

- Residual Sound Level - $L_{Aeq,T}$ – the equivalent continuous ‘A’ weighted sound pressure level at the assessment location in the absence of the specific sound source under consideration, over a given time interval, T; and
- Rating Level – $L_{Ar,Tr}$ – the specific sound level plus any adjustment made for the characteristic features of the noise.

8.67 The background level and the rating levels are compared and the standard states that:

- *"Typically, the greater the difference, the greater the magnitude of impact;*
- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending upon the context;*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending upon the context; and*
- *The lower the rating level is to the measured background sound level, the less likely it is that the specific sound will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending upon the context."*

8.68 During consultations undertaken with WCC it was confirmed that a plant noise rating level 10 dB below the lowest background noise level and 15 dB if tonal, would form the governing criteria. However, the magnitude of impact is classified in accordance with BS4142:2014, as outlined in Table 8.8. The criteria are applicable to the nearest NSRs, thereby forming a worst-case scenario as more distant receptors will be subject to lower levels of noise from the 2022 amended proposed development.

Table 8.8: Magnitude of Impact - Operational Plant Noise			
Rating Level – Background Level (dB)	BS 4142 Descriptor	Adverse Effect Level	Magnitude of Impact
≥10	Indication of significant adverse effect, depending on context	SOAEL	High
5 to 9	Indication of adverse effect, depending on context	SOAEL	Medium
0 to 5	Indication of adverse effect, depending on context	LOAEL	Low
≤0	Indication of low impact	NOAEL	Very Low

Operational Noise from Servicing

- 8.69 There is expected to be minimal additional servicing vehicle movements as the non-residential spaces are likely to comprise small-scale retail and community uses, with minimal servicing requirements. In any event servicing and the provision for waste disposal would be via the WEG development basement.
- 8.70 As the waste disposal servicing route would be from the north (via Church Street) through the enclosed basement of the WEG development, there would be a negligible effect from vehicle movements on existing residential receptors, especially in the context of the existing movements on the road network. Comparing scenario 3 (Future Baseline 2030 + 2022 Amended Proposed Development) with scenario 2 (Future Baseline 2030) would result in ≤0.5 dB change on all roads.
- 8.71 Similarly, the loading zone would be enclosed within the basement with minimal breakout expected to existing residential NSRs.
- 8.72 Accordingly, servicing noise has not been assessed further.

Completed Development Noise Transfer from Commercial Units to Dwellings

8.73 Based on professional judgement and experience of such adjacencies in similar development the following assessment criteria have been set:

- Noise levels from commercial operations must not exceed NR20 $L_{eq,5min}$ within habitable rooms. The minimum party floor sound insulation requirements set out within the Building Regulations Approved Document E must be achieved as a minimum regardless of commercial unit noise emission levels.

Operational Noise from Cumulative Schemes

8.74 As the requirement of the WCC is that the plant noise rating level should be 10 dB below the minimum background noise level (15 dB if tonal), new plant associated with the 2022 amended proposed development and cumulative schemes also adhering to this criterion would cumulatively be non-significant as overall noise levels would not increase.

Scale of Effect Criteria

8.75 The scale of effects has been assessed on the basis of the sensitivity/value of receptors against the magnitude of impact as presented in Table 8.9.

Table 8.9: Scale of Effects Matrix			
Magnitude of Impact	Sensitivity / Value of Receptor		
	Low	Medium	High
Very Low	Negligible	Negligible	Negligible
Low	Negligible	Negligible	Minor
Medium	Negligible	Minor	Moderate
High	Minor	Moderate	Major

- 8.76 In line with the guidance contained within PPG-Noise:
- Major adverse effects are considered to be significant and should be prevented;
 - Moderate adverse effects are significant and should be mitigated, where possible;
 - Minor adverse effects are not significant but should be mitigated where possible; and
 - Negligible adverse effects are not significant and should not require mitigation.
- 8.77 Thus, moderate and major effects are considered significant in EIA terms.
- 8.78 In determining the significance of reported effects, consideration has been given to the type of effect i.e. direct, indirect or secondary, the geographical extent of the effect and the duration of the effect i.e. temporary which is considered to be either short-term (up to 5 years) or medium-term (5-10 years) or long-term (10 years or more).

Nature of Effect

- 8.79 The nature of the effect has been described as either adverse, neutral or beneficial as follows:
- Beneficial – An advantageous effect to a NSR;
 - Neutral – an effect that on balance, is neither beneficial nor adverse to NSR OR an effect that is equally beneficial and adverse to a NSR; or
 - Adverse – A detrimental effect to a NSR.
- 8.80 Negligible can also be used in isolation when achieving a particular threshold, absolute value or target criteria.

Assumptions and Limitations

8.81 Demolition and construction noise and vibration calculations have been made based on the plant items, percentage on-times and programme provided by the Project Team; however, demolition and construction practices and requirements may be subject to change by the contractor.

- 8.82 The effect of solid site hoarding has not been included in the calculation as the majority of the receptors are multi-storey with direct line of sight to the 2022 amended proposed development i.e. no reduction in noise level would be observed.
- 8.83 During the 2020 survey, a significant drop in traffic numbers were not observed on the surrounding road network, considering the COVID-19 pandemic. This is particularly true of HGV movements which generate a high proportion of the road traffic noise. It is also noted that the majority of businesses were operational as normal at the time of the survey period, which was outside of the national and local lockdowns.

Baseline Conditions

Existing Baseline

- 8.84 The existing noise baseline was quantified by means of a baseline noise and vibration survey comprising the following measurements:
- long-term unattended noise logging (LT);
 - short-term (ST) / night-time (NT) attended noise logging; and
 - vibration logging (VB).
- 8.85 Measurement locations are shown in Figure 8.2.

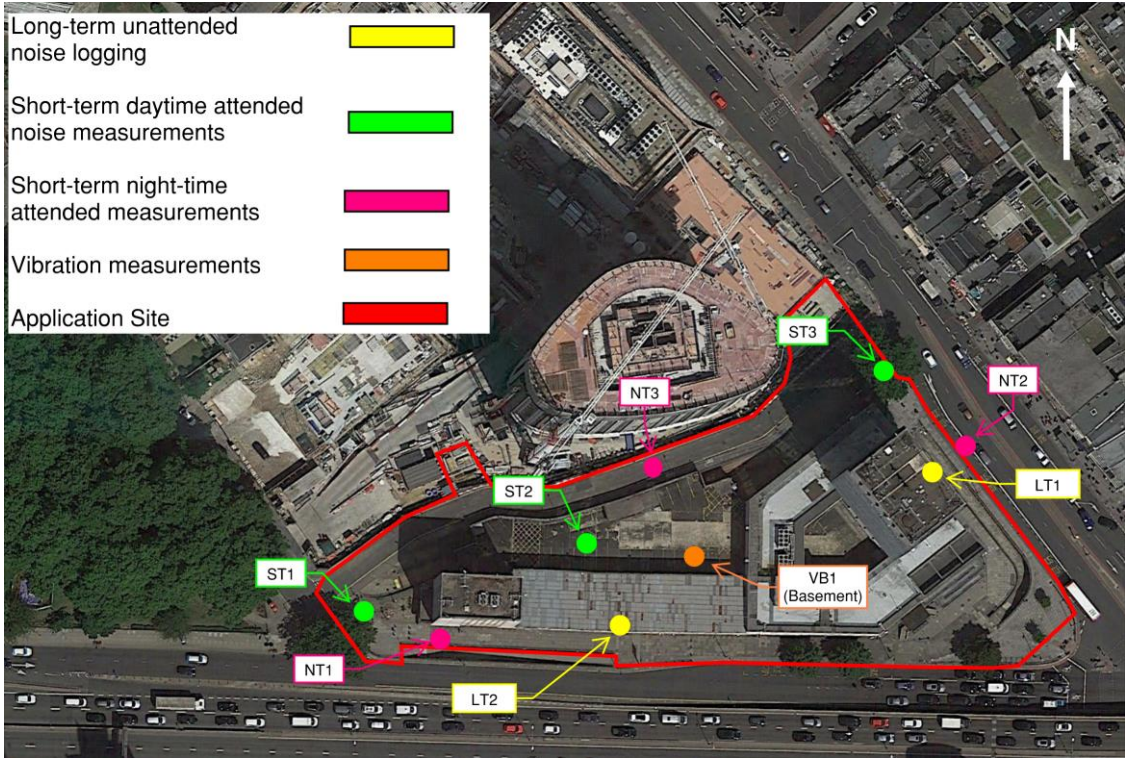


Figure 8.2: Noise Survey Locations

- 8.86 Full details of the baseline noise and vibration survey are presented in Technical Appendix 8.2.
- 8.87 The noise climate was dominated by traffic noise on the A40 (Marylebone Flyover) and the A5 (Edgware Road). Periods that were dominated by construction noise at the WEG site, have been excluded from the assessment.
- 8.88 The key noise levels used in this assessment are presented in Table 8.10.

Table 8.10: Key Noise Measurements used in Assessment				
Measurement location	Period	Representative Ambient Noise Level / dB L _{Aeq}	Representative Maximum Noise Level* / dB L _{AFmax}	Lowest Background Noise Level / dB L _{A90}
ST1 (representative of R2)	Daytime (07.00-23.00)	71	-	67
	Night-time (23.00-07.00)	-	-	-
ST2 / NT3 (representative of R7-R10)	Daytime (07.00-23.00)	66	-	63
	Night-time (23.00-07.00)	61	75	54
LT1 / ST3 / NT2 (representative of R6)	Daytime (07.00-23.00)	70	-	57
	Night-time (23.00-07.00)	67 ⁺	85	53
LT2 (representative of R3-R5)	Daytime (07.00-23.00)	71	-	57
	Night-time (23.00-07.00)	69	84	53
<p>* The unattended data has been analysed so that the top 10 noise events at night have been excluded, in accordance with BS8233:2014. Daytime maximum noise levels have not been reported as they have not been used in this assessment.</p> <p>+ Contribution of construction noise, particularly on Sunday night-Monday night. These days have been excluded. The 8-hour L_{Aeq} for each night was 67, 68, 66, 75, 75 dB respectively.</p> <p>The loggers (LT1 and LT2) were surrounded by site hoarding and located out of a window respectively; thus a façade correction has been applied.</p>				

- 8.89 The baseline vibration levels were measured in the on-site basement. The results are given in Technical Appendix 8.2 and are well below the level where ‘adverse comment possible’ (as outlined in BS6472-1).

Future Baseline

- 8.90 Traffic flow changes are such that no significant change is predicted between the existing baseline and future baseline. With the exception of Church Street, the increase on all roads is predicted to be <1dB. On Church Street a 1.8 dB change is predicted. This level change is primarily a result of traffic associated with WEG. It would not affect the façade noise levels incident on the 2022 amended proposed development as it is set back from and screened by WEG.
- 8.91 As traffic levels are not expected to change significantly between the baseline and future baseline; the existing baseline has been used as the basis for assessment throughout, unless otherwise stated.

Sensitive Receptors

- 8.92 The identified NSR to the 2022 amended proposed development which have been ‘scoped-in’ to the assessment are summarised in Table 8.11 and shown in Figure 8.1.

Table 8.11: Summary of Sensitive Receptors	
Receptor	Sensitivity
R1 – City of Westminster College, Paddington Green Campus	High
R2 – St. Mary’s Church, Little Venice	High
R3 – North Wharf Gardens East (Hotel and School)	High
R5 - Hilton	High
R6 – Residential Premises on Edgware Road	High

Table 8.11: Summary of Sensitive Receptors	
Receptor	Sensitivity
R7 – West End Gate (residential)	High
R8 – 14-17 Paddington Green (residential)	High
R9 – Princess Louise Close (residential)	High
R10 - Paddington Green Health Centre (healthcare)	High

8.93 The construction noise from Phase 2 of the 2022 amended proposed development, on Phase 1 on-site occupiers have also been assessed.

8.94 Based on the baseline characterisation, R4 (1 Merchant Square) has not been considered given that the development has not yet commenced to a material degree. In any case, the impact assessed at R3 and R5 provide an indication of the impact upon R4.

Assessment of Effects

Demolition and Construction Effects

8.95 All demolition and construction effects would be direct, temporary and short-term.

8.96 Account has been taken of the best practice measures that would be adopted and implemented by the Applicant, as described in ES Chapter 5(R): Demolition and Construction Description, including the implementation of BPM and a Construction and Environment Management Plan (CEMP). This constitutes embedded mitigation accounted for in this assessment. Site hoarding of 2.4 m is to be installed around the site perimeter. To BS 5228:2009+A1:2014, a screen can provide 5 dB attenuation for partial line of sight from source to receiver, and up to 10 dB attenuation where there is no line of sight between source and receiver.

8.97 A CEMP would be prepared in advance of construction which would define all mitigation measures to be adopted to minimise noise and vibration emissions at surrounding NSRs. This would incorporate specific measures within all phases of the works where noise and vibration may give rise to disturbance. It is expected that the CEMP would be secured by means of an appropriately worded planning condition.

8.98 BPM as defined by the Control of Pollution Act 1974, would be implemented as part of the working methodology. This would serve to minimise the noise and vibration effects at NSRs from the demolition and construction works. The reduction in noise levels provided through the implementation of BPM would vary depending on the nature of the works.

8.99 Community liaison and communication regarding demolition and construction works would be undertaken throughout the demolition and construction stage to provide information to people residing in properties adjacent to the demolition and construction works and reduce the likelihood of adverse effects on the local community which could result in potential noise complaints. The level of engagement required would vary during the demolition and construction period, depending upon the expected effects experienced by individual NSRs due to the demolition and construction works.

8.100 Details relating to liaison with the local community would be managed by the Applicant. It is envisaged that community liaison would provide local residents with the following information in relation to the construction works:

- The nature of the works being undertaken;
- The expected duration of the works;
- The contractor's working hours;
- Mitigation measures to be adopted to minimise noise and vibration, detailed in the CEMP; and
- Contact details in the event of a noise disturbance.

8.101 If work is required to extend into periods beyond the agreed hours, separate authorisation would be secured with the WCC via the CEMP process.

Demolition and Construction Noise

8.102 The predicted construction noise levels at each existing NSR from the individual demolition and construction activities are presented in Table 8.12 (the location of these NSRs is shown in Figure 8.1). In each case a reasonable 'worst-case' assumption has been applied i.e. the distance to the NSRs is the closest point to site and no screening from future buildings at WEG has been accounted for (screening only relevant to Paddington Green Health Centre). The medium and high impacts have been determined in accordance with Table 8.3. The high impacts are highlighted in red and the medium impacts are highlighted in orange. Minor impacts are shaded in grey.

8.103 The predicted construction noise levels at Phase 1, from Phase 2 construction has also been predicted where applicable. The assessment methodology is the same as that used for existing NSRs.

Table 8.12: Demolition and Construction Noise on NSRs (dB L _{Aeq,10hour}) Per Activity								
Receptors	Existing Ambient Noise Level	Site Enabling Works	Demolition	Excavation and Remediation	Substructure	Superstructure	Internal works	External works
R1 - City of Westminster College, Paddington Green Campus	62*	71	73	66	67	66	65	64
R2 - St. Mary's Church, Little Venice	71	67	70	62	64	63	62	61
R3 - North Wharf Gardens West (Hotel and School)	71	74	77	69	71	70	69	68
R5 - Hilton	71	74	76	68	71	69	68	67
R6 - Residential premises on Edgware Road	70	81	83	76	78	76	75	74
R7 - West End Gate	66	81	84	88 [#]	79	76	75	75
R8 - 14-17 Paddington Green	66	90	93	88 [#]	81	80	79	84
R9 - Princess Louise Close	66	73	76	68	70	69	68	67
R10 - Paddington Green Health Centre	66	76	79	71	73	72	71	70
Phase 1 of PGPS (from Phase 2 only)	66 ⁺	n/a	n/a	n/a	n/a	83	87	81
<p>* As modelled</p> <p>⁺ Considered to be 66dBA on the façade facing Newcastle Place. Façade facing the A40 is expected to experience noise levels of 71dB L_{Aeq}.</p> <p>[#] Block A and H of WEG are affected by piling works directly adjacent to the building although this is expected to be relatively short-term in duration. Lower construction noise levels (up to 76 dBA) would occur once the piling rig is located at 10 m or more from the building.</p>								

- 8.104 The effects to each NSR are predicted to be as follows:
- R2: **Minor Adverse** (not significant);
 - R3 and R5: **Moderate Adverse** (significant) but only during site enabling works and demolition; otherwise **Minor Adverse** (not significant);
 - R1, R6 and R10: **Major Adverse** (significant) but only during site enabling works / demolition; otherwise **Minor-Moderate Adverse** (not significant - significant);
 - R7, R8 and Phase 1: **Major Adverse** (significant) for much of the demolition and construction period; and
 - R9: **Major Adverse** (significant) during demolition; otherwise **Minor-Moderate Adverse** (not significant to significant).
- 8.105 However, several construction activities are proposed to overlap. The periods with most activities running concurrently are:
- Q3 2024;
 - Q2 2025;
 - Q1 2027; and
 - Q3 2028.
- 8.106 The construction noise from these periods has been modelled and the results are presented in Table 8.13.

Table 8.13: Demolition and Construction Noise on NSRs (dB L _{Aeq,10hour}) From Multiple Activities					
Receptors	Existing Ambient Noise Level	Q3 2024	Q2 2025	Q1 2027	Q3 2028
R1 – City of Westminster College, Paddington Green Campus	62*	76	70	70	70
R2 – St. Mary’s Church, Little Venice	71	73	66	67	67
R3 – North Wharf Gardens West (Hotel and School)	74	80	74	74	74
R5 - Hilton	74	79	73	73	73
R6 – Residential premises on Edgware Road	71	86	80	80	80
R7 – West End Gate	66	91 [#]	80	80	80
R8 – 14-17 Paddington Green	66	95 [#]	84	86	86
R9 – Princess Louise Close	66	79	72	73	73
R10 - Paddington Green Health Centre	66	82	75	76	76
Phase 1 of Paddington Green (from Phase 2 only)	66	n/a	n/a	n/a	89
* As modelled					
[#] Block A and H of WEG are affected by piling works directly adjacent to the building although this is expected to be relatively short-term in duration. Lower construction noise levels (up to 76 dBA) would occur once the piling rig is located at 10 m or more from the building.					

- 8.107 The maximum effects to each NSR are predicted to be as follows:
- R2: **Minor Adverse** (not significant);
 - R3 and R5: **Moderate Adverse** (significant); and
 - R1, R6-R10, Phase 1: **Major Adverse** (significant).

Demolition and Construction Traffic Noise

- 8.108 The demolition and construction traffic is expected to generate up to two HGV movements per hour during peak periods. Comparing the future baseline with and without construction noise, would result in a 0.0 dB change in road traffic noise level at the nearest NSRs i.e. a negligible change in noise level. Thus, a temporary, short-term **Negligible Adverse** effect (not significant) effect is predicted as a result of construction traffic at the NSRs.

Demolition and Construction Vibration

Effects on Humans

- 8.109 The potential effects of demolition and construction vibration on human receptors have been assessed with reference to BS 5228-2:2009+A1:2014, considering only the construction activities most likely to result in perceptible levels of vibration within the nearby receptor buildings.
- 8.110 Potential effects due to vibration from piling during the Excavation and Remediation stage have been considered.
- 8.111 Piling is expected to be directly adjacent to WEG Block A and 14-17 PG. At these distances, ground-borne vibration from CFA piling would result in a high magnitude of impact while the rig is situated directly adjacent to the buildings (estimated to be PPV of around 12.5 mm.s⁻¹). While the rig is situated directly adjacent to the buildings, the effects in terms of human perception of vibration would be a direct, temporary, short-term, **Major Adverse** (and significant) at WEG Block A and 14-17 PG. Vibration of this magnitude is likely to be intolerable for any more than a very brief exposure at this level.
- 8.112 It is noted that the position of the piling rig would vary as works on the secant pile wall progress. Vibration from the piling rig would be classed as a medium magnitude of impact when the rig is around 10 m from the receptor building and a low magnitude of impact when the rig is 20 m or more from the receptor building.
- 8.113 Considering the Excavation and Remediation stage of the proposed works as a whole, construction vibration during this stage of works would result in direct, temporary, short-term, **Moderate Adverse** (and significant) effects (in terms of human perception) at WEG Block A and 14-17 PG.
- 8.114 Given the above, additional mitigation in relation the effects of vibration due to piling on humans would be required.
- 8.115 All other receptors are at a greater distance and therefore the vibration effects on humans would be direct, temporary, short-term **Negligible Adverse** (not significant).

Effects on Buildings

- 8.116 The potential effects of construction vibration on buildings have also been assessed where piling occurs directly adjacent to WEG Block A and 14-17 PG.
- 8.117 Vibration from the piling activity is considered to be transient and not of sufficient duration to result in dynamic magnification of vibration within the receptor building structure. Therefore, with reference to Tables 8.6 and 8.7, vibration from piling activity would result in a low magnitude of impact in terms of the potential for cosmetic damage to these two receptor buildings.
- 8.118 Accordingly, the effects of construction vibration on the closest receptor buildings (in terms of potential building damage) would be direct, temporary, short-term, **Minor Adverse** (and not significant).

- 8.119 Given the magnitude of vibration, it would be prudent to carry out a condition survey of the two closest buildings (WEG Block A and 14-17 PG) before the works commence.
- 8.120 All other receptors are at a greater distance and therefore the vibration effects on buildings would be direct, temporary, short-term **Negligible Adverse** (not significant).

Completed Development Effects

- 8.121 All operational effects would be direct, permanent and long-term.
- 8.122 The following embedded mitigation forms part of the completed and operational 2022 amended proposed development:
- Suitable façade and ventilation design to control noise ingress from the surroundings (as detailed in Technical Appendix 8.5(R)); and
 - Suitable fixed plant design to control plant noise emissions.
- 8.123 Servicing noise has been ‘scoped out’ as outlined above.

Site Suitability

- 8.124 In respect of internal noise levels, it is anticipated that the façade and ventilation design specified in Technical Appendix 8.5(R) would be secured by means of an appropriately worded planning condition.
- 8.125 In respect of external noise levels, it is shown in Technical Appendix 8.5 proposed external amenity areas are predicted to experience noise levels in excess of the guideline value for urban areas within BS 8233:2014 of 55 dB LAeq,16hr, due to proximity to the local highway network. However, the 2022 amended proposed development has been designed to achieve the lowest practicable levels through locating the main external amenity areas away from the A40.
- 8.126 In addition, the majority of balconies are predicted to experience noise levels in excess of the guideline value for urban areas within BS 8233:2014. However, inset balconies are proposed which would afford, at least 5dB of attenuation. It should also be noted that, residents would have access to additional amenity areas such as St Mary’s Churchyard, Paddington Green and Paddington Basin within 5 minutes walk.
- 8.127 Taking into account the urban location of the site and the open balconies provided within the adjacent WEG and 14-17 PG schemes, noise levels within the proposed external amenity areas are not unusual for the site context. The 2022 amended proposed development has been designed to achieve the lowest practicable levels in the proposed external amenity spaces, as recommended within BS 8233:2014, and alternative quieter external amenity areas are available in the vicinity. .
- 8.128 Accordingly, the site would be suitable for the proposed residential use. The effects to newly introduced on-site residential receptors would be direct, permanent, long-term **Negligible**.

Competed Development Traffic Noise

- 8.129 The effect of road traffic noise level changes due to additional 2021 proposed development traffic on the local highway network when compared against the existing baseline, was ‘scoped out’ during the EIA scoping process. This is because no significant change in road traffic noise levels was predicted at existing NSRs within the study area.
- 8.130 This remains the case for the 2022 amended proposed development; however, the 2022 amended proposed development now proposes the complete closure of the existing Newcastle Place and routing of vehicles on the loop road around the northern facades of WEG Block A. As the scheme does not include provision for residents parking and servicing would largely be via the combined basement accessed off Church Street, traffic using the loop road would primarily comprise drop-offs and deliveries, typically cars (taxis),LGVs or vans. Accordingly, for completeness, an assessment was undertaken of the likely change in road traffic noise levels along the loop road.

- 8.131 With reference to the traffic data in Appendix 8.4(R), the traffic volume using the loop road in the Future Baseline + 2022 Amended Proposed Development scenario would be an AAWT of 547 vehicles (11 % HGV), an increase from the 37 vehicles of the existing Baseline. The data is based on an assumption that all of the current traffic and vehicle types on Newcastle Place would use the loop road. This is the absolute worst-case as in practice HGVs would not be able to access the loop road. Noise from this volume of traffic has been estimated using the procedures in CRTN and modelled at the facades of WEG using Cadna software. The volume of traffic on the loop road would increase noise levels at the northern facades of WEG by no more than 1dB. Accordingly the effects of the loop road on residential receptors at WEG and other locations would be long-term **Negligible Adverse**.

Completed Development Plant Noise

- 8.132 In accordance with consultation undertaken with WCC, the plant noise rating level should be 10 dB below the lowest background noise level (15 dB if tonal). The lowest background noise level and the corresponding plant noise limit at each of the nearest NSRs has been outlined in Table 8.14.
- 8.133 The rating noise level is the specific noise level, plus any corrections for intermittency or other sound characteristics outlined in BS4142:2014+A1:2019. It should be noted that this plant noise rating level applies to the cumulative noise levels from all plant installed as part of the 2022 amended proposed development. As is typical practice, it is anticipated that this limit would be secured by means of an appropriately worded planning condition.

Table 8.14: Fixed Plant Noise Limits			
Receptors	Period	Lowest Measured Background Noise Level dB LA90	Noise Rating Level Limit* / dB L _{ar}
R2	Daytime (0700-2300)	67	57
	Night-time (2300-0700)	-	-
R3-R6	Daytime (0700-2300)	57	47
	Night-time (2300-0700)	53	43
R7-R10	Daytime (0700-2300)	63	53
	Night-time (2300-0700)	54	44
* This should be 5 dB lower if noise from building services plant is tonal in character. As R1 is at a greater distance, it is considered that mitigation to meet the limits at the other receptors would result in no noise impact at R1.			

- 8.134 Suitable building services plant should be chosen so as to meet the above criteria. This applies to all plant associated with the 2022 amended proposed development.
- 8.135 Providing the above limits are met, the noise impacts of fixed plant installations of the 2022 amended proposed development are predicted to be very low and therefore, result in direct, permanent long-term, **Negligible Adverse** (not significant) effects.

Completed Development Noise Transfer from Commercial Units to Dwellings

- 8.136 The sound insulation performance of the floor between the commercial uses and dwellings above would be designed to ensure that the appropriate internal noise limits (which may be secured in or defined by relevant planning conditions) are achieved within the dwellings. Achieving appropriate noise limits is in line with the Building Regulations requirement of providing a higher standard of sound insulation between such spaces (than typical inter-dwelling sound insulation requirements) where necessary.

- 8.137 Where commercial units are occupied by relatively quiet uses such as retail, it is expected that the proposed criteria would be achieved by meeting standard Building Regulations Approved Document E Party Floor sound insulation requirements. However, this should be checked by an acoustic consultant.
- 8.138 Where higher noise level generating uses are proposed, or where noise such as music is expected within the commercial units, a full assessment will be undertaken prior to fitout to establish any sound insulation enhancements required to ensure that the noise impact is suitably controlled. Prior to fitout, a detailed design specification will be submitted to WCC for approval.
- 8.139 With the noise limits achieved within the dwellings, the effects of noise from commercial operations to adjacent proposed receptors would be direct, permanent, long-term **Negligible** (not significant) for even the most exposed residences.

Assessment of Residual Effects

Additional Mitigation

Demolition and Construction Stage

- 8.140 In modelling the demolition and construction plant noise levels, account has been taken of standard practice BPM to be adopted on-site in accordance with the CEMP, including monitoring.
- 8.141 Realistic working practices would be agreed with the appointed principal contractor within detailed Demolition and Construction Method Statements to be secured as part of the CEMP to reduce the predicted 'worst-case' noise levels. Works would be programmed to minimise the overlap of noisy activities, that quiet plant is selected where possible, that noisy activities are screened e.g. locally screening activities such as piling, and that detailed demolition and construction method statements would be prepared to minimise impacts to close proximity NSRs.
- 8.142 It is noted that in the case of the new NSRs, occupants would be moving in to completed buildings in the knowledge that it is an active construction site.
- 8.143 In respect of all construction and demolition related noise, it should be noted that the effects would be temporary and would only occur for short periods within the overall programme.
- 8.144 Despite the above measures, the effects would remain as presented in the assessment of effects section with significant noise effects on existing and new NSRs arising from the demolition and construction of the proposed development.
- 8.145 In respect of noise and vibration effects arising from piling works close to WEG Block A and 14-17 Paddington Green, the potential for adverse effects in terms of human perception can be reduced through the following:
- Selection of the piling method that would result in lowest levels of noise and vibration;
 - Minimising the amount of works carried out within 10 m of the receptor building;
 - Timing of the works to occur during non-sensitive periods;
 - Effective liaison with the building occupants prior to works commencing. Early communications with the surrounding receptors would assist with reducing the potential for adverse comments arising and could identify the most appropriate time of day to carry out the works;
 - Where possible, provision of localised screening around the piling rig; and
 - Noise and vibration monitoring during the works with defined actions to be taken where trigger levels are exceeded (in the same manner as trigger levels with COPA Section 61 agreements).
- 8.146 Where all of the above is implemented, the short-term residual effects of vibration due to piling (in terms of human response) would be reduced to temporary, short-term, **Minor Adverse** and not significant.

- 8.147 No additional mitigation is required; however, given the proximity of the piling rig to the two closest building receptors, a condition survey of the two buildings should be carried out prior to the works commencing.

Completed Development Stage

- 8.148 All fixed plant would be fitted with standard attenuation and acoustic screening, as required to meet the set noise limits. No additional mitigation would be required beyond this to address noise from fixed plant installations.
- 8.149 Mitigation relating to the noise incident on the façade of the proposed buildings is outlined in the Site Suitability Assessment (Appendix 8.5(R)). This includes future traffic noise. With the implementation of suitable façade and ventilation design, the site would be suitable for the proposed use.
- 8.150 No additional mitigation is required in respect of additional traffic on the loop road.
- 8.151 Noise transfer between residential and commercial units would be addressed by achieving appropriate noise limits in line with the Building Regulations requirements.

Enhancement Measures

- 8.152 No enhancement measures are proposed in respect of noise and vibration.

Demolition and Construction Residual Effects

- 8.153 Despite the adoption of embedded mitigation in the form of BPM and as proposed within Chapter 5(R): Demolition and Construction Description, which would be expected to be secured by a suitably worded planning condition requiring submission of a CEMP, temporary significant adverse residual effects are predicted at all receptors except R2, at some point during demolition and construction as outlined above.
- 8.154 The residual demolition and construction effects would therefore remain as reported in the Assessment of Effects section.

Completed Development Residual Effects

- 8.155 All residual effects remain as reported in the Assessment of Effects section of this chapter.

Summary of Residual Effects

- 8.156 Table 8.15 provides a tabulated summary of the outcomes of the noise and vibration assessment of the 2022 amended proposed development.

Table 8.15: Summary of Residual Noise and Vibration Effects								
Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	D I	P T	R IR	St Mt Lt
Demolition and Construction								
R1	Demolition and Construction Plant Noise	None required.	Major for enabling/ demolition and overlapping works (significant) Minor to Moderate for all other works (not significant)	-	D	T	R	St

Table 8.15: Summary of Residual Noise and Vibration Effects								
Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+	D I	P T	R IR	St Mt Lt
R2	Demolition and Construction Plant Noise	None required.	Minor for all works (not significant)	-	D	T	R	St
R3	Demolition and Construction Plant Noise	None required.	Moderate for enabling/ demolition and overlapping works (significant) Minor for all other works (not significant)	-	D	T	R	St
R5			Moderate for enabling/ demolition and overlapping works (significant) Minor for all other works (not significant)	-	D	T	R	St
R6			Major for enabling/ demolition and overlapping works (significant) Minor to Moderate for all other works (not significant)	-	D	T	R	St
R7 and R8			Major for much of demolition and construction period and for overlapping works (significant)	-	D	T	R	St
R9 and R10			Major during demolition and overlapping works (significant) Minor to Moderate for all other works (not significant)	-	D	T	R	St
Phase 1			Major for much of the demolition and construction period and for overlapping works (significant)	-	D	T	R	St
All receptors	Demolition and Construction Traffic Noise	None required.	Negligible (not significant)	-	D	T	R	St

Table 8.15: Summary of Residual Noise and Vibration Effects								
Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	D I	P T	R IR	St Mt Lt
R7, R8	Demolition and Construction Vibration effects to Humans	Additional Vibration mitigation measures to be included in the CEMP, secured by means of an appropriately worded planning condition.	Minor (not significant)	-	D	T	R	St
	Demolition and Construction Vibration effects to Buildings	Condition Survey recommended.	Minor (not significant)	-	D	T	R	St
R1-R6, R9-R10	Demolition and Construction Vibration to Humans and Buildings	None required	Negligible	-	D	T	R	St
Completed Development								
All receptors	Plant noise	None required.	Negligible (not significant)	-	D	P	IR	Lt
All receptors	Site suitability	Suitable façade and ventilation design would be secured by means of an appropriately worded planning condition.	Negligible (not significant)	N/A	D	P	IR	Lt
WEG receptors	Road Traffic Noise	None required.	Negligible (not significant)	-	D	P	IR	Lt
All receptors	Commercial noise transfer	Standard Building Regulations Approved Document E Party Floor sound insulation requirements are achieved.	Negligible (not significant)	N/A	D	P	IR	Lt
Notes: * - = Adverse/ + = Beneficial/ +/- Neutral; D = Direct/ I = Indirect; P = Permanent/ T = Temporary; R=Reversible/ IR= Irreversible; St = Short-term/ Mt = Medium-term/ Lt = Long-term. **Negligible/Minor/Moderate/Major								

Cumulative Effects

Intra-Project Effects

8.157 As set out in Chapter 2(R): EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 11(R): Intra Cumulative.

Inter-Project Effects

8.158 Table 8.16 provides a summary of the likely cumulative effects resulting from the 2022 amended proposed development and the cumulative developments.

Table 8.16: Inter-Project Cumulative Effects				
Cumulative Development	Demolition and Construction		Completed Development	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
One Merchant Square	Yes	Demolition and construction phases could overlap with 2022 amended proposed development	No	Plant noise is required to be 10 dB below background level (15dB if tonal); therefore, cumulative plant noise will be inaudible. Traffic to/from the 2022 amended proposed development are not predicted to increase traffic levels by an amount where noise levels would change.
Two Merchant Square	Yes	Demolition and construction phases could overlap with 2022 amended proposed development	No	Plant noise is required to be 10 dB below background level (15dB if tonal); therefore, cumulative plant noise will be inaudible. Traffic from to/from the 2022 amended proposed development are not predicted to increase traffic levels by an amount where noise levels would change.
Six Merchant Square	Yes	Demolition and construction phases could overlap with 2022 amended proposed development	No	Plant noise is required to be 10dB below background level (15dB if tonal); therefore, cumulative plant noise will be inaudible. Traffic to/from the 2022 amended proposed development are not predicted to increase traffic levels by an amount where noise levels would change.

Table 8.16: Inter-Project Cumulative Effects				
Cumulative Development	Demolition and Construction		Completed Development	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
The Landseer 38-44 Lodge Road / 36 St John’s Wood Road / Paddington Triangle / Paddington Cube, 1A Sheldon Square, W2 / Luton Street, Capland Street, Bedlow Close NW8 / 5 Kingdom Street	No	Development site >400 m from site; therefore, demolition and construction noise will not be heard at receptors	No	Cumulative development site >400 m from 2022 amended proposed development; therefore, cumulative plant noise not considered to change beyond the predicted levels in Table 8.12.

Demolition and Construction Cumulative Effects

8.159 The cumulative developments that would generate noise from demolition and construction concurrently with the proposed development are summarised in Table 8.17. The table presents the cumulative noise levels to the closest NSRs from both the proposed development and the cumulative sites simultaneously. Noise levels for each development represent the maximum predicted level across the total demolition and construction programme as a worst-case scenario.

8.160 Cumulative schemes One Merchant Square and Six Merchant Square have been considered as one development as per the submitted Environmental Statement for this site.

Table 8.17: Cumulative Demolition and Construction Noise Assessment		
Cumulative Site	Predicted construction Noise Level from 'Worst-Case' Activity / dB L _{Aeq,T}	Cumulative Construction Noise Level / dB L _{Aeq}
One and Six Merchant Square	69 at R5 – Hilton*	R3 – Hotel/school: 79
		R5 – Hilton: 77
		R7 – West End Gate: 84
Two Merchant Square	78 at R5 – Hilton**	R3 – Hotel/school: 78
		R5 – Hilton: 80
		R7 – West End Gate: 84
2022 amended proposed development and all cumulative developments		R3 – Hotel/school: 80
		R5 – Hilton: 80
		R7 – West End Gate: 84
* ES Volume 1: Main Report Buildings 1 and 6 Merchant Square; June 2018 [18/05018/FULL]		
** ES Volume 1: Main Report 1, 2, 3 and 6 Merchant Square; November 2010 [10/09757/FULL]		

8.161 The following levels are the cumulative increase, i.e. noise level increase beyond the demolition and construction noise predicted from the proposed development alone:

- One and Six Merchant square is predicted to result in a 2 dB increase at R3 and 1 dB increase at R5. No increase is predicted at R7 beyond the levels calculated from the proposed development.
- Two Merchant Square together with the proposed development is likely to result in a 1 dB increase at R3, 4 dB increase at R5 and no increase at R7.
- Construction at all three Merchant Square sites and the proposed development are predicted to have a 3 dB and 4 dB increase at R3 and R5 respectively.

8.162 The above combined cumulative demolition and construction noise, is predicted to result in a direct, temporary, short-term **Moderate Adverse** effect at R3 and R5 (the same as that predicted for the 2022 amended proposed development in isolation).

Completed Development Cumulative Effects

- 8.163 Fixed installations of plant from other developments is expected to comply with WCC requirements and BS4142:2014. When combined with plant from the 2022 amended proposed development, no significant cumulative effect is predicted at any receptors.
- 8.164 No cumulative schemes with significant sources of vibration are proposed; hence no cumulative vibration effects are predicted.
- 8.165 Cumulative traffic has been accounted for in the transport data provided by the transport consultant. The effects would not be significant.

Summary of Assessment Background

- 8.166 This chapter has detailed the potential noise and vibration effects due to the construction and completed development stages of the 2022 amended proposed development. The assessment of construction and completed development stages has been undertaken taking into account the relevant national and local guidance and regulations.
- 8.167 The existing baseline noise climate is dominated by road traffic noise from both the A40 and A5 Edgware road.

Demolition and Construction Effects

- 8.168 During demolition and construction works, there would be plant noise, traffic noise and vibration sources.
- 8.169 It is considered that noise from demolition of the existing site and construction of the 2022 amended proposed development would result in a significant effect on all receptors, except R2. However, this would only occur for discrete demolition and construction activities and overlapping works.
- 8.170 Demolition and construction traffic is considered to result in no significant effects, due to the relatively small number of construction vehicles on a road network with existing high levels of traffic.
- 8.171 The assessment of demolition and construction vibration effects on human receptors and buildings concluded that significant adverse effects are likely in respect of the residential occupants of the two closest buildings at the WEG and 14-17 PG developments. This is due to the proximity of proposed piling and excavation works. However following the adoption of additional mitigation measures, including the use of appropriate piling techniques, to be secured through the CEMP, effects could be reduced to temporary, short-term, **Minor Adverse**. Effects to all other receptors would be temporary, short-term **Negligible Adverse**.
- 8.172 In addition, it has been recommended to carry out a condition survey of the two closest buildings before the works commence.

Completed Development Effects

- 8.173 Operational traffic was considered as part of the scoping process and was 'scoped out'. Due to the small increase on a road network with existing high levels of traffic, no significant change in noise level is predicted.
- 8.174 However, the 2022 amended proposed development now proposes the complete closure of the existing Newcastle Place and routing of vehicles on a loop road around the northern facade of WEG Block A. The traffic data used to assess the associated road traffic noise is based on an assumption that all of the current traffic and vehicle types on Newcastle Place would use the loop road. This is the absolute worst-case as in practice HGVs would not be able to access the loop road. Noise from this volume of traffic has been estimated using the procedures in CRTN and modelled at the facades of WEG using Cadna software. The volume of traffic on the loop road would increase noise levels at the northern facades of WEG by no more than 1dB. Accordingly the effects of the loop road on residential receptors at WEG and other locations would be long-term **Negligible Adverse** and not significant. Noise transfer between residential and commercial units would be avoided by achieving appropriate noise limits in line with the Building Regulations requirements. On this basis, the effects would be **Negligible Adverse** i.e. not significant.
- 8.175 Fixed plant noise, commercial noise and site suitability for residential use have been assessed.
- 8.176 Operational plant rating limits have been set in accordance with BS414:2014+A1:2019 and WCC requirements. All fixed plant installations would be fitted with attenuation and acoustic screening, as required to meet the noise emissions limits. Mitigation would be developed during detailed design and the required noise levels would be secured by means of an appropriately worded planning condition. On this basis, the effects would be **Negligible Adverse** i.e. not significant.
- 8.177 Based upon measured noise levels and modelling of the cumulative traffic flows, the ambient noise levels on the proposed building facades have been predicted. Minimum sound insulation performance requirements have been provided for the façade to achieve internal noise levels as per BS8233:2014 and ProPG. This would be further developed during detailed design and secured by means of an appropriately worded planning condition. In respect of external amenity noise levels, the 2022 amended proposed development has been designed to achieve the lowest practicable levels in the proposed external amenity spaces, as recommended within BS 8233:2014, and alternative quieter external amenity areas are available in the vicinity. On this basis the site is considered suitable for residential development from an acoustics perspective.

Cumulative Effects

- 8.178 Cumulative demolition and construction noise from the 2022 amended proposed development and the One, Six and Two Merchant Square schemes are likely to increase the construction noise levels at NSRs. However, this increase is not sufficient to change the scale of effect above predicted for the 2022 amended proposed development alone.
- 8.179 All other cumulative sources are considered to have negligible adverse effects i.e. no significant effect. This applies to:
- Demolition and construction traffic;
 - Demolition and construction vibration;
 - Operational plant; and
 - Site suitability.

9(R) WIND MICROCLIMATE

Introduction

- 9.1 This chapter of the 2022 Replacement ES reports on the likely significant wind microclimate effects to arise from the demolition and construction stage and from the completed development stage of the 2022 amended proposed development.
- 9.2 The chapter describes the wind microclimate policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at the site and within the study area; the likely wind microclimate effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and inter-project cumulative effects.
- 9.3 This chapter is supported by the following technical appendices in ES Volume 3(R):
- Appendix 9.1(R): Pedestrian Level Wind Microclimate Assessment.

Methodology

- 9.4 The assessment has been informed by the following legislation, policies and published guidance:
- National Policy:
 - NPPF (2021)¹ in particular Sections '2 - Achieving sustainable development' and '12 - Achieving well-designed places'.
 - Regional Policy:
 - The London Plan (2021)² in particular policies 'D3 - Optimising site capacity through the design-led approach', 'D8 - Public realm', 'D9 - Tall buildings'; and
 - Shaping Neighbourhoods: Play and Informal Recreation SPG (2012)³ in particular policy 'B5: What types of play space should be provided and how should existing play provision be improved?'; and
 - Local Policy:
 - Westminster City Plan 2019 – 2040 (2021)⁴ in particular Policy '41 - Building Height;
 - Westminster Environmental SPD (2022)⁵ in particular Policy '34 - Green Infrastructure';
 - Westminster Development and Demolition in Conservation Areas SPG (1996) although there are no specific policies that relate directly to the wind microclimate assessment; and
 - Westminster Code of Construction Practice (2022)⁶;
 - National Guidance and Industry Standards:
 - PPG⁷ in particular policy 'B2 - Appropriate building types and forms' in the National Design Guide;
 - The Lawson Comfort Criteria (2001)⁸;
 - Guidance on Tall Buildings (2007)⁹; and
 - Historic England Advice Note 4: Tall Buildings (2022)¹⁰.

Consultation

Pre-Submission Consultation

- 9.5 An EIA Scoping Opinion Report was submitted to the WCC in September 2020 in support of a request for a formal EIA Scoping Opinion (Technical Appendix 2.1, ES Volume 3(R)). Avison Young was appointed by WCC to undertake an independent review of the EIA Scoping Opinion Report. Correspondence was undertaken with Avison and Young as part of this review. The final Avison Young report is presented in Technical Appendix 2.2, ES Volume 3(R).
- 9.6 The WCC adopted their EIA Scoping Opinion on 25 March 2021 (Technical Appendix 2.3, ES Volume 3(R)), informed by Avison Young's Independent Review. The inclusion of a wind microclimate technical assessment chapter was confirmed.

Post-Submission Consultations

- 9.7 Following the submission of the 2021 ES, Avison Young completed an Independent Environmental Statement Review Report in June 2021 (Technical Appendix 2.3 (N), ES Volume 3(R)). No matters were raised in this review that would require alterations to be made to the scope and methodology of this updated assessment.
- 9.8 Following the 'call in' by the GLA, no further consultation comments have been provided by the GLA.
- 9.9 No further consultation relating to the wind microclimate assessment has been undertaken since the previous submission. Due to the similar nature of the 2022 amended proposed development, the scope and methodology agreed in March 2021 are considered to remain valid.
- 9.10 In addition, there has been no request for amendments to the previously adopted scoping opinion and in accordance with Regulation 18(4)(a), the updated EIA has been undertaken and the 2022 Replacement ES prepared based on the EIA Scoping Opinion issued on 25 March 2021.

Assessment Scope

- 9.11 As there is no published guidance for the assessment of wind microclimate in EIA, the assessment has been undertaken by applying the well-established Lawson Comfort Criteria ('the Lawson Criteria'), professional judgement and experience. The Lawson Criteria (LDDC version) has been used to assess pedestrian comfort around the 2022 amended proposed development and study area in accordance with industry standards.
- 9.12 The following section outlines the methodologies applied to identify and assess the likely wind effects to result from the 2022 amended proposed development.

Technical Scope

- 9.13 The assessment considers the potential impacts and likely effects of the 2022 amended proposed development in isolation during the demolition and construction stage and the completed development stage within the context of existing surrounding buildings, as well as future surrounding buildings.

¹ Ministry of Housing, Communities and Local Government, 2021. National Planning Policy Framework. London. HMSO.

² Greater London Authority, 2021. The London Plan. The Spatial Development Strategy for London. London. GLA.

³ Greater London Authority, 2012. Shaping Neighbourhoods: Play and Informal Recreation Supplementary Planning Guidance. London. GLA

⁴ Westminster City Council, 2021. Westminster City Plan 2019 – 2040. London. WCC.

⁵ Westminster City Council, 2022. Westminster Environmental Supplementary Planning Document. London. WCC.

⁶ Westminster City Council, 2022. Westminster Code of Construction Practice. Available: <https://www.westminster.gov.uk/media/document/code-of-construction-practice-february-2022-4pdf>

⁷ Ministry of Housing, Communities and Local Government. Planning Practice Guidance [online]. Available from: <https://www.gov.uk/government/collections/planning-practice-guidance>. Accessed October 2022.

⁸ Lawson T.V., 2001. Building Aerodynamics, Imperial College Press

⁹ Commission for Architecture and the Built Environment and English Heritage, 2007. Guidance on Tall Buildings. London. CABE and English Heritage

¹⁰ Historic England, 2022. Tall Buildings: Historic England Advice Note 4, 2022. Swindon. Historic England.

- 9.14 The technical scope of the wind microclimate assessment considers the expected wind microclimate in areas that would be accessible to pedestrians and future occupiers of the 2022 amended proposed development at ground, podium, balcony and roof levels. The wind conditions have been categorised using the Lawson Comfort Criteria to determine the suitability of the 2022 amended proposed development for different pedestrian activities. In addition, consideration has been given to strong winds which may pose a safety concern.
- 9.15 A qualitative assessment of wind conditions has been undertaken for the demolition and construction stage using the measured wind conditions at the existing site in combination with the professional judgement of an experienced wind engineer.
- 9.16 A quantitative assessment of wind conditions has been undertaken for the completed development stage by means of wind tunnel testing.
- 9.17 Existing pedestrian receptors around the site and study area have been assessed for wind conditions against both their intended use and against the baseline wind conditions. New pedestrian receptors introduced by the 2022 amended proposed development have been assessed against their intended use.
- 9.18 For both existing and new receptors, a scale of effect has been assigned based on the wind conditions measured, the intended usage of the receptor area and any potential change in wind conditions from the baseline configuration.

Spatial Scope

- 9.19 The study area has been determined based on experience of similar developments taking into account the surroundings and the influence they would be expected to have on the oncoming wind flow and covers an area within a 360 m radius from the centre of the site. Based on RWDI's experience, it is not expected that any surrounding buildings outside of this radius would have an effect on the oncoming wind flow. The study area incorporates new and existing sensitive receptors located around the site.
- 9.20 The main interactions of wind with a building occur relatively close to the building, particularly when there are neighbouring buildings and streets along which the wind can be channelled. Accordingly, the assessment has focused on the areas within the site boundary and the immediate surrounding streets and public realm, to assess the relative comfort of site residents, visitors and users of the public, communal and private open spaces and pedestrians utilising other public realm areas such as pedestrian routes within and bordering the site.
- 9.21 The study area includes the entrances, thoroughfares and amenity areas at ground, balcony and roof terrace levels within the 2022 amended proposed development, as well as the streets immediately around the site.
- 9.22 Wind conditions have been assessed at ground level at and in the immediate study area of the site where the proposed development would have the potential to influence the local wind environment. The measurement locations around the site and 2022 amended proposed development have been chosen based on the terrain, prevailing wind directions and surrounding developments. Therefore, the receptors have been placed in areas where the 2022 amended proposed development would be expected to influence the wind microclimate and where particular pedestrian activities are existing or proposed.

Temporal Scope

- 9.23 The assessment has considered impacts arising during the demolition and construction stage which would be expected to be temporary and short-term (0-5 years) to medium-term (5-10 years) in nature and from the completed development stage which would be expected to be permanent and long-term in nature (i.e. more than 10 years).
- 9.24 The assessment has considered the following configurations:
- Configuration 1: Existing Baseline:

- Existing site with existing surrounding buildings and existing landscaping, including Blocks A – F of West End Gate (WEG) and its associated landscaping;
- Configuration 2: 2022 Amended Proposed Development with Existing Surrounding Buildings:
 - 2022 amended proposed development with existing surrounding buildings, including WEG and 14-17 Paddington Green and their associated landscaping (excluding overlapping landscape proposals);
- Configuration 3: 2022 Amended Proposed Development with Existing Surrounding Buildings and Mitigation Measures:
 - 2022 amended proposed development with existing surrounding buildings, including WEG and 14-17 Paddington Green and their associated landscaping (excluding overlapping landscape proposals) and mitigation measures;
- Configuration 4: 2022 Amended Proposed Development with Cumulative Surrounding Buildings:
 - 2022 amended proposed development with existing and cumulative surrounding buildings, including WEG and 14-17 Paddington Green and their associated landscaping (excluding overlapping landscape proposals); and
- Configuration 5: 2022 Amended Proposed Development with Cumulative Surrounding Buildings and Mitigation Measures:
 - 2022 amended proposed development with existing and cumulative surrounding buildings, including WEG and 14-17 Paddington Green and their associated landscaping (excluding overlapping landscape proposals) and mitigation measures.

- 9.25 Configurations 2- 5 are based on a future baseline of 2030 when the 14-17 PG development would be completed and would be considered as forming part of the existing buildings.

Baseline Characterisation Method

Desk Study

- 9.26 In order to establish the existing baseline wind microclimate conditions in the study area, relevant data was reviewed and assessed. The meteorological data for London (Heathrow and London City Airports) was reviewed and assessed.

Field Study

- 9.27 Field study/data collection was not required to inform the assessment as the data provided by other sources (e.g. local meteorological data combined with a terrain roughness assessment) was deemed to be adequate and representative of the site conditions. This is in line with industry standards and best practice.

Modelling

- 9.28 The quantitative assessment was undertaken by means of wind tunnel testing using a 1:300 scale model of the existing and future surrounding buildings within the study area, as well as the proposed development, constructed on a 2.4 m diameter disc – covering a 360 m radius from the site. This study area includes the streets immediately around the site where the proposed development could have an influence on the wind microclimate.
- 9.29 The existing baseline wind conditions across the study area, as of October 2022 (Configuration 1), were defined using wind tunnel testing to provide a detailed, quantitative assessment. Measurements were taken at up to 131 locations around the study area in the existing baseline configuration.
- 9.30 For the 2022 amended proposed development and cumulative wind conditions (Configurations 2-5), 194 locations were assessed to cover additional on-site sensitive locations and elevated spaces.

- 9.31 The measurements covered ground level locations along existing and proposed building façades and corners, near existing and proposed main entrances and pedestrian routes. Off-site measurement locations were limited to immediate surrounding streets as changes in wind conditions are not expected beyond these locations.
- 9.32 Existing landscaping (trees) within Paddington Green, along Harrow Road and along Edgware Road were included in the model. However, the 2022 amended proposed development was initially tested in the absence of landscaping to present a worst-case. Landscaping was then introduced for the 2022 amended proposed development mitigation and cumulative configurations.
- 9.33 The wind tunnel model is shown in Figure 9.1.

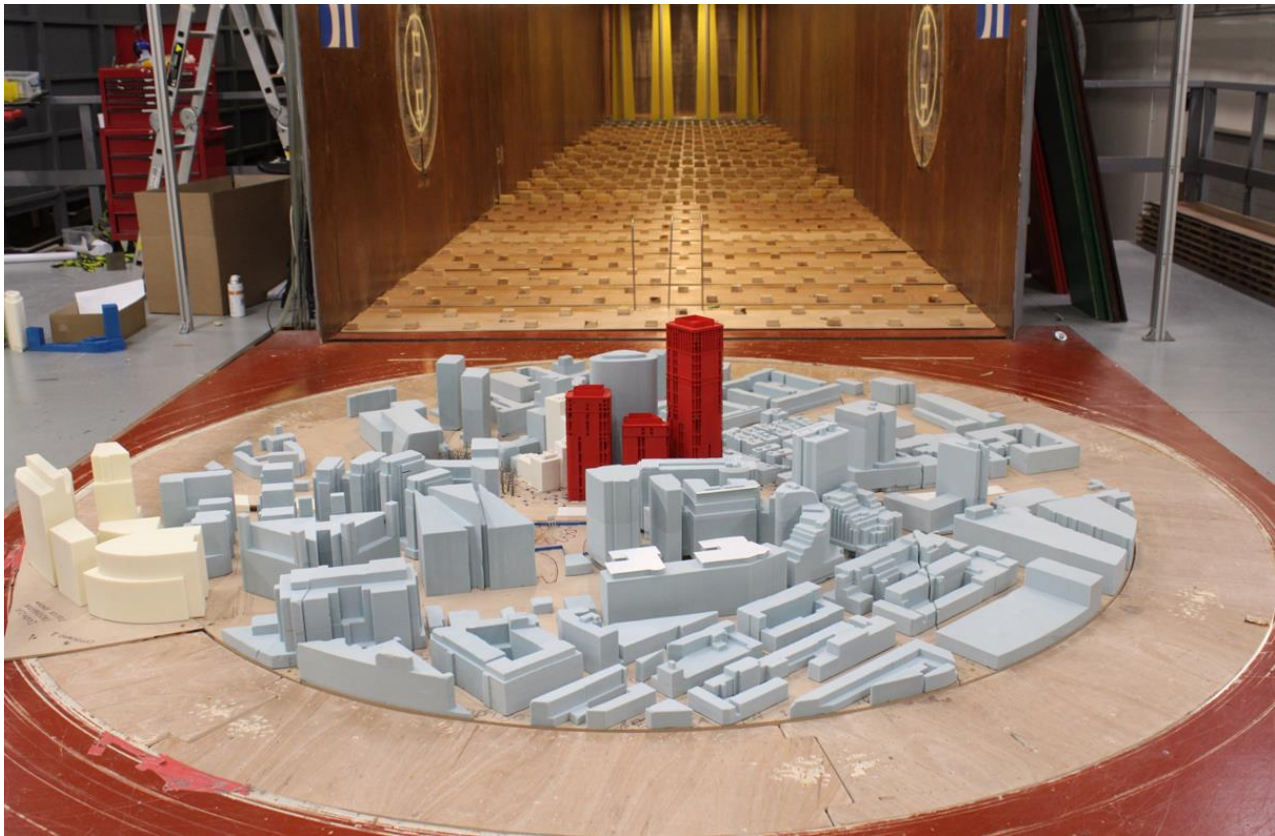


Figure 9.1: Model of Wind Tunnel Model (View from South)

- 9.34 Mean and peak wind speeds were measured for both the windiest season (normally the winter season) to show the ‘worst-case’ scenario, and summer season, when amenity spaces are expected to be used most frequently with an expectation of calmer conditions compared to other times of the year. Measurements were taken at locations across the existing site and at immediately surrounding buildings, paths, roads and areas of open space for 36 wind directions in 10° increments.
- 9.35 The results were combined with long-term meteorological climate data for the wider London area obtained from Heathrow and London City Airport records. The meteorological data that was used is presented as ‘wind roses’ in Figure 9.2. The radial axis in this figure indicates the percentage of time for which the stated threshold is exceeded.
- 9.36 The meteorological data obtained for the wider London area indicates that the prevailing wind throughout the year is from the south-west (i.e. 210 to 240 degrees on the compass); which is typical for many areas of southern England. There is a secondary peak from the north-east during the late spring and early summer. The winds from the north-east are not as strong as the prevailing winds from the south-west.

¹¹ ESDU International, 2001. Computer program for wind speeds and turbulence properties: flat or hilly sites in terrain with roughness changes, ESDU 01008, 2001 01008.

- 9.37 Low to medium rise suburban environments increase the turbulence within the atmospheric boundary layer which reduces the mean wind speed, requiring terrain roughness factors to be specified and applied to the meteorological data to account for the variations in terrain surrounding the site.
- 9.38 To account for the difference in height and terrain roughness between meteorological conditions at the airports and the site, adjustment factors were applied to the wind tunnel velocity ratios. The meteorological station data was adjusted to the site conditions using the methodology set out in ESDU 01008¹¹. Adjustment factors (mean factors) were computed for wind directions from 0° through to 350°. The reference height in the wind tunnel was at the equivalent full-scale height of 120 m. The results are presented in Table 9.1.

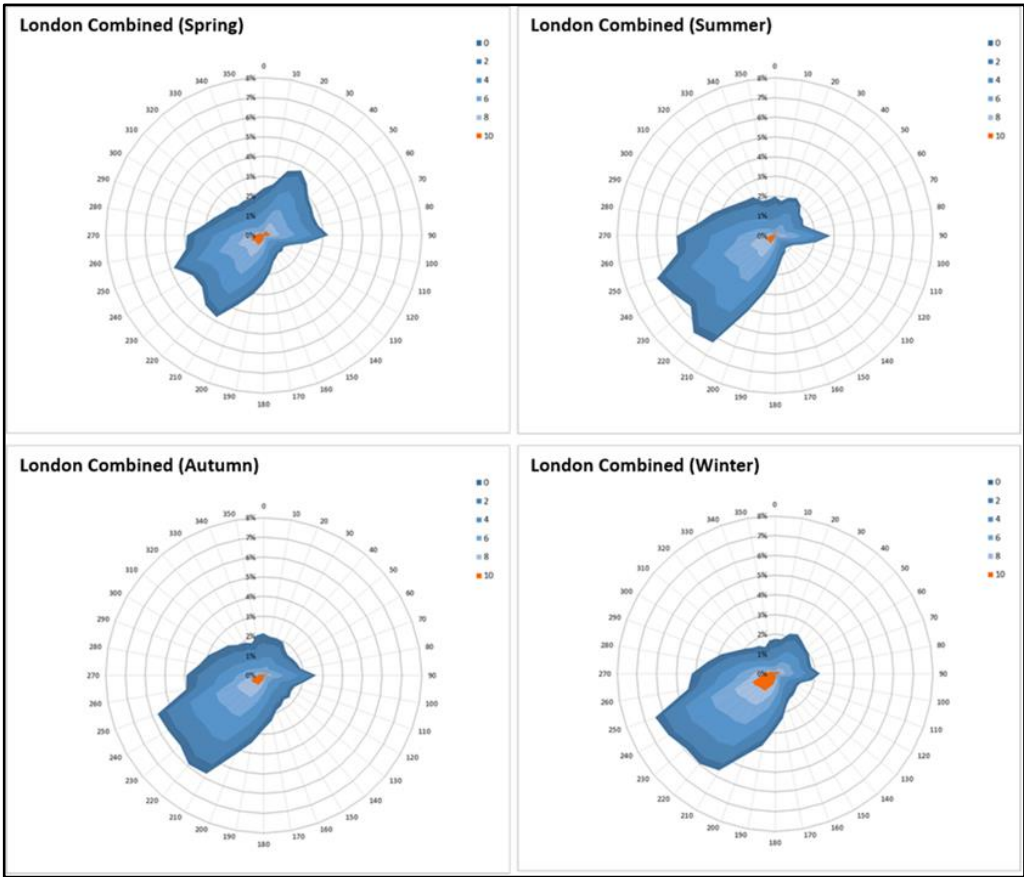


Figure 9.2: Seasonal Wind Roses for Greater London Area

Table 9.1: Site Meteorological Data Adjustment Factors												
Direction (°)	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°
Mean Factor	1.22	1.22	1.25	1.22	1.22	1.22	1.22	1.22	1.18	1.18	1.18	1.18
Direction (°)	120°	130°	140°	150°	160°	170°	180°	190°	200°	210°	220°	230°
Mean Factor	1.18	1.18	1.19	1.19	1.19	1.19	1.19	1.19	1.21	1.21	1.20	1.20
Direction (°)	240°	250°	260°	270°	280°	290°	300°	310°	320°	330°	340°	350°
Mean Factor	1.20	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.21	1.22

- 9.39 The method applied for assessing existing site conditions is consistent with that described for assessing the 2022 amended proposed development configurations as presented in the next section.

Assessment Method

Methodology

- 9.40 The following section outlines the methodologies applied to identify and assess the likely effects to result from the 2022 amended proposed development.
- 9.41 The assessment has been based on the 2022 amended proposed development as described in Chapter 4(R): 2022 Amended Proposed Development Description; and Chapter 5(R): Demolition and Construction Description and informed by a 3D model of the 2022 amended proposed development based on detailed planning drawings.
- 9.42 The intended pedestrian uses were informed by a usage plot prepared in consultation with the design team as shown in Figure 9.3. This plot is only relevant for locations where the uses would remain unchanged following the introduction of the 2022 amended proposed development.

Demolition and Construction Stage

- 9.43 The potential microclimate impacts and likely effects during demolition and construction works for the 2022 amended proposed development have not been directly assessed within the wind tunnel, as this is a temporary condition and would be highly variable as the existing buildings are demolished and the proposed development is constructed. As is typical for a wind microclimate assessment, a qualitative assessment of the likely effects during demolition and construction has been undertaken using the professional judgement of an experienced wind engineer, based on an assessment of the background wind climate at the site (the results of the tested configurations for the existing baseline (Configuration 1) and completed proposed development (Configuration 2)) and an understanding of the likely effects based on the wind engineer's experience of assessing wind in the built environment.
- 9.44 This approach has been taken on the basis that the activity on the site during this time (i.e. construction activity) is less sensitive to wind conditions (due to the site access being restricted to site workers) than when the 2022 amended proposed development is completed and occupied (e.g. which would include new building entrances and outdoor amenity spaces). In addition, it is assumed that there would be appropriate health and safety measures implemented to ensure that the demolition and construction workers were adequately protected.
- 9.45 Any wind conditions (in terms of pedestrian comfort, not safety) would be acceptable across the demolition and construction site as this area is not for typical pedestrian use (see Assumptions and Limitations section).

Completed Development Stage

- 9.46 To predict the local wind environment associated with the completed development and the resulting pedestrian comfort within the study area, wind tunnel testing of the 2022 amended proposed development has been undertaken.
- 9.47 Wind tunnel testing is a well-established and robust means of assessing the pedestrian wind microclimate effects of tall buildings. It enables the wind conditions at the 2022 amended proposed development and study area to be quantified and classified in accordance with the widely accepted Lawson Comfort Criteria.

Wind Tunnel Testing Methodology

- 9.48 The methodology for quantifying the pedestrian level wind environment is outlined below within four steps:
- Step 1: The site's induced wind speeds are measured for the appropriate configuration(s) at the appropriate pedestrian level(s) in the wind tunnel;
 - Step 2: Standard meteorological data is adjusted to account for conditions at the site (for this assessment, meteorological data has been derived from London meteorological stations (as mentioned previously);

- Step 3: Data from Step 1 and Step 2 is combined to obtain the expected frequency and magnitude of wind speed for the appropriate configuration(s) and at the appropriate pedestrian level(s); and
- Step 4: The results of Step 3 are compared with the Lawson Comfort Criteria (and where relevant, the change in the wind microclimate conditions between appropriate test configuration(s)) to 'grade / score' the conditions within and around the site.

- 9.49 In order to model the likely effects of turbulence (which depends on the surrounding environment) a series of grid, spires and floor roughness elements were employed in the wind tunnel in order to create a 'boundary layer' that is representative of the location of the site. In addition, the wind tunnel included relevant buildings and other topographical features with regard to wind flow up to a distance of 360m radius from the centre of the site.
- 9.50 Wind speed measurements around the site for the tested configurations were established using Irwin probes. These measure the mean and gust wind speeds at a full-scale height of approximately 1.5 m above the surface upon which the probe is located.
- 9.51 The wind speed was measured at up to 194 locations (131 under the existing baseline conditions and 194 with the 2022 amended proposed development configurations) for all wind directions in equal increments, with 0° representing wind blowing from the north and 90° wind from the east (and so on). The measurements covered ground level locations along existing thoroughfares, proposed building façades and at corners, near entrances, pedestrian routes, roof terraces and balconies.
- 9.52 The assessment has focused on the windiest season (in northern Europe, generally winter; specifically, December, January and February), to represent a 'worst-case' scenario, and the summer season (June, July and August) for amenity spaces, when they are expected to be most frequently used.

Cumulative Stage

- 9.53 To predict the cumulative effects of nearby cumulative schemes on pedestrian comfort within the study area, wind tunnel testing including nearby cumulative schemes were undertaken, to provide a quantitative cumulative assessment (Configurations 4 and 5).
- 9.54 The following consented cumulative schemes (as set out in ES Chapter 2(R): EIA Approach and Methodology of this Volume) were identified within the 360 m study area and have therefore been included in the wind tunnel for Configurations 4 and 5:
- 18/05018/FULL One Merchant Square;
 - 18/05018/FULL Six Merchant Square; and
 - 10/09757/FULL Two Merchant Square.

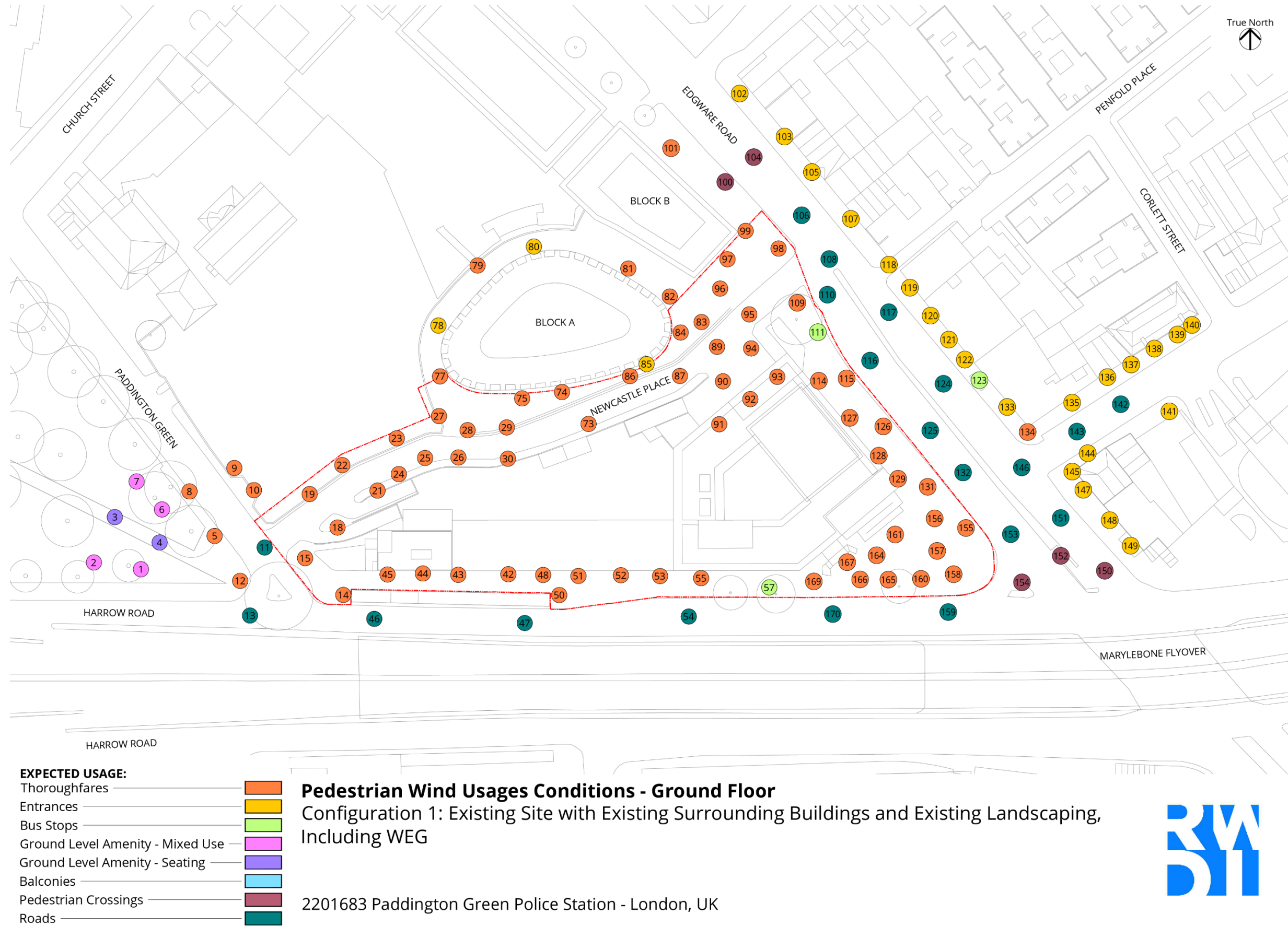







Figure 9.3: Existing Baseline –Ground Level Intended Pedestrian Uses

Assessment Criteria

9.55 The criteria used to assess if an effect is significant or not, is set out in subsequent sub-sections. This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement.

Lawson Comfort Criteria

- 9.56 The assessment of wind conditions requires a ‘standard’ against which to benchmark the microclimate. The Lawson Comfort Criteria have been established for some 30 years and have been widely used on building developments across the United Kingdom (UK).
- 9.57 The Lawson Comfort Criteria (set out in Table 9.2) define a range of pedestrian activities from sitting through to more transient activities such walking along a thoroughfare. For each activity, a threshold wind speed and frequency of occurrence beyond which the wind environment would be unsuitable for the stated activity is defined.
- 9.58 If the measured wind conditions exceed the threshold wind speed for more than 5 % of the time, then they are unacceptable for the stated pedestrian activity and the expectation is that there may be complaints of nuisance or people will not use the area for its intended purpose.

Table 9.2: Lawson Comfort Criteria			
Key	Comfort Category	Threshold	Description
	Sitting	0-4 m/s	Light breezes desired for outdoor restaurants and seating areas where one can read a paper or comfortably sit for long periods.
	Standing	4-6 m/s	Gentle breezes suitable for main building entrances, pick-up/drop-off points and bus stops.
	Strolling	6-8 m/s	Moderate breezes that would be acceptable for strolling along a city/town centre street, plaza or park.
	Walking	8-10 m/s	Relatively high speeds that can be tolerated if the objective is to walk, run or cycle without lingering.
	Uncomfortable	>10 m/s	Winds of this magnitude are considered a nuisance for most activities, and wind mitigation is typically recommended.

- 9.59 The distinction between ‘Strolling’ and ‘Walking’ is that in the ‘Strolling’ scenario pedestrians are more likely to take on a leisurely pace, with the intention of taking time to move through the area, whereas in the ‘Walking’ scenario pedestrians are intending to move through the area quickly and are therefore expected to be more tolerant of stronger winds.
- 9.60 The Lawson Criteria are derived for open air conditions and assume that pedestrians will be suitably dressed for the season. Thermal comfort is therefore not evaluated as part of the assessment.

Target Wind Comfort Conditions

- 9.61 The following target comfort conditions have been assessed:
- For main thoroughfares, strolling or calmer conditions are desirable during the windiest season for a mixed-use development in an urban area, similar to the 2022 amended proposed development.
 - For pedestrian crossings, walking or calmer conditions are required throughout the year.
 - For main entrances, standing conditions or calmer are required throughout the year.
 - For rarely used service entrances or fire escapes, strolling level winds are considered acceptable throughout the year.
 - For bus stops, standing or calmer conditions are required throughout the year.

- For public amenity areas, the possible pedestrian activities include frequent outdoor sitting (e.g. cafés) where sitting conditions are required, to occasional outdoor sitting (e.g. benches) where standing conditions are considered acceptable.
- For communal roof terraces, activities can vary and typically sitting to standing conditions are considered acceptable in these areas during the summer season.
- Similarly, for private balconies standing conditions are considered acceptable during the summer season.
- For roads, consideration was given to strong wind conditions in relation to cyclist use. .

9.62 The proposed pedestrian uses for the 2022 amended proposed development are shown in the Figures 9.6 and 9.7 and has been used as a basis for assessment together with the coloured key in Table 9.2 and the associated target wind conditions. Assessment narrative and plots should be reviewed by reference to this figure and table.

Strong Winds

- 9.63 The assessments undertaken also provide a notification of stronger winds as specified by Lawson, which are defined as wind speeds in excess of 15 m/s for more than 0.025 % of the time (2.2 hours of the year). Strong winds are assessed on an annual basis; however, the greatest proportion of the total can generally be attributed to the windiest season (most commonly winter in the UK).
- 9.64 Exceedance of the 15 m/s threshold indicates a safety issue for cyclists and certain members of the population and the need for remedial measures and careful assessment of the expected use of the location in question; e.g. is it reasonable to expect elderly or very young pedestrians to be present at the location on the windiest day of the year?
- 9.65 Wind speeds that exceed 20 m/s for more than 0.025 % of the time (2.2 hours of the year) represent a safety issue for all members of the population and would require mitigation to provide an appropriate wind environment.
- 9.66 Strong winds are generally associated with areas which would be classified by the Lawson Comfort Criteria as being acceptable for ‘walking’ or as ‘uncomfortable’; however, they are occasionally concurrent with areas acceptable for ‘strolling’ use. In a residential-led urban development, ‘walking’ and ‘uncomfortable’ conditions would not usually form part of the ‘target’ wind environment in terms of pedestrian comfort and would usually require mitigation to reduce the frequency of, or even eliminate, any strong winds.

Receptor Sensitivity/Value Criteria

- 9.67 The criteria used in the assessment of the likely effects has been based on the relationship between the required pedestrian uses (as defined by the Lawson Criteria) and the wind conditions measured at a particular receptor location with the proposed development in place. This allows for the assessment to take into account any changes in pedestrian activity that might result from the proposed development.
- 9.68 The sensitivity of receptors is related to the intended pedestrian use at each location. There are no definitions for sensitivity, as the important consideration is whether the wind conditions experienced at a particular receptor location are suitable for the intended use (in terms of pedestrian comfort and strong winds) at that particular location. All receptors are considered to be highly sensitive to the local wind microclimate conditions and are given an equal weighting. Therefore, the sensitivity for all receptors are defined as high.
- 9.69 Future on-site sensitive receptors include the following locations (where present at the 2022 amended proposed development) with the required wind conditions specified for each use:
- Thoroughfares – targeting ‘strolling’ wind conditions during the windiest season;
 - Entrances – targeting ‘standing’ wind conditions during the windiest season;
 - Secondary entrances – targeting ‘strolling’ wind conditions or calmer during the windiest season;

- Seating areas – targeting ‘sitting’ wind conditions during the summer season; and
 - Amenity spaces and balconies – targeting ‘sitting’ to ‘standing’ wind conditions during the summer season (with ‘standing’ wind conditions acceptable at private amenity, mixed-use amenity areas and large amenity spaces).
- 9.70 In addition, the wind conditions at existing locations within the study area which could potentially be affected by the 2022 amended proposed development have also been considered. For sensitive receptors surrounding the site, consideration was given to the uses listed above where appropriate, as well as (where present):
- Existing amenity spaces – targeting ‘sitting’ and ‘standing’ wind conditions during the summer season;
 - Bus stops – targeting ‘standing’ wind conditions during the windiest season; and
 - Pedestrian crossings – targeting ‘walking’ wind conditions during the windiest season.
- 9.71 The off-site locations in the study area have been compared against the existing baseline configuration where the use would remain unchanged. The significance of the effect has been defined based on whether there is a material change in the wind conditions. An example of a material change would be a location which was suitable and safe in the existing baseline becoming unsuitable or unsafe, or an already unsuitable/unsafe location being made worse by the introduction of the 2022 amended proposed development.

Impact Magnitude Criteria

- 9.72 The magnitude of impact for all receptors which would experience wind conditions windier than required for the intended use is defined as high and would require mitigation, regardless of location.

Scale of Effect Criteria

- 9.73 For assessing the likely and residual wind effects of the proposed development, the scale and nature/type criteria have been based upon the relation between the required pedestrian use (as defined by the Lawson Comfort Criteria) at a particular location, and the modelled (predicted) wind conditions at the same location. Accordingly, the criteria presented in Table 9.3 have been applied.

Table 9.3: Scale and Nature/Type of Effect Criteria	
Criteria	Descriptor
Major Adverse effect	Wind conditions are three categories windier than required
Moderate Adverse effect	Wind conditions are two categories windier than required
Minor Adverse effect	Wind conditions are one category windier than required
Negligible	Wind conditions are similar to those required
Minor Beneficial effect	Wind conditions are one category calmer than required
Moderate Beneficial effect	Wind conditions are two categories calmer than required
Major Beneficial effect	Wind conditions are three categories calmer than required

- 9.74 The minor, moderate and major scale of effects indicate the severity of the change in wind conditions between the required wind microclimate and the wind microclimate presented in the modelled results. As an example, if the required wind conditions at a location are required to be suitable for ‘standing’, but the predicted wind conditions are suitable for ‘strolling’, the difference between the required and predicted wind conditions is one category windier than required. In this case, the scale of the effect would be identified as ‘minor adverse’.

- 9.75 Any adverse effect is ‘significant’ because it implies that a location, or area, has a wind microclimate that is unsuitable for the proposed use of that area. On this basis, effects that are adverse require mitigation. Beneficial effects that are minor, moderate or major in scale are considered to be ‘not significant’. Safety exceedances due to strong winds are deemed ‘significant’, however no magnitude is applied to them. These locations would require mitigation.
- 9.76 Strong winds (affecting pedestrian safety) are reported separately as any strong wind exceedance is significant and cannot be scaled to major/moderate/minor. Where strong winds occur, mitigation is required (as per adverse effects related to pedestrian comfort).
- 9.77 In determining the significance of reported effects, consideration has been given to the type of effect i.e. direct, indirect or secondary, the geographical extent of the effect and the duration of the effect i.e. temporary which is considered to be either short-term (0 to 5 years) or medium-term (5-10 years) or long-term (10 years or more).
- 9.78 Effects during the demolition and construction works are direct, local and short-term and reversible.
- 9.79 Effects once the proposed development is completed are direct, local and long-term (permanent) and irreversible unless there is a change in the massing on-site.
- 9.80 In terms of off-site areas, wind conditions are compared to the existing baseline scenario and the intended use. If wind conditions remain consistent with or calmer than the existing baseline scenario or remain suitable for the intended use, this would represent a negligible effect. However, if wind conditions at the site or within the study area are windier than the existing baseline scenario and unsuitable for the intended use, the effect would be significant. Wind conditions off-site would only be classified as beneficial if wind conditions were not suitable for the intended use in the existing baseline scenario and are improved to be calmer than required for the intended use with the proposed development completed. If conditions are windier than the existing baseline, but remain suitable for the intended use, this would remain a negligible effect.

Nature of Effect Criteria

- 9.81 The nature of the effect has been described as either adverse or beneficial as follows:
- Beneficial – An advantageous effect to a receptor; or
 - Adverse – A detrimental effect to a receptor.
- 9.82 Negligible has been used in isolation when achieving a particular threshold, absolute value or target criterion, in this instance, the intended/proposed use.

Assumptions and Limitations

- 9.83 It has been assumed that there would be restricted access (i.e. not accessible to the general public) to the site during demolition and construction, and therefore windier conditions would be tolerable as the area is not for typical pedestrian use where the tolerable wind speed threshold would be lower.
- 9.84 This assessment is based on ‘worst-case’ wind speeds for the ‘windiest season’, expected to be encountered during the winter season (December, January and February) in the UK. Additional consideration has been made for summer wind conditions due to the presence of ground level and podium level amenity spaces. This complies with the standard methodology set out by Lawson for wind microclimate assessments.
- 9.85 It is expected that use of outdoor amenity spaces and balconies for sitting would be limited to the summer season. During the winter, it would be expected that these spaces would increase a criteria level to standing use.
- 9.86 The UK Climate Projections (UKCP18)¹² published by the Met Office presents a number of different predicted scenarios. The ‘Climate Projects Report’ published by UKCP18 presents the probable changes

¹² Met Office, 2018. UKCP18 Science Overview Report.

in wind speed for 2070-2099 in both the summer and winter seasons. With these predictions, the current trends in the climate change are not likely to have any significant effects on the predicted wind microclimate conditions in and around the proposed development.

- 9.87 The proposed landscaping scheme that was tested in the wind tunnel in Configurations 3 and 5 was subsequently updated in response to both the results of the wind assessment and other design considerations. Accordingly, the final landscaping plan that accompanies the planning application supersedes the landscaping plan used in this wind assessment. The updated landscaping plan is presented within *1446-013J Tree Planting Strategy and Size Guide*, as shown within Technical Appendix 9.1(R).
- 9.88 It is noted that the landscaping plan includes the following relevant minor amendments which were made following the wind tunnel testing:
- Public realm to west of Block I amended from lawn space to shrub planters with specific seating spaces; and
 - Public art panels included alongside the hedgerow between Harrow Road and the public realm to the west of Block I.
- 9.89 The changes are minor and would not materially affect the results reported within this ES Chapter.

Baseline Conditions

Existing Baseline

Configuration 1: Existing Baseline

- 9.90 Configuration 1 consisted of the existing Baseline which comprised Blocks A – F of WEG along with associated landscaping.
- 9.91 The wind tunnel results for Configuration 1 are presented in Figures 9.4 and 9.5 for the windiest and summer seasons respectively.

Pedestrian Comfort

- 9.92 During the windiest season (Figure 9.4), wind conditions are suitable for sitting and standing use with localised strolling conditions at the eastern end of Newcastle Place. During the summer season (Figure 9.5), conditions are overall calmer, and suitable for sitting and standing use, due to the calmer winds experienced during this time of the year.

Thoroughfares

- 9.93 Pedestrian thoroughfares which have been assessed are situated on Edgware Road, Bell Street, Harrow Road, Paddington Green and Newcastle Place. On-site thoroughfares are represented by measurement locations 9, 10, 14, 15, 18, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 42, 43, 44, 45, 48, 50, 51, 52, 53, 55, 73, 74, 75, 83, 84, 86, 87, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 109, 114, 115, 126, 127, 128, 129, 131, 155, 156, 157, 158, 160, 161, 164, 165, 166, 167 and 169. Off-site thoroughfares are represented by measurement locations 5, 8, 12, 77, 79, 81, 82, 101 and 134.
- 9.94 Wind conditions at on-site thoroughfares are suitable for sitting to strolling use during the windiest season, acceptable conditions for the existing use.
- 9.95 Wind conditions at off-site thoroughfares range from suitable for sitting to standing use during the windiest season, acceptable conditions for the existing use.

Entrances

- 9.96 Off-site entrances to retail units along Edgware Road, Bell Street, and to Block A of the WEG scheme have been assessed. These are represented by measurement locations 78, 80, 85, 102, 103, 105, 107, 118, 119, 120, 121, 122, 133, 135, 136, 137, 138, 139, 140, 141, 144, 145, 147, 148 and 149.
- 9.97 Wind conditions at all off-site entrances would range from suitable for sitting to standing use during the windiest season, acceptable conditions for the existing use.

Pedestrian Crossings

- 9.98 Pedestrian crossings situated on Edgware Road have been assessed. These are represented by measurement locations 100, 104, 150, 152 and 154.
- 9.99 Wind conditions at off-site crossings are suitable for sitting and standing use during the windiest season, acceptable conditions for the existing use.

Bus Stops

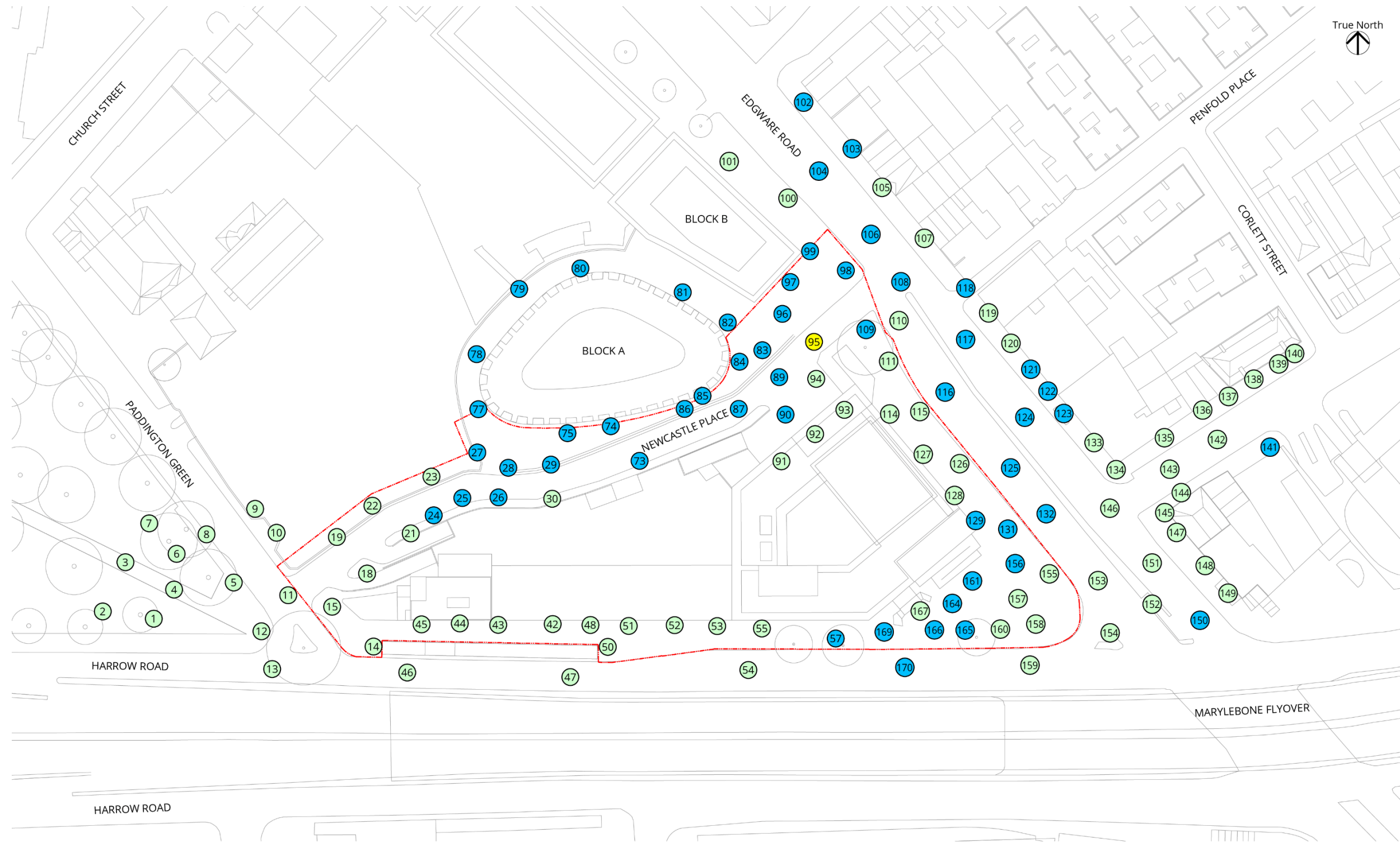
- 9.100 Bus stops which have been assessed are situated on Edgware Road and Harrow Road. These are represented by measurement locations 57, 111 and 123.
- 9.101 Wind conditions at bus stops around the site are suitable for sitting and standing use during the windiest season, acceptable conditions for the existing use.

Ground Level Amenity

- 9.102 Ground level amenity in Paddington Green has been assessed at measurement locations 3 and 4, with seating at measurement locations 1, 2, 6 and 7.
- 9.103 During the summer season, wind conditions in Paddington Green (off-site) are suitable for sitting use, acceptable conditions for the existing use.

Strong Winds

- 9.104 There are no locations that have instances of strong winds exceeding 15 m/s for more than the safety threshold of 2.2 hours annually in the baseline scenario (Configuration 1).



LDDC COMFORT CATEGORIES:

Sitting	Light Green
Standing	Blue
Strolling	Yellow
Walking	Magenta
Uncomfortable	Red

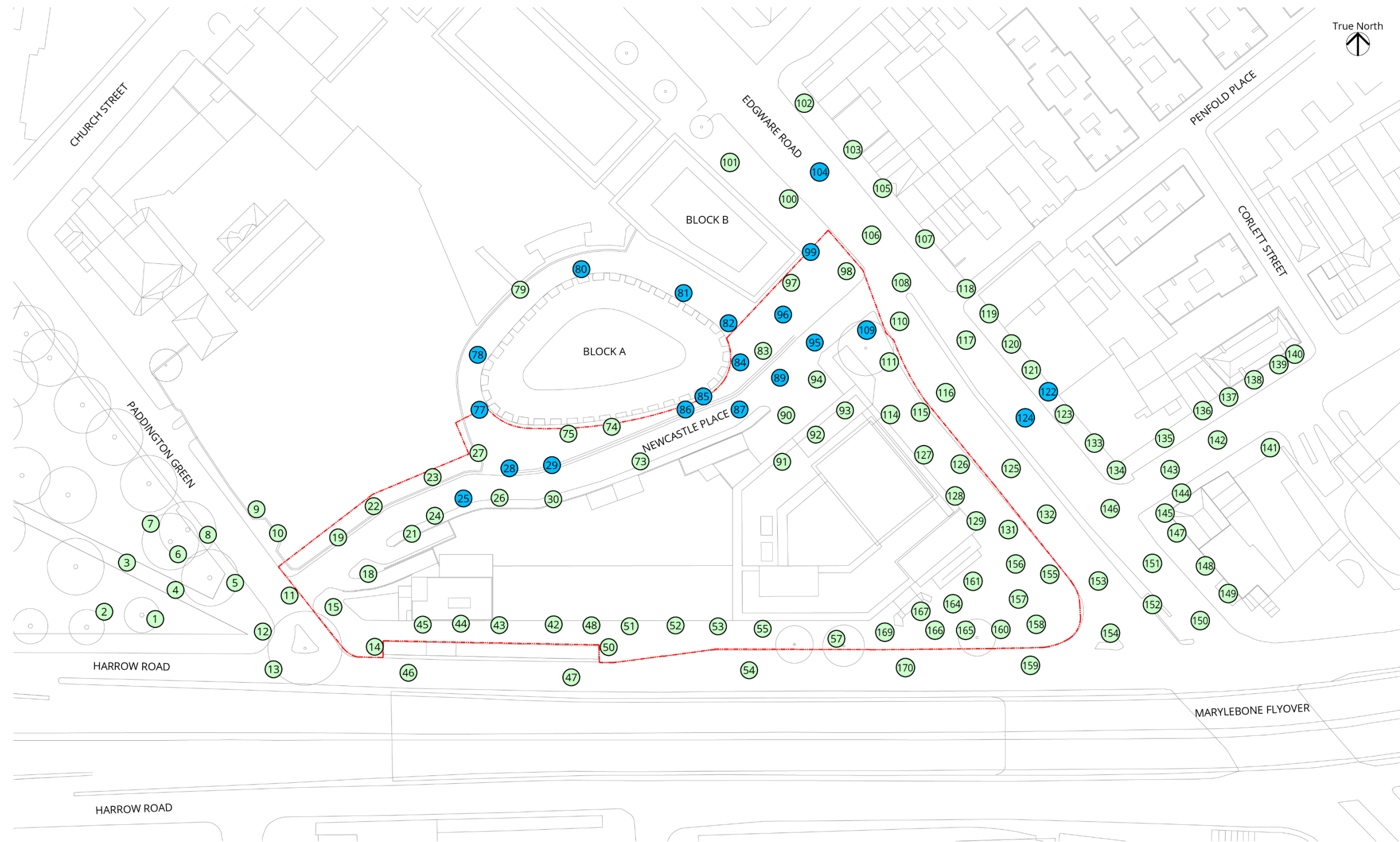
Pedestrian Wind Comfort Conditions - Ground Floor

Configuration 1: Existing Site with Existing Surrounding Buildings and Existing Landscaping,
Including WEG
Windiest Season

2201683 Paddington Green Police Station - London, UK

Figure 9.4: Existing Baseline – Ground Level During Windiest Season





LDDC COMFORT CATEGORIES:

Sitting	Light Green
Standing	Blue
Strolling	Yellow
Walking	Magenta
Uncomfortable	Red

Pedestrian Wind Comfort Conditions - Ground Floor

Configuration 1: Existing Site with Existing Surrounding Buildings and Existing Landscaping,
Including WEG
Summer Season

2201683 Paddington Green Police Station - London, UK

Figure 9.5: Existing Baseline –Ground Level During Summer Season



Future Baseline

- 9.105 The wind conditions for the future baseline scenario (existing site with future surrounding buildings of 14-17 PG) have been informed by the baseline wind tunnel testing scenario (Configuration 2) and the wind tunnel testing of the proposed development with the cumulative surrounding buildings (Configuration 4).
- 9.106 It would be expected that future baseline wind conditions would be consistent with, or calmer than, the existing baseline conditions owing to the shelter afforded to the site by the cumulative surrounding buildings, as demonstrated when comparing Configuration 4 with Configuration 2.

Sensitive Receptors

- 9.107 The receptors identified as sensitive to the 2022 amended proposed development and which have been 'scoped-in' to the assessment are summarised in Table 9.4.
- 9.108 The existing sensitive receptors that could be affected by the 2022 amended proposed development are the thoroughfares around the site, entrances to existing buildings in the study area, as well as roads, pedestrian crossings, bus stops and amenity spaces.
- 9.109 The new sensitive receptors resulting from the 2022 amended proposed development would be the users entering and exiting the buildings; users of the thoroughfares, public, communal and private amenity areas in and around the 2022 amended proposed development in addition to the existing sensitive receptors discussed above.

Table 9.4: Summary of Sensitive Receptors and Existing/Proposed Use	
Receptor Area	Location
Configuration 1 (Existing Baseline) – On-Site	
Thoroughfares	9, 10, 14, 15, 18, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 42, 43, 44, 45, 48, 50, 51, 52, 53, 55, 73, 74, 75, 83, 84, 86, 87, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 109, 114, 115, 126, 127, 128, 129, 131, 155, 156, 157, 158, 160, 161, 164, 165, 166, 167, 169
Configuration 1 (Existing Baseline) – Off-Site	
Thoroughfares	5, 8, 12, 77, 79, 81, 82, 101, 134
Entrances	78, 80, 85, 102, 103, 105, 107, 118, 119, 120, 121, 122, 133, 135, 136, 137, 138, 139, 140, 141, 144, 145, 147, 148, 149
Bus Stops	57, 111, 123
Pedestrian Crossings	100, 104, 150, 152, 154
Roads	11, 13, 46, 47, 54, 106, 108, 110, 116, 117, 124, 125, 132, 142, 143, 146, 151, 153, 159, 170
Ground Level Amenity	1, 2, 6, 7
Ground Level Amenity – Seating	3, 4
Configurations 2, 3, 4 and 5 – On-Site	
Thoroughfares	9, 10, 14, 15, 19, 21, 22, 23, 25, 27, 30, 31, 32, 36, 41, 42, 45, 49, 50, 51, 55, 56, 58, 61, 65, 67, 68, 84, 95, 96, 98, 99, 112, 113, 129, 130, 169
Entrances	20, 24, 26, 33, 34, 37, 39, 40, 43, 44, 52, 53, 60, 63, 64, 66, 69, 71, 91, 92, 93, 114, 127, 128, 162, 163, 168
Ground Level Amenity	16, 18, 62, 72, 73, 83, 89, 90, 109, 126

Table 9.4: Summary of Sensitive Receptors and Existing/Proposed Use	
Receptor Area	Location
Ground Level Amenity – Seating	17, 28, 29, 35, 38, 48, 59, 70, 74, 75, 76, 86, 87, 88, 94, 97, 111, 115, 131, 155, 156, 157, 158, 160, 161, 164, 165, 166, 167
Balconies	171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194
Configurations 2, 3 and 4 – Off-Site	
Thoroughfares	5, 8, 12, 77, 79, 81, 82, 101, 134
Entrances	78, 80, 85, 102, 103, 105, 107, 118, 119, 120, 121, 122, 133, 135, 136, 137, 138, 139, 140, 141, 144, 145, 147, 148, 149
Bus Stops	57, 123
Pedestrian Crossings	100, 104, 150, 152, 154
Roads	11, 13, 46, 47, 54, 106, 108, 110, 116, 117, 124, 125, 132, 142, 143, 146, 151, 153, 159, 170
Ground Level Amenity	1, 2, 6, 7
Ground Level Amenity - Seating	3, 4

- 9.110 Note: Measurement locations 16, 17, 20, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 49, 56, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 76, 88, 112, 113, 130, 162, 163, 168 and 171-194 were not included in Configuration 1 (Existing Baseline), due to being located within the footprint of the new 2022 amended proposed development.

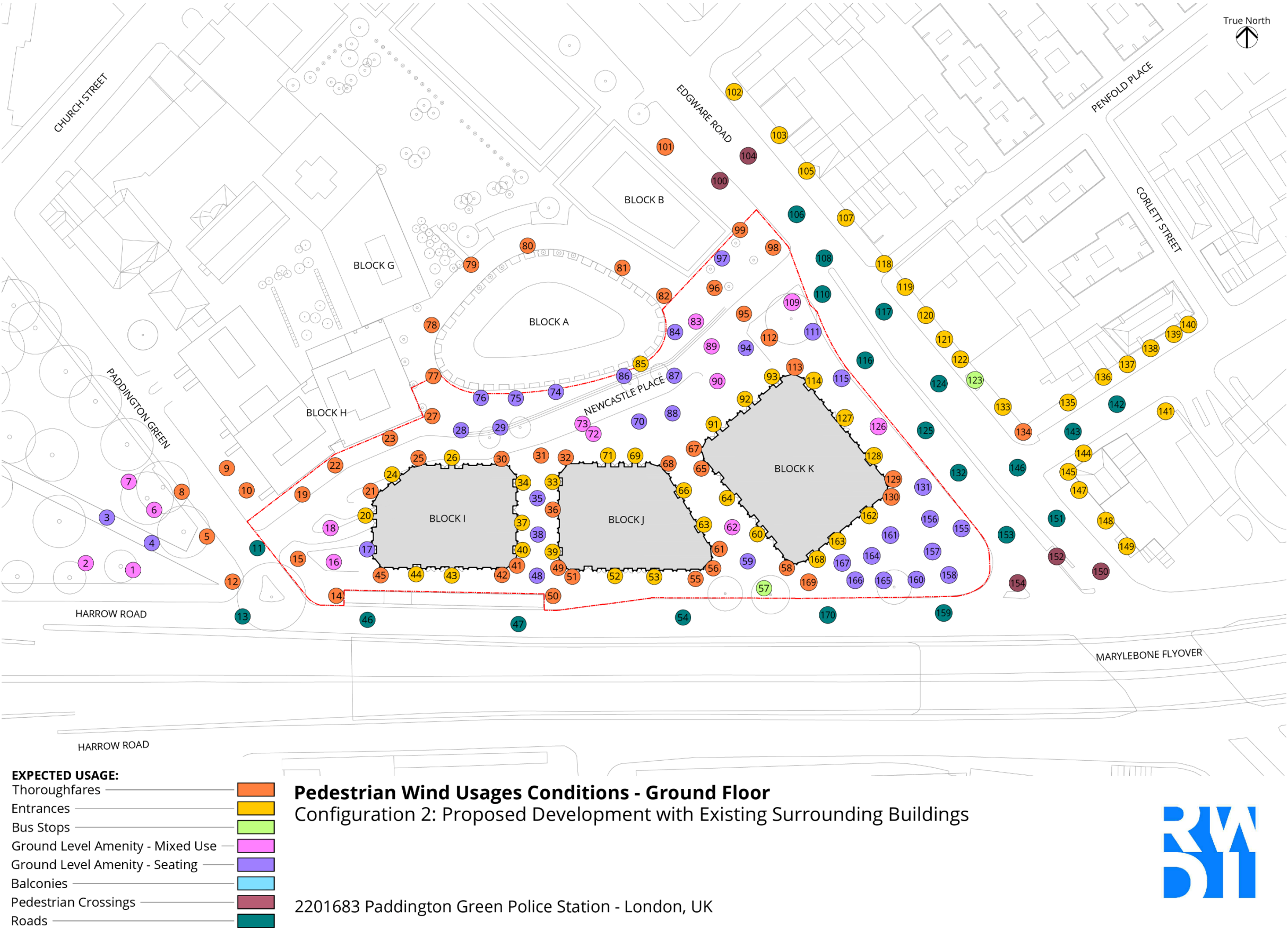
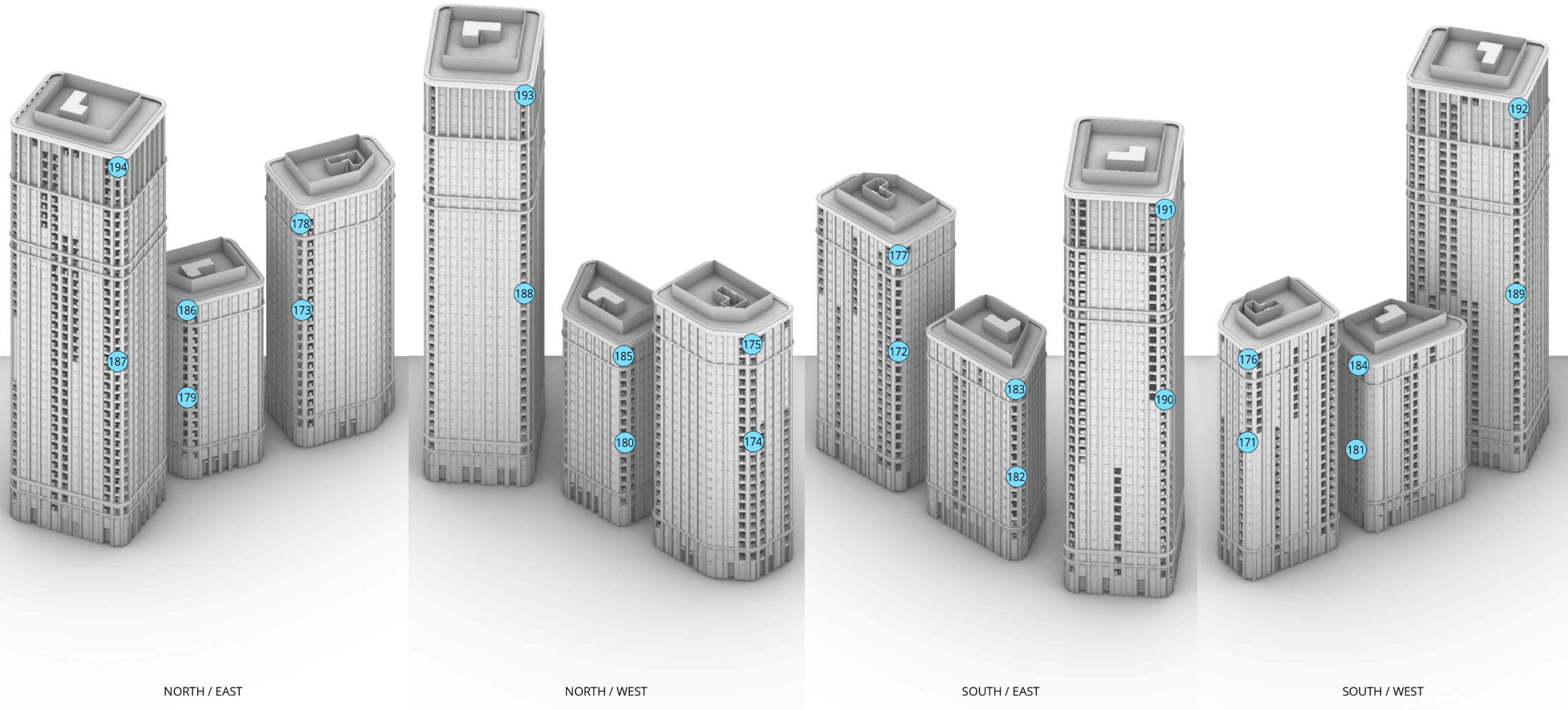


Figure 9.6: Proposed Development–Ground Level Proposed Pedestrian Uses



EXPECTED USAGE:

Thoroughfares	
Entrances	
Bus Stops	
Ground Level Amenity - Mixed Use	
Ground Level Amenity - Seating	
Balconies	
Pedestrian Crossings	
Roads	

Pedestrian Wind Usages Conditions - Isometric Views
Configuration 2: Proposed Development with Existing Surrounding Buildings

2201683 Paddington Green Police Station - London, UK



Figure 9.7: Proposed Development–Balconies Proposed Pedestrian Uses

Assessment of Effects

Demolition and Construction Effects

- 9.111 Wind conditions during the demolition and construction stage would be expected to gradually adjust from those of the Existing Baseline scenario (Configuration 1, see Figures 9.4 and 9.5) to the likely wind conditions identified for the completed development in Configuration 2 (see Figures 9.8, 9.9 and 9.10)
- 9.112 Based on professional judgement, the demolition works are not anticipated to give any rise to any significant change to the existing wind microclimate both on and off the site.
- 9.113 There would be no public access to the site during demolition and construction. Hoarding (or other sheltering measures) would be implemented around the site during demolition and construction works to restrict access to the site to construction workers. Wind conditions on-site would be suitable for a demolition and construction site. Off-site receptor locations are predicted to be suitable for the intended pedestrian uses.
- 9.114 Wind conditions during the demolition and construction stage would likely be direct, temporary, medium-term **Negligible** (not significant).
- 9.115 As construction of the proposed development proceeds, the wind conditions of the 2022 amended proposed development and the study area would gradually adjust to those described below for the completed development.
- 9.116 During the phased occupation, Block I would be constructed within Phase 1 and Blocks J and K within Phase 2. As above, wind conditions would again gradually adjust from the Existing Baseline scenario to those described below for the completed development. Therefore wind conditions both on-site and off-site during the phased occupation would likely be direct, temporary, medium-term and range from **Negligible** (not significant) to **Minor Adverse** (significant) in the absence of mitigation.

Completed Development Effects

- 9.117 The proposed usage plot that formed the basis for assessment is presented in Figures 9.6 and 9.7. The assessment is based on the future baseline year of 2030 with the 14-17 PG development forming part of the existing surrounding buildings.

Configuration 2: 2022 Amended Proposed Development with Existing Surrounding Buildings

- 9.118 Wind tunnel results for Configuration 2 are presented in Figures 9.8 and 9.9 for the windiest and summer seasons respectively at ground level. Figure 9.10 presents wind conditions at balconies on the 2022 amended proposed development during the summer season. Safety exceedances due to strong winds at ground level are presented in Figure 9.11. There would be no safety exceedances at elevated levels therefore there are no safety plots presented for these.
- 9.119 This configuration includes WEG and 14-17 Paddington Green, however, any landscaping within these schemes that was found to overlap with the site boundary was not included as the 2022 amended proposed development's landscaping would (if approved) supersede the consented landscape plans.

Pedestrian Comfort

- 9.120 With the completion of the 2022 amended proposed development, wind conditions would range from suitable for sitting to strolling use during the windiest season, with strolling conditions situated

predominantly around Block K. Wind conditions during the summer season would generally be one category calmer and suitable for sitting and standing use, due to the calmer winds experienced during this time of the year.

- 9.121 All reported effects would be direct, long-term and permanent.

- 9.122 Table 9.5 provides a summary of the locations with negligible and beneficial effects and no strong winds.

- 9.123 Locations which would experience significant adverse effects are presented in Table 9.6. The assessment presented in the following sub-sections therefore focuses on the measurement locations presented in Table 9.6. All other locations assessed would have suitable and safe wind conditions.

Entrances

- 9.124 Entrance locations to Block K (measurement locations 91 and 168) would have strolling use wind conditions during the windiest season, one category windier than suitable, representing a direct, permanent, long-term **Minor Adverse** effect (significant). Mitigation measures would be required to improve conditions.

Bus Stops

- 9.125 The existing bus stop at measurement location 57 (south of Block K) would have strolling use wind conditions during the windiest season, one category windier than suitable, representing a direct, permanent, long-term **Minor Adverse** effect (significant). Mitigation measures would be required to improve conditions.

Ground Level Amenity

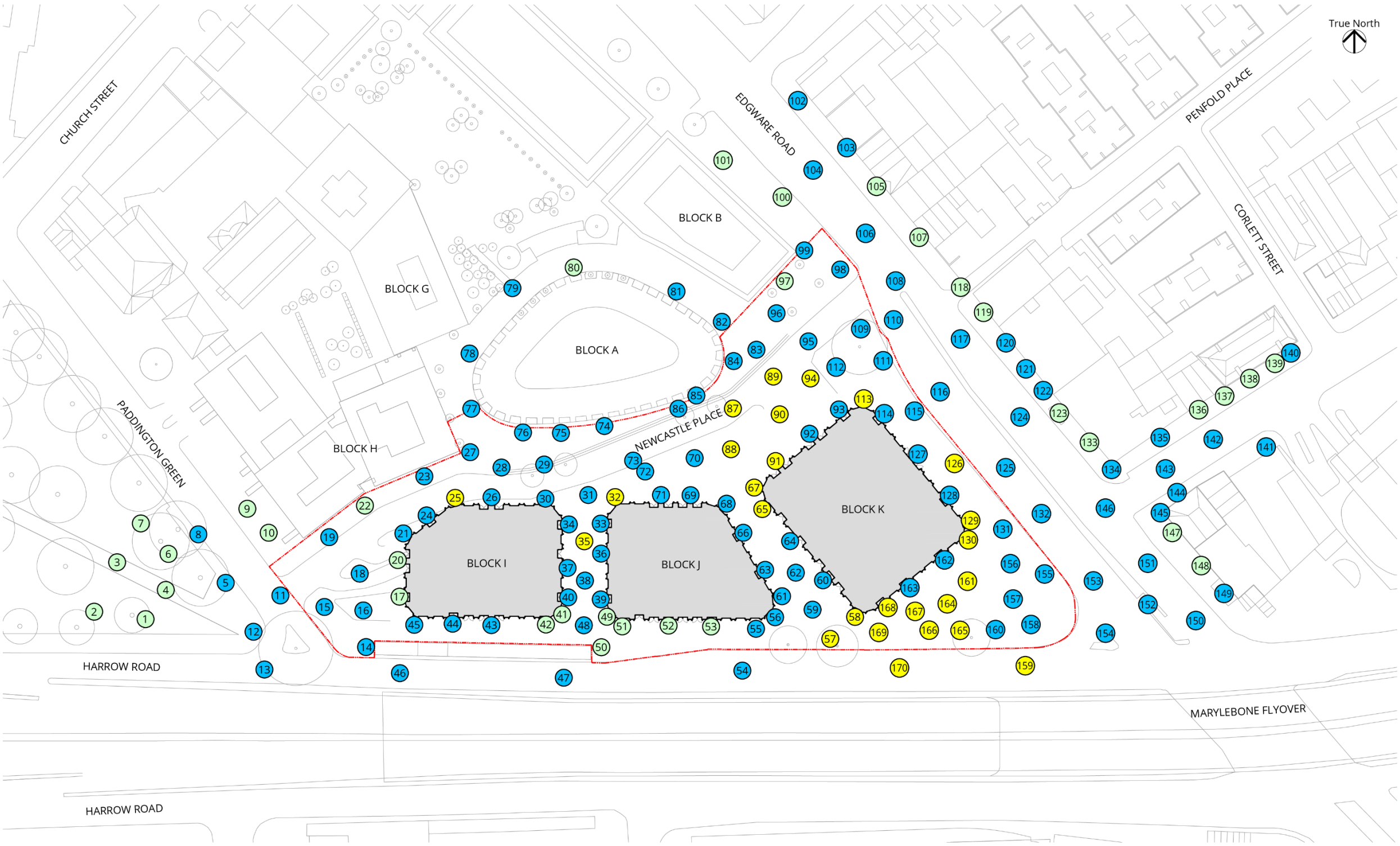
- 9.126 Seating areas situated around the site would have standing conditions during the summer season, one category windier than suitable for the intended use, representing a direct, permanent, long-term **Minor Adverse** effect (significant). Mitigation measures would be required to improve conditions at these locations.

Strong Winds

- 9.127 There would be instances of strong winds exceeding the 15 m/s safety threshold of 2.2 hours annually at measurement locations 58 and 169 (south of Block K). Mitigation measures would therefore be required to eliminate these safety exceedances.

Table 9.5: Configuration 2 – Summary of Receptor Locations with Negligible and Beneficial Effects and No Strong Winds						
Location	Existing and Proposed Use	Comfort Wind Conditions			Strong Winds	
		Required Wind Conditions	Measured Wind Conditions	Scale and Nature of Effect	Wind Speed Category	Time Exceeding Category per Year (Hours)
Completed Development Stage						
<i>Windiest Season</i>						
22, 41, 42, 49, 50, 51	Thoroughfares (on-site)	Strolling	Sitting	Moderate Beneficial	N/A	N/A
14, 15, 19, 21, 23, 27, 30, 31, 36, 45, 55, 56, 61, 68, 84, 95, 96, 98, 99, 112	Thoroughfares (on-site)	Strolling	Standing	Minor Beneficial	N/A	N/A
25, 32, 58, 65, 67, 113, 129, 130, 169	Thoroughfares (on-site)	Strolling	Strolling	Negligible	N/A	N/A
20, 52, 53	Entrances (on-site)	Standing	Sitting	Minor Beneficial	N/A	N/A
24, 26, 33, 34, 37, 39, 40, 43, 44, 60, 63, 64, 66, 69, 71, 92, 93, 114, 127, 128, 162, 163	Entrances (on-site)	Standing	Standing	Negligible	N/A	N/A
5, 8, 9, 10, 12, 77, 79, 81, 82, 101, 134	Thoroughfares (off-site)	Strolling	Sitting-Strolling	Negligible	N/A	N/A
78, 80, 85. 102. 103. 105. 107. 118. 119. 120. 121. 122. 133. 135. 136. 137. 138. 139. 140. 141. 144. 145. 147. 148, 149	Entrances (off-site)	Standing	Sitting-Standing	Negligible	N/A	N/A
100, 104, 150, 152, 154	Crossings (off-site)	Walking	Sitting-Standing	Negligible	N/A	N/A
123	Bus Stops (off-site)	Standing	Standing	Negligible	N/A	N/A
<i>Summer Season</i>						
16, 18, 62, 72, 73, 83, 89, 90, 109, 126	Ground Level Amenity (on-site)	Standing	Sitting–Standing	Negligible	N/A	N/A
17, 28, 38, 48, 59, 74, 75, 76, 97	Ground Level Amenity – Seating (on-site)	Sitting	Sitting	Negligible	N/A	N/A
171, 172, 173, 174,175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194	Balconies (on-site)	Standing	Sitting–Standing	Negligible	N/A	N/A
1, 2, 6, 7	Ground Level Amenity (off-site)	Standing	Sitting	Negligible	N/A	N/A
3, 4	Ground Level Amenity – Seating (off-site)	Sitting	Sitting	Negligible	N/A	N/A
Notes: GL: Ground Level; N/A: Not applicable						

Table 9.6: Configuration 2 – Summary of Receptor Locations with Adverse Effects and/or Strong Winds						
Location	Existing and Proposed Use	Comfort Wind Conditions			Strong Winds	
		Required Wind Conditions	Measured Wind Conditions	Scale and Nature of Effect	Wind Speed Category	Time Exceeding Category per Year (Hours)
Completed Development Stage						
Windiest Season						
58	Thoroughfares (on-site)	Strolling	Strolling	Negligible	S15	3.4
169	Thoroughfares (on-site)	Strolling	Strolling	Negligible	S15	2.3
91, 168	Entrances (on-site)	Standing	Strolling	Minor Adverse	N/A	N/A
57	Bus Stops (off-site)	Standing	Strolling	Minor Adverse	N/A	N/A
Summer Season						
29, 35, 70, 86, 87, 88, 94, 111, 115, 131, 155, 156, 157, 158, 160, 161, 164, 165, 166, 167	Ground Level Amenity – Seating (on-site)	Sitting	Standing	Minor Adverse	N/A	N/A
Notes: GL: Ground Level; N/A: Not applicable						



LDDC COMFORT CATEGORIES:

- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

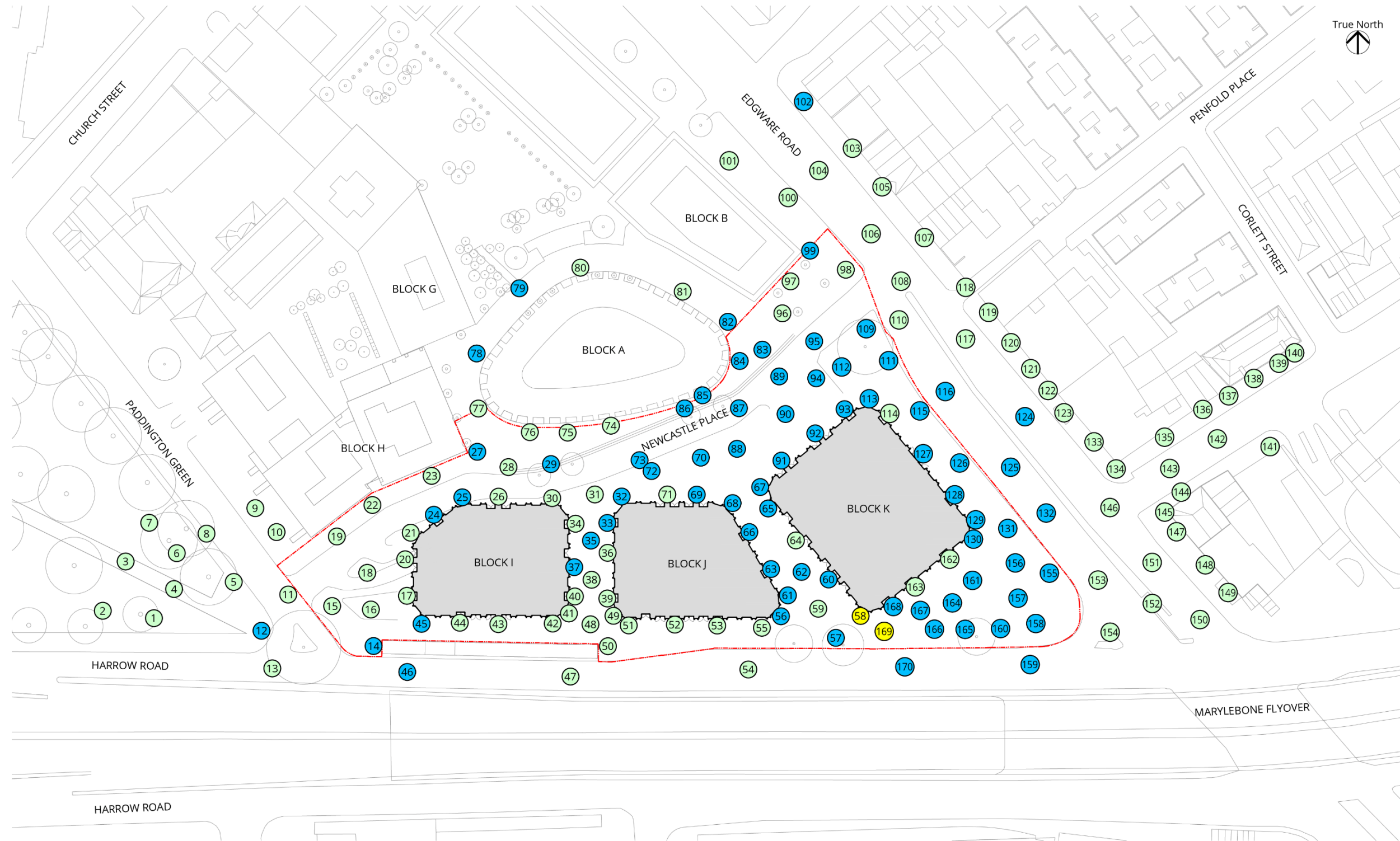
Pedestrian Wind Comfort Conditions - Ground Floor

Configuration 2: Proposed Development with Existing Surrounding Buildings Including WEG and 14 -17 PG and their Associated Landscaping
Windiest Season

2201683 Paddington Green Police Station - London, UK



Figure 9.8: Configuration 2: 2022 Amended Proposed Development with Existing Surrounding Buildings–Ground Level During Windiest Season



LDDC COMFORT CATEGORIES:

Sitting	Light Green
Standing	Blue
Strolling	Yellow
Walking	Magenta
Uncomfortable	Red

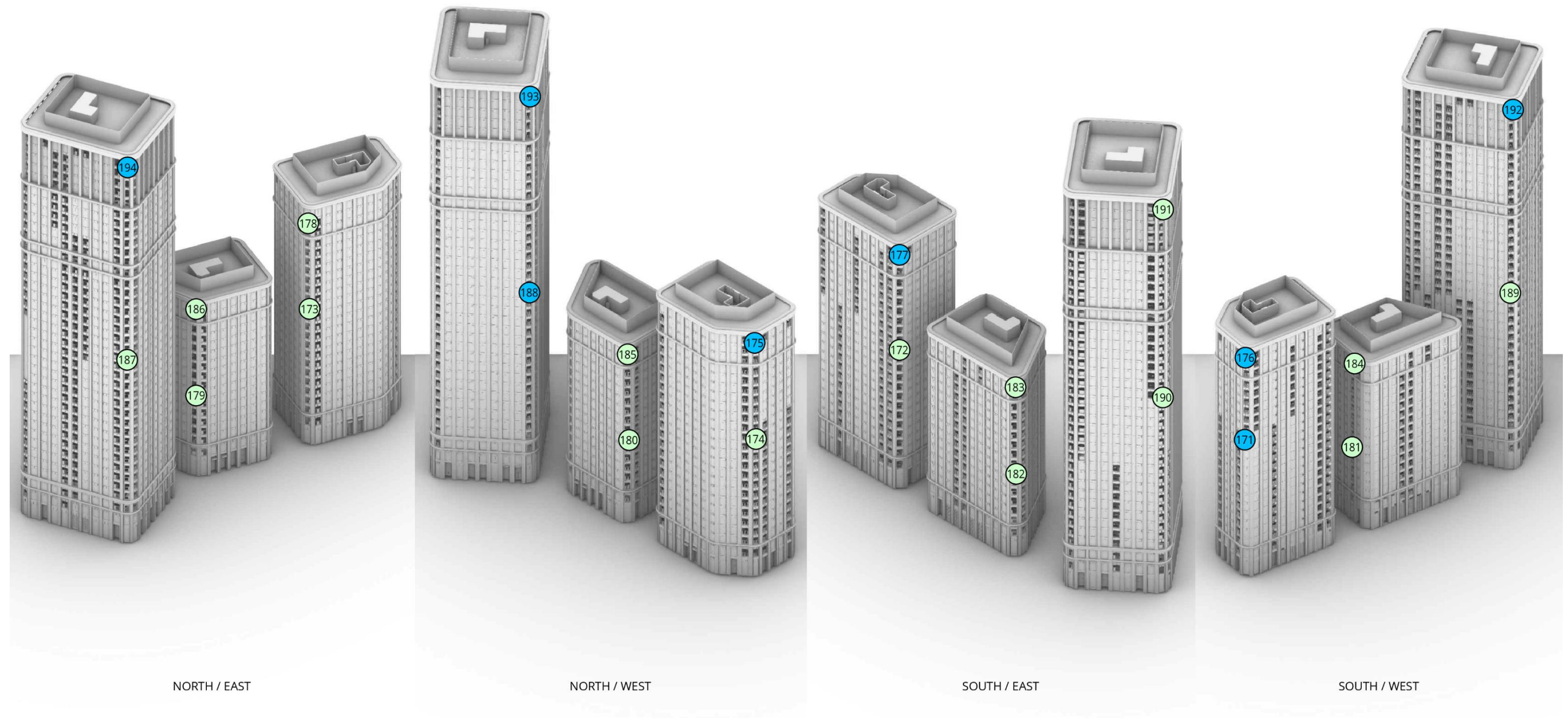
Pedestrian Wind Comfort Conditions - Ground Floor

Configuration 2: Proposed Development with Existing Surrounding Buildings Including WEG and 14 -17 PG and their Associated Landscaping
Summer Season

2201683 Paddington Green Police Station - London, UK



Figure 9.9: Configuration 2: 2022 Amended Proposed Development with Existing Surrounding Buildings–Ground Level During Summer Season



LDDC COMFORT CATEGORIES:

Sitting	Light Green
Standing	Blue
Strolling	Yellow
Walking	Magenta
Uncomfortable	Red

Pedestrian Wind Comfort Conditions - Isometric Views

Configuration 2: Proposed Development with Existing Surrounding Buildings Including WEG and 14 -17 PG and their Associated Landscaping
Summer Season

2201683 Paddington Green Police Station - London, UK

Figure 9.10: Configuration 2: 220 Amended Proposed Development with Existing Surrounding Buildings–Balconies During Summer Season

