

Chapter 13: Wind Microclimate

Wind Microclimate	
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SUPPORTING APPENDIX	ES Volume 3: Appendix: Wind Microclimate: Annex 1: Policy and Guidance Annex 2: Technical Appendix
KEY CONSIDERATIONS	This ES Chapter assesses the effects of the Proposed Development on wind microclimate conditions on the site and considers if the resulting changes in wind speeds would be suitable, with regards to comfort and safety, for the intended usage of sensitive locations in and around the Site. Key wind microclimate considerations associated with the Proposed Development include: The creation of undesirable wind speeds (resulting in effects for pedestrian comfort and safety) at ground level within the site, around the buildings surrounding the site and within nearby areas off-site (including building entrances, throughfares, bus stops, balconies and roof terraces) during the demolition and construction work; and The creation of undesirable wind speeds at ground level (specifically at building entrances and pedestrian thoroughfares) within the site, at the Proposed Development's podium, balcony and roof terrace levels, around the buildings surrounding the site and within nearby areas off-site (including building entrances, throughfares, bus stops, balconies and roof terraces) once the Proposed Development is completed and occupied.
CONSULTATION	An EIA Scoping Report was prepared and submitted to the LBTH in August 2021 requesting a formal Scoping Opinion. The EIA Scoping Report is presented in ES Volume 3, Appendix EIA Methodology – Annex 1 . LBTH's EIA Scoping Opinion was received on the 8 th September 2021 and has requested some adjustments to the scope and approach of the wind assessment. This assessment addresses the points raised in the Opinion which are of relevance to wind. The Scoping Opinion Report can be found within ES Volume 3, Appendix Methodology – Annex 2 .

INITIAL DESIGN REVIEW

- 13.1** Prior to the wind tunnel assessment that is discussed thoroughly in this ES chapter, RWDI conducted a desk-based design review assessment to provide the design team with initial insight into the expected wind conditions at the Proposed Development during the initial design phase. A follow-up wind mitigation workshop to adjust the massing of the Illustrative Scheme was conducted and the guidance provided by RWDI to improve wind conditions within and around the Proposed Development have been taken into consideration during the design process of the Proposed Development and have been implemented in the current assessment.

EXECUTIVE SUMMARY

- 13.2** Several wind tunnel assessments of the Proposed Development (Outline Proposals, Detailed Proposals and Illustrative Scheme) have been undertaken to support the hybrid planning application, both with and without the proposed landscaping and wind mitigation measures. Ten configurations were assessed to simulate different phases of the Proposed Development as it comes forward including existing baseline and future baseline scenarios, taking into account other cumulative schemes in the locality.
- 13.3** For the Detailed Proposals alone (Phase A) in the context of existing surrounds, the majority of wind conditions would be suitable for the intended use with the exception of several areas with significant effects at two entrance locations and at an existing bus stop during the windiest season and at a stack of balconies during the summer season, when amenity spaces would be expected to be most frequently used. There would be no instance of strong winds in the Detailed Proposals in this context. Qualitative mitigation measures have been recommended to resolve the windy areas within the Detailed Proposals. Refer to page 14 for a detailed breakdown of these wind conditions. Wind mitigation measures are proposed on page 41.
- 13.4** With the introduction of the hybrid Proposed Development (comprising the Outline Proposals with the Detailed Proposals), wind conditions would improve around the Detailed Proposals particularly on the northern elevation of Plot F, however, significant effects would persist at entrance locations and the existing bus stop. For the area within the Site encompassing the Outline Proposals, significant effects would occur at several locations including thoroughfares, potential entrances during the windiest season and ground level amenity and roof terraces during the summer season. There would be instances of strong winds with the potential to be a safety concern to cyclists, more vulnerable pedestrians and terrace occupants in 22 areas. Refer to **page 21** for a detailed breakdown of these wind conditions. Due to the nature of the Outline Proposals (based on maximum parameters), the impact of the wind mitigation measures has been investigated only for the Illustrative Scheme, as the Outline Proposals would not be representative of a scheme that could be developed (taking into account balconies, roof plant and the need for high quality design and façade treatments).

- 13.5** Replacing the maximum parameter model of the Outline Proposals with that of the Illustrative Scheme would improve wind conditions between Plots B2/B3 and C/E, however, the majority of wind conditions and significant effects would remain similar to Outline Proposals in the context of existing surrounding buildings. Refer to page 30 for a detailed breakdown of these wind conditions.
- 13.6** With the introduction of proposed landscaping and the implemented wind mitigation measures to the Illustrative Proposals plus Detailed Proposals in the context of existing surrounds, wind conditions would improve such that the majority of areas would be suitable for the intended use with the exception of several thoroughfares, entrances, an existing bus stop during the windiest season and ground level amenity and roof terraces during the summer season, which would continue to have significant effects. There would be strong winds exceeding the threshold at one location at the north-west corner of Plot C. Refer to **page 39** for a detailed breakdown of these wind conditions.
- 13.7** Wind mitigation measures have been suggested in addition to the developed proposed landscaping and wind mitigation measures which would be expected to improve wind conditions further at the remaining windy areas of the Proposed Development. The effectiveness of these measures to ensure a suitable wind microclimate will be assessed at the reserved matters stages and secured through an appropriately worded planning condition for the Outline Proposals and should, where possible be integrated into the detailed design of the Proposed Development and associated landscaping scheme. All of the wind microclimate residual effects, following the implementation of wind mitigation measures, would be not significant, where the wind conditions would be expected to be the same or calmer than the desired comfort category.
- 13.8** In the context of cumulative surrounding buildings, wind conditions at the Proposed Development in the aforementioned phasing scenarios would all improve, however, the significant effects at the majority of areas would persist including the safety exceedances. Refer to **pages 58, 66, 77, 88** for a detailed breakdown of the wind conditions in the context of cumulative surrounds.
- 13.9** Wind mitigation measures required to improve wind conditions in the context of existing surrounding buildings would remain necessary in the context of cumulative surrounding buildings. Similarly measures expected to improve wind conditions in the context of existing surrounding buildings would be expected to remain effective in the cumulative scenarios.
- 13.10** In all off-site locations wind conditions would remain suitable for the intended use for the tested scenarios.

ASSESSMENT METHODOLOGY

Defining the Baseline

- 13.11** The baseline conditions of the Site in its existing condition (referred to as the 'existing Site') together with the wider surrounding area (within a 450m radius of the site) have been defined using wind tunnel testing to provide a detailed, quantitative assessment of the existing wind microclimate conditions in terms of pedestrian comfort and safety.
- 13.12** Mean and peak wind speeds have been measured at each location around the existing Site and within the wider surrounding area at a scaled height of 1.5m (in accordance with the Lawson Comfort Criteria) above ground level for both the windiest season (normally winter in the UK) to show the worst-case scenario, and summer season for amenity spaces (amenity spaces are assessed during the summer season as these areas are expected to be used most frequently during this period with an expectation of calmer conditions compared to other times of the year). They have also been measured at locations across the existing Site and at other surrounding buildings, paths, roads, areas of open spaces and elevated amenity spaces (including balconies) for 36 wind directions in 10° increments within a 450m radius of the Site which is considered a large enough scale to ensure all wind effects are captured. Details of the tunnel test methodology is presented in the 'Wind Tunnel Test Methodology' section of this ES Chapter.
- 13.13** The results have been combined with long-term meteorological climate data for the London area (Heathrow and London City Airports). The meteorological data used in this assessment is deemed to be representative of the local wind microclimate for the London area. The meteorological data used is presented within 'Baseline Condition – Meteorological Data' section and shown as a 'wind rose' in **Figure 2 of ES Volume 3, Appendix: Wind Microclimate – Annex 2**.
- 13.14** The baseline conditions are reflected within the wind scenario – 'Configuration 1: Existing Site with Existing Surrounding Buildings' (also referred as the 'Baseline Scenario'). Further detail on the wind tunnel testing methodology can be found in **ES Volume 3, Appendix: Wind Microclimate – Annex 2**.

13.15 It is acknowledged that a direct comparison with the baseline conditions would be useful to understand changes from the existing (baseline) wind conditions across the site due to the Proposed Development. However, a comparison of the measured wind environment for the Proposed Development with the existing conditions does not take into account any change in pedestrian activity that would accompany the Proposed Development. Comparisons between the baseline scenario and 'completed development' scenarios have therefore been made where pedestrian activity is the same in the baseline and with the Proposed Development in place.

Evolution of the Baseline

13.16 The evolved baseline is a baseline condition at an indeterminate point in the future, for a scenario which assumes all of the cumulative schemes are built in the surrounding environment and that the surrounding environment, including the Site, has naturally evolved (e.g. trees / scrub have grown larger), in the absence of the Proposed Development being implemented. The cumulative scenario would provide information of the general changes, if any, in wind conditions around the site as a result of the cumulative schemes.

13.17 The likely evolution of the baseline wind conditions at the Site in the future, in the absence of the Proposed Development, has been tested in the wind tunnel in 'Configuration 6: Existing Site with Cumulative Surrounding Buildings'. The cumulative effects assessment takes into account the relevant cumulative schemes within the area surrounding the Site that have the potential to influence wind conditions within and immediately surrounding the site (presented within **ES Volume 1, Chapter 2: EIA Methodology**).

Impact Assessment Methodology

Demolition and Construction

13.18 The potential microclimate impacts during demolition and construction works 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. The potential wind impacts of the Proposed Development during construction are assessed using the professional judgement of an experienced wind engineer in **ES Volume 3, Appendix Introduction – Annex 1**, based on an assessment of the background wind microclimate at the Site (the results of the tested configurations for the baseline and completed development scenarios) and an understanding of the likely effects based on RWDI's experience of assessing wind in the built environment.

13.19 This approach was taken assuming that the activity on-site during this time (i.e. construction activity) is less sensitive to wind conditions (due to protection from site hoarding, and site access being restricted to site workers) than when the Proposed Development is completed and occupied (which would include new building entrances and outdoor seating with amenity spaces, for example). In addition, there would be appropriate health and safety measures implemented (through a Construction Environmental Management Plan (CEMP)) to ensure that the construction workers were adequately protected.

13.20 Windier conditions (in terms of pedestrian comfort) will be tolerable across the active demolition and construction site as this area is not for typical pedestrian use (see section 'Assumptions and Limitations' below).

13.21 With regard to the use of cranes on-site, it can be noted that these are typically slender and relatively "open" in structure. They would therefore not be expected to introduce any material microclimate effects to the site or surrounding area that would require assessment in this ES chapter. The indicative crane locations are displayed in **ES Volume 1, Chapter 5: Demolition and Construction**.

Phasing

13.22 Wind conditions at the Proposed Development have been quantitatively assessed for the completed and operational development only as this would be expected to be the worst case (i.e. windiest) scenario. Wind conditions during the demolition/construction phase have been assessed qualitatively as detailed above based on the expected change in wind conditions between the existing site and the Completed Development.

13.23 Phasing has been quantitatively assessed for the scenario of the Detailed Proposals (Phase A) only, as they come forward ahead of the Outline Proposals, in Configurations 2 and 7 and with the outline phases of the masterplan in Configurations 3-5 and 8-10. The details of these configurations are discussed in **Paragraph 13.39** and images of the setup are shown in **ES Volume 3, Appendix: Wind Microclimate – Annex 2**.

Completed Development

13.24 In order to assess the local wind environment associated with the completed Proposed Development and the resulting pedestrian comfort within and surrounding the Site, wind tunnel testing of the Proposed Development has been undertaken.

13.25 Wind tunnel testing is one of the most well-established and robust means of assessing the pedestrian wind microclimate. Such testing allows the pedestrian level wind microclimate within and surrounding the Site to be quantified and classified in accordance with the accepted criteria (refer to 'Assessment Criteria' section of this ES Chapter).

13.26 Wind tunnel testing provides a detailed assessment of the mean and gust wind conditions in and around the site for 36 wind directions, in 10° increments in terms of pedestrian comfort and safety and provides a basis to assess the potential wind microclimate impacts and likely effects of the Proposed Development with regards to its intended use. Strong winds are also reported when they occur.

Outline Proposals

13.27 The Maximum Parameter massing of the Outline phase of the Proposed Development has been assessed to represent the worst-case scenario and the Illustrative Scheme that is more representative of the potential massing that could come forward as part of the approved design, within subsequent Reserved Matter Applications. It should also be recognised that the maximum parameters do not include the locations of entrances, balconies and/or amenity spaces, but worst-case assumptions have therefore been used where appropriate relating to the likely pedestrian uses, with mitigation identified as necessary.

13.28 The Illustrative Scheme model of the Proposed Development includes a proposed landscaping scheme and provides architectural details (such as recessed entrances, parapets, balustrades etc.) which fundamentally affect the aerodynamics of buildings and this would be expected to be more representative of the eventual detailed scheme which could come forward through Reserved Matters Application's (RMA's). Assessment of the Illustrative Scheme also allows for locations to be referenced to a target use of the Site (i.e. entrances, amenity space, thoroughfares etc.) which is a key component of wind microclimate assessments, and provides a scenario representative of the likely on-site wind microclimate. By undertaking an assessment of the Illustrative Scheme, it demonstrates that a detailed scheme could come forward within the parameters sought for approval, which would be acceptable from a wind perspective.

13.29 Testing the Maximum Parameter Model of the Proposed Development and the Illustrative Scheme provides a robust assessment of the worst range of possible wind conditions on-site (being the Maximum Parameter Model of the Outline Proposals of the Proposed Development) with a more realistic scenario (the Illustrative Scheme). Mitigation is only conducted on the Illustrative Scheme as it provides a more realistic representation of the real wind conditions when the Proposed Development comes forward. Mitigating the Maximum Parameter Model scheme would not be reasonable and would result in unnecessarily large measures which could be unfeasible and unrealistic; this would not be representative of a scheme which could be developed and for which no landscaping has been proposed.

13.30 The detailed wind mitigation strategy would be tested at the RMA stage and secured by an appropriately worded planning condition as relevant and more specific mitigation would be developed if required and be part of the design/landscaping of each specific future detailed phase of development.

Assumptions and Limitations

13.31 It is assumed that there will be site hoarding with restricted access (i.e. not accessible to the general public) across the site during the demolition and construction work. As the area would not typically be for the pedestrian use, windier conditions would be tolerable during demolition and construction activities.

13.32 The assessment is based on worst-case wind speeds, expected to be encountered during the winter season (December, January and February) in the UK. Additional consideration has been made for summer (June, July and August) wind conditions due to the presence of roof terrace level public amenity space. This complies with the standard methodology set out by Lawson (discussed in **paragraph 13.43**) for wind-microclimate assessments.

13.33 The usage of outdoor amenity spaces and rooftop terraces has been assessed for the summer season only as it is expected that the wind environment will play a larger role in the usability of these spaces during this period. During the windiest season (winter), it is expected that other environmental factors (such as precipitation and temperature) would play more of a role in the usability of these spaces.

Wind Tunnel Testing Methodology

13.34 The methodology for quantifying the pedestrian level wind environment is outlined below within four steps. Full details of the assessment methodology can be obtained by reference to **ES Volume 3, Appendix Wind Microclimate - Annex 2**:

- Step 1: The subject 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 a subject site (for this assessment, meteorological data has been derived from London meteorological stations (Heathrow and London City Airports));
- 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 a subject site.

13.35 To produce the results within the wind tunnel, a 1:300 scale model comprising the site and the surrounding area (including relevant existing and future buildings and other topographical features) was constructed allowing for the surrounding area within a 450 metre (m) radius of the centre of the site of the Proposed Development to be modelled (the radius is determined based on the scale model and due to the physical constraints of the wind tunnel test section) (**Figure 13.1**). This radius is considered a large enough scale to ensure all likely wind effects are captured. Other developments outside the 450m radius of the site would not individually be expected to modify the wind approaching the site and as such have been included within the analysis of the surrounding terrain.

13.36 In order to model the likely effects of gustiness or turbulence (which depends on the geographical location) a series of spires and floor roughness elements have been employed in the wind tunnel in order to create a 'boundary layer' that is representative of the urban location of the site.

13.37 Wind speed measurements around the Site for the tested configurations were established using Irwin probes. These measure the mean and peak (gust) wind speeds at a full-scale height of approximately 1.5m above the surface upon which the probe is located. These results are combined with long-term meteorological climate data for the London area and then benchmarked against the Lawson Comfort Criteria (LDDC variant - both in terms of pedestrian comfort and safety), to determine the suitability of different areas within and surrounding the site.

13.38 The wind speed was measured at up to 496 locations for the Proposed Development scenarios and the baseline scenarios for all wind directions in equal increments, with 0° representing wind blowing from the north and 90° wind from the east (and so on). Some probe numbers will not be present in specific configurations due to probe locations clashing with the existing buildings or the probed building is not forming part of the assessment.

Model Configurations Assessed

13.39 The assessment of the wind microclimate is based on the results from the test of the physical model within the wind tunnel to provide a detailed, quantitative assessment.

13.40 Therefore, the wind microclimate across the Site was tested for the following configurations:

- Configuration 1: Existing Site with Existing Surrounding Buildings;
- Configuration 2: Detailed Proposals (Phase A) with Existing Surrounding Buildings;
- Configuration 3: Proposed Development (Outline Proposals plus Detailed Proposals) with Existing Surrounding Buildings;
- Configuration 4: Proposed Development (Illustrative Scheme) and Phase A with Existing Surrounding Buildings;
- Configuration 5: Proposed Development (Illustrative Scheme) and Phase A with Existing Surrounding Buildings, Proposed Landscaping and Wind Mitigation Measures;
- Configuration 6: Existing Site with Cumulative Surrounding Buildings;
- Configuration 7: Detailed Proposals (Phase A) with Cumulative Surrounding Buildings;
- Configuration 8: Proposed Development (Outline Proposals plus Detailed Proposals) with Cumulative Surrounding Buildings;
- Configuration 9: Proposed Development (Illustrative Scheme) and Phase A with Cumulative Surrounding Buildings; and

- Configuration 10: Proposed Development (Illustrative Scheme) and Phase A with Cumulative Surrounding Buildings, Proposed Landscaping and Wind Mitigation Measures.

13.41 No landscaping has been assessed for Configurations 1-4 and 6-9 in order to present a worst-case scenario. The proposed landscaping design along with the developed wind mitigation measures have been incorporated into Configurations 5 and 10 to test the effectiveness of the proposed landscaping scheme and wind mitigation measures.

13.42 Discussion of Configurations 5 and 10 are based on outcomes of several wind mitigation workshops that were undertaken with the design team to collectively establish and agree suitable wind mitigation measures to resolve any comfort/safety issues within and around the Proposed Development.

13.43 The cumulative schemes identified within the 450m radius of the Site assessed in the wind tunnel model (in Configurations 6-10) are:

- Leven Road Gasworks (Planning Ref: PA/18/02803/A1);
- Former Poplar Bus Depot (Planning Ref: PA/19/02148/A1)
- Ailsa Wharf (Planning Ref: PA/16/02692 & PA/18/03461); and
- Islay Wharf (Planning Ref: PA/19/01760).

Figure 13.1 View from the south of the Proposed Development (Outline Proposals plus Detailed Proposals) with Cumulative Surrounding Buildings in the wind tunnel (Configuration 8)



Assessment Criteria






Lawson Comfort Criteria

13.44 The assessment of the wind conditions requires a standard against which the measurements can be compared. The assessment of the wind tunnel test results presented in this ES chapter adopts the Lawson Comfort Criteria

(‘the Lawson Criteria’) (LDDC version)¹. The Lawson Comfort Criteria, which seek to define the reaction of an average pedestrian to the wind, are described in **Figure 13.1**. 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

- 13.45** The Lawson Comfort Criteria sets out four pedestrian activities and reflects the fact that less active pursuits require more benign wind conditions. The four categories are sitting, standing, strolling and walking, in ascending order of activity level, with a fifth category for conditions that are uncomfortable for all pedestrian uses. In other words, the wind conditions in an area for sitting need to be calmer than a location that people merely walk past. 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.
- 13.46** The Lawson Comfort Criteria are derived for open air conditions and assume that pedestrians would be suitably dressed for the season. Thermal comfort is not evaluated as part of the assessment.
- 13.47** The coloured key in **Table 13.1** corresponds to the presentation of wind tunnel test results described later in this ES Chapter.

Table 13.1 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 ²	6-8 m/s	Moderate breezes that would be appropriate 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.

Target Wind Conditions

- 13.48** For a mixed-use urban environment, such as the site and surrounding area, the desired wind microclimate for the Proposed Development and surrounding area would typically need to have areas suitable for sitting, standing/entrance use and strolling.
- 13.49** The walking and uncomfortable classifications may be acceptable in isolated areas, but these classifications are also associated with occasional strong winds (which are described below) and so the aim has been to avoid conditions falling into these categories.
- 13.50** The assessment is based on worst-case wind speeds, expected to be encountered during the winter season (December, January and February) in the UK. Additional consideration has been made for summer (June, July and August) wind conditions due to the presence of above ground amenity spaces (podium, terrace and balcony levels). This complies with the standard methodology set out by Lawson for wind-microclimate assessments.

Thoroughfares

- 13.51** A pedestrian thoroughfare should be suitable for strolling or calmer during the windiest season. The assessment for pedestrian thoroughfares therefore focuses on the windiest season result, as a worst-case assessment.
- 13.52** Localised occurrences of walking conditions may be acceptable in areas with limited footfall, or service areas, as long as the strong wind criteria (see section ‘Strong Winds’) is not exceeded.

Entrances

- 13.53** In areas in proximity to building entrances, a wind environment suitable for standing or calmer is desired, as pedestrians will transition from the calm indoors to the windier outdoors throughout the year. The assessment for building entrances therefore focuses on the windiest season result, as a worst-case assessment.
- 13.54** Generally, an entrance that is recessed provides a transitional zone with calmer wind conditions for pedestrians exiting the building. If strolling conditions were observed on the pavement outside a recessed entrance, acceptable standing conditions would be expected at the recessed entrance and would therefore be suitable for an entrance use.

Pedestrian Crossings

- 13.55** Pedestrian crossings should be suitable for walking or calmer use during the windiest season.

Bus Stops

- 13.56** Bus stops should have wind conditions suitable for standing or calmer use during the windiest season.

Amenity Areas and Podium Terraces

- 13.57** The target conditions for seating in amenity areas is a wind microclimate that is suitable for sitting use during the summer season. This is because these areas are more likely to be frequently used during the summer when pedestrians would expect to be able to sit comfortably. If an area is classified as suitable for sitting in the summer, the windier conditions that occur during the winter season usually mean that the area would be classified as suitable for standing in the windiest season, unless additional shelter was provided. This is considered to be tolerable on the basis that such an area would be most frequently used for sitting during the summer months. At other times of the year, the expectation of usability is lower due to other factors such as temperature and precipitation.

- 13.58** Large upper-level terraces and large amenity spaces are assessed on the basis that they are intended for good weather use only. A mix of sitting and standing conditions during the summer would be acceptable provided that any desired seating areas are situated in areas having sitting use wind conditions.

Balconies

- 13.59** The target wind conditions for balcony levels is a wind microclimate that is suitable for standing use or calmer during the summer season.

Strong Winds

- 13.60** The Lawson Criteria also specifies a strong wind threshold when winds exceed 15m/s for more than 0.025% of the time (approximately 2.2 hours of the year) and would have the potential to cause distress to pedestrians and cyclists. These instances are referred to as ‘S15 Exceeded’ in the figures. Exceedance of this threshold may indicate a need for remedial measures or a careful assessment of the expected use of that location; e.g. is it reasonable to expect older adults or young children to be present at the location on the windiest day of the year?
- 13.61** Wind speeds that exceed 20m/s for more than 0.025% of the time (approximately 2.2 hours of the year) represent safety issues for all members of the population and would require mitigation to provide an appropriate wind microclimate environment. These instances are referred to as ‘S20 Exceeded’ in the figures.
- 13.62** Strong winds are generally associated with areas which would be classified as acceptable for walking or conditions which would be considered uncomfortable. In a mixed-use urban development scheme, walking and uncomfortable conditions would not usually form part of the ‘target’ wind environment and would usually require mitigation due to pedestrian comfort considerations. This mitigation would also have the impact of reducing the frequency of, or even eliminate, any strong winds.

Vehicles and Cyclists

- 13.63** The Lawson Criteria does not specifically assess the potential for vehicles to overturn in high winds. However, given that strong wind occurrences would require mitigation in any case (for the safety of pedestrians and cyclists), such mitigation would also minimise the risk of vehicle overturning.

¹ Building Aerodynamics, (2001); Lawson T.

² 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.

13.64 The Lawson Criteria does not specify criteria for acceptable wind conditions for cyclists; however, the occurrence of winds exceeding the strong winds threshold would be considered unsuitable for cyclists. The assessment for roads focuses on annual strong winds.

Methodology for Defining Effects

Receptors and Receptor Sensitivity

13.65 The sensitivity of a receptor at the Site in the presence of the Proposed Development is high and equal for all measurement locations. This is because the effect criteria for the wind assessment is based on whether the wind environment of the Site is acceptable for the intended use. As such, an equal sensitivity is assigned to each receptor within and surrounding the Proposed Development. The geographical extent of the wind microclimate is expected to be within the Site and its immediate surroundings i.e. a local effect, for all receptors.

13.66 The description of receptor categories for the site and the approach taken to the allocation of the probe locations to the categories is as follows:

- On-site locations:
 - Pedestrian Thoroughfares: includes areas that are immediately adjacent to the Proposed Development (i.e. within 5m of the building line). This also includes thoroughfares within the Proposed Development;
 - Entrances: includes entrances at ground level;
 - Amenity areas: ground floor, podium, balcony and roof terrace.
- Off-site locations:
 - All receptors falling outside the definition of the boundary of the Site; such as along roadways, car parks, surrounding building entrances, amenity areas (including terraces and balconies of nearby buildings), thoroughfares, bus stops and pedestrian crossings.

Magnitude of Impact

13.67 The magnitude of impact for all receptors are defined as high. The impact of all receptors is consistent (in respect of the specific wind direction and speed defined by standard meteorological data) and the effect at each probe location is in accordance with the Lawson Comfort Criteria, described in **Figure 13.1**. The impacts to all receptors are the same, as any receptor which has wind conditions windier than required for the intended use will require mitigation, regardless of location.

Defining the Effect

13.68 The assessment of the likely scale of effect is based on the comparison of the predicated wind conditions at a particular measurement location with the desired pedestrian use of the site as defined in the Lawson Comfort Criteria and defined in **Figure 13.2**. Where appropriate, wind conditions experienced across the site are also compared against the baseline conditions.

13.69 In line with Lawson’s overall methodology, strong winds (affecting pedestrian safety) are reported separately from the comfort assessment and do not form a part of the scale of effect criteria. This is due to the fact that any strong wind exceedance is considered to be significant and cannot be scaled to major / moderate / minor. Where strong winds occur, mitigation is required (as per adverse effects related to pedestrian comfort).

Table 13.2 Scale And Nature of Effect

Expected Wind Microclimate	Scale and Nature of Effect
Wind conditions are 3-steps calmer than those desired	Major Beneficial
Wind conditions are 2-steps calmer than those desired	Moderate Beneficial
Wind conditions are 1-step calmer than those desired	Minor Beneficial
Wind conditions are as desired	Negligible
Wind conditions are 1-step windier than those desired	Minor Adverse

Expected Wind Microclimate	Scale and Nature of Effect
Wind conditions are 2-steps windier than those desired	Moderate Adverse
Wind conditions are 3-steps windier than those desired	Major Adverse

13.70 The minor, moderate and major categories indicate the severity of the change in wind conditions between the desired wind microclimate and the wind microclimate presented in the modelled results. As an example, if the desired 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 desired and predicted wind conditions is one category windier than desired. In this case, the scale of the effect would be identified as ‘Minor Adverse’.

13.71 The residual effects reported during demolition / construction of the Proposed Development are considered to be direct, local and short-term (temporary), whereas effects outlined in the assessment for the completed and occupied Proposed Development are direct, local and long-term (permanent).

Categorising Likely Significant Effects

13.72 Any adverse effect is a ‘significant effect’ because it implies that a location, or area, has a wind microclimate that is unsuitable for the desired use of that area. On this basis, effects that are adverse need mitigating. Beneficial effects that are minor, moderate or major in scale are not considered to be significant. In addition, any identified strong winds will be classed as ‘significant’.

13.73 The ‘Mitigation, Monitoring and Residual Effects’ section of this ES chapter describes the remedial measures expected to mitigate the effect in the event of adverse effects occurring.

13.74 In terms of off-site areas, wind conditions are compared to the baseline scenario and the intended use. If wind conditions remain consistent with or calmer than the baseline scenario, or remain suitable for the intended use, this would represent a negligible effect. However, if wind conditions around the site are windier than the baseline scenario and unsuitable for the intended use, the effect would be adverse and significant. Wind conditions off-site will only be classified as beneficial if wind conditions were not suitable for the intended use in the 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 baseline, but remain suitable for the intended use, this would remain a negligible effect.

13.75 Strong winds (affecting pedestrian safety) are not assigned a scale of effect and so overall significance but, 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 conditions related to pedestrian comfort).

13.76 The discussion of wind conditions focused on the significant effects only due to the large number of receptors used for this assessment. All unmentioned areas would be appropriate for the intended use and thus deemed not significant.

BASELINE CONDITIONS

Meteorological Data

13.77 The UK Meteorological Office supplies records of the number of hours that wind occurs for ranges of wind speed and by direction. Meteorological data for London Combined (Heathrow and London City Airports) provides a representation of the local wind microclimate for the wider London area. Further details of the meteorological data used for this assessment can be found in section 2.4 in **ES Volume 3, Appendix: Wind Microclimate - Annex 2**.

13.78 The meteorological data obtained for London indicates that the prevailing wind throughout the year is from the south-west (i.e. 210 to 240 degrees on the compass). This 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.

13.79 The meteorological data from each airport has been corrected to open country conditions at 10m height, to account for the effects of nearby terrain, using the methodology set out in ESDU 01008³.

Configuration 1: Existing Site with Existing Surrounding Buildings

13.80 Wind conditions for Configuration 1 (the baseline scenario) are presented in **Figure 13.2** for the windiest season and **Figure 13.3** for the summer season. **Figure 13.4** presents summer season results for elevated levels. Occurrence of annual strong winds are presented in **Figure 13.5** for ground floor and **Figure 13.6** for elevated levels.

Pedestrian Comfort

13.81 During the windiest season (**Figure 13.2**) wind conditions at all on-site and off-site probe locations (throughfares, entrances, bus stops and pedestrian crossings) range from suitable for sitting to standing use.

13.82 Wind conditions during the summer season (**Figure 13.3**) are typically the same or one category calmer with a larger area fulfilling the sitting use criteria.

13.83 Wind conditions at elevated levels of off-site buildings noted in **Figure 13.7** would also be suitable for sitting to standing use during the summer season (**Figure 13.4**).

Strong Winds

13.84 There are no instances of strong winds exceeding the safety threshold at any probe location within and around the site in the baseline scenario.

³ ESDU International, Computer program for wind speeds and turbulence properties: flat or hilly sites in terrain with roughness changes, ESDU 01008, 2001 01008

Figure 13.2 Configuration 1: Existing Site with Existing Surrounding Buildings – Ground Level (Windiest Season)

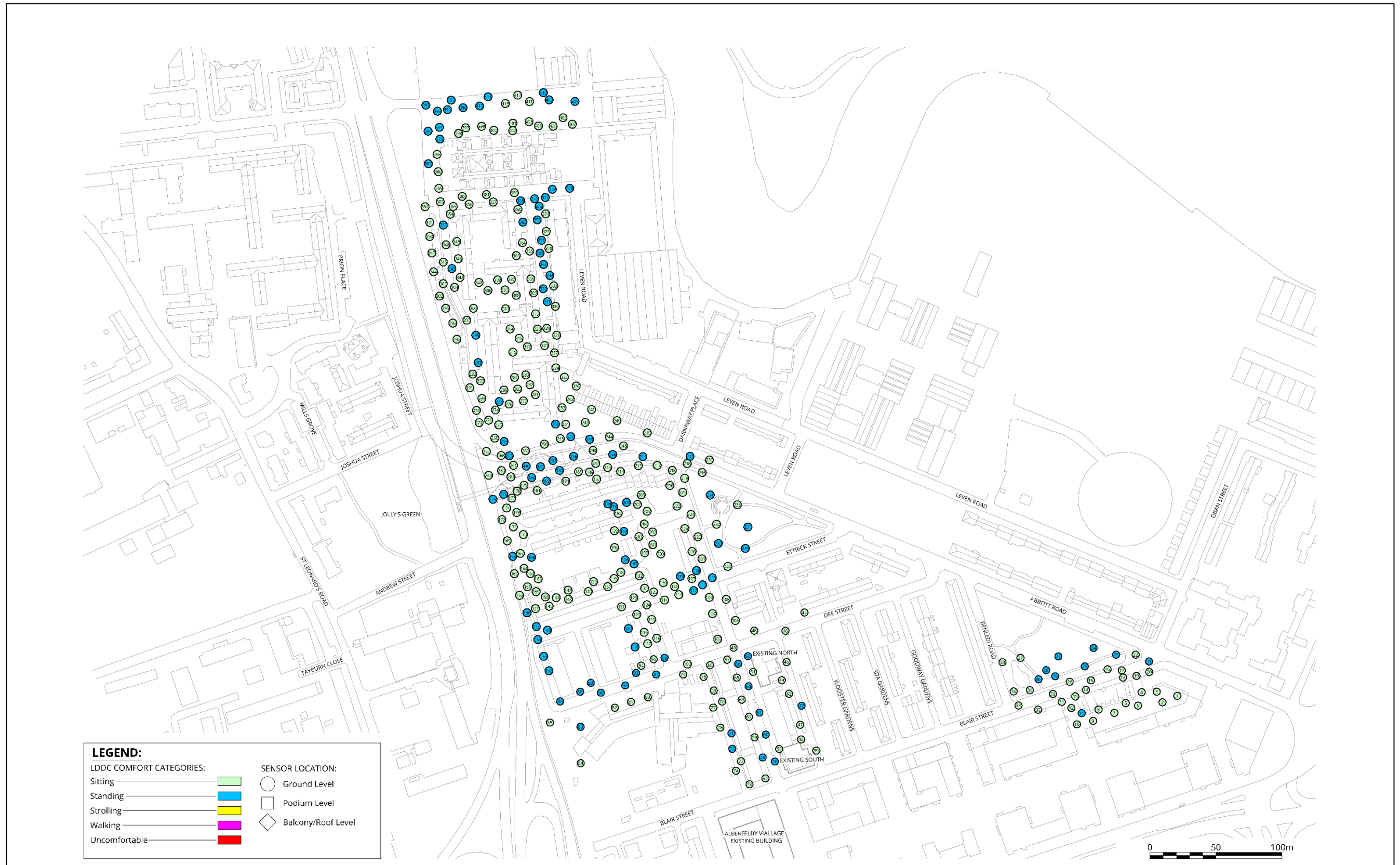


Figure 13.3 Configuration 1: Existing Site with Existing Surrounding Buildings – Ground Level (Summer Season)



Figure 13.4 Configuration 1: Existing Site with Existing Surrounding Buildings – Elevated Levels (Summer Season)

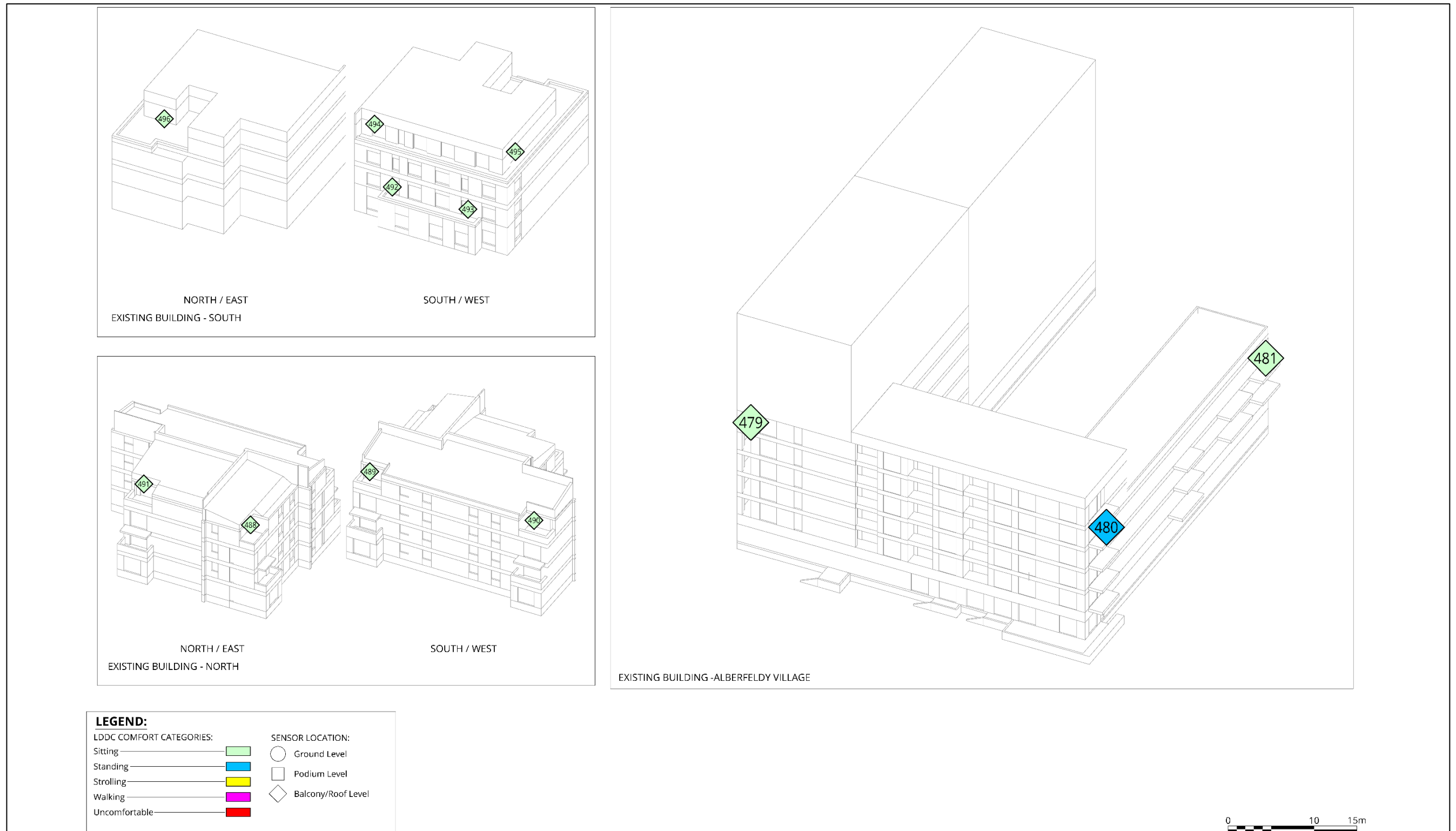


Figure 13.5 Configuration 1: Existing Site with Existing Surrounding Buildings – Ground Level (Strong Winds)

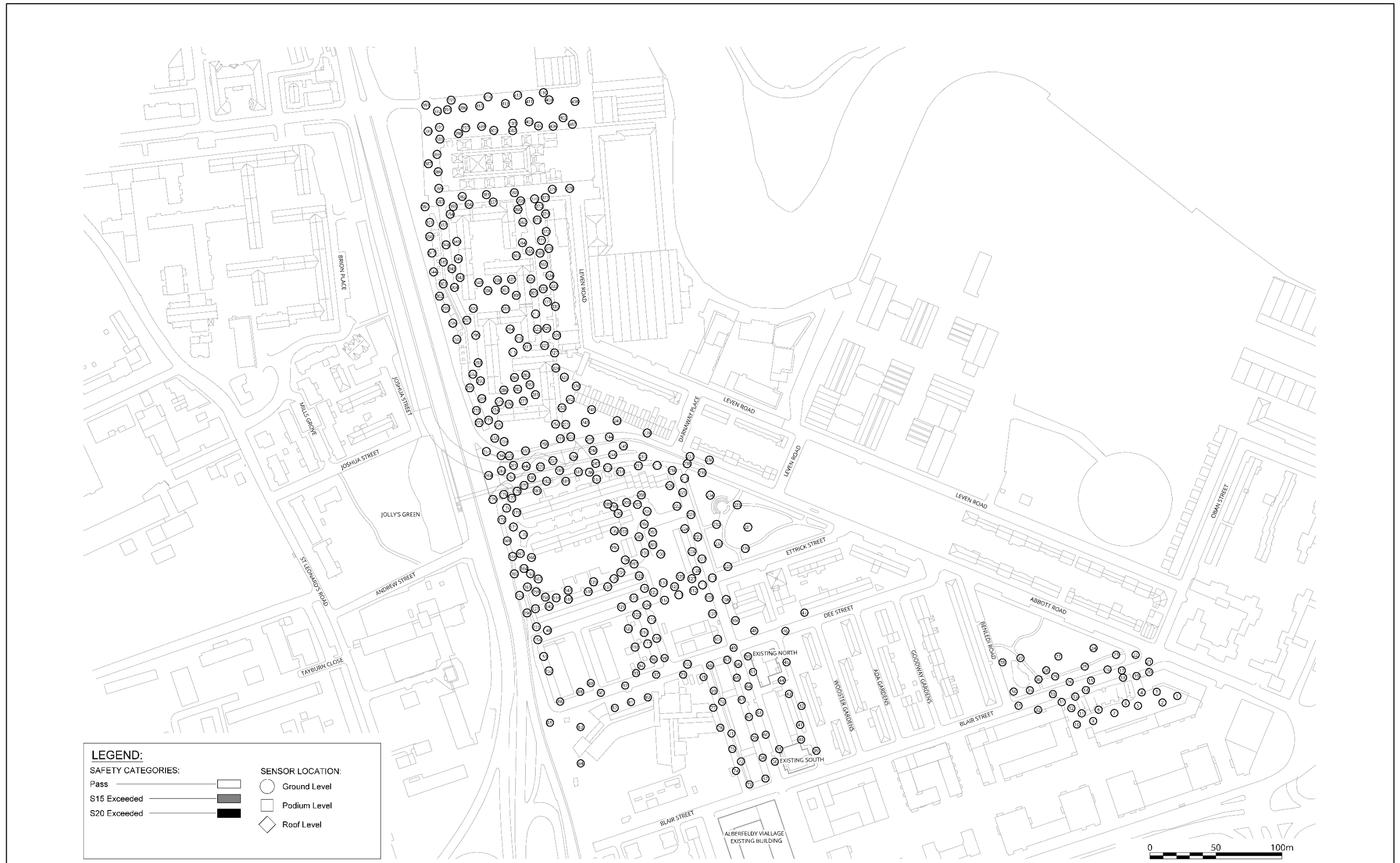
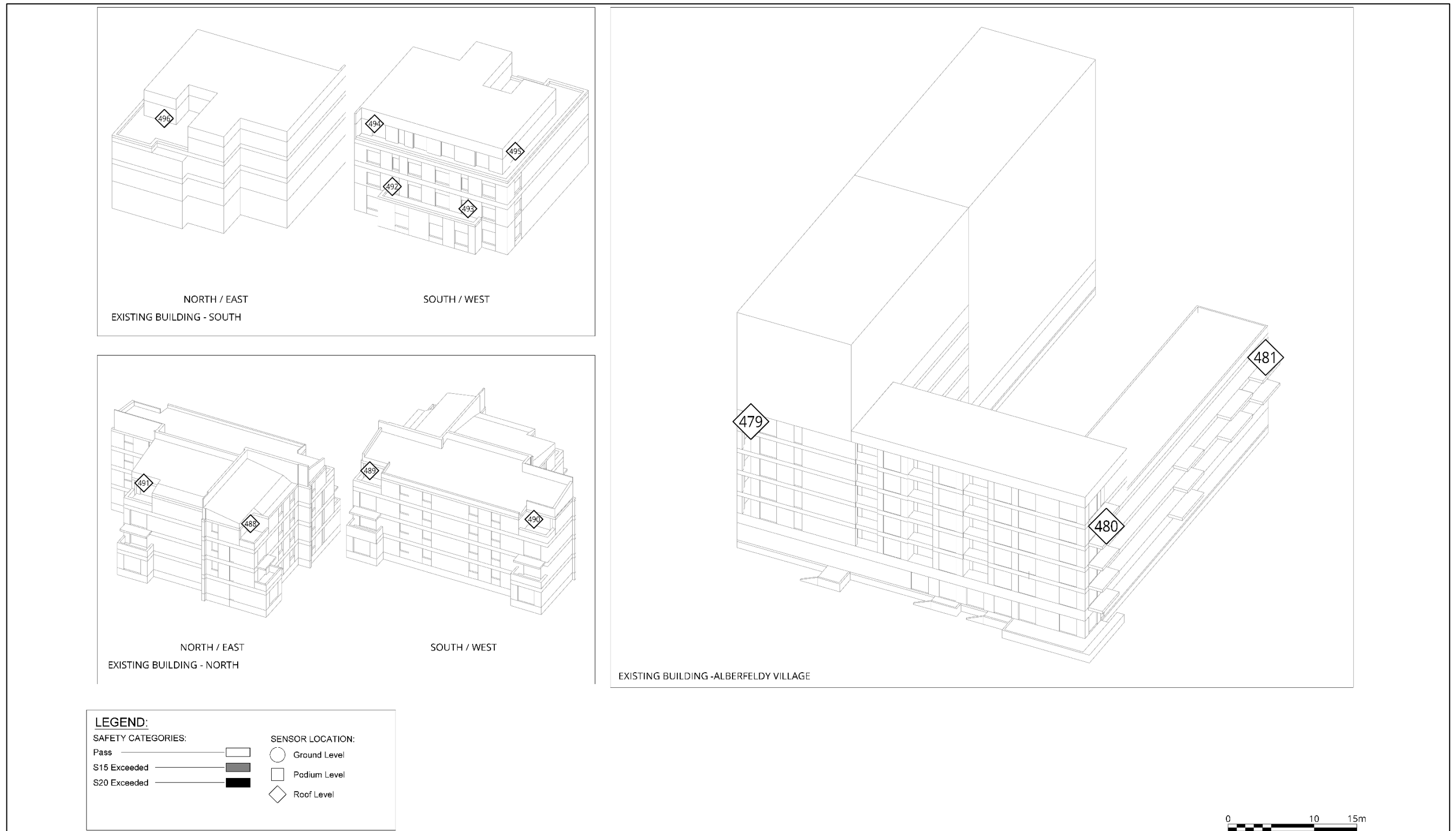


Figure 13.6 Configuration 1: Existing Site with Existing Surrounding Buildings – Elevated Levels (Strong Winds)



RECEPTORS AND RECEPTOR SENSITIVITY

Existing

13.85 The existing sensitive receptors that could be affected by the Proposed Development include pedestrians and construction workers using the surrounding thoroughfares, the users of entrances at the immediate surrounding buildings and bus stops, and users of amenity space (including terraces and balconies). Table 13.3 sets out the probe location numbers and the corresponding receptors on the Site and in the surrounding area that would be affected by the Proposed Development.

Table 13.3 Likely receptors of the Existing Site

Receptor Type (Season)	Required Wind Conditions	Receptor Reference (Measurement location numbers)
On-site		
Pedestrian thoroughfares (Windiest)	Strolling	1, 2, 3, 4, 6, 8, 11, 13, 16, 19, 22, 23, 25, 26, 28, 29, 31, 36, 37, 50, 51, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 74, 76, 77, 85, 88, 89, 93, 94, 96, 100, 107, 108, 110, 111, 112, 113, 116, 117, 118, 119, 121, 123, 124, 125, 126, 127, 128, 129, 130, 131, 134, 135, 137, 138, 140, 143, 144, 146, 148, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 167, 169, 170, 171, 175, 176, 177, 184, 185, 186, 187, 189, 192, 193, 194, 196, 197, 199, 200, 201, 202, 203, 204, 205, 207, 208, 209, 210, 215, 216, 217, 218, 219, 221, 223, 225, 227, 249, 252, 254, 257, 259, 264, 265, 267, 268, 270, 271, 272, 273, 274, 275, 276, 277, 281, 282, 283, 284, 286, 290, 293, 295, 297, 298, 299, 300, 302, 304, 306, 307, 309, 311, 313, 314, 315, 317, 318, 321, 326, 327, 329, 332, 335, 337, 338, 340, 343, 344, 345, 346, 348, 349, 350, 352, 354, 355, 356, 357, 359, 360, 362, 364, 365, 366, 369, 372, 373, 375, 376, 384, 391, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 410, 412, 414
Entrances (Windiest)	Standing	14, 18, 20, 32, 70, 71, 72, 73, 132, 142, 239, 240, 241, 285, 308, 334
Bus Stops (Windiest)	Standing	105, 106, 168
Pedestrian Crossings (Windiest)	Walking	237, 238
Ground Level Amenity – Mixed Use (Summer)	Sitting/Standing	24, 27, 34, 35, 38, 165, 166, 172, 173, 180, 183, 190, 213, 214, 371
Roads/Car Parks (Strong Winds)	No Strong Winds	5, 7, 9, 10, 12, 15, 17, 21, 30, 33, 39, 40, 41, 42, 43, 44, 45, 49, 69, 75, 86, 90, 92, 97, 98, 99, 109, 114, 115, 120, 122, 174, 178, 179, 181, 182, 220, 222, 224, 226, 242, 243, 244, 245, 246, 247, 248, 250, 251, 255, 256, 258, 260, 261, 262, 263, 266, 269, 289, 291, 292, 296, 303, 320, 324, 331, 342, 347, 351, 368, 392, 394, 409, 411, 413, 415, 440
Off-site		
Pedestrian thoroughfares (Windiest)	Strolling	47, 48, 78, 79, 84, 228, 229, 230, 231, 232, 233, 234, 235, 236, 374, 383, 385, 387, 388, 390, 393
Roof Amenity – Mixed Use (Summer)	Sitting/Standing	496
Balconies (Summer)	Sitting/Standing	479, 480, 481, 488, 489, 490, 491, 492, 493, 494, 495
Roads/Car Parks (Strong winds)	No Strong Winds	46, 80, 81, 82, 328, 330, 333, 370, 377, 378, 379, 380, 381, 382, 386, 389

13.86 Millennium Green was instrumented as it is located directly to the east of Block D and wind conditions would likely be influenced by the presence of this Block. In contrast, Leven Road Open Space is located much further away (to the east of Millennium Green) and wind conditions would unlikely be influenced by the presence of the Proposed Development.

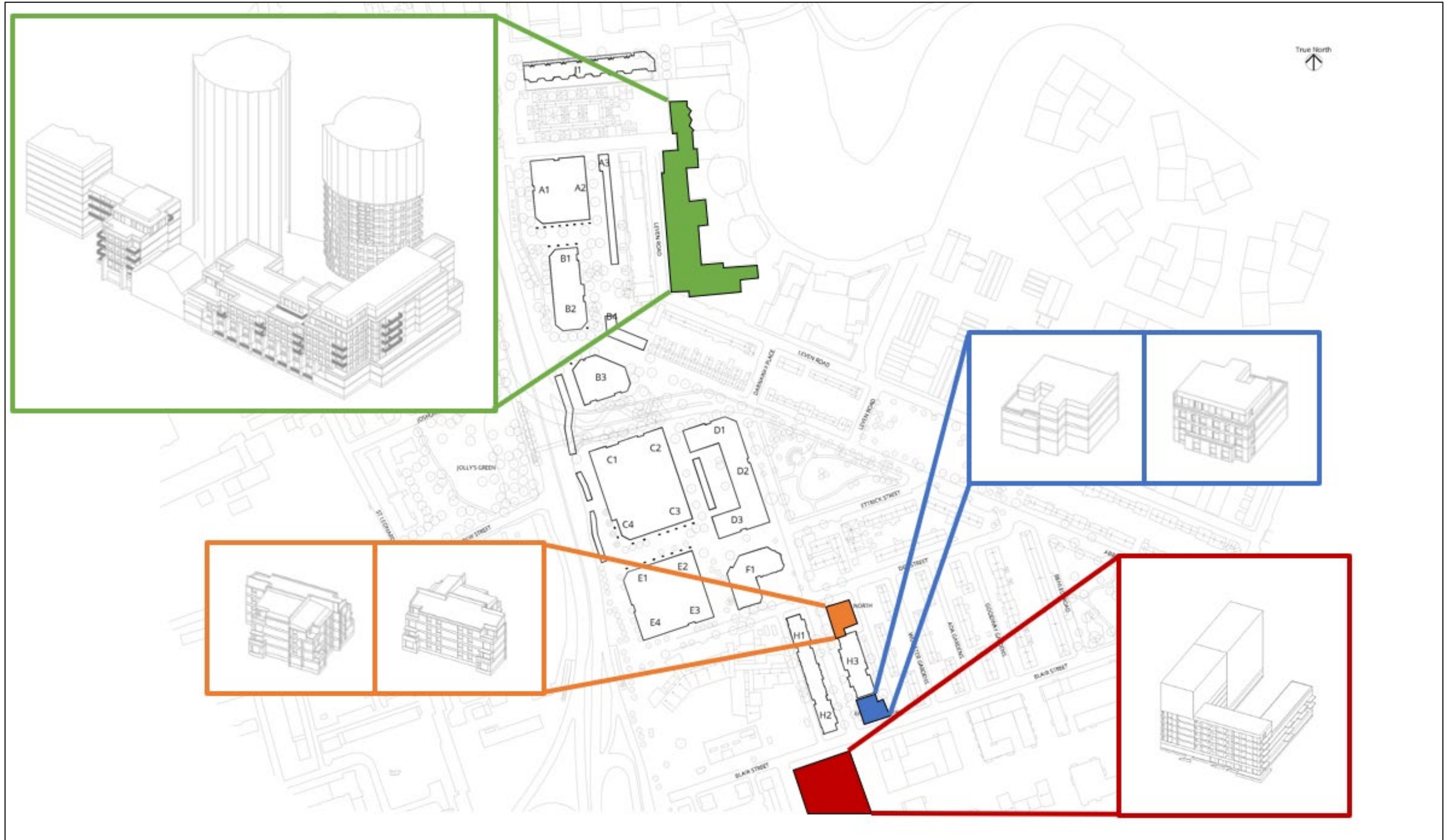
Introduced

13.87 The new sensitive receptors resulting from the introduction of the Proposed Development includes the users entering/exiting the Proposed Development; users of the open amenity areas/public realm in the Proposed Development (podium amenity, roof terraces and balconies); and pedestrians along thoroughfares that form part of the Proposed Development, in addition to the existing off-site sensitive receptors identified above. Table 13.4 sets out the receptors and their corresponding location that are being introduced on the site as part of the Proposed Development. off-Site buildings within close proximity to the Proposed Development were instrumented to assess the balconies and roof terraces around the Proposed Development are presented in Figure 13.7.

Table 13.4 Likely receptors of the Proposed Development

Receptor Type (Season)	Required Wind Conditions	Receptor Reference (Measurement location numbers)
On-site		
Pedestrian thoroughfares (Windiest)	Strolling	1, 2, 3, 4, 6, 8, 11, 13, 16, 19, 22, 23, 25, 26, 28, 29, 31, 36, 37, 41, 44, 50, 51, 53, 55, 56, 57, 60, 61, 64, 66, 67, 68, 71, 73, 74, 76, 77, 85, 87, 88, 93, 94, 95, 96, 98, 99, 101, 103, 104, 107, 108, 111, 117, 119, 123, 124, 128, 131, 132, 134, 135, 136, 144, 147, 148, 150, 151, 156, 157, 158, 160, 161, 164, 165, 167, 169, 172, 174, 175, 176, 177, 178, 179, 180, 182, 183, 185, 186, 187, 189, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 216, 217, 218, 219, 220, 227, 244, 245, 246, 247, 248, 249, 250, 251, 253, 254, 256, 258, 263, 264, 266, 267, 268, 269, 270, 271, 272, 274, 275, 277, 282, 283, 284, 288, 290, 292, 294, 296, 297, 298, 299, 301, 302, 303, 305, 307, 308, 310, 311, 314, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 329, 331, 332, 334, 336, 341, 342, 344, 345, 347, 350, 351, 354, 355, 358, 359, 363, 365, 368, 369, 371, 372, 373, 375, 376, 384, 391, 392, 394, 396, 398, 400, 402, 404, 405, 406, 407, 408, 409, 411, 413, 415
Entrances (Windiest)	Standing	14, 18, 20, 32, 40, 43, 52, 54, 58, 59, 62, 63, 65, 70, 72, 89, 91, 102, 109, 112, 113, 114, 116, 118, 120, 121, 129, 130, 138, 139, 141, 142, 145, 149, 162, 166, 170, 173, 181, 184, 188, 190, 191, 194, 195, 214, 215, 222, 224, 239, 240, 241, 242, 255, 260, 276, 278, 280, 287, 293, 295, 300, 306, 309, 313, 315, 335, 339, 346, 349, 353, 356, 357, 361, 366, 397, 399, 401, 403
Bus Stops (Windiest)	Standing	105, 106, 168
Pedestrian Crossings (Windiest)	Walking	237, 238
Ground Level Amenity – Mixed Use (Summer)	Sitting/Standing	24, 27, 34, 35, 38, 193, 257, 259, 261, 262, 440
Ground Level Amenity – Seating (Summer)	Sitting	115, 122, 192, 226, 265, 312, 316
Podium Level Amenity – Mixed Use (Summer)	Sitting/Standing	419, 420, 421, 428, 429, 430, 437, 438, 439
Balconies (Summer)	Sitting/Standing	454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 477, 478
Roads/Car Parks (Strong Winds)	No Strong Winds	5, 7, 9, 10, 12, 15, 17, 21, 30, 33, 39, 42, 45, 49, 69, 75, 86, 90, 92, 97, 100, 110, 125, 126, 127, 133, 137, 140, 143, 146, 152, 153, 154, 155, 159, 163, 171, 221, 223, 225, 243, 252, 273, 279, 281, 285, 286, 289, 291, 304, 337, 338, 340, 343, 348, 352, 360, 362, 364, 367, 395, 410, 412, 414
Off-site		
Pedestrian thoroughfares (Windiest)	Strolling	47, 48, 78, 79, 84, 228, 229, 230, 231, 232, 233, 234, 235, 236, 328, 330, 333, 370, 374, 377, 385, 386, 388, 389
Ground Level Amenity – Mixed Use (Summer)	Sitting/Standing	83
Roof Amenity – Mixed Use (Summer)	Sitting/Standing	483, 484, 486, 487, 496
Balconies (Summer)	Sitting/Standing	479, 480, 481, 488, 489, 490, 491, 492, 493, 494, 495
Roads/Car Parks (Strong winds)	No Strong Winds	46, 80, 81, 82, 237, 378, 379, 380, 381, 382, 383, 387, 390, 393

Figure 13.7 Off-Site Buildings Instrumented to Assess Balcony and Roof Terrace Wind Conditions



POTENTIAL EFFECTS

Demolition and Construction

- 13.88** Based on the description of the baseline environment (Configuration 1), it would be expected that conditions during demolition and construction would be suitable for a working construction site and pedestrian thoroughfares around the site (with the hoarding in place). Therefore, the likely effect is expected to be **Negligible (Not Significant)** and no design and/or management measures are considered necessary during the demolition and construction of the Proposed Development.
- 13.89** During the demolition and construction period all off-site locations (thoroughfares, entrances and bus stops) would remain suitable for their intended uses. Strong winds exceeding the safety threshold would not occur at any off-site locations. It is therefore considered that there would be a **Negligible (Not Significant)** effect during demolition and construction of the Proposed Development.
- 13.90** As construction of the Proposed Development (Outline and Detailed Proposals) progresses, wind conditions at the Site would gradually adjust from those of the existing Site to those of the completed Proposed Development, as described in the following section 'Completed Development' (the effects of which range from **Major Beneficial (Not Significant)** to **Moderate Adverse (Significant)** once the Proposed Development is accessible). The Completed Development results are considered to be a worst-case assessment for the likely wind environment during construction works.
- 13.91** Wind mitigation measures discussed in **paragraphs 13.183 and 13.216** would need to be installed prior to the completion and occupation of the Proposed Development to mitigate against adverse wind conditions on-site once the Proposed Development is completed.

Completed Development

Detailed Proposals

Configuration 2: Detailed Proposals (Phase A) with Existing Surrounding Buildings

- 13.92** The assessment of the wind conditions for Configuration 2 is based on the results presented in **Figure 13.8** and **Figure 13.9** for the windiest and summer seasons respectively for ground floor level and **Figure 13.10** for elevated levels during the summer season. Safety exceedances are presented in **Figure 13.11** and **Figure 13.12** respectively for ground and elevated levels.

Pedestrian Comfort

- 13.93** With the Detailed Proposals built out, wind conditions within and surrounding the Site would be suitable for sitting use to strolling use during the windiest season.
- 13.94** During the summer season, wind conditions are either the same category or one category calmer and range from suitable for sitting to strolling use.

Thoroughfares

On-site

- 13.95** Wind conditions at thoroughfares within the Detailed Proposed would range from sitting to strolling use during the windiest season. This would represent **Moderate Beneficial (Not Significant)** to **Negligible (Not Significant)** effects.
- 13.96** All other thoroughfares within the Site would range from suitable for sitting to strolling use during the windiest season representing a **Moderate Beneficial (Not Significant)** to **Negligible (Not Significant)** effects.

Off-site

- 13.97** Off-site thoroughfares in the vicinity of the Site would be suitable for sitting (probe locations 47, 48, 79, 84, 228, 230, 231, 232, 233, 234, 235, 236, 328, 330, 333, 370, 374, 385, 386 and 388), and standing (probe locations 78, 229, 377 and 389) use during the windiest season, which would represent a **Negligible (Not Significant)** effect.

Entrances

- 13.98** Wind conditions at the majority of entrances to the Detailed Proposals would be range from suitable for sitting to standing use representing a **Minor Beneficial (Not Significant)** to **Negligible (Not Significant)** effects.

- 13.99** The exception to this would be at probe locations 112 and 114 which would one category windier than suitable representing a **Minor Adverse (Significant)** effect.

- 13.100** All other entrances within the Site would range from suitable for sitting to standing use during the windiest season representing a **Minor Beneficial (Not Significant)** to **Negligible (Not Significant)** effects.

Bus stops

- 13.101** Bus stops around the Site would have wind conditions suitable for sitting (probe location 169) and standing (probe location 106) during the windiest season. This would represent **Minor Beneficial (Not Significant)** to **Negligible (Not Significant)** effect.

- 13.102** Probe location 105 would be suitable for strolling use during the windiest season, one category windier than suitable for the intended use. This would represent a **Minor Adverse (Significant)** effect.

Pedestrian Crossings

- 13.103** Wind conditions at pedestrian crossings around the Site (probe locations 237 and 238) would range from suitable for sitting to standing use during the windiest season representing a **Major Beneficial (Not Significant)** to **Moderate Beneficial (Not Significant)** effect.

Ground Level Amenity – Mixed Use

On-Site

- 13.104** Wind conditions at ground level amenity spaces within the Detailed Proposals would range from suitable for sitting to standing use during the summer season. This represents a **Negligible (Not Significant)** effect.

- 13.105** All other mixed-use amenity spaces around the Site would range from suitable for sitting to standing use during the summer season, representing a **Negligible (Not Significant)** effect.

Off-Site

- 13.106** Wind conditions at the school court (represented by probe 83) would be suitable for sitting use during the summer season. This represents **Negligible (Not Significant)** effect.

Ground Level Amenity – Seating

- 13.107** Wind conditions at ground level seating area (north-west of Plot F) within the Detailed Proposals presented by probe location 115 would be one category windier than suitable for sitting use. This represents **Minor Adverse (Significant)** effect.

Roof Terrace Amenity – Mixed Use

On-site

- 13.108** Wind conditions at roof terraces within the Detailed Proposals would range from suitable for sitting to standing use during the summer season. This represents a **Negligible (Not Significant)** effect.

Off-site

- 13.109** Wind conditions at off-site roof terraces represented by probe location 496 would be suitable for sitting use during the summer season. This would represent a **Negligible (Not Significant)** effect.

Balcony Levels

On-site

- 13.110** The majority of wind conditions at balconies within the Detailed Proposals would range from suitable for sitting to standing use during the summer season. This would represent a **Negligible (Not Significant)** effect.

- 13.111** The exception to this would be at probe location 455 which would be one category windier than suitable for balcony use. This would represent a **Minor Adverse (Not Significant)** effect for the stack of balconies that probe 455 represents.

Off-site

- 13.112** Wind conditions at off-site balconies of neighbouring buildings represented by probe locations 479, 480, 481, 488, 489, 490, 491, 492, 493, 494 and 495 would range from suitable for sitting to standing use during the summer season. This would represent a **Negligible (Not Significant)** effect.

Strong winds

- 13.113** There would be no instances of strong winds exceeding the safety threshold within or around the Detailed Proposals, including roads and car parks.

Figure 13.8 Configuration 2: Detailed Proposals (Phase A) with Existing Surrounding Buildings – Ground Level (Windiest Season)

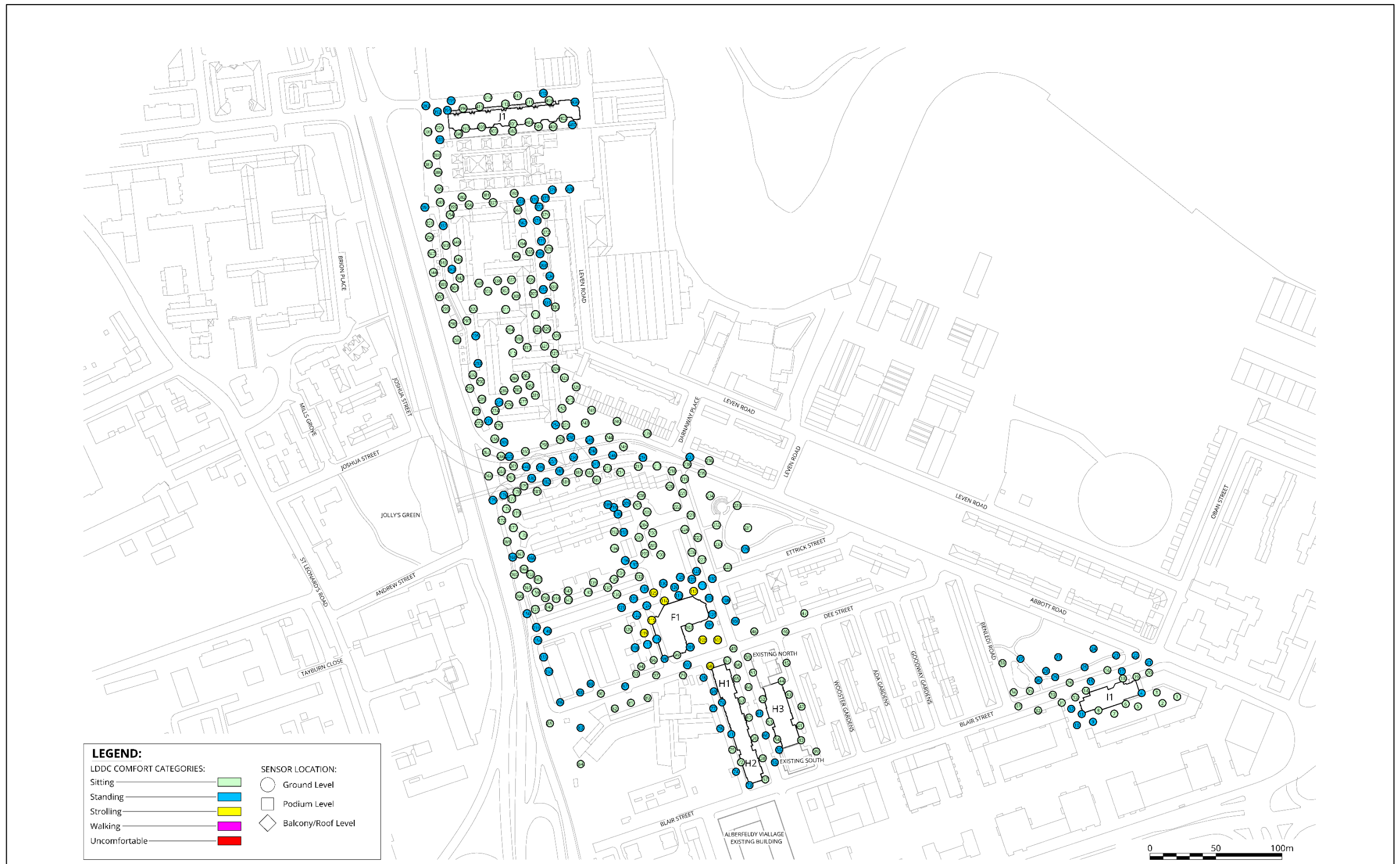


Figure 13.9 Configuration 2: Detailed Proposals (Phase A) with Existing Surrounding Buildings – Ground Level (Summer Season)



Figure 13.10 Configuration 2: Detailed Proposals (Phase A) with Existing Surrounding Buildings – Elevated Levels (Summer Season)

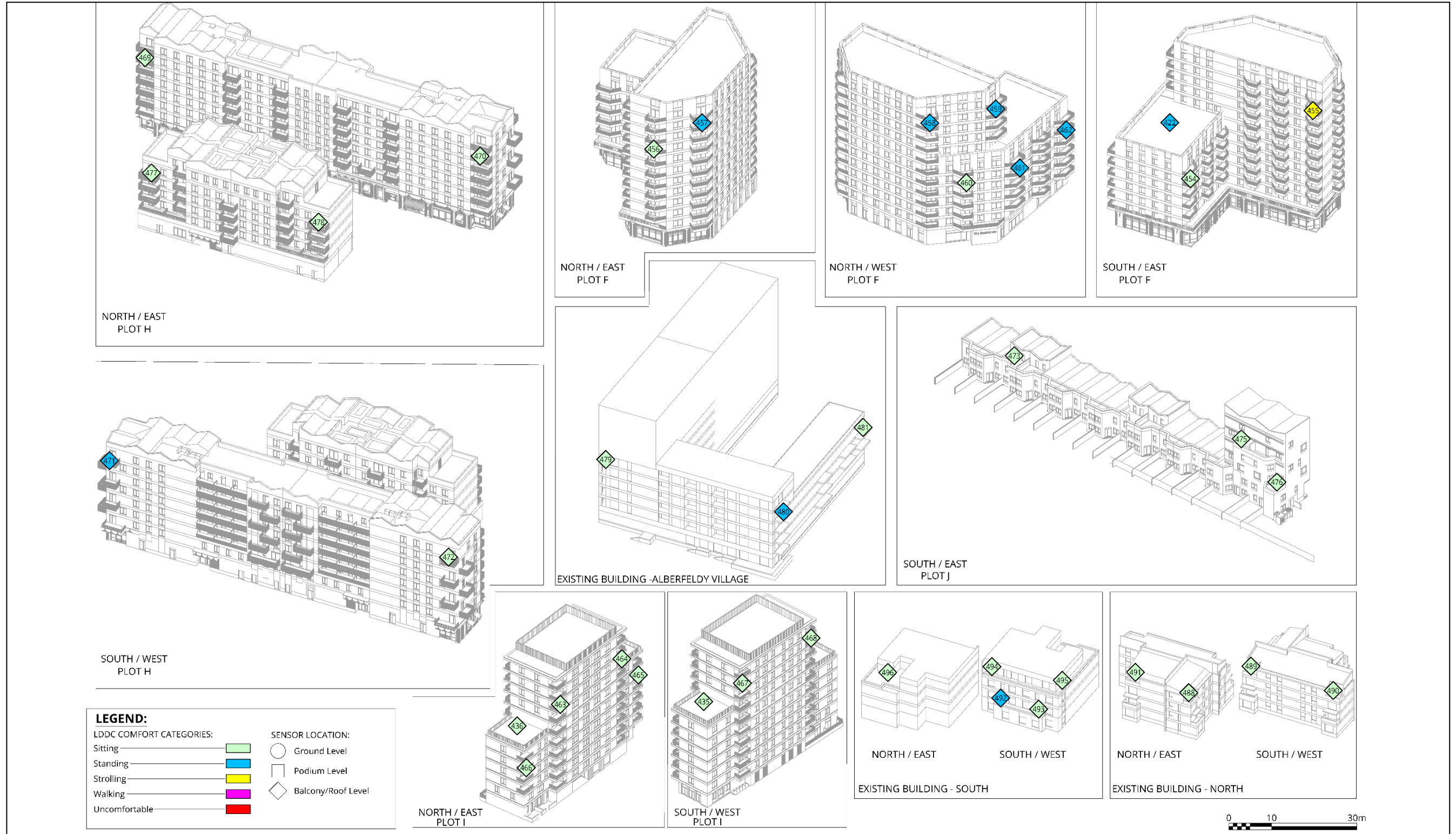


Figure 13.11 Configuration 2: Detailed Proposals (Phase A) with Existing Surrounding Buildings – Ground Level (Strong Winds)

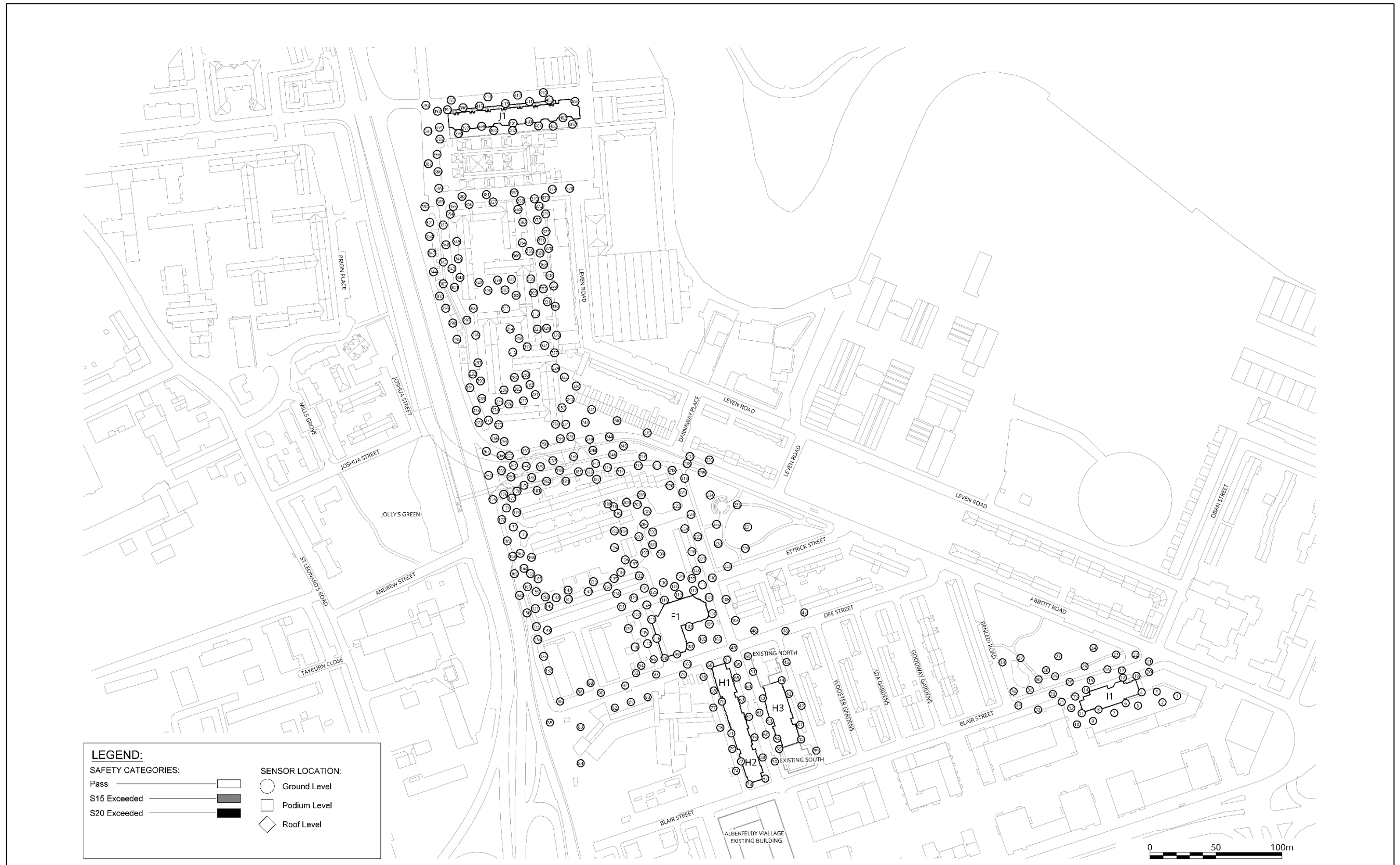
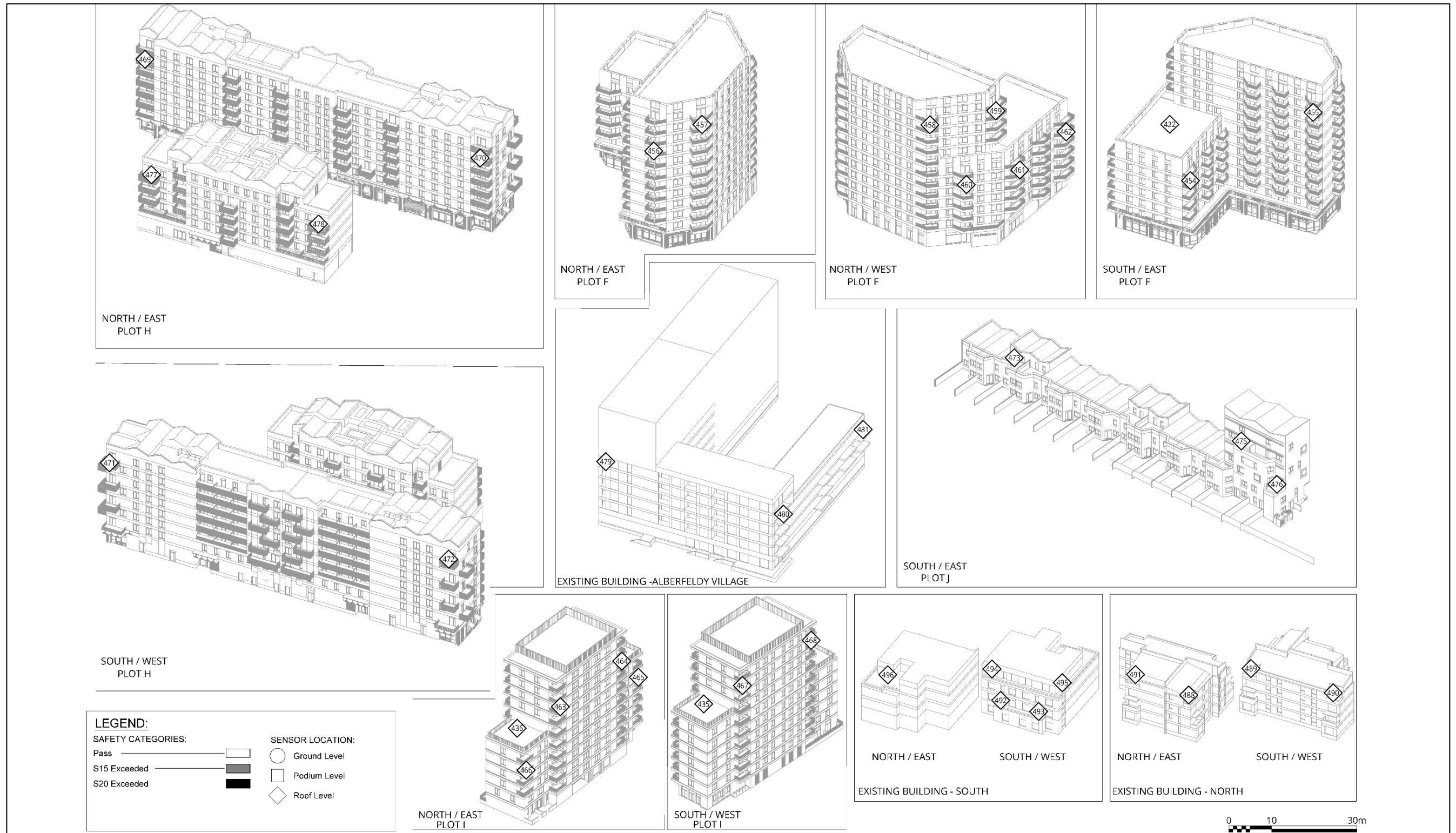


Figure 13.12 Configuration 2: Detailed Proposals (Phase A) with Existing Surrounding Buildings – Elevated Levels (Strong Winds)



Proposed Development

Configuration 3: Proposed Development (Outline Proposals plus Detailed Proposals) with Existing Surrounding Buildings

13.114 The assessment of the wind conditions for Configuration 3 is based on the results presented in **Figure 13.13** and **Figure 13.14** for the windiest and summer seasons respectively for ground floor level and **Figure 13.15** and **Figure 13.16** for elevated levels during the summer season. Safety exceedances are presented in **Figure 13.17** and **Figure 13.18** and **Figure 13.19** respectively for ground and elevated levels.

Pedestrian Comfort

13.115 With the introduction of the rest of the masterplan and Outline Proposals, wind conditions would improve around the Detailed Proposals particularly on the northern elevation of Plot F. However, the rest of the masterplan would continue to range from suitable for sitting to walking use during the windiest season.

13.116 During the summer season, wind conditions are either the same category or one category calmer and range from suitable for sitting to strolling use.

Thoroughfares

Detailed Proposals

13.117 Wind conditions at thoroughfares within the Detailed Proposals would range from suitable for sitting to strolling use during the windiest season, representing a **Moderate Beneficial (Not Significant)** to **Negligible (Not Significant)** effects.

Outline Proposals

13.118 Wind conditions at the majority of thoroughfares within the Outline Proposals would range from suitable for sitting to strolling use during the windiest season, representing a **Moderate Beneficial (Not Significant)** to **Negligible (Not Significant)** effects.

13.119 The exception to this would be at probe locations 158, 177, 274, 275, 277, 284 and 305 which would be one category windier than suitable for the intended use. These conditions would represent a **Minor Adverse (Significant)** effect.

Off-site

13.120 Off-site thoroughfares in the vicinity of the Proposed Development would range from suitable for sitting to strolling use representing a **Negligible (Not Significant)** effect.

Entrances

Detailed Proposals

13.121 Wind conditions at the majority of entrances to the Detailed Proposals would range from suitable for sitting to standing use during the windiest season, representing a **Minor Beneficial (Not Significant)** to **Negligible (Not Significant)** effects.

13.122 The exception to this would be at probe locations 116 which would be one category windier than suitable for the intended use, thus representing a **Minor Adverse (Significant)** effect.

Outline Proposals

13.123 Wind conditions at the majority of potential entrances to the Outline Proposals would range from suitable for sitting to standing use during the windiest season, representing a **Minor Beneficial (Not Significant)** to **Negligible (Not Significant)** effects.

13.124 The exception to this would be at probe locations 139, 142, 145, 162, 195, 255, 276, 278 and 280 which would be one category windier than suitable for entrance use representing a **Minor Adverse (Significant)** effect.

13.125 Probe locations 141, 313 and 339 would be two categories windier than suitable for entrance use representing a **Moderate Adverse (Significant)** effect.

Bus stops

13.126 Bus stops around the Proposed Development would have wind conditions suitable for sitting (probe location 169) and standing (probe location 106) during the windiest season. This would represent **Minor Beneficial (Not Significant)** to **Negligible (Not Significant)** effect.

13.127 Probe location 105 would be suitable for strolling use during the windiest season, one category windier than suitable for the intended use. This would represent a **Minor Adverse (Significant)** effect.

Pedestrian Crossings

13.128 Wind conditions at pedestrian crossings around the Site (probe locations 237 and 238) would be suitable for standing use during the windiest season representing a **Moderate Beneficial (Not Significant)** effect.

Ground Level Amenity – Mixed Use

Detailed Proposals

13.129 Wind conditions at ground level amenity spaces within the Detailed Proposals would range from suitable for sitting to standing use during the summer season. This represents a **Negligible (Not Significant)** effect.

Outline Proposals

13.130 Wind conditions at the majority of ground level amenity spaces within the Outline Proposals would range from suitable for sitting to standing use during the summer season. This represents a **Negligible (Not Significant)** effect.

13.131 The exception to this would be at probe location 259 which would be one category windier than suitable for amenity use representing a **Minor Adverse (Significant)** effect.

Off-Site

13.132 Wind conditions at the school court (represented by probe 83) would be suitable for sitting use during the summer season. This represents **Negligible (Not Significant)** effect.

Ground Level Amenity – Seating

Detailed Proposals

13.133 Wind conditions at designated seating areas within the Detailed Proposals would be suitable for sitting use during the summer season. This would represent a **Negligible (Not Significant)** effect.

Outline Proposals

13.134 Wind conditions at the majority of designated seating areas within the Outline Proposals would be suitable for sitting use during the summer season representing a **Negligible (Not Significant)** effect.

13.135 The exception to this would be at probe locations 312 and 316 which would be one category windier than suitable for the intended use representing a **Minor Adverse (Significant)** effect.

13.136 Probe location 265 would be two categories windier than suitable for the intended use representing a **Moderate Adverse (Significant)** effect.

Podium Level Amenity – Mixed Use

Outline Proposals

13.137 Podium amenity spaces (at probe locations 419, 420, 421, 428, 429, 430, 437, 438 and 439) would range from suitable for sitting to standing use during the summer season. These wind conditions would represent a **Negligible (Not Significant)** effect.

Roof Terrace Amenity – Mixed Use

Detailed Proposals

13.138 Wind conditions at roof terraces within the Detailed Proposals would be suitable for sitting use during the summer season. This represents a **Negligible (Not Significant)** effect.

Outline Proposals

13.139 Wind conditions at the majority of roof terraces within the Outline Proposals would range from suitable for sitting to standing use during the summer season. This represents a **Negligible (Not Significant)** effect.

13.140 The exception to this would be at probe locations 416, 417, 426, 427, 434 which would be one category windier than suitable during the windiest season. This would represent a **Minor Adverse (Not Significant)** effect.

Off-site

13.141 Wind conditions at off-site roof terraces represented by probe location 496 would be suitable for sitting use during the summer season. This would represent a **Negligible (Not Significant)** effect.

Balcony Levels

Detailed Proposals

13.142 Wind conditions at balconies within the Detailed Proposals would range from suitable for sitting to standing use during the summer season. This would represent a **Negligible (Not Significant)** effect.

Outline Proposals

13.143 Wind conditions at balconies within the Outline Proposals would range from suitable for sitting to standing use during the summer season. This would represent a **Negligible (Not Significant)** effect.

Off-site

13.144 Wind conditions at off-site balconies of neighbouring buildings represented by probe locations 479, 480, 481, 488, 489, 490, 491, 492, 493, 494 and 495 would range from suitable for sitting to standing use during the summer season. This would represent a **Negligible (Not Significant)** effect.

Strong winds

Detailed Proposals

13.145 There would be no instances of strong winds exceeding the safety threshold within the Detailed Proposals.

Outline Proposals

13.146 There would be instances of strong winds exceeding the safety threshold at probe locations 137, 140, 141, 143, 158, 177, 195, 265, 274, 277, 281, 286, 290, 305, 337, 338, 339, 340, 416, 426, 427 and 434 within or around the Proposed Development including roads and car parks.

Figure 13.13 Configuration 3: Proposed Development (Outline Proposals plus Detailed Proposals) with Existing Surrounding Buildings – Ground Level (Windiest Season)

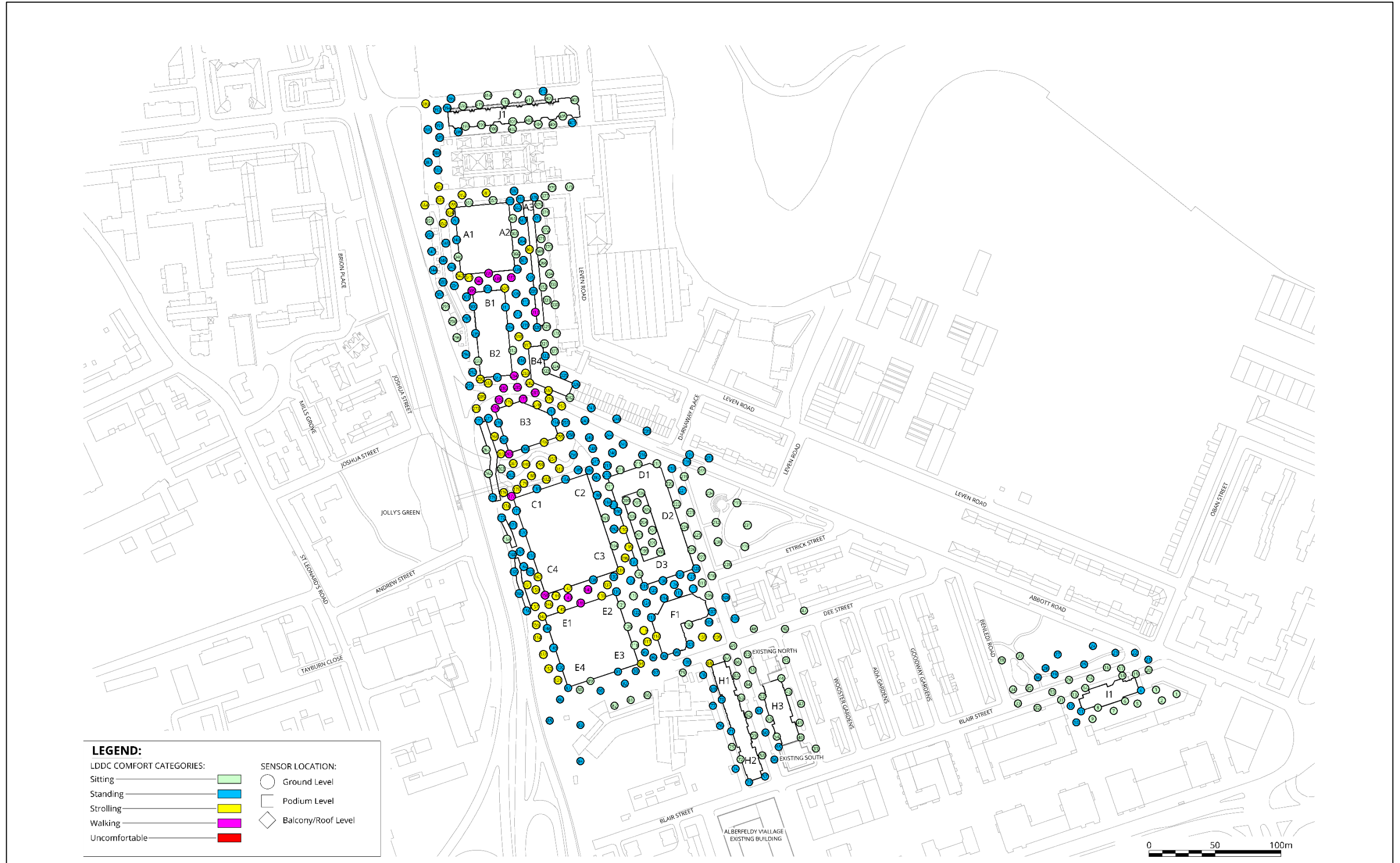


Figure 13.14 Configuration 3: Proposed Development (Outline Proposals plus Detailed Proposals) with Existing Surrounding Buildings – Ground Level (Summer Season)



Figure 13.15 Configuration 3: Proposed Development (Outline Proposals plus Detailed Proposals) with Existing Surrounding Buildings – Elevated Levels (Summer Season)

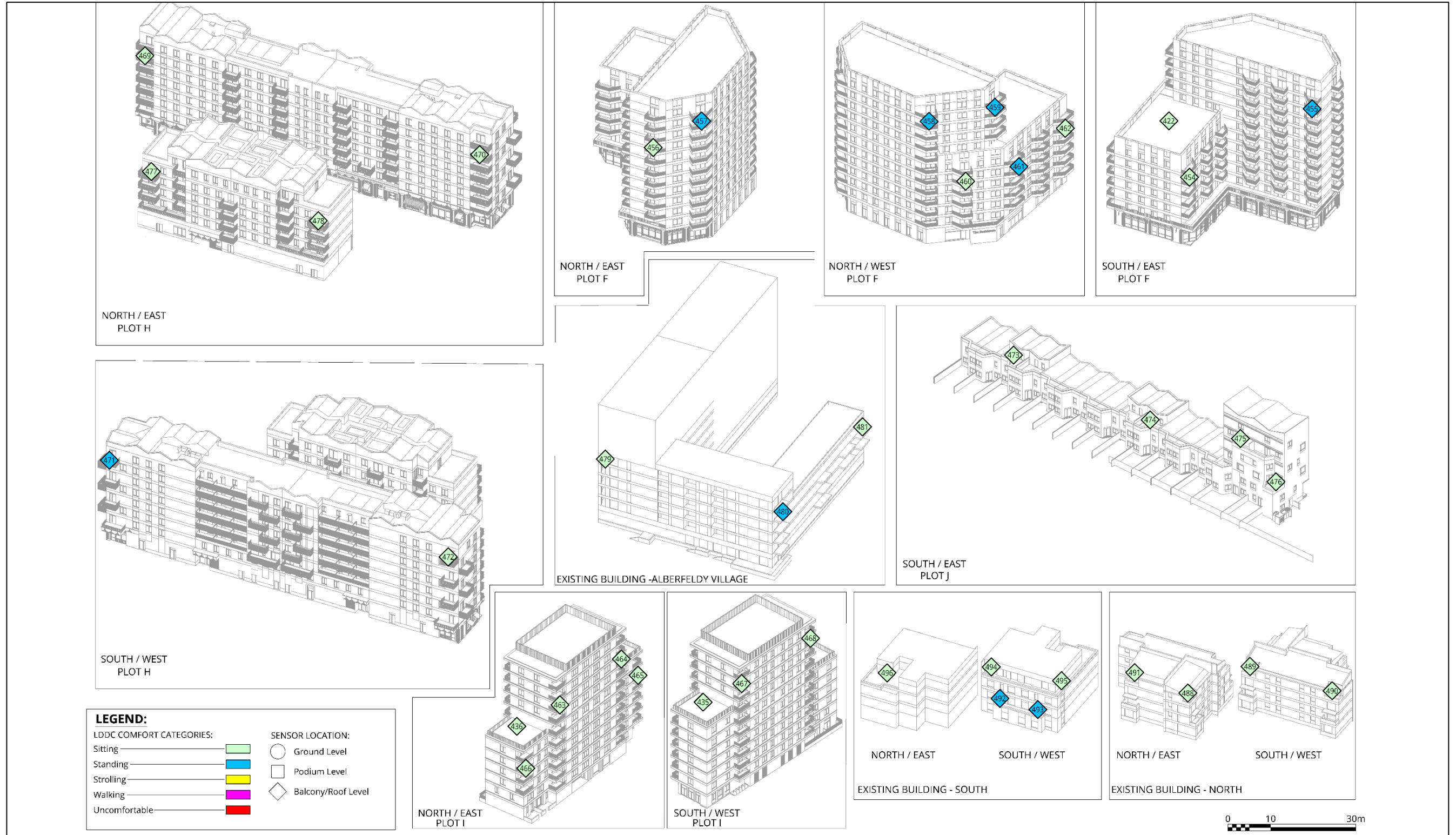


Figure 13.16 Configuration 3: Proposed Development (Outline Proposals plus Detailed Proposals) with Existing Surrounding Buildings – Elevated Levels (Summer Season)



Figure 13.17 Configuration 3: Proposed Development (Outline Proposals plus Detailed Proposals) with Existing Surrounding Buildings – Ground Level (Strong Winds)

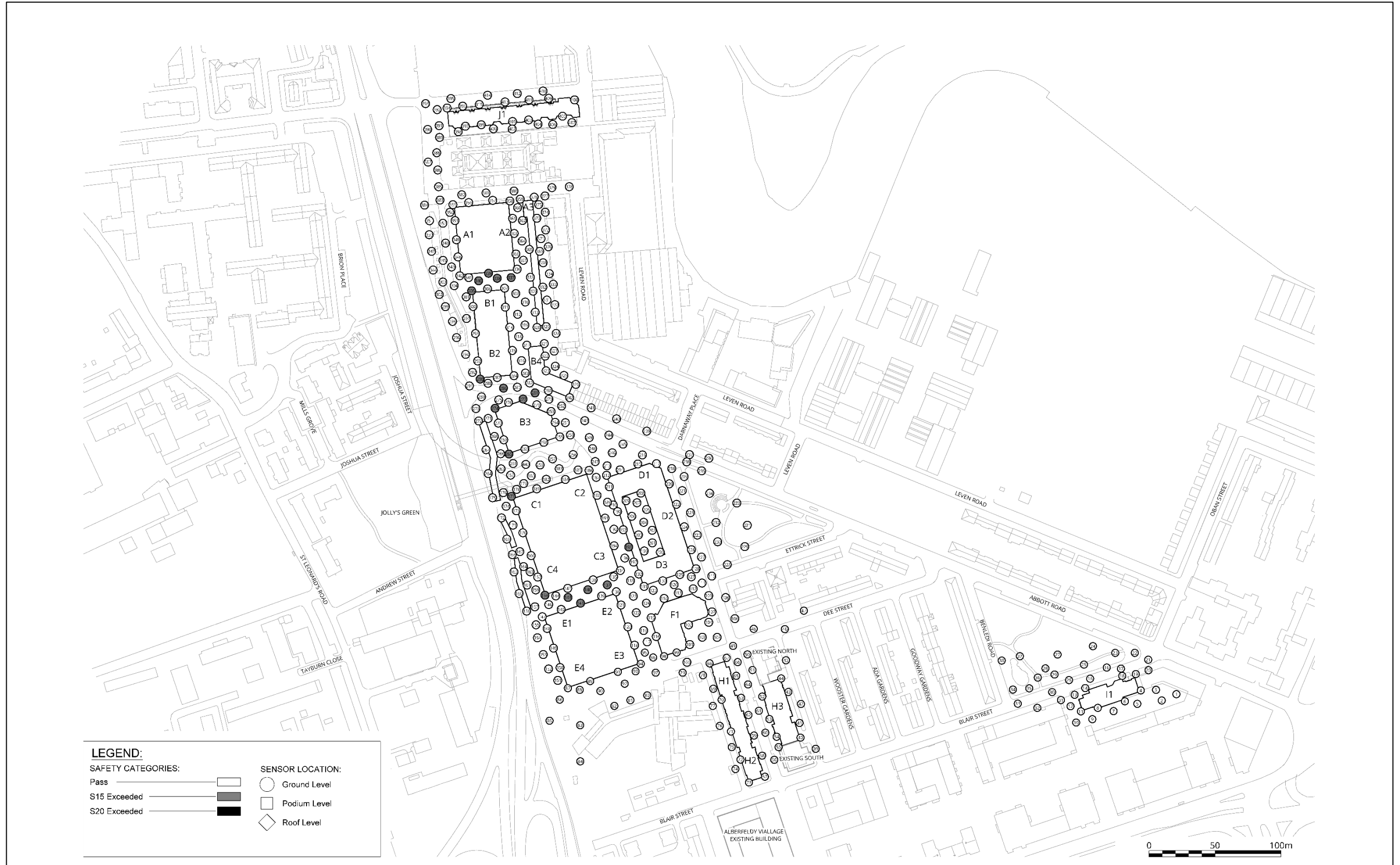


Figure 13.18 Configuration 3: Proposed Development (Outline Proposals plus Detailed Proposals) with Existing Surrounding Buildings – Elevated Levels (Strong Winds)

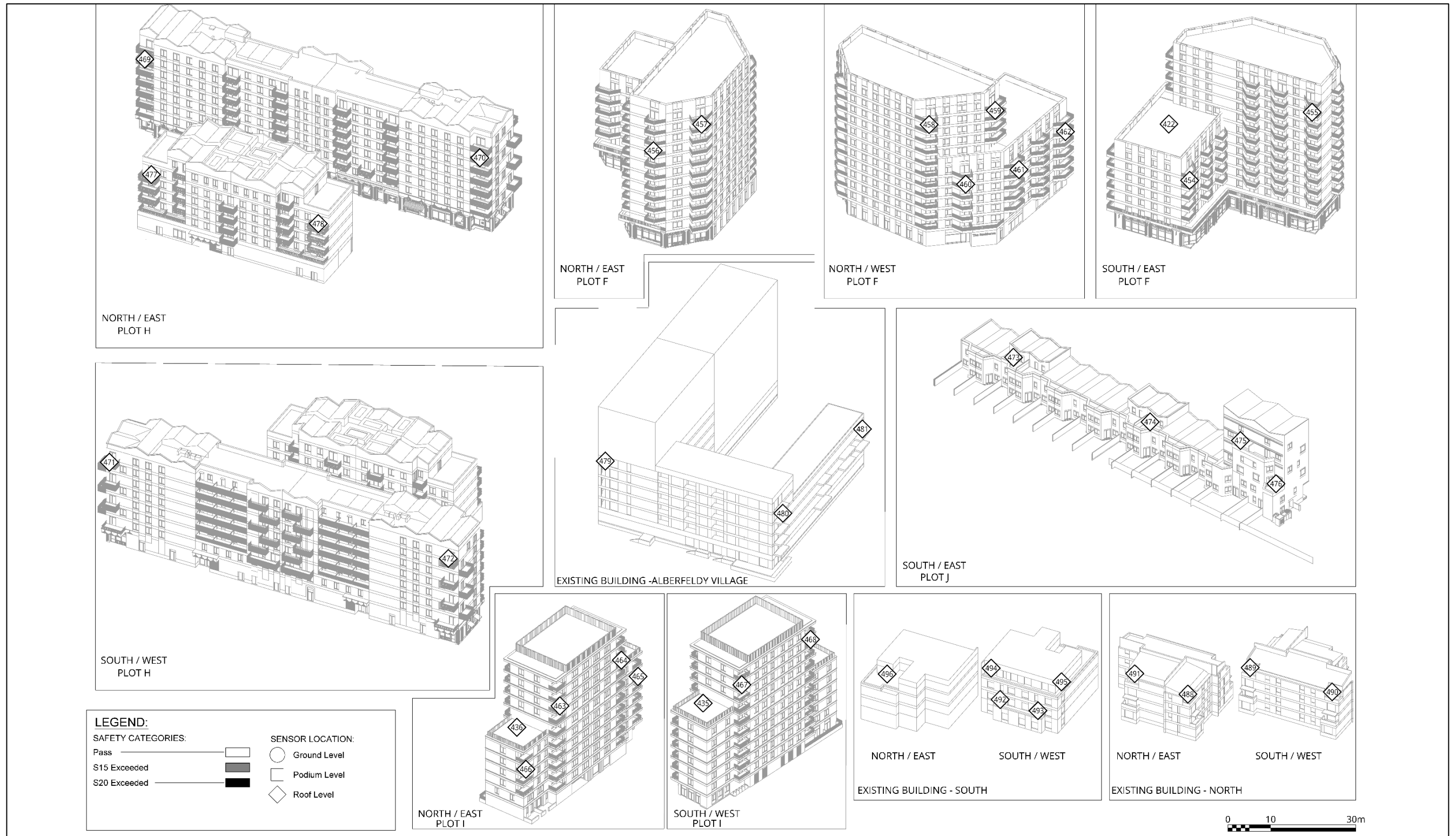
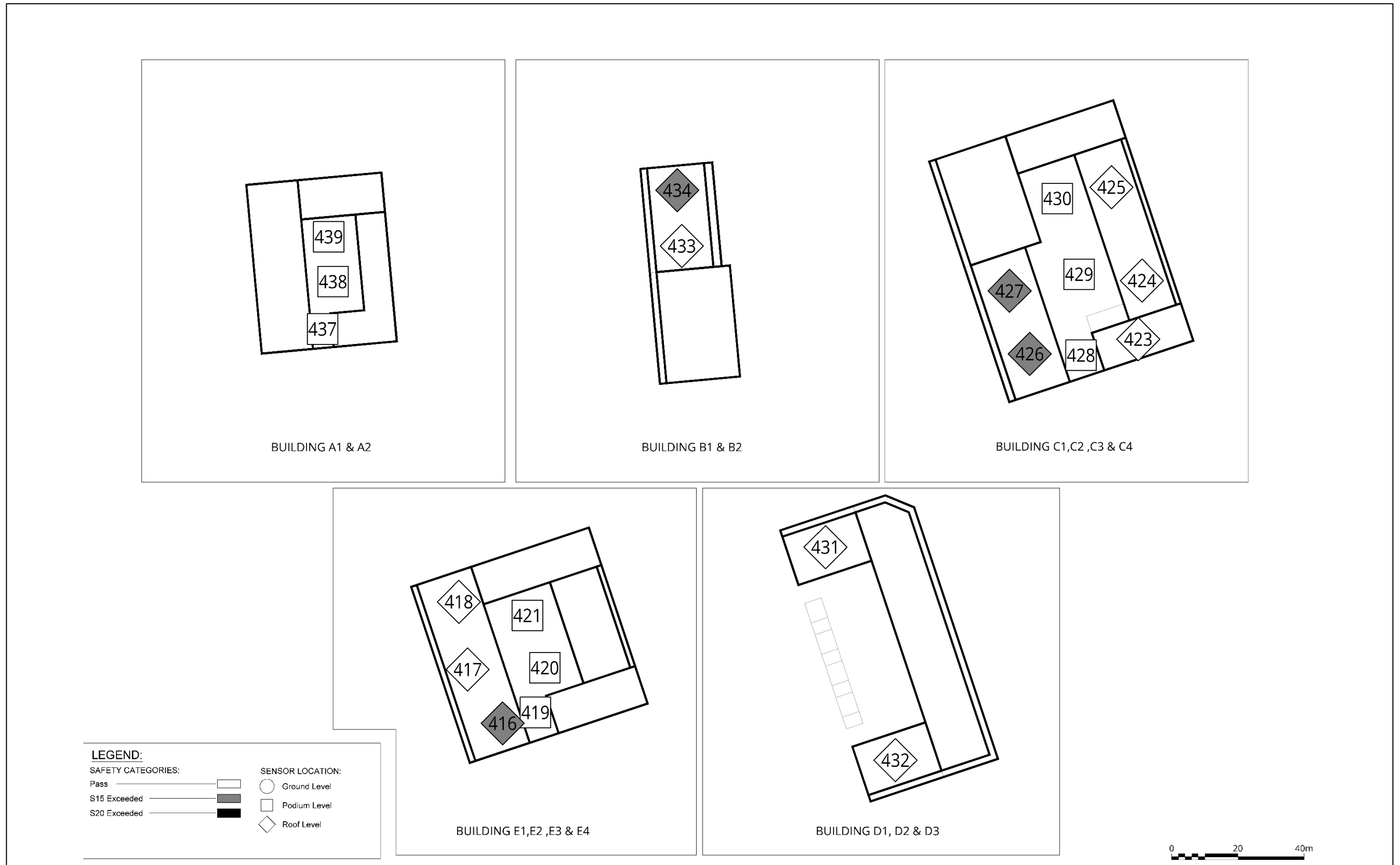


Figure 13.19 Configuration 3: Proposed Development (Outline Proposals) and Phase A with Existing Surrounding Buildings – Elevated Levels (Strong Winds)



Configuration 4: Proposed Development (Illustrative Scheme) and Phase A with Existing Surrounding Buildings

13.147 The assessment of the wind conditions for Configuration 4 is based on the results presented in **Figure 13.20** and **Figure 13.21** for the windiest and summer seasons respectively for ground floor level and **Figure 13.22** and **Figure 13.23** for elevated levels during the summer season. Safety exceedances are presented in **Figure 13.24** for ground floor level and **Figure 13.25** and **Figure 13.26** for elevated levels.

Pedestrian Comfort

13.148 With the Illustrative Scheme in place of the Outline Proposals (in Configuration 3), wind conditions would remain largely similar to Configuration 3 and would continue to range from suitable for sitting to walking use during the windiest season.

13.149 During the summer season, wind conditions are either the same category or one category calmer and range from suitable for sitting to strolling use.

Thoroughfares

Detailed Proposals

13.150 Wind conditions at thoroughfares within the Detailed Proposals would range from suitable for sitting to strolling use during the windiest season, representing **Moderate Beneficial (Not Significant)** to **Negligible (Not Significant)** effects.

Illustrative Scheme

13.151 Wind conditions at the majority of thoroughfares within the Illustrative Scheme would range from suitable for sitting to strolling use during the windiest season, representing **Moderate Beneficial (Not Significant)** to **Negligible (Not Significant)** effects.

13.152 The exception to this would be at probe locations 158, 177, 266, 274, 277 and 305 which would be one category windier than suitable for the intended use. These conditions would represent a **Minor Adverse (Significant)** effect.

Off-site

13.153 Off-site thoroughfares in the vicinity of the Site would be suitable for sitting (probe locations 47, 79, 84, 228, 229, 230, 231, 232, 233, 234, 235, 330, 333, 370, 374 and 377), standing (probe locations 48, 78, 236, 328, 386, 388 and 389) and strolling (probe location 385) use during the windiest season, which would represent a **Negligible (Not Significant)** effect.

Entrances

Detailed Proposals

13.154 Wind conditions at the majority of entrances to the Detailed Proposals would range from suitable for sitting to standing use during the windiest season, representing a **Minor Beneficial (Not Significant)** to **Negligible (Not Significant)** effects.

13.155 The exception to this would be at probe locations 116 which would be one category windier than suitable for the intended use, thus representing a **Minor Adverse (Significant)** effect.

Illustrative Scheme

13.156 Wind conditions at the majority of entrances to the Illustrative Scheme would range from suitable for sitting to standing use during the windiest season. This would represent **Minor Beneficial (Not Significant)** to **Negligible (Not Significant)** effects.

13.157 The exception to this would be at probe locations 141, 142, 145, 162, 195, 260, 280, 300 and 335 which would be one category windier than suitable for entrance use. These would represent a **Minor Adverse (Significant)** effect.

13.158 Probe locations 276 and 339 would be two categories windier than suitable for entrance use. These would represent a **Moderate Adverse (Significant)** effect.

13.159 Probe location 306 would be uncomfortable during the windiest season representing a **Major Adverse (Significant)** effect.

Bus stops

13.160 Bus stops around the Proposed Development would have wind conditions suitable for sitting (probe locations 106 and 169) during the windiest season. This would represent **Minor Beneficial (Not Significant)** effect.

13.161 Probe location 105 would be suitable for strolling use during the windiest season, one category windier than suitable for the intended use. This would represent a **Minor Adverse (Significant)** effect.

Pedestrian Crossings

13.162 Wind conditions at pedestrian crossings around the Site (probe locations 237 and 238) would be suitable for standing use during the windiest season representing a **Moderate Beneficial (Not Significant)** effect.

Ground Level Amenity – Mixed Use

Detailed Proposals

13.163 Wind conditions at ground level amenity spaces within the Detailed Proposals would range from suitable for sitting to standing use during the summer season, representing a **Negligible (Not Significant)** effect.

Illustrative Scheme

13.164 Wind conditions at the majority of ground level amenity spaces would range from suitable for sitting to standing use during the summer season. This represents a **Negligible (Not Significant)** effect.

13.165 The exception to this would be at probe locations 259 and 440 which would be one category windier than suitable for amenity use. This would represent a **Minor Adverse (Significant)** effect.

Off-Site

13.166 Wind conditions at the school court (represented by probe 83) would be suitable for sitting use during the summer season. This represents **Negligible (Not Significant)** effect.

Ground Level Amenity – Seating

Detailed Proposals

13.167 Wind conditions at the majority of designated seating areas within the Detailed Proposals would be suitable for sitting use during the summer season. This would represent a **Negligible (Not Significant)** effect.

13.168 The exception to this would be at probe location 115 (to the north-west of Plot F) which would be one category windier than suitable for the intended use. This would represent a **Minor Adverse (Significant)** effect.

Illustrative Scheme

13.169 Wind conditions at the majority of designated seating areas within the Illustrative Scheme would be suitable for sitting use during the summer season. This would represent a **Negligible (Not Significant)** effect.

13.170 The exception to this would be at probe locations 265 and 316 which would be one category windier than suitable for the intended use. This would represent a **Minor Adverse (Significant)** effect.

Podium Level Amenity – Mixed Use

Illustrative Proposals

13.171 Podium amenity spaces (at probe locations 419, 420, 421, 428, 429, 430, 437, 438 and 439) would range from suitable for sitting to standing use during the summer season. These wind conditions would represent a **Negligible (Not Significant)** effect.

Roof Terrace Amenity – Mixed Use

Detailed Proposals

13.172 Wind conditions at roof terraces within the Detailed Proposals would be suitable for sitting use during the summer season. This would represent a **Negligible (Not Significant)** effect.

Illustrative Scheme

13.173 Wind conditions at the majority of roof terraces would range from suitable for sitting to standing use during the summer season. This represents a **Negligible (Not Significant)** effect.

13.174 The exception to this would be at probe locations 416, 418 and 434 which would be one category windier than suitable during the windiest season. This would represent a **Minor Adverse (Significant)** effect.

Off-site

- 13.175** Wind conditions at off-site roof terraces represented by probe locations 483, 484, 486, 487 and 496 would be suitable for sitting use during the summer season. This would represent a **Negligible (Not Significant)** effect.

Balcony Levels

Detailed Proposals

- 13.176** Wind conditions at balconies within the Detailed Proposals would range from suitable for sitting to standing use during the summer season. This would represent a **Negligible (Not Significant)** effect.

Illustrative Scheme

- 13.177** Wind conditions at balconies within the Illustrative Scheme would range from suitable for sitting to standing use during the summer season. This would represent a **Negligible (Not Significant)** effect.

Off-site

- 13.178** Wind conditions at off-site balconies of neighbouring buildings represented by probe locations 479, 480, 481, 488, 489, 490, 491, 492, 493, 494 and 495 would range from suitable for sitting to standing use during the summer season. This would represent a **Negligible (Not Significant)** effect.

Strong winds

Detailed Proposals

- 13.179** There would be no instances of strong winds exceeding the safety threshold within the Detailed Proposals.

Illustrative Scheme

- 13.180** There would be instances of strong winds exceeding the safety threshold at probe locations 158, 159, 177, 195, 198, 266, 274, 277, 281, 306, 337, 338, 340, 447 and 453 within or around the Proposed Development including roads and car parks.

Figure 13.20 Configuration 4: Proposed Development (Illustrative Scheme) and Phase A with Existing Surrounding Buildings – Ground Level (Windiest Season)

