BLOCK B, FORMER NESTLE FACTORY HAYES, LONDON

Planning Update - Smoke Vent Enclosure

09 January 2023

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BARRATT
LONDON

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EXTRACT FAN HOUSING AT PODIUM LEVEL

In accordance with Approved Document Part B, relevant BS guidance and the project fire strategy, the design to clear smoke from the car park at basement and ground floor levels in the event of a fire requires smoke extraction to be at a rate of 10ACH (air changes per hour). The fans also serve to extract polluted car park air of CO every day at 6ACH. Calculations of discharge to be achieved are 78.1m3/sec.

Two number fans are required to meet the air change capacity, but to meet regulatory compliance and LFB requirements, a third fan is required as back up to ensure 100% capacity is maintained should one fan become disabled during a fire situation.

The sizes of the fans are dictated by the design criteria they are to meet for air flow and air change capacity and the fans that are selected have been kept to the minimum size so as to minimise the size of the fan housing at podium level. Refer to Appendix 2 for data sheet including fan diameters.

The location of the fan housing at podium level is placed centrally about the car park for all air intakes to feed to a central outlet. The size of the housing is dictated by the fan sizes and access / servicing requirements from the manufacturer and has been kept to the absolute minimum. The housing is constructed of a lightweight steel structure with masonry external skin and has been set into the surrounding landscape with a green roof to minimise impact on the podium and surrounding blocks.

Materials:

Roof – Biodiverse sedum with wildflower planting

Fascia – PPC aluminium (RAL 7021)

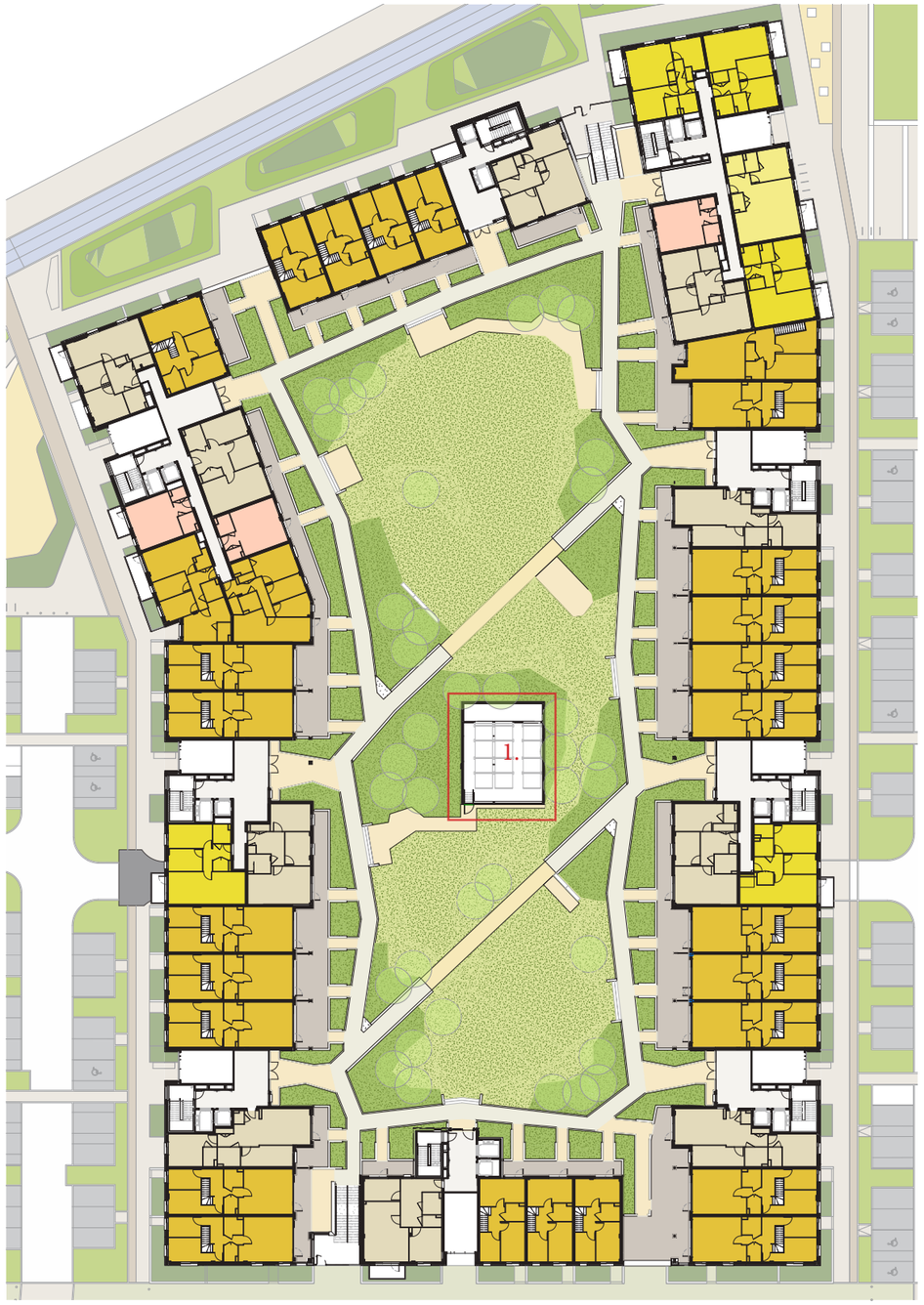
External walls above external ground level – Concrete facing brickwork (white to match main building podium facing elevations) to the North, East and West elevations. PPC aluminium louvres and door (RAL 7021) to the South elevation

Appendix 1 - H+H Carpark Extraction System - HHF_UK02177_TECH_013 rev 02

Appendix 2 - NSP Technical Data Sheet - Fan Model LCSGV200X8-A12/23

01 FLOOR PLANS

Level 01 Floor Plan



GA Plan - Podium Level

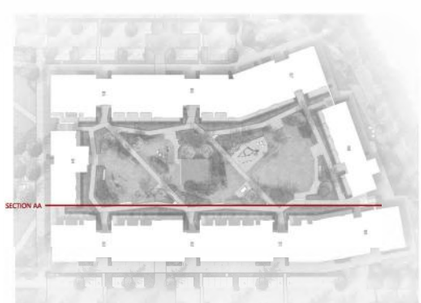
1. Podium level smoke vent enclosure

Landscape Plan - Podium Level

02 SECTIONS / ELEVATIONS

North-South Section

SECTION AA - BLOCK B PODIUM NORTH SOUTH SECTION
SCALE: 1:200



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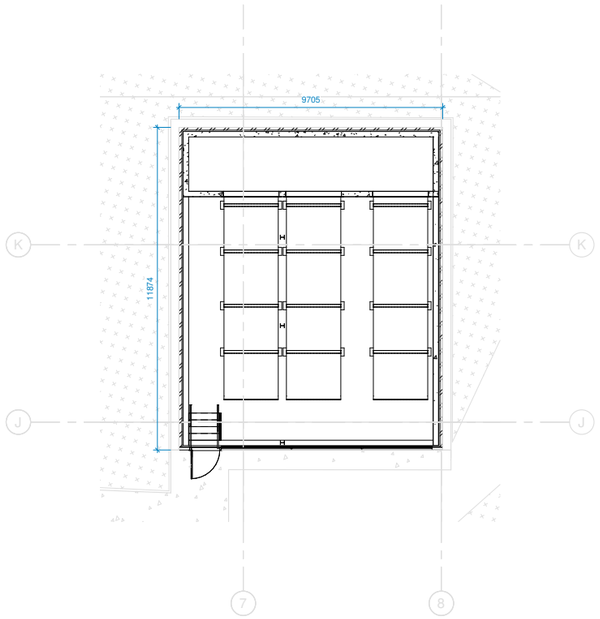
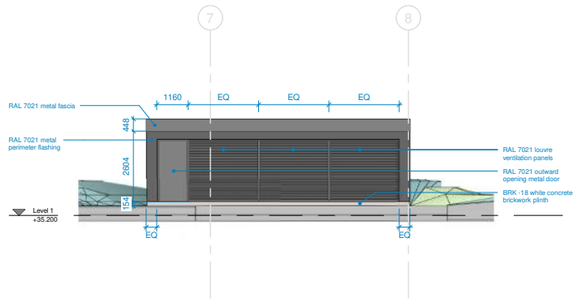
02 SECTIONS / ELEVATIONS

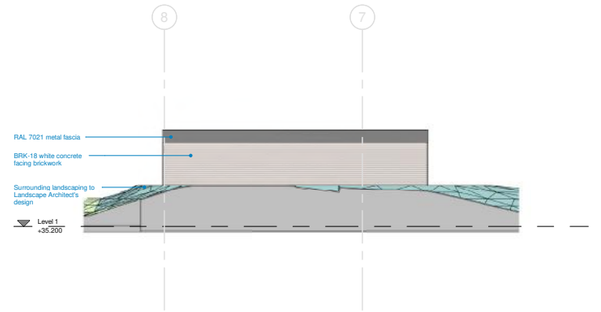
Elevations and East-West Section



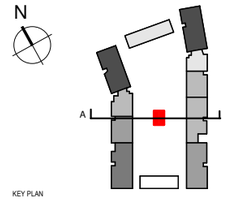
1 Smoke Vent Enclosure - Plan View
1 : 100

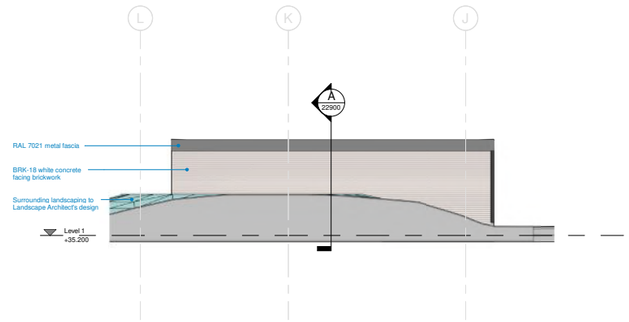


2 Smoke Vent Enclosure - South Elevation
1 : 100

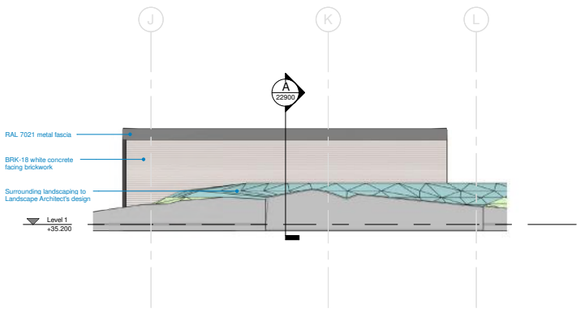


3 Smoke Vent Enclosure - North Elevation
1 : 100

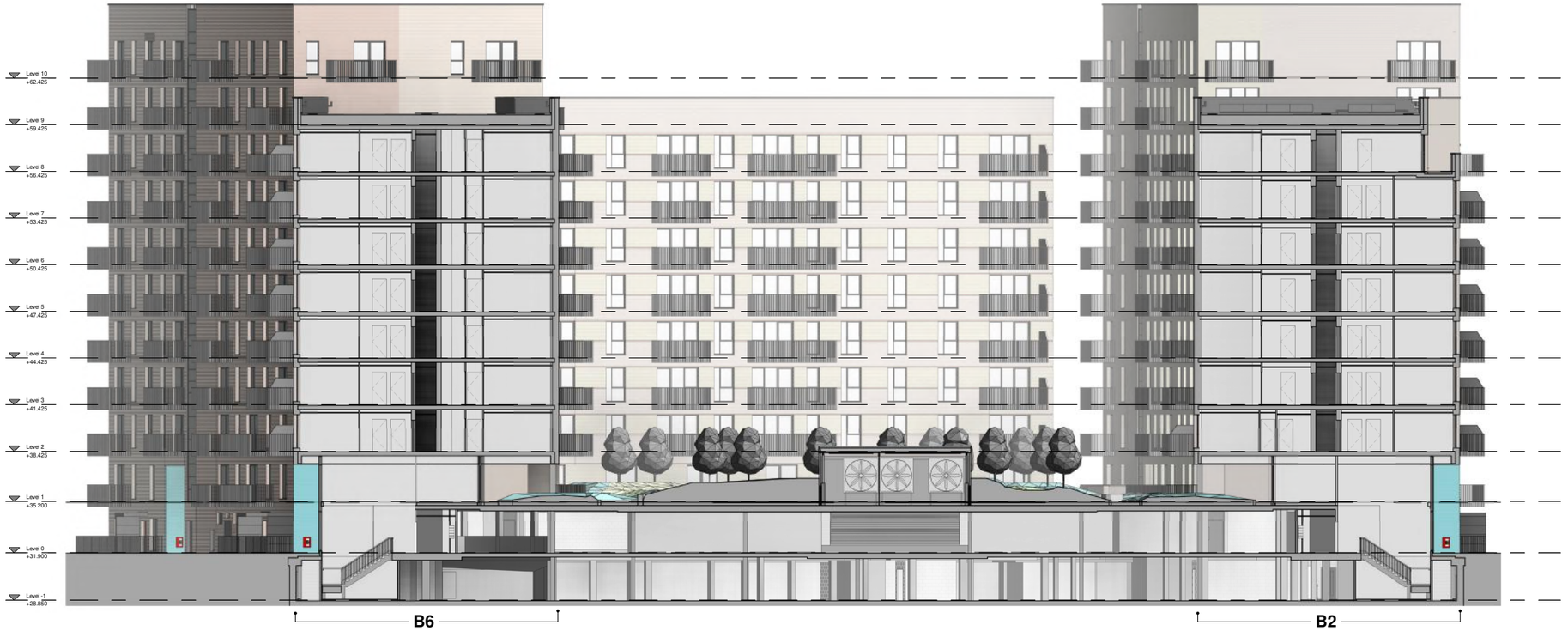




4 Smoke Vent Enclosure - West Elevation
1 : 100



5 Smoke Vent Enclosure - East Elevation
1 : 100



A Smoke Vent Enclosure - East / West Podium Section
1 : 150

Not to Scale @ A3

APPENDIX 1

Project

Former Nestle Site

Block B

Title

Carpark Extraction System

Document Ref. Doc	HHF_UK02177_TECH_013
Date	02.02.23
Revision	02

Prepared for

BARRATT
LONDON

You provide the problem, **We provide the solution.**

H+H Fire

1.1 Introduction

1.1.1 Barratt have been consulting with LBH planners in regards to changes within the development for Block B. One of the changes relates to the carpark ventilation system housing unit at the podium level which accommodates the three extraction fans required for the ventilation system made larger.

1.1.2 This technical note has been provided to confirm that the carpark extraction system housing unit is a requirement in relation to Part B of the Building Regulations for the carpark ventilation system.

1.1.3 Due to the ventilation system requirement changing since the original planning application; the housing unit has been increased in size to accommodate the additional equipment and the larger fan sizes for the carpark.

1.2 Overview

1.2.1 At the time of the original planning application, the housing unit for the carpark ventilation was an estimated size for the extraction system and designed as a smoke clearance system in line with the relevant guidance at the time of application in 2017 which did not have to include the additional fan or life safety equipment.

1.2.2 The Building Regulation has not changed since the time of application; but the guidance recommendations have been updated to improve the level of safety within residential developments and the carparking area. Furthermore, there have also been changes requested from Building Control to increase the level of safety to the occupants within the development.

1.2.3 The smoke clearance system is now a life safety system which is required to have back-up fan to ensure there is 100% fan redundancy, and therefore the fan size required has increased to accommodate the additional life safety features.

1.3 Statutory Requirements

1.3.1 The carpark ventilation system has been designed to meet the Building Regulations for Part B1 & B5.

1.3.2 The following Building Regulations are relevant to the carpark ventilation system as it is designed to protect the means of escape and the fire service access into the carparking area:

B1 – Means of warning and escape

- *The building shall be designed and constructed so that there are appropriate provisions for the early warning of fire, and appropriate means of escape in case of fire from the building to a place of safety outside the building capable of being safely and effectively used at all materials times.*

B5 – Access and facilities for the fire service

- *The building shall be designed and constructed so as to provide reasonable facilities to assist firefighters in the protection of life*
- *Reasonable provision shall be made within the site of the building to enable fire appliances to gain access to the building.*

1.4 Guidance Recommendations

1.4.1 In order to meet the Functional Building Regulations for Part B for the carpark ventilation system, needs to meet the relevant guidance recommendations to ensure it has life safety systems to ensure the system is always functionable if a fan is down for maintenance or it is broken.

1.4.2 The mechanical extract system installed within the car park will provide the ventilation requirements of 10 air changes per hour under Section 14.2.1.4 of BS9991:2015 [3] and, as part of a Fire Engineered solution, the smoke control system will be used and has been designed in line with BS 7346-7 for the prevention of smoke entering the lobbies to the stairs.

1.4.3 The ventilation system for the carpark area is designed to be a smoke control system that has also been provided with back-up power supplies to ensure the system is always operational and the fans have been provided with 100% fan redundancy for the extraction system.

1.4.4 The fan sizes have been designed to the minimum sizes to meet the extraction rates required, which in turn keeps the fan housing at the podium level to a minimum size.

Carpark Extraction System
Project: Nestle – Block B
Date: 02/02/2023
Revision: 02
Author: Trenton Graham

1.5 Ventilation to the Car Park

1.5.1 The design of the carpark ventilation system is in line with BS 9991:2015.

1.5.2 The extraction system within the carpark area should achieve the minimum requirements in accordance with BS 9991: 2015:

- Provide ten air changes per hour,
- Be capable of handling gas temperatures of 300°C for not less than 60 minutes,
- Come into operation automatically upon activation of the alarm and detection system.

1.5.3 As both carpark levels will be using the same mechanical extract chamber, and the basement area is bigger than the ground floor carpark, it should be designed for the basement carpark area.

1.5.4 The minimum extraction rate will be based upon 10 air changes per hour. This is 71.3 m^3/s as per the calculation in the Section 6.3.4 of the latest fire strategy "HHF_UK02177_FS_005" dated July 2021. This is based on the following:

- {10 air charges x Volume (area x height)} / 1 hour (3,600 seconds)
- $\frac{10 \times (a \times h)}{3600}$

For the basement carpark the area is 9,173 m^2 x the average height which is 2.8 m

- $\frac{10 \times (9173 \times 2.8)}{3600} = 71.3\ m^3/s$

1.5.5 Due to the calculations above the fan sets have increased to ensure they can meet the required acceptance criteria stated in section 1.5.4 above. This is to ensure each of the extraction fans can provide a minimum of 50% of the required extraction rate to provide the 100% redundancy.

1.6 Conclusion

1.6.1 In conclusion, the housing unit for the carpark extraction fans is required to be larger to accommodate all three of the extraction fans to achieve the minimum requirements stated within the guidance recommendations to achieve the 71.3m^3/s.

2 BIBLIOGRAPHY

[1] HM Government, “Approved Document B (fire safety) volume 2: buildings other than dwellinghouses (2006 edition incorporating the 2010 and 2013 amendments),” Crown Copyright, London, 2006.

[2] The Secretary of State of the United Kingdom, “The Building Regulations 2010,” legislaton.gov.uk, London, 2010.

[3] BSI, “BS 9991:2015 Fire safety in the design, management and use of residential buildings. Code of practice,” British Standards Institute, London, 2015.

[4] BSI, “BS 7346-7 2013 Functional recommendations and calculation methods for smoke and heat control systems for covered car parks,” BSI, London, 2013.

APPENDIX 2

Technical Data - Fan Model LCSGV200X8-A12/23

Location:

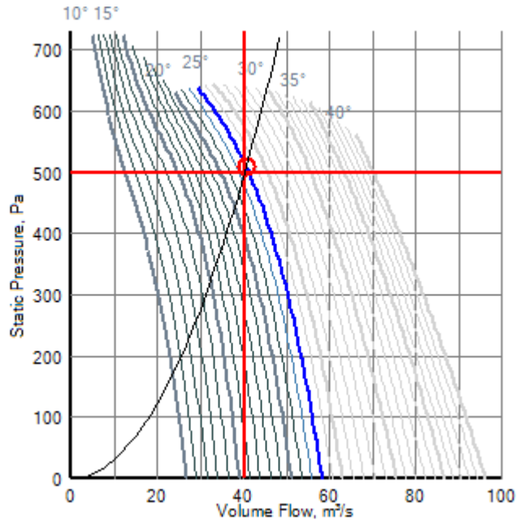
Designation:

Performance - Required

Air Flow :	40.31 m³/s
Static Pressure :	500 Pa
Selection Pressure:	500 Pa
Installation Type:	TYPE D
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude:	0 m
- Humidity:	0.0 %

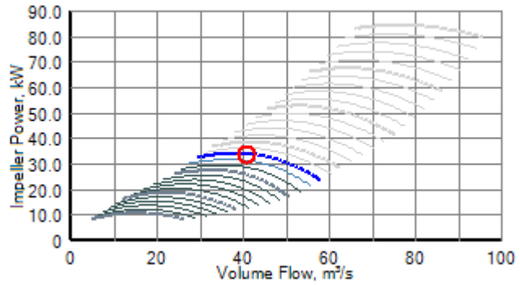
Actual

Air Flow:	40.67 m³/s
Static Pressure:	509 Pa
Total Pressure:	610 Pa



Fan Data

Catalogue Code:	LCSGV200X8-A12/23 (LCSGV200X-A12_717-IE3-250-30-8)		
Description:	Long-Cased DSG Smoke		
Diameter:	2000 mm	Hub:	550 mm
Impeller Type:	Axial	Pitch:	23°
Blade Material:	Aluminium	Blades:	12
Speed:	720 r/min @50 Hz	Form:	A
Power, Abs:	33.99 kW	Peak:	34.11 kW
Input Power:	37.01 kW		
Efficiency Total:	73.0%	Static:	60.9%
SFP:	0.92		
Fan Weight:	1286.6 kg		



Motor Data (at STP)

Motor Type:	F300 (IE3)	
Electrical Supply:	400V 3ph 50Hz	
Motor Frame:	250S/M	
Motor Power:	36.00kW (AOM)	(30.00kW IEC)
FLC/Start (DOL):	67.80A (AOM) / 420.36A	(56.50A FL IEC)
Motor Speed:	8 pole	
Motor Efficiency:	91.8%	

Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	103	106	105	106	105	103	100	92	113	89
Outlet (dB):	104	106	103	105	104	102	99	91	112	88

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

Technical Data - Fan Model LCSGV200X8-A12/23

Location:

Designation:

Energy Related Product Data

Overall Efficiency:	56.0%
Measurement Category:	C
Efficiency Category:	Static
FMEG:	55
Specific Ratio:	1

At Maximum Efficiency Point

Input Power:	37.13 kW
Air Flow:	39 m³/s
Pressure:	529 Pa
Speed:	720 r/min

Drawing for Fan Model LCSGV200X8-A12/23