4.7 Wind Microclimate

4.7.1 This section of the ECR reports the effects and specific commitments of the Consented Scheme on Wind. It also describes the various Planning Conditions attached for the topic, as required up to Construction Stage, and identifies how and where information required such conditions is located.

4.7.2 This section revisits and builds upon (where necessary) Chapter 11: Wind Microclimate of the 2013 ES by assessing the detailed scheme for the Proposed Development, introducing further mitigation (as required), before concluding whether the detailed scheme is in compliance with the findings of the 2013 ES.

4.7.3 Chapter 11: Wind Microclimate of the 2013 ES, considered the following potential microclimate impacts:

- Pedestrian Comfort.

4.7.4 This Section has been written by RWDI and it is supported by Appendix 4.7.1 (Pedestrian Level Wind Microclimate Report).

Findings and commitments of the 2013 ES

Baseline

4.7.5 The baseline assessment conducted for the 2013 ES indicate the results for baseline as annual averages. The 2013 ES identified the velocities in the plots are limited to 4.7m/s and as per the 2013 ES this is reported as the unacceptable limit for Pedestrian Walkthrough.

Construction phase impacts

4.7.6 The 2013 ES states, Activities associated with construction will, in general, have relatively little impact on the wind environment at pedestrian level and this has therefore not been assessed. The key issue would probably be that of dust nuisance and any potential impacts would be mitigated through best practice construction site methods, delivered through the CEMP.

Operational phase impacts

4.7.7 The 2013 ES states that, *"when the consented Proposed Development is in situ, most areas would have wind conditions up to moderately adverse or better than the level required for the intended activity. A moderate adverse effect may periodically be expected in the Royal Arsenal Gardens and at the seating to the north of Plot K5. These areas are acceptable for "Pedestrian Walking" but for benches or seating areas, the wind would be considered unacceptable at certain times. Localised sheltering provided by planting or screening could provide a more comfortable environment. The necessity, nature and extent of this screening would depend on the exact location within the Royal Arsenal Gardens."*

Relevant planning conditions

4.7.8 There are no planning conditions relating to Wind Microclimate.

Assessment methodology

4.7.9 The following section outlines the methodologies applied to identify and assess the potential impacts and likely effects to result from the Proposed Development.

Extent of The Study Area

4.7.10 The Proposed Development and the surrounding area up to a 400m radius from the centre of the Site were created.

Method of Baseline Collection

4.7.11 To account for the update to the surrounding buildings since the 2013 ES, the baseline wind conditions around the Site has been assessed using an updated model of the baseline scenario.

Method of Assessment

Demolition & Construction Phase

4.7.12 The method of assessment of the demolition and construction phase would be the same as in the 2013 ES Chapter. A qualitative assessment has been undertaken and is based on professional judgement informed by an assessment of the background wind microclimate in the area and RWDI's experience of assessing wind in the built environment.

4.7.13 The residual effects reported for the demolition and construction phases of the Proposed Development are considered to be temporary, whereas effects outlined in the assessment for the complete and occupied Proposed Development are permanent.

Operational Phase

4.7.14 The following scenarios have been assessed in this CFD assessment:

- Configuration 1: Updated baseline;
- Configuration 2: Proposed Development with existing surrounds;
- Configuration 3: Proposed Development with proposed landscaping and existing surrounds; and
- Configuration 4: Proposed Development with cumulative surrounds.

Simulation of Atmospheric Winds

4.7.15 The computational fluid dynamics (CFD) assessment methodology has been updated for this Reserved Matters Application (RMA) (results of which are presented below in 'Assessment of the detailed scheme') compared to the Environmental Assessments.

4.7.16 For the RMA, computational modelling was undertaken using Orbital Stack, a proprietary computational fluid dynamics (CFD) tool developed by RWDI. 18 wind angles were tested, equally spaced out around the compass (equal 20° intervals) compared to the 12 angles tested (at equal 30° intervals) for the Environmental Assessments.

4.7.17 The individual scenarios at the Site were solved using a Reynolds Averages Navier-Stokes (RANS) approach with an RNG k-ε turbulence model. The steady state RANS type model with the RNG k- ε turbulence model is chosen over other turbulence models or transient type schemes for wind microclimate studies by RWDI for its ability to approximate highly complex flows within urban environments to a high level of accuracy within a practical computational timeframe.

4.7.18 RANS simulations yield statistically steady solutions which are, in the standard approach, unable to inform on the gusty nature of the flow. The potential for strong winds, which is frequently driven by these gusts, leading to potential safety issues, has therefore been assessed using informed engineering judgement.

4.7.19 The computational model was discretized into approximately 19 million hexahedral cells with refinement close to the areas of expected high velocity gradients.

Meteorological Data

4.7.20 The output of the CFD modelling has been combined with 30 years of meteorological data records taken from the meteorological station at Heathrow Airport. This data is presented as wind roses in the Figures below.

4.7.21 Results are presented for the windiest season (which are typically representative of the winter season in the UK) and the summer season. This is because some pedestrian activities defined by the Lawson Comfort Criteria need to be met during the windiest season whereas others are relevant for summertime conditions.

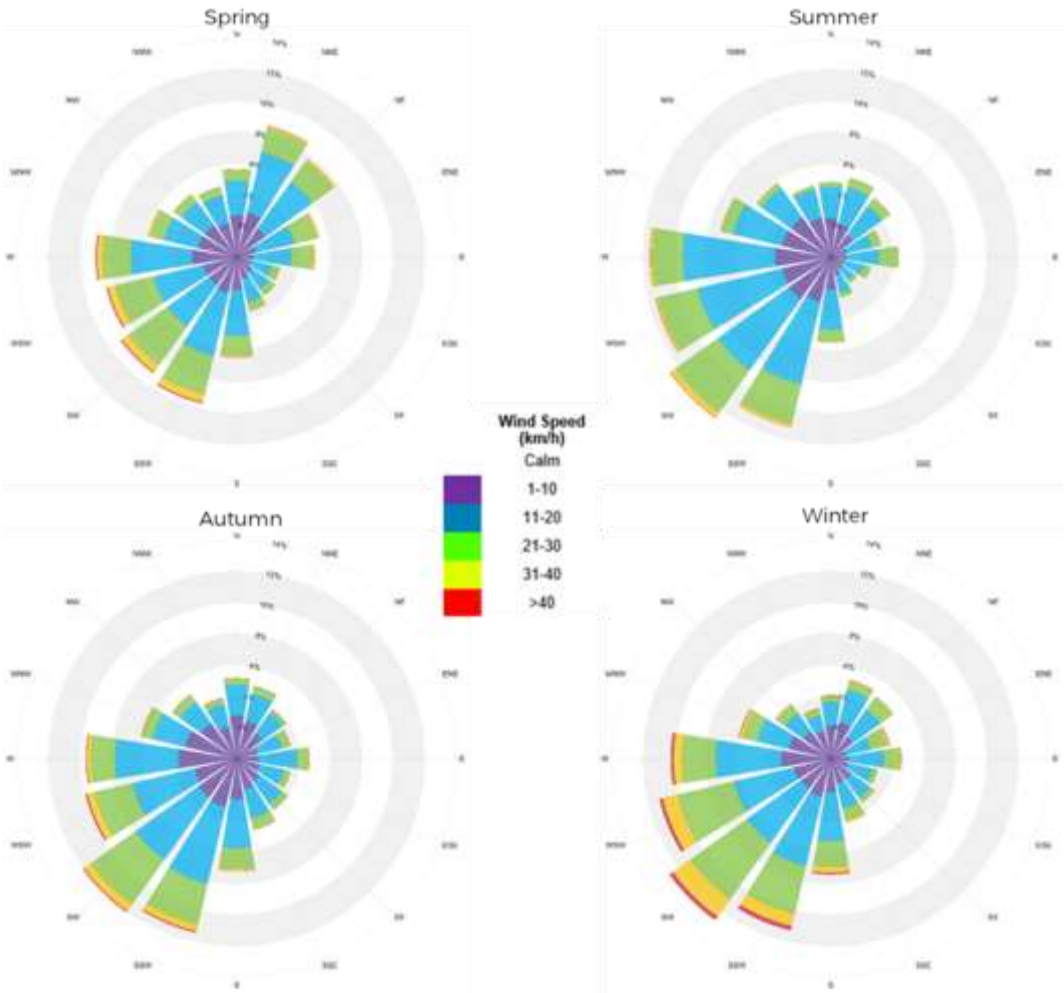

Figure 4.7.1: Seasonal Wind Roses for Heathrow Airport (over a period of 30 years from 1973)

Lawson Comfort Criteria

4.7.22 The RMA assessment presents results using the LDDC variant of the Lawson Comfort Criteria. The criteria, which has been established for over 30 years and are widely used on building developments through the United Kingdom, are described in Table 4.7.1.

4.7.23 The criteria set out four pedestrian activities and reflect the fact that less active pursuits require more benign wind conditions. If the expected wind conditions exceed the threshold, then they are likely to be 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.

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

Target Wind Conditions

4.7.24 For a mixed-use urban site, such as the Proposed Development Site (and surrounding area), wind conditions that are suitable for strolling use, or calmer, are desirable on main thoroughfares during the windiest season. Standing use wind conditions, or calmer, are generally required at entrances throughout the year. Wind conditions suitable for sitting in the summer season are desirable for public amenity spaces and balconies. For a mixed-use amenity space, such as outdoor gym areas, a mix of sitting and standing wind conditions is acceptable.

Strong Winds

4.7.25 The Lawson Criteria also specify a strong wind threshold when winds exceed 15m/s for more than 0.025% of the time (approximately two hours per annum). Exceedance of this threshold has the potential to cause distress to pedestrians and would indicate a need for remedial measures and careful assessment of the expected use of that location.

4.7.26 As discussed in the *Simulation of Atmospheric Winds*, the likelihood of strong winds occurring at the Proposed Development has been assessed using professional judgement and experience of assessing similar developments, informed by the results of the RANS based computational assessment.

4.7.27 In the UK, stronger winds are associated with areas which would be classified as suitable for walking or the uncomfortable criteria. In a mixed-use, urban development scheme, conditions suitable for walking would not usually form part of the 'target' wind environment and would generally require mitigation due to pedestrian comfort considerations.

Significance Criteria

4.7.28 There are no changes to the method of assessing significance or the magnitude of effect used in the RMA assessment from the significance criteria used in the Environmental Assessments.

4.7.29 As such, the significance criteria used in the assessment of potential and residual effects are based on the comparison of the predicted wind conditions at particular locations with the desired pedestrian uses of the site, as defined by the Lawson Comfort Criteria. This comparison takes into account any change of pedestrian activity as a result of the Proposed Development. It should be noted that all adverse effects are considered a significant effect and would therefore require mitigation; beneficial effects are not considered significant.

4.7.30 Off-site locations would only be deemed to have an adverse effect should conditions be windier than suitable by the criteria and windier than the baseline scenario, and will only be deemed to have a beneficial effect if the wind conditions have been improved, in areas which were windier than required in the baseline scenario, relative to the criteria because of the introduction Proposed Development. In both cases these effects would be considered not significant.

4.7.31 All instances of strong winds (affecting pedestrian safety) would be significant and adverse, representing a safety concern for pedestrians as detailed by Lawson. Strong winds are not included within this description of an effect as they cannot be scaled to major/moderate/minor. Strong winds are therefore reported separately from comfort within this chapter, as it is RWDI's practice to report incidence and to maintain consistency with Lawson's approach. Where strong winds occur, remedial measures will be identified, alongside careful assessment of the expected use.

4.7.32 The following terms have been used to define the significance of effects identified:

- **Major beneficial or adverse effect** – where wind conditions are 3- categories calmer or windier than required;
- **Moderate beneficial or adverse effect** – where wind conditions are 2- categories calmer or windier than required;
- **Minor beneficial or adverse effect** – where wind conditions are 1 – category calmer or windier than required; and
- **Negligible** – wind conditions are the same or similar to those required.

4.7.33 The geographical extent of wind microclimate effects is expected to be within the Site and its immediate surroundings, i.e. a local effect, for all receptors. Additionally, all operational effects are anticipated to be permanent and long term.

Assessment of the Existing Site

Configuration 1: Baseline with Existing Surrounding Buildings

4.7.34 Wind conditions around the existing Site are shown in Figures 4.7.2 and 4.7.3 for the windiest and summer season at ground level respectively.

Pedestrian Comfort

Thoroughfares (Figure 4.7.2)

4.7.35 Thoroughfares at and around the Site have sitting to strolling conditions during the windiest season.

Entrances (Figure 4.7.2)

4.7.36 Entrances to the existing surrounding buildings are suitable for sitting and standing use during the windiest season.

Bus stops (Figure 4.7.2)

4.7.37 Bus stops along Beresford Street have standing use conditions during the windiest season.

Pedestrian Crossings (Figure 4.7.2)

4.7.38 Pedestrian crossings in the vicinity of the Site have standing and strolling use conditions during the windiest season.

Ground Level Amenity (Figure 4.7.3)

4.7.39 Amenity spaces within Plot B apartment buildings to the north of the Site are suitable for standing use during the summer season. Amenity spaces within the Pavilion Square to the east of the Site are suitable for sitting use during the summer season.

Strong winds

4.7.40 There are no areas around the existing Site that have wind conditions suitable for walking or worse during the windiest season. As such, strong winds exceeding the safety threshold are not expected to occur around the Site.

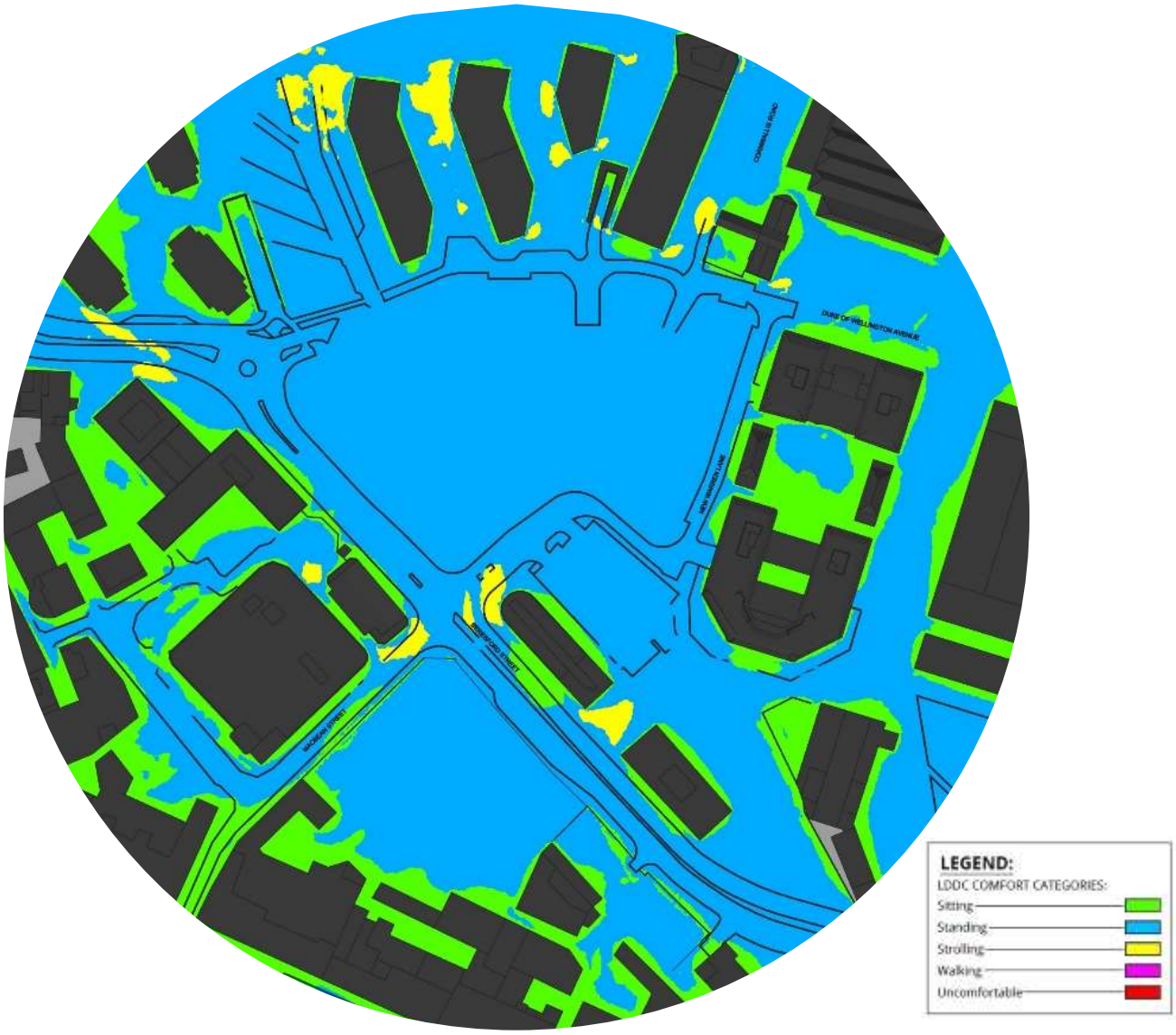

Figure 4.7.2 Configuration 1: Baseline with Existing Surrounding Buildings – Windiest Season (Ground Level)

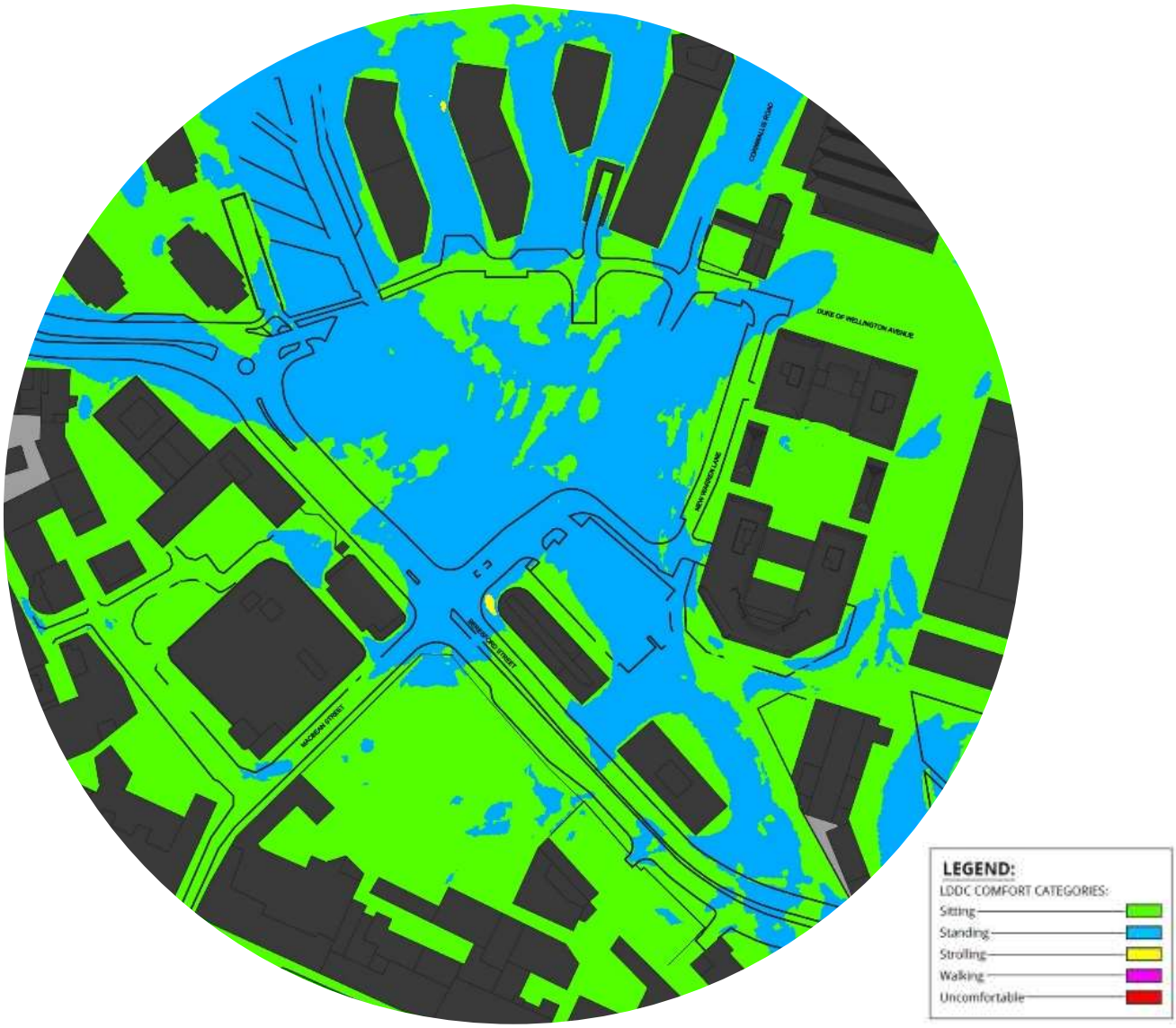

Figure 4.7.3 Configuration 1: Baseline with Existing Surrounding Buildings – Summer Season (Ground Level)

Assessment of the Detailed Scheme

Construction stage effects

4.7.41 This section identifies and assesses the scale and nature of the main effects arising from the Proposed Development during the construction phase.

4.7.42 Wind conditions during the demolition and construction works would be expected to gradually adjust from those of the Baseline Scenario to the likely wind conditions identified for the Completed Development.

4.7.43 Wind conditions at ground level during the demolition and construction phase would be suitable for sitting to strolling use during the windiest season. As access to the Site by the general public would be restricted during the demolition and construction works of the Proposed Development, Site users would be expected to be more tolerant of windier conditions. Wind conditions on-Site would therefore represent a **Negligible** effect.

Operational stage effects

Configuration 2: Proposed Development with Existing Surrounding Buildings

4.7.44 Wind conditions around the existing Site are shown in Figures 4.7.4 and 4.7.5 for the windiest and summer season at ground level respectively. Figures 4.7.6 and 4.7.7 represent the wind conditions at balconies during the windiest season and Figures 4.7.8 and 4.7.9 represent the wind conditions at balconies during summer season. Figures 4.7.10 and 4.7.11 for windiest and summer season at terrace levels respectively.

Pedestrian Comfort

Thoroughfares (Figure 4.7.4)

4.7.45 Thoroughfares within the Site would have strolling or calmer use conditions during the windiest season, suitable conditions for intended use. Sitting to strolling use conditions would represent **Moderate Beneficial** to **Negligible** effects.

4.7.46 Similar to Configuration 1, wind conditions on off-Site thoroughfares would be suitable for sitting to strolling use during the windiest season, suitable conditions for the intended use. These conditions would represent a **Negligible** effect.

Entrances (Figure 4.7.4)

4.7.47 Wind conditions at the entrances to Plot D and Plot F would be suitable for sitting and standing use during the windiest season, suitable conditions for entrance use. These conditions would represent **Minor Beneficial** to **Negligible** effects.

4.7.48 Consistent with Configuration 1, entrances to the existing surrounding buildings would be suitable for sitting and standing use during the windiest season, suitable conditions for the intended use. This would represent a **Negligible** effect.

Bus stops (Figure 4.7.4)

4.7.49 Wind conditions at the bus stops along Beresford Street would be suitable for sitting and standing use during the windiest season. Sitting conditions at the Bus Stop to the south of Plot K would be one category calmer than that in the existing scenario. These conditions would be suitable for the intended use and would represent a **Negligible** effect.

Pedestrian Crossings (Figure 4.7.4)

4.7.50 Consistent with Configuration 1, pedestrian crossings in the vicinity of the Site would have suitable standing and strolling use conditions during the windiest season. Standing and strolling use conditions would represent **Negligible** effects.

Ground Level Amenity (Figure 4.7.5)

4.7.51 The proposed amenity between Plot D and Plot K would be suitable for standing use during the summer season, suitable conditions for play spaces. However, this would be one category windier than suitable for any seating provisions within the play spaces. Standing conditions at seating and play spaces would represent **Minor Adverse** and **Negligible** effects respectively.

4.7.52 The massing of Plot D and Plot K would provide some beneficial shelter from the prevailing south-westerly winds. As such, the amenity spaces within the Plot B apartment buildings to the north of the Proposed Development would be suitable for sitting and standing use during the summer season, one category calmer than that in existing scenario. Consistent with Configuration 1, amenity spaces within the Pavilion Square to the east of the Site are suitable for sitting use during the summer season. These conditions would represent a **Negligible** effect.

Elevated Level Amenity (Figure 4.7.8, Figure 4.7.9, Figure 4.7.11)

4.7.53 The majority of the balcony amenity spaces would have wind conditions suitable for sitting and standing use during the summer season, suitable conditions for private amenity use. This would represent a **Negligible** effect.

4.7.54 Strolling and walking conditions on the balconies would be up to two categories windier than suitable for the intended use and would require wind mitigation. Strolling and walking conditions would represent **Minor Adverse** to **Moderate Adverse** effects respectively.

4.7.55 Podium spaces of Plot K would be suitable for standing to sitting use during the summer season. Standing conditions at the seating provisions to the south of the courtyard would be one category windier than suitable for the intended use. This would represent **Minor Adverse** to **Negligible** effects.

4.7.56 The level 8 terraces of Plot D Building D1 and Building D2 would have sitting and standing use conditions during the summer season, suitable conditions for private amenity use and would represent a **Negligible** effect.

Strong winds (Figure 4.7.4, Figure 4.7.6, Figure 4.7.7 and Figure 4.7.10)

4.7.57 Strong winds which would pose a safety concern for pedestrians would be expected within the roof terraces with walking and conditions uncomfortable for pedestrian use during the windiest season. The roof terraces would be accessible for maintenance use only and as such the access to these terraces would be controlled during the windiest times of the year.

4.7.58 Consistent with Configuration 1, strong winds exceeding the safety threshold would not be expected at ground level at and around the Proposed Development.

4.7.59 Strong winds which would pose a safety concern for the occupants would be expected within the private balconies of Plot D and Plot K with walking and conditions uncomfortable for pedestrian use during the windiest season. Wind mitigation measures that would be expected to beneficial shelter are discussed under the Configuration 3 of this chapter. Inclusion of the suggested measures would be expected to result in suitable wind environment in these private amenity spaces. Effectiveness of these measures would be assessed through further simulations post submission of this chapter.

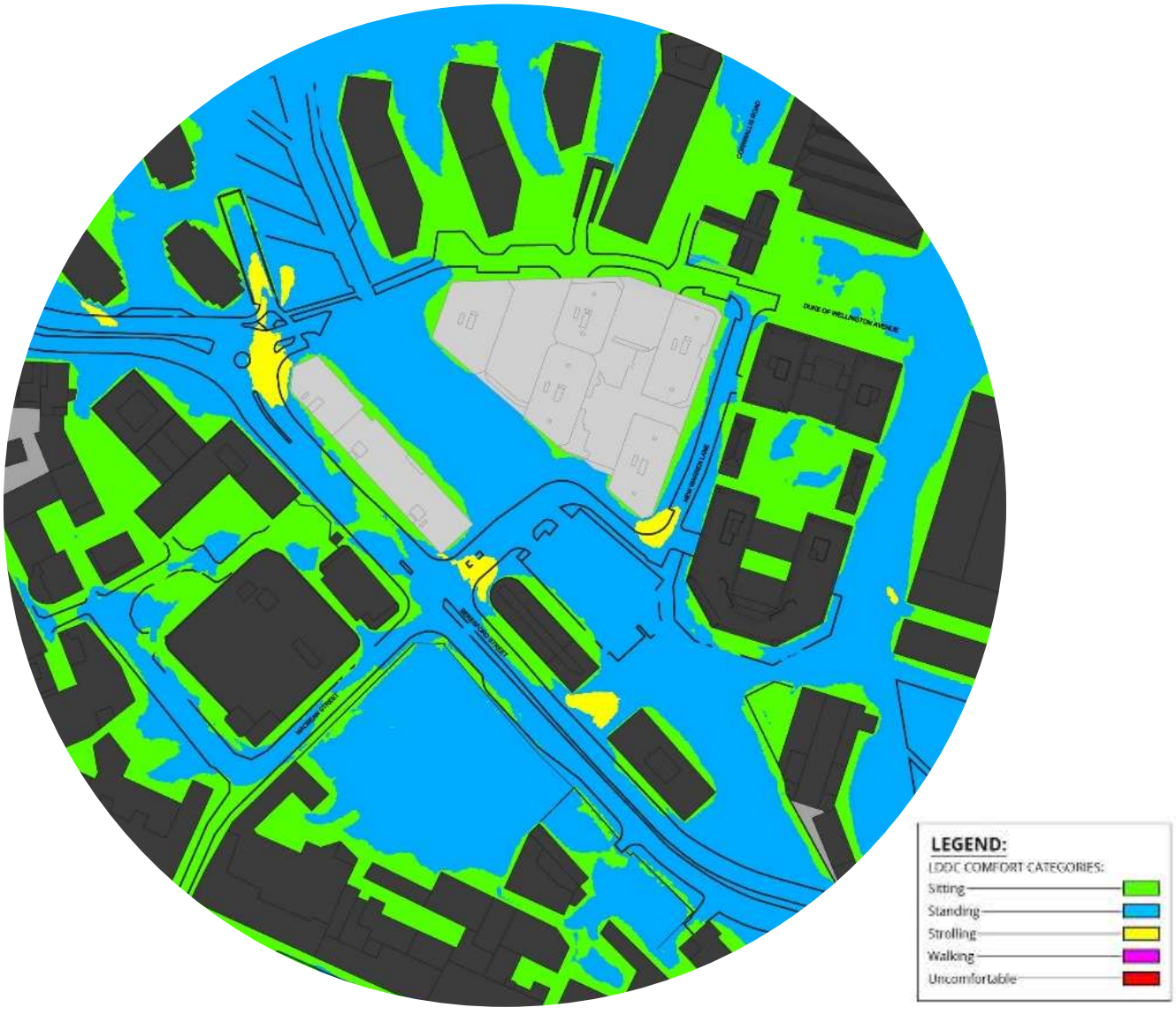

Figure 4.7.4 Configuration 2: Proposed Development with Existing Surrounding Buildings – Windiest Season (Ground Level)

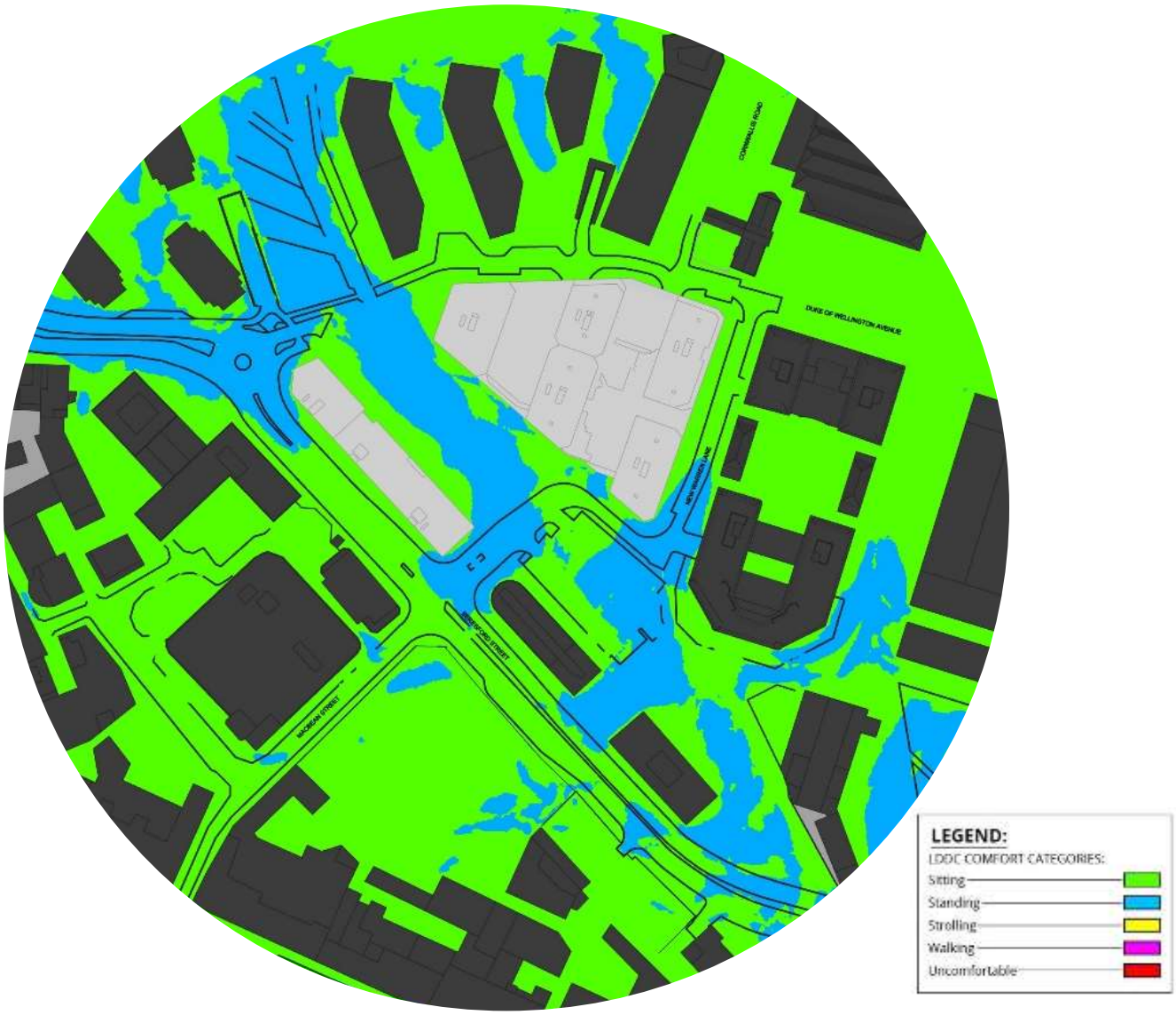

Figure 4.7.5 Configuration 2: Proposed Development with Existing Surrounding Buildings – Summer Season (Ground Level)

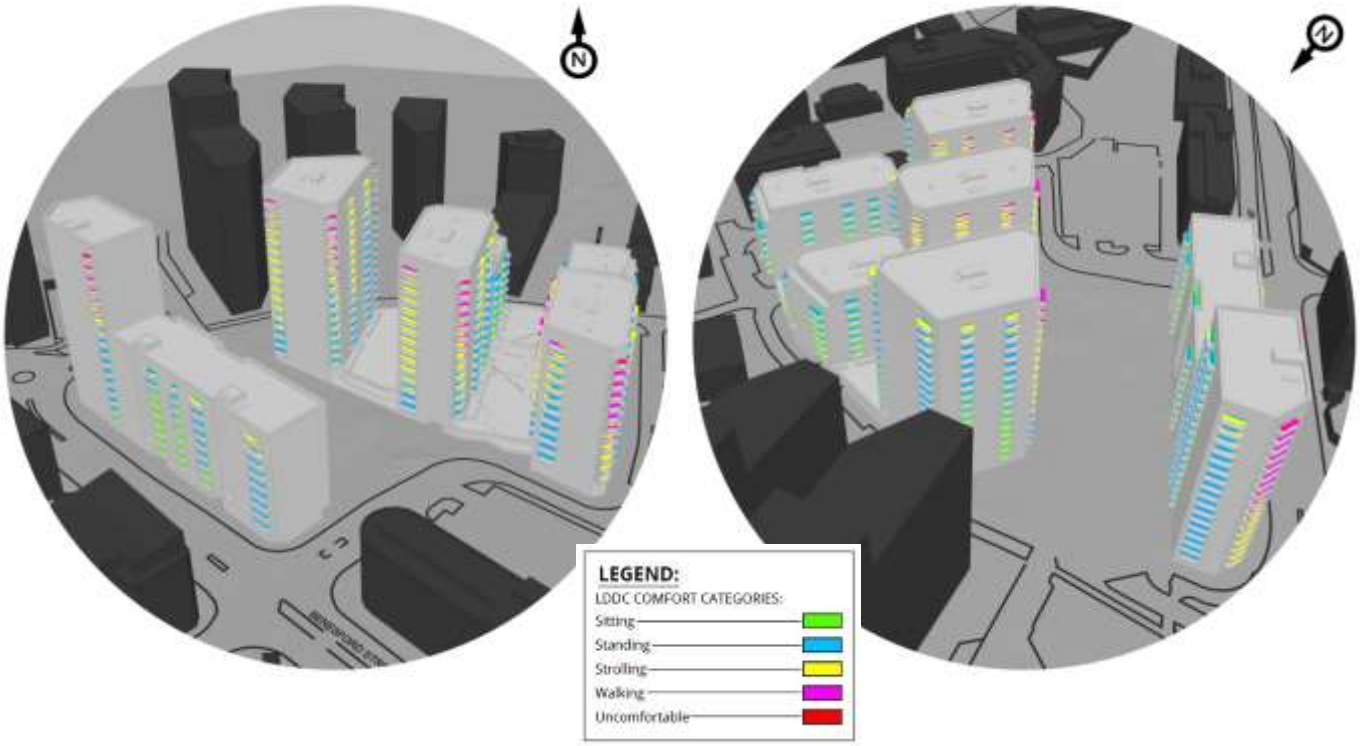

Figure 4.7.6 Configuration 2: Proposed Development with Existing Surrounding Buildings – Windiest Season (Balconies)

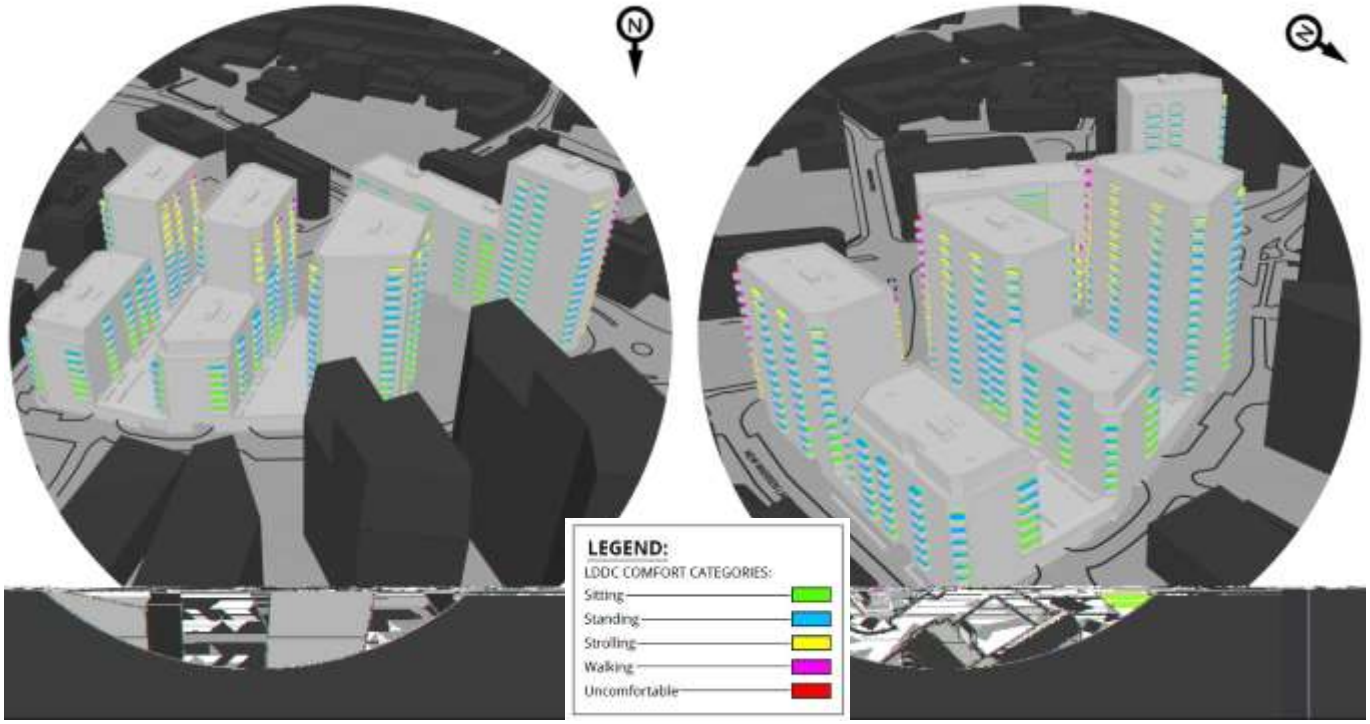

Figure 4.7.7 Configuration 2: Proposed Development with Existing Surrounding Buildings – Windiest Season (Balconies)

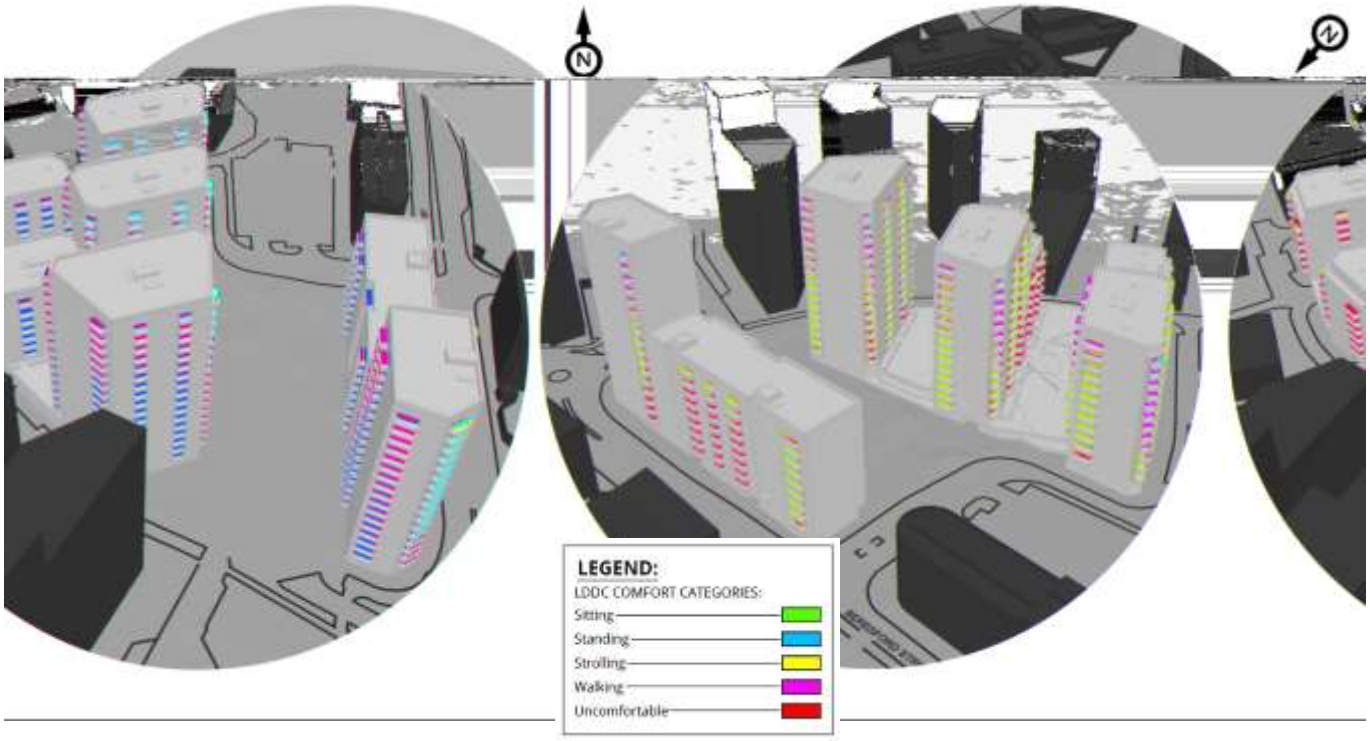

Figure 4.7.8 Configuration 2: Proposed Development with Existing Surrounding Buildings – Summer Season (Balconies)

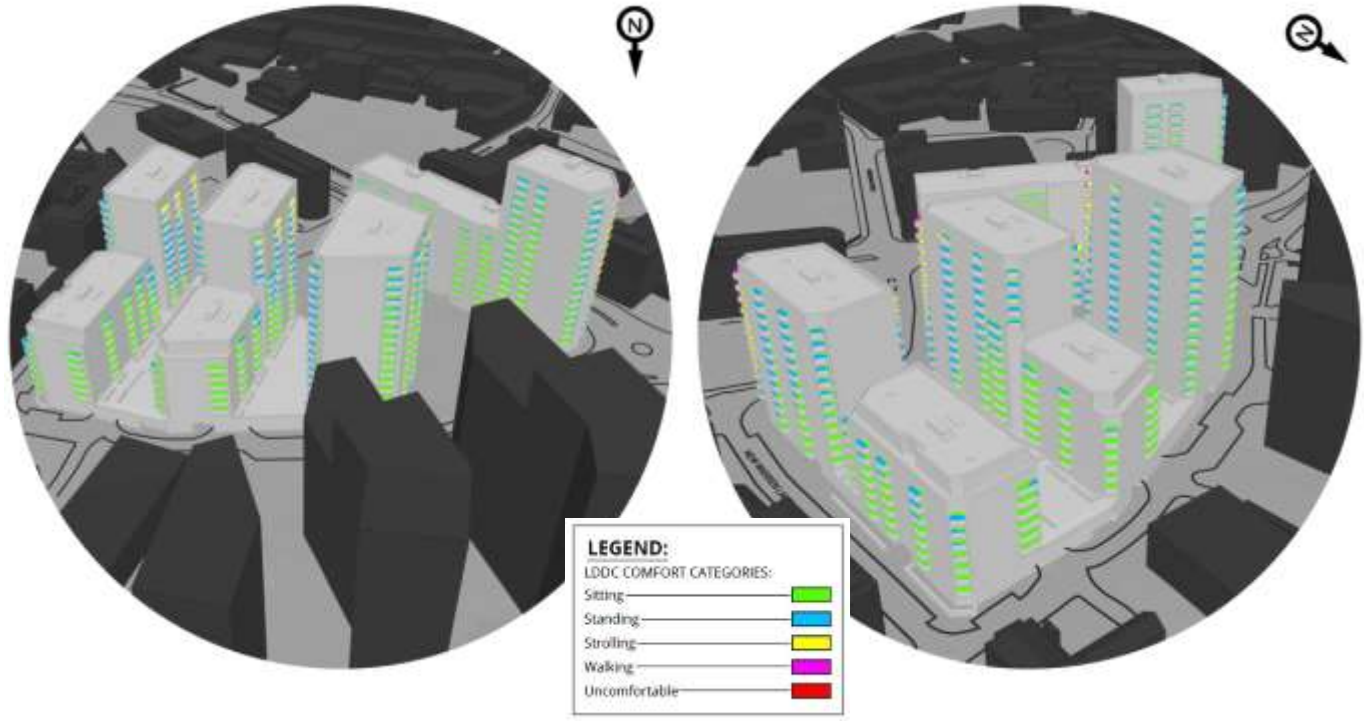

Figure 4.7.9 Configuration 2: Proposed Development with Existing Surrounding Buildings – Summer Season (Balconies)

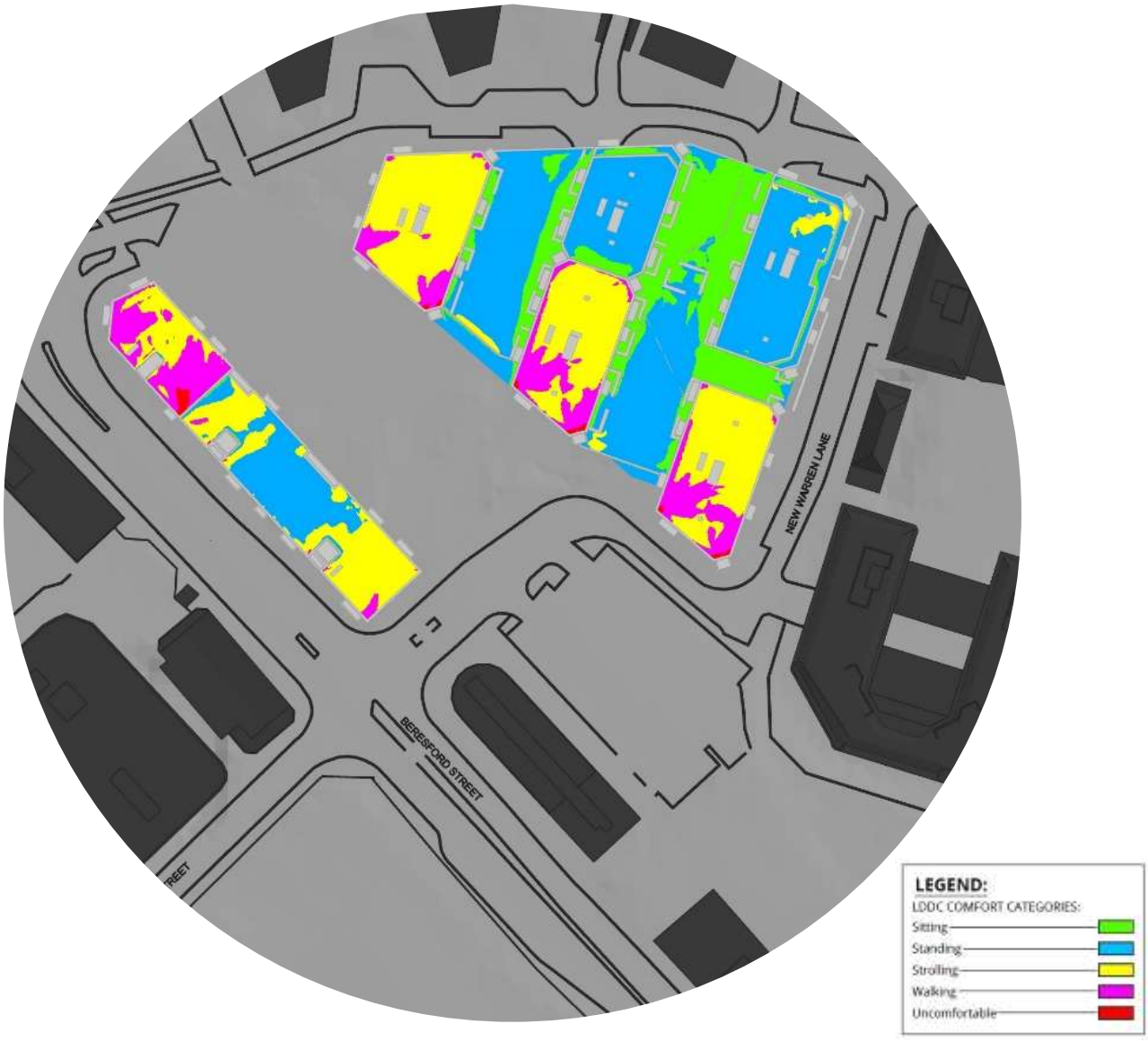

Figure 4.7.10 Configuration 2: Proposed Development with Existing Surrounding Buildings – Windiest Season (Terrace and Podium Levels)

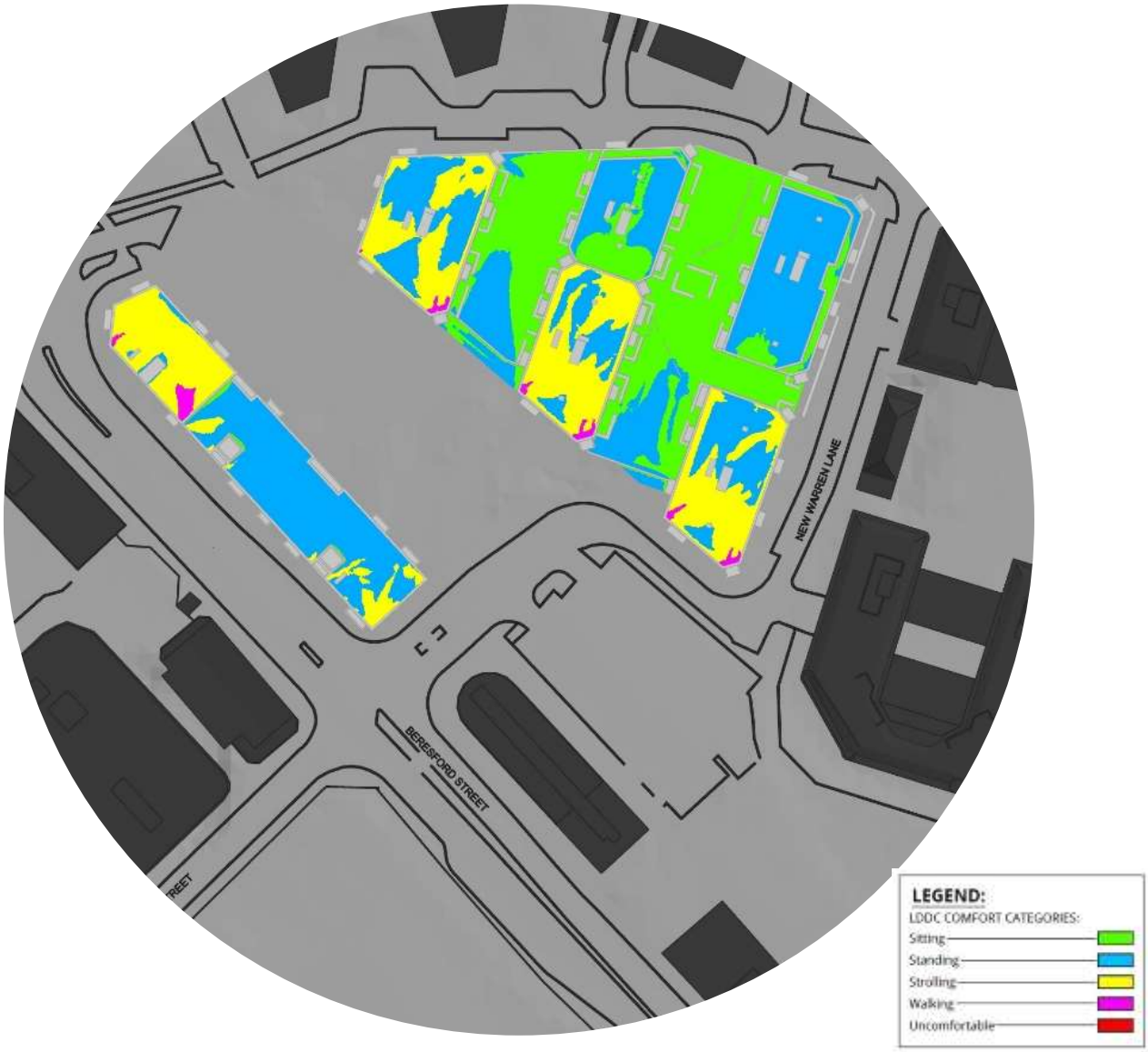

Figure 4.7.11 Configuration 2: Proposed Development with Existing Surrounding Buildings – Summer Season (Terrace and Podium Levels)

Configuration 3: Proposed Development with Proposed Landscaping and Existing Surrounding Buildings

4.7.60 Wind conditions around the existing Site are shown in Figures 4.7.12 and 4.7.13 for the windiest and summer season at ground level respectively. Figures 4.7.14 and 4.71.15 represent the wind conditions at balconies during the windiest season and Figures 4.7.16 and 4.7.17 represent the wind conditions at balconies during summer season. Figures 4.7.18 and 4.7.19 for windiest and summer season at terrace levels respectively.

Pedestrian Comfort

4.7.61 Inclusion of the ground and podium level landscaping schemes would provide beneficial shelter to the amenity spaces. As such proposed seating within the play spaces to the south of Plot D and the seating provisions to the south of the podium spaces within Plot D would have suitable sitting conditions during the summer season. All the thoroughfares, entrances and ground level/podium amenity spaces would have wind conditions suitable for the intended use and would represent **Moderate Beneficial** to **Negligible** effects.

4.7.62 Consistent with Configuration 2, some balcony amenity spaces of Plot D and Plot K would have strolling and walking conditions during the summer season which would represent **Minor Adverse** to **Moderate Adverse** effects respectively and would require wind mitigation measures.

4.7.63 Wind conditions at off-Site areas would represent **Negligible** effect.

Strong winds

4.7.64 Consistent with Configuration 2, strong winds which would pose a safety concern for pedestrians would be expected within the roof terraces with walking and conditions uncomfortable for pedestrian use during the windiest season. The roof terraces would be accessible for maintenance use only and as such the access to these terraces would be controlled during the windiest times of the year.

4.7.65 Consistent with Configuration 2, strong winds which would pose a safety concern for the occupants would be expected within the balconies on the southern and western façade of Plot D and Plot K with walking and conditions uncomfortable for pedestrian use during the windiest season. As such, wind mitigation measures would be required to provide beneficial shelter to these spaces.

4.7.66 Consistent with Configuration 1, strong winds exceeding the safety threshold would not be expected at ground level at and around the Proposed Development.

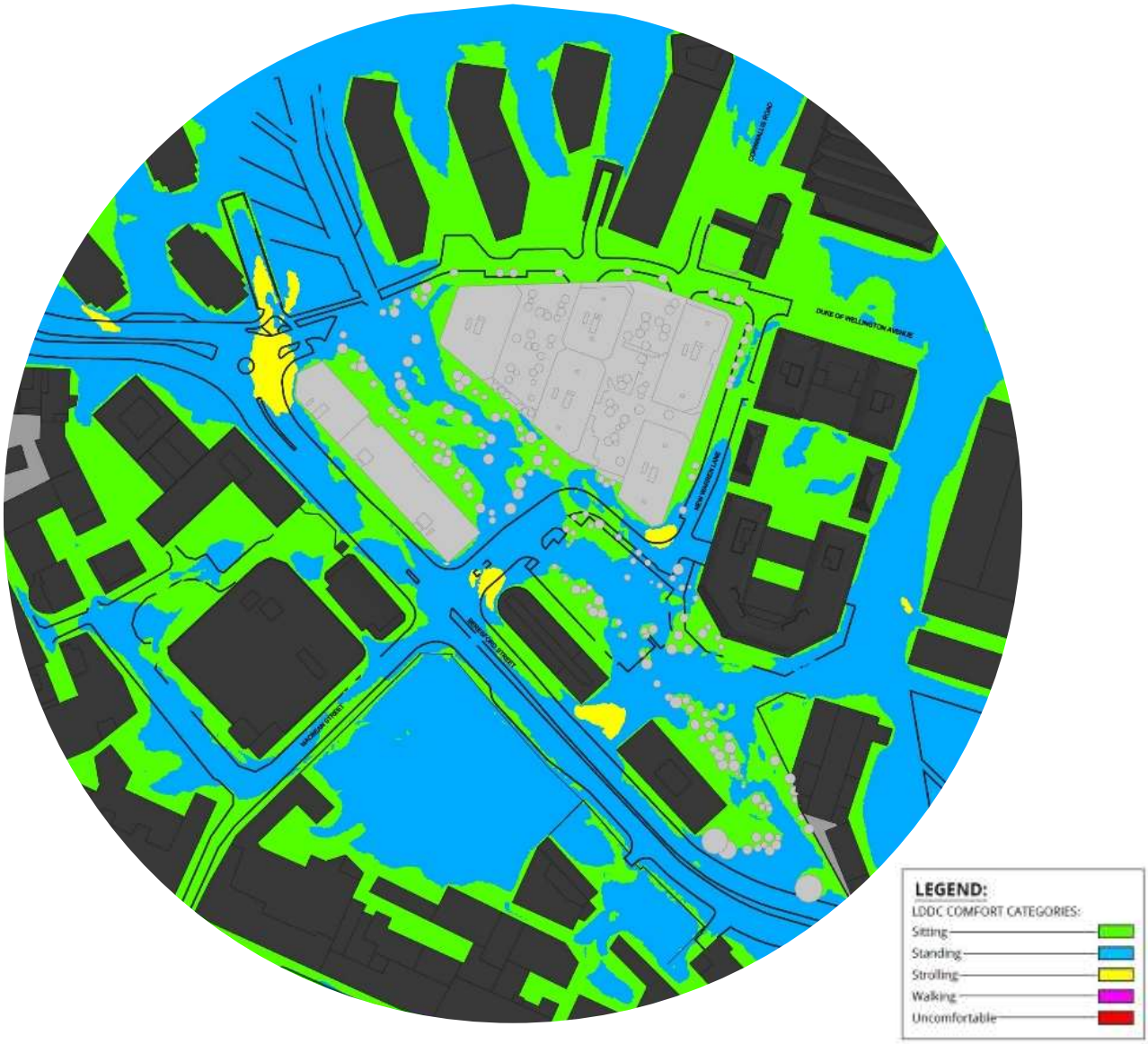

Figure 4.7.12 Configuration 3: Proposed Development with Proposed Landscaping and Existing Surrounding Buildings – Windiest Season (Ground Level)

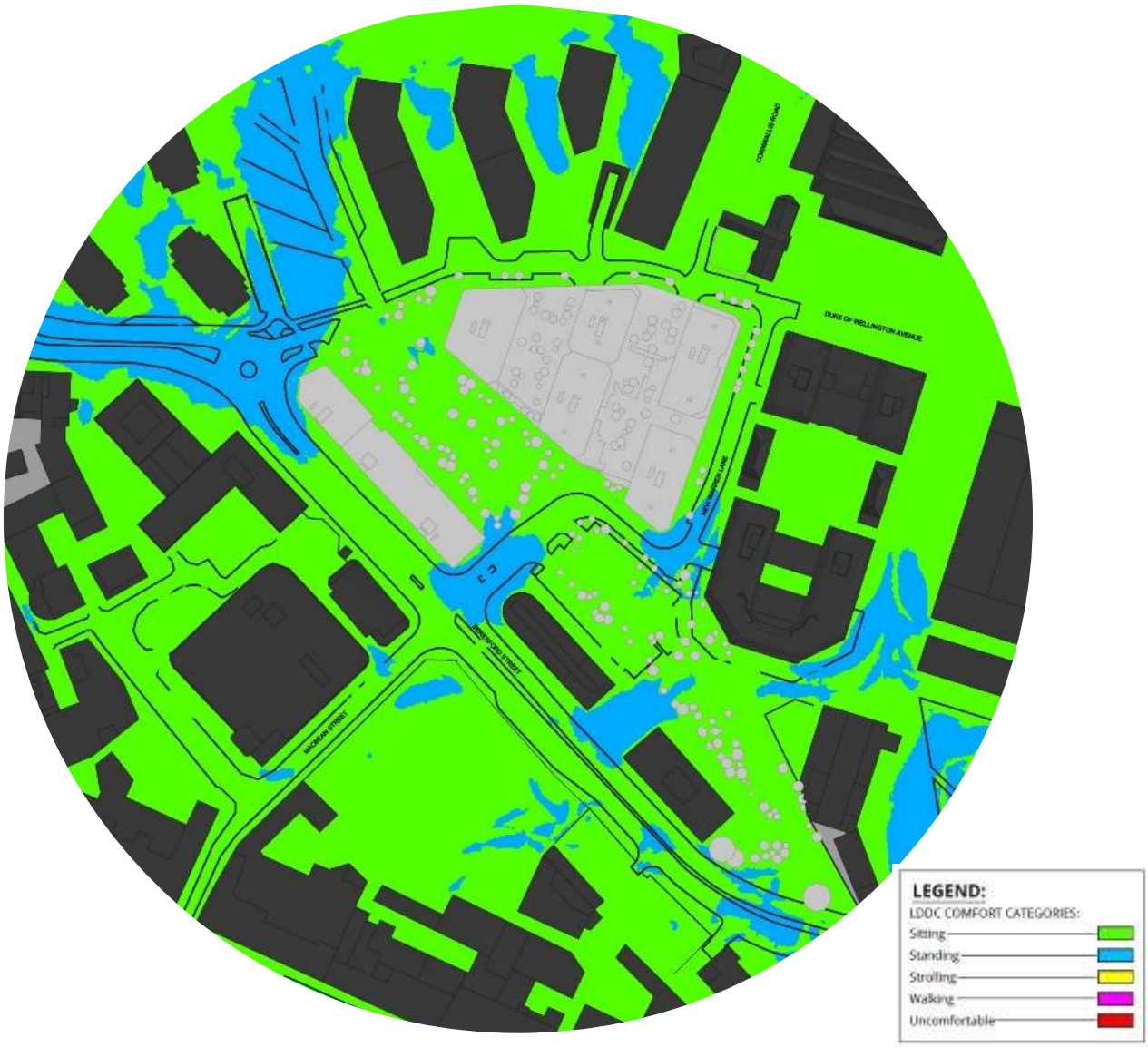

Figure 4.7.13 Configuration 3: Proposed Development with Proposed Landscaping and Existing Surrounding Buildings – Summer Season (Ground Level)

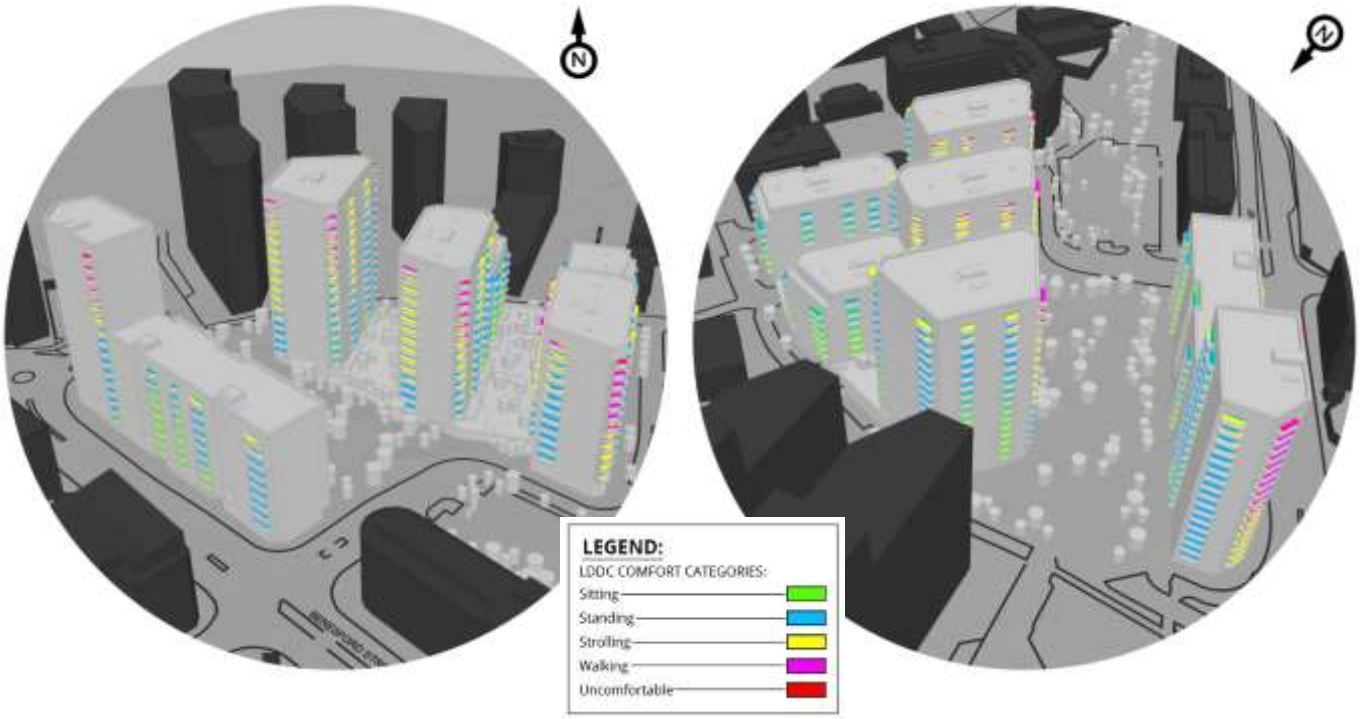

Figure 4.7.14 Configuration 3: Proposed Development with Proposed Landscaping and Existing Surrounding Buildings – Windiest Season (Balconies)

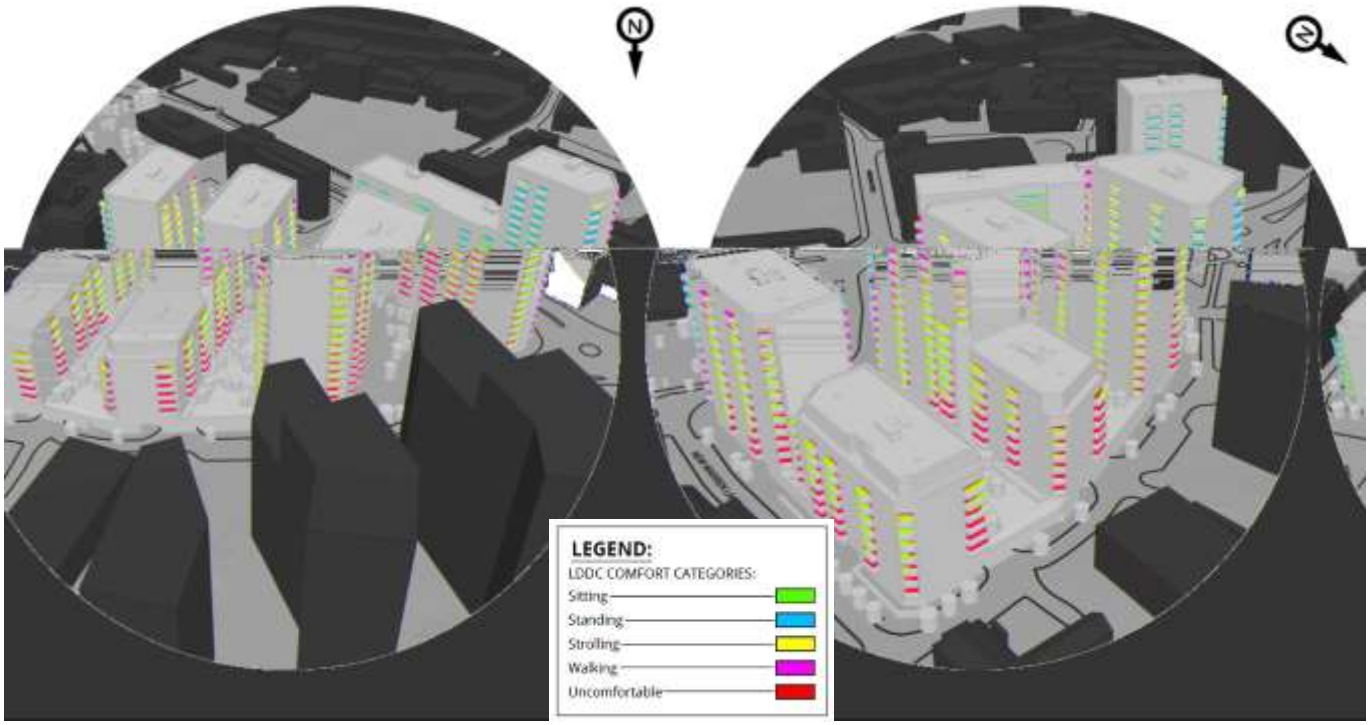

Figure 4.7.15 Configuration 3: Proposed Development with Proposed Landscaping and Existing Surrounding Buildings – Windiest Season (Balconies)

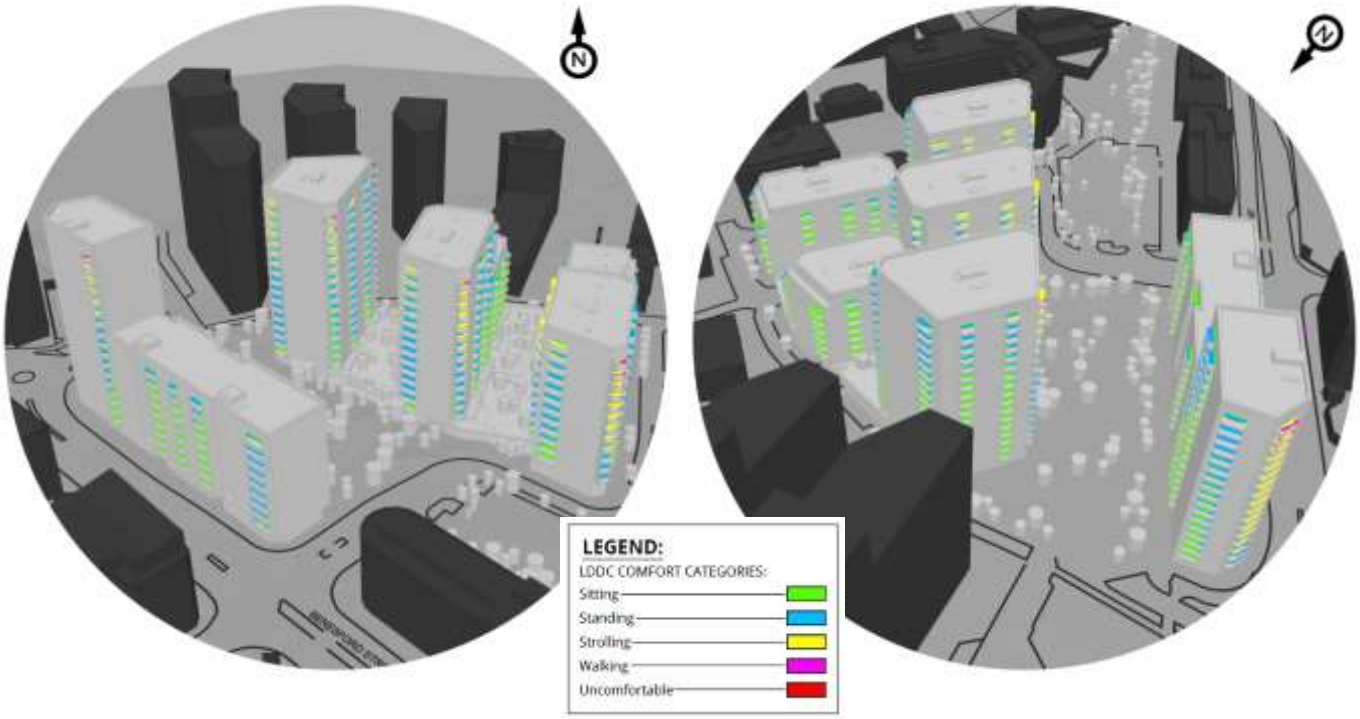

Figure 4.7.16 Configuration 3: Proposed Development with Proposed Landscaping and Existing Surrounding Buildings – Summer Season (Balconies)

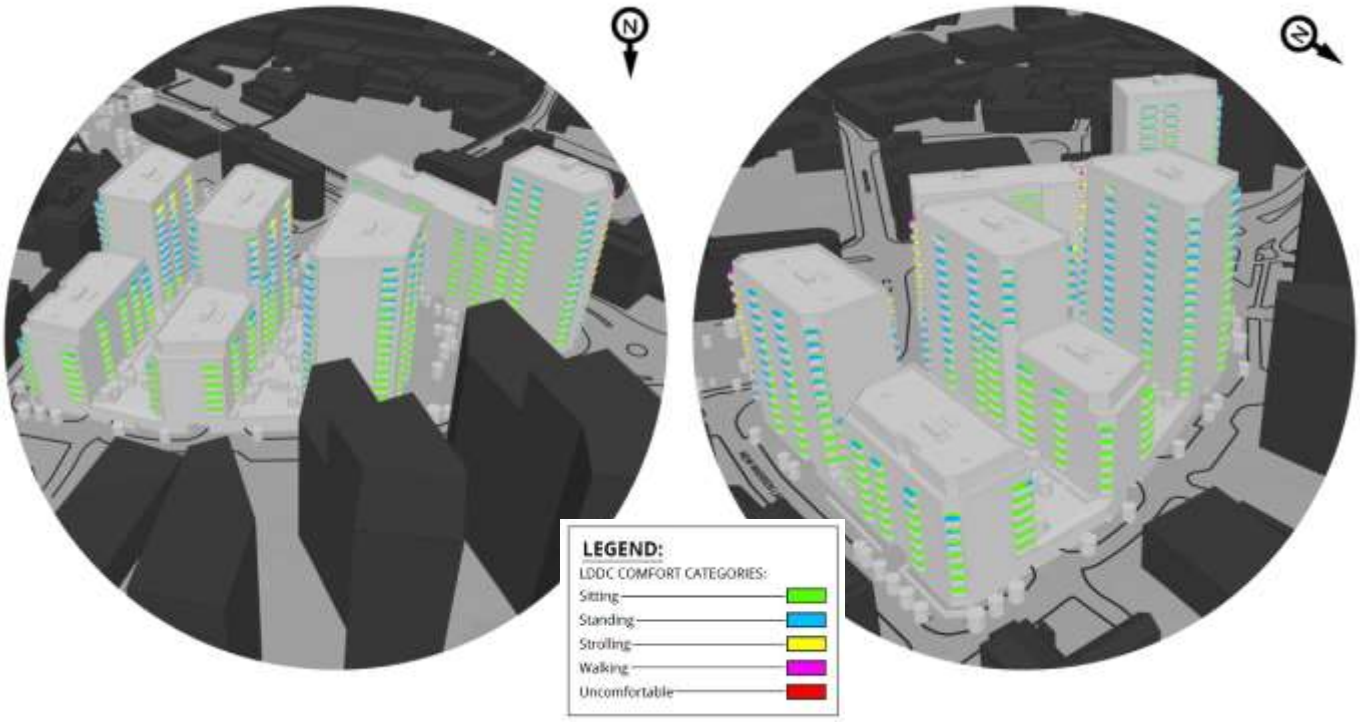

Figure 4.7.17 Configuration 3: Proposed Development with Proposed Landscaping and Existing Surrounding Buildings – Summer Season (Balconies)

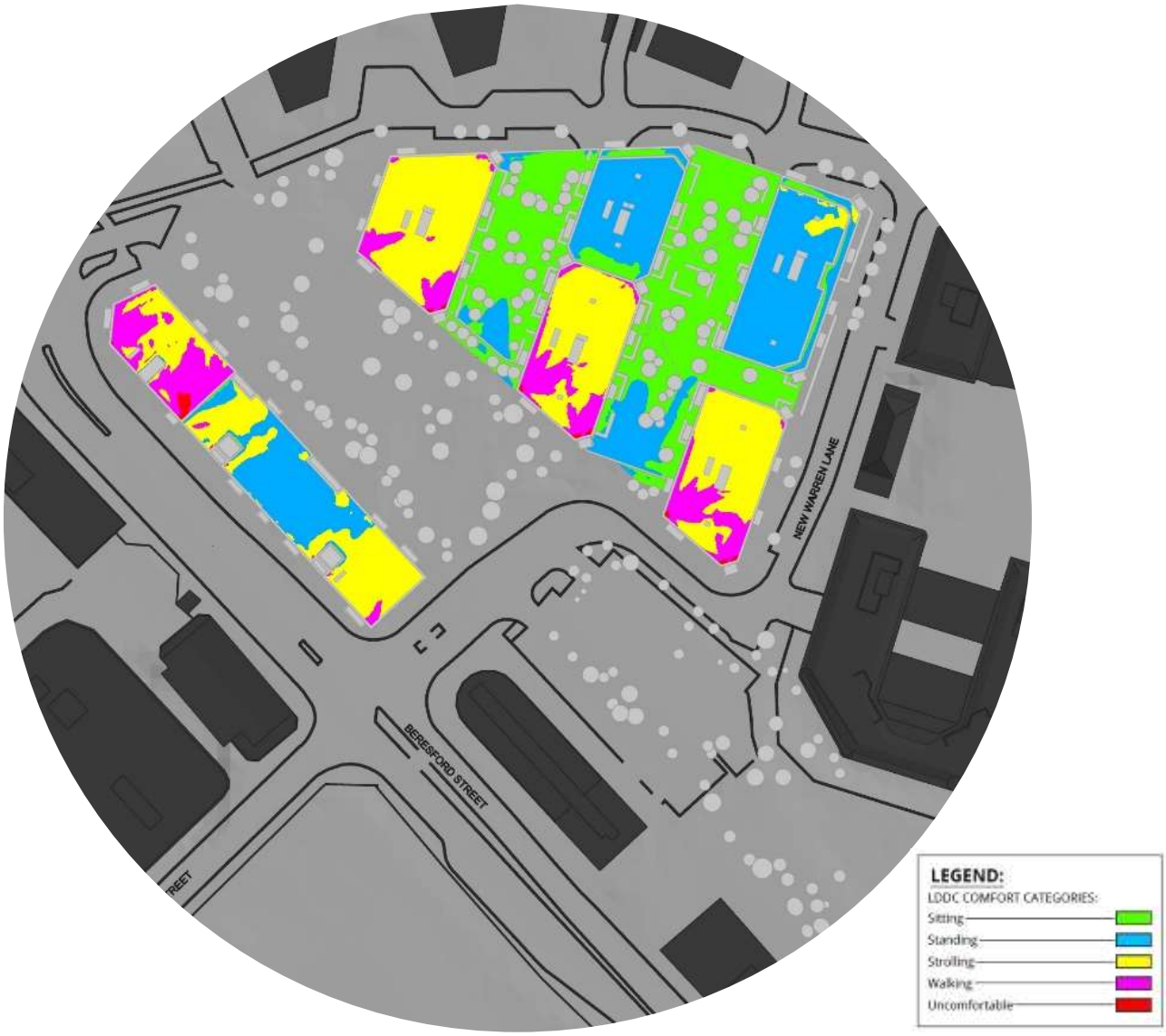

Figure 4.7.18 Configuration 3: Proposed Development with Proposed Landscaping and Existing Surrounding Buildings – Windiest Season (Terrace and Podium Levels)

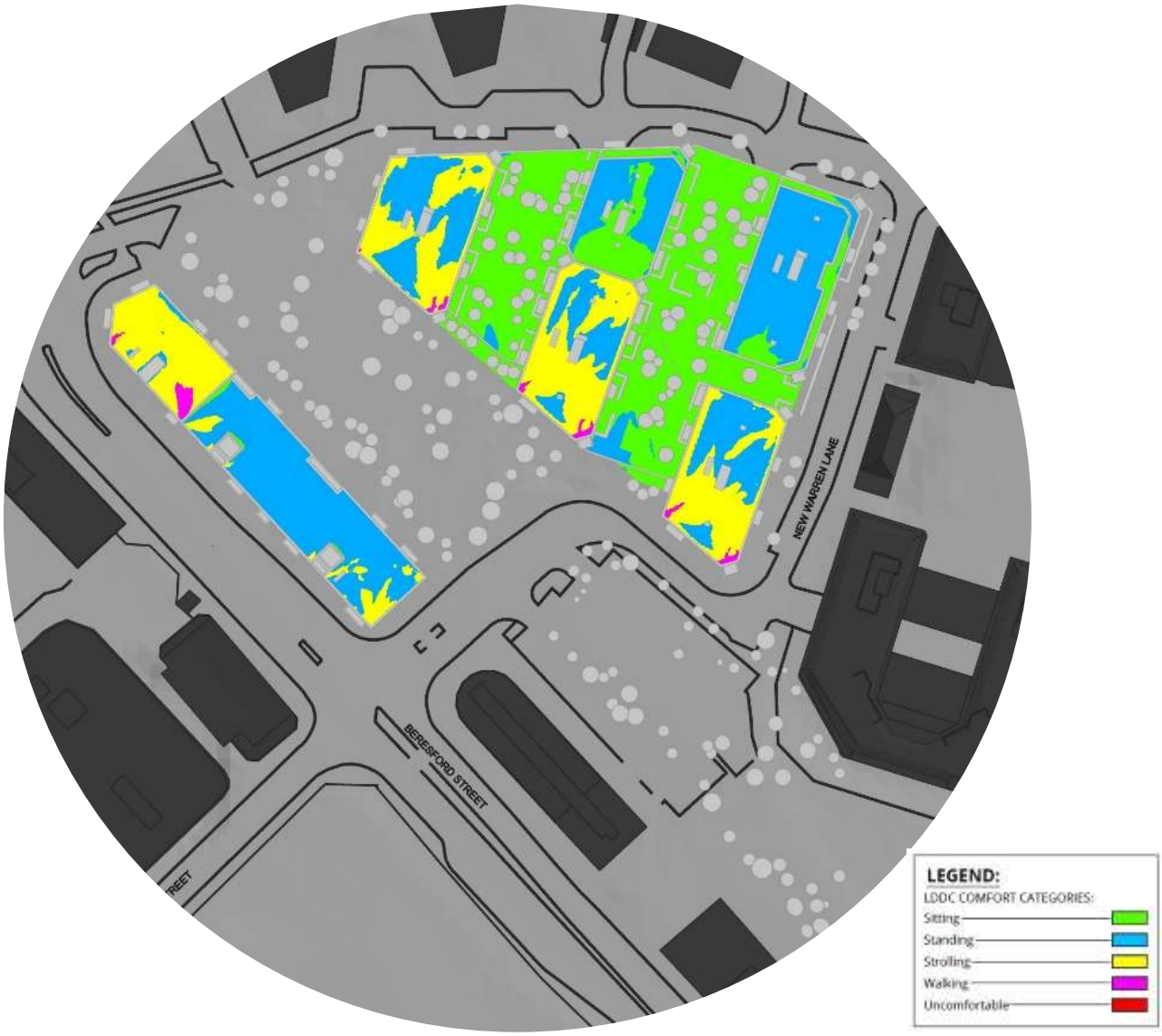

Figure 4.7.19 Configuration 3: Proposed Development with Proposed Landscaping and Existing Surrounding Buildings – Summer Season (Terrace and Podium Levels)

Mitigation Measures

4.7.67 With the proposed landscaping scheme in place, wind conditions at ground and podium levels would be suitable for the intended use. However, the following balcony amenity spaces would have conditions windier than suitable/unsafe for occupant use:

Unsafe conditions:

- Three uppermost balconies at the south-west corner of Building D3 in Plot D;
- Six uppermost balconies at the southern corner of Building D3 in Plot D;
- Two uppermost balconies on the western façade of Building D4 in Plot D;
- Two uppermost balconies at the north-west corner of Building D4 in Plot;
- Seven uppermost balconies at the southern corner of Building D4 in Plot D;

- Two uppermost balconies on the western façade of Building D5 in Plot D;
- Uppermost balcony at the south-west corner of Building D5 in Plot D;
- Eight uppermost balconies at the southern corner of Building D5 in Plot D;
- Nine uppermost balconies at the south-west corner of Building K5 in Plot K;
- Six uppermost balconies at the southern corner of Building K5 in Plot K;

Uncomfortable Conditions:

- Eight uppermost balconies at the south-west corner of Building D3 in Plot D with strolling conditions during the summer season;
- Eight uppermost balconies at the southern corner of Building D3 in Plot D with strolling and walking conditions during the summer season;
- Uppermost balconies on the western and eastern facades of Building D3 in Plot D with strolling conditions during the summer season;
- Seven uppermost balconies at the south-west corner of Building D4 in Plot D with strolling conditions during the summer season;
- Nine uppermost balconies at the southern corner of Building D4 in Plot D with strolling and walking conditions during the summer season;
- Uppermost balconies on the eastern façade of Building D4 in Plot D with strolling conditions during the summer season;
- Four uppermost balconies on the western façade of Building D4 in Plot D with strolling conditions during the summer season;
- Three uppermost balconies at the northern corner of Building D4 in Plot D with strolling conditions during the summer season;
- Two uppermost balconies at the south-west corner of Building D5 in Plot D with strolling conditions during the summer season;
- Ten uppermost balconies at the southern corner of Building D5 in Plot D with strolling and walking conditions during the summer season;
- Five uppermost balconies on the western façade of Building D5 in Plot D with strolling conditions during the summer season;
- Thirteen uppermost balconies at the south-west corner of Building K5 in Plot K with strolling and walking conditions during the summer season;
- Seven uppermost balconies at the southern corner of Building K5 in Plot K with strolling and walking conditions during the summer season;
- Uppermost balcony at the southern corner of Building K3 in Plot K with strolling conditions during the summer season.

4.7.68 Figure 4.7.20 and 4.7.21 indicate the balcony locations that would require wind mitigation measures.

4.7.69 The balcony amenity spaces with wind conditions unsafe/windier than suitable for the intended use identified above would require the following wind mitigation measures to increase the shelter provided for these spaces:

- Replacing the railing with 1.5m high solid balustrade around the perimeter of the balcony; or

- Inclusion of 2m high solid balustrades on the two sides of the balcony and inclusion of 1.2m high solid balustrade along the frontage of the balcony.

4.7.70 It should be noted that the ground and podium level open areas at and around the Proposed Development that are accessible by general public would have wind conditions suitable and safe for pedestrian use throughout the year. Conditions winder than suitable for occupant use would only occur on the private balcony levels. Based on RWDI's experience combination of the above wind mitigation measures would be expected to provide beneficial shelter to the balcony amenity spaces. It is expected with the inclusion of the proposed balcony wind mitigation measures, balconies would have wind conditions suitable and safe for occupant use. Effectiveness of the wind mitigation measures would be assessed through further simulations post submission of this chapter to confirm that the balcony amenity spaces would have a suitable and safe wind environment.

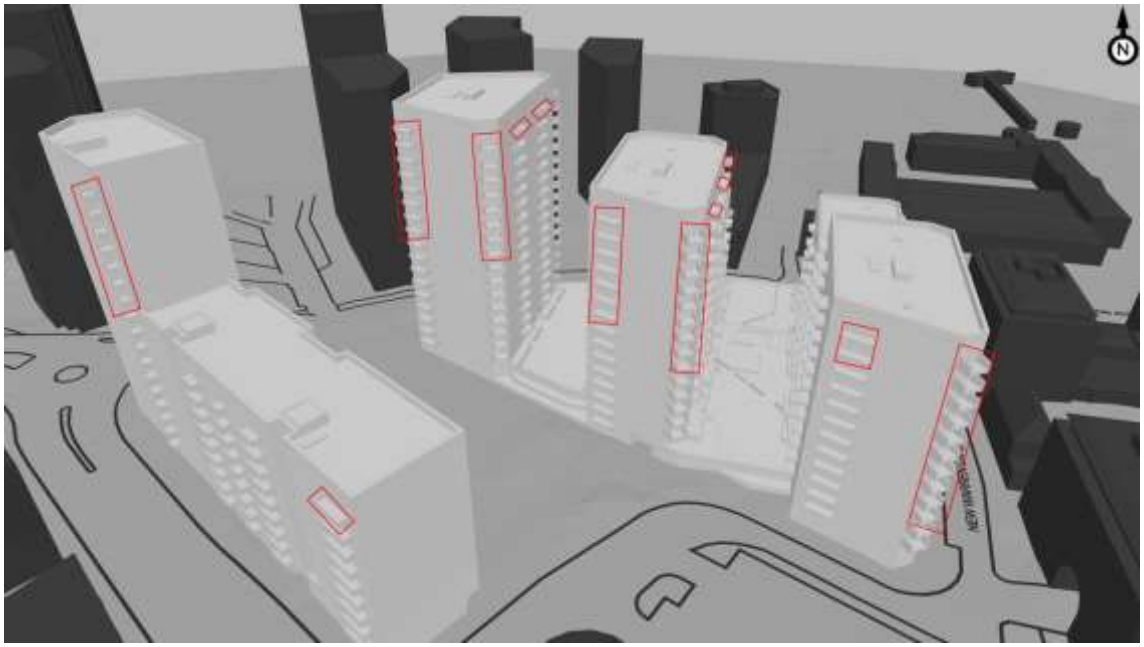

Figure 4.7.20 Balconies that would require wind mitigation measures

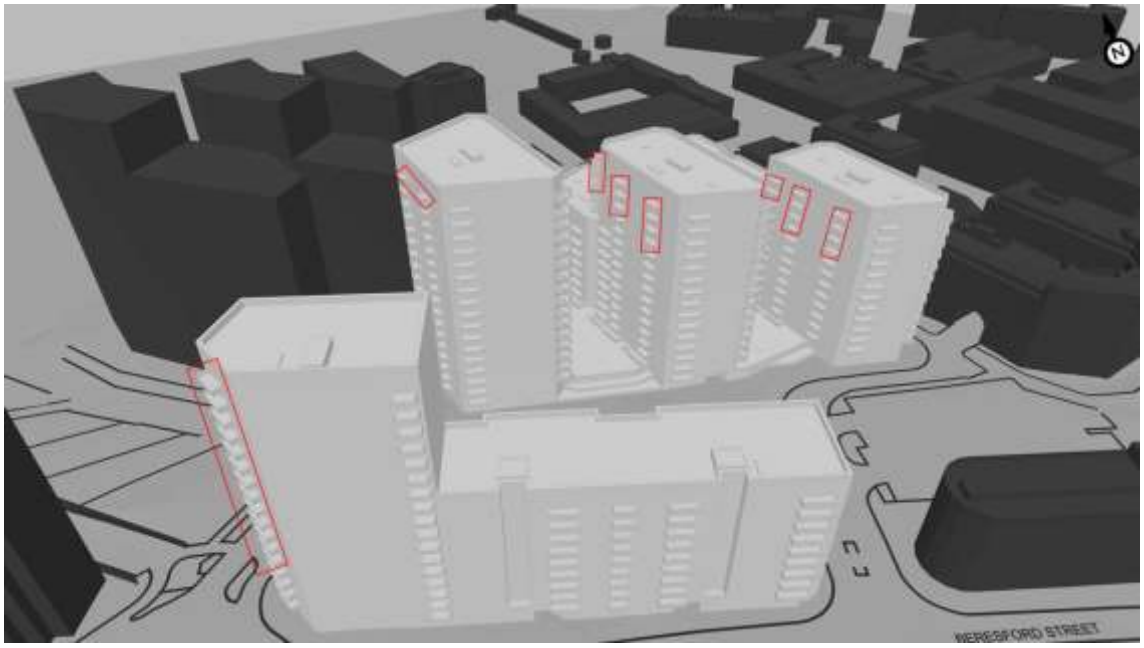

Figure 4.7.21 Balconies that would require wind mitigation measures

Cumulative Effects

Configuration 4: Proposed Development with Cumulative Surrounding Buildings

4.7.71 Wind conditions around the existing Site are shown in Figures 4.7.22 and 4.7.23 for the windiest and summer season at ground level respectively. Figures 4.7.24 and 4.7.25 represent the wind conditions at balconies during the windiest season and Figures 4.7.26 and 4.7.27 represent the wind conditions at balconies during summer season. Figures 4.7.28 and 4.7.29 for windiest and summer season at terrace levels respectively.

Pedestrian Comfort

4.7.72 The majority of the cumulative schemes would be located far away from the Proposed Development to have any significant material effect. Inclusion of the taller 81-88 Beresford Street Scheme (Planning ref 21/4216/F) would increase the windiness to the south of the cumulative scheme due to the wind interactions with this cumulative scheme; resulting in strolling conditions during the windiest season. These conditions would be suitable for the intended thoroughfare use.

4.7.73 Wind conditions on all other areas at and around the Proposed Development would be consistent with Configuration 2. As such on-Site wind conditions would represent **Moderate Beneficial** to **Moderate Adverse** effects.

4.7.74 Wind conditions at off-Site areas would represent **Negligible** effect.

Strong winds

4.7.75 Consistent with Configuration 2, strong winds which would pose a safety concern for pedestrians would be expected within the roof terraces with walking and conditions uncomfortable for pedestrian use during the windiest season. The roof terraces would be accessible for maintenance use only and as such the access to these terraces would be controlled during the windiest times of the year.

4.7.76 Consistent with Configuration 2, strong winds which would pose a safety concern for the occupants would be expected within the balconies of Plot D and Plot K with walking and conditions uncomfortable for pedestrian use during the windiest season. As such, wind mitigation measures suggested for Configuration 3 would be required to provide beneficial shelter to these spaces.

4.7.77 Consistent with Configuration 1, strong winds exceeding the safety threshold would not be expected at ground level at and around the Proposed Development.

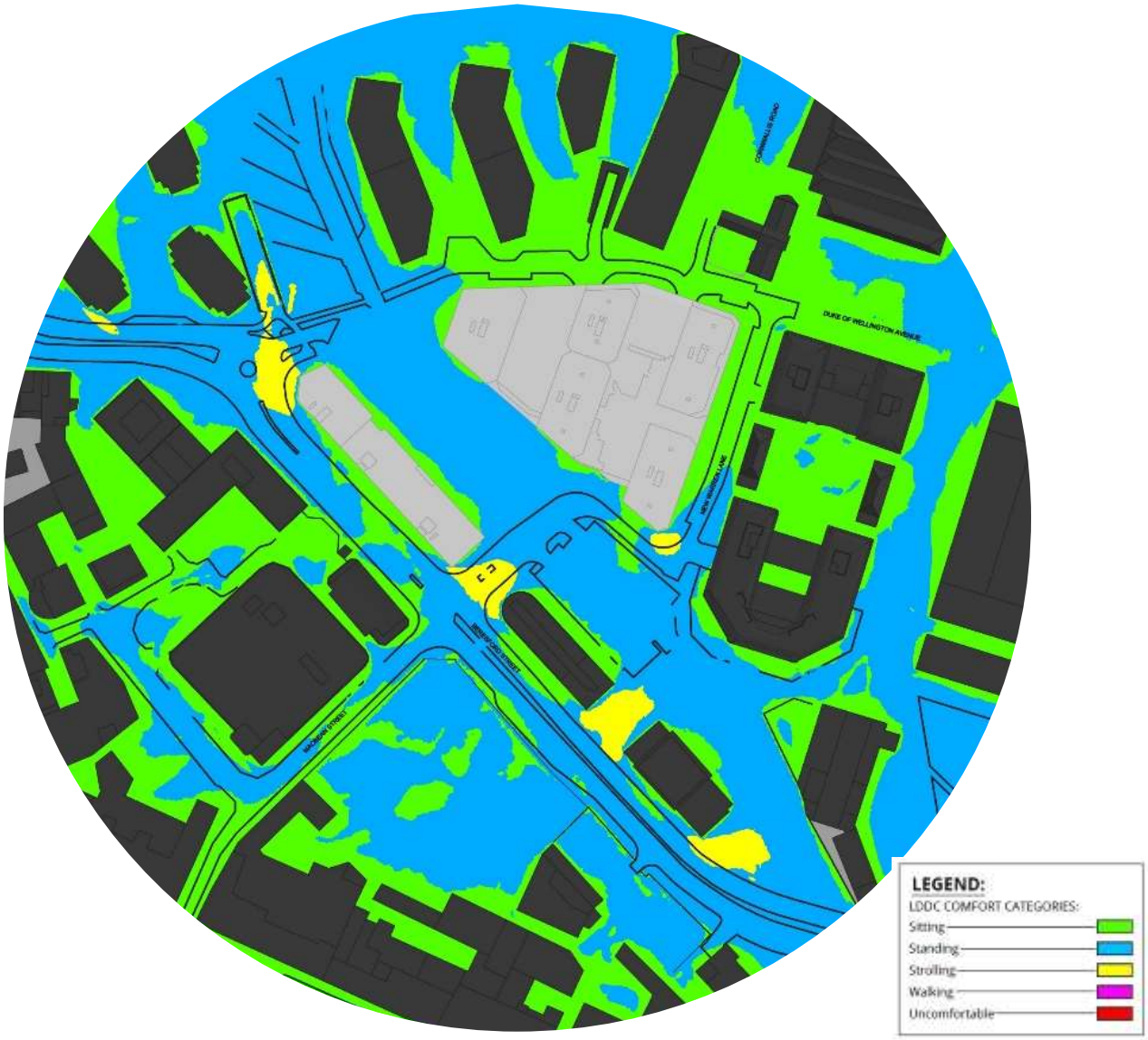

Figure 4.7.22 Configuration 4: Proposed Development with Cumulative Surrounding Buildings – Windiest Season (Ground Level)

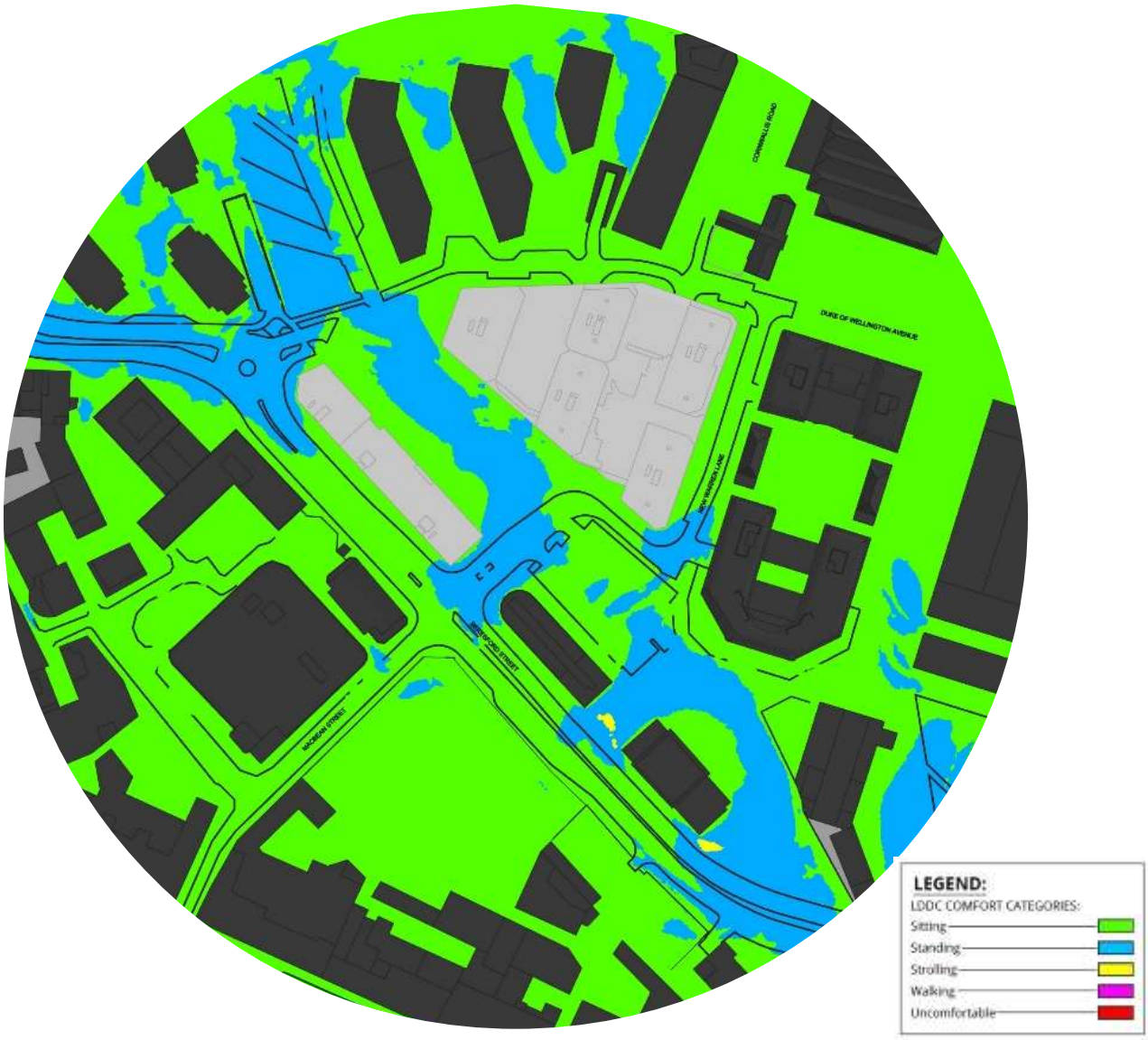

Figure 4.7.23 Configuration 4: Proposed Development with Cumulative Surrounding Buildings – Summer Season (Ground Level)

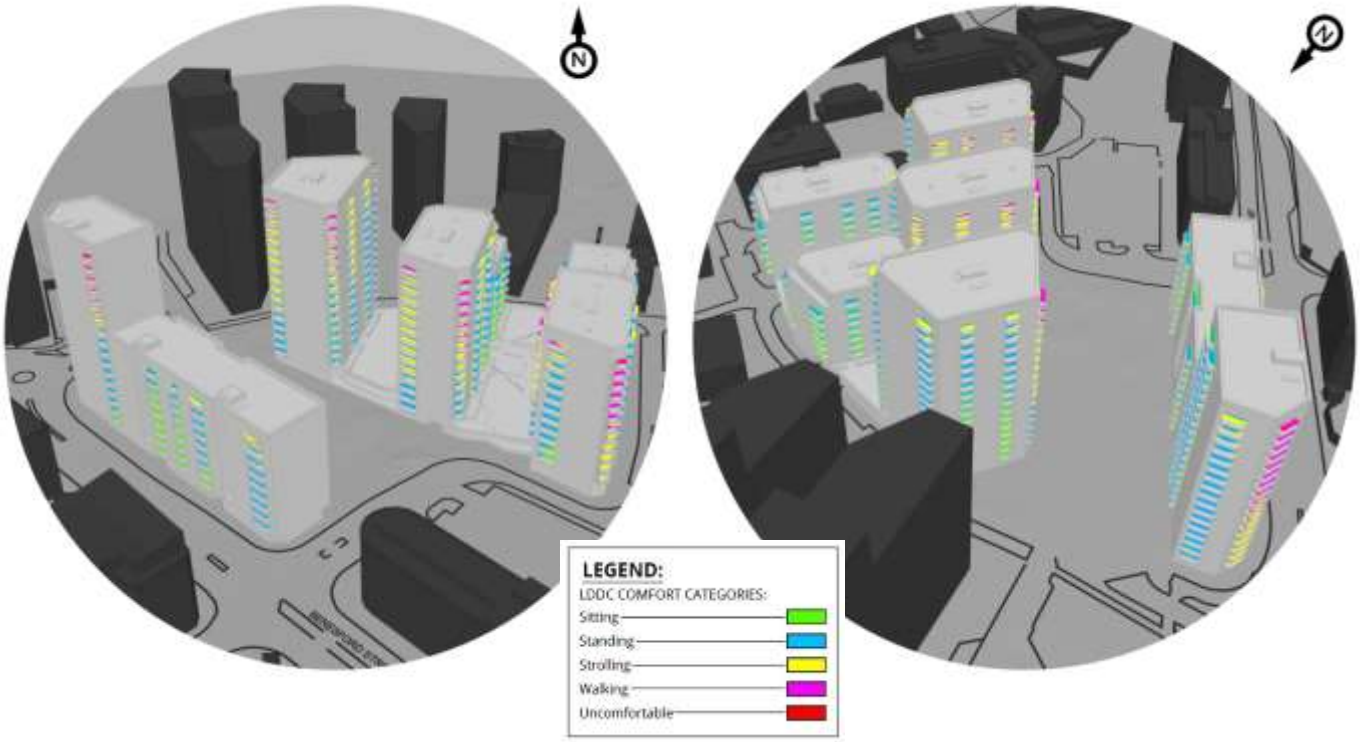

Figure 4.7.24 Configuration 4: Proposed Development with Cumulative Surrounding Buildings – Windiest Season (Balconies)

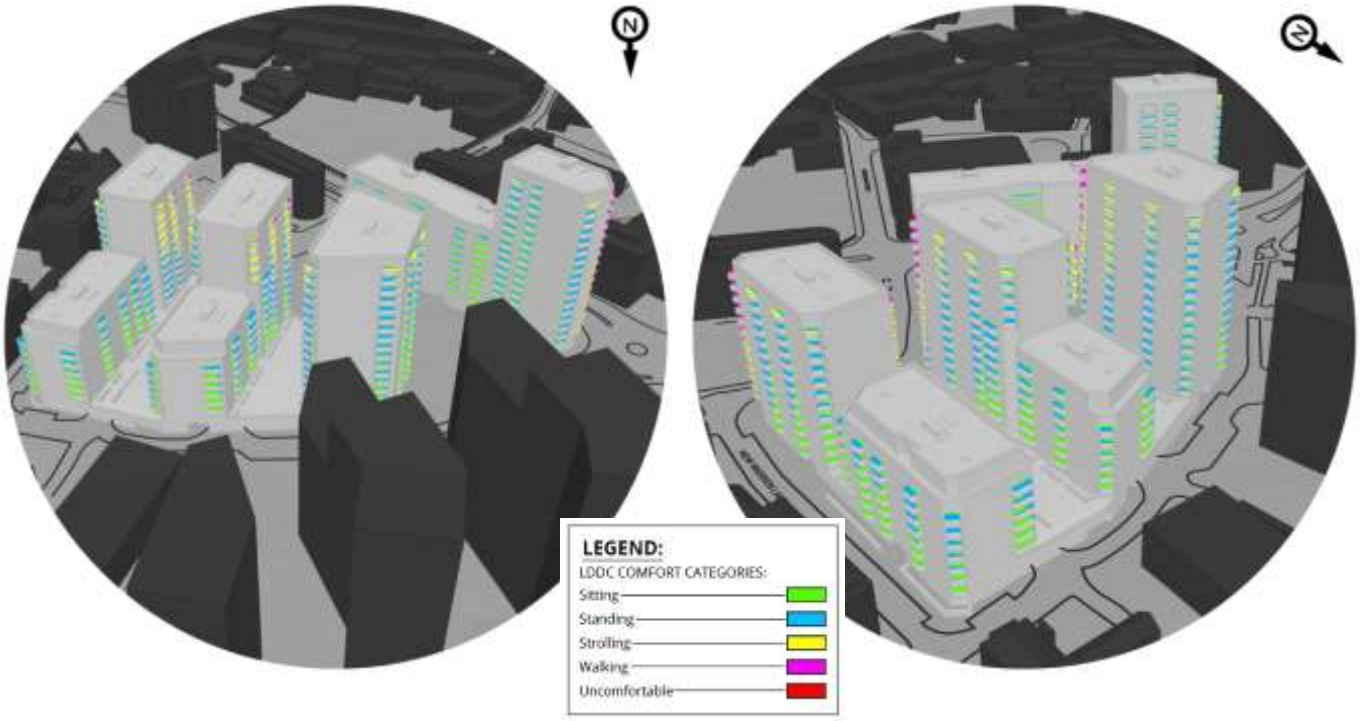

Figure 4.7.25 Configuration 4: Proposed Development with Cumulative Surrounding Buildings – Windiest Season (Balconies)

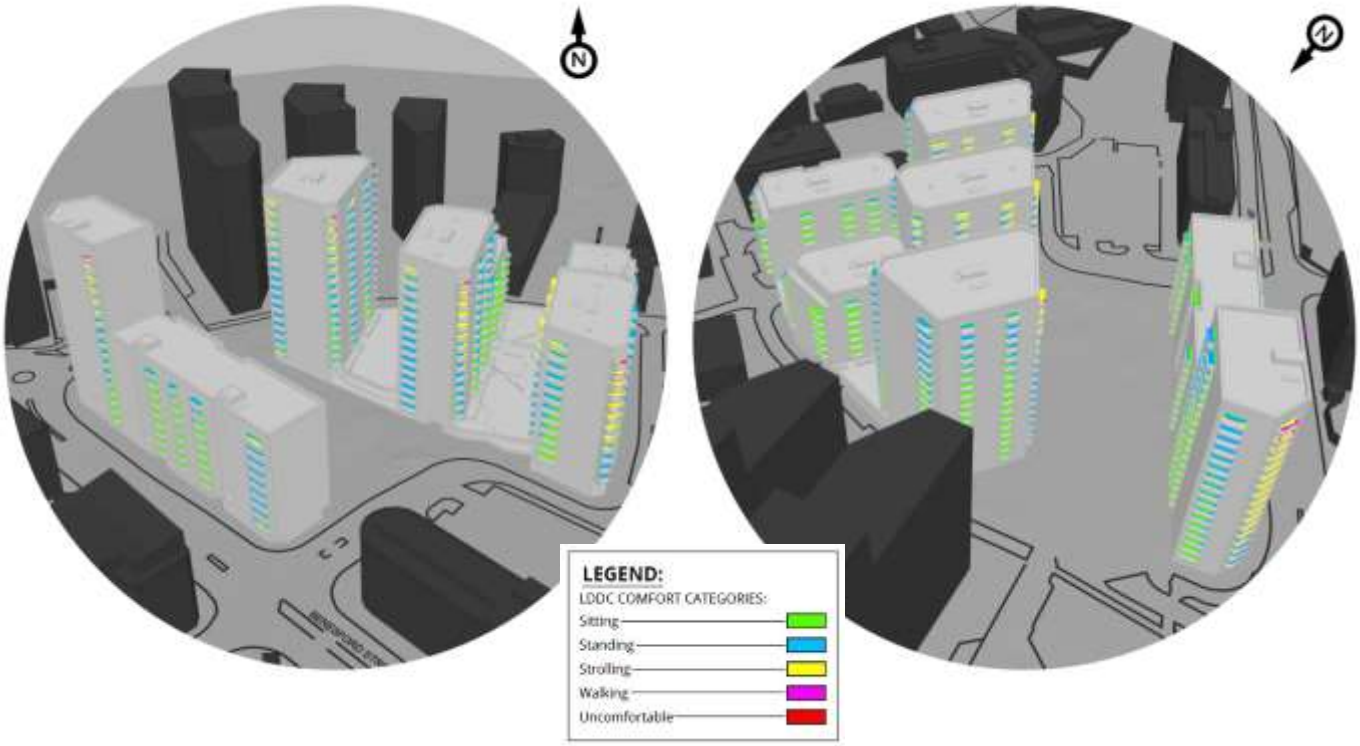

Figure 4.7.26 Configuration 4: Proposed Development with Cumulative Surrounding Buildings – Summer Season (Balconies)

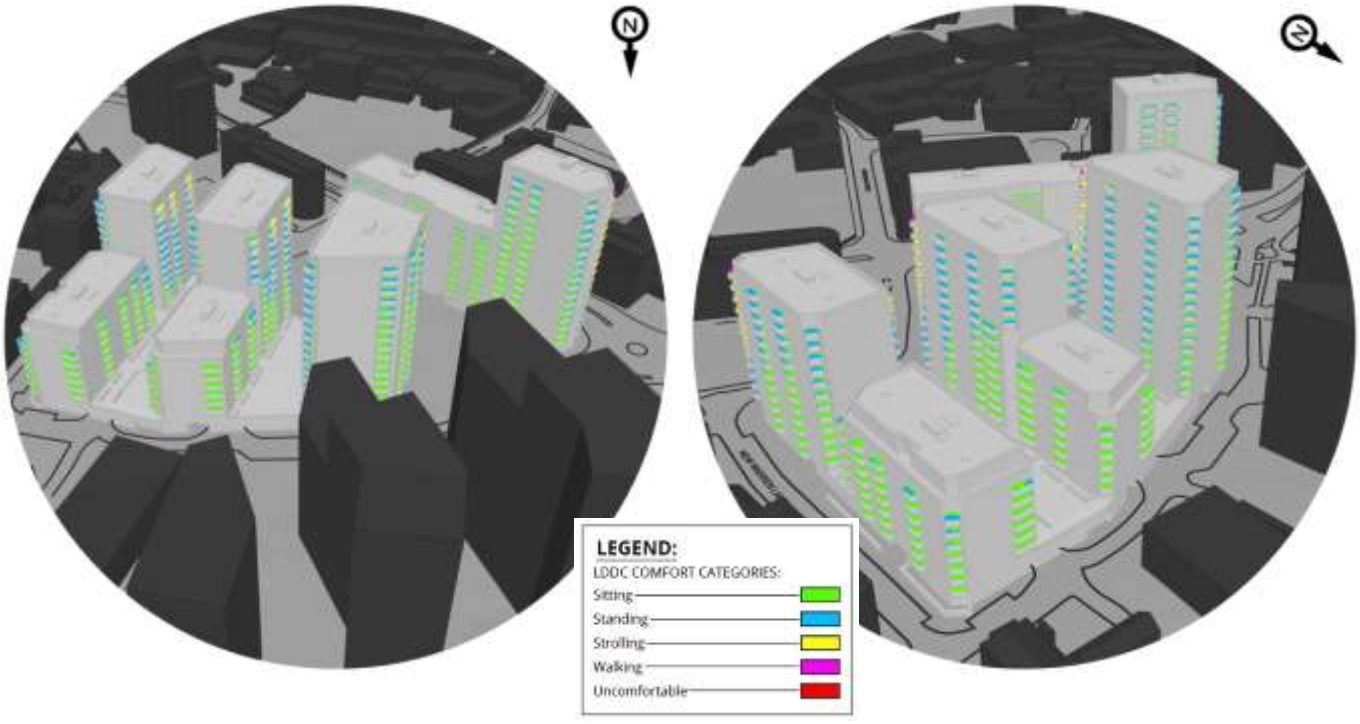

Figure 4.7.27 Configuration 4: Proposed Development with Cumulative Surrounding Buildings – Summer Season (Balconies)

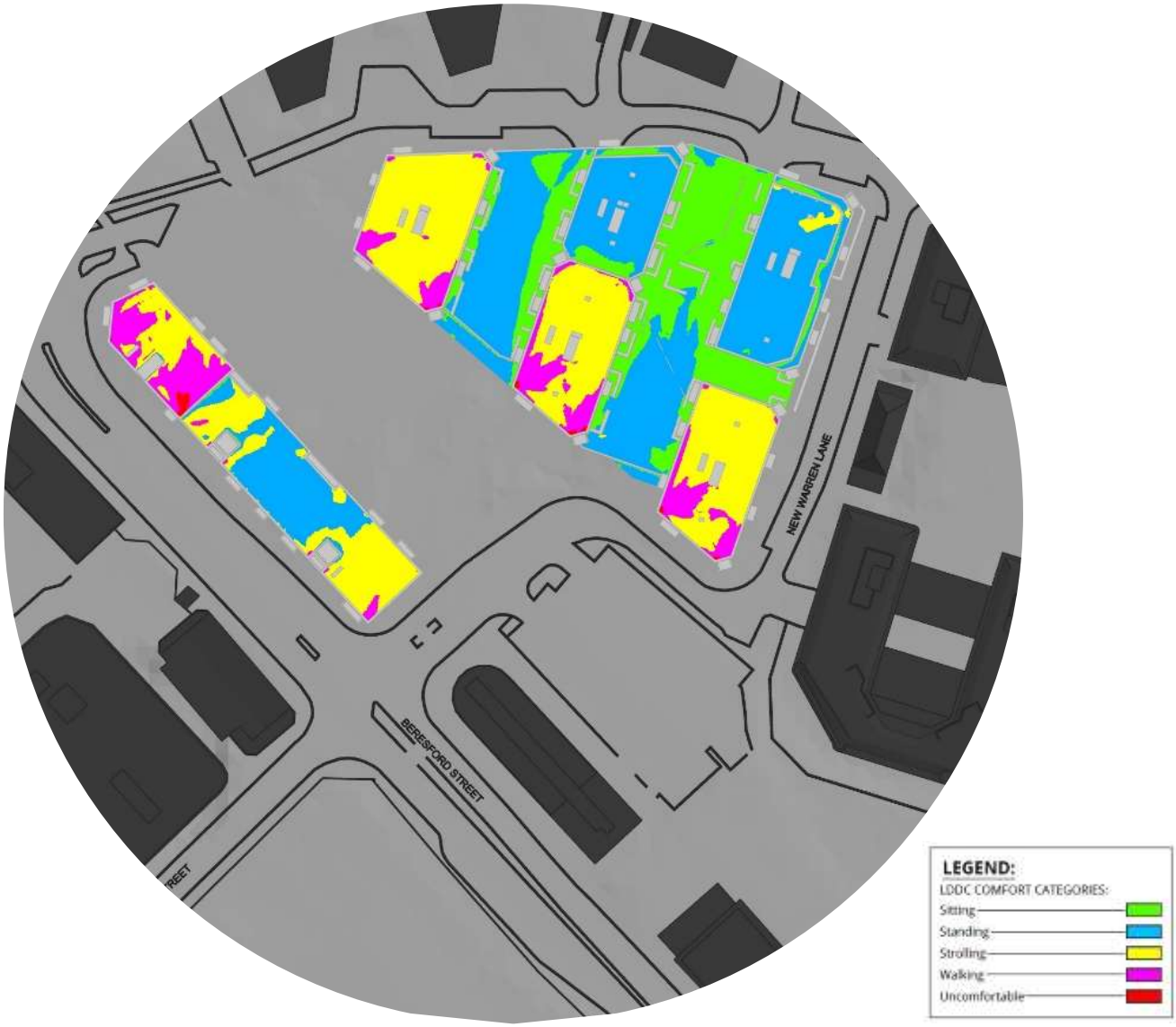

Figure 4.7.28 Configuration 4: Proposed Development with Cumulative Surrounding Buildings – Windiest Season (Terrace and Podium Levels)

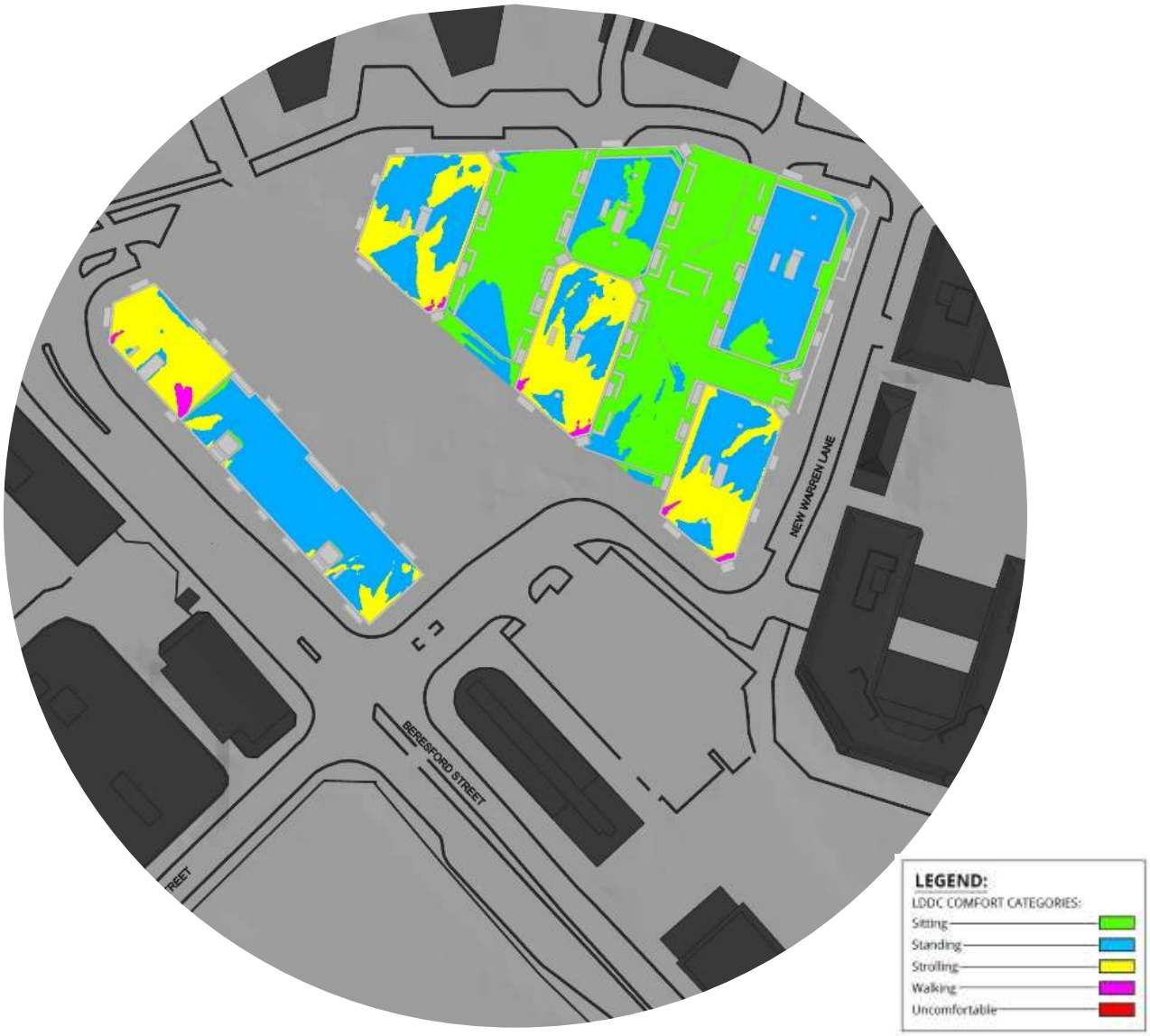

Figure 4.7.29 Configuration 4: Proposed Development with Cumulative Surrounding Buildings – Summer Season (Terrace and Podium Levels)

Mitigation Measures

4.7.78 Due to the occurrence of wind conditions windier than suitable/unsafe for occupant use, balcony amenity spaces would require wind mitigation measures proposed for Configuration 3. Inclusion of the proposed balcony wind mitigation measures would be expected to provide beneficial shelter to these spaces. As such, with the mitigation in place, balcony amenity spaces would be expected to have suitable conditions representing a **Negligible** effect. Effectiveness of the proposed balcony wind mitigation measures would be assessed through further simulations post submission of this chapter.

Conclusions

4.7.79 A wind microclimate assessment was undertaken to support the RMA of the Proposed Development, taking into account the detailed model of Plots D and K, using Computational Fluid Dynamic modelling in the context of the existing and cumulative surrounding buildings. This document therefore focuses on conditions within and around Plots D and K specifically, in comparison to the previous 2013 ES Chapter.

4.7.80 Similar to the 2013 ES Chapter, the majority of the areas at and around the Proposed Development would remain suitable for the intended uses. The 2013 ES Chapter identified proposed seating adjacent to Plot K5 would have conditions windier than suitable for the intended use. Similarly, the assessment of the detailed model in this ES Chapter identified any seating proposed within the play spaced adjacent to Plot K5 (area between Plots D and K) would have conditions winder than suitable for sitting use. However, as indicated by Configuration 3, inclusion of the proposed landscaping scheme would be beneficial to achieve suitable sitting conditions within these spaces.

4.7.81 With the inclusion of the ground and podium landscape scheme all the thoroughfares, entrances, ground and podium level amenity spaces and majority of the balcony amenity spaces would represent **Moderate Beneficial** to **Negligible** effects.

4.7.82 Wind conditions at off-Site thoroughfares, entrances, pedestrian crossings, bus stops and amenity spaces would represent a **Negligible** effect.

4.7.83 Areas which would be windier than suitable/unsafe for occupant use and require mitigation measures would be situated at balcony levels of Plots D and K. Strolling and walking conditions would represent **Minor Adverse** to **Moderate Adverse** effects. Inclusion of the wind mitigation measures proposed within this chapter would be expected to provide beneficial shelter representing a **Negligible** effect. Due to the occurrence of strong winds, it is recommended that the effectiveness of the proposed balcony wind mitigation measures is confirmed through further CFD simulations.