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Built environment | Engineering | Consultancy

MEP TECHNICAL NOTE

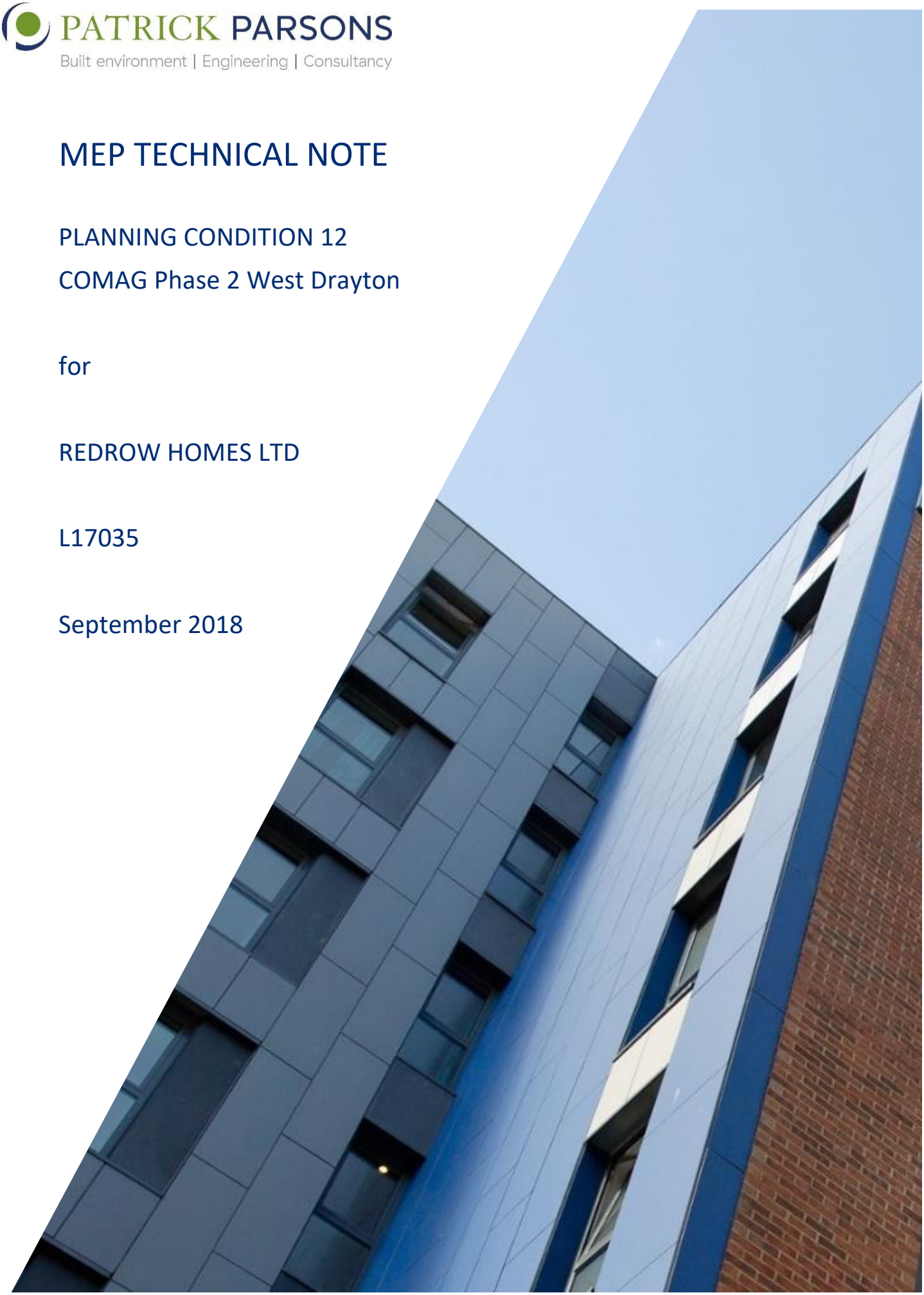
PLANNING CONDITION 12
COMAG Phase 2 West Drayton

for

REDROW HOMES LTD

L17035

September 2018



MEP TECHNICAL NOTE

PLANNING CONDITION 12

for

REDROW HOMES LTD

Revision	Date of issue	Comments	Prepared By	Checked By
P1	25/09/2018	Issued for Planning	AW	EB

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QMS ISO 9001 REGISTERED
QMS ISO 14001 REGISTERED

PATRICK PARSONS

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1.0 Introduction

1.1 Technical Note

This technical note has been written to discharge planning condition 12 for the proposed Phase 2 residential development at the former COMAG building site, West Drayton. The development will comprise of 104 dwelling units, community space, amenity space with lift overrun and covered car parking.

2.0 Development Site

2.1 Existing Site Description

The development site is adjacent to Tavistock Road and Winnock Road, in West Drayton (see site location plan in Appendix A).

2.2 Proposed Site Description

As part of the works, the property will consist of 104 apartments between Ground – 6th floor split between two block A and B. Access to the ground floor apartments is via Tavistock and Winnock Road. All apartments from 1st to 6th floor access is via the communal stairs and lifts within each block.

The 7th floor of block B shall include a break out amenity space which will also house the lift overrun. The total height of the building is 34.505m from basement slab Finish Floor Level (FFL) to the highest point above the lift overrun.

The ground level car park is situated adjacent to the cycle store. The basement level will include car parking, central energy centre and electrical plant and metering room.

The energy centre shall house the central heating plant which shall consist of new Low Temperature Hot Water (LTHW) boilers and Combined Heat and Power (CHP) generation. A dedicated flue riser shall be provided allowing all combustible air to be discharged at high level above the 7th floor amenity space.

3.0 Planning Condition

3.1 Planning Condition 12

- Prior to commencement (other than demolition) a scheme designed to minimise the ingress of polluted air shall be submitted for approval in writing by the Local planning Authority. The design must take into account climate change pollutants. Any suitable ventilation systems will need to address the following:
  - Take air from a clean location or treat the air and remove pollutants;
  - Be designed to minimise energy usage;
  - Be sufficient to prevent summer overheating;
  - Have robust arrangements for maintenance.
- Thereafter and prior to occupation, the scheme shall be completed in strict accordance with the approved details and thereafter maintained for the life of the development.

3.2 London Plan

The London Plan 2016 states that major development proposals should demonstrate how the design, materials, construction and operation of a development would minimise overheating and also meet its cooling needs. New developments in London should also be designed to avoid the need for energy intensive air conditioning systems as much as possible.

3.3 London Plan (Policy 5.9)

Policy 5.9 of the London Plan 2016 requires development proposals to reduce the impact of the urban heat island effect in London. It also encourages the design of places and spaces to avoid overheating and excessive heat generation, and to reduce overheating due to impacts of climate change and the urban heat island effect on an area wide basis.

- Major development proposals should reduce potential overheating and reliance on air conditioning systems and demonstrate this in accordance with the following cooling hierarchy:
- Minimise internal heat generation through energy efficient design
- Reduce the amount of heat entering the building in summer through orientation, shading albedo, fenestration, insulation and green roofs and walls
- Manage the heat within the building through exposed internal thermal mass and high ceilings
- Passive ventilation
- Mechanical ventilation
- Active cooling systems

Major development proposals should demonstrate how the design, materials, construction and operation of the development would minimise overheating and also meet its cooling needs. New developments in London should also be designed to avoid the need for energy intensive air conditioning systems as much as possible.

Although the London Plan addresses the avoidance of overheating within buildings, it does not stipulate any document that must be followed; to assess overheating in the apartments and corridors CIBSE Guide A, CIBSE TM52 and CIBSE TM59 have been used.

4.0 Proposal

4.1 Ventilation Strategy

The ventilation strategy has been developed in accordance with the preplanning Air Quality report and developed Overheating and External Building Fabric Assessment.

In accordance with the Air Quality Report which can be found in Appendix D, the following operation stage impacts have been established:

> *7.2.1. The impacts of the Proposed Development on air quality are negligible at all existing receptors for all the pollutants of concern.*
>
> *7.2.2. The Proposed Development is air quality neutral in terms of building emissions, but not air quality neutral in respect of transport emissions, therefore mitigation or off-setting is required on this basis. It is understood that a Travel Plan is proposed which will contain a number of hard and soft measures to manage development generated road traffic and promote sustainable transport. Furthermore, there are a number of electric vehicle charging points being proposed.*
>
> *7.2.3. The assessment indicates that total concentrations for all pollutants (assuming a 2013 baseline position – worst case.*
>
> *7.2.5. The overall residual effect for the operational stage is* ***not significant.***

In summary, no additional mitigation measures are required to satisfy the air quality report for the Phase 2 development.

The External Building Fabric Assessment found in Appendix E and the Overheating Assessment found in Appendix F stipulate that acoustic windows and trickle ventilators shall be required throughout the site to mitigate the noise pollution on Winnock and Tavistock Road. Table 4.1 outlines the internal noise levels and expected noise outcomes against risk to occupants. The report confirms a high risk in exceeding the minimum indoor noise levels on Tavistock Road should bedrooms and living areas windows be openable between 23.00 – 07.00 hours.

The External Fabric Building Assessment confirms that should window opening times be restricted between the hours of 07.00 – 23.00, the risk category would be reduced to a medium level. The overheating assessment is based the following:

- Windows open between 07.00 – 23.00 when the room temperatures exceeds 25°C
- Typical bedroom windows would be opened 550 – 660 hours a year (6.2% - 6.85%)
- Typical Kitchen/ Living rooms would be open around 850 hours and year (9.71%)

Table 4.1 – ANC Draft Guidance on Overheating (Internal Noise Levels due to Transport Sources)

Internal Ambient Noise Level		Examples of outcomes	Risk category for Level 2 assessment
$L_{Aeq,T}$ during 07:00 – 23:00	$L_{Aeq,T}$ during 23:00 – 07:00		
≤ 35 dB	≤ 30 dB	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	Negligible
> 35 dB and ≤ 40 dB	< 30 dB and ≥ 35 dB	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where the is no alternative ventilation, having to close windows for some of the time because of noise. Potential for some reported sleep disturbance. Affects the acoustic environment inside the dwelling such that there is a perceived change in the quality of life.	Low
>40 dB and ≤ 50 dB	>35 dB and ≤ 43 dB	Increasing risk of adverse effect due to impact on reliable speech communication during daytime or sleep disturbance at night. Although noise levels at the lower end of this category will cause changes in behaviour, they may still be considered suitable. Noise levels at the upper end of this category will result in more significant changes in behaviour and are only likely to be considered suitable if they occur for limited periods.	Medium
>50 dB	> 43 dB	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in character of the area.	High

In summary a medium level risk during restricted day time times could have the following outcomes:

- Increase risk of adverse effect due to impact on reliable speech communication during daytime
- Although noise levels at the lower end of this category will cause changes in behaviour, they may still be considered acceptable
- Noise levels at the upper end of this category will result in more significant changes in behaviour and only likely to be considered suitable if they occur for limited periods.

Based on the air quality, External Fabric Building Assessment and Overheating report, it is proposed that the ventilation strategy shall utilize mechanical ventilation heat recovery unit (MVHR) technology to provide continuous running whole house ventilation to each of the apartments. In addition to this, windows shall be openable during restricted times and during high summertime temperatures (expected to occur between 7 – 10% of the occupied hours within a year). The MVHR Units shall be fitted with the following features and controls.

- Extremely low Specific Fan Power of 0.41 W/l/s
- Highly efficient heat exchanger; up to 91%
- SAP Appendix Q certified
- Intelligent frost protection, stepped reduction of supply air rates prevents HRV unit from freezing
- G3 filters as standard

- Fully adjustable boost overrun timer 0-60 minutes; can be used with non-latching (momentary) switches to prevent unit from being accidently left in boost mode
- Setback facility to reduce ventilation where local regulations allow Summer Mode facility
- Intelligent controller
- Lightweight for easy handling
- Re-usable plastic filter frames
- Quick fix mounting bracket
- Independent fan adjustment

4.2 MVHR Selection

It is proposed that the MVHR unit for the COMAG Phase 2 development shall be a Titon HRV1.75Q plus. The MVHR unit shall be fitted with removable G3 panel filters on the front elevation. Full technical datasheet can be found in Appendix D

Appendix A

SITE LOCATION PLAN

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NOTES

1 The Contractor must check and confirm all dimensions
2 All discrepancies must be reported and resolved by the Architect before works commence
3 This drawing is not to be scaled
4 All work and materials to be in accordance with current applicable Statutory Legislation and to comply with all relevant Codes of Practice and British Standards

WINNOCK ROAD
TAVISTOCK RD
ACCESS FROM PAVEMENT
SUB-STATION
MAIN ENTRY
PRIVATE AMENITY SPACE
SHARED AMENITY SPACE
SHARED AMENITY SPACE
BLDG - A
REFUSE A
VISITOR
POST
MOTORCYCLES
PARKING
RAMP DOWN
RAMP UP
CYCLES
BLDG - B
REFUSE B
MEETING ROOM
TOILETS
COMMUNITY SPACE
POTENTIAL PHASE 3
INDICATIVE FOOTPRINT
North
This scale is 10cm in length when printed at the size indicated in the title block
0 1 2 3 4 5 10cm

Rev	Date	
1E	19/01/18	Issued for Planning
1D	17/11/17	Issued for Planning
1C	30/10/17	Issued for Planning
1B	18/08/17	Issued for Planning
1A	11/08/17	Issued for Planning

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Client
Redrow Homes Ltd (London)

Project
Padcroft Phase II

Drawing
As Proposed
Ground Floor Plan

Scale	Date	Status
1:200 (A1)	Aug 17	Planning

Job Number	Drawing Number	Revision
5935	T(20)P00	1E

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Appendix B

SITE ELEVATIONS

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NOTES

1 The Contractor must check and confirm all dimensions
2 All discrepancies must be reported and resolved by the Architect before works commence
3 This drawing is not to be scaled
4 All work and materials to be in accordance with current applicable Statutory Legislation and to comply with all relevant Codes of Practice and British Standards



1 - Proposed Elevation 3
SCALE: 1:200 (A1)

SOUTH ELEVATION SHOWN ON Z20S02



2 - Proposed Elevation 4
SCALE: 1:200 (A1)





3 - Proposed Elevation 5
SCALE: 1:200 (A1)

This scale is 10cm in length when printed at the size indicated in the title block
0 1 2 3 4 5 10cm

Rev		Date
1E	Issued for Planning	19/01/18
1D	Issued for Planning	17/11/17
1C	Issued for Planning	27/10/17
1B	Issued for Planning	18/08/17
1A	Issued for Planning	11/08/17

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Client
Redrow Homes Ltd (London)

Project
Padcroft Phase II

Drawing
Proposed Elevations 3, 4 & 5

Scale	Date	Status
1:200 (A1)	Aug 17	Planning

Job Number	Drawing Number	Revision
5935	T(20)E02	1E

G:\5935\T_Series\T20\T20E02

Appendix C

MVHR TECHNICAL SUBMISSION

HRV1.75 Q *Plus*

Ultra energy efficient Heat Recovery Ventilation unit



For use in small to medium sized dwellings

The enhanced capacity HRV1.75 Q *Plus* continuously running whole-house ventilation unit with heat recovery is independently tested by the BRE maintains an ultra compact size despite its improved results.

Combining extremely low power consumption and a highly efficient heat exchanger, this unit enhances SAP performance via Appendix Q, and yet remains versatile enough in size to be equally as functional in larger apartments as it is in small to medium sized dwellings.

The Eco versions offer a 100% airflow diverting Summer Bypass, recognised and listed in the UK Product Characteristics Database. They also include intelligent humidity options and can be fitted with auralite® status indicator or the auramode® and aurastat® controllers.





aurastat®



auralite®



auramode®



Features & Benefits

- **Highly versatile compact unit**
- **Extremely low Specific Fan Power; down to 0.41 W/l/s**
- **Highly efficient heat exchanger; up to 91%**
- **Accepts 125mm or 150mm diameter ducting, no adaptors required**
- **Intelligent frost protection, stepped reduction of supply air rates prevents HRV unit from freezing**
- **G3 filters as standard with G4 as an option**
- **Fully adjustable boost overrun timer 0-60 minutes; can be used with nonlatching (momentary) switches to prevent unit from being accidently left in boost mode**
- **Setback facility to reduce ventilation where local regulations allow**
- **Volt free switching control**
- **Intelligent controller, quick and easy to commission**
- **Lightweight for easy handling**
- **Re-usable plastic filter frames**
- **Quick fix mounting bracket**
- **Patented**
- **Independent fan adjustment**
- **Effective in reducing pollutants in the home and improving Indoor Air Quality (IAQ), therefore reducing the risk of Toxic Home Syndrome**

Basic version:

- **Summer mode**

Eco versions:

- **Intelligent Summer Bypass & humidity controls**
- **SUMMERboost® facility**

Eco HMB Models:

- **Compatible with auralite® (TP518) status indicator**
- **Quick access filter doors as standard**

Eco B Models:

- **Compatible with Eco-Aura range; aurastat®, auramode® and auralite® (TP519) controllers**
- **Duct heater control (requires independent power supply)**
- **Available in left and right handed configurations**
- **BMS compatible via RS485**

Product Codes

HRV1.75 Q *Plus* -
TP404A - Energy Rating A

HRV1.75 Q *Plus* HMB Eco auralite® ready -
TP404HMB - Energy Rating A

HRV1.75 Q *Plus* B Eco-Aura controls ready -
TP414B/LH (left hand config) or
TP414B/RH (right hand config) - Energy Rating A+

Filters:

XP40132/099 - G3 Filters fitted as standard
XP46122/099 - G4 Filters available on request

Eco versions:

XP40133/099 - G3 Filters fitted as standard
XP46133/099 - G4 Filters available on request
XP46222/099 - G3/F7 Filters available on request
XP46232/099 - G4/F7 Filters available on request

Standards

Conforms to requirements of UK statutory Building Regulations and Technical Standards for Ventilation and BRE 398.

SAP Appendix Q tested (http://www.ncm-pcdb.org.uk/sap/pcdbsearch.jsp?pid=34)

Exceeds requirements of Building Regulations Approved Document L (England & Wales).

EU RoHS Directive compliant.

Conforms to requirements of EC council directives relating to Electromagnetic Compatibility and Electrical Safety:
2006/95/EC (LVD), 2004/108/EC (EMC)
EN 60335-1:2002/A2:2006, EN 60335-2- 80:2003/A1:2004. CE Marked.

Specification

Dimensions: 715mm wide x 490mm high (excluding ports) x 415mm deep (426mm with mounting bracket)

Weight: 24kg

Finish: White Paint

Materials:

Housing: Zintec sheet steel housing, powder coated white
Internals: Expanded polypropylene (EPP)
Heat exchanger: Polystyrene
Internal insulation: Closed cell foamed Nitrile rubber, class 'O' fire rating
Standard filters: Grade G3 synthetic filters.

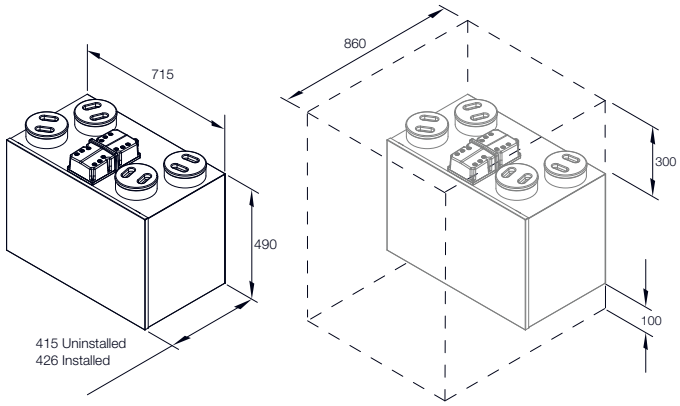
Guarantee period: 3 years (UK only)

Electrical: 230V ~ 50/60Hz, 3A fuse

Installation: Install in accordance with regulatory requirements, such as the Domestic Ventilation Compliance Guide (England & Wales) and the Residential Ventilation Association recommendations.

Maintenance: Service and filter clean/replacement subject to local environment - see product manual.

Drawing & Dimensions



Performance

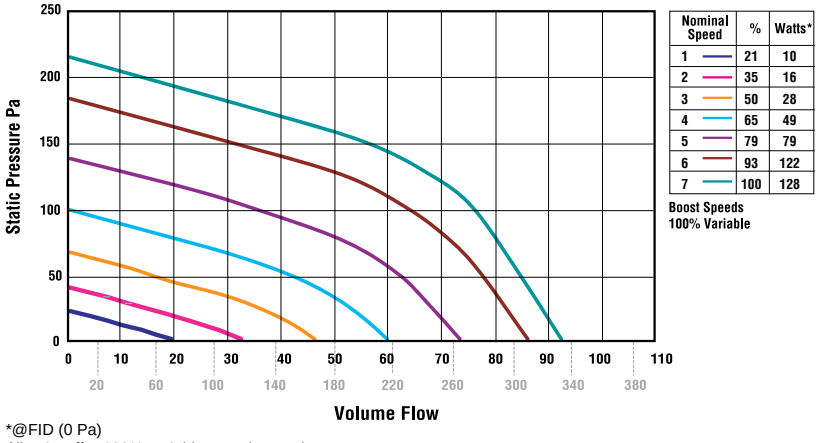
The figures and compliance levels below relate to current SAP requirements. Revised SAP guidance will have an effect on performance and up-to-date figures can be found on the relevant product page at www.titon.co.uk.

Exhaust terminal configuration*	Fan speed setting	Specific fan power (W/l/s)	Heat exchange efficiency (%)
Kitchen + 1 additional wet room	100% variable	0.41	91
Kitchen + 2 additional wet rooms	100% variable	0.42	90
Kitchen + 3 additional wet rooms	100% variable	0.49	90
Kitchen + 4 additional wet rooms	100% variable	0.59	89
Kitchen + 5 additional wet room	100% variable	0.73	88
Kitchen + 6 additional wet room	100% variable	0.90	88

Figures taken from the BRE Test Results

*Number of wet rooms is based on SAP Q test criteria and does not correlate directly with regulatory performance requirements.

Nominal fan performance



*@FID (0 Pa)
All units offer 100% variable speed control.
Performance curves for Eco version.

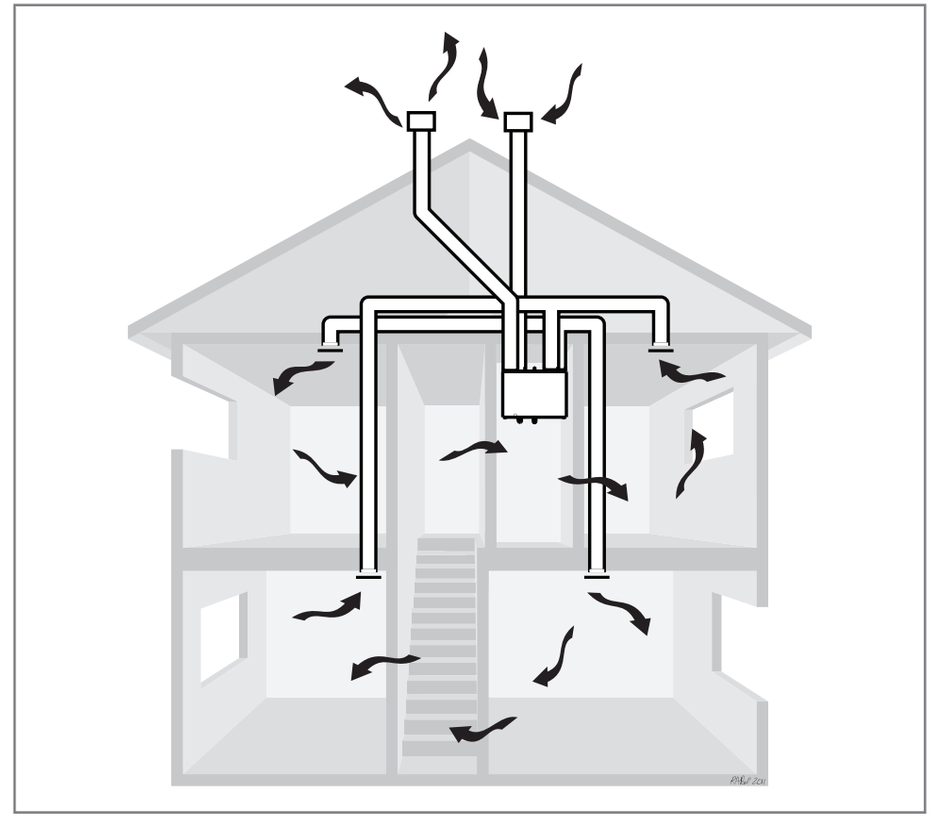
Acoustic Data

Product	% of Max flow	Airflow	dB(A) @ 3m Hemispherical			dB(A) @ 3m Spherical
			Induct Inlet	Induct Outlet	Casing Breakout	Casing Breakout
HRV1.75 Q *Plus* Eco	39%	30l/s @ 18Pa	26	36	22	19
	60%	47l/s @ 47Pa	31	46	22	19
	100%	78l/s @ 100Pa	40	54	30	27

For full frequency acoustic data at various speeds please see www.titon.co.uk. All acoustic data is third party tested at Sound Research Laboratories (SRL) Ltd.

Heat Recovery Ventilation System

HRV User Guide - MVHR



DO NOT SWITCH OFF THE UNIT! The system is designed to run continuously.
If the unit is switched off indoor pollutant and moisture levels are likely to increase.

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Email: ventsales@titon.co.uk **Web:** www.titon.com

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BM 975 iss 03

Your home has is fitted with a balanced ventilation system with heat recovery. At the heart of this system is a Titon HRV **Q** Plus Heat Recovery Unit. This contributes to improved indoor air quality and increased comfort levels. For the ventilation unit to function efficiently it needs to be maintained and used correctly.

Ventilation is Vital

Indoor air quality deteriorates without controlled ventilation, and this is intensified now modern homes are built more airtight. Chemicals, gases and moisture produced by everyday products and activities may lead to the build up of pollutants which could be harmful to the health of the occupants and may damage the building fabric.

Once homes are occupied it is the responsibility of the home owner/ landlord to maintain the system following the guidance provided.

How the System Works

The ventilation system extracts stale polluted air from rooms where most moisture is generated e.g. kitchens and bathrooms, and provides fresh air taken from outside which is by the HRV Q Plus then delivered to other rooms. This creates a flow of fresh, clean air throughout the house.

Heat is reclaimed from the extracted air and used to preheat incoming fresh air by a "heat exchanger" which is built into the central ventilation unit.

The ventilation system functions continuously via hidden ducts without wasting heat or energy unnecessarily. The air travels through terminals built into the ceiling which are connected by hidden ducts to the unit. Do not disturb or adjust the ceiling terminals, they have been set to give the correct amount of ventilation for the property.

The central unit is usually installed in a roof space or cupboard, although most of the system is hidden from view as it has been designed into the house construction. The system has the facility to boost the ventilation rate at times when more moisture is being generated, such as when bathing or cooking.
During cold weather the frost protection program will automatically vary the ventilation to ensure that there is no build up of ice in the unit. During operation, you may notice small changes in airflow or noise levels. This is quite normal as the unit is designed to operate in this way.

How to Use the System

The system runs by itself for normal ventilation rates. If a boost switch has been installed, it should be used to increase the extract ventilation rate at times when moisture or pollutant levels are considered excessive. Sensors may be fitted in the dwelling which detect high levels of moisture or pollutants and boost the system automatically.



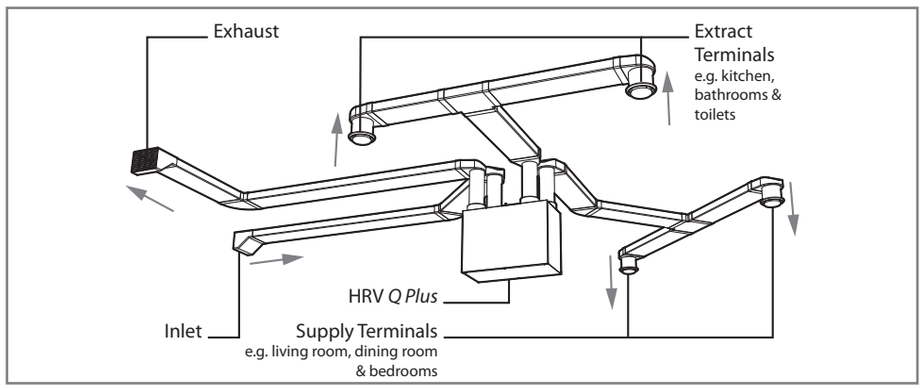
Typical Ceiling Terminal

Your system may have additional switching options and settings, please ask your housebuilder for further details if you are unsure.

Maintenance

All ventilation units require periodic maintenance. Routine maintenance, apart from filter changes, must only be carried out by a suitably qualified and competent person. The filters should be changed regularly, the frequency of cleaning will vary depending on the environmental conditions and occupancy levels in the property.

Filters can be cleaned by carefully using a vacuum cleaner. Filters should be replaced at least annually, or more regularly dependent on environmental conditions. Replacement Filters are available from TitonDirect.co.uk or via contact numbers shown. You will need to know the unit part number, which can be found on the serial number label fixed to the top and front of the unit.

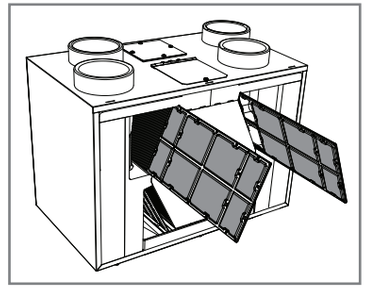


HRV User Guide - MVHR

WARNING: The unit uses a 230V ~ supply and contains rotating mechanical parts. ISOLATE the unit from mains power supply and allow sufficient time for all moving parts to stop before undergoing any Servicing or Maintenance.

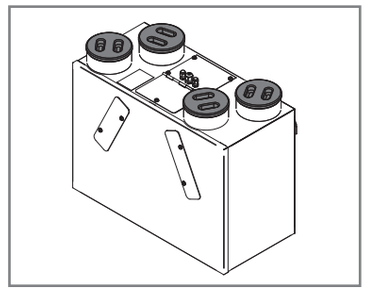
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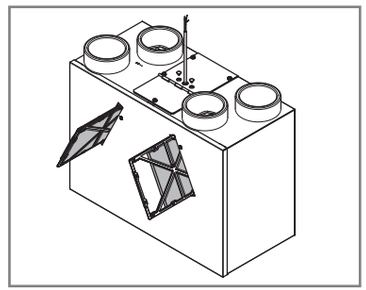
1. ISOLATE the unit from mains power supply and allow sufficient time for all moving parts to stop.
2. Loosen the two corner screws located on the bottom front of the unit.
3. Completely remove the centre screw.
4. Completely remove the Front Cover by pulling it away from the unit at the bottom and lifting.
5. Slide out Filter Frames fitted either side of heat exchanger. Some units will have handed filters, so ensure the left and right hand filters are replaced or re-inserted like for like.
6. Clean by carefully remove any dust from face of heat exchanger, interior of the unit and the Bypass (if fitted) using a vacuum cleaner or alternatively replace with new filters. Do not use water or any other fluids.
7. Cover replacement is the reverse of the above steps. Ensure it is securely located at the top before tightening screws.



Filter door type

1. Unscrew and remove filter covers on front of unit.
2. Slide out Filter Frames fitted either side of heat exchanger. Some units will have handed filters, so ensure the left and right hand filters are replaced or re-inserted like for like.
3. Clean by carefully remove any dust from face of heat exchanger, interior of the unit and the Bypass (if fitted) using a vacuum cleaner or alternatively replace with new filters. Do not use water or any other fluids.
4. Replace filter covers ensuring they fit tightly against the front panel.





Filters should be replaced after a maximum of 3 cleaning cycles.

A Product Manual with full maintenance instructions is supplied with the unit and should be located on the unit or left with the householder or landlord.

If your manual is missing and you are responsible for maintenance, please go to www.titon.co.uk/mvhr for a copy.

It must be used as a service record.

Tel: +44 (0) 1206 713800 **Email:** ventsales@titon.co.uk **Web:** www.titon.com

Appendix D

AIR QUALITY ASSESSMENT

REDROW HOMES LIMITED

PADCROFT PHASE II, WEST DRAYTON

Air Quality Assessment



002
JANUARY 2018

CONFIDENTIAL

REDROW HOMES LIMITED

PADCROFT PHASE II, WEST DRAYTON

Air Quality Assessment

CONFIDENTIAL

PROJECT NO. 70034440
OUR REF. NO. 002

DATE: JANUARY 2018

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WSP.com

QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	Draft for comment	Qualitative technical review to assess potential impact of proposed scheme changes. Modelling revised to use current vehicle emission factors and to reflect change in building heights.		
Date	21/06/2017	18/01/2018		
Prepared by	Tom Reade	Justin Lingard		
Signature		Lingard, Justin I am the author of this document 2018.01.18 21:41:42 Z		
Checked by	Andy Talbot	Andy Talbot		
Signature		Talbot, Andy 2018.01.18 21:59:33 Z		
Authorised by	Andy Talbot	Andy Talbot		
Signature		Talbot, Andy 2018.01.18 22:01:24 Z		
Project number	70034440	70034440		
Report number	01	02		
File reference	\\uk.wspgroup.com\central data\Projects\700344xx\70034440 - Comag Site, Tavistock Road\D Design and Analysis\Air Quality\11 Report	\\uk.wspgroup.com\central data\Projects\700344xx\70034440 - Comag Site, Tavistock Road\C Documents\Reports\Application Reports		

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EXECUTIVE SUMMARY

WSP has been instructed by Redrow Homes Ltd to prepare an air quality assessment to support the planning application for the Padcroft Phase II site, which covers an area of 0.34 hectares (ha). This site is defined by the red line boundary on the site location plan submitted with the application and is located on the north side of Tavistock Road. Full planning permission is sought for the demolition of existing structures for redevelopment of the Padcroft Phase II site for 104 residential units comprising 20 x 1-bed; 75 x 2-bed; and 9 x 3- bed; community space; 104 car parking spaces; dedicated secure cycle parking, landscaping and other ancillary works.

This report addresses the potential air quality impacts during both the construction and operational stages of the proposed development. For both phases the type, source and significance of potential impacts were identified, and the measures that should be employed to minimise these proposed. The methodology followed in this study was discussed and agreed with the Environmental Health Officer at London Borough of Hillingdon.

A qualitative assessment of construction stage impacts has been carried out. There is a **medium risk** of dust soiling during demolition, earthworks, construction and from vehicle trackout. The construction poses a **low risk** in terms of fugitive PM_{10} emissions. However, through good site practice and the implementation of suitable mitigation measures, the impact of dust and PM_{10} releases will be reduced and excessive releases prevented. The residual effect of the construction phase on air quality is **not significant**.

A quantitative assessment of operational stage impacts has been carried out by modelling road traffic and on-site boilers emission sources. The impacts of the operational phase on ambient air quality are **negligible** for all pollutants and the effect on air quality is **not significant**. Additionally, the predicted concentrations at new exposure locations introduced by the Proposed Development do not exceed the relevant objectives and are classified as **APEC Level A** (not requiring mitigation).

The Proposed Development is air quality neutral for building emissions, but it is **not air quality neutral** for transport emissions, therefore additional mitigation and/ or off-setting is required.

Overall, with the recommended mitigation measure in place, the proposals would comply with relevant national air quality legislation and national, regional and local planning policy.

1

INTRODUCTION

1 INTRODUCTION

1.1.1. WSP has been instructed by Redrow Homes Ltd to prepare the air quality Application Report to support the proposed application for the Padcroft Phase II site redevelopment for 104 residential units, as defined by the red line boundary on the site location plan submitted with this application extends 0.34 ha and is located on the north side of Tavistock Road.

1.1.2. This application report presents the findings of the potential air quality impacts during both the construction and operational stages of the Proposed Development. For both stages, the type, source and significance of potential impacts are identified, and the measures that should be employed to minimise these described.

1.1.3. The report also considers the potential exposure of future residents of the Proposed Development to potential poor air quality given the location of the Application Site within the Hillingdon borough-wide Air Quality Management Area (AQMA) declared for exceedances of annual mean NO_2 objective.

1.1.4. In addition, an air quality neutral assessment in respect of building and transport emissions has been undertaken.

1.1.5. A glossary of technical terms used in this report is given in **Appendix A.**

2

SITE DESCRIPTION

2 SITE DESCRIPTION

2.1 EXISTING SITE

2.1.1. The Padcroft Phase II site, as defined by the red line boundary on the site location plan submitted with this application extends 0.34 ha and is located on the north side of Tavistock Road.

2.1.2. In 2016, Redrow purchased the adjacent former Padcroft Works site following the grant of planning permission for 308 residential units (ref. 45200/APP/2014/3638). The Padcroft Works site has been the subject of a S96a application (ref. 45200/APP/2015/4567) to amend the boundary, subsequent S73 application (ref. 45200/APP/2016/3886) for additional floor space (infill) and amendments to the basement, as well as a further S73 application (ref. 45200/APP/2017/327) to reconfigure the existing layout to provide an additional seven units (315 total). Redrow is currently implementing the most recent S73 planning permission (ref. 45200/APP/2017/327).

2.1.3. The Padcroft Phase II site, the subject of this application, provides an opportunity to further extend the residential development of the adjacent Padcroft Works site. The design strategy is to link the proposed development of the Padcroft Phase II site to bring forward comprehensive scheme across the two sites to deliver one single integrated residential development.

2.1.4. The site location is illustrated in **Figure 1.**

2.2 PROPOSED DEVELOPMENT

2.2.1. Full planning permission is sought for the demolition of existing structures for redevelopment of the Padcroft Phase II site for 104 residential units comprising 20 x 1-bed; 75 x 2-bed; and 9 x 3- bed; community space; 104 car parking spaces; dedicated secure cycle parking, landscaping and other ancillary works.

3

PLANNING POLICY AND GUIDANCE

3 PLANNING POLICY AND GUIDANCE

3.1 AIR QUALITY LEGISLATION & POLICY

3.1.1. A summary of the relevant air quality legislation and policy is provided below.

UK AIR QUALITY STRATEGY

3.1.2. The Government's policy on air quality within the UK is set out in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (AQS)1. The AQS provides a framework for reducing air pollution in the UK with the aim of meeting the requirements of European Union legislation.

3.1.3. The AQS also sets standards and objectives for nine key air pollutants to protect health, vegetation and ecosystems. These are benzene (C_6H_6), 1,3 butadiene (C_4H_6), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$), sulphur dioxide (SO_2), ozone (O_3), and polycyclic aromatic hydrocarbons (PAHs). The standards and objectives for the pollutants considered in this assessment are given in **Appendix B.**

3.1.4. The air quality standards are levels recommended by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO) with regards to current scientific knowledge about the effects of each pollutant on health and the environment.

3.1.5. The air quality objectives are medium-term policy based targets set by the Government, which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to the EPAQS recommended standards or WHO guideline limits, whereas others involve a margin of tolerance, i.e. a limited number of permitted exceedances of the standard over a given period.

3.1.6. For the pollutants considered in this assessment, there are both long-term (annual mean) and short-term standards. In the case of NO_2, the short-term standard is for a 1-hour averaging period, whereas for PM_{10} it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants, for example temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road.

3.1.7. The AQS contains a framework for considering the effects of a finer group of particles known as '$PM_{2.5}$' as there is increasing evidence that this size of particles can be more closely associated with observed adverse health effects than PM_{10}. Local Authorities are required to work towards reducing emissions/concentrations of particulate matter within their administrative area. However, there is no statutory objective given in the AQS for $PM_{2.5}$ at this time.

AIR QUALITY REGULATIONS

3.1.8. Many of the objectives in the AQS have been made statutory in England with the Air Quality (England) Regulations 2000[2] and the Air Quality (England) (Amendment) Regulations 2002[3] for the purpose of Local Air Quality Management (LAQM).

3.1.9. These Regulations require that likely exceedances of the AQS objectives are assessed in relation to:

"…the quality of air at locations which are situated outside of buildings or other natural or man-made structures, above or below ground, and where members of the public are regularly present…"

3.1.10. The Air Quality Standards Regulations 2010[4] transpose the European Union Ambient Air Quality Directive (2008/50/EC)[5] into law in England. This Directive sets legally binding limit values for concentrations in outdoor

[1] Department for Environment, Food and Rural Affairs (Defra) and the Devolved Administrations (2007). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1 and 2).
[2] The Air Quality (England) Regulations 2000 – Statutory Instrument 2000 No.928.
[3] The Air Quality (England) (Amendment) Regulations 2002 – Statutory Instrument 2002 No.3043.
[4] The Air Quality Standards Regulations 2010 – Statutory Instrument 2010 No. 1001.
[5] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.

air of major air pollutants that impact public health such as PM_{10}, $PM_{2.5}$ and NO_2. The limit values for NO_2 and PM_{10} are the same concentration levels as the relevant. AQS objectives, and the limit value for $PM_{2.5}$ introduced in this Directive is a concentration of 25µg/m^3 to apply from 2015.

ENVIRONMENTAL PROTECTION ACT 1990 – CONTROL OF DUST AND PARTICULATES ASSOCIATED WITH CONSTRUCTION

3.1.11. Section 79 of the Environmental Protection Act 1990 gives the following definitions of statutory nuisance relevant to dust and particles:

3.1.12. "*Any dust, steam, smell or other effluvia arising from industrial, trade or business premises or smoke, fumes or gases emitted from premises so as to be prejudicial to health or a nuisance*"; and

"*Any accumulation or deposit which is prejudicial to health or a nuisance*".

3.1.13. Following this, Section 80 says that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.

3.1.14. There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist. Nuisance is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred.

ENVIRONMENT ACT 1995

3.1.15. Under Part IV of the Environment Act 1995, local authorities must review and document local air quality within their area by way of staged appraisals and respond accordingly, with the aim of meeting the air quality objectives defined in the Regulations. Where the objectives are not likely to be achieved, an authority is required to designate an AQMA. For each AQMA the local authority is required to draw up an Air Quality Action Plan (AQAP) to secure improvements in air quality and show how it intends to work towards achieving air quality standards in the future.

3.2 PLANNING POLICY

3.2.1. A summary of the national, regional and local planning policy relevant to the Proposed Development and air quality is provided below.

NATIONAL PLANNING POLICY

National Planning Policy Framework

3.2.2. The Government's overall planning policies for England are described in the National Planning Policy Framework[6]. The core underpinning principle of the Framework is the presumption in favour of sustainable development, defined as:

3.2.3. "*Development that meets the needs of the present without compromising the ability of future generations to meet their own needs*".

3.2.4. One of the 12 core planning principles in the NPPF is that planning should *"contribute to conserving and enhancing the natural environment and reducing pollution."*

3.2.5. In relation to air quality, the following paragraphs in the document are relevant:

- Paragraph 109, which states *"The planning system should contribute to and enhance the natural and local environment by:…preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water, or noise pollution.."*;
- Paragraph 110, which states *"In preparing plans to meet development needs, the aim should be to minimise pollution and other adverse effects on the local and natural environment. Plans should allocate land with the least environmental or amenity values, where consistent with other policies in this Framework"*;

[6] Department for Communities and Local Government (2012). National Planning Policy Framework.

- Paragraph 122, which states *"…local planning authorities should focus on whether the development itself is an acceptable use of the land, and the impact of the use, rather than the control of processes or emissions themselves where these are subject to approval under pollution control regimes. Local planning authorities should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities"*;
- Paragraph 124, which states *"Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan"*; and
- Paragraph 203, which states *"Local Planning authorities should consider where otherwise unacceptable development could be made acceptable though the use of conditions or planning obligations. Planning Obligations should only be used where it is not possible to address unacceptable impacts through a planning condition."*

REGIONAL PLANNING POLICY

The Mayor's Air Quality Strategy for London

3.2.6. In 2010 the GLA/Mayor of London published a new Mayor's Air Quality Strategy for London[7]. This strategy is focused on improving London's air quality. It also explains the current air quality experienced across London and gives predictions of future levels of pollution. The sources of pollution are outlined and a comprehensive set of policies and proposals are set out that will improve air quality in the London Boroughs.

3.2.7. The Strategy sets out a framework for delivering improvements to London's air quality and includes measures aimed at reducing emissions from transport, homes, offices and new developments, promoting smarter more sustainable travel, as well as raising awareness of air quality issues.

3.2.8. The Strategy includes a policy which states: "New developments in London shall as a minimum be 'air quality neutral' through the adoption of best practice in the management and mitigation of emissions".

The London Plan: Spatial Development Strategy for Greater London (consolidated with alterations since 2011)

3.2.9. Policy 7.14 of the London Plan[8] is specific to the improvement of air quality and states that development proposals should:

- *"minimise increased exposure to existing poor air quality and make provision to address local problems of air quality"*;
- *"promote sustainable design and construction in order to reduce emissions from the demolition and construction of buildings following the best practice guidance in the GLA and London Councils' 'The control of dust and emissions from construction and demolition'"*;
- *"be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality"*;
- *"ensure that where provision needs to be made to reduce emissions from a development, this is usually made on site"*; and
- *"where the development requires a detailed air quality assessment and biomass boilers are included, the assessment should forecast pollutant concentrations. Permission should only be granted if no adverse air quality impacts from the biomass boiler are identified."*

LOCAL PLANNING POLICY

London Borough of Hillingdon Local Plan

3.2.10. In this document9, Policy EM1: Climate Change Adaptation and Mitigation and Policy EM8: Land, Water, Air and Noise make reference to improving air quality within the borough. The objectives of both policies aims to:

[7] Mayor of London: Cleaning London's air, The Mayor's Air Quality Strategy (December 2010).
[8] Mayor of London (March 2016) The London Plan: Spatial Development Strategy for Greater London Consolidated with alterations since 2011.
[9] London Borough of Hillingdon Local Plan: Part 1 – Strategic Policies (Adopted November 2012).

- Minimise emissions of local air pollutants from new development and transport; and
- Reduce the reliance on car use by promoting safe and sustainable forms of transport, such as improved walking and cycling routes and encouraging travel plans.

3.2.11. The Local Plan states:

- All development should not cause a deterioration in local air quality levels and ensure protection for both existing and new sensitive receptors;
- All major development within the AQMA should demonstrate air quality neutrality (no worsening of impacts) where appropriate; actively contribute to the promotion of sustainable transport measures such as vehicle charging points and the increased provision for vehicles with cleaner transport fuels; deliver increased planting through soft landscaping and living walls and roofs; and provide a management plan for ensuring air quality impacts can be kept to a minimum;
- The Council seeks to reduce the levels of pollutants referred to in the Government's National Air Quality Strategy and will have regard to the Mayor's Air Quality Strategy. London Boroughs should also take account of the findings of the Air Quality Review and Assessments and Actions plans, in particular where Air Quality Management Areas have been designated; and
- The Council has a network of Air Quality Monitoring stations but recognises that this can be widened to improve understanding of air quality impacts. The Council may therefore require new major development in an AQMA to fund additional air quality monitoring stations to assist in managing air quality improvements.

London Borough of Hillingdon Air Quality Action Plan (AQAP)

3.2.12. In this document[10] there is a large number of measures considered in the plan, therefore these have been grouped into a series of delivery packages which are summarised below:

- Reduce road traffic emissions:
- Switch to cleaner technologies and promote the use of public transport;
- Shift freight from road to rail;
- Tackle through traffic; and
- Promote cleaner vehicle technology.
- Tackle specific sources of emission within the borough:
- Measures specific to Heathrow Airport; and
- Measures concerning local industry and business.
- Improve eco-efficiency of current and future developments, including council run properties.
- Implement the Mayor of London's AQAP.

3.2.13. For each measure, the AQAP goes further to suggest the associated costs, impact on overall pollutant concentrations, the economic viability of each package, what is required for implementation, who is responsible, how will success be measured and how will progress be monitored.

3.3 GUIDANCE

3.3.1. A summary of the publications referred to in the undertaking of this assessment is provided below.

LONDON LOCAL AIR QUALITY MANAGEMENT TECHNICAL GUIDANCE

3.3.2. The Mayor of London has published guidance for use by the London Boroughs in their review and assessment work[11]. This guidance, referred to in this document as LLAQM.TG(16), has been used where appropriate in the assessment presented herein.

LOCAL AIR QUALITY MANAGEMENT REVIEW AND ASSESSMENT TECHNICAL GUIDANCE

3.3.3. The Department for Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities outside of their London Boroughs in their review and assessment work[12]. This guidance,

[10] London Borough of Hillingdon Air Quality Action Plan (June 2004).
[11] Mayor of London (May 2016) London Local Air Quality Management (LLAQM) Technical Guidance (LLAQM.TG(16))

referred to in this document as LAQM.TG16, has been used with respect to the methodology used in the assessment of operational phase effects because LLAQM.TG(16) does not include suitable guidance on the approach that should be taken.

LAND-USE PLANNING & DEVELOPMENT CONTROL: PLANNING FOR AIR QUALITY

3.3.4. Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have published guidance[13] that offers comprehensive advice on: when an air quality assessment may be required; what should be included in an assessment; how to determine the significance of any air quality impacts associated with a development; and, the possible mitigation measures that may be implemented to minimise these impacts.

GUIDANCE ON THE ASSESSMENT OF DUST FROM DEMOLITION AND CONSTRUCTION

3.3.5. This document[14] published by the IAQM was produced to provide guidance to developers, consultants and environmental health officers on how to assess the impacts arising from construction activities. The emphasis of the methodology is on classifying sites according to the risk of impacts (in terms of dust nuisance, PM_{10} impacts on public exposure and impact upon sensitive ecological receptors) and to identify mitigation measures appropriate to the level of risk identified.

NATIONAL PLANNING PRACTICE GUIDANCE – AIR QUALITY

3.3.6. This guidance[15] provides a number of guiding principles on how the planning process can take into account the impact of new development on air quality, and explains how much detail air quality assessments need to include for proposed developments, and how impacts on air quality can be mitigated. It also provides information on how air quality is taken into account by Local Authorities in both the wider planning context of Local Plans and neighbourhood planning, and in individual cases where air quality is a consideration in a planning decision.

LONDON COUNCILS GUIDANCE FOR AIR QUALITY ASSESSMENTS

3.3.7. The London Councils have published guidance[16] for undertaking air quality assessments in the London Boroughs, the majority of which have declared AQMAs. The guidance sets out suggested methods for undertaking such an assessment within the London area and provides a methodology to assist in determining the impacts of a development proposal on air quality. The main message of the document is, as above, that the factor of greatest importance will generally be the difference in air quality as a result of the proposed development.

MAYOR OF LONDON'S SUPPLEMENTARY PLANNING GUIDANCE FOR THE CONTROL OF DUST AND EMISSIONS DURING CONSTRUCTION AND DEMOLITION

3.3.8. This Supplementary Planning Guidance[17] (SPG) builds on the voluntary guidance published in 2006 by the London Councils to establish best practice in mitigating impacts on air quality during construction and demolition work. The SPG incorporates more detailed guidance and best practice, and seeks to address emissions from Non-Road Mobile Machinery (NRMM) through the use of a Low Emission Zone, which was introduced in September 2015.

3.3.9. The SPG provides a methodology for assessing the potential impact of construction and demolition activities on air quality following the same procedure as set out in the IAQM guidance. It then identifies the relevant

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[12] Defra (2016) Part IV of the Environment Act 1995 and Environment (Northern Ireland) Order 2002 Part III, Local Air Quality Management Technical Guidance LAQM.TG16.
[13] Environmental Protection UK and Institute of Air Quality Management (Version 1.2 Updated January 2017). Land Use Planning & Development Control: Planning for Air Quality.
[14] Institute of Air Quality Management (Version 1.1 Updated June 2016). Guidance on the Assessment of Dust from Demolition and Construction.
[15] Department of Communities and Local Government (DCLG) (March 2014). National Planning Practice Guidance.
[16] London Councils (January 2007): Air Quality and Planning Guidance – Revised version.
[17] Mayor of London (July 2014): The control of dust and emissions during construction and demolition – Supplementary Planning Guidance.

controls and mitigation measures that should be put in place to minimise any adverse impacts, which need to be set out, in draft, in an air quality assessment report submitted with the planning application, and then formalised post submission as an Air Quality and Dust Management Plan. Details of site air quality monitoring protocols are also provided with varying requirements depending on the size of the site and the potential risk of adverse impacts.

GREATER LONDON AUTHORITY: SUSTAINABLE DESIGN AND CONSTRUCTION SUPPLEMENTARY PLANNING GUIDANCE

3.3.10. Section 4.3 of this SPG provides guidance on when a developer will be required to undertake an air quality assessment, looks at how design and transport measures can be used to minimise emissions to air, and sets out emissions standards for combustion plant.

3.3.11. The SPG also contains guidance on assessing the air quality neutrality of a Proposed Development in order to comply with the London Plan and the Mayor's Air Quality Strategy. Air Quality neutral benchmarks for both transport and buildings NOx and PM_{10} emissions are provided within the SPG.

3.3.12. Developments that do not exceed these benchmarks (considered separately) will be considered to be 'air quality neutral', whilst developments that exceed the benchmarks after appropriate on-site mitigation measures have been incorporated will be required to off-set any excess in emissions off site. This can be achieved by providing NOx and PM abatement measures in the vicinity of the development, such as: green planting/walls and screens, with special consideration given to planting that absorbs or supresses pollutants; upgrade or abatement work to combustion plant; retro-fitting abatement technology for vehicles and flues; and exposure reduction. These measures can be secured by condition or Section 106 contribution. Air quality monitoring is not eligible for funding as it is not considered to contribute to actual air quality improvements.

AIR QUALITY NEUTRAL PLANNING SUPPORT GUIDANCE

3.3.13. The Air Quality Neutral Planning Support guidance[18] provides a methodology for assessing the air quality neutrality of Proposed Developments in London.

LONDON BOROUGH OF HILLINGDON: AIR QUALITY SUPPLEMENTARY PLANNING GUIDANCE (MAY 2002)

3.3.14. The aim of this document[19] is to:

- Identify the circumstances in which an air quality assessment would be required to accompany a development proposal;
- Provide technical guidance on the process of air quality assessments; and
- Provide guidance on the circumstances when air quality conditions and S106 planning obligations will be sought in accordance with national guidance and Hillingdon's UDP policies for air quality. The guidance is aimed at ensuring that air quality has been considered in enough depth and to help minimise any potential impacts.

[18] AQC and ENVIRON UK Ltd (2014). Air Quality Neutral Planning Support.
[19] London Borough of Hillingdon: Air Quality Supplementary Planning Guidance (May 2002)

4

SCOPE & METHODOLOGY

4 SCOPE & METHODOLOGY

4.1 SCOPE

4.1.1. The scope of the assessment has been determined in the following way:

- Consultation with the Environmental Health Officer (EHO) at LBH to regarding the assessment and the methodology to be applied[20];
- Review of LBH's latest review and assessment reports[21] and air quality data for the area surrounding the Application Site, including data from Defra[22], the Environment Agency (EA)[23], the Greater London Authority (GLA)'s London Atmospheric Emissions Inventory (LAEI)[24], and the London Air website[25];
- Desk study to confirm the locations of nearby existing receptors that may be sensitive to changes in local air quality, and a review of the masterplan for the Proposed Development to establish the location of new sensitive receptors;
- Review of the traffic data provided by WSP; and
- Review of the emissions data for the proposed energy centre as supplied by WSP and Patrick Parsons.

4.1.2. The scope of the assessment includes consideration of the potential impacts on local air quality resulting from:

- Dust and particulate matter generated by on-site activities during the construction stage;
- Increases in pollutant concentrations as a result of exhaust emissions arising from construction traffic and plant;
- Increases in pollutant concentrations as a result of exhaust emissions arising from traffic generated by the Application Site once operational; and
- Increases in pollutant concentrations as a result of emissions to air from the proposed onsite energy centre.

4.1.3. In addition, the potential exposure of future residents to poor air quality will also be considered.

4.2 METHODOLOGY

CONSTRUCTION STAGE

4.2.1. Dust comprises particles typically in the size range 1-75 micrometres (µm) in aerodynamic diameter and is created through the action of crushing and abrasive forces on materials. The larger dust particles fall out of the atmosphere quickly after initial release and therefore tend to be deposited in close proximity to the source of emission. Dust therefore, is unlikely to cause long-term or widespread changes to local air quality; however, its deposition on property and cars can cause 'soiling' and discolouration. This may result in complaints of nuisance through amenity loss or perceived damage caused, which is usually temporary.

4.2.2. The smaller particles of dust (less than 10µm in aerodynamic diameter) are known as particulate matter (PM_{10}) and represent only a small proportion of total dust released; this includes a finer fraction, known as $PM_{2.5}$ (with an aerodynamic diameter less than 2.5µm). As these particles are at the smaller end of the size range of dust particles they remain suspended in the atmosphere for a longer period of time than the larger dust particles, and can therefore be transported by wind over a wider area. PM_{10} and $PM_{2.5}$ are small enough to be drawn into the lungs during breathing, which in sensitive members of the public could have a potential impact on health.

[20] Consultation with London Borough of Hillingdon was undertaken on 05/06/2017 and 08/06/2017.
[21] London Borough of Hillingdon (2017) Air Quality Progress Report 2017 (Draft).
[22] Defra Local Air Quality Management (LAQM) Support Pages. Available at: http://laqm.defra.gov.uk/ Accessed on 28/07/2017.
[23]http://maps.environmentagency.gov.uk/wiyby/wiybyController?x=357683&y=355134&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=airpollution. Accessed on 25/07/2017.
[24] LAEI from 2013 and 2020, London Data Store. Available at http://data.london.gov.uk/. Accessed on 28/07/2017.
[25] London Air Website. Available at: http://www.londonair.org.uk/LondonAir/Default.aspx. Accessed on 25/07/2017.

4.2.3. An assessment of the likely significant impacts on local air quality due to the generation and dispersion of dust and PM_{10} during the construction stage has been undertaken using: the relevant assessment methodology published by the IAQM; the available information for this phase of the Proposed Development provided by the Client and Project Team; and, professional judgement.

4.2.4. The IAQM methodology assesses the risk of potential dust and PM_{10} impacts from the following four sources: demolition; earthworks; general construction activities and track-out. It takes into account the nature and scale of the activities undertaken for each source and the sensitivity of the area to an increase in dust and PM_{10} levels to assign a level of risk. Risks are described in terms of there being a low, medium or high risk of dust impacts. Once the level of risk has been ascertained, then site specific mitigation proportionate to the level of risk is identified, and the significance of residual effects determined. A summary of the IAQM assessment methodology is provided in **Appendix C.**

4.2.5. In addition to impacts on local air quality due to on-site construction activities, exhaust emissions from construction vehicles and plant may have an impact on local air quality adjacent to the routes used by these vehicles to access the Application Site and in the vicinity of the site itself. As information on the number of vehicles and plant associated with the construction phase was not available at the time of writing, a qualitative assessment of their impact on local air quality has been undertaken using professional judgement and by considering the following:

- The number and type of construction traffic and plant likely to be generated by this phase of the Development;
- The number and proximity of sensitive receptors to the Application Site and along the likely routes to be used by construction vehicles; and
- The likely duration of the construction stage and the nature of the construction activities undertaken.

OPERATIONAL STAGE

Road sources

4.2.6. Impacts on concentrations of NO_2 and particulate matter (PM_{10} and $PM_{2.5}$) have been considered in this assessment as road traffic is a major source of these pollutants.

4.2.7. For the prediction of impacts due to emissions arising from road traffic during the operation of the Proposed Development, the dispersion model ADMS-Roads (version 4.1) has been used. This model uses detailed information regarding traffic flows on the local road network, surface roughness, and local meteorological conditions to predict pollutant concentrations at specific receptor locations, as determined by the user. **Table 1** below provides a summary of the air quality modelling parameters from road traffic.

Table 1 ADMS-Roads Modelling Parameters

Parameter	Study area	Met measurement site
Latitude	51.3	51.2
Surface Roughness	1	0.5
Monin-Obukhov Length (m)	30	30

4.2.8. Meteorological data, such as wind speed and direction, is used by the model to determine pollutant transportation and levels of dilution by the wind. Meteorological data used in the model was obtained from the Met Office observing station at Heathrow Airport in 2013 (align with the baseline model from the LAEI). This station is considered to provide representative data for the assessment.

4.2.9. A summary of the traffic data and pollutant emission factors used in the assessment can be found in **Appendix D.** It includes details of the annual average daily traffic (AADT) flows, vehicle speeds (kph) and the percentage of heavy duty vehicles (HDVs) for the local road network in all assessment years considered. Traffic speeds were reduced at junctions in line with guidance provided in LAQM.TG16, and using professional judgement. For the assessment, two scenarios have been modelled, in addition to the 2016 baseline:

- 2016 – Baseline
- 2020 – Opening Year 'Without Development + Committed Developments'; and
- 2020 – Opening Year 'With development + Energy Centre Process Contributions + Committed Developments'.

4.2.10. Baseline ambient pollutant concentration data for NO_2, PM_{10} and $PM_{2.5}$ have been taken from the LAEI models for 2013 and 2020 to indicate future baseline concentrations in 2019. These baseline data account for all known pollutant sources within the local and wider areas. The LAEI 2013 model (updated in April 2017) has been validated against data from London Air Quality Network monitoring sites and future projections for 2020 onwards are based on current GLA emissions forecasts.

4.2.11. The traffic flows for the 2020 scenarios include flows for committed developments in the locality of the Application Site.

4.2.12. Vehicle emissions data as input into ADMS-Roads have been obtained using the Emission Factor Toolkit (EFT) version 8.0.1 (published in December 2017) available on the Defra website. The EFT allows for the calculation of emission rates arising from road traffic for all years between 2013 and 2030. To represent a worst case scenario 2016 vehicle emission rates have been used in all scenarios considered in the assessment.

4.2.13. The ADMS-Roads models have been run to give estimates of annual mean NOx, PM_{10} and $PM_{2.5}$ concentrations at selected receptor locations as a consequence of contributions from explicitly modelled road sources. Conversion of modelled annual mean NOx to NO_2 has been undertaken using NO_2/NOx ratios derived from the LAEI 2013 mapping for these pollutants. The differences in modelled concentrations between the 'with development' and 'without development' scenarios have then been derived.

4.2.14. To determine total pollutant concentrations with the Development the baseline LAEI 2013 mapped data have been added to the process contributions from the Application Site.

4.2.15. This approach is considered reasonable given that the LAEI models have been validated and represent the GLA's official baseline projections for ambient pollutant concentrations.

4.2.16. A sensitivity test has been undertaken assuming there is some improvement in baseline conditions between the current and future baseline years; this uses LAEI 2020 mapped data as opposed to 2013 data. The process contributions derived from the modelling have been added to the LAEI 2020 baseline concentrations to determine total pollutant concentrations. This approach assumes no improvement in emission factors and is considered to be a reasonable worst case approach.

4.2.17. PM_{10} and $PM_{2.5}$ have not been considered in the sensitivity test, as these pollutants are unlikely to exceed the AQS objectives.

Assessment of impacts due to emissions generated by energy plant

4.2.18. For the prediction of impacts due to emissions arising from the operation of the proposed energy centre, the air pollutant dispersion model ADMS 5.2 has been used. This model uses detailed information regarding the pollutant releases, local building effects and local meteorological conditions to predict pollution concentrations at specific locations selected by the user.

4.2.19. A summary of the model parameters used in the assessment are detailed in **Table 2.**

Table 2 Emission Parameters for Energy Centre

Parameter	CHP	Gas-Fired Boiler (each unit)
Stack Height (m)	27.78	27.78
Stack diameter (m)	0.1	0.15
Release temperature (ºC)	95	63
Release velocity (m/s)	1.98	1.64
NO_x emission rate (g/s)	0.0003299	0.00053
NO_x emissions (mg/Nm^3)	50	37.3

4.2.20. Both nearby buildings and complex topography can have a significant effect on the dispersion characteristics of the plumes from the stacks being assessed. ADMS 5.2 has algorithms which attempt to take account of

these impacts. Buildings can cause the plume to come to ground much closer to the stack than otherwise expected, causing higher pollutant concentrations. Plumes can also impact on hillsides under certain weather conditions, or within a basin or hollow which may result in pollutants being trapped for low level discharges.

4.2.21. A detailed description of the energy centre input data and modelled buildings can be found in **Appendix E**.

4.2.22. The energy centre contribution to annual mean NO_x concentrations was predicted, along with the 99.79th percentile of hourly mean concentrations. The predicted NO_x contributions were then converted to NO_2 assuming 70% for long-term emissions and 35% for short-term emissions, as set out in a guidance note published by the Environment Agency.

SIGNIFICANT ENERGY CENTRE CONTRIBUTIONS

4.2.23. The Environment Agency's Air Emissions risk assessment guidance sets out the levels at which process contributions (contributions to concentrations from energy centre emissions) can be screened out as being insignificant; Process Contributions (PC) can be considered insignificant if:

- The long term PC is <1% of the long term environmental standard (for NO_2 <0.4µg/m^3);
- The short term PC is <10% of the short term environmental standard (for NO_2 <20µg/m^3).

4.2.24. Where the PC exceeds these thresholds and is potentially significant, it is necessary to compare the Predicted Environmental Concentration (PEC) against the relevant statutory and guideline air quality standards, by combining the PC with appropriate background data.

IN-COMBINATION IMPACTS OF THE EMISSIONS FROM THE PROPOSED ENERGY CENTRE & TRAFFIC EMISSIONS

4.2.25. The total NO_2 concentrations (i.e. PEC) at each receptor were calculated as follows:

- Long term standards: PEC = PC + Background Concentration
- Short term standards: $PEC_{short\ term} = PC_{short\ term} + (2 \times Background_{long\ term})$.

4.2.26. The air quality modelling generates pollutant estimates of road source contributed NOx, PM_{10} and $PM_{2.5}$ and energy centre NOx contributions at specified receptors. To permit comparison with the relevant air quality objectives for NO_2, PM_{10} and $PM_{2.5}$ it has been necessary to combine the model outputs data with the relevant LAEI baseline concentrations.

4.2.27. To consider compliance with the 1-hour mean air quality objective for NO_2, Defra's guidance suggests that in locations where the annual mean NO_2 concentration exceeds 60µg/m^3 then the 1-hour mean objective may be exceeded. Where annual mean concentrations are less than 60µg/m^3 then exceedance of the 1-hour mean objective is considered unlikely. The risk of non-compliance with the 1-hour mean objective, where up to 18 exceedances of an 1-hour mean concentration of 200µg/m^3 are allowed in a calendar year, is therefore considered likely when the annual mean concentration is greater than 60µg/m^3 but unlikely when not. This approach has been adopted for this assessment.

4.2.28. To estimate total annual mean concentrations for PM_{10} and $PM_{2.5}$, for comparison with the annual mean air quality objectives (40 and 25 µg/m^3 respectively), the model output concentrations are simply added to the LAEI baseline concentrations for these pollutants.

4.2.29. To consider compliance with the 24-hour mean air quality objective for PM_{10}, Defra's guidance gives the following equation that relates the annual mean concentration to the number of exceedances of the 24-hour mean concentration of 50µg/m3, where up to 35 exceedances are allowed:

$$\text{No. 24-hour mean exceedances} = -18.5 + 0.00145 \times \text{annual mean}^3 + (206/\text{annual mean}).$$

4.2.30. This approach has been adopted for 24-hour mean PM_{10} for this assessment.

Great Western Mainline

4.2.31. The Great Western Railway (GWR) is located approximately 50m from the site boundary of the Application Site (exceeding the 30m exposure threshold detailed in LAQM.TG(16) for moving locomotives). Currently this railway line has a large number of diesel locomotives operating along it on a daily basis. However, it is anticipated that with the electrification of the GWR there will be a noticeable reduction in NO_2 (and particulate) concentrations in the vicinity of the railway line. This will have an impact on background concentrations in the vicinity of the Application Site such that the background concentrations in the opening year 2020 could potentially be lower than current levels. Furthermore, it should be noted that there is potential that beyond the

electrification of the GWR, some diesel locomotives may continue to use this line; however, it is likely that the number of movements would be substantially less than at the current time and therefore substantial improvements are still expected. On this basis an assessment of the impact of the GWR on the Proposed Development has been scoped out.

Selection of Sensitive Receptors

4.2.32. Defra provides guidance in locations where air quality objectives should apply (**Table 3**). This guidance has been used in the selection of receptors with likely relevant exposure to pollutant concentrations.

Table 3: Examples of where the Air Quality Objectives Should/Should Not Apply

Averaging Period	Objectives Should Apply At:	Objectives Should Generally Not Apply At:
Annual mean	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care homes etc.	Building facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other locations where public exposure is expected to be short term.
24-hour mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties.[26]	Kerbside sites (as opposed to locations at the building façade), or any other locations where public exposure is expected to be short term.
1-hour mean	All locations where the annual mean and 24 - hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.
15-minute mean	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer.	

4.2.33. A number of locations were selected based up on professional judgement and the appropriate planning guidance to represent relevant public exposure receptors at which pollution concentrations were predicted. The assessment receptors considered are detailed in **Appendix F** and their locations shown on **Figure 1**. They include locations adjacent or near to the routes that are likely to experience the greatest change in traffic volume as a result of the Development.

[26] Such locations should represent parts of the garden where relevant public exposure is likely, for example where there are seating or play areas. It is unlikely that relevant public exposure would occur at the extremities of the garden boundary, or in front gardens, although local judgement should always be applied.

4.3 SIGNIFICANCE CRITERIA

CONSTRUCTION PHASE

4.3.1. For the construction stage, IAQM guidance regarding determination of a significant effect has been followed, where:

"*IAQM recommends that significance is only assigned to the effect after considering the construction activity with mitigation. It is, therefore, important that the mitigation measures are defined in a form suitable for implementation by way of a planning condition or legal obligation within a section 106 agreement, and are included in a DMP or a more general Code of Construction Practice or Construction Environmental Management Plan."*

"For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'."

OPERATIONAL PHASE

4.3.2. Impacts have been described in accordance with EPUK & IAQM guidance, impact descriptors are given in **Table 4.** This guidance has been followed to determine whether or not local air quality impacts are likely to give rise to a significant effect, which may be adverse or beneficial.

Table 4 Impact Descriptors for Individual Receptors

Long Term Average Concentration at Receptors in Assessment Year	% Change in Concentration Relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Notes
AQAL = Air Quality Assessment Level, which for this assessment related to the UK Air Quality Strategy objectives.
Where the %change in concentrations is <0.5%, the change is described as 'Negligible' regardless of the concentration.
When defining the concentration as a percentage of the AQAL, 'without scheme' concentration should be used where there is a decrease in pollutant concentration and the 'with scheme;' concentration where there is an increase.
Where concentrations increase, the impact is described as adverse, and where it decreases as beneficial.

4.3.3. In determining whether or not an effect is significant the following have been considered:

- The magnitude of each change in ambient pollutant concentration at each receptor (i.e. the impact as given by the impact descriptors);
- The existing and future air quality in the absence of the Development;
- The extent of current population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

4.3.4. In addition to these criteria, the flow chart method for determining the significance of the predicted air quality impacts of a proposed development and published in the London Councils guidance for air quality assessments has been used. A summary of the flow chart for determining significance is shown below in **Table 5.**

Table 5 Summary of the London Councils flow chart method for assessing the significance of air quality impacts

Effect of Development	Outcome
Will development interfere with or prevent implementation of measures in the AQAP	Air Quality is an overriding consideration.
Is development likely to cause a worsening of air quality or introduce new exposure into the AQMA?	Air Quality is a highly significant consideration.
Would the development contribute to air quality exceedances or lead to the designation of a new AQMA?	Air Quality is a highly significant consideration.
Is the development likely to increase emissions of or increase/introduce new exposure to PM_{10}	Air Quality is a significant consideration.
None of the above.	Air Quality is not a significant consideration but mitigation measures may still need to be considered.

4.3.5. In determining both the significance of new exposure to air pollution and the levels of mitigation required, consideration was given to the Air Pollution Exposure Criteria (APEC) published in the London Councils guidance for air quality assessments and shown in **Table 6.**

Table 6 London Councils Air Pollution Exposure Criteria

APEC Level	Applicable Range Annual average NO_2	Applicable Range PM_{10}	Recommendation
A	>5% below national objective	Annual Mean > 5% below national objective 24 hour mean >1 day less than the national objective	No air quality grounds for refusal; however mitigation of any emissions should be considered.
B	Between 5% below or above national objective	Annual Mean Between 5% below or above national objective 24 hour mean Between 1 day above or below the national objective	May not be sufficient air quality grounds for refusal, however appropriate mitigation must be considered e.g. maximise distance from pollution source, proven ventilation systems, parking considerations, winter gardens, internal layout considered and internal pollutant emissions minimised.
C	>5% above national objective	Annual Mean >5% above national objective 24 hour mean >1 day more than the national objective	Refusal on air quality grounds should be anticipated, unless the Local Authority has a specific policy enabling such land use and ensure best endeavours to reduce exposure are incorporated. Worker exposure in commercial/industrial land uses should be considered further. Mitigation measures must be presented with air quality assessment, detailing anticipated outcomes of mitigation measures.

MAYOR OF LONDON'S AIR QUALITY NEUTRAL POLICY

4.3.6. To address the Mayor's Air Quality Neutral policy concerning new developments, and in line with the 2014 Sustainable Design and Construction SPG, NOx and PM_{10} emissions for buildings and transport have been calculated based on the data given in **Table 7.**

Table 7 Parameters Used in the Air Quality Neutral Assessment

Land Use Class	Parameter
Gross external area (used as a proxy for gross floor area, m^2)	13,461
Energy centre – total NO_x emissions (kg/year)	9
Annual vehicle trip generation (two-way trips)	67,282

4.3.7. The resultant emissions have been compared to the benchmarks given in **Table 8**. Where a benchmark is exceeded (i.e., is in deficit), mitigation is required, either locally or by way of off-setting emissions.

Table 8 Emission Benchmarks

Land Use Class	Benchmark Category	NO_x Benchmark	PM_{10} Benchmark
C3	Building Emissions (kg/year)	352.7	30.7
C3	Transport Emissions (kg/year)	160.0	27.5

4.4 LIMITATIONS & ASSUMPTIONS

4.4.1. Professional judgement has been used when completing the construction phase assessment for the Development.

4.4.2. There are uncertainties associated with both measured and predicted concentrations. The model (ADMS-Roads) used in this assessment relies on input data (including predicted traffic flows), which also have uncertainties associated with them. The model itself simplifies complex physical systems into a range of algorithms. In addition, local micro-climatic conditions may affect the concentrations of pollutants that the ADMS-Roads model will not take into account.

4.4.3. It has been assumed all the existing road sources and relevant emissions have been included in the baseline LAEI map data.

4.4.4. The following energy centre modelling assumptions were made:

- It has been assumed heat demand profile for the onsite energy centre (site wide) issued by EON and the modelling parameters detailed **Table 2** remain unchanged from the 2015 consent; and
- For the offsite energy centre (Elephant 1) the modelling parameters detailed in the Waterman document titled 'Elephant Road, MEP Planning Statement Response: Condition 18' were used.
- In addition, an operational profile was absent, therefore it has been assumed that the CHP operates for 17 hours per day, 365 days per year, and the gas-fired boilers operate 5 hours per day, 365 days per year.

4.4.5. The assumptions made for the assessment are considered to be reasonable and robust.

5

BASELINE CONDITIONS

5 BASELINE CONDITIONS

5.1 LBH'S REVIEW & ASSESSMENT OF AIR QUALITY

5.1.1. LBH designated an AQMA in 2001 for the whole administrative area as part of their Review and Assessment responsibilities, due to exceedances of the annual mean NO_2 and daily mean PM_{10} objectives.

5.2 LOCAL EMISSION SOURCES

5.2.1. The Application Site is located in an area where emissions of NOx, PM_{10} and $PM_{2.5}$ are locally influenced most strongly by road transport emissions; however the largest contributor of pollution is aviation. This is shown in **Appendix G** and is based on estimates included in the LAEI for 2013 and 2020. The LAEI forecasts that total estimated emissions of NOx, PM_{10} and $PM_{2.5}$ will reduce beyond 2020.

5.2.2. Other key sectors for NOx emissions are gas combustion (domestic and commercial). With respect to PM_{10} and $PM_{2.5}$ the key contributors are transport, aviation, gas combustion (domestic and commercial) and re-suspension.

LOCAL MONITORING

5.2.3. LBH currently operate eleven automatic monitoring stations and undertake passive diffusion tube monitoring at thirty-nine locations.

5.2.4. **Table 9** and **Table 10** summarise the 2010-2016 annual mean NO_2 concentrations and the number of exceedances of hourly mean NO_2 air quality objective, respectively, obtained from the automatic monitoring stations.

5.2.5. The annual mean NO_2 objective has been exceeded at four (LHR2, HIL, HI1 and HIL5) of the eleven monitoring stations (**Table 9**) between 2010 and 2016. Monitoring location HI3 has fluctuated between compliance and non-compliance between 2010 and 2016; however in 2016 this location exceeded the AQS objective.

5.2.6. No exceedances of the annual mean NO_2 objective were recorded at five (HRL, SIPS, HIL1, T55 and T54) of the eleven monitoring stations between 2010 and 2016, with the exception of T55 which was above the AQS objective in 2010.

5.2.7. No exceedances of the hourly mean NO_2 objective (**Table 10**) have been recorded at any of the monitoring stations between 2010 and 2016.

Table 9 Automatic Monitoring Data – Annual Mean NO_2 Concentrations in LBH

Site ID	Site Type	X, Y Co-ordinates (m)	Annual Mean (µg/m^3)						
			2010	2011	2012	2013	2014	2015	2016
Heathrow (LHR2)	Airport	508600,176700	**49.6**	**52**	**47.7**	**47.9**	**46.4**	**44.2**	**47**
London Hillingdon (HIL)	Suburban	506951,178605	**53.6**	**55**	**57.1**	**52.8**	**57.5**	**51.9**	**51.2**
Hillingdon 1 (HI1)	Roadside	510857,184917	**46.9**	**41.7**	**52**	**45**	**44.4**	**48.4**	**42.9**
Hillingdon 3 (HI3)	Roadside	509557,177800	**41.0**	**44.3**	**44**	39.2	36.7	**34.5**	**41.9**
London Harlington (HRL)	Airport	508295,177800	34.5	34	34.5	37.1	36.5	32	34
Hillingdon Sipson (SIPS)	Urban Background	507325,177282	38.3	37	35.2	36.5	36.6	33.7	35.2
London Harmondsworth (HIL1)	Roadside	505561,177661	30.5	31.5	31.8	30.4	29.2	28	27
Heathrow Green Gates (T55)	Airport	505207,177072	**41.2**	34.8	33.4	33.5	35.1	32.2	34.4

Site ID	Site Type	X, Y Co-ordinates (m)	Annual Mean (µg/m^3)						
			2010	2011	2012	2013	2014	2015	2016
Heathrow Oaks Road (T54)	Airport	505729,174496	37.2	30.5	30.3	34.2	32.6	27.4	31
Hillingdon Hayes (HIL5)	Roadside	510303,178882	**54.3**	**55.3**	**45.9**	**47**	**52.9**	**46.2**	**45.9**

Values in **bold** indicates an exceedance of the annual mean objective.
Data capture was greater than 90% at all monitoring locations.

Table 10 Automatic Monitoring Data – Number of Exceedances of the Hourly Mean NO_2 Objective in LBH

Site ID	Site Type	Number of Exceedances of Hourly Mean (1-hour) NO_2 Objective						
		2010	2011	2012	2013	2014	2015	2016
Heathrow (LHR2)	Airport	2	0	0	3	0	2	8
London Hillingdon (HIL)	Suburban	0	0	0	0	0	1	2
Hillingdon 1 (HI1)	Roadside	7	0	14	0	0	0	2
Hillingdon 3 (HI3)	Roadside	1	0	0	1	0	2	0
London Harlington (HRL)	Airport	0	0	0	5	0	0	0
Hillingdon Sipson (SIPS)	Urban Background	0	0	0	0	0	3	0
London Harmondsworth (HIL1)	Roadside	0	0	0	0	0	1	0
Heathrow Green Gates (T55)	Airport	0	0	0	0	0	0	0
Heathrow Oaks Road (T54)	Airport	0	0	0	0	0	0	0
Hillingdon Hayes (HIL5)	Roadside	15	15	2	4	2	2	1

Data capture was greater than 90% at all monitoring locations.

5.2.8. **Table 11** and **Table 12** show the annual mean PM_{10} concentration and the number of exceedances of the daily mean PM_{10} AQS objective, respectively.

5.2.9. Measured annual mean PM_{10} concentrations (**Table 11**) at all monitoring locations are well below the objective since 2010.

5.2.10. No exceedances of the AQS objectives for annual mean and 24-hour mean PM_{10} (**Table 12**) were recorded at any monitoring location between 2010 and 2016, with the exception of Hillingdon Hayes (HIL5) in 2014.

Table 11 Automatic Monitoring Data – Annual Mean PM_{10} Concentrations in LBH

Site ID	Site Type	Annual Mean (µg/m^3)						
		2010	2011	2012	2013	2014	2015	2016
Heathrow (LHR2)	Airport	23.8	25	24.8	24.6	18.6	13	15
Hillingdon 1 (HI1)	Roadside	22.4	24	24.1	22.6	23.2	24	22
Hillingdon 3 (HI3)	Roadside	20.4	23	22.4	21	21.5	21	20
London Harlington (HRL)	Airport	19.7	22	17.7	20	19.6	16	15
London Harmondsworth (HIL1)	Roadside	17.8	21	19.7	21.9	21	22	23

Site ID	Site Type	Annual Mean (µg/m³)						
		2010	2011	2012	2013	2014	2015	2016
Heathrow Green Gates (T55)	Airport	20	21	20.8	20.4	17	14	14
Heathrow Oaks Road (T54)	Airport	21.8	24	21.3	12	18.2	14	15
Hillingdon Hayes (HIL5)	Roadside	23.5	25	25.4	29.4	34.5	28	28

Data capture was greater than 90% at all monitoring locations.

Table 12 Automatic Air Quality Monitoring Data – Number of Exceedances of the Daily (24-hour) Mean PM_{10} Objective in LBH

Site ID	Site Type	Number of Exceedances of Daily Mean PM_{10} Objective						
		2010	2011	2012	2013	2014	2015	2016
Heathrow (LHR2)	Airport	4	19	18	12	6	3	3
Hillingdon 1 (HI1)	Roadside	5	21	16	10	18	3	9
Hillingdon 3 (HI3)	Roadside	2	16	10	6	6	3	11
London Harlington (HRL)	Airport	12	1	8	9	6	3	5
London Harmondsworth (HIL1)	Roadside	2	10	5	7	7	4	4
Heathrow Green Gates (T55)	Airport	0	16	8	8	2	3	3
Heathrow Oaks Road (T54)	Airport	2	16	11	8	2	5	2
Hillingdon Hayes (HIL5)	Roadside	7	18	15	17	**45**	14	32

Values in **bold** indicates an exceedance of the annual mean objective.
Data capture was greater than 90% at all monitoring locations.

5.2.11. **Table 13** summarises the 2010 to 2016 annual mean $PM_{2.5}$ concentrations obtained from the automatic monitoring stations.

5.2.12. All monitoring locations have recorded annual mean $PM_{2.5}$ concentrations well below the AQS objective in since 2011.

Table 13 Automatic monitoring Data – Annual Mean $PM_{2.5}$ in LBH

Site ID	Site Type	Annual Mean (µg/m³)						
		2010	2011	2012	2013	2014	2015	2016
Heathrow (LHR2)	Airport	-	11	11	11	9.9	9	10
London Harlington (HRL)	Airport	-	16	13	14	14	10	10
Heathrow Green Gates (T55)	Airport	-	10	10	10	10	9	10
Heathrow Oaks Road (T54)	Airport	-	10	10	10	10	10	10

Data capture was greater than 90% at all monitoring locations.

5.2.13. **Table 14** summarises the diffusion tube monitoring data collected by LBH within 1km of the Application Site between 2010 and 2016.

5.2.14. All monitoring locations within 1km of the Application Site indicated annual mean NO_2 concentrations below the AQS objective of 40µg/m³ between 2010 and 2016, with the exception of HD205 where exceedances were measured between 2012 and 2015.

Table 14 NO_2 Diffusion Tube Data for the LBH

Site ID	Site Type	X, Y Co-ordinates (m)	Data Capture	Annual Mean (µg/m^3)						
				2010	2011	2012	2013	2014	2015	2016
Colham Avenue (HD51)	Roadside	506335, 180263	83	35.6	33.9	36.6	34.3	36.7	33.3	26.7
31 Tavistock Road (HD67)	Roadside	505731, 180288	83	32.9	30.7	29.5	29.8	30.7	28.7	23.8
104 Yiewsley High Street (HD204)	Urban Background	506108, 180493	83	-	-	37.5	38.3	39.7	40.9	29.5
1 Porters Way (HD205)	Urban Background	506503, 179510	83	-	-	**41.8**	**40.0**	**42**	**41.1**	33.3

Values in **bold** indicates an exceedance of the annual mean objective.

LAEI modelled Annual Mean NO_2 Concentrations

5.2.15. The LAEI includes dispersion model results for the whole of London for 2013 and 2020. Estimated annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations at ground level in vicinity of the Application Site are illustrated in **Figure 4A** to **Figure 4F**. The area of the LAEI map data utilised for this assessment includes the road network used in the road traffic assessment, and includes coverage of modelled receptors.

5.2.16. Estimated annual mean NO_2 concentrations for 2013 at ground level in vicinity of the Application Site are illustrated in **Figure 4A**. This indicates very high concentrations, in excess of 50 and occasionally 60µg/m^3, along the main roads including Station Road and the GWR. Concentrations within the Application Site are below 35µg/m^3.

5.2.17. Estimated annual mean PM_{10} concentrations for 2013 at ground level in vicinity of the Development are illustrated in **Figure 4B**. Concentrations are generally between 30 and 35µg/m^3 along Station Road and High Street. Concentrations within the Application Site are below 25µg/m^3 which is well below the objective.

5.2.18. Estimated annual mean $PM_{2.5}$ concentrations for 2013 at ground level in vicinity of the Development are illustrated in **Figure 3C**. Concentrations are generally between 16 and 19µg/m^3 along Station Road and High Street; however, the LAEI map data indicates concentrations between 22 and 25µg/m^3 along the GWR. Concentrations within the Application Site are below 16µg/m^3 which is well below the objective.

5.2.19. If cleaner vehicle technologies, such as EURO 6 (VI) do deliver substantial improvements in vehicle emissions, in particular in terms of NO_x emissions then ambient pollutant concentrations could be expected to be somewhat lower in the vicinity of the Application Site in 2020 than in 2013, although by how much would largely depend upon traffic growth and congestion. **Figures 4D**, **4E** and **4F** indicate indicative concentrations of NO_2, PM_{10} and $PM_{2.5}$ (respectively) in 2020, based up on detailed modelling undertaken by the GLA. It is evident, that concentrations of all three pollutants are substantially lower in 2020, than those presented in **Figures 4A**, **4B** and **4C** for 2013.

6

ASSESSMENT OF IMPACTS

6 ASSESSMENT OF IMPACTS

6.1 CONSTRUCTION STAGE

DUST AND PM_{10} ARISING FROM ON-SITE ACTIVITIES

6.1.1. Construction activities that have the potential to generate and/or re-suspend dust and PM_{10} include:

- Site clearance and preparation including demolition activities;
- Preparation of temporary access/egress to the Application Site and haulage routes;
- Earthworks;
- Materials handling, storage, stockpiling, spillage and disposal;
- Movement of vehicles and construction traffic within the Application Site (including excavators and dumper trucks);
- Use of crushing and screening equipment/plant;
- Exhaust emissions from site plant, especially when used at the extremes of their capacity and during mechanical breakdown;
- Construction of buildings, roads and areas of hardstanding alongside fabrication processes;
- Internal and external finishing and refurbishment; and
- Site landscaping after completion.

6.1.2. The majority of the releases are likely to occur during the 'working week'. However, for some potential release sources (e.g. exposed soil produced from significant earthwork activities) in the absence of dust control mitigation measures, dust generation has the potential to occur 24 hours per day over the period during which such activities are to take place.

ASSESSMENT OF POTENTIAL DUST EMISSION MAGNITUDE

6.1.3. The IAQM assessment methodology has been used to determine the potential dust emission magnitude for the following four different dust and PM_{10} sources: demolition; earthworks; construction; and, trackout. The findings of the assessment are presented below.

Demolition

6.1.4. Total volume of buildings to be demolished on site is between 20,000m^3 and 50,000m^3, with potentially dusty construction material, and with demolition activities occurring between 10 and 20m above ground level. Therefore, the potential dust emission magnitude is considered to be medium for demolition activities.

Earthworks

6.1.5. The total area of the Application Site is between 2,500-10,000m^2. The soil type has the potential to be dusty it is estimated that the amount of material to be moved is between 20,000-100,000 tonnes. It is also estimated that less than 5 heavy earth moving vehicles will be active at any one time, and that the formation of bunds with a height of less than 4m is likely to occur. The potential dust emission magnitude is considered to be medium for earthwork activities.

Construction

6.1.6. The total volume of buildings to be constructed on the Application Site will be approximately 90,000m3 (which lies between the IAQM range of 25,000m^3 and 100,000m^3) with potentially dusty construction materials being used. In addition, on site concrete batching will occur. Therefore, the potential dust emission magnitude is considered to be medium for construction activities.

Trackout

6.1.7. Based on our professional judgment of similar schemes, there will be less than 10 HDV (>3.5t) outward movements in any one day travelling on surface materials with low potential for dust release. Due to the size of the site, it is also assumed that the length of unpaved roads within Application Site will be less than 50m. Therefore, the potential dust emission magnitude is considered to be small for trackout.

6.1.8. **Table 15** provides a summary of the potential dust emission magnitude determined for each construction activity considered.

Table 15 Potential Dust Emission Magnitude

Activity	Dust Emission Magnitude
Demolition	Medium
Earthworks	Medium
Construction Activities	Medium
Trackout	Small

ASSESSMENT OF SENSITIVITY OF THE STUDY AREA

6.1.9. A windrose generated using the meteorological data for London Heathrow Airport is provided in **Appendix H**. This shows that the prevailing wind direction is from the south east. Therefore, receptors located to north east of the Application Site are more likely to be affected by dust and particulate matter emitted and re-suspended during the construction stage.

6.1.10. Under low wind speed conditions, it is likely that the majority of dust would be deposited in the area immediately surrounding the source. Most of the buildings surrounding the application site are residential in nature, some of which are located on routes which construction traffic would use to access the site.

6.1.11. There are no ecological receptors within 50m of the Application Site or within 50m of roads to be used by construction vehicles, up to 500m from the Application Site access, therefore ecological receptors have not been considered further in this assessment.

6.1.12. Taking the above into account and following the IAQM assessment methodology, the sensitivity of the area to changes in dust and PM_{10} has been derived for each of the construction activities considered. The results are shown in **Table 16**.

Table 16 Sensitivity of the Study Area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	High
Human Health	Low	Low	Low	Low

Risk of Impacts

6.1.13. The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction phase, prior to mitigation. **Table 17** below provides a summary of the risk of dust impacts for the Proposed Development. The risk category identified for each construction activity has been used to determine the level of mitigation required.

Table 17 Summary Dust Risk Table to Define Site Specific Mitigation

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	Medium	Medium
Human Health	Low	Low	Low	Negligible

CONSTRUCTION VEHICLES & PLANT

6.1.14. The greatest impact on air quality due to emissions from vehicles and plant associated with the construction phase will be in the areas immediately adjacent to the Application Site access. It is anticipated that construction traffic will access the Application Site via Tavistock Road. Due to the size of the Application Site, it is considered likely that the construction traffic will be low in comparison to the existing traffic flows on these roads.

6.1.15. Final details of the exact plant and equipment likely to be used during the construction phase will be determined by the appointed contractor, it is considered likely to comprise dump trucks, tracked excavators, diesel generators, asphalt spreaders, rollers, compressors and trucks. The number of plant and their location are likely to be variable over the construction period.

6.1.16. Based on the current local air quality in the area, the proximity of sensitive receptors to the roads likely to be used by construction vehicles, the impacts are therefore considered to range from slight adverse to negligible without the implementation of mitigation.

6.2 OPERATIONAL STAGE

6.2.1. Full results of the dispersion modelling are presented in **Appendix I** and a summary is provided below.

ANNUAL MEAN NO_2 CONCENTRATIONS

6.2.2. The objective for annual mean NO_2 concentrations is 40µg/m^3. In 2020, concentrations at 14 out of the 24 existing receptors exceed the objective when the Proposed Development is operational. The highest concentration is 67.0µg/m^3 at Receptor E_5 (residential property above Coopers).

6.2.3. The greatest predicted change in annual mean NO_2 brought by the Proposed Development is less than 0.03µg/m^3 at Receptors E_4 and E_9 (a residential property on the 1st floor above Daphne's Grill and a residential property in Ashley Court on the ground floor, respectively). According to the EPUK/IAQM guidance, the impacts on annual mean NO_2 concentrations for all existing receptors are negligible.

6.2.4. The results indicate that all new exposure locations are well below the objective in 2020, with the highest concentration of 33.6µg/m^3 predicted at Receptor 3 (new receptor situated to the southeast of the Proposed Development, from ground to eighth floor). This is a more conservative estimate than the GLA LAEI data for 2020 which indicates baseline concentrations of less than 30µg/m^3 at the Application Site.

6.2.5. In the opening year, all new receptors are classed as APEC A; hence, no mitigation should be required.

HOURLY MEAN NO_2 CONCENTRATIONS

6.2.6. The objective for hourly mean NO_2 concentrations is 200µg/m^3, not to be exceeded more than 18 times a year (99.79th percentile). There are no breaches of hourly mean objective predicted at any of the existing and new receptors.

ANNUAL MEAN PM_{10} CONCENTRATIONS

6.2.7. The objective for annual mean PM_{10} concentrations is a concentration of 40µg/m^3. Predicted concentrations of PM_{10} are well below the annual mean objective at all receptors within the Proposed Development.

6.2.8. The greatest predicted change in annual mean PM_{10} brought about by the Proposed Development is less than 0.01µg/m^3. Following the EPUK/IAQM guidance, the impacts of the Proposed Development on annual mean PM_{10} concentrations at existing receptors are negligible.

6.2.9. In 2020, the highest concentration predicted for new receptors within the Application Site is 24.2µg/m^3 at Receptor 3. In the opening year, all new receptors are classed as APEC A; hence, no mitigation should be required.

DAILY MEAN PM_{10} CONCENTRATIONS

6.2.10. The objective for daily mean PM_{10} concentrations is 50µg/m^3 to be exceeded no more than 35 times a year. The results indicate that concentrations at both existing and future receptors will comply with the objective. The impact on daily mean PM_{10} concentrations at existing receptors is considered negligible.

ANNUAL MEAN $PM_{2.5}$ CONCENTRATIONS

6.2.11. The objective for annual mean $PM_{2.5}$ concentrations is 25µg/m^3. Predicted concentrations of $PM_{2.5}$ are well below the annual mean objective at all receptors with the Proposed Development.

6.2.12. In 2020, there is no predicted change in annual mean $PM_{2.5}$ across all existing receptors. According to the EPUK/IAQM guidance, the impacts on annual mean $PM_{2.5}$ concentrations for all existing receptors are negligible.

6.2.13. In 2020, the highest $PM_{2.5}$ concentration predicted at new receptors within the Application Site is 15.7µg/m^3 at Receptor 3 (new receptor situated to the southwest of the Proposed Development, from ground to top floor). Concentrations at the new exposure locations are well below the objective.

SENSITIVITY TEST

6.2.14. The following sensitivity test has also included in the assessment:

- The addition of modelled NO_2, PM_{10} and $PM_{2.5}$ concentrations to 2020 LAEI baseline concentrations.

6.2.15. The results of the sensitivity test are given in **Appendix J**.

6.2.16. The sensitivity test using 2020 LAEI baseline concentrations gives lower concentrations at both existing and new receptors. Concentrations at 11 out of the 24 existing receptors exceed the annual mean NO_2 objective and the impacts remain negligible. There are no noticeable differences in annual mean concentrations of PM_{10} and $PM_{2.5}$ in the without and with development scenarios. The impacts of the Proposed Development remain negligible.

AIR QUALITY NEUTRAL ASSESSMENT

6.2.17. Performance against the BEB for NO_x emissions was found to be compliant, and the TEB policy standards were found to be deficient in respect of NO_x and PM_{10}. A summary of the findings of this assessment are presented in **Table 18**.

Table 18 Summary of Air Quality Neutral Assessment

Category	Parameter	NO_x (kg/annum)	PM_{10} (kg/annum)
Building Emissions	Benchmark	352.7	30.7
	Development	9.2	0.0
	Deficit	**-343.5**	**-30.7**
Transport Emissions	Benchmark	160.0	27.5
	Development	270.8	46.5
	Deficit	**110.8**	**19.0**

6.2.18. The Proposed Development is air quality neutral for building emissions. In respect of transport emissions the Proposed Development is not air quality neutral, therefore mitigation or off-setting is required.

7

MITIGATION & RESIDUAL EFFECTS

7 MITIGATION & RESIDUAL EFFECTS

7.1 CONSTRUCTION STAGE

MITIGATION

7.1.1. Based on the assessment results, mitigation will be required. Recommended mitigation measures are given below.

GENERAL COMMUNICATION

- A stakeholder communications plan that includes community engagement before work commences on site should be developed and implemented.
- The name and contact details of person(s) accountable for air quality and dust issues should be displayed on the site boundary. This may be the environment manager/engineer or the site manager. The head or regional office contact information should also be displayed.

GENERAL DUST MANAGEMENT

- A Dust Management Plan (DMP), which may include measures to control other emissions, in addition to the dust and PM_{10} mitigation measures given in this report, should be developed and implemented, and approved by the Local Authority. In London, additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include a requirement for monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.

SITE MANAGEMENT

- All dust and air quality complaints should be recorded and causes identified. Appropriate remedial action should be taken in a timely manner with a record kept of actions taken including of any additional measures put in-place to avoid reoccurrence.
- The complaints log should be made available to the local authority on request.
- Any exceptional incidents that cause dust and/or air emissions, either on- or offsite should be recorded, and then the action taken to resolve the situation recorded in the log book.
- Regular liaison meetings with other high risk construction sites within 500m of the site boundary should be held, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.

MONITORING

- Daily on-site and off-site visual inspections should be undertaken, where receptors (including roads) are nearby to monitor dust. The inspection results should be recorded and made available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.
- The frequency of site inspections should be increased when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations should be agreed with the Local Authority. Where possible baseline monitoring should start at least three months before work commences on site or, if it a large site, before work on a phase commences.

PREPARING AND MAINTAINING THE SITE

- Plan the site layout so that machinery and dust causing activities are located away from receptors, as far as is practicable.
- Where practicable, erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Where practicable, fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover appropriately.
- Where practicable, cover, seed or fence stockpiles to prevent wind whipping.

OPERATING VEHICLE/MACHINERY AND SUSTAINABLE TRAVEL

- Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable.
- Ensure all vehicle operators switch off engines when stationary – no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- A maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas should be imposed (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate). (This mitigation measure is considered to be desirable.)
- A Construction Logistics Plan should be produced to manage the sustainable delivery of goods and materials.
- A Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing) should be considered. (This mitigation measure is considered to be desirable.)

OPERATIONS

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-portable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

WASTE MANAGEMENT

- Avoid bonfires and burning of waste materials.

MEASURES SPECIFIC TO DEMOLITION

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust). (This mitigation measure is considered to be desirable.)
- Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

MEASURES SPECIFIC TO EARTHWORKS

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. (This mitigation measure is considered to be desirable.)
- Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. (This mitigation measure is considered to be desirable.)
- Where practicable, only remove the cover in small areas during work and not all at once. (This mitigation measure is considered to be desirable.)
- Stockpile surface areas should be minimised (subject to health and safety and visual constraints regarding slope gradients and visual intrusion) to reduce area of surfaces exposed to wind pick-up.
- Where practicable, windbreak netting/screening should be positioned around material stockpiles and vehicle loading/unloading areas, as well as exposed excavation and material handling operations, to provide a physical barrier between the Application Site and the surroundings.
- Where practicable, stockpiles of soils and materials should be located as far as possible from sensitive properties, taking account of the prevailing wind direction.
- During dry or windy weather, material stockpiles and exposed surfaces should be dampened down using a water spray to minimise the potential for wind pick-up.

MEASURES SPECIFIC TO CONSTRUCTION

- Avoid scabbling (roughening of concrete surfaces) if possible. (This mitigation measure is considered to be desirable.)
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. (This mitigation measure is considered to be desirable.)
- For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust. (This mitigation measure is considered to be desirable.)
- All construction plant and equipment should be maintained in good working order and not left running when not in use.

MEASURES SPECIFIC TO TRACKOUT

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being in frequent use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Where practicable, hard surfaced haul routes should be installed, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10m from receptors where possible.

RESIDUAL EFFECTS

7.1.2. The residual effects of dust and PM_{10} generated by construction activities following the application of the mitigation measures described above and good site practice is considered to be **negligible**.

7.1.3. The residual effects of emissions to air from construction vehicles and plant on local air quality is considered to be **not significant** by implementing the recommended mitigation measures.

7.1.4. The residual effects of dust and PM_{10} generated by construction activities following the application of the mitigation measures described above and good site practice is considered to be **negligible**.

7.1.5. The residual effects of emissions to air from construction vehicles and plant on local air quality is considered to be **not significant** by implementing the recommended mitigation measures.

7.2 OPERATIONAL STAGE

MITIGATION

7.2.1. The impacts of the Proposed Development on air quality are **negligible** at all existing receptors for all the pollutants of concern.

7.2.2. The Proposed Development is air quality neutral in terms of building emissions, but not air quality neutral in respect of transport emissions, therefore mitigation or off-setting is required on this basis. It is understood that a Travel Plan is proposed which will contain a number of hard and soft measures to manage development generated road traffic and promote sustainable transport. Furthermore, there are a number of electric vehicle charging points being proposed.

7.2.3. The assessment indicates that total concentrations for all pollutants (assuming a 2013 baseline position – worst case assumption) are well below the respective objective. Therefore, site specific mitigation is **not required**.

7.2.4. The sensitivity test indicates compliance with the relevant objectives, therefore **no mitigation** is required.

RESIDUAL EFFECTS

7.2.5. The overall residual effect for the operational stage is **not significant**.

8

CONCLUSIONS

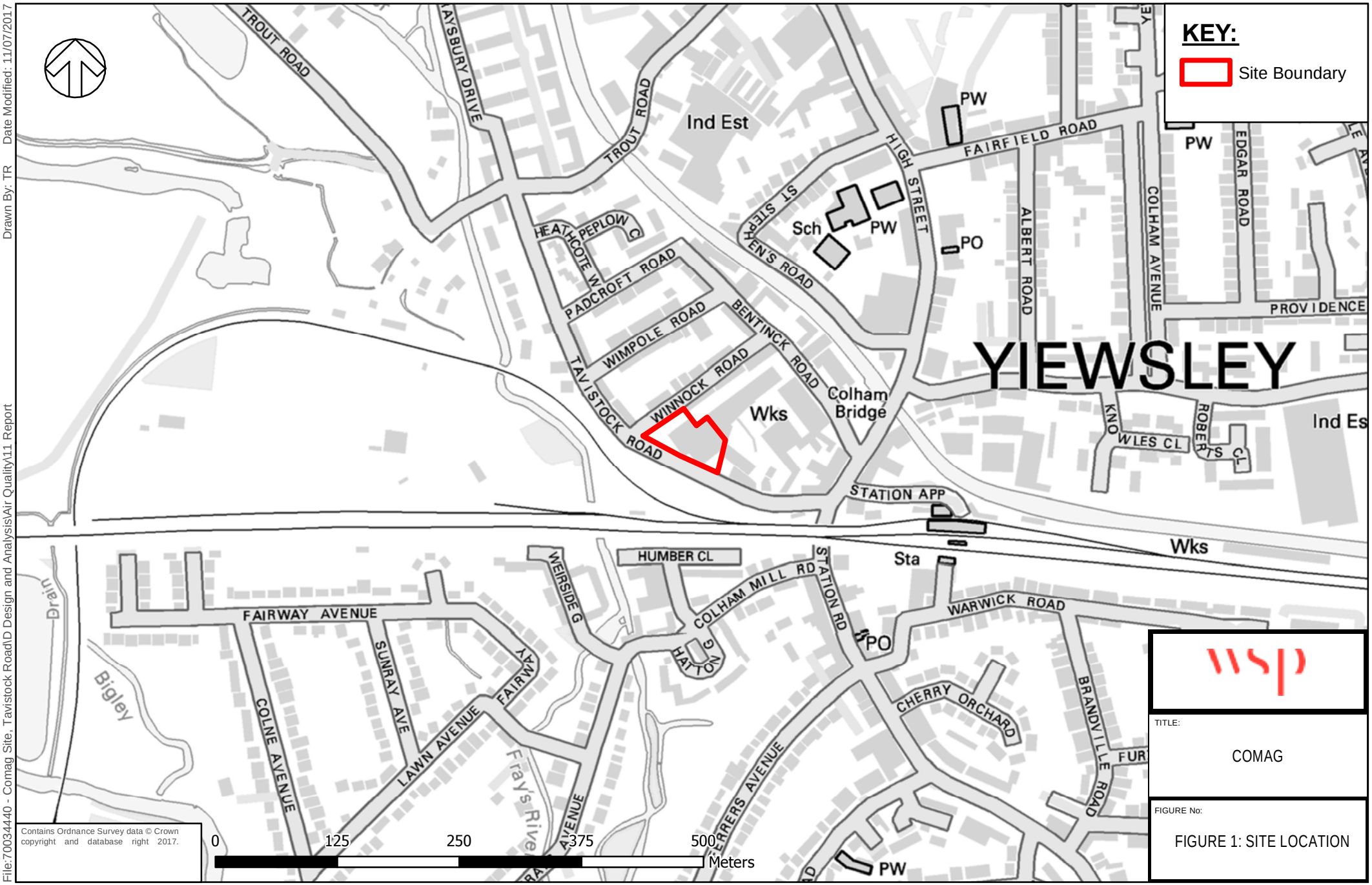
8 CONCLUSIONS

8.1.1. A qualitative assessment of construction stage impacts has been carried out. There is a **medium risk** of dust soiling during demolition, earthworks, construction and from vehicle trackout. The construction poses a l**ow risk** in terms of fugitive PM_{10} emissions. Through good site practice and the implementation of suitable mitigation measures, the impact of dust and PM_{10} releases will be reduced and excessive releases prevented. The residual effect of the construction phase on air quality is therefore **not significant**.

8.1.2. A quantitative assessment of operational stage impacts has been carried out by modelling road traffic and on-site energy centre emission sources. Assuming a worst case scenario (2013 baseline) the impacts of the operational stage on ambient air quality are **negligible** for all pollutants. Additionally, the predicted concentrations at new exposure locations introduced by the Proposed Development do not exceed the relevant AQS objectives and are classified as APEC Level A. No specific mitigation should therefore be required. The residual effect is **not significant**.

8.1.3. The Proposed Development is air quality neutral in terms of building emissions, but not air quality neutral in respect of transport emissions, therefore overall **not** air quality neutral a d additional mitigation or off-setting is required.

8.1.4. Overall, with the recommended mitigation measure in place, the proposals would comply with relevant national air quality legislation and national, regional and local planning policy.



wsp

TITLE:

COMAG

FIGURE No:

FIGURE 1: SITE LOCATION

Drawn By: TR Date Modified: 11/07/2017

File:70034440 - Comag Site, Tavistock Road\D Design and Analysis\Air Quality\11 Report