants should use Part L 2013 BRUKL and SAP outputs to fill in this spreadsheet which serves as a the final step in reporting the carbon emission performance of the proposed energy strategy. **It is solely for the purpose of reporting to the GLA and does not replace Part L calculations submitted for Building Regulations approval.**

The spreadsheet has been developed to fit as wide a range of policy compliant approaches for referable schemes as possible. Any planning applicants with a policy compliant approach that the spreadsheet does not serve should contact the GLA at: environment@london.gov.uk. Applicants must not amend or alter the spreadsheet to suit non-policy compliant strategies. Any unauthorised amendment to the spreadsheet will invalidate the CO₂ emission calculations.

Applicants should note that we will update the spreadsheet from time to time to ensure it remains fit for purpose. Applicants are expected to use the latest version at the time of the planning submission.

Any feedback on this spreadsheet should be sent to: environment@london.gov.uk.

METHODOLOGY

Applicants are required to complete all light blue input cells in the applicable tabs ('Carbon Factors', 'Baseline', 'Be Lean', 'Be Clean', 'Be Green' and 'GLA Summary Tables').

Input Data

For all applications, the input data required includes:

- Bespoke Carbon Factors (if applicable)
- Type of units modelled
- Area of units modelled (m²)
- Number of units modelled
- Total area represented by model (m²)

Total area represented by model (m²)

- Regulated energy consumption by end use (kWh p.a. for residential and kWh/m² p.a. for non-residential)
- Regulated energy consumption by fuel type (kWh/m² p.a. for non-residential)
- TER, DER and BER figures (kgCO₂/m² p.a.)
- TFEE and DFEE figures for residential (kWh/m² p.a.)
- Unregulated figures (tCO₂ p.a.) **[In the 'GLA Summary tables' tab only]**
- Actual and notional building cooling demand (MJ/m²) **[In the 'GLA Summary tables' tab only]**
- Distribution loss factor (if applicable) **[In the 'Development information' tab, Table 4]**

Applicants should update the highlighted cells with the type, area and number of modelled units. The consumption figures (kWh p.a. for domestic and kWh/m² p.a. for non-domestic) from the Part L modelling output reports should be reported and used to estimate the CO₂ emissions for each stage of the Energy Hierarchy. The TER, DER and BER figures from the Part L 2013 modelling output sheets should also be reported for cross-reference purposes. The applicant should ensure that the manually calculated TER, DER and BER figures are equal to the figures reported within the output sheets. TFEE and DFEE information should also be provided as well as unregulated uses consumption figures and cooling demand performance.

The total carbon emissions figures in the 'GLA Summary tables' tab are now calculated based on the area input for 'Total area represented by model (m²)'. This input requirement has been added to ensure that the carbon emission figures align with the development area schedule (included within the DAS) rather than the number of representative models.

Required Part L Outputs for the GLA spreadsheet

Domestic Part L Outputs:

For the domestic conversion applicants are required to use the outputs from the SAP TER and DER worksheets. To assist in the conversion process the required SAP worksheet rows have been referenced in each input cell. For Space Heating and Hot Water applicants will be required to manually convert the SAP energy requirements to energy consumption by fuel type, the appropriate SAP rows for this calculation have also been listed. **Note.** The SAP worksheet rows are based on a communal heating system, which is an expectation for GLA referable schemes. Applicants proposing individual systems must first seek confirmation from the GLA as to whether the approach will be acceptable.

Non-domestic Part L Outputs:

The required Part L outputs from non-domestic modelling will be energy consumption by **fuel type** (e.g. grid electricity, natural gas). The energy consumption by end use (e.g. heating, hot water, cooling etc.) included in the BRUKL documents are no longer used to estimate the CO₂ emission performance with SAP 10.0 emission factors in this spreadsheet. This decision has been taken as the consumption figures provided in the BRUKL may include a mixture of fuel types, for instance heating may include energy consumption from gas boilers and electrically driven heat pumps. The required data can be found in:

- SBEM software: the required data is included in the output file ending "*sim.csv"
- Government approved software (such as IES and TAS): the required data is included in the output file ending in "*BRUKL.inp"

The above output files should be appended to the energy assessment document.

Regarding the non-domestic uses, the applicant can determine whether each individual unit will be modelled independently and apportioned to the entire scheme or whether a single model will be generated for the entire development. The applicant should, however, include the results from all BRUKL outputs generated for the proposed development under the "NON-DOMESTIC ENERGY CONSUMPTION AND CO₂ ANALYSIS" sections. Applicants are generally encouraged to model each individual typology independently.

Note: GLA are aware that the Part L outputs for grid supplied electricity consumption does not account for power factor correction. Where power factor correction is present applicants may be required to amend the electricity consumption by the appropriate adjustment factor. The power factor correction is found in Table 1 of the Government's Approved Document L2A (ADL2A). Applicants should note in the appropriate cells where power factor correction has been applied.

Carbon Factors

The carbon factors for SAP 2012 and SAP 10.0 scenarios have been provided in the 'Development Information' tab. The table has been pre-populated with grid electricity and gas factors. Additional space has been included for alternative fuel factors that are included in Table 12 of the SAP 2012 and SAP 10.0 methodology documents. For applications with non-domestic buildings connecting to external heat networks a bespoke carbon factor needs to be introduced, the applicant should provide the full calculation behind the introduced bespoke carbon factor.

Validation Check

A validation check is required for each model entered to ensure that the conversion is robust. Applicants must ensure that the calculated TER/DER/BER in this spreadsheet matches the actual values from the Part L 2013 BRUKL and SAP worksheets.

TABLE 1. DEVELOPMENT INFORMATION

		NOTES
Date of Application		Please provide the date the application was submitted to the Local Planning Authority.
Local Planning Authority	<i>Redbridge</i>	Please indicate the Local Planning Authority determining the application.
Confirmed carbon offset price (£/tonne of carbon dioxide)	60	Please confirm the agreed carbon offset price for the Local Planning Authority. Evidence of communication on the price is expected to be included in the energy assessment. If no value is entered then the GLA's recommend price of £95 per tonne of carbon dioxide will be used.

TABLE 2. CARBON (CO₂) FACTORS

Fuel type	Fuel Carbon Factor (kgCO ₂ /kWh)		NOTES
	SAP 2012	SAP 10.0	
Natural Gas	0.216	0.210	SAP 2012 and SAP 10.0 carbon emission factors (Table 12).
Grid Electricity	0.519	0.233	
Enter Carbon Factor 1			These factors should be used where alternative fuel is used to grid gas and electricity. Carbon emission factors used here must be taken from Table 12 within the SAP 2012 and SAP 10.0 documents.
Enter Carbon Factor 2			
Enter Carbon Factor 3			Fuel type should be updated and referenced in Column A when additional carbon factor values have been added.
Enter Carbon Factor 4			
Bespoke DH Factor			This should only be used for non-domestic buildings that are connecting to District Heating (DH) networks. The network carbon factor should be calculated in line with Part L requirements and separate factors should be provided using SAP 2012 and SAP 10.0 fuel factors. Assumptions and workings should be shown below in Table 4.

TABLE 3. BESPOKE DH CARBON FACTOR CALCULATION METHODOLOGY

Please provide below details of the calculation methodology followed to establish the bespoke carbon factor, if applicable.		
---	--	--

TABLE 4. DISTRIBUTION LOSSES

		COMMENTS
Primary network (buried pipe)	Total pipe length (m)	
	Average heat loss rate (W/m)	
Secondary network (buried pipe)	Total pipe length (m)	
	Average heat loss rate (W/m)	
Total losses (MWh/year)		
Total heat supplied (MWh/year)		
Distribution Loss Factor (DLF)		
Calculation included in energy statement (yes/no)		

The applicant should complete all the light blue cells including information on the modelled units, the area per unit, the number of units, the baseline energy consumption figures, the TER and the TFEE.

DOMESTIC ENERGY CONSUMPTION AND CO ₂ ANALYSIS										SAP 2012 CO ₂ PERFORMANCE					SAP 10.0 CO ₂ PERFORMANCE					DEMAND								
Unit Identifier (e.g. plot number, dwelling type etc.)	Model total floor area (m ²)	Number of units	Total area represented by model (m ²)	VALIDATION CHECK					REGULATED ENERGY CONSUMPTION PER UNIT (kWh p.a.) - TER WORKSHEET					REGULATED CO ₂ EMISSIONS PER UNIT (kgCO ₂ p.a.)					REGULATED CO ₂ EMISSIONS PER UNIT					Fabric Energy Efficiency (FEE)				
				Calculated TER 2012 (kgCO ₂ / m ²)	TER Worksheet TER 2012 (kgCO ₂ / m ²)	Space Heating	Fuel type Space Heating	Domestic Hot Water	Fuel type Domestic Hot Water	Lighting	Auxiliary	Cooling	Space Heating	Domestic Hot Water	Lighting	Auxiliary	Cooling	2012 CO ₂ emissions (kgCO ₂ p.a.)	Space Heating	Domestic Hot Water	Lighting	Auxiliary	Cooling	SAP 10.0 CO ₂ emissions (kgCO ₂ p.a.)	Calculated TER SAP 10.0 (kgCO ₂ / m ²)	Target Fabric Energy Efficiency (TFEE) (kWh/m ²)		
TER Worksheet (Row 4)				TER Worksheet (Row 273)					TER Worksheet (Row 211)					TER Worksheet (Row 219)					TER Worksheet (Row 232)					TER Worksheet (Row 231)				
Type 1	50.63	14	708.82	14.7	14.7	561	Natural Gas	2,114	Natural Gas	244	75	121	457	127	39	744	118	444	57	17	636	12.6	19.2					
Type 2	50.63	12	607.56	17.5	17.5	1,263	Natural Gas	2,081	Natural Gas	244	75	273	449	127	39	888	265	437	57	17	777	15.3	36.01					
Type 3	50.63	10	506.3	18.5	18.5	1,499	Natural Gas	2,073	Natural Gas	244	75	324	448	127	39	937	315	435	57	17	825	16.3	41.8					
Type 4	50.63	136	6885.68	15.6	15.6	788.7576	Natural Gas	2,011.988	Natural Gas	244.3565	75	170	454	127	39	790	166	441	57	17	681	13.5	25.15					
Type 5	50.63	23	1164.49	18.7	18.7	1,542.9513	Natural Gas	2,071.826	Natural Gas	244.3565	75	333	448	127	39	947	324	435	57	17	834	16.5	42.73					
Type 6	50.63	21	1063.23	16.5	16.5	1,043.7183	Natural Gas	2,091.713	Natural Gas	234.3855	75	225	452	122	39	838	219	439	55	17	731	14.4	32.54					
Type 7	50.63	7	354.41	20.2	20.2	1,923.025	Natural Gas	2,062.5899	Natural Gas	234.3855	75	415	446	122	39	1,021	404	433	55	17	909	18.0	51.33					
Type 8	50.63	8	405.04	21.3	21.3	2,184.0402	Natural Gas	2,055.9647	Natural Gas	234.3855	75	472	444	122	39	1,076	459	432	55	17	962	19.0	56.94					
Type 9	50.63	51	2582.13	18.1	18.1	1,421.6453	Natural Gas	2,076.7897	Natural Gas	234.3855	75	307	449	122	39	916	299	436	55	17	807	15.9	40.76					
Type 10	50.63	38	1923.94	16.8	16.8	1,116.8939	Natural Gas	2,088.6558	Natural Gas	234.3855	75	241	451	122	39	853	235	439	55	17	745	14.7	34.35					
Type 11	50.63	10	506.3	20.5	20.5	2,006.5971	Natural Gas	2,060.7466	Natural Gas	234.3855	75	433	445	122	39	1,039	421	433	55	17	926	18.3	53.31					
Type 12	50.14	10	501.4	18.8	18.8	1,529.8961	Natural Gas	2,065.5991	Natural Gas	241.808	75	330	446	125	39	941	321	434	56	17	829	16.5	42.88					
Type 13	50.14	48	2406.72	15.8	15.8	811.7129	Natural Gas	2,094.1299	Natural Gas	241.808	75	175	452	125	39	792	170	440	56	17	684	13.6	25.91					
Type 14	50.43	5	252.15	16.5	16.5	1,009.0756	Natural Gas	2,050.2139	Natural Gas	233.8754	75	218	451	121	39	830	212	439	54	17	723	14.3	32.12					
Type 15	61.65	2	123.3	16.1	16.1	1,508.8836	Natural Gas	2,220.299	Natural Gas	285.8663	75	326	480	148	39	993	317	466	67	17	867	14.1	34.73					
Type 16	61.65	6	369.9	13.5	13.5	737.6722	Natural Gas	2,253.7007	Natural Gas	285.8663	75	159	487	148	39	833	155	473	67	17	712	11.6	20.96					
Type 17	61.65	18	1109.7	14.6	14.6	1,053.023	Natural Gas	2,238.7618	Natural Gas	285.8663	75	227	484	148	39	898	221	470	67	17	775	12.6	26.07					
Type 18	61.65	6	369.9	17.6	17.6	1,943.8886	Natural Gas	2,208.6862	Natural Gas	234.3855	75	420	477	148	39	1,084	408	464	67	17	956	15.5	43.07					
Type 19	61.29	3	183.87	16.8	16.8	1,681.4581	Natural Gas	2,210.1334	Natural Gas	285.3177	75	363	477	148	39	1,028	353	464	66	17	901	14.7	38.21					
Type 20	61.29	18	1103.22	14.0	14.0	866.8616	Natural Gas	2,242.3192	Natural Gas	285.3177	75	187	484	148	39	859	182	471	66	17	737	12.0	23.6					
Type 21	61.29	4	245.16	18.4	18.4	2,168.8729	Natural Gas	2,196.0848	Natural Gas	285.3177	75	468	474	148	39	1,130	455	461	66	17	1,001	16.3	46.96					
Type 22	61.29	16	980.64	15.4	15.4	1,278.4845	Natural Gas	2,223.1471	Natural Gas	285.3177	75	276	480	148	39	943	268	467	66	17	819	13.4	31.2					
Type 23	61.29	8	490.32	17.4	17.4	1,878.6352	Natural Gas	2,204.8606	Natural Gas	285.3177	75	406	476	148	39	1,069	395	463	66	17	941	15.4	42.08					
Type 24	61.29	29	1777.41	14.6	14.6	1,036.0626	Natural Gas	2,234.6244	Natural Gas	232.7464	75	224	483	148	39	893	218	469	66	17	771	12.6	27.12					
Type 25	70.32	13	914.16	16.7	16.7	2,169.9215	Natural Gas	2,305.682	Natural Gas	327.7464	75	469	498	170	39	1,176	456	484	76	17	1,034	14.7	41.58					
Type 26	70.32	143	1005.76	15.6	15.6	1,787.4027	Natural Gas	2,316.3487	Natural Gas	327.7464	75	386	500	170	39	1,095	375	486										

Use	Total Area (m ²)	TER 2012 (kgCO ₂ / m ²)	-	Space Heating (kWh p.a.)	N/A	Domestic Hot Water (kWh p.a.)	N/A	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)		2012 CO ₂ emissions (kgCO ₂ p.a.)			SAP 10.0 CO ₂ emissions (kgCO ₂ p.a.)	Calculated TER SAP 10.0 (kgCO ₂ / m ²)	
Sum	103,126	17.8	-	2,160,640		2,986,237		1,065,404	171,097	183,401		1,836,373			1,406,168	13.6	

The applicant should complete all the light blue cells including information on the 'be lean' energy consumption figures, the 'be lean' DER, the DFEE and the regulated energy demand of the 'be lean' scenario.

SAP 2012 CO₂ PERFORMANCE

SAP 10.0 CO₂ PERFORMANCE

FEES

DOMESTIC ENERGY CONSUMPTION AND CO₂ ANALYSIS

Unit Identifier (e.g. plot number, dwelling type etc.)	Model total floor area (m ²)	Number of units	Total area represented by model (m ²)	VALIDATION CHECK		REGULATED ENERGY CONSUMPTION PER UNIT (kWh p.a.) - 'BE LEAN' SAP DER WORKSHEET									Space Heating Space Heating Fuel type Domestic Hot Water (Heat Source 1)	Fuel type Domestic Hot Water Secondary Heating system	Fuel type Space Heating	Lighting	Auxiliary	Cooling	Space Heating CO ₂ emissions (kgCO ₂ / m ²)	DER Worksheet DER 2012 (kgCO ₂ / m ²)	Calculated DER Sheet (Row 304)	Select fuel type DER Sheet [Row 307a] + (Row 367a x 0.01)]	Select fuel type DER Sheet [Row 309]	Select fuel type DER Sheet [Row 332]	Select fuel type DER Sheet [Row 313 + 331]	Select fuel type DER Sheet [Row 315]	REGULATED CO ₂ EMISSIONS PER UNIT (kgCO ₂ p.a.)						REGULATED CO ₂ EMISSIONS PER UNIT						Space Heating CO ₂ emissions (kgCO ₂ p.a.)	Domestic Hot Water CO ₂ emissions (kgCO ₂ p.a.)	Lighting CO ₂ emissions (kgCO ₂ p.a.)	Auxiliary CO ₂ emissions (kgCO ₂ p.a.)	Cooling CO ₂ emissions (kgCO ₂ p.a.)	Unregulated CO ₂ emissions (kgCO ₂ p.a.)	SAP 10.0 CO ₂ emissions (kgCO ₂ p.a.)	Calculated DER SAP 10.0 (kgCO ₂ / m ²)	SAP 10.0 CO ₂ emissions (kgCO ₂ p.a.)	Calculated DER SAP 10.0 (kgCO ₂ / m ²)	Dwelling Fabric Energy Efficiency (DFEE) (kWh/m ²)
				Space Heating	Space Heating	Domestic Hot Water	Secondary Heating system	Lighting	Auxiliary	Cooling	Space Heating CO ₂ emissions (kgCO ₂ p.a.)	Domestic Hot Water CO ₂ emissions (kgCO ₂ p.a.)	Lighting CO ₂ emissions (kgCO ₂ p.a.)	Auxiliary CO ₂ emissions (kgCO ₂ p.a.)						Cooling CO ₂ emissions (kgCO ₂ p.a.)	Unregulated CO ₂ emissions (kgCO ₂ p.a.)	SAP 10.0 CO ₂ emissions (kgCO ₂ p.a.)	Calculated DER SAP 10.0 (kgCO ₂ / m ²)	SAP 10.0 CO ₂ emissions (kgCO ₂ p.a.)	Calculated DER SAP 10.0 (kgCO ₂ / m ²)	Dwelling Fabric Energy Efficiency (DFEE) (kWh/m ²)																									
Type 1	50.63	14	708.82	13.1	13.1	Natural Gas	0	Natural Gas	235	121	0									35	443	122	63	0	663	34	431	55	28	0	434	548	10.8	17.47																	
Type 2	50.63	12	607.56	16.2	16.2	Natural Gas	2,052	Natural Gas	235	128									190	443	122	66	822	185	431	55	30	0	434	700	13.8	32.88																			
Type 3	50.63	10	506.3	17.4	17.4	Natural Gas	1,153	Natural Gas	2,052	Natural Gas	235	130							249	443	122	68	882	242	431	55	30	0	434	758	15.0	40.33																			
Type 4	50.63	136	6885.68	13.7	13.7	205,3058824	Natural Gas	205,2195829	Natural Gas	235,3346	122,267041								62	443	122	63	691	61	431	55	28	0	434	575	11.4	22.53																			
Type 5	50.63	23	1164.49	17.1	17.1	108,438717	Natural Gas	205,2195829	Natural Gas	235,3346	129,692183							234	443	122	67	867	228	431	55	30	0	434	744	14.7	37.59																				
Type 6	50.63	21	1063.23	15.0	15.0	597,080556	Natural Gas	205,2195829	Natural Gas	235,3855	125,146607							129	443	122	65	759	125	431	55	29	0	434	640	12.6	29.07																				
Type 7	50.63	7	354.41	19.0	19.0	151,207508	Natural Gas	205,2195829	Natural Gas	235,3855	133,699933							327	443	122	69	961	318	431	55	31	0	434	834	16.5	45.85																				
Type 8	50.63	8	405.04	20.7	20.7	190,656588	Natural Gas	205,2195829	Natural Gas	235,3855	137,379923							412	443	122	71	1,048	400	431	55	32	0	434	918	18.1	54.85																				
Type 9	50.63	51	2582.13	16.3	16.3	907,742139	Natural Gas	205,2195829	Natural Gas	235,3855	128,04942							196	443	122	66	827	191	431	55	30	0	434	706	13.9	36.36																				
Type 10	50.63	38	1923.94	15.2	15.2	656,5672727	Natural Gas	205,2195829	Natural Gas	235,3855	125,700935							142	443	122	65	772	138	431	55	29	0	434	653	12.9	30.68																				
Type 11	50.63	10	506.3	19.3	19.3	157,7234439	Natural Gas	205,2195829	Natural Gas	235,3855	134,309173							341	443	122	70	975	331	431	55	31	0	434	848	16.8	47.26																				
Type 12	50.14	10	501.4	17.7	17.7	118,288663	Natural Gas	204,6137005	Natural Gas	231,31433	129,593803							255	442	121	67	886	248	430	54	30	0	430	763	15.2	41.22																				
Type 13	50.14	48	2406.72	13.8	13.8	307,4187166	Natural Gas	204,6137005	Natural Gas	231,31433	121,408346							66	442	121	63	692	65	430	54	28	0	430	577	11.5	23.15																				
Type 14	50.43	5	252.15	14.6	14.6	496,3429947	Natural Gas	204,6722139	Natural Gas	235,35677	123,783209							107	443	121	64	735	104	430	54	29	0	432	618	12.3	27.32																				
Type 15	61.65	2	123.3	15.3	15.3	114,029519	Natural Gas	218,636726	Natural Gas	238,762	153,366726							247	472	145	80	240	459	459	65	36	0	511	800	13.0	34.11																				
Type 16	61.65	6	369.9	12.1	12.1	255,1254545	Natural Gas	218,635476	Natural Gas	238,762	145,047058							55	472	145	75	29	54	459	65	36	0	511	611																						

DOMESTIC ENERGY CONSUMPTION AND CO ₂ ANALYSIS										SAP 2012 CO ₂ PERFORMANCE										SAP 10.0 CO ₂ PERFORMANCE															
Unit Identifier (e.g. plot number, dwelling type etc.)			VALIDATION CHECK			REGULATED ENERGY CONSUMPTION PER UNIT (kWh p.a.) - 'BE CLEAN' SAP DER WORKSHEET										REGULATED CO ₂ EMISSIONS PER UNIT (kgCO ₂ p.a.)										REGULATED CO ₂ EMISSIONS PER UNIT (kgCO ₂ p.a.)									
Model total floor area (m ²)	Number of units represented by model (m ²)	Total area represented by model (m ²)	Calculated DER Worksheet BER 2012 (kgCO ₂ / m ²)	DER Worksheet BER 2012 (kgCO ₂ / m ²)	Space Heating (Heat Source 1)	Fuel type Space Heating	Domestic Hot Water (Heat Source 1)	Fuel type Domestic Hot Water	Space and Domestic Hot Water from CHP (kWh p.a.)	Fuel type CHP	Total Electricity generated by CHP (-)	Secondary Heating system	Fuel type Secondary Heating	Lighting	Auxiliary	Cooling	Space Heating	Domestic Hot Water	Space Heating and DHW from CHP	Electricity generated by CHP	Lighting	Auxiliary	Cooling	2012 CO ₂ emissions (kgCO ₂ p.a.)	Space Heating	Domestic Hot Water	Space Heating and DHW from CHP	Electricity generated by CHP	Lighting	Auxiliary	Cooling	SAP 10.0 CO ₂ emissions (kgCO ₂ / m ²)	Calculated DER SAP 10.0 (kgCO ₂ / m ²)		
DER Sheet (Row 384)	DER Sheet (Row 384)	DER Sheet (Row 387a + (Row 387b x 0.01))	DER Sheet (Row 387a + (Row 387b x 0.01))	Select fuel type	DER Sheet (Row 310b + (Row 310a) x 0.01)	Select fuel type	DER Sheet (Row 307a + (Row 309a) x 0.01)	Select fuel type	DER Sheet (Row 307a + (Row 309a) x 0.01)	Select fuel type	DER Sheet (Row 309)	Select fuel type	DER Sheet (Row 332)	DER Sheet (Row 313 + 331)	DER Sheet (Row 315)	if applicable	if applicable	if applicable	if applicable	if applicable	if applicable	if applicable	if applicable	if applicable	if applicable	if applicable	if applicable	if applicable	if applicable	if applicable	if applicable	if applicable			
Type 1	50.63	12	607.82	13.1	162.0678075	Natural Gas	0	Natural Gas	0	Natural Gas	0	0	122	63	0	235	121	0	109	443	122	66	0	34	451	0	0	28	0	548	10.0				
Type 2	50.63	12	607.82	16.2	162.0678075	Natural Gas	0	Natural Gas	0	Natural Gas	0	0	235	128	0	235	130	0	249	443	122	68	0	55	451	0	0	28	0	548	10.0				
Type 3	50.63	10	505.3	17.4	162.0678075	Natural Gas	0	Natural Gas	0	Natural Gas	0	0	235	130	0	2052.195829	Natural Gas	0	2052.195829	Natural Gas	0	62	443	122	63	0	61	451	122	63	0	55	28	575	11.4
Type 4	50.63	13	689.568	13.7	289.3058824	Natural Gas	0	Natural Gas	0	Natural Gas	0	0	235	1346	0	2052.195829	Natural Gas	0	2052.195829	Natural Gas	0	234.3856	129.692183	234	443	122	67	0	759	125	30	29	744	14.7	
Type 5	50.63	23	1164.49	17.1	1083.438717	Natural Gas	0	Natural Gas	0	Natural Gas	0	0	235	1346	0	2052.195829	Natural Gas	0	2052.195829	Natural Gas	0	327	443	122	65	0	597	125	31	29	640	12.6			
Type 6	50.63	7	554.41	15.0	152.075256	Natural Gas	0	Natural Gas	0	Natural Gas	0	0	235	1346	0	2052.195829	Natural Gas	0	2052.195829	Natural Gas	0	327	443	122	66	0	518	125	31	29	534	10.6			
Type 7	50.63	8	405.4	19.0	204.722098	Natural Gas	0	Natural Gas	0	Natural Gas	0	0	235	1346	0	2052.195829	Natural Gas	0	2052.195829	Natural Gas	0	327	443	122	66	0	400	125	31	29	510	10.1			
Type 8	50.63	51	2592.13	16.3	907.421239	Natural Gas	0	Natural Gas	0	Natural Gas	0	0	235	1346	0	2052.195829	Natural Gas	0	2052.195829	Natural Gas	0	196	443	122	66	0	827	191	31	29	506	13.9			
Type 9	50.63	38	1923.94	15.2	656.507227	Natural Gas	0	Natural Gas	0	Natural Gas	0	0	235	1346	0	2052.195829	Natural Gas	0	2052.195829	Natural Gas	0	142	443	122	65	0	772	138	31	29	563	12.9			
Type 10	50.63	10	505.3	19.3	277.334439	Natural Gas	0	Natural Gas	0	Natural Gas	0	0	235	1346	0	2052.195829	Natural Gas	0	2052.195829	Natural Gas	0	341	443	122	70	0	331	431	31	29	548	16.8			
Type 11	50.63	10	505.3	17.7	1182.886663	Natural Gas	0	Natural Gas	0	Natural Gas	0	0	235	1343	0	2046.137005	Natural Gas	0	2046.137005	Natural Gas	0	255	442	121	67	0	886	248	30	28	763	15.2			
Type 12	50.63	14	48	205.42	13.8	307.41256	Natural Gas	0	Natural Gas	0	Natural Gas	0	0	235	1343	0	2046.137005	Natural Gas	0	2046.137005	Natural Gas	0	66	442	121	63	0	65	430	28	27	577	11.5		
Type 13	50.63	5	252.15	14.6	405.239547	Natural Gas	0	Natural Gas	0	Natural Gas	0	0	235	1343	0	2046.137005	Natural Gas	0	2046.137005	Natural Gas	0	107	443	121	64	0	755	104	31	29	610	12.3			
Type 14	50.63	2	123.3	15.3	1144.239519	Natural Gas	0	Natural Gas	0	Natural Gas	0	0	235	1343	0	208.153476	Natural Gas	0	208.153476	Natural Gas	0	247	472	145	80	0	944	240	36	36	800	13.0			
Type 15	61.65	2	123.3	6	369.9	12.1	255.1254545	Natural Gas	0	Natural Gas	0	0	235	1343	0	208.153476	Natural Gas	0	208.153476	Natural Gas	0	55	472	145	75	0	549	65	34	34	611	9.9			
Type 16	61.65	18	1109.7	12.8	454.786728	Natural Gas	0	Natural Gas	0	Natural Gas	0	0	235	1343	0	208.153476	Natural Gas	0	208.153476	Natural Gas	0	98	472	145	76	0	791	96	34	34	654	10.6			
Type 17	61.65	18	1109.7	16.2	185.906524	Natural Gas	0	Natural Gas	0	Natural Gas	0	0	235	1343	0	208.153476	Natural Gas	0	208.153476	Natural Gas	0	299	472	145	81	0	291	55	36	36	851	13.8			
Type 18	61.65	3	83.87	16.0	1311.29974	Natural Gas	0	Natural Gas	0	Natural Gas	0	0	235	1343	0	216.17938	Natural Gas	0	216.17938	Natural Gas	0	283	471	144	84	0	892	275	38	38	836	13.6			
Type 19	61.65	10	1109.7	15.5	125.377079	Natural Gas	0	Natural Gas	0	Natural Gas	0	0	235	1343	0	187.40139	Natural Gas	0	187.40139	Natural Gas	0	73	471	144	79	0	456	155	35	35	823	10.3			
Type 20	61.65	4	245.16	17.7	17.7	181.949412	Natural Gas																												

DOMESTIC ENERGY CONSUMPTION AND CO ₂ ANALYSIS														SAP 2012 CO ₂ PERFORMANCE										SAP 10.0 CO ₂ PERFORMANCE																	
Unit identifier (e.g. plot number, dwelling type etc.)			VALIDATION CHECK			REGULATED ENERGY CONSUMPTION PER UNIT (kWh p.a.) - 'BE GREEN' SAP DER WORKSHEET												REGULATED CO ₂ EMISSIONS PER UNIT (kgCO ₂ p.a.)												REGULATED CO ₂ EMISSIONS PER UNIT											
			Model total floor area (m ²)	Number of units	Total area represented by model (m ²)	Calculated DER 2012 (kgCO ₂ / m ²)	DER Worksheet DER 2012 (kgCO ₂ / m ²)	Space Heating (Heat Source 1)	Fuel type	Domestic Hot Water (Heat Source 1)	Fuel type	Space Heating (Heat source 2)	Fuel type	Domestic Hot Water (Heat source 2)	Fuel type	Space and Domestic Hot Water from CHP	Total Electricity generated by CHP (-)	Secondary Heating system	Fuel type Secondary Heating	Electricity generated by renewable (-)	Lighting	Auxiliary	Cooling	Space Heating	Domestic Hot Water	Space Heating and DHW from CHP	Electricity generated by CHP	Electricity generated by renewable	Lighting	Auxiliary	Cooling	2012 CO ₂ emissions (kgCO ₂ p.a.)	Space Heating	Domestic Hot Water	Space Heating and DHW from CHP	Electricity generated by CHP	Electricity generated by renewable	Lighting	Auxiliary	Cooling	AP 10.0 CO ₂ calculated emissions (kgCO ₂ / p.a.)
Type 1	50.63	14	708.82	10.3	59	Grid Electricity	750	Grid Electricity	0	Grid Electricity	0	Grid Electricity	0	0	0	-163	235	121	0	31	389	0	-84	122	63	0	620	14	175	0	-38	55	28	0	23.4	5.9					
Type 2	50.63	12	607.56	13.0	13.0	321	Grid Electricity	750	Grid Electricity	-163	235	128	0	167	389	-84	122	66	660	75	175	-38	55	30	29	2.6	5.9														
Type 3	50.63	10	506.3	14.1	14.1	421	Grid Electricity	750	Grid Electricity	-163	219	389	-84	122	68	713	98	175	-38	55	30	32	0.3	5.3																	
Type 4	50.63	136	6885.68	10.8	105.664531	Grid Electricity	749.5324609	Grid Electricity	-163	235.3346	122.267041	-84	122	63	545	25	175	-38	55	28	24.5	4.8																			
Type 5	50.63	23	1164.49	13.8	105.7090625	Grid Electricity	749.5324609	Grid Electricity	-163	235.3346	129.692183	-84	122	67	699	92	175	-38	55	30	31.4	6.2																			
Type 6	50.63	21	1063.23	11.9	11.9	218.1475	Grid Electricity	749.5324609	Grid Electricity	-163	234.3855	125.146607	-84	122	65	604	51	175	-38	55	29	27.1	5.4																		
Type 7	50.63	7	354.41	15.4	15.4	552.2617969	Grid Electricity	749.5324609	Grid Electricity	-163	234.3855	133.699833	-84	122	69	782	129	175	-38	55	31	35.1	6.9																		
Type 8	50.63	8	405.04	17.0	17.0	696.011406	Grid Electricity	749.5324609	Grid Electricity	-163	234.3855	137.379923	-84	122	71	859	162	175	-38	55	32	38.6	7.6																		
Type 9	50.63	51	292.13	13.1	13.1	392.6324	Grid Electricity	749.5324609	Grid Electricity	-163	172	389	-84	122	66	665	73	175	-38	55	30	29.8	0.1																		
Type 10	50.63	39	1923.94	12.2	12.2	229.80025	Grid Electricity	749.5324609	Grid Electricity	-163	124	389	-84	122	65	616	55	175	-38	55	29	27.7	5.5																		
Type 11	50.63	10	501.3	15.7	15.7	576.002344	Grid Electricity	749.5324609	Grid Electricity	-163	234.3855	134.309173	-84	122	70	795	134	175	-38	55	30	31.7	5.0																		
Type 12	50.14	10	501.4	14.3	14.3	432.0242969	Grid Electricity	747.315703	Grid Electricity	-163	224	388	-84	121	67	716	101	174	-38	54	30	22.1	6.4																		
Type 13	50.14	48	2406.72	10.9	10.9	112.279882	Grid Electricity	747.315703	Grid Electricity	-163	233.1433	121.408346	-84	121	63	546	26	174	-38	54	28	24.5	4.9																		
Type 14	50.43	5	252.15	11.6	11.6	181.2815234	Grid Electricity	748.6269844	Grid Electricity	-163	233.5677	123.783209	-84	121	64	594	42	174	-38	54	29	26.2	5.2																		
Type 15	61.65	2	123.3	12.5	12.5	418.1676172	Grid Electricity	798.4583986	Grid Electricity	-163	217	414	-84	145	80	771	97	186	-38	65	36	34.6	5.6																		
Type 16	61.65	6	369.9	9.7	9.7	93.1805859	Grid Electricity	798.4583986	Grid Electricity	-163	278.762	145.047058	-84	145	75	598	22	186	-38	65	34	26.9	4.6																		
Type 17	61.65	18	1109.7	10.3	10.3	166.10375	Grid Electricity	798.4583986	Grid Electricity	-163	278.762	146.913891	-84	145	76	637	39	186	-38	65	34	28.6	4.6																		
Type 18	61.65	6	369.9	13.3	13.3	708.0703	Grid Electricity	798.4583986	Grid Electricity	-163	278.762	155.619861	-84	145	81	818	118	186	-38	65	34	36.7	5.9																		
Type 19	61.29	3	183.87	13.1	13.1	478.9317578	Grid Electricity	796.9229297	Grid Electricity	-163	277.4235	161.17938	-84	144	84	805	112	186	-38	65	34	36.2	5.9																		
Type 20	61.29	18	1103.22	10.1	10.1	61.870820	Grid Electricity	796.9229297	Grid Electricity	-163	277.4235	152.074589	-84	144	79	616	29	186	-38	65	34	27.7	4.5																		
Type 21	61.29	4	245.16	14.6	14.6	61.870820	Grid Electricity	796.9229297	Grid Electricity	-163	277.4235	165.60662	-84	144	86	897	152	186	-38	65	34	30.3	6.6																		
Type 22	61.29	16	906.4	10.8	10.8	221.90625	Grid Electricity	796.9229297	Grid Electricity	-163	277.4235	154.534978	-84	144	86	689	52	186	-38	65	34	30.3	6.6																		
Type 23	61.29	6	389.32	13.5	13.5	540.4582951	Grid Electricity	796.9229297	Grid Electricity	-163	277.4235	165.45737	-84	144	86	693	52	186	-38	65	34	30.3	6.6																		
Type 24	61.29	29	1777.41	10.4	10.4	164.3226935	Grid Electricity	796.9229297	Grid Electricity	-163	277.4235	153.123084	-84	144	79	636	39	186	-38	65	34	28.6	5.3																		
Type 25	70.32	13	914.16	13.2	13.2	614.0844922	Grid Electricity	833.0948438	Grid Electricity	-163	219.3059	184.499991	-84	143	96	829	101	194	-38	73	43	41.6	5.9																		
Type 26	70.32	143	10055.76	12.0	12.0	465.6971																																			

SAP 2012 Performance

Domestic

Table 1: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for domestic buildings

	Carbon Dioxide Emissions for domestic buildings (Tonnes CO ₂ per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	1,312.4	1,485.0
After energy demand reduction (be lean)	1,195.1	1,317.0
After heat network connection (be clean)	1,195.1	1,317.0
After renewable energy (be green)	978.6	1,317.0

Table 2: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for domestic buildings

	Regulated domestic carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: savings from energy demand reduction	117.3	9%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	216.4	16%
Cumulative on site savings	333.7	25%
Annual savings from off-set payment	978.6	-
	(Tonnes CO₂)	
Cumulative savings for off-set payment	29,359	-
Cash in-lieu contribution (£)	1,761,517	

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' tab

SAP 10.0 Performance

Table 1: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for domestic buildings

	Carbon Dioxide Emissions for domestic buildings (Tonnes CO ₂ per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	1,147.3	666.7
After energy demand reduction (be lean)	1,003.3	591.1
After heat network connection (be clean)	1,003.3	591.1
After renewable energy (be green)	439.3	591.1

Table 2: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for domestic buildings

	Regulated domestic carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: Savings from energy demand reduction	144.1	13%
Be clean: Savings from heat network	0.0	0%
Be green: Savings from renewable energy	563.9	49%
Cumulative on site savings	708.0	62%
Annual savings from off-set payment	439.3	-
	(Tonnes CO₂)	
Cumulative savings for off-set payment	13,180	-
Cash in-lieu contribution (£)	790,816	

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' tab

Non-domestic

Table 3: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-domestic buildings

	Carbon Dioxide Emissions for non-domestic buildings (Tonnes CO ₂ per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	524.0	1,396.0
After energy demand reduction (be lean)	379.3	1,237.0
After heat network connection (be clean)	379.3	1,237.0
After renewable energy (be green)	362.9	1,237.0

Table 3: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-domestic buildings

	Carbon Dioxide Emissions for non-domestic buildings (Tonnes CO ₂ per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	258.8	626.8
After energy demand reduction (be lean)	196.8	555.4
After heat network connection (be clean)	196.8	555.4
After renewable energy (be green)	162.9	555.4

Table 4: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for non-domestic buildings

	Regulated non-domestic carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: savings from energy demand reduction	144.7	28%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	16.5	3%
Total Cumulative Savings	161.1	31%
Annual savings from off-set payment	362.9	-
(Tonnes CO ₂)		
Cumulative savings for off-set payment	10,887	-
Cash in-lieu contribution (£)	653,193	

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' tab

Table 4: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for non-domestic buildings

	Regulated non-domestic carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: savings from energy demand reduction	62.0	24%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	33.9	13%
Total Cumulative Savings	95.9	37%
Annual savings from off-set payment	162.9	-
(Tonnes CO ₂)		
Cumulative savings for off-set payment	4,887	-
Cash in-lieu contribution (£)*	293,245	

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' tab

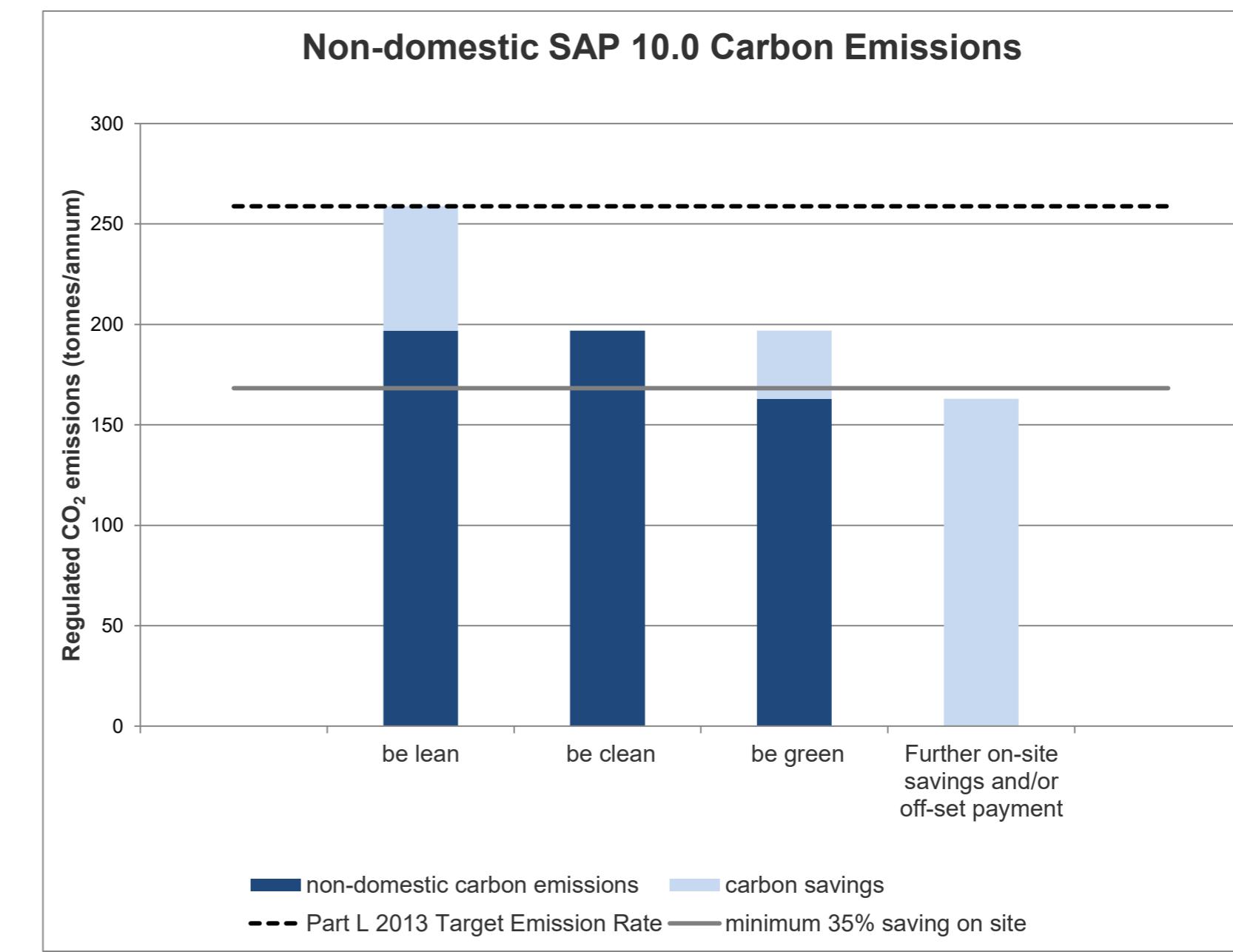
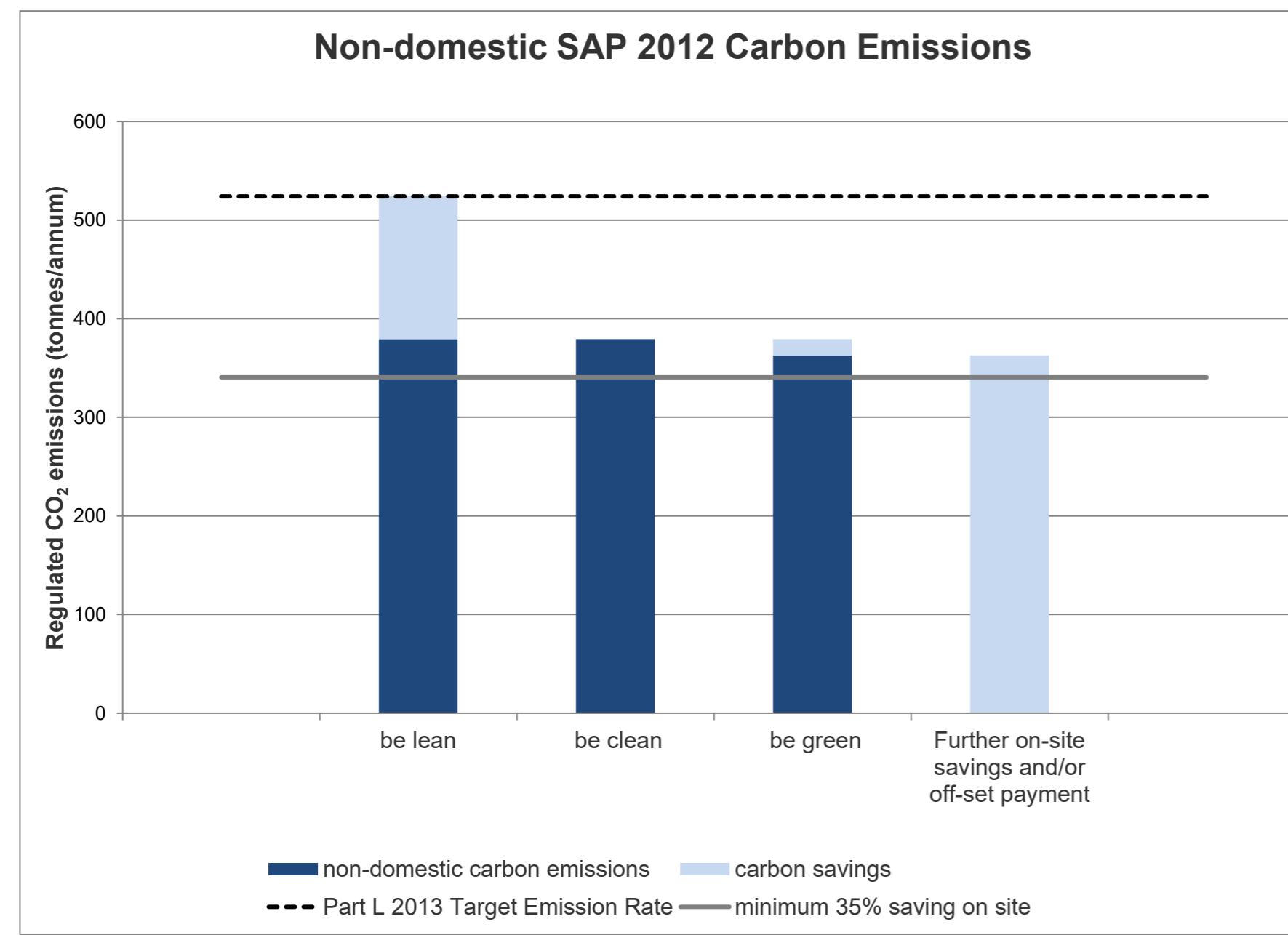
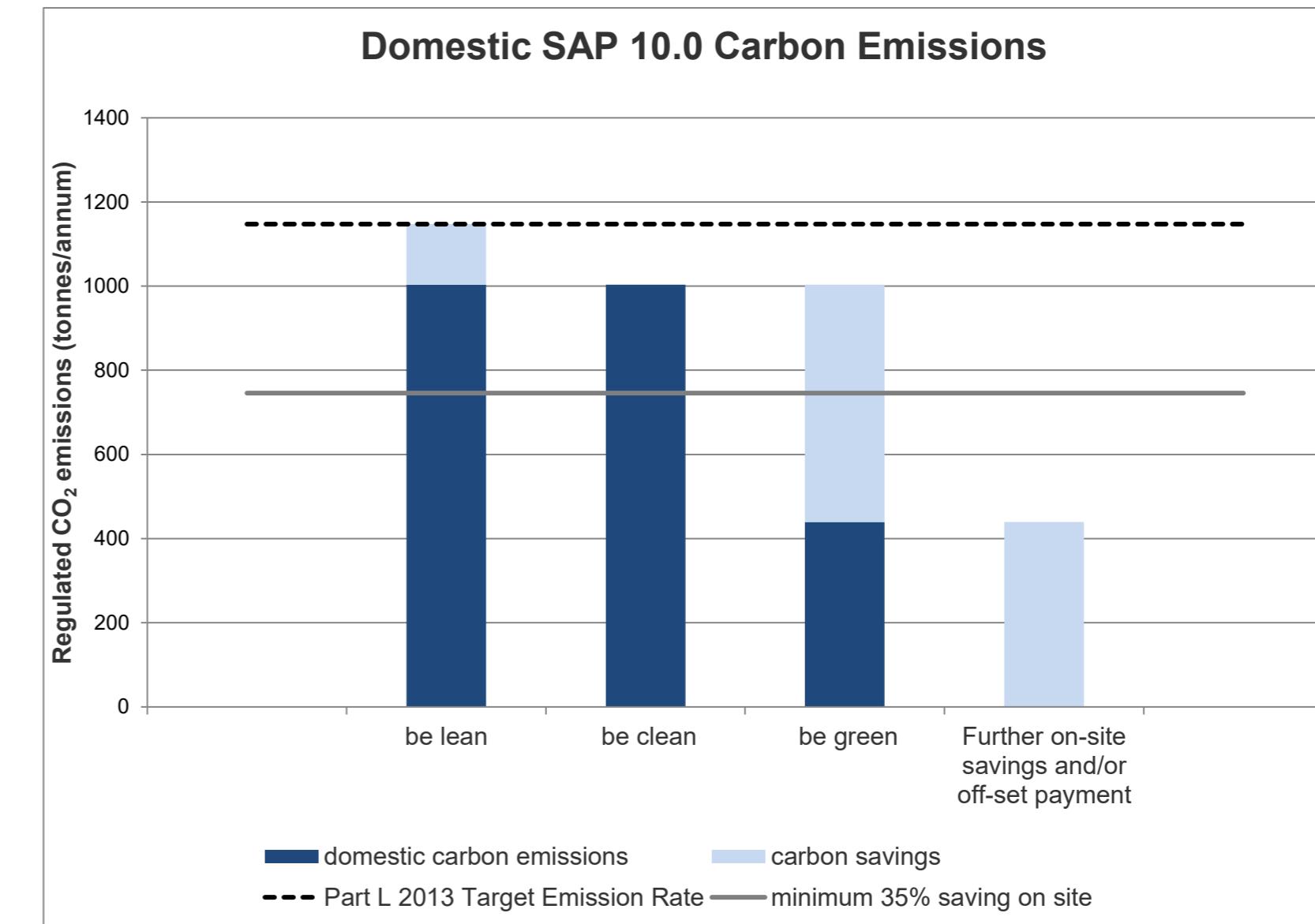
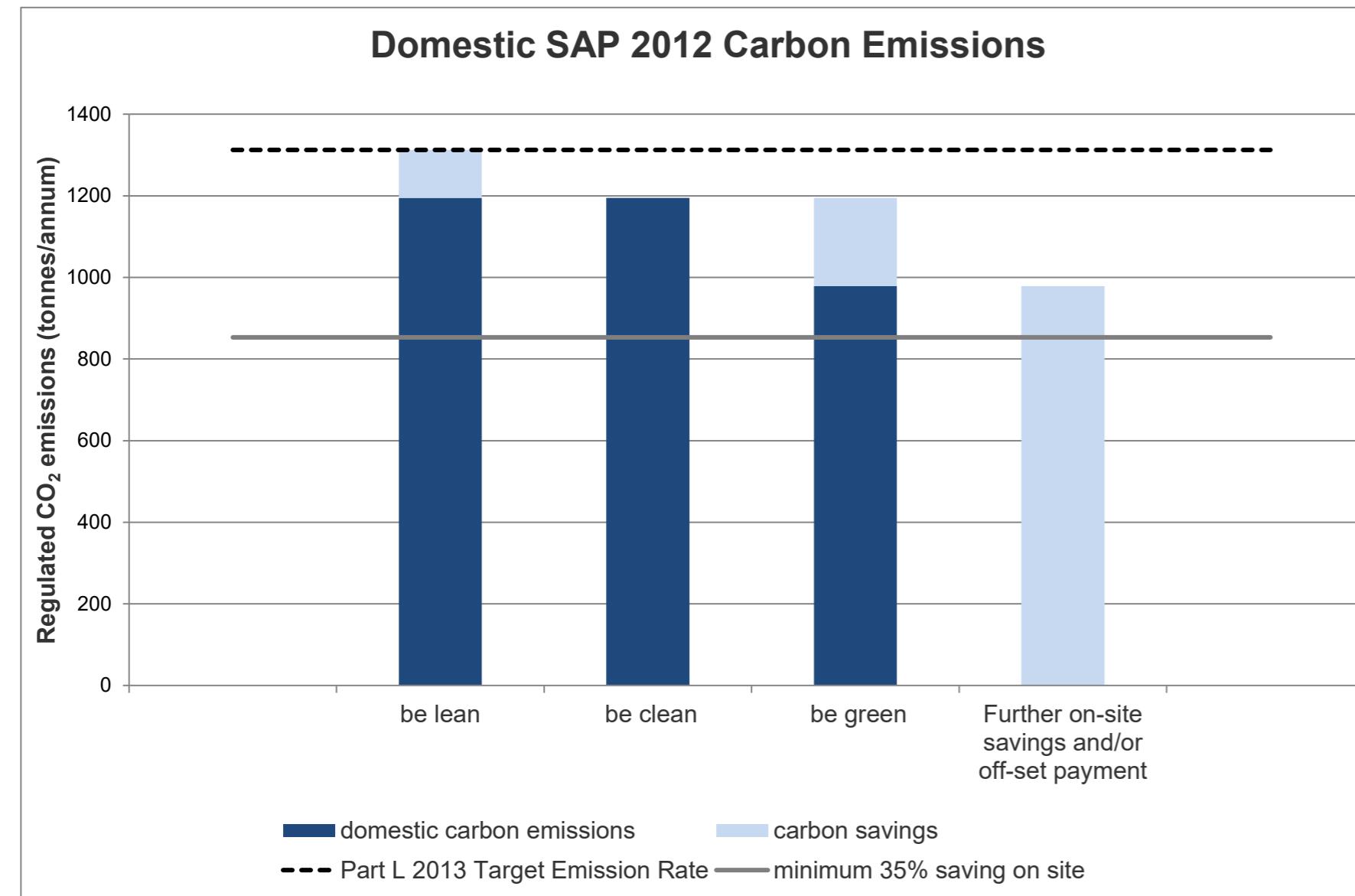
SITE-WIDE

	Total regulated emissions (Tonnes CO ₂ / year)	CO ₂ savings (Tonnes CO ₂ / year)	Percentage savings (%)
Part L 2013 baseline	1,836.4		
Be lean	1,574.4	262.0	14%
Be clean	1,574.4	0.0	0%
Be green	1,341.5	232.9	13%
Total Savings	-	494.9	27%
	-	CO₂ savings off-set (Tonnes CO₂)	-
Off-set	-	40,245.2	-

	Total regulated emissions (Tonnes CO ₂ / year)	CO ₂ savings (Tonnes CO ₂ / year)	Percentage savings (%)
Part L 2013 baseline	1,406.2		
Be lean	1,200.1	206.1	15%
Be clean	1,200.1	0.0	0%
Be green	602.3	597.8	43%
Total Savings	-	803.9	57%
	-	CO₂ savings off-set (Tonnes CO₂)	-
Off-set	-	18,067.7	-

	Target Fabric Energy Efficiency (kWh/m ²)	Dwelling Fabric Energy Efficiency (kWh/m ²)	Improvement (%)
Development total	35.65	32.19	10%

	Area weighted non-domestic cooling demand (MJ/m ²)	Total area weighted non-domestic cooling demand (MJ/year)
Actual	131.40671	1,625,184
Notional	204.04515	2,523,547









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Issue	1.2
Date	23/04/2020
Author	Greater London Authority

Update Location	Update Location	Description of changes made to GLA Carbon Emission Reporting Spreadsheet
Version 1.2	Introduction	References to SAP 10 have been updated to SAP 10.0 throughout the reporting spreadsheet to confirm the specific emission factors used in the sheet.
	Development Information	Replaces 'Carbon factor tab' and includes additional inputs for development information on Local Planning Authority for the application, agreed carbon offset price and distribution loss factor.
	Baseline, be lean, be clean & be green tabs	<p>Domestic Secondary heating system has been added. Please note that this feature may only be used in exceptional circumstances, for example innovative modular construction methods, and with approval from GLA.</p> <p>For consistency all summations for energy consumption and carbon emissions by end energy use on Rows 58 & 94 are now based on 'total area represented by model (m²)'. The calculation for estimating total emissions remains was already based on 'total area represented by model (m²)' in Version 1.1 so remains unchanged.</p> <p>Additional rows added to allow for a greater number of representative Part L models.</p>
	Be Clean/Be Green tab	Formula updated so that data input is not required for heat sources that are not used.
	Be Green tab	SAP row reference changed from 380 to 333.
	GLA Summary Tables	Tables now report figures to one decimal place.
		The zero carbon offset fund is now calculated based on the GLA recommended price of £95 per tonne of carbon dioxide unless the borough price is added into the 'Development Information' tab.
		Non-domestic tables have now been updated to include for the new London Plan zero carbon requirement.
	Carbon factors tab	Inclusion of energy assessment graphs, which are automatically generated from the results tables.
Previous version updates		
Version 1.1	Introduction / Version Control	Additional explanatory wording has been included in the 'Background and Purpose' and 'Methodology' sections to further assist applicants with the reporting process.
		A version control tab has been added to list all changes made to the spreadsheet under separate versions.
	Baseline, be lean, be clean & be green tabs	<p>Domestic SAP worksheet row reference numbers have been included in the input tabs.</p> <p>Non-domestic Non-domestic calculation is now based on 'energy consumption by fuel type' instead of the consumption figures in the BRUKL tab to enable the accurate calculation of the TER/BER figures. This data is available in the output file ending in "*BRUKL.inp" for government approved software and output file ending "*sim.csv" for SBEM. Where these files are used they should be appended to the Energy Statement.</p> <p>Total calculation is now based on the 'total area represented by model (m²)' rather than the 'number of units'. This is to ensure that the total model area aligns with the development area schedule.</p> <p>Rows with void formulas have now been fixed.</p> <p>Formula for CHP/Renewable contribution now fixed in SAP 10 calculation.</p> <p>Extra input rows have been added to account for larger schemes.</p> <p>Columns used to calculate the carbon emissions using SAP 10 carbon factors have been unhidden to allow for greater transparency in the calculation methodology.</p> <p>Validation check moved to be more prominent.</p> <p>Additional heat source has been added into the calculation.</p> <p>Reporting of electricity generated by CHP or renewable technologies has been changed; this should now be inputted as a negative value (-).</p>
		Additional heat source has been added into the calculation in the 'be green' tabs to account for multiple heating systems, if present.
		The carbon emission factor table has been updated and clarification has been provided on how they should be used.

Carbon factors tab

A typo in the carbon factor unit has been corrected (kgCO₂/kWh).

Principal Planner
Regeneration, Property and Planning
London Borough of Redbridge
11th Floor (Front) Lynton House
255-259 High Road
Ilford
IG1 1NY

28 August 2020

Our Reference: 253302/GB
LPA Reference: 4309/19

Dear [REDACTED]

Development Site At Tesco Extra 822 High Road, High Road, Chadwell Heath, Romford (4309/19)

**Demolition of all existing buildings including petrol filling station.
Redevelopment of the site to provide a replacement food retail store (use class A1), a series of apartment blocks ranging between 4 and 23 storeys in height to provide 1,280 residential units (use class C3), flexible use floorspace for commercial/community uses (within use classes A1/A2/A3/B1/D1), a 3-form entry primary school (use class D1), public open space, car and cycle parking, associated landscaping and infrastructure works, and provision of pedestrian and vehicular access.**

I refer to the above planning application which was registered on 15 November 2019 with London Borough of Redbridge for proposed development of Tesco Extra, 822 High Road, Goodmayes.

Over recent months, the applicant project team has sought to address the matters raised by internal and external consultees, and other stakeholders, during the post-submission period. Through a series of meetings and information exchange, the team has worked with officers and stakeholders to progress matters positively towards a resolution, enabling relevant application documents to be revised and updated accordingly. We consider that all aspects raised are now resolved and hereby formally submit a set of documents for the Amended Scheme for determination by the Local Planning Authority.

For clarity, Schedule 1 attached to this letter lists the application documents, with any amendments noted, which form part of the submission. To confirm, all other documents submitted with the original application remain unchanged.

The Planning Supporting Statement Addendum notes the imminent change to the Town and Country Planning (Use Classes) (Amendment) (England)

LONDON
7 Heddon Street
London
W1B 4BD

BIRMINGHAM
Enterprise House
115 Edmund Street
Birmingham
B3 2HJ

BOURNEMOUTH
Everdene House
Deansleigh Road
Bournemouth
BH7 7DU

TELEPHONE
020 3664 6755
www.torltd.co.uk



Regulations 2020, laid before parliament in July 2020 with changes agreed coming into form on 1st September 2020.

Use Classes A1, A2, A3, B1, parts of D1 and D2 will be combined into a new Class E as commercial, business and service uses. Class F.1 (Learning and non-residential institutions) and Class F.2 (Local community) replace other sections of current D1 and D2 uses.

As a result of the changes to the Order, it is proposed to omit the Use Classes from the development description and seek to designate the uses through appropriately worded conditions (e.g. 1,710 sqm of Class E floorspace). This will ensure flexibility moving forward, avoiding the need to amend the description in future if further changes arise, yet still maintain control over the uses delivered on site.

Revised development description:

“Demolition of all existing buildings and structures on site, development of a replacement food retail store, 1,280 residential units, flexible use floorspace for commercial/community uses, a 3-form entry primary school, public open space, car and cycle parking, associated landscaping and infrastructure works, and provision of pedestrian and vehicular access”.

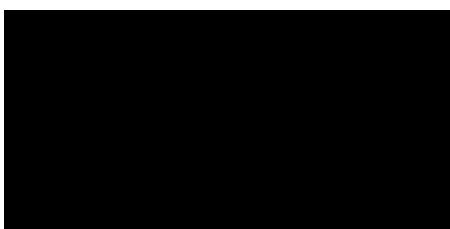
We trust this is agreeable and request the description is updated accordingly going forward.

In accordance with the Council's initial validation requirements, CIL form 1: Additional Information has been updated with the floor areas illustrated by the Amended Scheme plans and is included as part of this submission. Please be advised these figures remain indicative at this stage and will be agreed with the Council during the course of the application for the purposes of calculating CIL liability and any relief to be applied. Any adjustments to the finalised floor areas will inform a subsequent revision to the CIL 1 form, and associated calculations.

I trust that this information and the accompanying documentation is sufficient to enable you to validate the application in line with our pre-application discussions. I look forward to receiving your confirmation of this in due course.

Please do not hesitate to contact me if you require anything further.

Yours sincerely,



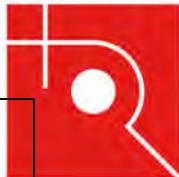
Technical Director

Cc Steve Hatton, Weston Homes PLC

Schedule 1: Submission information – Amended Scheme August 2020

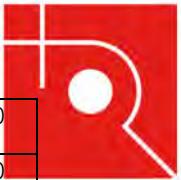


List of documents		
Title	Prepared by	Amended Scheme status
Application forms with ownership certificates	TOR	<i>Updated description of development</i>
CIL forms	TOR	Rev A
Application drawings	RDA/Weston Homes	See amended drawing schedule below.
Planning Statement with Affordable Housing Statement and S.106 draft Heads of Terms	TOR	Addendum
Design and Access Statement, with Tall Building Assessment	Russ Drage Architects (RDA)	Addendum
Environmental Statement 1. Introduction 2. Site description and the proposals 3. Environmental issues and methodology 4. Air quality 5. Community and, social effects 6. Cultural heritage 7. Ground conditions and water environment 8. Townscape and visual effects 9. Noise and vibration 10. Traffic and transport 11. Waste 12. Summary tables Glossary	TOR (plus other contributors)	<p>Addendum</p> <ul style="list-style-type: none"> Annex 1: Replacement chapter 7: ground conditions and water environment Annex 2: Replacement chapter 10: traffic and transport Technical appendix C1: Replacement air quality assessment Technical appendix E1: Replacement water environmental report Technical appendix H: Supplementary traffic and transport documents
Technical Appendices A. Scoping B. Competent experts C. Air Quality D. Cultural Heritage E. Ground conditions and water environment F. Townscape and visual G. Noise and vibration H. Traffic and transport I. Construction health, safety and environmental plan (CHSEP)	TOR TOR SES/ Aether CgMS & TOR SES & EAS TOR SES Motion SES	
Landscape Strategy and Plans	Allen Pyke Associates	Rev A
Tree Survey, Arboricultural Impact Assessment, Arboricultural Method Statement & Tree Protection Plan	Haydens	-

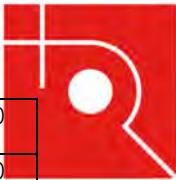


Lighting Report	Vanguard Lighting Co.	-
Retail Impact Assessment	Cushman & Wakefield	-
Daylight & Sunlight Assessment	Point 2 Surveyors	Rev A
Foul Water Drainage Strategy	EAS	-
Utility Services Report	MLM Group	-
Health Impact Assessment	Hodkinson	Rev A – prepared by Meinhardt
Statement of Community Involvement	Newington	-
Waste and Management Servicing Strategy	SES/Motion/ RDA	Rev A
Energy Assessment including Overheating	SES/Hodkinson	Replaced by Energy Assessment and Sustainability Strategy – prepared by Meinhardt
Sustainability Assessment with BREEAM Assessment Pre-Assessment	SES/Hodkinson	As above. Combined document prepared by Meinhardt.
Ecological Assessment	Ecology Solutions	Rev A
Wind and Microclimate Assessment	Architectural Aerodynamics	Rev A
Telecommunications and TV and Radio Interference	Trium	-
Travel Plans: <ul style="list-style-type: none"> • Residential Travel Plan • School Travel Plan • Retail Travel Plan 	Motion	-

List of architectural plans – Amended Scheme Author: Russ Drage Architects & Weston Homes			
Plan	Drawing No.	Revision	Scale
Site Location Plan	P 001	-	A1 @ 1:1250
Existing Site Plan	P 002	-	A1 @ 1:1000
Indicative Existing Site Elevations	P 003	-	A1 @ 1:500
Proposed Site Plan	P 010	14.08.20	A1 @ 1:100
LGF01 - East	P 100	14.08.20	A0 @ 1:200
LGF02 - East	P 101	Omitted	A0 @ 1:200
Level 00 - East	P 102	14.08.20	A0 @ 1:200
Level 01 - East	P 103	14.08.20	A0 @ 1:200
Level 03 - East	P 105	14.08.20	A0 @ 1:200
Level 04 - East	P 106	14.08.20	A0 @ 1:200



Level 05 - East	P 107	14.08.20	A0 @ 1:200
Level 06 - East	P 108	14.08.20	A0 @ 1:200
Level 07 - East	P 109	14.08.20	A0 @ 1:200
Level 08 - East	P 110	14.08.20	A0 @ 1:200
Level 09 - East	P 111	14.08.20	A0 @ 1:200
Level 10 - East	P 112	14.08.20	A0 @ 1:200
Level 11 - East	P 113	14.08.20	A0 @ 1:200
Level 12 - East	P 114	14.08.20	A0 @ 1:200
Level 13 - East	P 115	14.08.20	A0 @ 1:200
Level 14 - East	P 116	14.08.20	A0 @ 1:200
Level 15 - East	P 117	14.08.20	A0 @ 1:200
Roof - East	P 118	14.08.20	A0 @ 1:200
LGF01 - West	P 150	14.08.20	A0 @ 1:200
LGF02 - West	P 151	Omitted	A0 @ 1:200
Level 00 - West	P 152	14.08.20	A0 @ 1:200
Level 01 - West	P 153	14.08.20	A0 @ 1:200
Level 02 - West	P 154	14.08.20	A0 @ 1:200
Level 03 - West	P 155	14.08.20	A0 @ 1:200
Level 04 - West	P 156	14.08.20	A0 @ 1:200
Level 05 - West	P 157	14.08.20	A0 @ 1:200
Level 06 - West	P 158	14.08.20	A0 @ 1:200
Level 07 - West	P 159	14.08.20	A0 @ 1:200
Level 08 - West	P 160	14.08.20	A0 @ 1:200
Level 09 - West	P 161	14.08.20	A0 @ 1:200
Level 10 - West	P 162	14.08.20	A0 @ 1:200
Level 11 - West	P 163	14.08.20	A0 @ 1:200
Level 12 - West	P 164	14.08.20	A0 @ 1:200
Level 13 - West	P 165	14.08.20	A0 @ 1:200
Level 14 - West	P 166	14.08.20	A0 @ 1:200
Level 15 - West	P 167	14.08.20	A0 @ 1:200
Level 16 - West	P 168	14.08.20	A0 @ 1:200
Level 17 - West	P 169	14.08.20	A0 @ 1:200
Level 18 - West	P 170	14.08.20	A0 @ 1:200
Level 19 - West	P 171	14.08.20	A0 @ 1:200

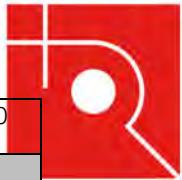


Level 20 - West	P 172	14.08.20	A0 @ 1:200
Level 21 - West	P 173	14.08.20	A0 @ 1:200
Level 22 - West	P 174	14.08.20	A0 @ 1:200
Roof - West	P 175	Omitted	A0 @ 1:200
Site Elevation 01 & 02 - High Road (North), Railway (south)	P 201	14.08.20	A1 @ 500
Site Elevation 03 & 04 - Through Podium Gardens & Civic Square	P 202	14.08.20	A1 @ 500
Elevation 01	P 210	14.08.20	A0 @ 1:200
Elevation 02	P 211	14.08.20	A0 @ 1:200
Elevation 03	P 212	14.08.20	A0 @ 1:200
Elevation 04	P 213	14.08.20	A0 @ 1:200
Elevation 05	P 214	14.08.20	A1 @ 1:200
Elevation 06	P 215	14.08.20	A1 @ 1:200
Elevation 07	P 216	14.08.20	A1 @ 1:200
Elevation 08	P 217	14.08.20	A1 @ 1:200
Elevation 09	P 218	14.08.20	A1 @ 1:200
Elevation 10	P 219	14.08.20	A1 @ 1:200
Elevation 11	P 220	14.08.20	A1 @ 1:200
Elevation 12	P 221	14.08.20	A1 @ 1:200
Elevation 13	P 222	14.08.20	A1 @ 1:200
Elevation 14	P 223	14.08.20	A1 @ 1:200
Elevation 15	P 224	14.08.20	A1 @ 1:200
Elevation 16	P 225	14.08.20	A1 @ 1:200
Elevation 17	P 226	14.08.20	A1 @ 1:200
Elevation 18	P 227	14.08.20	A1 @ 1:200
Elevation 19	P 228	14.08.20	A1 @ 1:200
Elevation 20	P 229	14.08.20	A1 @ 1:200
Elevation 21	P 230	14.08.20	A1 @ 1:200
Elevation 22	P 231	14.08.20	A1 @ 1:200

List of landscape plans – Amended Scheme

Author: Allan Pyke Associates

Plan	Drawing No.	Revision	Scale
Landscape Strategy	2822-RE-05	D	A3



Graphic Landscape Masterplan	2822-LP-00	F	A1 @ 1:500
NOTE: ALL OTHER PLANS PREVIOUSLY SUBMITTED ARE NOW OMITTED			