APPENDIX III

AIR VENTILATION ASSESSMENT

FINAL REPORT

AIR VENTILATION ASSESSMENT
TAMAR DEVELOPMENT PROJECT
HONG KONG

CONSULTING ENGINEERS & SCIENTISTS

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EXECUTIVE SUMMARY

This report presents a summary of the studies performed for the Air Ventilation Assessment (AVA) of the Tamar Development in Hong Kong, China as proposed by the Gammon Hip Hing Joint Venture (JV). The AVA includes an assessment of the air ventilation and wind availability at the site and the influence of the proposed development on the urban wind environment on and around the site. The assessment also takes into consideration the wind comfort conditions at the important pedestrian areas around the development.

RWDI was engaged by JV to conduct the AVA in three phases namely, the expert evaluation, the initial study and the detailed study, as described by the Employers Requirements [1, clause 6-8] (ER). These studies were carried out with continuous interaction with the design team to allow for the evolution of the most appropriate design in terms of the ventilation of the urban environment.

The objective of the expert evaluation was to provide a screen-level estimation of the potential impact that the development may have on the air ventilation and pedestrian wind comfort, based on local wind climate, design information, our experience in wind tunnel studies and our knowledge of wind flow around buildings. This was followed by the initial study, which used our proprietary Computational Fluid Dynamics (CFD) software to refine and substantiate the expert evaluation. The final stage of the work, the detailed study, involved wind tunnel testing of the existing site and various design changes recommended by the expert evaluation and initial study for better ventilation. These design changes ranged from large openings on the proposed buildings, for increasing building permeability, to large canopies for reducing wind speeds at building entrances. The objective of this final phase was to quantitatively assess the impact of the development on the air ventilation on and around the development. Results of the detailed study are provided in the form of tables and figures in this report.

As advised by ER, the wind availability of the site and the surrounding areas was determined by using the long-term wind statistics recorded at the Waglan Island Observatory, combined with results of a topographical wind tunnel study, carried out by the CLP Wind / Wave Tunnel Facility of the Hong Kong University of Science and Technology.

The present report describes in detail the scope of the project, methodology, results and recommendations of each of the study phases of the project. The overall conclusions drawn from the completed AVA are provided below:

- The general layout and design of the evolved Tamar Development, as proposed by JV, will, on average, improve the air ventilation in the immediate perimeter of the site and maintain existing air ventilation conditions in the surrounding area and inner city.

- The permeability of the design allows prevailing northerly winds to penetrate the inner city. This maintains the breezeways between the waterfront and the areas around the Harcourt Garden.

- The design, location and orientation of the proposed development on the site do not impede wind flow from the prevailing easterly winds from reaching the inner city.

- In general, the design provides sufficient shelter to pedestrians from strong wind gusts but not at the expense of suitable air ventilation.

- For the proposed development, a few locations in the inner city and surrounding areas recorded lower velocity ratios than the calculated Local Spatial Averaged Velocity Ratio (LVRw) (e.g. the area between the LegCo Complex and the CGC Low Block and the Admiralty Public Transport Interchange to the southwest of the proposed development). Most of these locations are either marginally lower than the LVRw or improved the air ventilation from existing conditions.

- Mitigation concepts in the form of ventilation openings and building canopies were introduced and evaluated during the project. In general, the mitigation concepts were successful in improving local pedestrian level wind comfort conditions with a marginal and localized reduction in air ventilation conditions.

1. INTRODUCTION

This report presents a summary of the studies performed for the Air Ventilation Assessment (AVA) of the Tamar Development in Hong Kong, China as proposed by the Gammon Hip Hing Joint Venture (JV). The AVA includes an assessment of the air ventilation and wind availability at the site and the influence of the proposed development on the urban wind environment on and around the site. The assessment also takes into consideration the wind comfort conditions at the important pedestrian areas around the development.

The AVA was performed using the technical guidelines described in the Employers Requirements [1](ER) and our engineering judgment of wind flows in the urban environment. The ER provides details on the qualitative AVA to evaluate design features of the proposed development that may influence air ventilation on the site and surrounding area. These features include, among others, building massing and permeability, site layout and maintaining available wind breezeways throughout the site and the inner city. The ER also provides guidelines for the quantitative AVA, as developed and presented in the AVA feasibility study [2], to measure through wind tunnel testing, the velocity ratio at pedestrian level throughout the site and the surrounding area.

The quantitative AVA measures and compares the velocity ratios the existing and proposed configurations and evaluates the results for the site and the surrounding area. Although suitable air ventilation needs to be achieved on the proposed site, emphasis is placed in the ER and in this project, on the impact of the development on the surrounding areas and the inner city. As an indicator of suitable or improved air ventilation for the proposed configuration, this project evaluated whether velocity ratios at individual measurement locations were above the spatially averaged velocity ratio for the existing condition or where improved velocity ratios were recorded.

A proposed development is considered to have an insignificant impact on the urban air ventilation when measured velocity ratios are higher than the spatial average velocity ratio measured for existing conditions or remain similar or increase from the existing conditions at a given location. Any new development will have an impact on the air ventilation with areas where reduced air flow or high wind gusts can exist. A development is considered to be successful in meeting the AVA criteria when these ventilation impacts are minimized and isolated to local areas within the immediate area of the development site.

In addition to the evaluation of the wind velocity ratios in the detailed study, the wind availability is assessed around the development and the surroundings. The wind availability is defined, as per the ER, as the probability that mean wind speeds will exceed 1.5m/s at pedestrian level. For this project wind availability is considered suitable when wind speeds exceed the 1.5m/s for at least 50% of the time or where this probability increased when compared to existing conditions.

RWDI was engaged by JV to conduct the AVA in three phases namely, the expert evaluation, the initial study and the detailed study, as described by the Employers Requirements [1, clause 6-8] (ER). These studies were carried out with continuous interaction with the design team to allow for the evolution of the most appropriate design in terms of the ventilation of the urban environment.

1.1 Phase 1: Expert evaluation

The expert evaluation reviewed the influence of the proposed design on the existing air ventilation and pedestrian wind comfort. The proposed design was evaluated against the technical guidelines provided in the ER. The results of the expert evaluation are described in Section 2 below.

The objective of the expert evaluation was to provide a screen-level estimation of the potential impact that the development may have on the air ventilation and pedestrian wind comfort, based on local wind climate, design information, our experience in wind tunnel studies and our knowledge of wind flow around buildings.

This was followed by the initial study, which used our proprietary Computational Fluid Dynamics (CFD) software to refine and substantiate the expert evaluation. The final stage of the work, the detailed study, involved wind tunnel testing of the existing site and various design changes recommended by the expert evaluation and initial study for better ventilation. These design changes ranged from large openings on the proposed buildings, for increasing building permeability, to large canopies for reducing wind speeds at building entrances. The objective of this final phase was to quantitatively assess the impact of the development on the air ventilation on and around the development. Results of the detailed study are provided in the form of tables and figures in this report.

As advised by ER, the wind availability of the site and the surrounding areas was determined by using the long-term wind statistics recorded at the Waglan Island Observatory, combined with results of a topographical wind tunnel study, carried out by the CLP Wind / Wave Tunnel Facility of the Hong Kong University of Science and Technology.

1.2 Phase 2 : Initial Study

The expert evaluation was followed by a more detailed qualitative assessment of the impact of the site on the urban air ventilation. This initial study was performed using the proprietary RWDI Computational Fluid Dynamics (CFD) software Virtualwind®, designed by Virtualwind Inc., a member of the RWDI Group of companies. In these Virtualwind simulations, a Large Eddy Simulation technique was used to simulate the turbulent flow field around the development site for a select set of prevailing wind directions. The recommendations made in the expert evaluation were integrated into the designs that were evaluated in this phase of the project.

The simulated pedestrian level wind results of three different configurations were compared to the existing conditions for two prevailing wind directions. The results of this phase of work are given in Section 3 below. The results from this initial study were then used to refine the configurations that were to be tested and evaluated quantitatively during the detailed wind tunnel study, namely, Phase 3 of this project.

1.3 Phase 3 : Detailed Study

The final phase of the work, the detailed study, involved wind tunnel testing of the existing site and various design configurations. This was done as part of the quantitative assessment of the impact of the development on the air ventilation and the pedestrian wind comfort conditions. The design configurations tested incorporated the features recommended during the earlier phases of this project. The objective of this phase was to quantitatively assess the impact of the development on the air ventilation around the site and the surrounding area. In addition, the pedestrian level wind comfort conditions were appraised. The methodology and results of this work are given in Section 4 below.

Conclusions

The present report describes in detail the scope of the project, methodology, results and recommendations of each of the study phases of the project. The overall conclusions drawn from the completed AVA are provided below:

- The general layout and design of the evolved Tamar Development, as proposed by JV, will, on average, improve the air ventilation in the immediate perimeter of the site and maintain existing air ventilation conditions in the surrounding area and inner city.

- The permeability of the design and the use of buildings of different heights, allows prevailing northerly winds to penetrate the inner city. This maintains the breezeways between the waterfront and the areas around the Harcourt Garden. Similarly, the design, location and orientation of the proposed development on the site do not impede wind flow from the prevailing easterly winds from reaching the inner city.

- In general, the design provides sufficient shelter to pedestrians from strong wind gusts but not at the expense of suitable air ventilation.

- For the proposed development, a few locations in the inner city and surrounding areas recorded lower velocity ratios than the calculated Local Spatial Averaged Velocity Ratio (LVRw) (e.g. the area between the LegCo Complex and the CGC Low Block and the Admiralty Public Transport Interchange to the southwest of the proposed development). Most of these locations are either marginally lower than the LVRw or improved the air ventilation from existing conditions.

- Good air ventilation was achieved along Tim Wa Avenue. This can be attributed to the low elevation of the CGC Office Block building that allows penetration of wind into the pedestrian areas. The area of poor ventilation expected to exist to the west of the CGC Office Block West Tower is confined to the area near the building façade and does not extend into the surrounding area or across Harcourt Avenue.

- The existing area to the immediate west of the CITIC Tower is generally sheltered from prevailing easterly winds with potential for stagnant flow to exist under existing conditions. The proposed development improves ventilation along Tim Mei Avenue.

- Mitigation concepts in the form of ventilation openings and building canopies were introduced and evaluated during the project. In general, the mitigation concepts were successful in improving local pedestrian level wind comfort conditions with a marginal and localized reduction in air ventilation conditions.

2. EXPERT EVALUATION

The first phase of the current work was to provide an expert evaluation of the proposed development to identify good design features, identify areas of concern and if necessary, propose mitigation measures. This review also determined the need for additional interim or initial studies and outlined the methodology and focus of the detailed AVA assessment through topographical modeling and wind tunnel testing.

This qualitative review provided a screening-level estimation of the potential impact that the development may have on the air quality and wind comfort of the pedestrian-level urban environment. In its methodology, the review incorporated a number of performance based guidelines as suggested by the feasibility study carried out by the Department of Architecture, Chinese University of Hong Kong [2]. This review identified and assessed design features that may have an impact on the environment in the immediate vicinity of the site and those that may have an impact on the air ventilation and wind comfort of the surrounding area.

Using the design drawings, technical guidelines and information provided by JV received by RWDI on September 26 and 27, 2006 and November 2 and 3, 2006, the assessment was based on:

- The Employer's Requirements, defining the scope and technical requirements of the AVA [1, clause 6-7];

- our extensive experience of wind tunnel modelling of developments in Hong Kong and other cities;

- review of local long-term meteorological data and site and surrounding information; and

- RWDI's knowledge of wind flow around buildings and engineering judgement.

2.1 Site Information

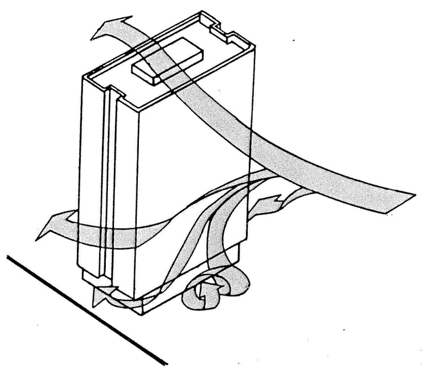
The site location of the proposed development is in Central Hong Kong, as shown in Figure 1a. As per the technical requirements [1, 2, clause 13-16], the study area assessed, both in this review and the subsequent initial and detailed studies, included the assessment area and the surrounding area as shown in Figure 1a. The assessment area included adjacent buildings surrounding the development site, as these buildings are considered to directly influence the ventilation around the development site.

The proposed development is located on the north side of Harcourt Road between Tim Wa Avenue and Tim Mei Avenue as shown in Figure 1b. The development includes the CGC Office Block East and West Towers (126m tall), the LegCo Complex (57.75m tall) and the CGC Low Block (31.6m). Between the CGC Office Block East and West Towers, a passage (the Green Carpet), raised approximately 11m above the surrounding pedestrian streets, connects the Harcourt Garden and the Waterfront Promenade.

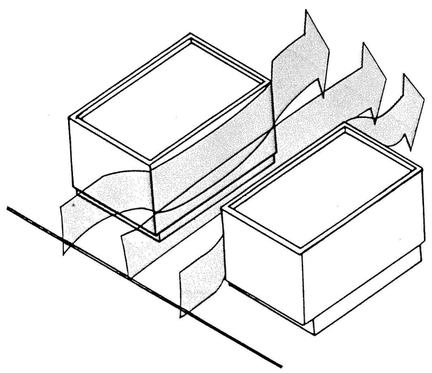
Tall buildings are located to the immediate east, south and west of the site with the numerous tall buildings located further in these directions. An outdoor park (Harcourt Garden) is located to the southeast of the site as well as an outdoor theater to the east between the CITIC Tower and the Hong Kong Academy for the Performing Arts. The northwest through northeast side of the site and the adjacent areas are open to Victoria Bay. Further topographic features include the mountain range to the south, which has a significant influence on the wind climate in the Central Hong Kong area.

2.2 Background Information

In the explanation of the wind conditions surrounding the site, reference will be made to the following wind characteristics: downwashing and channelling. Large buildings, relative to the surroundings, tend to intercept the stronger winds at higher elevations and redirect them down to the ground level. There is usually increased wind acceleration at the corners of tall buildings as the *downwashed* wind flows around the edge of the building. Also, when two buildings are situated side by side, wind flow tends to accelerate through the gap between the buildings due to *channelling*. If these buildings/wind combinations occur for prevailing winds, there is an increased potential for even higher wind speeds.

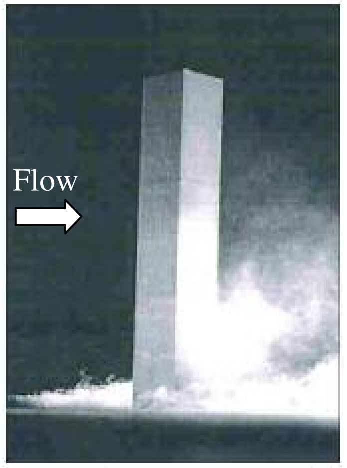


Channelling

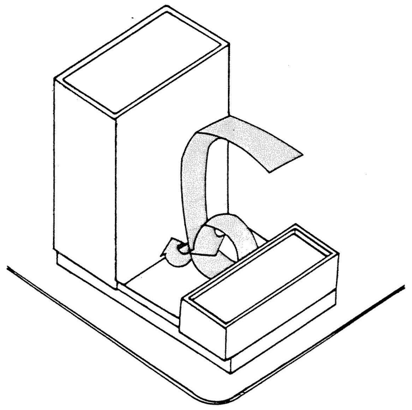


Downwashing

On the leeward side of tall buildings, regions of flow recirculation may exist. These recirculation regions are typically associated with low mean wind velocities and poor air ventilation. However, during strong winds, the pollutants are often vertically entrained in these recirculation zones leading to a reduction of grade level pollutants. The level of pollutant entrainment depends, among other parameters, on the extent of the region of recirculating flow, which, in turn, depends on the dimensions and geometries of the building as well as its surroundings [3]. The downwashing effect from buildings can be harnessed to increase flow mixing at street level and reduce stagnation in urban canyons. This can be achieved by placing buildings of lower heights on the windward side of tall buildings with an adequate gap between the buildings.



Vertical mixing leeward of tall buildings [3].



Flow mixing between buildings of different height.

In many locations in Hong Kong, due to the low permeability and arrangement of the buildings in the inner city, areas of flow stagnation are a greater concern than pedestrian wind comfort conditions. The flow characteristics surrounding building forms, including downwashing and channelling, may be harnessed to facilitate the proper ventilation of air at pedestrian level.

To qualitatively review the impact the proposed development may have on the urban air quality and pedestrian wind comfort, several key parameters were evaluated:

- the effect of the proposed development on the breezeway and the orientation of the existing and proposed street grid in terms of the prevailing winds to influence the air pathway;
- the use of open spaces and the linkage of existing and proposed open spaces;
- the impact that the waterfront development may have on the inner city ventilation;

- the influence of the general massing and design of the site on the urban environment, e.g. the effects of podiums and building height and spacing;

- the layout and permeability of buildings or groups of buildings, the presence of vertical blockage and the addition of openings in building facades to facility ventilation; and,

- the application of landscaping around the proposed development in the form of shading and greenery.

2.3 Meteorological Data

As advised by the ER, long-term wind statistics recorded at the Waglan Island Observatory, Hong Kong between 1975 and 2000, were analysed to determine the local wind climate. Figure 2 shows the directional distributions of wind frequency for the Spring (March through May), Summer (June through August), Autumn (September through November) and Winter (December through February) seasons for the meteorological station.

At the Waglan Island weather station, the prevailing wind directions are from the east throughout the year, with secondary winds from the north in autumn, north through east-northeast during spring and winter, and east and southwest in summer. For pedestrian wind comfort, the prevailing strong winds, from the east may be associated with uncomfortable conditions at pedestrian level. For urban ventilation, lower wind speeds or calm winds are more likely to be associated with a reduction in air quality. The results from topographical model studies [1, clause 10] were used to refine the selection of the appropriate wind directions and determine suitable wind profiles to be used in the wind tunnel tests. This methodology will be discussed in the subsequent description of the detailed study.

Results of a topographical wind tunnel study, carried out by the CLP Wind / Wave Tunnel Facility of the Hong Kong University of Science and Technology [1, clause 10], was used in this project. This study provided the details of the effects of the local topography and surrounding urban fabric on the mean wind speed, direction and turbulence characteristics at the site. This study indicated that there was no statistically significant change in wind direction at gradient height at the site compared to the reference site (Waglan Observatory) although wind speeds were reduced considerably for most wind directions. The prevailing wind directions at the Tamar site were found to be east, north and southwest. It is our opinion that these results are valid during strong winds, when air movements are dominated by convective forces. Under low wind or calm wind conditions, wind speeds and directions will also be significantly affected by thermal effects in the atmospheric boundary layer, for example, when warm air plumes rise from hot stagnant regions within the urban areas. More advanced procedures, such as numerical methods, may be required to better quantify the local environmental conditions over a wide range of wind speeds and directions.

For the purpose of this review, the north, northeast, east and southwest wind directions were considered to be most prevalent, although winds from other directions were also considered in our analysis.

2.4 Expected Air Ventilation and Wind Comfort Conditions

The air quality and wind comfort of the urban environment in Hong Kong depends on a number of factors, including the combination of the local wind speed at pedestrian level and the temperature and humidity of the surroundings. For the purpose of this expert evaluation, the term urban environment is used to describe the combination of air ventilation characteristics and wind comfort levels that may affect pedestrian activities in the area. For Hong Kong, a breeze is preferred to improve air quality, while strong gust occurrences at key locations should be minimized to improve comfort and safety of pedestrians.

For the purpose of the AVA expert evaluation, it is assumed that a suitable urban environment may exist in regions around the site where high wind velocity ratios occur, while low velocity regions may be associated with poor air ventilation [2]. In this qualitative assessment, the potential extent and location of the high and low velocity regions was identified. In the description of the wind conditions below, reference is made to locations indicated on the site plan shown in Figure 1b. The urban environment is also examined here to identify regions where strong gusts may occur that could lead to unsuitable pedestrian wind conditions. The wind comfort criteria developed by RWDI, as described in Appendix B, will be applied. Generally, wind conditions suitable for walking are appropriate for sidewalks; wind speeds comfortable for standing are preferred for building entrances and bus stops; and lower wind speeds comfortable for sitting or standing are required for seating areas such as amenity spaces.

The design includes the following positive features that are likely to facilitate improved air ventilations at the site and its surrounding area:

- The exposure of the existing site is likely to facilitate penetration of the approaching northern and northeastern sea breezes into the inner city to the south of Harcourt Road. The proposed development is likely to have a minor impact on this wind path due to the high permeability of the tall CGC Office Block Towers.

- The orientation, permeability and layout of the development are expected to allow the northerly wind flows to reach the outdoor Harcourt Garden.

- The flow acceleration through the passage (Green Carpet) between the CGC Office Block East and West Towers (Location D in Figure 1b) is expected to be low during east winds due to the north-south orientation of the channel. Therefore, low velocity ratios and reduced air ventilation are expected within the CGC Office Block passage although local areas of higher velocity ratios should exist at the north and south edges of the building. The large volume of this space and high levels of turbulent flow that would be expected to exist between the CGC Office Block East and West Towers will improve dilution of the air during east winds.

- The CGC Low Block will allow easterly winds to reach the tall People's Liberation Army Garrisons Headquarters to the west. This will allow these winds to be downwashed to street level and improve the urban air environment along Tim Wa Avenue.

- The curved facade of the LegCo Complex will reduce wind acceleration around the north side of the LegCo Complex (Location B2 in Figure 1b) and will likely create a comfortable wind environment without reducing the air ventilation in the area.

The following aspects of the design will likely results in a reduction of air ventilation or pedestrian wind comfort:

- The Green Carpet connecting the Waterfront Promenade with the Harcourt Garden is elevated to meet the grade level of the passage between the CGC Office Block Towers. A few areas of stagnant flow may be present near ground level below the elevated walkway (Location C2 and C3 in Figure 1b).

- Due to the large east facade being perpendicular to the prevailing east winds, the proposed tall CGC Office Block East Tower (123m tall) would deflect easterly winds down and around the building. Therefore, at pedestrian level, accelerated wind conditions (and high velocity ratios) are expected at the southeast and northeast corners of the CGC Office Block East Wing (Locations A1 and A2 in Figure 1b). Chamfering or stepping the corners of the building at Locations A1 and A2 will reduce the potential for uncomfortable or unsafe wind conditions to occur in the areas. The deflected and *downwashed* flow would also be *channelled* between the CGC Office Block East Tower and the LegCo Complex, resulting in strong wind accelerations between the buildings (Location C1 in Figure 1b).

- The CITIC Tower to the east of the CGC Office Block and LegCo Complex will deflect some of the east wind that can reach the site, potentially reducing the ventilating effect provided by the easterly winds. The CGC Office Block passage and LegCo Complex could also reduce the pedestrian level ventilation adjacent to and below the elevated passage passing through the CGC Office Block (Locations C2 and C3 in Figure 1b).

- During north or northeast winds, the area to the south of the LegCo Complex (Locations C1 in Figure 1b) will be sheltered by the LegCo Complex which may cause stagnant zones and thus a deterioration of air quality. The CGC Office Block East Tower will also shelter the area between the CGC Office Block and LegCo Complex from southeast winds which could potentially lead to reduced air quality. This can be mitigated by reducing the extent of the depressed areas (i.e., Locations C2 and C3 in Figure 1b), adjacent to the passage between the CGC Office Block Towers and the CGC Low Block /

LegCo Complex or increasing the distance between the CGC Office Block East Tower and the LegCo Complex.

- Low velocity ratios are expected in the area west of the CGC Office Block West Tower since this area is sheltered from the prevailing east winds by the CGC Office Block (Location E in Figure 1b). The low mean velocity region is likely to extend across Tim Wa Avenue to the west. However, stronger east winds are likely to entrain pollutants vertically in this area and may actually assist the ventilation of the area in the vicinity of the intersection of Harcourt Avenue and Tim Wa Avenue. During light easterly winds, reduced air ventilation can be expected due to the large wake generated to the west of the CGC Office Block. Mitigation options should be considered, including increasing the permeability of the east and west wings of the CGC Office Block. If feasible, consideration should be given to increased permeability by introducing openings in the vertical portions of the CGC Office Block East and West Towers. The canopy near ground level at the west facade of the CGC Office Block West Tower will create stagnant regions below the canopy; removing or modifying this canopy should be considered to minimize stagnant areas.

- During east and northeast winds, a low velocity ratio region is also expected on the west side of the LegCo and CGC Low Block Buildings (Locations B3 and F3 in Figure 1b). These may again, allow entrainment of pollutant vertically during strong east winds although stagnant flow regions can be expected during low wind conditions.

2.5 Recommendations from the Expert Evaluation

In summary, several positive design aspects were highlighted that will promote air ventilation in the pedestrian areas. A few locations were identified where stagnant zones may be created and the following mitigation options should be considered and discussed:

- Reducing the effect of the depressed areas on both sides of the passage through the CGC Office Block;

- Increasing the distance between the LegCo Complex and CGC Office Block East Tower;

- Stepping or chamfering the eastern corners of the CGC Office Tower and the CGC Low Block; and

- Reducing the effect of the wake flow to the west of the CGC Office Block by increasing the Tower permeability and modifying or removing the canopy at the lower west facade. Building permeability may be increased by introducing openings, at least 5m high, in the building at the ground level and at higher elevation.

- Introducing an opening, at least 5m high, at the 2nd floor level of the CGC Office Block East Tower, will improve ventilation within the CGC Office Block passage during easterly winds.

- Stepping or chamfering the corners of the northeast and southeast corners of the CGC Low Block Building (Locations F1 and F2 in Figure 1b) will reduce wind acceleration in this area and create a better pedestrian wind environment.

The recommendations were seriously considered by the design team. Some of the concerns were addressed through the modification of architectural design to improve the air ventilation, while other identified stagnant zones could not be tackled through architectural means due to the site constraints as the ER. The design team will explore other means of mitigation through the disposition of greenery and the landscape formation to improve the comfort level of the localized area.

The shifting of the LegCo Complex to the north to increase the gap between CGC Office Block could not be accommodated since this is constrained by the Drainage Reserve running across the site near the LegCo Chamber.

The chamfering of the corners of the CGC Office Block will decrease the flexibility of internal layout and instead tree planting on Green Carpet levels on the side of CGC Low Block will be considered to filter the strong wind.

The canopy on at the CGC Office Block West Tower is part of the ER requirement to provide cover to the drop-off area and cannot be deleted. The introduction of opening at West Wing is not feasible due the architectural arrangement of positioning the core on the whole length of east façade to allow maximum view out to the surrounding site, rendering the east to west opening not possible.

The mitigation measures that were adopted are as follows:

- One storey opening introduced at the East Wing of CGC Office Block at Carpet level to minimize the channeling effect at pedestrian level of the accelerating wind induced by the gap between the East Wing and the LegCo Complex;
- One storey opening introduced on the north end of the LegCo High Block on the 5th floor, i.e. at the roof garden level of the LegCo Complex to increase the pedestrian comfort for garden users and improve the stagnant zone at the leeward side of LegCo Complex at B3 during east wind;
- Introduction of a continuous canopy to the east of LegCo Complex and CGC Office Block to minimize the downwash effect of east wind to increase the pedestrian comfort at the drop-off area;
- Opening on ground floor of the CGC Office Block East Tower at the north end to improve the ventilation on its west side at grade level;
- The design of the landscape at the Green Carpet will consider the gradual change in level to avoid localized sharp depression; and
- A green roof at low level is introduced on top of the roof of the projected Multi-purpose Hall on the 5th floor of the LegCo Complex, aimed at lowering the carbon dioxide concentration.

Note that these mitigation options were refined in the initial study using a Computational Fluid Dynamics (CFD) technique and then evaluated by the wind tunnel testing carried out during the detailed study.

3. INITIAL STUDY

The AVA technical guidelines for the Tamar Development [2, clause 7] suggest that an expert evaluation could lead to an initial study prior to the wind tunnel modelling in a detailed study. An initial study was performed for the Tamar Development AVA to refine the interpretations and recommendations made during the expert evaluation and to provide an improved qualitative estimate of the air ventilation around the site. The initial study also evaluated the performance of the proposed development in terms of the expected wind comfort around pedestrian areas.

During the expert evaluation, a number of recommendations were made to improve the local air ventilation around the development. The design features that were incorporated in the original configuration and assessed in this initial study included a ventilation opening at the second floor of the CGC Office Block East Tower as well as on the 5th floor of the LegCo Complex and enclosure of the empty space beneath the Green Carpet.

This initial study was performed using the proprietary RWDI Computational Fluid Dynamics (CFD) software Virtualwind®, designed by Virtualwind Inc., a member of the RWDI Group of companies. In these Virtualwind simulations, a Large Eddy Simulation (LES) technique was used to simulate the turbulent flow field around the development site for a select set of prevailing wind directions. The Virtualwind software is custom designed specifically for wind engineering applications to resolve turbulent flow fields around buildings in typical open, suburban or urban terrain.

3.1 Simulated Wind Directions

The review of the long-term meteorological data carried out during the expert evaluation, as described above, identified that the prevailing winds approach the site from the east, north and southwest directions (See Figure 2). For the purpose of the Virtualwind simulations, the north and east winds were considered the most important, since the inner city air ventilation may be mostly affected by the proposed development under these conditions.

Table 3.1 shows the directional probability of all winds for Waglan Island [1, Annex A]. This indicates that easterly, northerly and southwesterly winds annually occur for approximately 23.0%, 12.5% and 5.0% of the time, respectively. When these winds are grouped with the wind direction probabilities in their adjacent bins, the total probability of occurrence is 76.1%. This confirms that these wind directions generally account for the majority of winds. However, considering that southwesterly winds would have a minimal impact on the air ventilation or pedestrian wind comfort in the surrounding pedestrian areas, especially towards the inner city to the south of the development, only the north and east directions were selected for the Virtualwind CFD assessment.

Table 3.1: Directional Probability of Annual Winds Waglan Island, Hong Kong (1975-2005)

Wind direction	**Annual Frequency %**	**Cumulative Frequency %**
North-northwest	0.8	
North	12.5	21.8
North-northeast	8.5	
Northeast	9.1	
East-northeast	16.1	
East	23.0	43.4
East-southeast	4.3	
Southeast	2.9	
South-southeast	2.7	
South	3.9	
South-southwest	2.9	
Southwest	5.0	10.9
West-southwest	3.00	
West	2.4	
West-northwest	0.9	
Northwest	0.5	
Calm	8.5	
Total	100.0	76.1

3.2 Virtualwind Simulated Air Ventilation Assessment

Through the Virtualwind simulations, the wind flow across the proposed development was compared against the results of the simulated conditions for the existing site. Different design configurations were evaluated, including mitigation measures proposed to improve air ventilation around key areas.

The results of the Virtualwind simulations are presented in contours of wind speeds or vectors of wind flow patterns (Figures 3a through 8b) at local pedestrian level. For the purpose of the AVA, it is important to note that in these figures, regions coloured blue correspond to relatively low wind speeds and identify regions where low air ventilation can be expected. Red regions are relatively high wind speeds where pedestrian wind comfort could be a concern, depending on the intended use of the area. The Virtualwind assessment was considered a qualitative analysis, used only to compare the relative performance of various configurations and mitigation options. The detailed study following this initial assessment relied on wind tunnel testing for the quantitative verification of the wind conditions around the site.

Note that these figures represent mean wind speeds while actual wind speeds vary with time. Animations of the wind conditions can be used to better understand the time dependent and turbulent nature of the wind flows. Animations of wind speed contours and smoke visualization is available on the attached DVD in appendix D.

For the initial study the following configurations were assessed with the Virtualwind simulations:

- Configuration 1: Existing site;
- Configuration 2: Initial design;
- Configuration 3: Initial design with building extensions to the LegCo and CGC Office Block buildings; and,

- Configuration 4: Amended initial design integrating mitigation options recommended during the expert evaluation (without extensions to the LegCo Complex and CGC Office Block). Details of mitigation options are provided in Section 3.2.2.

The surrounding area included the existing buildings but did not include the future buildings located on the northeast, northwest and west sides of the development, as per the Employers Requirements [1, Annex B]. This information was not available at the time of the initial study. Although the future buildings were not included in these CFD simulation models, they were included in the model used for the wind tunnel tests performed during the subsequent detailed study.

The following discussions focus on the air ventilation conditions and wind comfort levels within the assessment area as shown in Figure 1a. In the following section, reference will be made to areas keyed as shown in the reference plan in Figure 1b, as per the expert evaluation described above.

3.2.1 Configuration 2: Initial Design - Simulation Results

Figures 3a through 4b compare the simulated results for the Configuration 2 (initial design) with the results of the existing configuration for east and north winds. The simulations highlighted the following positive aspects of the Configuration 2, similar to the findings of the expert evaluation:

- The low elevation of the CGC Low Block exposes the People Liberation Army Building to the east winds. This allows downwash of wind to street level that will increase ventilation along Tim Wa Avenue (Figure 3a). This downwash flow is channelled to the south along Tim Wa Avenue and will improve circulation in the area to the immediate west of the CGC West wing.

- Accelerated winds are predicted for north winds along Tim Mei Avenue due to the canyon generated between the CITIC Tower and LegCo Complexs (Figure 3b). This will improve ventilation along the avenue but may cause occasional windy conditions at pedestrian areas. A canopy for the LegCo Complex east entrances is recommended. During east winds, flow is channelled along Tim Mei Avenue that will improve the ventilation in the existing wind sheltered area to the west of the CITIC Building.

- The simulations showed that the proposed development does not impede ventilation along Harcourt Road and that this breezeway for easterly wind is maintained. The breezeways from the waterfront in the north towards the Harcourt Garden to the south of the site are similarly maintained due to the permeability of the design and assisted by continuous wind passage provided by the Green Carpet. Similar air ventilation and pedestrian wind comfort conditions are predicted for the Harcourt Garden and the bus station to the south of the Admiralty Centre for both easterly and northerly winds.

- For Configuration 1 (the existing conditions), an area of high wind velocities is identified around the northeast corner of the Admiralty Centre for the north wind (Figure 3b). The addition of the proposed development reduces these localized high velocities to more suitable levels without deterioration of the wind availability or air ventilation in the areas.

- Suitable ventilation is expected on most areas along the Green Carpet connecting the Waterfront Promenade with the CGC Office Block and the inner city.

The simulations also identified areas where regions of poor ventilation can occur. These areas of concern are summarized below:

- During east winds (Figure 3a), local wind acceleration may cause unsuitable pedestrian wind comfort conditions at the north end of the LegCo Complex (Location B2 in Figure 1b) and at the southeast end of the CGC Office Block East Tower (Location A1 in Figure 1b).

- A local region of low air velocity was predicted to the immediate west of the CGC Office Block West Tower (Location E in Figure 1b). Even though the initial study predicts this region of reduced air velocity, pollutants are expected to vertically entrain to higher elevation during strong easterly wind events. Fortunately, this local stagnation of the flow is only expected for easterly winds and the area will be suitably ventilated during prevailing northerly winds (Figure 3b).

- A localized area of low ventilation was predicted to the north of the CGC Low Block during easterly winds (Location F in Figure 1b). This is due to the deflection of the easterly winds around the CITIC Building and the LegCo Complex. Northerly winds will suitably ventilate this area.

- During north winds, a localised region of poor air ventilation is expected in the area to the east of CGC Office Block East Tower and south of the LegCo Complex (Locations A2 and C1 in Figure 1b). Mitigation measures in the form of openings in the CGC Office Block East Tower 2nd floor, at least 5m high, are likely to improve these conditions.

- East winds may cause accelerated winds conditions at the roof garden of the LegCo Complex near the gap (Location A2 and C1 in Figure 1b) between the LegCo and the CGC Office Block East Tower (See Figures 4a and 4b). Wind mitigation measures, in the form of landscaping, may be considered to improve pedestrian comfort conditions at the south end of the roof garden although these measures should not impede the wind from reaching the grade level area to the south of the LegCo Complex.

- For east winds, a few areas of low wind velocities are expected to the west of the LegCo Complex and in the passage between the CGC Office Block East and West Towers (See Figure 4a). Higher wind speeds are expected occasionally along the Green Carpet that crosses Harcourt Road (See Figure 4a). Partial or full enclosures, or wind screens, may be required to improve wind comfort for pedestrians on the walkway bridges. Suitable ventilation is expected on the walkway during north winds (See Figure 4b).

Overall, the areas identified above as regions where poor ventilation can occur, are constrained to locations within the development perimeter while the impact of the development on the air ventilation of the surrounding areas, are likely to be minimal. Mitigation measures recommended therefore focuses on improving conditions on site.

3.2.2 Configuration 4: Amended Initial Design including Mitigation – Simulation Results

As a result of the expert evaluation and the Virtualwind simulations described above for the initial design configuration, the following mitigation measures were evaluated through the Virtualwind simulations:

- A 5m high opening at the Green Carpet level of the CGC Office Block East Tower to improve the air ventilation on the Green Carpet through the CGC Office Block and in the area on the east side of the CGC Office Block East Tower.

- A 5m high opening at the north end of the LegCo Complex at the 5th floor level. This opening will provide additional ventilation to the rooftop garden of the LegCo Complex during easterly winds.

- A continuous canopy along the east façade of the LegCo Complex and at the first floor elevation will improve pedestrian wind comfort at the entrance areas.

Figures 5a through 6b compare the simulated results for the initial design with mitigation options, with the results of the Configuration 1 (existing site) for east and north winds. The following summarises the key findings for the simulated initial design with mitigation options in place:

- The Virtualwind results showed that, for the east and north winds, most surrounding areas around the initial design showed similar conditions to that simulated for the initial design without mitigation.

- The addition of the canopy to the east façade of the LegCo Complex caused slightly higher winds speeds around the northeast corner of the LegCo Complex and the south corner of the CGC Office Block East Tower (see Figure 5a). Lower wind speeds were observed underneath the canopy, resulting in comfortable pedestrian wind conditions at the east entrance.

- The openings at the CGC Office Block East Tower provided suitable ventilation for the Green Carpet passage between the CGC Office Block Towers during east winds (Figure

6a). During north winds, these openings allowed flow to penetrate the area to the east of the East Tower and south of the LegCo Complex, improving the ventilation (Figure 6b). More uniform wind distributions were achieved along Harcourt Road to the south of the CGC Office Block.

- The opening at the north end of the LegCo Complex allowed better ventilation of the roof garden during east winds (Figure 6a).

3.2.3 Configuration 3: Initial Design with Extensions – Simulation Results

Virtualwind simulations were performed to assess the influence that future vertical extensions to the LegCo Complex and the CGC Office Block may have on the air ventilation and wind comfort at pedestrian level. For this purpose, a simulation was performed that included 6 additional storeys to the LegCo Complex and 2 additional floors to the CGC Office Block. These are referred to as extensions.

Figures 7a through 8b compare the simulated results for the initial design with extensions, with the results of the Configuration 1 (existing site) for east and north winds. The following summarises the key findings for the simulated initial design with extensions:

- The area at the south end of the LegCo roof has local regions of high winds speeds as winds are accelerated from the east façade of the CGC Office Block between the two buildings (see Figures 8a and 8b). This does, however, help ventilate the roof area. Local mitigation may be required along the south perimeter of the LegCo lower roof to improve pedestrian wind comfort conditions.

- For east winds, the north end of the roof area of the LegCo Complex will have a localised region of low wind speeds close to the vertical building extension. This area of low velocity is localised and is likely to remain well ventilated for winds from other directions. The mitigation opening for the north end of the LegCo Complex will improve the exposure of the area to the west of the LegCo to the easterly winds.

- The Green Carpet between the East and West Towers of the CGC Office Block will be suitably ventilated during east winds except for the area close to the East Tower. Accelerated wind speeds are expected at the south end of the Green Carpet above Harcourt Road while moderate wind speeds are expected along the Green Carpet to the west of the LegCo Complex. Due to the elevation of the Green Carpet, the area is expected to remain well ventilated. To improve pedestrian wind comfort conditions along the Green Carpet above Harcourt Road, a walkway area with a partial enclosure and wind screen may be necessary.

- During north winds, moderate wind velocities are expected above the LegCo Complex roof garden with a local region of accelerated flow at the southeast end of the roof as the wind is channelled between the LegCo Complex and CGC Office Block.

- The Green Carpet will be exposed to the north winds and remain well ventilated in most areas except for a small area between the LegCo Complex and CGC Office Block.

3.3 Evaluation and Recommendation for Detailed Study

The Virtualwind simulation results confirmed the findings of the expert evaluation, highlighted the same positive design features of the originally proposed initial design, and identified the areas of concern in terms of air ventilation and pedestrian wind comfort. The Virtualwind simulations allowed the evaluation of mitigation options and alternative design configurations. The following mitigation measures are recommended for wind tunnel testing during the detailed study:

- A canopy approximately 6m wide should be provided above grade on the east side of the CGC Office Block East Tower to improve pedestrian wind comfort at the drop-off area and at the southeast corner of the CGC Office Block.

- A canopy, at least 6m wide, should be provided above the entrances on the east side of the LegCo Complex.

- The 2nd floor level of the CGC Office Block East Tower should be opened to allow wind to penetrate to the Green Carpet. The opening should be at least 5m high.

- An opening should be added to the north end of the LegCo Complex above the roof garden to improve ventilation in the roof area and allow improved ventilation near the Green Carpet. The opening should be at least 5m high.

- An opening, at least 5m high, should be provided on the north end of the CGC Low Block at grade to improve ventilation on the west side of the CGC Low Block.

These mitigation options will be evaluated during the detailed study involving wind tunnel testing to quantify their effects on the local and overall wind conditions on the site and surrounding area.

4. DETAILED STUDY

4.1 Introduction

Wind tunnel tests were conducted to quantitatively assess the air ventilation and pedestrian wind comfort conditions around the proposed Tamar Development. The wind tunnel tests were carried out as part of the detailed study of the AVA and were performed for existing and proposed configurations with and without mitigation options. The wind tunnel test and analysis methodology is described below along with the analysis results and recommendations.

This wind tunnel tests were performed by testing a 1:500 scale model of the proposed Tamar Development with existing and future surroundings for the following five building configurations:

Configuration 1: Existing (existing and future surroundings as per the Employer's Requirements [1, Annex B]; without the proposed development);

Configuration 2: Initial design;

Configuration 3: Initial design with future extension to the LegCo Complex;

Configuration 4: Amended initial design including mitigation in the form of openings in the CGC Office Block East Tower (6m high opening), the LegCo 5th floor (5m high opening) and at the base of the CGC Low Block building (6m high opening) as well as canopies on the east façade of the CGC Office Block East Tower (6m wide canopy) and the LegCo Complex; and

Configuration 5: Amended initial design including extensions as per Configuration 3 and mitigation as per Configuration 4.

The photographs in Figures 9a through 9e show the test model in RWDI's boundary-layer wind tunnel. The test model was constructed using the design information and drawings listed in Appendix A.

As shown in Figures 9a through 9e, the wind tunnel model included the proposed development and all relevant surrounding buildings within a 600 m radius of the study site. The mean speed profile and turbulence of the natural wind approaching the modelled area were also simulated in RWDI's boundary layer wind tunnel. The wind profiles used in this study were developed from the results of the topographic wind tunnel tests conducted by HKU [1, Annex A].

The wind tunnel model was instrumented with 131 wind speed sensors to measure mean and gust wind speeds at a full scale pedestrian height of approximately 1.8m. These measurements were recorded for 36 equally incremented wind directions.

The AVA technical guidelines require that wind measurement sensors are classified either as perimeter sensors (located on the development site boundary), overall sensors (located on the site and the surrounding area) or special sensors (located specific points of interest). The sensors for the Tamar Development wind tunnel tests were placed in accordance with the sensor locations described in the Employers Requirements [1, Clause 17-20] as well as in accordance with our experience, judgement and understanding of the wind conditions for this site.

For this study, 18 sensors were placed on the site perimeter (Locations 17 and 22 through 38 in Figure 10a), 103 sensors located on the site and surrounding area and 10 special sensors at specific locations (Location 1, 41, 42, 109, 125 and 127 through 131 in Figure 10a). The number of sensors used in this study exceeded the minimum number of sensors suggested by the ER. The ER recommends a minimum of 15 perimeter sensors and 48 overall sensors to be used. For this project, the location of the special sensors was as specified in the Employer's Requirements [1, Clause 20]. No additional special sensors were included in this project.

The placement and classification of sensors can have a significant effect on the results of the AVA since the sensors are used to calculate the spatial average of velocity ratios from individual sensor measurements. In this study, more than the recommended amount of sensors were evenly distributed throughout the assessment area and also placed at key pedestrian areas. Some of these sensor locations, such as those at drop-off areas to the east and west of the CGC Office Block, are likely to be in regions where flow stagnation can occur and could therefore contribute to lower spatial average velocity ratios for the site. These sensor locations were not classified as special sensors, which otherwise would exclude them from the spatial average velocity ratio analysis, since it was considered a more conservative approach to include sensors that identify pedestrian areas prone to poor ventilation.

4.2 Air Ventilation Assessment Methodology

The detailed study involved wind tunnel testing of the existing and proposed development. The wind tunnel study compared the measured velocity ratios of the existing urban environment to those of the proposed development and configurations including mitigation concepts.

As per the Employer's Requirements [1, Clause 11], wind tunnel tests were used to measure the wind velocity ratio in the pedestrian areas. The methodology used for the quantitative AVA analysis by means of the wind tunnel measurement is given in Appendix C. At each of the test points, the wind velocity ratio was calculated using wind tunnel velocity ratio results, weighted by wind direction probability values determined from the meteorological analysis. The velocity ratio was compared to the Site Spatial Average Wind Velocity Ratio (SVR_w) and a Local Spatial Average Wind Velocity Ratio (LVR_w) to determine the likelihood that a suitable urban environment will exist in a pedestrian area, for each of the proposed configurations tested. In the current study, the SVR_w was calculated from the 18 perimeter sensors and the LVR_w from all the test sensors excluding the 10 special sensors. In addition, the wind availability at each of the sensor locations was determined as per Appendix C and compared against existing conditions. The analysis also assessed the pedestrian wind comfort conditions in and around the pedestrian areas using the RWDI wind comfort criteria (Appendix B).

The wind data from the Waglan Observatory was used in the detailed study as a reference for the appropriate scaling of the wind characteristics at the site. The meteorological data was used, along with the results of the topographical model study carried out by the Hong Kong University (HKU) of Science and Technology [1, Annex A], to determine the mean wind speed and turbulence intensity profiles at the Tamar site. These profiles describe the characteristics of the atmospheric boundary layer as simulated in the wind tunnel tests.

The AVA technical guidelines for the detailed study using wind tunnel testing provide the following criteria for assessment of the wind availability or air ventilation at a development site:

- Assess whether, for a tested configuration, the LVR_w and SVR_w are higher or lower than the corresponding LVR_w and SVR_w values for existing conditions for the season under consideration. A configuration with higher spatial average values than those measured for the existing condition implies that the proposed development is likely to improve air ventilation at the site and its surroundings and reduce the areas of flow stagnation.

- Assess whether the individual velocity ratios for each sensor are higher or lower than the SVR_w and LVR_w value. For this project, the comparison was made between individual sensor values and the spatial average value (LVR_w) measured for the existing conditions.

- Assess whether the wind availability has improved or deteriorated from existing conditions, i.e., whether the probability of wind speeds at pedestrian level exceeding 1.5m/s, is higher than 50%. For this project, the comparison was made whether the 50% probability value was exceeded or whether the wind availability increased from the value recorded at each sensor for existing conditions. This indicates improved or suitable wind availability conditions.

The LVR_w includes the effects of the development on the surrounding area and inner city and in this analysis will be given preference to the SVR_w values, which evaluates the impact of the development on the site boundary area only. The technical guidelines suggest that the wind speed at pedestrian height should exceed 1.5m/s for at least 50% of the time. The wind availability criterion is treated as a guide only and the evaluation of the SVR_w and LVR_w values takes preference.

4.3 Air Ventilation Assessment Results

The annual and seasonal Site Spatial Average Wind Velocity Ratio (SVR_w) and the Local Spatial Average Wind Velocity Ratio (LVR_w) results are given in Table 4.1 below for each of the configurations tested. The comparison between the individual velocity ratio recorded at each sensor and the LVR_w calculated for existing conditions for each season is given graphically in Figures 10a through 14d. Individual sensor values of measured velocity ratios for each configuration tested are given in Table 1a through 1e in the Tables section of this report. The values in bold in these tables indicate where the velocity ratio values were similar to or higher than those measured for the existing conditions or where values were higher than the LVR_w for existing conditions. The bold values therefore indicate an improvement in air ventilation conditions.

The wind availability values for each sensor and calculated as the percentage of time that the pedestrian level wind speed exceeds 1.5m/s, is given in Tables 2a through 2e in the Tables section of this report. The values in bold in these tables indicate where wind availability increased above the existing conditions or where the 1.5m/s and 50% probability criterion was met.

Table 4.1 shows that the highest and lowest SVR_w and LVR_w were measured during the winter and summer months, respectively. This is in accordance with the expected high wind velocities occurring in winter and the low wind velocities in the summer months. In general, the SVR_w improved from the existing conditions for all seasons and configurations tested except during summer for Configuration 4. The LVR_w remained similar to existing conditions except for Configurations 4 and 5 where a marginal reduction in average ventilation ratios was recorded.

Table 4.1: Spatial Averaged Velocity Ratios for the Tamar Development

Season	**Configuration 1** Existing Site	**Configuration 2** Initial Design	**Configuration 3** Initial Design with Extensions	**Configuration 4** Amended Initial Design including Mitigation	**Configuration 5** Amended Initial Design including Mitigation with Extensions
Annual					
$SVR_w{}^{+}$	0.24	0.25	0.26	0.25	0.25
LVR_w	0.26	0.26	0.25	0.25	0.25
$RSVR_w{}^{++}$		4.6%	5.3%	1.3%	4.6%
$RLVR_w$		0.1%	-0.5%	-2.6%	-1.0%
Spring					
SVR_w	0.24	0.26	0.26	0.25	0.26
LVR_w	0.26	0.26	0.26	0.25	0.26
$RSVR_w$		5.5%	6.4%	2.0%	5.6%
$RLVR_w$		0.4%	0.0%	-2.4%	-0.5%
Summer					
SVR_w	0.20	0.21	0.21	0.20	0.20
LVR_w	0.21	0.21	0.21	0.21	0.21
$RSVR_w$		2.9%	2.7%	-0.3%	1.7%
$RLVR_w$		-0.5%	-1.3%	-3.0%	-2.2%
Autumn					
SVR_w	0.25	0.26	0.27	0.26	0.26
LVR_w	0.26	0.26	0.26	0.26	0.26
$RSVR_w$		5.2%	5.9%	1.8%	5.2%
$RLVR_w$		0.4%	-0.4%	-2.5%	-0.8%
Winter					
SVR_w	0.28	0.29	0.29	0.28	0.29
LVR_w	0.29	0.29	0.29	0.28	0.29
$RSVR_w$		4.4%	5.6%	1.3%	5.1%
$RLVR_w$		-0.1%	-0.5%	-2.6%	-0.7%

$^{+}SVR_w$ (Site Spatial Average Velocity Ratio), LVR_w (Local Spatial Average Velocity Ratio)

$^{++}RSVR_w$ (Relative percentage improvement of SVR_w over existing conditions), $RLVR_w$ (Relative percentage improvement of LVR_w over existing conditions)

The comparison of the velocity ratios of Configurations 3 and 4 (initial design with and without building extensions) and Configuration 4 and 5 (amended initial design with and without extensions including mitigation measures), shows that the additional mitigation improved pedestrian wind conditions, resulting in a marginal decrease in velocity ratio.

For the purpose of the air ventilation assessment, the following discussion will focus on the summer conditions since these represent the worst wind availability and air ventilation conditions.

4.3.1 Air ventilation conditions within the proposed development site

In the summer, the air ventilation conditions around the proposed development are expected to improve from existing conditions or remain suitable for most areas within the site perimeter, as shown in Figure 12a. A number of areas were recorded with improved ventilation, namely on the site perimeter along Tim Wa Avenue and Harcourt Road (Locations 17, 24 through 30 in Figure 12a) as well as along Tim Mei Avenue (Locations 35 through 38 in Figure 12a). This increased wind activity along Tim Mei and Tim Wa Avenues was also predicted with the CFD simulations in the initial study.

Table 1c shows the improved ventilation ratios for these locations. When comparing each sensor's velocity ratio for different configurations against the velocity ratio measured for existing conditions, 12 of the 18 perimeter locations shows improved ventilation in summer.

Within the development site, reduced air ventilation conditions were recorded in the area between the LegCo Complex and the CGC Low Block (Locations 3 through 7, 20 through 22, 40 and 52 through 57 in Figure 12a) and at the roof garden of the LegCo Complex (Locations 41 and 42 in Figure 12a). The lower wind velocity ratios at these locations were a result of the blockage of the CGC Office Block East Tower and the LegCo Complex to the prevailing easterly winds in summer. The extension added to the LegCo Complex (Configuration 3) did not reduce the wind availability further.

The canopy added to the base of the CGC Office Block East Tower, improved the pedestrian level wind conditions at the drop-off area (see Locations 43 through 45 in Figure 19b). Air ventilation conditions in the passage through the CGC Office Block (see Locations 7 through 9 in Table 1c) were similar to the conditions predicted for the initial design. Marginal improvements were recorded for spring, autumn and winter when wind availability was higher. The opening added at the LegCo Complex 5th floor did not record an effect on the ventilation at the roof garden nor did the opening at grade on the north side of the CGC Low Block building affect the ventilation in its vicinity. This is due to the sheltering of the area by the buildings to the east of the LegCo Complex. Since the reported velocity values are weighted with the wind directionality the effect of the opening is moderated. The additional opening to the LegCo Complex is considered to improve the ventilation around the roof garden for northeasterly and easterly winds.

A reduction in air ventilation conditions was recorded near the eastern and northern entrances of the LegCo Complex (Locations 39, 40 and 49 in Figure 12a) as well as at the drop-off areas to the east and west of the CCG Office Block Office Towers (Locations 43 through 45, 50 and 51 in Figure 12a). The area where low velocity ratios was measured for the drop-off area west of the CGC Building (Location 50 and 51 in Figure 12a) was constrained to the area near the west façade of the CGC Office Block West Tower. This indicates that other prevailing wind directions will generally enhance the ventilation of this area further to the west of the drop of area. Other locations where a reduction in ventilation conditions was recorded include the elevated pedestrian area on the southeast corner of the CGC Office Block East Tower (Locations 18 and 19 in Figure 12a) and locations on the perimeter of the site (Locations 22 and 31 through 34 in Figure 12a). Locations 23 through 25 also recorded reduced air ventilation conditions when the opening was added at the north end of the CGC Low Block. The addition of this opening reduced the flow channeling along Tim Wa Avenue leading to marginally smaller velocity ratios near the CGC Low Block.

4.3.2 Air ventilation conditions beyond the proposed development site

For the proposed configurations most locations in the surrounding area recorded improved air ventilation conditions during the summer months. All locations along Harcourt Road improved from the existing conditions with the exception of Locations 65, and 76 (see Figure 12a) where marginally lower values were recorded compared to existing conditions. In general, the proposed development increased the velocity ratio values recorded for Harcourt Road.

The area around the Harcourt Garden (Locations 82 through 87 in Figure 12a) as well as near the Drake Street bus depot access road (Locations 77, 88 and 101 in Figure 12a) recorded higher wind velocity ratios than existing conditions or higher values than the LVR_w for the existing conditions.

To the south of the site, improved air ventilation conditions were predicted except at Locations 115 and 118. In winter, Locations 111 through 118 recorded lower values than the existing conditions. However, these LVR_w values measured for winter conditions are still higher than those recorded during summer due to the high availability of wind in winter.

4.4 Pedestrian Wind Comfort Assessment Methodology

Wind statistics were combined with the wind tunnel data in order to predict the frequency of occurrence of full scale wind speeds. The full scale wind predictions were then compared with the RWDI criteria for pedestrian comfort and safety. These criteria, developed by RWDI through research and consulting practice since 1974, have been published in numerous academic journals and conference proceedings. They have also been widely accepted by municipal authorities as well as by the building design and city planning community. RWDI's criteria have been used in over 1500 pedestrian wind projects and adopted as part of environmental planning guidelines by several major cities around the world. The RWDI pedestrian wind comfort criteria as used in this assessment are given in Appendix B.

4.5 Pedestrian Wind Comfort Results

Table 3, located in the Tables section of this report, presents the wind comfort results for all the seasons for each of the configurations tested. The results of the wind comfort conditions at each wind measurement location are graphically depicted on a site plan in Figures 15a through 19e. For the discussion of pedestrian wind conditions, the winter season will be considered since this represents the worst case conditions.

All of the measurement locations passed the wind safety criterion for all of the seasons considered. Pedestrian wind comfort conditions measured were similar for all configurations tested; except for a few locations in the areas where local mitigation was applied and tested. The following is a detailed discussion of the suitability of the predicted wind conditions for the anticipated pedestrian use for each area.

4.5.1 Pedestrian wind conditions within the proposed development site

Wind conditions comfortable for standing are desired at building entrances. The wind comfort conditions at the drop-off area and entrances on the east and west side of the CGC Office Block (Locations 43 through 45 and 50 and 51 in Figure 19b and Table 3) were comfortable for standing or sitting in winter. These conditions are considered acceptable for the intended use of the area considering that lower wind speeds are predicted for the rest of the year. Wind speeds at Locations 44 and 45 were reduced by the addition of the canopy on the east façade of the CGC Office Block East Tower.

The wind conditions at the LegCo Complex entrances (Locations 40, 48 and 49 in Figure 19a and Table 3) were recorded as suitable for standing for the proposed configuration. These conditions remained unchanged with the addition of the canopy to the east façade of the building. The conditions are considered acceptable for these entrances.

The entrance areas and walkways on the Green Carpet through the CGC Office Block (Location 6 through 12 in Figure 19b and Table 3) varied between being comfortable for standing and walking in winter and suitable for sitting or standing in summer. These conditions are considered acceptable for the intended use of the area.

The wind conditions in the area surrounding the CGC Low Block (Locations 52 through 57 in Figure 19a and Table 3) were recorded as suitable for standing or better in winter. Generally these conditions improved to be comfortable for sitting in summer and are considered acceptable for the area.

Wind conditions suitable for walking are appropriate for the elevated passage providing access from the waterfront promenade to the proposed buildings. Conditions along this walkway (Locations 2 through 5 in Figure 19b and Table 3) were measured as suitable for standing in winter and sitting in summer. These conditions are acceptable for the intended use of the area.

Landscaping and wind screens along the edge of this walkway should provide shade in summer but not restrict wind flow at lower levels.

It is generally desirable for wind conditions on terraces and outdoor sitting areas to be comfortable for sitting more than 80% of the time. The wind conditions at the outdoor sitting area (Location 20 and 21 in Figures 19b and Table 3) were recorded as suitable for sitting throughout the year. The conditions at the LegCo roof garden (Location 41 and 42 in Figures 19b and Table 3) were measured as suitable for standing in winter and sitting in summer. If lower wind speeds are desired in winter, wind control measures in the form of porous wind screens and landscaping should be considered at the perimeter of the roof garden.

Wind conditions along the walkways on the perimeter of the site (Locations 22 through 39 in Figure 19b and Table 3) were all recorded as comfortable for standing or sitting with the exception of Locations 27 and 35 through 38, which recorded conditions comfortable for walking. These conditions are appropriate for the area. For the LegCo Complex with extensions, the conditions at Location 39 improved with the opening added to the 5th floor of the LegCo Complex from walking to standing in autumn.

4.5.2 Pedestrian wind conditions beyond the proposed development site

For the proposed development, wind conditions along Tim Wa Avenue (Locations 59 through 64 in Figure 19b and Table 3) were recorded as suitable for walking or standing in winter and are considered acceptable for the area. Higher wind speeds were recorded at a few of these locations (Locations 59 through 63 in Table 1e) than measured for the existing conditions. The wind acceleration was also predicted by the Virtualwind CFD simulations and is attributed to the downwash from the People Liberation Army building being channeled to the wake region on the west side of the CGC Office Block. This condition is considered appropriate since it allows for improved ventilation on the west side of the CGC Low Block and the CGC Office Block.

Generally pedestrian win conditions along Harcourt Avenue (Locations 65 through 81 in Figure 19b and Table 3) were measured as suitable for walking or standing. The conditions on and below the elevated bridges south of the CGC Office Block (Locations 13 through 15 in Figure 19b) were measured as comfortable for standing or walking. These conditions along Harcourt Avenue are considered appropriate for the area.

Wind conditions suitable for sitting are generally desired in outdoor park areas such as the Harcourt Garden (Locations 82 through 87 in Figure 19b and Table 3). The conditions at these locations were recorded as suitable for walking or standing in winter. The wind conditions in the garden area are appropriate when considering that these conditions are similar to the existing conditions and that the existing landscaping will further reduce the wind speed.

The wind speeds in the Drake Street access to the bus depot (Locations 88 and 101 in Figure 19b and Table 3) reduced to be suitable for standing in winter. The reduction in the wind speed in this area was also predicted with the Virtualwind simulations. The wind comfort conditions in the inner city area to the south of the CGC Office Block (Locations 102 through 126 in Figure 19b and Table 3) were recorded as suitable for standing or better for all configurations. The exception was Locations 123 and 124 which recorded conditions comfortable for walking for some configurations.

Conditions around the CITIC Building (Locations 89 through 100) recorded conditions suitable for walking or standing in winter and sitting or standing in summer. These conditions are considered appropriate for the area.

5. OVERALL CONCLUSIONS

The AVA for the proposed Tamar Development was performed using the technical guidelines described in the ER and our engineering judgement. In general, the objective of the AVA was to assess and reduce the impact of the proposed development on the air ventilation conditions on and around the development site and the surrounding area. Through the expert evaluation and the initial study, the AVA appraised qualitatively the effects of the building massing, layout, design and permeability. The positive design features that will maintain or improve the existing air ventilation conditions were identified while amendments were made to the original design to improve areas where concerns of poor ventilation or unsuitable pedestrian wind comfort conditions could exist. The AVA also included a detailed study using wind tunnel testing of the original and amended designs to quantitatively measure the impact of the proposed development on the air ventilation, wind availability and pedestrian wind comfort conditions. The detailed study used the velocity ratios measured at 131 wind speed sensor locations to compare the conditions for proposed configurations and the existing conditions.

Overall, the AVA conducted for the proposed Tamar Development has found the following:

- As indicated in Table 4.1, the air ventilation of the urban environment generally improved from existing conditions along the site perimeter for all configurations tested. The average air ventilation condition for the assessment area remained similar to the existing conditions. This suggests that the proposed development will result in favourable air ventilation conditions when considering that the existing conditions were measured on an exposed and open site.

- A few locations to the south of the development near the Tamar Street bus depot measured lower air ventilation conditions. However, during summer, when low wind availability is expected only two locations were found with marginally reduced velocity ratios.

- The air ventilation condition of the surrounding area is expected to remain the same or improve. The use of buildings with differing heights, the permeability of the CGC Office Block and the layout of the site generally maintains the wind flow along prevailing wind breezeways into the inner city.

- The measured air ventilation conditions for the proposed development were found to be similar to existing conditions even during summer months when the lowest wind availability is expected at the site.

- As expected, locally reduced air ventilation was expected and measured within the site boundary. This local effect did not negatively impact on the surrounding area and inner city. Compared to the conditions at the existing open site, any new development at the site will have areas where wind availability and air ventilation is reduced.

- The proposed development improved pedestrian level wind comfort conditions on the east side of the Admiralty Centre.

- The proposed future extensions to the LegCo Complex did not have any additional impact on the air ventilation of the surrounding site.

- The depressed areas adjacent to the Green Carpet in the centre of the development were minimized to reduce areas where stagnant flow could occur.

- Good ventilation was achieved on the Green Carpet passage through the CGC building.

- Good air ventilation was achieved along Tim Wa Avenue. This can be attributed to the low elevation of the CGC Office Block building that allows penetration of wind into the pedestrian areas. The area of poor ventilation expected to exist to the west of the CGC Office Block West Tower is confined to the area near the building façade and does not extend into the surrounding area or across Harcourt Avenue.

- The existing area to the immediate west of the CITIC Tower is generally sheltered from prevailing easterly winds with potential for stagnant flow to exist under existing conditions. The proposed development improves ventilation along Tim Mei Avenue.

- The east façade of the CGC Office Block is sheltered from eastern winds by the buildings around the CITIC Tower. This reduces high gusts at the southeast corner of the CGC Office Block. The addition of the canopy at the east façade of the CGC Office Block East Tower improved the pedestrian wind comfort conditions at the entrance areas.

- Pedestrian wind conditions were suitable for the intended use of all areas. The proposed mitigation concepts tested to improve conditions at entrances only had a marginal and local impact on the air ventilation conditions. The application of the canopies to improve pedestrian wind comfort conditions are considered optional.

- Wind mitigation to improve wind comfort on the roof garden is not necessary as these conditions are predicted to be suitable for the intended use of the area without any mitigation.

- The work has shown that the canopies which had been suggested during earlier phases of the project for mitigation on the east side of the LegCo Complex and the CGC Office Block East Tower are unnecessary to improve pedestrian wind conditions.

The AVA results have shown that the design and layout of the Tamar Development are successful in limiting the impact on air ventilation to local areas while, in general, the ventilation conditions are expected to improve. This is largely due to positive aspects inherent in the design:

- The permeability of the design to allow prevailing north winds to penetrate the inner city.

- The different building heights used allow for suitable flow mixing and recirculation that channel wind from higher elevations to pedestrian level where air ventilation is enhanced.

- The breezeways for northerly winds from the ocean and for easterly winds are maintained.

- In addition, some mitigation options such as the canopies at the east end of the LegCo Complex, at CGC Office Block East Tower drop-off area and on windscreens or landscaping on the LegCo Complex roof garden are optional for improving pedestrian wind comfort conditions.

6. REFERENCES

[1] Tamar Development - Part VI of Employer's requirements - Planning Requirements, Appendix ERVI/PR/C - Technical Requirements for Air Ventilation Assessment.

[2] Department of Architecture, Chinese University of Hong Kong, Feasibility study for the establishment of air ventilation assessment system, Executive Summary, November, 2005.

[3] Mavroidis, I., Griffiths, R.F., Hall, D.J., Field and wind tunnel investigations of plume dispersion around single surface obstacles, Atmospheric Environment, vol. 37, pp 2903-2918, 2003

TABLES

Table 1a: Weighted Velocity Ratios for the Tamar Development (Annual conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
1	Special	0.27	Data not available	Data not available	Data not available	Data not available
2	Overall	0.30	**0.28**	**0.28**	**0.27**	**0.27**
3	Overall	0.28	0.20	0.20	0.20	0.20
4	Overall	0.28	0.20	0.20	0.20	0.21
5	Overall	0.27	0.25	0.24	0.25	0.25
6	Overall	0.26	**0.27**	**0.26**	**0.27**	**0.27**
7	Overall	0.26	0.22	0.20	0.21	0.21
8	Overall	0.25	0.24	0.23	**0.26**	**0.25**
9	Overall	0.22	**0.27**	**0.26**	**0.27**	**0.27**
10	Overall	0.25	**0.30**	**0.28**	**0.29**	**0.29**
11	Overall	0.21	**0.30**	**0.28**	**0.30**	**0.29**
12	Overall	0.21	**0.32**	**0.31**	**0.32**	**0.32**
13	Overall	0.23	**0.26**	**0.25**	**0.25**	**0.25**
14	Overall	0.25	**0.28**	**0.27**	**0.27**	**0.27**
15	Overall	0.22	**0.23**	**0.22**	**0.22**	**0.22**
16	Overall	0.24	**0.26**	**0.25**	**0.24**	**0.26**
17	Perimeter	0.20	**0.22**	**0.21**	**0.22**	**0.22**
18	Overall	0.27	0.19	0.18	0.18	0.19
19	Overall	0.27	0.24	0.24	0.23	0.23
20	Overall	0.28	0.16	0.16	0.16	0.16
21	Overall	0.28	0.19	0.19	0.19	0.18
22	Perimeter	0.29	0.23	0.23	0.23	0.22
23	Perimeter	0.25	**0.25**	**0.25**	0.23	0.23
24	Perimeter	0.25	**0.25**	**0.25**	0.24	0.24
25	Perimeter	0.26	**0.26**	0.25	0.24	0.23
26	Perimeter	0.25	**0.29**	**0.28**	**0.28**	**0.28**
27	Perimeter	0.22	**0.28**	**0.28**	**0.28**	**0.27**
28	Perimeter	0.21	**0.26**	**0.26**	**0.27**	**0.26**
29	Perimeter	0.20	**0.24**	**0.23**	**0.24**	**0.24**
30	Perimeter	0.22	0.20	0.19	0.19	0.19
31	Perimeter	0.27	0.22	0.22	0.21	0.22
32	Perimeter	0.26	0.18	0.20	0.18	0.21
33	Perimeter	0.24	0.18	0.18	0.18	0.19
34	Perimeter	0.22	**0.23**	**0.27**	**0.25**	**0.27**
35	Perimeter	0.23	**0.38**	**0.42**	**0.38**	**0.41**
36	Perimeter	0.28	**0.29**	**0.29**	0.25	**0.29**
37	Perimeter	0.29	**0.29**	**0.29**	**0.28**	**0.30**
38	Perimeter	0.25	**0.31**	**0.32**	**0.30**	**0.31**
39	Overall	0.27	**0.26**	**0.27**	0.25	**0.26**
40	Overall	0.29	0.19	0.19	0.19	0.20
41	Special	0.32	**0.27**	0.24	0.25	0.24
42	Special	0.29	0.25	0.23	0.23	0.23
43	Overall	0.27	0.25	0.24	0.24	0.23
44	Overall	0.24	0.20	0.19	0.17	0.17
45	Overall	0.26	0.16	0.15	0.14	0.14
46	Overall	0.27	**0.31**	**0.28**	0.25	0.24
47	Overall	0.27	0.20	0.20	0.18	0.18
48	Overall	0.27	0.20	**0.28**	0.24	**0.27**
49	Overall	0.34	0.20	0.21	0.21	0.21
50	Overall	0.24	0.20	0.19	0.19	0.20
51	Overall	0.25	0.20	0.20	0.19	0.19
52	Overall	0.24	0.20	0.20	0.20	0.20
53	Overall	0.26	0.23	0.22	0.22	0.22
54	Overall	0.28	0.20	0.20	0.20	0.20
55	Overall	0.28	0.23	0.22	0.20	0.21
56	Overall	0.28	0.19	0.18	0.19	0.18
57	Overall	0.26	0.15	0.14	0.22	0.21
58	Overall	0.24	0.23	0.22	0.23	0.22
59	Overall	0.24	**0.29**	**0.28**	**0.30**	**0.29**
60	Overall	0.24	**0.33**	**0.32**	**0.32**	**0.32**
61	Overall	0.24	**0.31**	**0.30**	**0.31**	**0.30**
62	Overall	0.23	**0.27**	**0.27**	**0.25**	**0.26**
63	Overall	0.27	**0.32**	**0.31**	**0.30**	**0.30**
64	Overall	0.23	**0.31**	**0.30**	**0.31**	**0.30**
65	Overall	0.25	0.23	0.23	0.23	0.23
66	Overall	0.32	**0.33**	**0.33**	**0.32**	**0.33**
67	Overall	0.28	**0.29**	**0.29**	**0.29**	**0.29**
68	Overall	0.28	**0.26**	**0.26**	0.25	**0.26**
69	Overall	0.25	**0.25**	0.24	**0.25**	**0.25**
70	Overall	0.20	**0.20**	**0.20**	**0.20**	**0.20**
71	Overall	0.23	**0.24**	**0.23**	**0.23**	0.22
72	Overall	0.20	**0.23**	**0.22**	**0.22**	**0.22**
73	Overall	0.31	**0.29**	**0.28**	**0.29**	**0.29**
74	Overall	0.23	0.22	0.22	0.22	0.22
75	Overall	0.22	**0.25**	**0.25**	**0.25**	**0.24**
76	Overall	0.26	0.24	0.24	0.24	0.23
77	Overall	0.32	**0.29**	**0.29**	**0.30**	**0.30**
78	Overall	0.27	0.23	0.21	0.22	0.21
79	Overall	0.33	**0.29**	**0.26**	**0.27**	**0.26**
80	Overall	0.31	**0.28**	**0.26**	0.25	0.25
81	Overall	0.31	**0.32**	**0.31**	**0.30**	**0.31**
82	Overall	0.27	**0.27**	**0.26**	**0.26**	0.25
83	Overall	0.25	**0.27**	**0.26**	**0.25**	**0.26**
84	Overall	0.33	**0.35**	**0.34**	**0.33**	**0.34**
85	Overall	0.29	**0.32**	**0.31**	**0.30**	**0.31**
86	Overall	0.24	0.21	0.21	0.22	0.22
87	Overall	0.31	**0.28**	**0.28**	**0.27**	**0.27**
88	Overall	0.31	**0.28**	**0.28**	**0.28**	**0.29**
89	Overall	0.25	0.23	0.21	0.23	0.22
90	Overall	0.30	**0.30**	**0.30**	**0.28**	**0.29**
91	Overall	0.28	**0.28**	**0.29**	**0.28**	**0.29**
92	Overall	0.28	**0.29**	**0.29**	**0.30**	**0.31**
93	Overall	0.26	**0.27**	**0.26**	**0.26**	**0.27**
94	Overall	0.38	**0.38**	**0.37**	**0.36**	**0.37**
95	Overall	0.36	**0.36**	**0.36**	**0.34**	**0.35**
96	Overall	0.37	**0.37**	**0.36**	**0.35**	**0.36**

Bold values indicate velocity ratio values higher than either the LVR or the individual sensor's velocity ratio measured for existing conditions.

Table 1a: Weighted Velocity Ratios for the Tamar Development (Annual conditions)

Bold values indicate velocity ratio values higher than either the LVR or the individual sensor's velocity ratio measured for existing conditions.

Table 1a: Weighted Velocity Ratios for the Tamar Development (Annual conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
97	Overall	0.38	**0.37**	**0.36**	**0.34**	**0.34**
98	Overall	0.34	**0.28**	**0.28**	**0.28**	**0.29**
99	Overall	0.21	**0.34**	**0.36**	**0.34**	**0.36**
100	Overall	0.29	0.24	0.22	0.24	0.22
101	Overall	0.31	**0.29**	**0.27**	**0.29**	**0.28**
102	Overall	0.18	0.17	0.17	0.17	0.17
103	Overall	0.20	**0.21**	**0.21**	0.19	**0.20**
104	Overall	0.21	**0.22**	**0.22**	**0.21**	**0.21**
105	Overall	0.18	**0.18**	**0.18**	**0.18**	**0.18**
106	Overall	0.27	**0.30**	**0.29**	**0.28**	**0.28**
107	Overall	0.24	**0.25**	**0.25**	**0.24**	**0.24**
108	Overall	0.23	**0.24**	**0.23**	**0.23**	**0.23**
109	Special	0.18	**0.18**	**0.18**	**0.18**	**0.18**
110	Overall	0.21	**0.22**	**0.22**	**0.22**	**0.22**
111	Overall	0.27	**0.26**	**0.26**	**0.26**	**0.26**
112	Overall	0.16	**0.16**	0.15	0.15	0.15
113	Overall	0.20	**0.20**	**0.20**	**0.20**	**0.20**
114	Overall	0.27	0.24	0.24	0.24	0.25
115	Overall	0.29	0.22	0.21	0.22	0.22
116	Overall	0.26	**0.26**	**0.26**	**0.26**	**0.26**
117	Overall	0.30	0.24	0.23	0.23	0.24
118	Overall	0.28	0.24	0.24	0.24	0.23
119	Overall	0.25	**0.25**	**0.25**	**0.25**	**0.25**
120	Overall	0.26	**0.27**	**0.26**	**0.26**	**0.26**
121	Overall	0.28	**0.28**	**0.27**	**0.28**	**0.28**
122	Overall	0.36	**0.31**	**0.31**	**0.29**	**0.30**
123	Overall	0.33	**0.32**	**0.32**	**0.31**	**0.31**
124	Overall	0.34	**0.35**	**0.35**	**0.34**	**0.34**
125	Special	0.34	**0.33**	**0.33**	**0.34**	**0.33**
126	Overall	0.24	**0.27**	**0.26**	**0.27**	**0.26**
127	Special	0.35	**0.35**	**0.35**	**0.36**	**0.36**
128	Special	0.29	**0.31**	**0.31**	**0.31**	**0.31**
129	Special	0.29	**0.28**	**0.27**	**0.28**	**0.27**
130	Special	0.27	**0.29**	**0.29**	**0.28**	**0.28**
131	Special	0.28	**0.28**	**0.28**	**0.28**	**0.29**

Bold values indicate velocity ratio values higher than either the LVR or the individual sensor's velocity ratio measured for existing conditions.

Table 1b: Weighted Velocity Ratios for the Tamar Development (Spring conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
1	Special	0.27	Data not available	Data not available	Data not available	Data not available
2	Overall	0.30	**0.28**	**0.28**	**0.28**	**0.28**
3	Overall	0.28	0.21	0.21	0.21	0.21
4	Overall	0.28	0.20	0.20	0.20	0.20
5	Overall	0.27	0.25	0.24	0.25	0.25
6	Overall	0.26	**0.27**	**0.26**	**0.27**	**0.27**
7	Overall	0.26	0.22	0.20	0.22	0.21
8	Overall	0.25	0.24	0.23	**0.26**	**0.25**
9	Overall	0.22	**0.27**	**0.26**	**0.27**	**0.27**
10	Overall	0.25	**0.30**	**0.28**	**0.29**	**0.29**
11	Overall	0.21	**0.31**	**0.29**	**0.31**	**0.30**
12	Overall	0.21	**0.33**	**0.31**	**0.33**	**0.32**
13	Overall	0.24	**0.27**	**0.25**	**0.25**	**0.25**
14	Overall	0.25	**0.28**	**0.27**	**0.27**	**0.27**
15	Overall	0.22	**0.23**	**0.22**	**0.22**	**0.22**
16	Overall	0.24	**0.26**	**0.25**	**0.24**	**0.26**
17	Perimeter	0.20	**0.22**	**0.21**	**0.22**	**0.22**
18	Overall	0.27	0.18	0.18	0.18	0.18
19	Overall	0.27	0.24	0.23	0.23	0.22
20	Overall	0.29	0.16	0.16	0.16	0.16
21	Overall	0.28	0.19	0.19	0.19	0.19
22	Perimeter	0.29	0.24	0.23	0.23	0.23
23	Perimeter	0.25	**0.26**	**0.25**	0.24	0.23
24	Perimeter	0.25	**0.26**	**0.25**	0.24	0.24
25	Perimeter	0.26	**0.26**	0.25	0.23	0.22
26	Perimeter	0.25	**0.29**	**0.28**	**0.28**	**0.28**
27	Perimeter	0.22	**0.29**	**0.29**	**0.29**	**0.29**
28	Perimeter	0.21	**0.27**	**0.27**	**0.27**	**0.27**
29	Perimeter	0.20	**0.24**	**0.24**	**0.24**	**0.24**
30	Perimeter	0.22	0.20	0.19	0.19	0.19
31	Perimeter	0.27	0.21	0.22	0.20	0.22
32	Perimeter	0.26	0.18	0.20	0.19	0.21
33	Perimeter	0.23	0.18	0.19	0.18	0.19
34	Perimeter	0.22	**0.24**	**0.28**	**0.25**	**0.28**
35	Perimeter	0.23	**0.39**	**0.44**	**0.39**	**0.43**
36	Perimeter	0.29	**0.29**	**0.30**	0.25	**0.30**
37	Perimeter	0.29	**0.30**	**0.29**	**0.28**	**0.30**
38	Perimeter	0.26	**0.32**	**0.32**	**0.31**	**0.32**
39	Overall	0.28	**0.27**	**0.28**	0.25	**0.26**
40	Overall	0.30	0.20	0.20	0.19	0.20
41	Special	0.32	**0.27**	0.24	0.25	0.24
42	Special	0.30	0.25	0.23	0.23	0.23
43	Overall	0.27	0.24	0.24	0.23	0.23
44	Overall	0.24	0.20	0.19	0.17	0.16
45	Overall	0.26	0.15	0.15	0.14	0.14
46	Overall	0.27	**0.31**	**0.28**	0.25	0.25
47	Overall	0.27	0.20	0.20	0.18	0.17
48	Overall	0.28	0.20	**0.29**	0.24	**0.28**

Bold values indicate velocity ratio values higher than either the LVR or the individual sensor's velocity ratio measured for existing conditions.

Table 1b: Weighted Velocity Ratios for the Tamar Development (Spring conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
49	Overall	0.35	0.19	0.21	0.22	0.22
50	Overall	0.24	0.19	0.19	0.19	0.20
51	Overall	0.25	0.20	0.19	0.19	0.19
52	Overall	0.24	0.20	0.20	0.20	0.21
53	Overall	0.27	0.22	0.21	0.22	0.21
54	Overall	0.28	0.21	0.20	0.21	0.20
55	Overall	0.28	0.23	0.22	0.20	0.21
56	Overall	0.29	0.19	0.18	0.18	0.18
57	Overall	0.26	0.15	0.14	0.22	0.21
58	Overall	0.24	0.23	0.22	0.23	0.22
59	Overall	0.24	**0.29**	**0.29**	**0.30**	**0.30**
60	Overall	0.24	**0.34**	**0.33**	**0.33**	**0.33**
61	Overall	0.25	**0.33**	**0.32**	**0.32**	**0.31**
62	Overall	0.23	**0.28**	**0.28**	**0.26**	**0.26**
63	Overall	0.27	**0.33**	**0.32**	**0.31**	**0.30**
64	Overall	0.23	**0.32**	**0.31**	**0.32**	**0.31**
65	Overall	0.26	0.23	0.23	0.23	0.23
66	Overall	0.32	**0.34**	**0.33**	**0.33**	**0.34**
67	Overall	0.28	**0.30**	**0.29**	**0.29**	**0.30**
68	Overall	0.28	**0.27**	**0.26**	**0.26**	**0.26**
69	Overall	0.25	**0.25**	0.24	0.24	**0.25**
70	Overall	0.20	0.19	**0.20**	**0.20**	**0.20**
71	Overall	0.23	**0.24**	**0.23**	**0.24**	0.22
72	Overall	0.20	**0.23**	**0.22**	**0.22**	**0.22**
73	Overall	0.32	**0.29**	**0.28**	**0.29**	**0.29**
74	Overall	0.23	0.22	0.22	0.22	0.22
75	Overall	0.22	**0.25**	**0.25**	**0.25**	**0.25**
76	Overall	0.27	0.24	0.23	0.24	0.23
77	Overall	0.32	**0.29**	**0.29**	**0.30**	**0.31**
78	Overall	0.27	0.23	0.21	0.22	0.21
79	Overall	0.32	**0.29**	**0.26**	**0.26**	**0.26**
80	Overall	0.31	**0.28**	**0.26**	0.25	0.25
81	Overall	0.32	**0.33**	**0.32**	**0.31**	**0.32**
82	Overall	0.26	**0.27**	**0.26**	0.25	0.25
83	Overall	0.26	**0.27**	**0.27**	0.25	**0.26**
84	Overall	0.34	**0.35**	**0.35**	**0.34**	**0.35**
85	Overall	0.29	**0.32**	**0.31**	**0.30**	**0.32**
86	Overall	0.24	0.22	0.21	0.22	0.22
87	Overall	0.30	**0.28**	**0.28**	**0.27**	**0.28**
88	Overall	0.31	**0.28**	**0.28**	**0.28**	**0.29**
89	Overall	0.24	0.22	0.21	0.22	0.22
90	Overall	0.31	**0.31**	**0.31**	**0.28**	**0.30**
91	Overall	0.29	**0.29**	**0.30**	**0.29**	**0.30**
92	Overall	0.29	**0.30**	**0.29**	**0.30**	**0.31**
93	Overall	0.25	**0.26**	**0.25**	**0.25**	**0.26**
94	Overall	0.39	**0.39**	**0.38**	**0.37**	**0.38**
95	Overall	0.38	**0.36**	**0.36**	**0.35**	**0.35**
96	Overall	0.38	**0.37**	**0.36**	**0.35**	**0.36**

Bold values indicate velocity ratio values higher than either the LVR or the individual sensor's velocity ratio measured for existing conditions.

Table 1b: Weighted Velocity Ratios for the Tamar Development (Spring conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
97	Overall	0.37	**0.37**	**0.36**	**0.33**	**0.34**
98	Overall	0.35	**0.27**	**0.28**	**0.28**	**0.28**
99	Overall	0.21	**0.35**	**0.37**	**0.34**	**0.37**
100	Overall	0.28	0.23	0.22	0.23	0.23
101	Overall	0.31	**0.29**	**0.27**	**0.29**	**0.28**
102	Overall	0.18	0.17	0.17	0.17	0.17
103	Overall	0.20	**0.21**	**0.21**	**0.20**	**0.20**
104	Overall	0.21	**0.23**	**0.22**	**0.21**	**0.21**
105	Overall	0.18	**0.18**	**0.18**	**0.18**	**0.18**
106	Overall	0.28	**0.30**	**0.30**	**0.28**	**0.29**
107	Overall	0.24	**0.25**	**0.25**	**0.24**	**0.24**
108	Overall	0.23	**0.23**	**0.23**	**0.23**	**0.23**
109	Special	0.18	**0.18**	**0.18**	**0.18**	**0.18**
110	Overall	0.21	**0.22**	**0.21**	**0.21**	**0.22**
111	Overall	0.27	**0.27**	**0.27**	**0.27**	**0.26**
112	Overall	0.16	0.15	0.15	0.15	0.15
113	Overall	0.20	**0.20**	0.19	**0.20**	0.19
114	Overall	0.28	0.24	0.23	0.24	0.25
115	Overall	0.30	0.23	0.22	0.22	0.23
116	Overall	0.26	0.25	0.25	0.25	0.25
117	Overall	0.31	0.24	0.23	0.23	0.24
118	Overall	0.28	0.24	0.23	0.23	0.23
119	Overall	0.25	**0.25**	0.24	0.24	0.24
120	Overall	0.26	**0.27**	**0.27**	**0.26**	**0.26**
121	Overall	0.27	**0.27**	**0.27**	**0.27**	**0.27**
122	Overall	0.37	**0.32**	**0.31**	**0.30**	**0.30**
123	Overall	0.33	**0.32**	**0.32**	**0.31**	**0.32**
124	Overall	0.35	**0.36**	**0.36**	**0.35**	**0.35**
125	Special	0.35	**0.34**	**0.34**	**0.35**	**0.34**
126	Overall	0.23	**0.26**	**0.26**	**0.26**	**0.26**
127	Special	0.35	**0.36**	**0.36**	**0.36**	**0.37**
128	Special	0.30	**0.31**	**0.31**	**0.32**	**0.31**
129	Special	0.29	**0.28**	**0.28**	**0.28**	**0.27**
130	Special	0.27	**0.30**	**0.29**	**0.28**	**0.28**
131	Special	0.27	**0.27**	**0.27**	**0.27**	**0.28**

Bold values indicate velocity ratio values higher than either the LVR or the individual sensor's velocity ratio measured for existing conditions.

Table 1c: Weighted Velocity Ratios for the Tamar Development (Summer conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
1	Special	0.22	Data not available	Data not available	Data not available	Data not available
2	Overall	0.23	**0.21**	**0.21**	**0.21**	**0.21**
3	Overall	0.21	0.16	0.15	0.15	0.15
4	Overall	0.22	0.18	0.17	0.17	0.17
5	Overall	0.20	0.19	0.18	0.18	0.18
6	Overall	0.20	**0.21**	**0.20**	**0.20**	**0.20**
7	Overall	0.20	0.19	0.19	0.19	0.18
8	Overall	0.21	0.20	0.19	0.20	0.20
9	Overall	0.18	**0.18**	0.17	**0.18**	0.17
10	Overall	0.19	**0.21**	**0.20**	**0.20**	**0.19**
11	Overall	0.17	**0.21**	**0.20**	**0.21**	**0.20**
12	Overall	0.19	**0.24**	**0.23**	**0.24**	**0.23**
13	Overall	0.20	**0.21**	**0.20**	**0.20**	**0.20**
14	Overall	0.19	**0.21**	**0.20**	**0.20**	**0.20**
15	Overall	0.19	**0.19**	**0.19**	**0.19**	**0.19**
16	Overall	0.20	**0.21**	**0.20**	0.19	**0.21**
17	Perimeter	0.17	**0.19**	**0.19**	**0.19**	**0.19**
18	Overall	0.23	0.18	0.17	0.17	0.17
19	Overall	0.23	0.20	0.19	0.19	0.18
20	Overall	0.22	0.15	0.15	0.15	0.15
21	Overall	0.22	0.16	0.15	0.15	0.15
22	Perimeter	0.23	0.20	0.20	0.20	0.19
23	Perimeter	0.21	0.20	0.19	0.19	0.18
24	Perimeter	0.21	**0.21**	0.20	0.19	0.20
25	Perimeter	0.20	**0.20**	0.19	0.19	0.19
26	Perimeter	0.20	**0.22**	**0.21**	**0.21**	**0.21**
27	Perimeter	0.17	**0.20**	**0.20**	**0.20**	**0.20**
28	Perimeter	0.18	**0.20**	**0.20**	**0.21**	**0.20**
29	Perimeter	0.17	**0.19**	**0.19**	**0.19**	**0.19**
30	Perimeter	0.18	**0.18**	**0.18**	**0.18**	**0.18**
31	Perimeter	0.23	0.20	**0.21**	0.19	0.20
32	Perimeter	0.23	0.18	0.18	0.17	0.18
33	Perimeter	0.20	0.16	0.16	0.16	0.16
34	Perimeter	0.20	0.19	**0.21**	**0.20**	**0.21**
35	Perimeter	0.19	**0.30**	**0.32**	**0.29**	**0.31**
36	Perimeter	0.21	**0.23**	**0.23**	**0.21**	**0.23**
37	Perimeter	0.24	**0.22**	**0.21**	0.20	**0.21**
38	Perimeter	0.20	**0.26**	**0.26**	**0.24**	**0.25**
39	Overall	0.21	0.20	**0.21**	0.19	0.20
40	Overall	0.23	0.17	0.17	0.16	0.17
41	Special	0.24	0.20	0.18	0.19	0.18
42	Special	0.22	0.19	0.19	0.18	0.18
43	Overall	0.22	0.19	0.19	0.18	0.18
44	Overall	0.20	0.15	0.15	0.14	0.14
45	Overall	0.22	0.14	0.14	0.14	0.14
46	Overall	0.23	**0.23**	**0.21**	0.20	0.19
47	Overall	0.20	**0.21**	**0.20**	0.19	0.19
48	Overall	0.20	**0.20**	**0.25**	**0.21**	**0.24**
49	Overall	0.25	0.17	0.18	0.18	0.18
50	Overall	0.20	0.18	0.18	0.18	0.18
51	Overall	0.20	0.16	0.16	0.16	0.15
52	Overall	0.18	0.15	0.15	0.15	0.15
53	Overall	0.20	0.18	0.17	0.17	0.17
54	Overall	0.21	0.17	0.17	0.17	0.16
55	Overall	0.22	0.19	0.18	0.17	0.17
56	Overall	0.23	0.17	0.17	0.17	0.16
57	Overall	0.21	0.15	0.14	0.17	0.17
58	Overall	0.21	0.20	0.19	0.19	0.19
59	Overall	0.18	**0.21**	**0.21**	**0.21**	**0.21**
60	Overall	0.19	**0.24**	**0.23**	**0.23**	**0.23**
61	Overall	0.19	**0.22**	**0.22**	**0.22**	**0.21**
62	Overall	0.19	**0.21**	**0.21**	**0.20**	**0.20**
63	Overall	0.21	**0.24**	**0.23**	**0.23**	**0.22**
64	Overall	0.19	**0.22**	**0.22**	**0.23**	**0.22**
65	Overall	0.22	0.20	0.20	0.20	0.20
66	Overall	0.25	**0.26**	**0.26**	**0.25**	**0.26**
67	Overall	0.25	**0.26**	**0.26**	**0.25**	**0.26**
68	Overall	0.24	**0.23**	**0.23**	**0.22**	**0.23**
69	Overall	0.22	**0.22**	**0.21**	**0.21**	**0.21**
70	Overall	0.19	**0.19**	**0.19**	**0.19**	**0.19**
71	Overall	0.21	**0.21**	**0.21**	**0.21**	0.20
72	Overall	0.17	**0.18**	**0.18**	**0.18**	**0.17**
73	Overall	0.27	**0.27**	**0.26**	**0.26**	**0.26**
74	Overall	0.21	0.20	0.20	0.20	0.20
75	Overall	0.21	**0.22**	**0.22**	**0.21**	**0.21**
76	Overall	0.22	0.20	0.20	**0.21**	0.20
77	Overall	0.25	**0.24**	**0.24**	**0.24**	**0.24**
78	Overall	0.24	**0.21**	0.20	**0.21**	0.20
79	Overall	0.28	**0.26**	**0.25**	**0.25**	**0.24**
80	Overall	0.26	**0.24**	**0.23**	**0.22**	**0.22**
81	Overall	0.26	**0.26**	**0.26**	**0.25**	**0.25**
82	Overall	0.23	**0.24**	**0.23**	**0.23**	**0.23**
83	Overall	0.22	**0.23**	**0.22**	**0.22**	**0.22**
84	Overall	0.26	**0.26**	**0.26**	**0.26**	**0.26**
85	Overall	0.26	**0.27**	**0.27**	**0.26**	**0.27**
86	Overall	0.21	**0.21**	**0.21**	**0.21**	**0.21**
87	Overall	0.27	**0.26**	**0.26**	**0.26**	**0.25**
88	Overall	0.25	**0.24**	**0.24**	**0.24**	**0.24**
89	Overall	0.22	0.20	0.20	0.20	0.20
90	Overall	0.25	**0.25**	**0.25**	**0.23**	**0.24**
91	Overall	0.22	**0.23**	**0.23**	**0.24**	**0.24**
92	Overall	0.22	**0.23**	**0.23**	**0.23**	**0.23**
93	Overall	0.23	**0.23**	**0.22**	**0.22**	**0.23**
94	Overall	0.28	**0.27**	**0.27**	**0.26**	**0.27**
95	Overall	0.28	**0.28**	**0.28**	**0.27**	**0.27**
96	Overall	0.29	**0.29**	**0.28**	**0.28**	**0.28**

Bold values indicate velocity ratio values higher than either the LVR or the individual sensor's velocity ratio measured for existing conditions.

Table 1c: Weighted Velocity Ratios for the Tamar Development (Summer conditions)

Bold values indicate velocity ratio values higher than either the LVR or the individual sensor's velocity ratio measured for existing conditions.

Table 1c: Weighted Velocity Ratios for the Tamar Development (Summer conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
97	Overall	0.31	**0.30**	**0.30**	**0.28**	**0.28**
98	Overall	0.28	**0.23**	**0.23**	**0.23**	**0.23**
99	Overall	0.18	**0.24**	**0.26**	**0.25**	**0.26**
100	Overall	0.25	**0.21**	0.20	**0.21**	0.20
101	Overall	0.28	**0.29**	**0.28**	**0.29**	**0.28**
102	Overall	0.17	**0.17**	**0.17**	**0.17**	**0.17**
103	Overall	0.19	**0.20**	**0.19**	0.18	**0.19**
104	Overall	0.20	**0.21**	**0.20**	**0.20**	**0.20**
105	Overall	0.18	**0.18**	**0.18**	**0.18**	**0.18**
106	Overall	0.24	**0.25**	**0.25**	**0.25**	**0.25**
107	Overall	0.24	**0.25**	**0.25**	**0.24**	**0.25**
108	Overall	0.26	**0.28**	**0.27**	**0.27**	**0.27**
109	Special	0.18	**0.18**	**0.18**	**0.18**	**0.18**
110	Overall	0.21	**0.22**	**0.22**	**0.22**	**0.22**
111	Overall	0.25	**0.25**	**0.25**	**0.25**	**0.24**
112	Overall	0.14	**0.14**	**0.14**	**0.14**	**0.14**
113	Overall	0.19	**0.19**	**0.19**	**0.19**	**0.19**
114	Overall	0.24	**0.22**	**0.22**	**0.22**	**0.22**
115	Overall	0.22	0.19	0.19	0.19	0.19
116	Overall	0.23	**0.22**	**0.22**	**0.22**	**0.23**
117	Overall	0.23	**0.21**	0.20	0.20	0.20
118	Overall	0.22	0.20	0.20	0.20	0.20
119	Overall	0.20	**0.20**	**0.20**	**0.20**	0.19
120	Overall	0.23	**0.24**	**0.23**	**0.23**	**0.23**
121	Overall	0.26	**0.25**	**0.25**	**0.25**	**0.25**
122	Overall	0.29	**0.28**	**0.28**	**0.27**	**0.27**
123	Overall	0.29	**0.29**	**0.30**	**0.29**	**0.30**
124	Overall	0.29	**0.30**	**0.30**	**0.30**	**0.30**
125	Special	0.28	**0.27**	**0.27**	**0.28**	**0.28**
126	Overall	0.21	**0.23**	**0.24**	**0.24**	**0.23**
127	Special	0.30	**0.30**	**0.30**	**0.30**	**0.31**
128	Special	0.26	**0.27**	**0.27**	**0.27**	**0.26**
129	Special	0.26	**0.26**	**0.26**	**0.26**	**0.25**
130	Special	0.25	**0.27**	**0.26**	**0.25**	**0.25**
131	Special	0.29	**0.29**	**0.29**	**0.29**	**0.30**

Bold values indicate velocity ratio values higher than either the LVR or the individual sensor's velocity ratio measured for existing conditions.

Table 1d: Weighted Velocity Ratios for the Tamar Development (Autumn conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
1	Special	0.28	Data not available	Data not available	Data not available	Data not available
2	Overall	0.31	**0.29**	**0.29**	**0.29**	**0.29**
3	Overall	0.30	0.21	0.21	0.21	0.21
4	Overall	0.29	0.21	0.20	0.21	0.21
5	Overall	0.28	**0.26**	0.24	**0.26**	**0.26**
6	Overall	0.27	**0.28**	**0.27**	**0.28**	**0.28**
7	Overall	0.26	0.22	0.21	0.22	0.21
8	Overall	0.25	**0.25**	0.23	**0.26**	**0.25**
9	Overall	0.22	**0.28**	**0.27**	**0.28**	**0.27**
10	Overall	0.26	**0.31**	**0.29**	**0.31**	**0.30**
11	Overall	0.22	**0.31**	**0.29**	**0.31**	**0.29**
12	Overall	0.22	**0.33**	**0.31**	**0.33**	**0.32**
13	Overall	0.24	**0.28**	**0.26**	**0.26**	**0.26**
14	Overall	0.26	**0.30**	**0.29**	**0.29**	**0.29**
15	Overall	0.23	**0.24**	**0.24**	**0.23**	**0.23**
16	Overall	0.25	**0.27**	**0.26**	**0.25**	**0.27**
17	Perimeter	0.21	**0.23**	**0.22**	**0.22**	**0.22**
18	Overall	0.28	0.19	0.18	0.19	0.19
19	Overall	0.27	**0.26**	0.25	0.24	0.24
20	Overall	0.30	0.17	0.16	0.17	0.17
21	Overall	0.30	0.19	0.19	0.19	0.19
22	Perimeter	0.30	0.24	0.24	0.24	0.23
23	Perimeter	0.27	0.25	0.25	0.24	0.23
24	Perimeter	0.26	**0.26**	0.25	0.24	0.25
25	Perimeter	0.27	**0.28**	**0.26**	0.25	0.24
26	Perimeter	0.25	**0.30**	**0.29**	**0.29**	**0.29**
27	Perimeter	0.22	**0.29**	**0.28**	**0.28**	**0.28**
28	Perimeter	0.21	**0.27**	**0.26**	**0.27**	**0.27**
29	Perimeter	0.21	**0.24**	**0.24**	**0.25**	**0.24**
30	Perimeter	0.22	0.20	0.19	0.20	0.19
31	Perimeter	0.28	0.22	0.23	0.21	0.23
32	Perimeter	0.26	0.19	0.21	0.19	0.21
33	Perimeter	0.24	0.19	0.19	0.18	0.19
34	Perimeter	0.22	**0.24**	**0.28**	**0.26**	**0.29**
35	Perimeter	0.23	**0.40**	**0.45**	**0.41**	**0.44**
36	Perimeter	0.28	**0.30**	**0.31**	**0.26**	**0.31**
37	Perimeter	0.31	**0.31**	**0.31**	**0.29**	**0.31**
38	Perimeter	0.26	**0.34**	**0.35**	**0.33**	**0.34**
39	Overall	0.28	**0.28**	**0.30**	**0.26**	**0.28**
40	Overall	0.31	0.20	0.20	0.19	0.20
41	Special	0.34	**0.28**	0.25	**0.27**	0.25
42	Special	0.30	**0.26**	0.25	0.24	0.24
43	Overall	0.27	**0.26**	0.25	0.25	0.24
44	Overall	0.24	0.21	0.20	0.19	0.18
45	Overall	0.26	0.16	0.15	0.14	0.14
46	Overall	0.27	**0.32**	**0.30**	**0.26**	0.25
47	Overall	0.27	0.20	0.20	0.18	0.17
48	Overall	0.28	0.20	**0.29**	0.24	**0.28**

Bold values indicate velocity ratio values higher than either the LVR or the individual sensor's velocity ratio measured for existing conditions.

Table 1d: Weighted Velocity Ratios for the Tamar Development (Autumn conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
49	Overall	0.37	0.21	0.22	0.23	0.23
50	Overall	0.24	0.20	0.19	0.19	0.20
51	Overall	0.25	0.20	0.20	0.20	0.19
52	Overall	0.25	0.21	0.21	0.20	0.21
53	Overall	0.27	0.23	0.22	0.23	0.23
54	Overall	0.29	0.21	0.20	0.21	0.21
55	Overall	0.29	0.24	0.23	0.21	0.21
56	Overall	0.30	0.20	0.19	0.19	0.19
57	Overall	0.27	0.15	0.14	0.22	0.21
58	Overall	0.25	0.23	0.23	0.23	0.23
59	Overall	0.24	**0.30**	**0.30**	**0.31**	**0.31**
60	Overall	0.25	**0.34**	**0.33**	**0.34**	**0.33**
61	Overall	0.25	**0.32**	**0.31**	**0.32**	**0.31**
62	Overall	0.23	**0.27**	**0.27**	**0.26**	**0.26**
63	Overall	0.27	**0.34**	**0.33**	**0.32**	**0.31**
64	Overall	0.23	**0.32**	**0.31**	**0.32**	**0.30**
65	Overall	0.27	0.23	0.23	0.23	0.23
66	Overall	0.33	**0.34**	**0.33**	**0.33**	**0.34**
67	Overall	0.29	**0.29**	**0.29**	**0.29**	**0.30**
68	Overall	0.28	**0.26**	**0.26**	0.25	**0.26**
69	Overall	0.26	**0.26**	0.25	0.25	0.25
70	Overall	0.20	**0.20**	**0.20**	**0.20**	**0.20**
71	Overall	0.24	**0.24**	**0.24**	**0.24**	0.22
72	Overall	0.21	**0.24**	**0.23**	**0.23**	**0.22**
73	Overall	0.31	**0.29**	**0.28**	**0.29**	**0.28**
74	Overall	0.24	0.23	0.23	0.22	0.23
75	Overall	0.22	**0.26**	**0.25**	**0.25**	**0.25**
76	Overall	0.28	0.25	0.25	0.25	0.24
77	Overall	0.33	**0.30**	**0.30**	**0.30**	**0.31**
78	Overall	0.29	0.24	0.22	0.23	0.22
79	Overall	0.35	**0.31**	**0.27**	**0.28**	**0.27**
80	Overall	0.34	**0.30**	**0.28**	**0.27**	**0.26**
81	Overall	0.33	**0.34**	**0.34**	**0.32**	**0.33**
82	Overall	0.27	**0.28**	**0.27**	**0.26**	0.25
83	Overall	0.26	**0.28**	**0.27**	**0.26**	**0.27**
84	Overall	0.35	**0.37**	**0.37**	**0.35**	**0.36**
85	Overall	0.29	**0.32**	**0.32**	**0.30**	**0.32**
86	Overall	0.24	0.21	0.21	0.21	0.21
87	Overall	0.31	**0.28**	**0.28**	**0.27**	**0.27**
88	Overall	0.31	**0.28**	**0.29**	**0.28**	**0.29**
89	Overall	0.27	0.23	0.22	0.23	0.22
90	Overall	0.33	**0.33**	**0.33**	**0.30**	**0.31**
91	Overall	0.28	**0.28**	**0.29**	**0.29**	**0.29**
92	Overall	0.28	**0.29**	**0.29**	**0.30**	**0.31**
93	Overall	0.28	**0.29**	**0.28**	**0.28**	**0.29**
94	Overall	0.42	**0.42**	**0.41**	**0.40**	**0.41**
95	Overall	0.38	**0.39**	**0.38**	**0.37**	**0.37**
96	Overall	0.41	**0.40**	**0.39**	**0.39**	**0.39**

Bold values indicate velocity ratio values higher than either the LVR or the individual sensor's velocity ratio measured for existing conditions.

Table 1d: Weighted Velocity Ratios for the Tamar Development (Autumn conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
97	Overall	0.41	**0.41**	**0.39**	**0.37**	**0.37**
98	Overall	0.37	**0.29**	**0.29**	**0.29**	**0.30**
99	Overall	0.21	**0.36**	**0.39**	**0.36**	**0.39**
100	Overall	0.31	**0.26**	0.23	0.25	0.23
101	Overall	0.30	**0.28**	**0.26**	**0.28**	**0.27**
102	Overall	0.18	0.17	0.17	**0.18**	**0.18**
103	Overall	0.21	**0.22**	**0.22**	0.20	**0.21**
104	Overall	0.21	**0.23**	**0.22**	**0.22**	**0.21**
105	Overall	0.18	**0.18**	**0.18**	**0.18**	**0.18**
106	Overall	0.28	**0.31**	**0.31**	**0.29**	**0.30**
107	Overall	0.24	**0.25**	**0.25**	**0.24**	**0.24**
108	Overall	0.23	**0.23**	**0.23**	0.22	0.22
109	Special	0.18	**0.18**	**0.18**	**0.18**	**0.18**
110	Overall	0.21	**0.22**	**0.22**	**0.22**	**0.22**
111	Overall	0.26	0.25	0.25	0.25	0.25
112	Overall	0.16	**0.16**	0.15	0.15	0.15
113	Overall	0.20	**0.20**	**0.20**	**0.20**	**0.20**
114	Overall	0.27	0.24	0.24	0.24	0.25
115	Overall	0.30	0.22	0.21	0.22	0.22
116	Overall	0.26	**0.26**	0.25	**0.26**	**0.26**
117	Overall	0.30	0.24	0.24	0.24	0.24
118	Overall	0.28	0.24	0.24	0.24	0.23
119	Overall	0.26	**0.26**	**0.26**	**0.26**	**0.26**
120	Overall	0.26	**0.27**	**0.26**	**0.26**	**0.26**
121	Overall	0.27	**0.27**	**0.27**	**0.27**	**0.27**
122	Overall	0.36	**0.31**	**0.31**	**0.29**	**0.29**
123	Overall	0.32	**0.32**	**0.32**	**0.31**	**0.31**
124	Overall	0.33	**0.34**	**0.33**	**0.33**	**0.33**
125	Special	0.36	**0.35**	**0.34**	**0.36**	**0.35**
126	Overall	0.24	**0.27**	**0.26**	**0.27**	**0.26**
127	Special	0.36	**0.37**	**0.38**	**0.38**	**0.39**
128	Special	0.31	**0.32**	**0.32**	**0.33**	**0.32**
129	Special	0.29	**0.29**	**0.28**	**0.29**	**0.27**
130	Special	0.28	**0.30**	**0.30**	**0.29**	**0.29**
131	Special	0.29	**0.29**	**0.29**	**0.29**	**0.30**

Bold values indicate velocity ratio values higher than either the LVR or the individual sensor's velocity ratio measured for existing conditions.

Table 1e: Weighted Velocity Ratios for the Tamar Development (Winter conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
1	Special	0.31	Data not available	Data not available	Data not available	Data not available
2	Overall	0.35	**0.32**	**0.32**	**0.32**	**0.31**
3	Overall	0.33	0.24	0.24	0.25	0.24
4	Overall	0.32	0.23	0.22	0.23	0.23
5	Overall	0.32	**0.31**	**0.29**	**0.31**	**0.31**
6	Overall	0.31	**0.32**	**0.31**	**0.32**	**0.33**
7	Overall	0.30	0.23	0.22	0.24	0.23
8	Overall	0.28	**0.28**	0.26	**0.31**	**0.29**
9	Overall	0.25	**0.36**	**0.34**	**0.35**	**0.35**
10	Overall	0.29	**0.37**	**0.35**	**0.37**	**0.36**
11	Overall	0.25	**0.37**	**0.35**	**0.37**	**0.35**
12	Overall	0.23	**0.39**	**0.37**	**0.39**	**0.39**
13	Overall	0.26	**0.30**	**0.28**	**0.29**	**0.28**
14	Overall	0.30	**0.33**	**0.32**	**0.32**	**0.33**
15	Overall	0.24	**0.25**	**0.25**	**0.25**	**0.25**
16	Overall	0.27	**0.29**	**0.28**	**0.28**	**0.30**
17	Perimeter	0.22	**0.25**	**0.24**	**0.24**	**0.24**
18	Overall	0.29	0.19	0.18	0.19	0.20
19	Overall	0.29	0.28	0.27	0.27	0.26
20	Overall	0.33	0.17	0.17	0.18	0.18
21	Overall	0.33	0.21	0.21	0.22	0.21
22	Perimeter	0.33	0.26	0.25	0.26	0.25
23	Perimeter	0.29	**0.29**	**0.29**	0.27	0.26
24	Perimeter	0.29	**0.29**	**0.29**	0.28	0.28
25	Perimeter	0.32	**0.31**	**0.29**	0.27	0.26
26	Perimeter	0.29	**0.34**	**0.33**	**0.34**	**0.33**
27	Perimeter	0.26	**0.34**	**0.33**	**0.33**	**0.33**
28	Perimeter	0.23	**0.31**	**0.31**	**0.31**	**0.31**
29	Perimeter	0.22	**0.28**	**0.28**	**0.28**	**0.28**
30	Perimeter	0.24	0.21	0.20	0.20	0.21
31	Perimeter	0.30	0.23	0.24	0.22	0.24
32	Perimeter	0.28	0.19	0.22	0.19	0.22
33	Perimeter	0.27	0.19	0.19	0.20	0.20
34	Perimeter	0.24	**0.26**	**0.31**	**0.28**	**0.31**
35	Perimeter	0.27	**0.43**	**0.48**	**0.43**	**0.47**
36	Perimeter	0.33	**0.32**	**0.32**	0.27	**0.33**
37	Perimeter	0.32	**0.35**	**0.36**	**0.33**	**0.36**
38	Perimeter	0.29	**0.34**	**0.35**	**0.33**	**0.34**
39	Overall	0.32	**0.29**	**0.30**	0.27	**0.29**
40	Overall	0.33	0.21	0.21	0.20	0.22
41	Special	0.36	**0.32**	**0.29**	**0.31**	0.28
42	Special	0.35	0.28	0.27	0.27	0.28
43	Overall	0.31	**0.30**	**0.30**	**0.29**	0.28
44	Overall	0.27	0.25	0.23	0.20	0.19
45	Overall	0.29	0.17	0.15	0.15	0.14
46	Overall	0.30	**0.37**	**0.34**	0.28	0.27
47	Overall	0.32	0.19	0.19	0.17	0.17
48	Overall	0.32	0.20	**0.29**	0.24	0.28

Bold values indicate velocity ratio values higher than either the LVR or the individual sensor's velocity ratio measured for existing conditions.

Table 1e: Weighted Velocity Ratios for the Tamar Development (Winter conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
49	Overall	0.39	0.22	0.23	0.23	0.23
50	Overall	0.27	0.21	0.20	0.20	0.21
51	Overall	0.29	0.23	0.23	0.22	0.22
52	Overall	0.29	0.24	0.24	0.24	0.25
53	Overall	0.31	0.27	0.26	0.26	0.26
54	Overall	0.33	0.22	0.22	0.22	0.22
55	Overall	0.33	0.26	0.26	0.23	0.24
56	Overall	0.33	0.21	0.20	0.20	0.20
57	Overall	0.30	0.14	0.14	0.25	0.24
58	Overall	0.27	0.25	0.24	0.25	0.25
59	Overall	0.28	**0.35**	**0.34**	**0.36**	**0.36**
60	Overall	0.28	**0.39**	**0.38**	**0.39**	**0.38**
61	Overall	0.28	**0.37**	**0.36**	**0.37**	**0.36**
62	Overall	0.25	**0.31**	**0.32**	**0.29**	**0.30**
63	Overall	0.32	**0.38**	**0.37**	**0.36**	**0.35**
64	Overall	0.25	**0.37**	**0.36**	**0.37**	**0.35**
65	Overall	0.27	0.24	0.24	0.24	0.24
66	Overall	0.37	**0.40**	**0.39**	**0.39**	**0.40**
67	Overall	0.30	**0.33**	**0.32**	**0.32**	**0.32**
68	Overall	0.30	**0.29**	**0.29**	0.28	0.28
69	Overall	0.27	**0.28**	**0.27**	**0.27**	**0.28**
70	Overall	0.20	**0.20**	**0.20**	**0.20**	**0.21**
71	Overall	0.25	**0.26**	**0.25**	**0.25**	0.23
72	Overall	0.22	**0.26**	**0.25**	**0.25**	**0.25**
73	Overall	0.35	**0.32**	**0.31**	**0.32**	**0.31**
74	Overall	0.24	**0.24**	0.23	0.23	0.23
75	Overall	0.22	**0.27**	**0.26**	**0.27**	**0.26**
76	Overall	0.30	0.26	0.26	0.26	0.26
77	Overall	0.39	**0.34**	**0.34**	**0.35**	**0.36**
78	Overall	0.29	0.23	0.22	0.23	0.21
79	Overall	0.36	**0.30**	0.27	0.28	0.26
80	Overall	0.33	**0.29**	0.27	0.26	0.26
81	Overall	0.33	**0.35**	**0.34**	**0.32**	**0.34**
82	Overall	0.29	**0.29**	0.27	0.27	0.26
83	Overall	0.27	**0.29**	**0.29**	**0.27**	**0.28**
84	Overall	0.37	**0.40**	**0.40**	**0.38**	**0.40**
85	Overall	0.31	**0.35**	**0.34**	**0.32**	**0.34**
86	Overall	0.27	0.22	0.22	0.23	0.22
87	Overall	0.34	**0.29**	**0.29**	0.28	**0.29**
88	Overall	0.37	**0.32**	**0.33**	**0.32**	**0.33**
89	Overall	0.28	0.24	0.23	0.24	0.24
90	Overall	0.31	**0.32**	**0.32**	0.28	**0.30**
91	Overall	0.32	**0.32**	**0.33**	**0.32**	**0.33**
92	Overall	0.33	**0.35**	**0.35**	**0.36**	**0.37**
93	Overall	0.29	**0.30**	**0.29**	**0.29**	**0.31**
94	Overall	0.44	**0.43**	**0.42**	**0.42**	**0.43**
95	Overall	0.40	**0.41**	**0.41**	**0.39**	**0.40**
96	Overall	0.42	**0.41**	**0.40**	**0.40**	**0.40**

Bold values indicate velocity ratio values higher than either the LVR or the individual sensor's velocity ratio measured for existing conditions.

Table 1e: Weighted Velocity Ratios for the Tamar Development (Winter conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
97	Overall	0.41	**0.41**	**0.39**	**0.37**	**0.37**
98	Overall	0.37	**0.32**	**0.32**	**0.32**	**0.34**
99	Overall	0.23	**0.40**	**0.42**	**0.40**	**0.42**
100	Overall	0.30	0.26	0.24	0.26	0.24
101	Overall	0.34	**0.30**	0.27	**0.30**	0.28
102	Overall	0.18	**0.18**	0.17	**0.18**	**0.18**
103	Overall	0.21	**0.21**	**0.21**	0.20	0.20
104	Overall	0.22	**0.23**	**0.22**	**0.22**	0.21
105	Overall	0.18	**0.18**	**0.18**	**0.18**	**0.18**
106	Overall	0.29	**0.32**	**0.31**	**0.29**	**0.30**
107	Overall	0.23	**0.24**	**0.24**	**0.23**	**0.23**
108	Overall	0.20	**0.20**	**0.20**	**0.20**	**0.20**
109	Special	0.18	**0.18**	**0.18**	**0.18**	**0.19**
110	Overall	0.21	**0.22**	**0.22**	**0.22**	**0.22**
111	Overall	0.29	0.28	0.28	**0.29**	**0.29**
112	Overall	0.18	0.17	0.17	0.17	0.17
113	Overall	0.21	**0.21**	0.20	**0.21**	0.20
114	Overall	0.31	0.27	0.26	0.27	0.28
115	Overall	0.33	0.25	0.23	0.24	0.25
116	Overall	0.30	**0.29**	**0.29**	**0.29**	**0.29**
117	Overall	0.34	0.26	0.25	0.26	0.26
118	Overall	0.32	0.28	0.27	0.27	0.27
119	Overall	0.30	**0.31**	**0.31**	**0.31**	**0.31**
120	Overall	0.28	**0.30**	**0.29**	**0.29**	**0.29**
121	Overall	0.30	**0.31**	**0.30**	**0.31**	**0.31**
122	Overall	0.41	**0.33**	**0.33**	**0.31**	**0.31**
123	Overall	0.36	**0.35**	**0.34**	**0.33**	**0.33**
124	Overall	0.38	**0.39**	**0.39**	**0.38**	**0.38**
125	Special	0.37	**0.37**	**0.36**	**0.37**	**0.37**
126	Overall	0.26	**0.30**	**0.29**	**0.30**	**0.29**
127	Special	0.37	**0.38**	**0.38**	**0.38**	**0.39**
128	Special	0.32	**0.33**	**0.32**	**0.33**	**0.33**
129	Special	0.30	0.28	0.28	**0.29**	0.27
130	Special	0.28	**0.30**	**0.30**	**0.29**	**0.29**
131	Special	0.27	**0.27**	**0.27**	**0.27**	**0.28**

Bold values indicate velocity ratio values higher than either the LVR or the individual sensor's velocity ratio measured for existing conditions.

Table 2a: Wind Availability for the Tamar Development (Annual conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
1	Special	52.1%	Data not available	Data not available	Data not available	Data not available
2	Overall	55.2%	**52.4%**	**52.3%**	**51.7%**	**52.0%**
3	Overall	52.8%	37.1%	36.6%	36.7%	36.6%
4	Overall	52.9%	36.0%	34.0%	34.6%	35.7%
5	Overall	49.6%	43.6%	40.5%	42.3%	41.4%
6	Overall	48.6%	**50.1%**	47.3%	**48.9%**	47.3%
7	Overall	48.6%	40.4%	37.4%	39.9%	39.0%
8	Overall	48.1%	45.2%	41.3%	46.7%	45.2%
9	Overall	39.7%	**44.2%**	**40.7%**	**43.9%**	**42.0%**
10	Overall	46.1%	**51.3%**	**48.5%**	**49.9%**	**47.9%**
11	Overall	38.8%	**52.7%**	**49.9%**	**51.9%**	**49.8%**
12	Overall	39.4%	**56.4%**	**53.6%**	**55.5%**	**54.3%**
13	Overall	46.8%	**51.1%**	**48.2%**	**47.9%**	**48.2%**
14	Overall	48.1%	**53.3%**	**51.5%**	**50.9%**	**51.1%**
15	Overall	41.8%	**44.6%**	**42.9%**	**42.4%**	**42.8%**
16	Overall	47.3%	**50.1%**	**48.3%**	46.2%	**50.2%**
17	Perimeter	37.5%	**41.6%**	37.4%	**38.4%**	**38.5%**
18	Overall	52.2%	31.0%	28.2%	28.9%	30.2%
19	Overall	52.1%	42.2%	42.9%	39.3%	39.6%
20	Overall	53.9%	22.8%	22.5%	22.6%	22.7%
21	Overall	53.7%	32.2%	31.1%	31.7%	30.8%
22	Perimeter	54.9%	45.2%	44.6%	44.8%	43.0%
23	Perimeter	48.5%	46.9%	45.7%	43.5%	42.5%
24	Perimeter	46.9%	**49.8%**	**48.0%**	45.5%	46.3%
25	Perimeter	47.0%	**49.2%**	45.1%	43.1%	41.3%
26	Perimeter	47.3%	**53.6%**	**51.5%**	**52.1%**	**50.9%**
27	Perimeter	40.7%	**50.2%**	**48.5%**	**48.9%**	**48.9%**
28	Perimeter	38.1%	**48.1%**	**46.9%**	**48.8%**	**48.1%**
29	Perimeter	35.8%	**43.7%**	**41.4%**	**43.6%**	**43.4%**
30	Perimeter	40.8%	34.3%	30.1%	32.2%	31.5%
31	Perimeter	52.9%	38.6%	39.6%	35.0%	39.4%
32	Perimeter	49.4%	30.5%	35.7%	30.3%	36.7%
33	Perimeter	43.6%	29.1%	29.1%	28.6%	30.5%
34	Perimeter	40.5%	**43.9%**	**49.9%**	**46.5%**	**50.2%**
35	Perimeter	43.6%	**66.4%**	**69.5%**	**66.4%**	**68.2%**
36	Perimeter	52.2%	**54.5%**	**55.5%**	48.2%	**55.5%**
37	Perimeter	56.0%	**54.1%**	**52.9%**	**50.8%**	**52.9%**
38	Perimeter	46.7%	**58.9%**	**59.0%**	**57.1%**	**58.3%**
39	Overall	51.2%	49.4%	**50.4%**	46.4%	48.1%
40	Overall	56.1%	34.0%	33.8%	31.8%	34.1%
41	Special	59.1%	49.5%	45.3%	46.8%	43.6%
42	Special	54.3%	46.5%	43.2%	42.1%	41.3%
43	Overall	51.4%	41.5%	38.6%	39.0%	36.6%
44	Overall	44.9%	32.5%	29.0%	24.1%	23.5%
45	Overall	49.7%	20.2%	17.3%	14.2%	14.5%
46	Overall	51.8%	**56.2%**	**52.8%**	47.1%	45.2%
47	Overall	49.7%	31.8%	32.1%	26.1%	25.0%
48	Overall	51.4%	34.6%	**52.2%**	42.9%	49.9%

Bold values indicate wind availability of either 1.5m/s for at least 50% of the time or improved from existing conditions

Table 2a: Wind Availability for the Tamar Development (Annual conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
49	Overall	61.2%	32.3%	38.6%	38.9%	39.3%
50	Overall	46.2%	34.1%	31.8%	32.0%	34.3%
51	Overall	47.5%	33.2%	32.3%	30.8%	29.7%
52	Overall	44.0%	36.5%	35.8%	35.3%	36.5%
53	Overall	49.3%	39.3%	36.8%	37.2%	36.6%
54	Overall	51.7%	36.7%	34.5%	35.9%	34.9%
55	Overall	53.2%	41.6%	40.0%	34.5%	36.4%
56	Overall	54.2%	33.2%	30.4%	31.0%	30.2%
57	Overall	49.3%	15.9%	13.6%	39.9%	37.5%
58	Overall	45.8%	42.9%	41.2%	43.0%	42.1%
59	Overall	42.3%	**53.7%**	**52.3%**	**54.3%**	**53.8%**
60	Overall	45.4%	**58.3%**	**56.8%**	**57.9%**	**56.3%**
61	Overall	46.3%	**54.8%**	**53.4%**	**53.9%**	**52.7%**
62	Overall	42.5%	**50.1%**	**50.5%**	**47.3%**	**48.3%**
63	Overall	49.9%	**58.8%**	**57.0%**	**56.2%**	**55.3%**
64	Overall	43.2%	**54.6%**	**53.4%**	**55.9%**	**52.6%**
65	Overall	49.1%	42.1%	41.8%	42.3%	42.0%
66	Overall	59.6%	**60.9%**	**59.7%**	**58.8%**	**59.9%**
67	Overall	54.0%	**56.6%**	**55.9%**	**55.0%**	**57.0%**
68	Overall	54.0%	**52.0%**	**50.5%**	49.0%	**50.5%**
69	Overall	49.9%	49.4%	48.0%	47.7%	48.7%
70	Overall	35.8%	34.5%	34.6%	34.7%	35.5%
71	Overall	45.2%	**47.2%**	**45.7%**	**45.9%**	42.0%
72	Overall	35.9%	**44.2%**	**41.6%**	**41.5%**	**40.5%**
73	Overall	60.2%	**58.3%**	**56.0%**	**57.2%**	**56.9%**
74	Overall	44.9%	43.1%	42.0%	41.1%	42.5%
75	Overall	41.2%	**50.5%**	**49.1%**	**48.9%**	**48.9%**
76	Overall	51.3%	44.3%	42.8%	44.5%	41.1%
77	Overall	56.0%	**54.4%**	**53.1%**	**54.9%**	**55.5%**
78	Overall	52.7%	42.9%	39.4%	41.9%	38.7%
79	Overall	60.6%	**54.5%**	**51.2%**	**51.4%**	**50.9%**
80	Overall	56.1%	**51.5%**	48.1%	48.2%	47.4%
81	Overall	57.5%	**58.6%**	**58.1%**	**56.6%**	**57.2%**
82	Overall	51.8%	**52.2%**	**50.4%**	49.9%	48.7%
83	Overall	47.7%	**51.3%**	**50.9%**	**48.3%**	**49.6%**
84	Overall	60.6%	**62.2%**	**62.4%**	**61.5%**	**61.8%**
85	Overall	56.6%	**60.8%**	**59.9%**	**58.6%**	**60.2%**
86	Overall	43.6%	40.5%	39.7%	41.0%	40.5%
87	Overall	57.6%	**55.4%**	**55.1%**	**53.8%**	**53.8%**
88	Overall	53.9%	**52.8%**	**52.7%**	**52.3%**	**53.2%**
89	Overall	45.2%	43.1%	40.7%	42.4%	42.5%
90	Overall	52.1%	**51.1%**	**51.3%**	48.8%	**50.6%**
91	Overall	52.6%	**54.0%**	**54.4%**	**54.4%**	**54.5%**
92	Overall	51.9%	**54.0%**	**53.6%**	**54.1%**	**55.1%**
93	Overall	47.2%	**48.1%**	46.4%	46.3%	**49.4%**
94	Overall	64.0%	**63.0%**	**62.4%**	**61.5%**	**62.2%**
95	Overall	62.8%	**64.3%**	**64.1%**	**62.7%**	**62.5%**
96	Overall	65.0%	**63.8%**	**62.8%**	**62.3%**	**62.2%**

Bold values indicate wind availability of either 1.5m/s for at least 50% of the time or improved from existing conditions

Table 2a: Wind Availability for the Tamar Development (Annual conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
97	Overall	66.6%	**64.6%**	**63.1%**	**62.0%**	**61.8%**
98	Overall	62.8%	**52.7%**	**52.2%**	**53.4%**	**53.0%**
99	Overall	36.0%	**60.0%**	**62.0%**	**60.0%**	**62.0%**
100	Overall	54.8%	44.3%	42.3%	44.0%	42.7%
101	Overall	57.3%	**57.9%**	**55.1%**	**57.5%**	**56.0%**
102	Overall	27.6%	26.8%	25.8%	26.7%	27.0%
103	Overall	36.5%	**37.9%**	**36.9%**	33.8%	35.1%
104	Overall	39.2%	**41.6%**	**40.6%**	**39.9%**	37.9%
105	Overall	30.0%	29.5%	28.8%	28.6%	29.4%
106	Overall	54.0%	**56.3%**	**56.4%**	**54.9%**	**55.1%**
107	Overall	45.1%	**47.8%**	**47.8%**	**45.3%**	**45.4%**
108	Overall	41.5%	**43.2%**	**42.9%**	**41.6%**	**42.1%**
109	Special	30.2%	30.0%	29.5%	29.2%	30.1%
110	Overall	39.2%	**41.4%**	**40.7%**	**40.3%**	**41.2%**
111	Overall	52.5%	**50.7%**	**50.7%**	**50.2%**	49.9%
112	Overall	18.9%	18.1%	17.2%	17.7%	16.9%
113	Overall	36.8%	35.7%	35.0%	35.6%	35.0%
114	Overall	53.5%	46.0%	45.1%	46.2%	47.8%
115	Overall	54.1%	42.5%	39.9%	41.5%	42.4%
116	Overall	50.2%	47.9%	47.6%	47.6%	48.0%
117	Overall	56.2%	46.5%	45.1%	45.5%	46.4%
118	Overall	53.6%	42.3%	40.9%	40.4%	39.8%
119	Overall	45.6%	41.2%	40.5%	40.3%	40.0%
120	Overall	51.2%	**52.4%**	**51.8%**	**51.4%**	**51.2%**
121	Overall	51.9%	**52.0%**	**50.5%**	**51.4%**	**52.0%**
122	Overall	63.9%	**60.6%**	**60.7%**	**58.5%**	**58.3%**
123	Overall	61.9%	**62.2%**	**62.4%**	**61.1%**	**61.8%**
124	Overall	62.5%	**63.5%**	**62.9%**	**63.2%**	**62.7%**
125	Special	63.3%	**61.9%**	**61.1%**	**62.9%**	**62.3%**
126	Overall	44.2%	**51.0%**	**50.4%**	**51.3%**	**49.6%**
127	Special	65.1%	**64.8%**	**64.6%**	**65.2%**	**65.5%**
128	Special	57.3%	**59.3%**	**58.8%**	**59.2%**	**58.5%**
129	Special	56.6%	**55.3%**	**53.9%**	**55.5%**	**52.5%**
130	Special	52.5%	**56.9%**	**56.0%**	**53.5%**	**53.6%**
131	Special	53.6%	**53.3%**	**53.1%**	**52.9%**	**55.0%**

Bold values indicate wind availability of either 1.5m/s for at least 50% of the time or improved from existing conditions

Table 2b: Wind Availability for the Tamar Development (Spring conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
1	Special	47.0%	Data not available	Data not available	Data not available	Data not available
2	Overall	50.9%	48.4%	48.5%	47.9%	48.1%
3	Overall	49.0%	33.0%	32.7%	33.0%	32.9%
4	Overall	48.6%	30.2%	28.2%	29.1%	30.4%
5	Overall	46.0%	40.0%	36.4%	38.7%	38.2%
6	Overall	44.5%	**45.8%**	43.0%	**45.0%**	43.5%
7	Overall	44.8%	34.7%	31.5%	34.5%	33.6%
8	Overall	42.8%	40.3%	36.1%	**42.8%**	40.8%
9	Overall	35.0%	**41.9%**	**38.6%**	**41.9%**	**40.0%**
10	Overall	41.9%	**48.3%**	**45.1%**	**47.2%**	**45.2%**
11	Overall	34.3%	**50.4%**	**47.5%**	**49.7%**	**47.5%**
12	Overall	33.5%	**53.7%**	**50.8%**	**53.0%**	**51.7%**
13	Overall	41.9%	**46.5%**	**43.2%**	**43.1%**	**43.3%**
14	Overall	43.7%	**49.5%**	**47.5%**	**47.1%**	**47.5%**
15	Overall	36.3%	**39.2%**	**37.5%**	**36.8%**	**37.4%**
16	Overall	41.9%	**45.3%**	**43.3%**	41.6%	**45.5%**
17	Perimeter	32.2%	**36.4%**	**32.3%**	**33.5%**	**33.5%**
18	Overall	47.0%	24.3%	21.1%	22.5%	23.5%
19	Overall	47.3%	36.5%	37.6%	33.8%	34.2%
20	Overall	49.7%	17.3%	17.1%	17.0%	17.3%
21	Overall	49.5%	28.1%	27.1%	27.9%	26.8%
22	Perimeter	49.9%	39.9%	39.0%	39.5%	37.7%
23	Perimeter	43.6%	**43.7%**	42.9%	40.2%	39.1%
24	Perimeter	41.7%	**45.1%**	**43.4%**	40.7%	41.5%
25	Perimeter	43.0%	**44.5%**	40.6%	37.6%	35.7%
26	Perimeter	43.0%	**49.6%**	**47.4%**	**48.2%**	**46.9%**
27	Perimeter	36.6%	**47.6%**	**46.0%**	**46.3%**	**46.3%**
28	Perimeter	32.6%	**44.9%**	**43.9%**	**45.6%**	**44.9%**
29	Perimeter	30.7%	**39.8%**	**38.0%**	**39.8%**	**39.6%**
30	Perimeter	35.4%	28.0%	23.8%	26.0%	25.4%
31	Perimeter	47.9%	32.0%	33.1%	28.8%	33.0%
32	Perimeter	44.1%	25.0%	30.5%	25.1%	31.7%
33	Perimeter	38.2%	23.7%	25.9%	23.7%	26.7%
34	Perimeter	35.2%	**39.3%**	**46.1%**	**42.0%**	**46.4%**
35	Perimeter	39.1%	**64.1%**	**67.7%**	**64.0%**	**66.3%**
36	Perimeter	49.1%	**50.7%**	**52.0%**	44.0%	**52.2%**
37	Perimeter	51.4%	**50.6%**	49.5%	47.3%	49.6%
38	Perimeter	42.9%	**55.1%**	**55.1%**	**53.2%**	**54.4%**
39	Overall	47.6%	45.4%	46.6%	42.4%	44.2%
40	Overall	52.1%	28.9%	28.7%	27.0%	29.3%
41	Special	55.5%	45.8%	41.2%	42.8%	39.4%
42	Special	50.8%	41.7%	37.9%	37.5%	36.6%
43	Overall	47.5%	36.8%	33.6%	34.5%	31.6%
44	Overall	40.9%	28.1%	24.0%	17.6%	17.6%
45	Overall	45.4%	14.2%	12.0%	9.6%	10.5%
46	Overall	47.6%	**52.5%**	**49.0%**	42.4%	41.3%
47	Overall	46.2%	25.2%	26.2%	19.6%	18.7%
48	Overall	48.3%	29.7%	**48.6%**	38.6%	46.2%
49	Overall	58.4%	26.6%	33.8%	33.6%	34.5%
50	Overall	40.9%	28.0%	25.7%	26.0%	28.6%
51	Overall	43.2%	27.8%	27.3%	25.5%	24.6%
52	Overall	40.2%	32.8%	32.0%	31.9%	33.0%
53	Overall	45.1%	34.2%	31.7%	32.5%	31.5%
54	Overall	47.7%	32.5%	30.3%	32.0%	31.1%
55	Overall	48.5%	36.4%	34.9%	28.9%	31.2%
56	Overall	49.5%	27.1%	24.3%	25.1%	24.0%
57	Overall	44.4%	11.6%	9.4%	35.7%	33.3%
58	Overall	39.5%	37.4%	35.7%	37.6%	36.7%
59	Overall	38.0%	**50.5%**	**49.2%**	**51.4%**	**50.7%**
60	Overall	41.4%	**55.7%**	**54.2%**	**55.3%**	**53.7%**
61	Overall	42.2%	**52.5%**	**51.0%**	**51.7%**	**50.3%**
62	Overall	37.2%	**47.4%**	**47.7%**	**44.4%**	**45.2%**
63	Overall	45.6%	**55.2%**	**53.4%**	**52.3%**	**51.3%**
64	Overall	37.9%	**51.9%**	**50.6%**	**52.8%**	**49.8%**
65	Overall	43.6%	36.9%	36.6%	36.9%	36.8%
66	Overall	55.2%	**57.6%**	**56.4%**	**55.4%**	**56.7%**
67	Overall	48.8%	**52.3%**	**51.5%**	**50.7%**	**52.6%**
68	Overall	48.6%	47.3%	45.8%	44.1%	45.7%
69	Overall	43.8%	43.6%	42.2%	42.0%	42.9%
70	Overall	29.4%	28.4%	28.4%	28.5%	**29.4%**
71	Overall	38.8%	**41.7%**	**40.2%**	**40.2%**	36.1%
72	Overall	30.7%	**39.8%**	**37.2%**	**37.1%**	**35.9%**
73	Overall	56.1%	**53.3%**	**50.8%**	**52.3%**	**51.9%**
74	Overall	38.8%	36.9%	35.8%	34.8%	36.2%
75	Overall	34.8%	**44.9%**	**43.4%**	**43.3%**	**43.3%**
76	Overall	46.9%	38.9%	37.3%	39.3%	35.5%
77	Overall	52.3%	**50.6%**	49.1%	**51.1%**	**51.7%**
78	Overall	46.7%	36.5%	33.4%	35.6%	33.1%
79	Overall	55.7%	49.0%	45.6%	45.6%	45.3%
80	Overall	50.4%	46.1%	43.0%	42.1%	42.1%
81	Overall	52.9%	**54.0%**	**53.5%**	**51.7%**	**52.6%**
82	Overall	46.0%	**46.5%**	44.5%	43.9%	42.6%
83	Overall	42.6%	**46.5%**	**46.1%**	**43.2%**	**44.9%**
84	Overall	56.5%	**58.7%**	**58.6%**	**57.5%**	**58.1%**
85	Overall	51.5%	**55.9%**	**54.9%**	**53.3%**	**55.1%**
86	Overall	38.7%	35.5%	34.8%	36.2%	35.7%
87	Overall	53.0%	**50.4%**	**50.0%**	48.6%	48.8%
88	Overall	50.2%	48.8%	48.6%	48.5%	49.4%
89	Overall	38.1%	36.7%	34.6%	36.0%	36.6%
90	Overall	47.8%	47.1%	47.2%	44.3%	46.3%
91	Overall	49.6%	**51.1%**	**51.6%**	**51.4%**	**51.7%**
92	Overall	48.3%	**50.6%**	**50.2%**	**50.9%**	**52.1%**
93	Overall	40.1%	**41.2%**	39.5%	39.5%	**42.9%**
94	Overall	61.1%	**60.0%**	**59.3%**	**58.2%**	**59.1%**
95	Overall	59.7%	**60.6%**	**60.4%**	**58.9%**	**58.7%**
96	Overall	60.9%	**59.5%**	**58.4%**	**57.8%**	**57.8%**

Bold values indicate wind availability of either 1.5m/s for at least 50% of the time or improved from existing conditions

Table 2b: Wind Availability for the Tamar Development (Spring conditions)

Bold values indicate wind availability of either 1.5m/s for at least 50% of the time or improved from existing conditions

Table 2b: Wind Availability for the Tamar Development (Spring conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
97	Overall	61.7%	**59.4%**	**57.7%**	**56.4%**	**56.2%**
98	Overall	58.9%	47.7%	47.3%	48.4%	48.4%
99	Overall	30.6%	**56.8%**	**59.1%**	**56.7%**	**59.1%**
100	Overall	48.9%	38.0%	37.0%	38.1%	37.5%
101	Overall	53.0%	**52.5%**	49.7%	**52.3%**	**50.7%**
102	Overall	21.5%	20.8%	20.0%	20.6%	21.0%
103	Overall	30.7%	**32.0%**	**30.9%**	27.9%	28.9%
104	Overall	33.7%	**36.1%**	**35.0%**	**34.4%**	32.0%
105	Overall	23.4%	**23.6%**	22.5%	22.3%	23.0%
106	Overall	49.1%	**51.8%**	**51.4%**	**49.7%**	**50.1%**
107	Overall	39.2%	**42.1%**	**42.2%**	**39.4%**	**39.2%**
108	Overall	34.9%	**36.5%**	**36.3%**	**34.9%**	**35.3%**
109	Special	23.7%	**24.3%**	**23.7%**	23.1%	**24.1%**
110	Overall	32.3%	**34.7%**	**34.0%**	**33.6%**	**34.6%**
111	Overall	47.8%	46.4%	46.4%	46.1%	45.8%
112	Overall	13.9%	12.8%	11.9%	12.4%	11.6%
113	Overall	30.0%	29.2%	28.2%	29.0%	28.3%
114	Overall	48.9%	40.1%	39.0%	40.3%	42.3%
115	Overall	50.8%	38.3%	35.4%	37.3%	38.2%
116	Overall	45.3%	42.8%	42.4%	42.3%	42.7%
117	Overall	52.4%	40.9%	39.4%	39.9%	40.8%
118	Overall	49.2%	37.0%	35.6%	35.1%	34.5%
119	Overall	40.6%	36.1%	35.5%	35.3%	35.0%
120	Overall	46.1%	**47.4%**	**46.9%**	**46.3%**	**46.1%**
121	Overall	46.1%	**46.6%**	45.0%	46.0%	**46.5%**
122	Overall	61.1%	**56.3%**	**56.1%**	**54.0%**	**54.1%**
123	Overall	57.9%	**57.4%**	**57.5%**	**56.2%**	**56.9%**
124	Overall	59.9%	**60.6%**	**60.1%**	**60.2%**	**59.8%**
125	Special	58.9%	**57.6%**	**56.7%**	**58.5%**	**57.7%**
126	Overall	38.1%	**45.8%**	**45.1%**	**45.9%**	**44.1%**
127	Special	59.9%	**59.7%**	**59.6%**	**60.2%**	**60.5%**
128	Special	51.8%	**53.9%**	**53.5%**	**54.0%**	**53.0%**
129	Special	51.0%	49.4%	48.4%	49.9%	46.6%
130	Special	47.0%	**51.7%**	**50.8%**	**48.1%**	**48.3%**
131	Special	45.9%	45.7%	45.5%	45.3%	**47.4%**

Bold values indicate wind availability of either 1.5m/s for at least 50% of the time or improved from existing conditions

Table 2c: Wind Availability for the Tamar Development (Summer conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Developme	**Configuration 3** Proposed Developme with Extensions	**Configuration 4** Proposed Developme with Mitigation	**Configuration 5** Proposed Developme with Mitigation and Extensions
1	Special	32.0%	Data not available	Data not available	Data not available	Data not available
2	Overall	33.2%	28.3%	27.6%	26.3%	27.8%
3	Overall	28.5%	14.8%	14.7%	13.8%	13.9%
4	Overall	31.8%	21.5%	19.5%	18.8%	19.3%
5	Overall	25.5%	21.1%	19.4%	18.1%	18.7%
6	Overall	27.2%	**28.1%**	25.6%	25.0%	23.6%
7	Overall	27.5%	26.1%	25.0%	24.8%	23.8%
8	Overall	32.4%	27.0%	24.3%	25.6%	25.9%
9	Overall	19.9%	17.3%	15.5%	16.8%	15.8%
10	Overall	24.3%	**24.7%**	23.1%	22.4%	21.2%
11	Overall	17.7%	**26.3%**	**24.3%**	**25.4%**	**23.8%**
12	Overall	24.8%	**33.7%**	**31.5%**	**32.7%**	**31.4%**
13	Overall	30.9%	28.6%	27.8%	27.3%	27.6%
14	Overall	24.7%	**26.8%**	**25.9%**	24.6%	**24.8%**
15	Overall	25.1%	**26.4%**	**25.1%**	24.7%	24.6%
16	Overall	28.9%	**29.0%**	27.7%	24.8%	28.7%
17	Perimeter	20.7%	**25.2%**	**23.0%**	**22.7%**	**23.2%**
18	Overall	36.9%	22.7%	21.5%	20.0%	20.9%
19	Overall	36.7%	25.7%	24.7%	23.4%	21.2%
20	Overall	31.6%	14.1%	13.2%	12.3%	12.1%
21	Overall	31.0%	15.5%	14.3%	14.0%	13.4%
22	Perimeter	34.7%	28.4%	28.0%	26.8%	25.7%
23	Perimeter	27.9%	25.5%	24.1%	22.8%	22.3%
24	Perimeter	29.2%	**30.2%**	28.5%	26.4%	27.4%
25	Perimeter	24.4%	**26.2%**	22.8%	23.2%	22.4%
26	Perimeter	27.0%	**30.9%**	**28.7%**	**28.6%**	**27.3%**
27	Perimeter	19.7%	**25.0%**	**23.7%**	**23.6%**	**24.3%**
28	Perimeter	22.3%	**25.8%**	**24.8%**	**26.7%**	**26.6%**
29	Perimeter	18.5%	**23.4%**	**22.1%**	**23.3%**	**23.9%**
30	Perimeter	22.8%	**23.5%**	21.4%	22.6%	21.4%
31	Perimeter	34.7%	29.1%	29.2%	25.4%	28.8%
32	Perimeter	35.5%	21.9%	22.2%	20.7%	22.7%
33	Perimeter	28.0%	16.0%	16.9%	15.2%	15.8%
34	Perimeter	28.5%	24.2%	26.9%	24.9%	26.3%
35	Perimeter	25.8%	**46.2%**	**48.6%**	**44.7%**	**46.0%**
36	Perimeter	28.1%	**32.7%**	**32.3%**	**28.2%**	**31.7%**
37	Perimeter	35.0%	29.1%	27.2%	24.9%	26.9%
38	Perimeter	25.2%	**36.6%**	**35.9%**	**33.5%**	**35.3%**
39	Overall	27.6%	25.9%	26.5%	22.9%	23.9%
40	Overall	34.6%	19.3%	18.3%	16.9%	17.4%
41	Special	35.1%	23.6%	20.6%	20.9%	19.4%
42	Special	31.0%	24.2%	22.4%	19.8%	19.4%
43	Overall	32.6%	23.0%	21.0%	19.6%	18.9%
44	Overall	25.8%	12.7%	11.2%	10.6%	10.3%
45	Overall	31.4%	11.9%	11.5%	10.5%	11.4%
46	Overall	35.9%	31.6%	28.5%	26.0%	25.0%
47	Overall	27.1%	**28.9%**	**28.3%**	24.4%	23.8%

Bold values indicate wind availability of either 1.5m/s for at least 50% of the time or improved from existing conditions

Table 2c: Wind Availability for the Tamar Development (Summer conditions)

Table 2c: Wind Availability for the Tamar Development (Summer conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Developme	**Configuration 3** Proposed Developme with Extensions	**Configuration 4** Proposed Developme with Mitigation	**Configuration 5** Proposed Developme with Mitigation and Extensions
48	Overall	27.0%	**28.0%**	**38.4%**	**30.8%**	**35.9%**
49	Overall	35.2%	16.4%	21.1%	20.5%	20.7%
50	Overall	29.4%	24.4%	22.2%	21.7%	22.0%
51	Overall	26.2%	16.5%	15.2%	14.6%	13.7%
52	Overall	20.1%	14.4%	13.6%	12.9%	13.4%
53	Overall	26.3%	20.4%	18.4%	17.7%	17.4%
54	Overall	28.0%	20.0%	18.1%	18.1%	17.1%
55	Overall	32.5%	23.3%	21.5%	18.6%	18.6%
56	Overall	34.1%	21.1%	18.7%	18.4%	17.8%
57	Overall	28.8%	14.4%	12.7%	19.3%	17.8%
58	Overall	30.4%	26.6%	24.8%	25.7%	24.9%
59	Overall	21.6%	**27.7%**	**26.4%**	**27.7%**	**27.7%**
60	Overall	24.0%	**33.0%**	**31.6%**	**32.6%**	**31.0%**
61	Overall	24.6%	**29.3%**	**27.5%**	**27.5%**	**26.5%**
62	Overall	25.9%	**28.5%**	**28.4%**	**26.0%**	**27.2%**
63	Overall	29.3%	**34.5%**	**32.6%**	**32.3%**	**31.8%**
64	Overall	26.1%	**30.1%**	**29.2%**	**31.6%**	**28.4%**
65	Overall	34.7%	29.4%	29.0%	29.6%	28.9%
66	Overall	41.4%	**42.0%**	41.1%	39.5%	40.4%
67	Overall	40.8%	**43.6%**	**43.6%**	**42.6%**	**44.7%**
68	Overall	40.3%	37.7%	36.7%	36.0%	36.9%
69	Overall	36.3%	34.5%	33.6%	33.3%	33.5%
70	Overall	28.7%	26.9%	26.8%	26.6%	26.6%
71	Overall	31.8%	**32.6%**	31.3%	**32.1%**	29.4%
72	Overall	18.9%	**22.1%**	**20.7%**	**21.0%**	**19.8%**
73	Overall	47.4%	47.2%	45.9%	46.9%	46.8%
74	Overall	31.5%	30.1%	29.5%	28.7%	28.9%
75	Overall	32.4%	**34.7%**	**34.0%**	**33.4%**	**33.0%**
76	Overall	30.1%	28.4%	27.2%	28.9%	25.7%
77	Overall	38.6%	37.0%	35.8%	37.3%	37.5%
78	Overall	37.6%	31.2%	29.9%	31.5%	28.9%
79	Overall	46.7%	43.3%	41.4%	41.2%	40.3%
80	Overall	39.4%	36.3%	35.0%	34.8%	34.8%
81	Overall	42.6%	41.1%	40.6%	39.9%	39.4%
82	Overall	38.3%	**39.4%**	**38.9%**	**38.5%**	38.0%
83	Overall	32.5%	**34.9%**	**34.2%**	**33.2%**	**33.5%**
84	Overall	39.6%	**39.6%**	**39.9%**	**39.6%**	39.5%
85	Overall	44.6%	**47.3%**	**46.3%**	**46.1%**	**47.8%**
86	Overall	31.8%	**32.2%**	**32.0%**	**33.3%**	**32.6%**
87	Overall	46.4%	46.1%	45.3%	44.8%	43.3%
88	Overall	39.8%	38.9%	38.2%	38.0%	38.5%
89	Overall	34.7%	30.5%	29.4%	30.0%	29.6%
90	Overall	36.4%	34.8%	34.9%	33.9%	34.9%
91	Overall	33.6%	**36.3%**	**36.2%**	**37.0%**	**36.8%**
92	Overall	30.9%	**33.7%**	**33.4%**	**34.2%**	**34.6%**
93	Overall	33.9%	33.3%	31.9%	31.6%	33.4%
94	Overall	37.3%	36.2%	35.8%	34.8%	35.1%
95	Overall	42.5%	**43.2%**	**42.9%**	41.5%	40.6%
96	Overall	43.5%	42.4%	41.7%	40.9%	40.6%
97	Overall	50.1%	47.4%	46.5%	45.4%	44.9%
98	Overall	43.3%	36.9%	36.2%	37.0%	35.7%
99	Overall	22.4%	**33.2%**	**35.2%**	**33.5%**	**35.3%**
100	Overall	41.1%	30.4%	28.3%	30.2%	28.5%
101	Overall	48.0%	**51.9%**	**49.8%**	**51.2%**	**50.6%**
102	Overall	20.5%	19.7%	19.4%	19.9%	19.6%
103	Overall	27.8%	**27.9%**	27.7%	24.9%	26.0%
104	Overall	29.8%	**32.0%**	**31.2%**	**31.5%**	**30.4%**
105	Overall	25.8%	24.3%	24.0%	23.9%	23.6%
106	Overall	38.8%	**41.5%**	**42.0%**	**41.0%**	**41.1%**
107	Overall	39.0%	**43.2%**	**43.0%**	**41.5%**	**42.0%**
108	Overall	45.8%	**48.7%**	**48.0%**	**47.8%**	**47.7%**
109	Special	25.3%	23.1%	23.0%	22.7%	22.5%
110	Overall	34.1%	**35.5%**	**35.1%**	**35.1%**	**35.3%**
111	Overall	43.4%	43.2%	42.7%	42.1%	41.2%
112	Overall	10.8%	**11.9%**	**10.8%**	**11.4%**	**11.2%**
113	Overall	28.4%	27.2%	26.8%	27.1%	26.4%
114	Overall	39.3%	34.3%	34.0%	35.2%	35.0%
115	Overall	32.2%	27.8%	26.4%	27.2%	27.6%
116	Overall	37.1%	35.5%	35.5%	35.9%	36.2%
117	Overall	36.5%	30.9%	30.2%	30.0%	30.0%
118	Overall	35.5%	29.2%	28.7%	28.6%	29.0%
119	Overall	27.9%	25.8%	25.1%	24.8%	23.9%
120	Overall	38.8%	**39.4%**	38.6%	**39.3%**	**38.8%**
121	Overall	44.4%	43.1%	41.9%	42.5%	43.4%
122	Overall	49.7%	49.4%	**49.8%**	47.9%	47.9%
123	Overall	49.8%	**51.4%**	**51.7%**	**50.9%**	**51.9%**
124	Overall	50.1%	**51.8%**	**51.2%**	**51.6%**	**50.8%**
125	Special	45.7%	44.7%	43.5%	45.4%	**45.9%**
126	Overall	33.4%	**38.9%**	**39.4%**	**40.6%**	**38.6%**
127	Special	51.0%	49.9%	48.9%	49.8%	49.2%
128	Special	42.8%	**45.4%**	**44.2%**	**43.9%**	**42.8%**
129	Special	44.6%	43.5%	42.2%	43.6%	41.1%
130	Special	40.7%	**43.8%**	**42.7%**	40.0%	40.3%
131	Special	49.5%	48.4%	48.8%	48.4%	**49.7%**

Bold values indicate wind availability of either 1.5m/s for at least 50% of the time or improved from existing conditions

Bold values indicate wind availability of either 1.5m/s for at least 50% of the time or improved from existing conditions

Table 2d: Wind Availability for the Tamar Development (Autumn conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
1	Special	59.9%	Data not available	Data not available	Data not available	Data not available
2	Overall	62.6%	**62.2%**	**62.4%**	**61.9%**	**62.4%**
3	Overall	61.6%	44.7%	43.8%	43.8%	43.6%
4	Overall	60.2%	43.0%	40.4%	41.3%	42.1%
5	Overall	56.8%	49.1%	45.5%	47.9%	46.9%
6	Overall	54.6%	**57.4%**	**53.9%**	**56.2%**	**53.7%**
7	Overall	54.3%	47.0%	43.5%	46.1%	45.2%
8	Overall	53.0%	**50.8%**	46.4%	**52.1%**	**50.3%**
9	Overall	47.0%	**49.8%**	46.1%	**49.5%**	**47.4%**
10	Overall	52.8%	**58.7%**	**55.0%**	**57.2%**	**54.5%**
11	Overall	47.0%	**59.5%**	**56.0%**	**58.8%**	**56.0%**
12	Overall	46.9%	**61.8%**	**58.4%**	**60.6%**	**59.2%**
13	Overall	53.2%	**60.6%**	**57.1%**	**56.2%**	**56.9%**
14	Overall	56.1%	**64.0%**	**61.9%**	**60.7%**	**60.8%**
15	Overall	50.3%	**53.8%**	**52.0%**	**50.4%**	**51.3%**
16	Overall	54.9%	**59.0%**	**57.1%**	**54.2%**	**59.0%**
17	Perimeter	46.8%	**48.5%**	43.1%	44.0%	44.0%
18	Overall	59.1%	37.8%	35.0%	35.1%	36.6%
19	Overall	58.3%	**50.1%**	**51.3%**	46.2%	47.5%
20	Overall	62.2%	29.5%	29.1%	29.0%	29.5%
21	Overall	62.1%	38.4%	37.0%	37.8%	37.0%
22	Perimeter	62.1%	**52.3%**	**51.4%**	**51.7%**	49.6%
23	Perimeter	56.5%	**53.9%**	**52.2%**	**50.2%**	49.4%
24	Perimeter	52.9%	**56.6%**	**54.1%**	**51.2%**	**52.2%**
25	Perimeter	53.1%	**58.8%**	**53.1%**	**53.3%**	**51.1%**
26	Perimeter	52.7%	**60.7%**	**58.2%**	**59.4%**	**57.6%**
27	Perimeter	47.4%	**57.3%**	**54.7%**	**56.2%**	**55.7%**
28	Perimeter	45.2%	**53.8%**	**52.2%**	**54.9%**	**53.6%**
29	Perimeter	43.9%	**49.0%**	**46.1%**	**48.8%**	**48.4%**
30	Perimeter	48.4%	41.3%	35.6%	38.0%	37.0%
31	Perimeter	61.5%	46.0%	47.6%	41.0%	46.9%
32	Perimeter	55.9%	37.4%	43.2%	36.8%	44.2%
33	Perimeter	50.1%	36.5%	37.2%	35.6%	37.4%
34	Perimeter	45.1%	**51.9%**	**59.5%**	**55.5%**	**59.4%**
35	Perimeter	48.6%	**73.4%**	**77.1%**	**74.5%**	**76.3%**
36	Perimeter	59.2%	**64.0%**	**65.5%**	**57.8%**	**65.2%**
37	Perimeter	66.3%	**62.4%**	**61.1%**	**59.2%**	**61.1%**
38	Perimeter	52.8%	**69.7%**	**70.1%**	**68.1%**	**69.0%**
39	Overall	58.2%	**60.8%**	**62.1%**	**57.4%**	**59.2%**
40	Overall	64.1%	41.6%	41.4%	39.1%	41.7%
41	Special	68.4%	**58.2%**	**53.6%**	**55.1%**	**52.0%**
42	Special	61.4%	**55.2%**	**52.1%**	**50.0%**	49.2%
43	Overall	56.6%	47.2%	44.0%	44.6%	42.6%
44	Overall	50.6%	39.0%	35.5%	31.8%	31.4%
45	Overall	56.2%	27.1%	23.1%	20.1%	19.5%
46	Overall	56.5%	**64.5%**	**60.8%**	**55.8%**	**53.8%**
47	Overall	55.8%	36.8%	36.9%	30.0%	29.0%
48	Overall	58.5%	39.1%	**59.8%**	**51.2%**	**58.0%**
49	Overall	71.8%	40.1%	47.7%	49.1%	48.6%
50	Overall	51.6%	40.1%	37.3%	37.8%	39.9%
51	Overall	53.9%	39.5%	38.8%	37.1%	36.4%
52	Overall	51.3%	43.6%	42.3%	41.9%	43.2%
53	Overall	55.6%	46.2%	43.3%	43.7%	43.1%
54	Overall	59.2%	44.7%	41.7%	44.1%	42.7%
55	Overall	60.0%	48.4%	46.6%	41.4%	43.0%
56	Overall	61.7%	40.2%	36.8%	37.5%	36.6%
57	Overall	56.5%	20.5%	17.2%	47.3%	44.2%
58	Overall	54.0%	**50.4%**	48.4%	**50.7%**	49.6%
59	Overall	48.1%	**62.2%**	**60.2%**	**62.8%**	**61.8%**
60	Overall	51.7%	**66.4%**	**64.2%**	**66.0%**	**64.0%**
61	Overall	54.4%	**62.6%**	**60.7%**	**61.8%**	**60.4%**
62	Overall	49.2%	**56.5%**	**56.7%**	**53.5%**	**54.1%**
63	Overall	55.0%	**67.4%**	**65.2%**	**65.3%**	**64.0%**
64	Overall	50.3%	**61.4%**	**59.6%**	**62.8%**	**59.5%**
65	Overall	57.1%	49.2%	48.6%	49.6%	49.2%
66	Overall	65.7%	**65.4%**	**63.8%**	**63.0%**	**64.3%**
67	Overall	59.6%	**59.8%**	**58.9%**	**57.7%**	**60.4%**
68	Overall	60.4%	**56.6%**	**54.6%**	**52.6%**	**54.7%**
69	Overall	56.5%	**55.9%**	**54.1%**	**53.5%**	**55.1%**
70	Overall	41.7%	40.4%	40.3%	40.4%	41.5%
71	Overall	53.2%	**53.3%**	**51.3%**	**51.4%**	47.7%
72	Overall	44.5%	**53.1%**	**49.7%**	**49.2%**	**48.0%**
73	Overall	62.7%	**61.6%**	**59.0%**	**59.8%**	**59.6%**
74	Overall	52.6%	**51.6%**	**50.2%**	48.6%	**50.5%**
75	Overall	47.2%	**58.4%**	**56.7%**	**56.1%**	**56.4%**
76	Overall	60.3%	**52.5%**	**50.7%**	**52.3%**	48.4%
77	Overall	59.2%	**58.6%**	**56.8%**	**58.8%**	**59.4%**
78	Overall	61.5%	**52.1%**	47.5%	**50.4%**	46.5%
79	Overall	68.3%	**62.9%**	**58.9%**	**59.0%**	**58.1%**
80	Overall	66.6%	**61.8%**	**58.0%**	**58.2%**	**56.9%**
81	Overall	66.1%	**67.4%**	**66.8%**	**65.4%**	**65.8%**
82	Overall	58.4%	**59.6%**	**57.5%**	**56.6%**	**55.5%**
83	Overall	55.7%	**59.3%**	**58.7%**	**55.8%**	**57.2%**
84	Overall	69.4%	**71.2%**	**71.1%**	**69.9%**	**70.3%**
85	Overall	61.7%	**66.0%**	**65.0%**	**63.1%**	**65.0%**
86	Overall	46.7%	43.3%	42.5%	43.6%	43.0%
87	Overall	59.5%	**58.5%**	**58.4%**	**56.8%**	**56.8%**
88	Overall	56.0%	**55.5%**	**55.4%**	**54.5%**	**55.8%**
89	Overall	51.5%	49.3%	46.6%	48.5%	48.5%
90	Overall	62.9%	**62.0%**	**62.0%**	**59.6%**	**61.3%**
91	Overall	59.0%	**59.2%**	**59.7%**	**59.9%**	**59.8%**
92	Overall	57.1%	**58.4%**	**57.9%**	**58.2%**	**59.3%**
93	Overall	56.0%	**57.4%**	**55.5%**	**54.8%**	**58.2%**
94	Overall	75.6%	**74.7%**	**74.0%**	**73.3%**	**73.9%**
95	Overall	71.5%	**73.0%**	**72.7%**	**71.6%**	**71.1%**
96	Overall	74.7%	**74.0%**	**73.0%**	**72.6%**	**72.4%**

Bold values indicate wind availability of either 1.5m/s for at least 50% of the time or improved from existing conditions

Table 2d: Wind Availability for the Tamar Development (Autumn conditions)

Bold values indicate wind availability of either 1.5m/s for at least 50% of the time or improved from existing conditions

Table 2d: Wind Availability for the Tamar Development (Autumn conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
97	Overall	75.3%	**74.2%**	**72.6%**	**71.5%**	**71.3%**
98	Overall	71.4%	**58.7%**	**57.4%**	**59.5%**	**58.1%**
99	Overall	40.8%	**69.7%**	**72.3%**	**69.8%**	**72.3%**
100	Overall	64.1%	**53.5%**	**50.0%**	**52.0%**	**50.1%**
101	Overall	58.3%	**59.6%**	**56.6%**	**59.0%**	**57.2%**
102	Overall	33.5%	32.7%	31.8%	32.5%	33.0%
103	Overall	44.4%	**47.2%**	**46.0%**	41.8%	43.5%
104	Overall	44.9%	**48.4%**	**47.3%**	**46.1%**	44.0%
105	Overall	35.4%	34.9%	34.0%	33.5%	34.7%
106	Overall	60.6%	**64.2%**	**63.9%**	**62.0%**	**62.8%**
107	Overall	51.0%	**53.1%**	**53.2%**	**50.4%**	**51.0%**
108	Overall	44.6%	**45.7%**	**45.5%**	43.9%	44.5%
109	Special	35.8%	**36.1%**	35.3%	35.1%	**36.3%**
110	Overall	43.5%	**45.8%**	**44.8%**	**44.2%**	**45.3%**
111	Overall	53.6%	**50.1%**	**50.4%**	49.8%	49.7%
112	Overall	24.4%	23.8%	22.9%	23.2%	22.5%
113	Overall	42.6%	41.6%	40.6%	41.4%	40.7%
114	Overall	56.5%	49.9%	48.9%	49.7%	**51.6%**
115	Overall	61.4%	47.3%	44.0%	45.8%	47.0%
116	Overall	52.9%	**50.9%**	**50.4%**	**50.2%**	**50.9%**
117	Overall	62.1%	**52.7%**	**50.9%**	**51.3%**	**52.7%**
118	Overall	59.5%	46.4%	44.3%	43.5%	42.9%
119	Overall	50.4%	45.2%	44.3%	44.1%	44.3%
120	Overall	55.0%	**55.7%**	**55.1%**	**54.4%**	**54.6%**
121	Overall	53.4%	**53.3%**	**51.7%**	**52.3%**	**53.2%**
122	Overall	66.9%	**64.6%**	**64.6%**	**61.8%**	**62.1%**
123	Overall	64.1%	**65.1%**	**65.5%**	**63.8%**	**65.1%**
124	Overall	63.1%	**64.0%**	**63.3%**	**63.6%**	**63.3%**
125	Special	71.0%	**69.2%**	**68.4%**	**70.4%**	**68.9%**
126	Overall	48.9%	**54.6%**	**53.4%**	**54.6%**	**53.0%**
127	Special	72.0%	**72.3%**	**72.6%**	**73.1%**	**73.6%**
128	Special	64.3%	**66.9%**	**66.8%**	**67.2%**	**66.4%**
129	Special	62.9%	**62.2%**	**61.3%**	**61.9%**	**59.6%**
130	Special	59.7%	**64.4%**	**63.5%**	**61.1%**	**61.5%**
131	Special	60.8%	**60.4%**	**60.3%**	**60.1%**	**62.8%**

Bold values indicate wind availability of either 1.5m/s for at least 50% of the time or improved from existing conditions

Table 2e: Wind Availability for the Tamar Development (Winter conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
1	Special	69.2%	Data not available	Data not available	Data not available	Data not available
2	Overall	73.8%	**70.8%**	**70.8%**	**70.8%**	**70.0%**
3	Overall	72.1%	**56.8%**	**56.2%**	**56.8%**	**56.7%**
4	Overall	71.2%	**50.4%**	48.3%	49.6%	**51.5%**
5	Overall	69.8%	**64.0%**	**59.7%**	**63.2%**	**62.2%**
6	Overall	68.0%	**69.1%**	**66.8%**	**69.2%**	**68.0%**
7	Overall	67.9%	**54.9%**	**51.1%**	**55.4%**	**54.7%**
8	Overall	63.9%	**63.3%**	**58.8%**	**66.8%**	**64.5%**
9	Overall	57.7%	**67.5%**	**63.6%**	**67.4%**	**65.1%**
10	Overall	65.9%	**73.4%**	**70.3%**	**72.4%**	**70.7%**
11	Overall	57.6%	**74.0%**	**71.6%**	**73.5%**	**71.6%**
12	Overall	53.4%	**75.8%**	**73.6%**	**75.1%**	**74.3%**
13	Overall	62.0%	**68.6%**	**65.1%**	**65.4%**	**65.6%**
14	Overall	67.9%	**73.3%**	**71.3%**	**71.5%**	**72.1%**
15	Overall	53.8%	**60.3%**	**58.8%**	**58.8%**	**59.3%**
16	Overall	63.7%	**67.5%**	**65.7%**	**65.2%**	**68.0%**
17	Perimeter	52.2%	**57.3%**	**52.1%**	**54.0%**	**53.8%**
18	Overall	66.2%	39.6%	32.9%	38.7%	39.9%
19	Overall	66.6%	**57.5%**	**59.5%**	**54.3%**	**56.0%**
20	Overall	72.1%	29.2%	29.1%	29.7%	30.3%
21	Overall	72.0%	45.7%	44.2%	45.8%	44.2%
22	Perimeter	72.3%	**60.7%**	**57.3%**	**61.2%**	**59.4%**
23	Perimeter	66.1%	**63.2%**	**65.2%**	**60.1%**	**58.6%**
24	Perimeter	64.2%	**67.3%**	**66.0%**	**63.7%**	**64.0%**
25	Perimeter	67.7%	**67.8%**	**64.6%**	**58.6%**	**57.2%**
26	Perimeter	66.2%	**72.9%**	**71.1%**	**71.8%**	**71.0%**
27	Perimeter	60.2%	**71.0%**	**69.3%**	**69.7%**	**69.5%**
28	Perimeter	53.6%	**68.1%**	**66.9%**	**68.3%**	**67.5%**
29	Perimeter	51.6%	**62.7%**	**60.3%**	**62.6%**	**62.1%**
30	Perimeter	57.2%	45.4%	39.7%	43.1%	43.1%
31	Perimeter	67.8%	48.0%	49.6%	45.0%	**50.0%**
32	Perimeter	62.9%	36.5%	46.4%	36.9%	47.2%
33	Perimeter	58.7%	37.6%	37.1%	37.6%	39.5%
34	Perimeter	54.8%	**60.6%**	**67.5%**	**63.6%**	**68.5%**
35	Perimeter	61.7%	**81.5%**	**83.9%**	**81.6%**	**83.5%**
36	Perimeter	72.5%	**70.8%**	**72.4%**	**61.4%**	**72.9%**
37	Perimeter	71.4%	**74.0%**	**73.6%**	**71.6%**	**73.7%**
38	Perimeter	66.4%	**74.2%**	**74.5%**	**73.4%**	**74.1%**
39	Overall	70.9%	**62.8%**	**63.7%**	**60.5%**	**62.0%**
40	Overall	73.5%	44.1%	44.5%	42.2%	46.3%
41	Special	76.9%	**70.6%**	**66.2%**	**67.7%**	**64.2%**
42	Special	73.8%	**65.2%**	**61.3%**	**61.4%**	**60.7%**
43	Overall	69.2%	**59.8%**	**55.6%**	**57.6%**	**53.2%**
44	Overall	63.0%	49.7%	44.0%	35.1%	34.4%
45	Overall	65.9%	25.1%	18.8%	15.5%	15.1%
46	Overall	67.9%	**75.9%**	**72.9%**	**65.0%**	**59.5%**
47	Overall	69.6%	36.3%	37.4%	27.1%	24.9%
48	Overall	71.6%	43.6%	**60.1%**	48.4%	**56.3%**

Bold values indicate wind availability of either 1.5m/s for at least 50% of the time or improved from existing conditions

Table 2e: Wind Availability for the Tamar Development (Winter conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
49	Overall	79.1%	46.7%	**50.0%**	48.9%	**50.2%**
50	Overall	62.8%	46.0%	42.9%	44.0%	48.0%
51	Overall	66.5%	49.0%	48.6%	45.5%	44.4%
52	Overall	65.1%	**56.4%**	**55.6%**	**55.3%**	**56.9%**
53	Overall	69.3%	**57.3%**	**54.6%**	**55.5%**	**54.5%**
54	Overall	71.6%	48.3%	45.3%	48.2%	47.8%
55	Overall	71.3%	**59.4%**	**58.1%**	49.5%	**53.5%**
56	Overall	71.6%	45.4%	39.6%	43.6%	42.4%
57	Overall	67.4%	15.7%	12.5%	**55.1%**	**52.9%**
58	Overall	60.0%	**57.9%**	**56.5%**	**58.4%**	**57.7%**
59	Overall	61.9%	**74.6%**	**73.5%**	**75.5%**	**74.9%**
60	Overall	65.0%	**78.0%**	**77.0%**	**77.6%**	**76.5%**
61	Overall	62.0%	**75.0%**	**74.1%**	**74.5%**	**73.6%**
62	Overall	58.9%	**69.2%**	**69.9%**	**66.6%**	**67.4%**
63	Overall	68.9%	**77.6%**	**76.5%**	**75.0%**	**74.1%**
64	Overall	56.2%	**74.8%**	**73.8%**	**75.3%**	**73.1%**
65	Overall	61.4%	**51.7%**	**51.7%**	**51.9%**	**52.0%**
66	Overall	75.4%	**77.7%**	**76.7%**	**76.2%**	**77.3%**
67	Overall	66.9%	**70.4%**	**69.7%**	**69.1%**	**70.3%**
68	Overall	67.1%	**67.0%**	**65.5%**	**64.0%**	**65.3%**
69	Overall	63.4%	**64.0%**	**62.7%**	**62.8%**	**63.7%**
70	Overall	42.3%	41.3%	41.6%	42.1%	**43.5%**
71	Overall	57.7%	**61.9%**	**60.6%**	**60.4%**	**55.4%**
72	Overall	47.5%	**62.5%**	**59.9%**	**59.7%**	**58.5%**
73	Overall	74.5%	**71.0%**	**68.6%**	**70.1%**	**69.6%**
74	Overall	57.6%	**55.3%**	**54.1%**	**53.7%**	**55.2%**
75	Overall	49.7%	**64.6%**	**63.0%**	**63.4%**	**63.4%**
76	Overall	68.2%	**58.6%**	**56.7%**	**59.2%**	**55.1%**
77	Overall	73.4%	**71.5%**	**70.6%**	**72.1%**	**72.8%**
78	Overall	65.1%	**52.5%**	46.3%	**51.4%**	46.3%
79	Overall	71.8%	**63.0%**	**59.8%**	**60.4%**	**60.8%**
80	Overall	68.1%	**62.6%**	**55.6%**	**58.5%**	**55.0%**
81	Overall	66.2%	**68.7%**	**68.3%**	**66.4%**	**68.0%**
82	Overall	64.8%	**63.9%**	**61.5%**	**61.6%**	**59.3%**
83	Overall	57.9%	**65.4%**	**65.3%**	**62.0%**	**63.9%**
84	Overall	76.6%	**79.3%**	**79.4%**	**78.3%**	**78.9%**
85	Overall	68.9%	**73.8%**	**73.0%**	**71.5%**	**72.7%**
86	Overall	58.2%	49.6%	48.1%	49.9%	49.2%
87	Overall	70.6%	**66.6%**	**66.6%**	**65.0%**	**65.9%**
88	Overall	69.8%	**68.4%**	**68.7%**	**68.4%**	**69.3%**
89	Overall	57.1%	**56.4%**	**53.2%**	**55.6%**	**56.0%**
90	Overall	58.0%	**57.1%**	**57.8%**	**54.2%**	**56.8%**
91	Overall	67.0%	**70.9%**	**71.7%**	**70.9%**	**71.2%**
92	Overall	71.2%	**72.9%**	**72.5%**	**72.8%**	**74.1%**
93	Overall	59.2%	**60.7%**	**59.1%**	**60.0%**	**63.7%**
94	Overall	81.6%	**80.5%**	**79.9%**	**79.2%**	**80.1%**
95	Overall	75.0%	**79.9%**	**80.1%**	**78.7%**	**79.3%**
96	Overall	80.3%	**78.8%**	**77.7%**	**77.5%**	**77.6%**

Bold values indicate wind availability of either 1.5m/s for at least 50% of the time or improved from existing conditions

Table 2e: Wind Availability for the Tamar Development (Winter conditions)

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
97	Overall	78.8%	**76.8%**	**75.2%**	**74.4%**	**74.4%**
98	Overall	76.9%	**68.2%**	**68.0%**	**68.9%**	**69.4%**
99	Overall	51.2%	**79.3%**	**80.8%**	**79.2%**	**80.7%**
100	Overall	65.7%	**56.4%**	**55.3%**	**57.2%**	**56.1%**
101	Overall	69.9%	**67.8%**	**64.5%**	**67.7%**	**65.4%**
102	Overall	32.7%	31.0%	29.5%	30.5%	31.2%
103	Overall	41.8%	41.7%	40.5%	38.1%	39.4%
104	Overall	47.3%	47.0%	45.9%	46.0%	42.3%
105	Overall	33.0%	**34.4%**	32.3%	31.9%	**33.4%**
106	Overall	67.9%	**66.1%**	**65.7%**	**64.4%**	**64.3%**
107	Overall	50.1%	49.9%	**51.1%**	47.2%	46.6%
108	Overall	39.8%	39.2%	39.4%	37.4%	38.3%
109	Special	33.2%	**35.6%**	**35.2%**	**33.5%**	**35.2%**
110	Overall	47.6%	**50.3%**	**49.4%**	**48.9%**	**50.7%**
111	Overall	65.1%	**63.3%**	**63.8%**	**63.6%**	**63.5%**
112	Overall	28.6%	26.4%	25.4%	25.9%	24.7%
113	Overall	46.9%	45.8%	41.9%	45.5%	42.0%
114	Overall	69.0%	**60.3%**	**59.0%**	**60.0%**	**62.8%**
115	Overall	72.1%	**55.7%**	**52.8%**	**54.9%**	**56.2%**
116	Overall	65.6%	**63.1%**	**62.6%**	**62.3%**	**62.7%**
117	Overall	73.7%	**61.9%**	**60.6%**	**61.1%**	**62.3%**
118	Overall	70.5%	**57.4%**	**55.2%**	**54.9%**	**53.2%**
119	Overall	63.8%	**57.8%**	**57.2%**	**56.7%**	**56.5%**
120	Overall	65.4%	**66.9%**	**66.6%**	**65.7%**	**65.6%**
121	Overall	63.7%	**65.1%**	**63.6%**	**64.6%**	**64.9%**
122	Overall	77.8%	**72.5%**	**72.3%**	**70.6%**	**67.3%**
123	Overall	75.5%	**74.4%**	**74.4%**	**73.3%**	**73.1%**
124	Overall	76.0%	**76.5%**	**76.2%**	**76.1%**	**76.0%**
125	Special	77.1%	**76.1%**	**75.6%**	**76.7%**	**76.2%**
126	Overall	56.7%	**64.7%**	**63.9%**	**64.5%**	**62.6%**
127	Special	77.0%	**76.9%**	**77.0%**	**77.3%**	**78.1%**
128	Special	70.2%	**71.1%**	**70.8%**	**71.9%**	**71.5%**
129	Special	68.1%	**66.5%**	**65.8%**	**64.3%**	**61.2%**
130	Special	63.3%	**67.9%**	**67.2%**	**65.3%**	**64.6%**
131	Special	58.6%	**58.9%**	**58.0%**	**58.2%**	**60.1%**

Bold values indicate wind availability of either 1.5m/s for at least 50% of the time or improved from existing conditions

Table 3: Pedestrian Level Wind Conditions for the Tamar Development

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
1	Spring	Standing (90.6%)	Data not available	Data not available	Data not available	Data not available
	Summer	Sitting (82.7%)	Data not available	Data not available	Data not available	Data not available
	Fall	Standing (83%)	Data not available	Data not available	Data not available	Data not available
	Winter	Standing (86.6%)	Data not available	Data not available	Data not available	Data not available
	Annual	Standing (88.9%)	Data not available	Data not available	Data not available	Data not available
2	Spring	Standing (88.6%)	Standing (88.4%)	Standing (87.5%)	Standing (88.6%)	Standing (87.6%)
	Summer	Sitting (83.3%)	Sitting (84.1%)	Sitting (84.3%)	Sitting (85.7%)	Sitting (85%)
	Fall	Standing (80.1%)	Standing (82.2%)	Standing (81.4%)	Standing (82.6%)	Standing (81.5%)
	Winter	Standing (82.5%)	Standing (84.3%)	Standing (82.8%)	Standing (84.1%)	Standing (83%)
	Annual	Standing (86.5%)	Standing (86.7%)	Standing (86%)	Standing (87.8%)	Standing (86.2%)
3	Spring	Standing (89.2%)	Sitting (84.1%)	Sitting (84.4%)	Sitting (83.9%)	Sitting (83.9%)
	Summer	Sitting (86.4%)	Sitting (92.4%)	Sitting (92.6%)	Sitting (92.8%)	Sitting (92.9%)
	Fall	Standing (80.8%)	Standing (91%)	Standing (90.9%)	Standing (90.5%)	Standing (90.8%)
	Winter	Standing (83.7%)	Standing (93.2%)	Standing (92.8%)	Standing (92.2%)	Standing (92.7%)
	Annual	Standing (86.9%)	Standing (93.9%)	Sitting (81%)	Sitting (80.2%)	Sitting (80.6%)
4	Spring	Standing (87.8%)	Sitting (85.2%)	Sitting (86.7%)	Sitting (85.2%)	Sitting (85.5%)
	Summer	Sitting (83%)	Sitting (89.9%)	Sitting (90.8%)	Sitting (91.1%)	Sitting (91.1%)
	Fall	Walking (93.1%)	Standing (90.7%)	Standing (92.4%)	Standing (91.5%)	Standing (91.4%)
	Winter	Standing (81.1%)	Standing (94.2%)	Standing (95%)	Standing (94.1%)	Standing (93.9%)
	Annual	Standing (85.2%)	Sitting (80.3%)	Sitting (82.5%)	Sitting (80.8%)	Sitting (81.1%)
5	Spring	Standing (88%)	Sitting (80.7%)	Sitting (83%)	Sitting (80.6%)	Sitting (80.9%)
	Summer	Sitting (86.1%)	Sitting (90.3%)	Sitting (91.3%)	Sitting (91.4%)	Sitting (91.5%)
	Fall	Standing (80.2%)	Standing (85.1%)	Standing (87%)	Standing (84.3%)	Standing (84.7%)
	Winter	Standing (81.4%)	Standing (87.4%)	Standing (89.6%)	Standing (86.1%)	Standing (86.5%)
	Annual	Standing (85.9%)	Standing (90%)	Standing (91.4%)	Standing (89.5%)	Standing (89.9%)
6	Spring	Standing (89.3%)	Standing (88.4%)	Standing (90.3%)	Standing (88.8%)	Standing (89.8%)
	Summer	Sitting (85.3%)	Sitting (85.5%)	Sitting (87.2%)	Sitting (87%)	Sitting (88%)
	Fall	Standing (81.8%)	Walking (92.5%)	Standing (81.6%)	Walking (92.5%)	Standing (80.9%)
	Winter	Standing (83.4%)	Standing (81.3%)	Standing (83.9%)	Standing (81.3%)	Standing (82.6%)
	Annual	Standing (87.5%)	Standing (85.2%)	Standing (87.5%)	Standing (85.5%)	Standing (86.9%)
7	Spring	Standing (88.7%)	Sitting (82.6%)	Sitting (85.4%)	Sitting (83.4%)	Sitting (84.4%)
	Summer	Sitting (84.5%)	Sitting (88.3%)	Sitting (89.6%)	Sitting (89.9%)	Sitting (90.4%)
	Fall	Standing (81.1%)	Standing (88.9%)	Standing (90.7%)	Standing (89.4%)	Standing (90.1%)
	Winter	Standing (81.9%)	Standing (92.1%)	Standing (93.7%)	Standing (92.2%)	Standing (93.1%)
	Annual	Standing (86.8%)	Standing (93.1%)	Sitting (80.7%)	Standing (93.4%)	Sitting (80.1%)
8	Spring	Standing (89.7%)	Standing (94.2%)	Sitting (83.6%)	Standing (91.7%)	Standing (92.5%)
	Summer	Sitting (80.7%)	Sitting (84.9%)	Sitting (87%)	Sitting (86.1%)	Sitting (86.8%)
	Fall	Standing (81.8%)	Standing (86.9%)	Standing (90%)	Standing (84.7%)	Standing (85.7%)
	Winter	Standing (84%)	Standing (90.2%)	Standing (93.2%)	Standing (86.9%)	Standing (88%)
	Annual	Standing (87.4%)	Standing (91.7%)	Standing (93.7%)	Standing (89.8%)	Standing (90.5%)
9	Spring	Standing (92.9%)	Standing (90.9%)	Sitting (80.1%)	Standing (89.8%)	Standing (90.6%)
	Summer	Sitting (88.9%)	Sitting (91%)	Sitting (92.2%)	Sitting (91.4%)	Sitting (91.9%)
	Fall	Standing (86.2%)	Standing (81.1%)	Standing (83.9%)	Standing (80.8%)	Standing (81.7%)
	Winter	Standing (88.9%)	Standing (80.1%)	Standing (83.3%)	Walking (93.9%)	Standing (80.4%)
	Annual	Standing (90.9%)	Standing (86.7%)	Standing (88.8%)	Standing (86.4%)	Standing (87%)
10	Spring	Standing (91.2%)	Standing (85.5%)	Standing (88%)	Standing (85.9%)	Standing (86.9%)
	Summer	Sitting (88.1%)	Sitting (86.5%)	Sitting (88.3%)	Sitting (87.7%)	Sitting (88.7%)
	Fall	Standing (84%)	Walking (89.3%)	Walking (91.2%)	Walking (89.6%)	Walking (89.6%)
	Winter	Standing (85.9%)	Walking (90.7%)	Walking (92.9%)	Walking (91.2%)	Walking (91.4%)
	Annual	Standing (89.2%)	Standing (82%)	Standing (84.5%)	Standing (82.5%)	Standing (83.4%)

Table 3: Pedestrian Level Wind Conditions for the Tamar Development

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
11	Spring	Sitting (80.3%)	Standing (86%)	Standing (88.9%)	Standing (86%)	Standing (88.2%)
	Summer	Sitting (90.8%)	Sitting (86.4%)	Sitting (88.2%)	Sitting (87.1%)	Sitting (88.2%)
	Fall	Standing (86.8%)	Walking (91.5%)	Standing (81.7%)	Walking (91.2%)	Standing (81.1%)
	Winter	Standing (89.7%)	Walking (92.8%)	Standing (82.1%)	Walking (92.5%)	Standing (81.5%)
	Annual	Standing (91.5%)	Standing (83.9%)	Standing (87.2%)	Standing (83.9%)	Standing (86.6%)
12	Spring	Standing (93.5%)	Standing (83.4%)	Standing (86%)	Standing (84.3%)	Standing (84.6%)
	Summer	Sitting (87%)	Sitting (81.6%)	Sitting (83.3%)	Sitting (82.7%)	Sitting (83.3%)
	Fall	Standing (86.4%)	Walking (88.5%)	Walking (90.4%)	Walking (89.2%)	Walking (89.3%)
	Winter	Standing (90.4%)	Walking (89.8%)	Walking (91.7%)	Walking (90.3%)	Walking (90.3%)
	Annual	Standing (91.5%)	Standing (80%)	Standing (82.5%)	Standing (80.9%)	Standing (81.3%)
13	Spring	Standing (92.3%)	Standing (86.7%)	Standing (89.2%)	Standing (88.3%)	Standing (88.1%)
	Summer	Sitting (83.9%)	Sitting (83.8%)	Sitting (85.1%)	Sitting (85.3%)	Sitting (84.8%)
	Fall	Standing (84.5%)	Walking (92.4%)	Standing (80.5%)	Walking (93.1%)	Standing (80%)
	Winter	Standing (88.2%)	Walking (95.1%)	Standing (83.5%)	Standing (81.4%)	Standing (82%)
	Annual	Standing (90%)	Standing (84%)	Standing (86.6%)	Standing (85.7%)	Standing (86.4%)
14	Spring	Standing (91.9%)	Standing (89.8%)	Standing (91.2%)	Standing (91.5%)	Standing (91%)
	Summer	Sitting (86.9%)	Sitting (86.2%)	Sitting (87%)	Sitting (88%)	Sitting (87.7%)
	Fall	Standing (82.9%)	Walking (93.8%)	Standing (81.7%)	Standing (82%)	Standing (81.5%)
	Winter	Standing (86.1%)	Standing (83%)	Standing (85.4%)	Standing (85.2%)	Standing (84.7%)
	Annual	Standing (89.3%)	Standing (86%)	Standing (88.2%)	Standing (88.6%)	Standing (88.3%)
15	Spring	Standing (92.4%)	Sitting (81.9%)	Sitting (83.5%)	Sitting (83.2%)	Sitting (82.5%)
	Summer	Sitting (85.9%)	Sitting (88.7%)	Sitting (89.6%)	Sitting (90.1%)	Sitting (89.9%)
	Fall	Standing (85.1%)	Standing (89.6%)	Standing (90.9%)	Standing (90.4%)	Standing (90.1%)
	Winter	Standing (88.2%)	Standing (93.2%)	Standing (94.1%)	Standing (93.4%)	Standing (92.9%)
	Annual	Standing (90.3%)	Standing (93.6%)	Standing (94.3%)	Standing (94%)	Standing (93.6%)
16	Spring	Standing (91.2%)	Standing (92.6%)	Standing (94.1%)	Standing (94.3%)	Standing (93.9%)
	Summer	Sitting (84.7%)	Sitting (86.1%)	Sitting (87.5%)	Sitting (88.7%)	Sitting (88%)
	Fall	Standing (82.3%)	Standing (84.7%)	Standing (87%)	Standing (87.2%)	Standing (86.6%)
	Winter	Standing (85.3%)	Standing (89%)	Standing (91.2%)	Standing (91%)	Standing (90.8%)
	Annual	Standing (88.6%)	Standing (90.2%)	Standing (92.1%)	Standing (92.1%)	Standing (91.8%)
17	Spring	Standing (93.6%)	Sitting (82%)	Sitting (85.9%)	Sitting (84%)	Sitting (84.1%)
	Summer	Sitting (88.7%)	Sitting (89%)	Sitting (90.4%)	Sitting (90.1%)	Sitting (90.1%)
	Fall	Standing (87.4%)	Standing (88.7%)	Standing (91.1%)	Standing (89.8%)	Standing (89.8%)
	Winter	Standing (90.7%)	Standing (91.6%)	Standing (93.8%)	Standing (92.3%)	Standing (92.4%)
	Annual	Standing (91.8%)	Standing (92.7%)	Sitting (82%)	Sitting (80.3%)	Standing (93.4%)
18	Spring	Standing (91.5%)	Sitting (88.4%)	Sitting (90.5%)	Sitting (90.2%)	Sitting (90.2%)
	Summer	Sitting (81.8%)	Sitting (88.5%)	Sitting (89.7%)	Sitting (90.3%)	Sitting (90.1%)
	Fall	Standing (83.2%)	Standing (93.3%)	Standing (94.9%)	Standing (94.1%)	Standing (94.2%)
	Winter	Standing (87.4%)	Sitting (81.7%)	Sitting (85.5%)	Sitting (83.1%)	Sitting (83.4%)
	Annual	Standing (88.9%)	Sitting (83.1%)	Sitting (85.5%)	Sitting (85.3%)	Sitting (84.4%)
19	Spring	Standing (91.7%)	Sitting (80.4%)	Sitting (80.7%)	Sitting (83.3%)	Sitting (82%)
	Summer	Sitting (82.4%)	Sitting (87.9%)	Sitting (88.6%)	Sitting (89.5%)	Sitting (89.5%)
	Fall	Standing (83.3%)	Standing (84.8%)	Standing (86.5%)	Standing (86.8%)	Standing (87.6%)
	Winter	Standing (87.2%)	Standing (89.3%)	Standing (91.4%)	Standing (90.7%)	Standing (91.8%)
	Annual	Standing (88.8%)	Standing (90.9%)	Standing (91.9%)	Standing (92.2%)	Standing (92.3%)
20	Spring	Standing (87.6%)	Sitting (93.4%)	Sitting (93.6%)	Sitting (93.6%)	Sitting (93.4%)
	Summer	Sitting (83.7%)	Sitting (94.1%)	Sitting (94.1%)	Sitting (94.6%)	Sitting (94.6%)
	Fall	Walking (93.2%)	Sitting (84.8%)	Sitting (85.5%)	Sitting (85.3%)	Sitting (84.9%)
	Winter	Standing (81.4%)	Sitting (89.4%)	Sitting (89.7%)	Sitting (89%)	Sitting (88.6%)
	Annual	Standing (85.1%)	Sitting (89.9%)	Sitting (90.9%)	Sitting (90.7%)	Sitting (90.5%)

Table 3: Pedestrian Level Wind Conditions for the Tamar Development

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
21	Spring	Standing (88.2%)	Sitting (88.4%)	Sitting (88.8%)	Sitting (88.4%)	Sitting (88.7%)
	Summer	Sitting (84.2%)	Sitting (93.1%)	Sitting (93.6%)	Sitting (93.6%)	Sitting (93.8%)
	Fall	Walking (93.5%)	Standing (94.6%)	Sitting (80.7%)	Sitting (80.2%)	Sitting (80.3%)
	Winter	Standing (82.2%)	Sitting (82.1%)	Sitting (82.2%)	Sitting (81.5%)	Sitting (81.9%)
	Annual	Standing (85.5%)	Sitting (86.3%)	Sitting (86.6%)	Sitting (86.3%)	Sitting (86.1%)
22	Spring	Standing (91.1%)	Sitting (80.9%)	Sitting (82%)	Sitting (81.5%)	Sitting (82%)
	Summer	Sitting (82.8%)	Sitting (86%)	Sitting (86.9%)	Sitting (87.2%)	Sitting (87.6%)
	Fall	Standing (81.4%)	Standing (89%)	Standing (89.9%)	Standing (89.2%)	Standing (89.3%)
	Winter	Standing (85.2%)	Standing (91.8%)	Standing (92.5%)	Standing (91.7%)	Standing (91.9%)
	Annual	Standing (87.6%)	Standing (92.7%)	Standing (93.3%)	Standing (92.7%)	Standing (92.8%)
23	Spring	Standing (93.3%)	Standing (90.4%)	Standing (90.4%)	Standing (92.4%)	Sitting (80.3%)
	Summer	Sitting (86.2%)	Sitting (86.6%)	Sitting (87.4%)	Sitting (88.1%)	Sitting (88.3%)
	Fall	Standing (85.4%)	Standing (85.3%)	Standing (85.4%)	Standing (88%)	Standing (88.5%)
	Winter	Standing (89.3%)	Standing (86.7%)	Standing (86.2%)	Standing (89.6%)	Standing (90.4%)
	Annual	Standing (91%)	Standing (89.6%)	Standing (89.5%)	Standing (91.5%)	Standing (92.1%)
24	Spring	Standing (93.2%)	Standing (91.6%)	Standing (92.6%)	Standing (94.2%)	Standing (93.8%)
	Summer	Sitting (84.9%)	Sitting (84.7%)	Sitting (86.2%)	Sitting (87.2%)	Sitting (87.2%)
	Fall	Standing (84.2%)	Standing (82.9%)	Standing (84.6%)	Standing (86.4%)	Standing (86.3%)
	Winter	Standing (87.9%)	Standing (86%)	Standing (87.3%)	Standing (90.1%)	Standing (89.7%)
	Annual	Standing (90.4%)	Standing (89%)	Standing (89.9%)	Standing (91.6%)	Standing (91.4%)
25	Spring	Standing (92.4%)	Standing (89.7%)	Standing (91.1%)	Standing (92.7%)	Standing (93.1%)
	Summer	Sitting (87.6%)	Sitting (86.6%)	Sitting (88.4%)	Sitting (88.5%)	Sitting (88.7%)
	Fall	Standing (82.4%)	Standing (80.4%)	Standing (82.9%)	Standing (83.6%)	Standing (84.6%)
	Winter	Standing (84.9%)	Standing (83.5%)	Standing (85.2%)	Standing (87.2%)	Standing (88.2%)
	Annual	Standing (88.4%)	Standing (87.7%)	Standing (88.1%)	Standing (89.6%)	Standing (90.8%)
26	Spring	Standing (92.3%)	Standing (89.1%)	Standing (90.3%)	Standing (89.7%)	Standing (90.6%)
	Summer	Sitting (85.5%)	Sitting (84.2%)	Sitting (85.5%)	Sitting (85.7%)	Sitting (86.3%)
	Fall	Standing (82.7%)	Walking (93%)	Standing (80.9%)	Walking (93.2%)	Standing (81.2%)
	Winter	Standing (85.7%)	Standing (81.9%)	Standing (83.4%)	Standing (82.4%)	Standing (84.1%)
	Annual	Standing (88.5%)	Standing (86%)	Standing (87.1%)	Standing (86%)	Standing (87.6%)
27	Spring	Standing (93.5%)	Standing (86.4%)	Standing (87.1%)	Standing (86.1%)	Standing (86.8%)
	Summer	Sitting (89.7%)	Sitting (87.1%)	Sitting (87.9%)	Sitting (87.5%)	Sitting (87.7%)
	Fall	Standing (85.6%)	Walking (91.8%)	Walking (92.2%)	Walking (91.7%)	Walking (91.9%)
	Winter	Standing (88.2%)	Walking (93%)	Walking (93.5%)	Walking (93.2%)	Walking (92.9%)
	Annual	Standing (90.9%)	Standing (84.1%)	Standing (84.9%)	Standing (84%)	Standing (84.6%)
28	Spring	Sitting (80%)	Standing (88.4%)	Standing (88.4%)	Standing (87.6%)	Standing (87.9%)
	Summer	Sitting (87.7%)	Sitting (87.2%)	Sitting (87.6%)	Sitting (87.3%)	Sitting (87.1%)
	Fall	Standing (87.2%)	Standing (80.1%)	Standing (80.5%)	Walking (92.8%)	Standing (80.1%)
	Winter	Standing (89.9%)	Standing (80.6%)	Standing (80.8%)	Walking (94.1%)	Standing (80.1%)
	Annual	Standing (91.8%)	Standing (86.3%)	Standing (86.5%)	Standing (85.7%)	Standing (86.1%)
29	Spring	Sitting (81.3%)	Standing (93.7%)	Sitting (80.8%)	Standing (93.6%)	Standing (93.6%)
	Summer	Sitting (90.2%)	Sitting (90.2%)	Sitting (90.7%)	Sitting (90.3%)	Sitting (90.3%)
	Fall	Standing (87.7%)	Standing (86.2%)	Standing (86.7%)	Standing (85.5%)	Standing (86.3%)
	Winter	Standing (91.1%)	Standing (88.2%)	Standing (88.5%)	Standing (87.7%)	Standing (88%)
	Annual	Standing (92.4%)	Standing (90.8%)	Standing (91.1%)	Standing (90.6%)	Standing (90.8%)
30	Spring	Standing (93.4%)	Sitting (87.9%)	Sitting (90.7%)	Sitting (89.5%)	Sitting (90%)
	Summer	Sitting (88.1%)	Sitting (90.2%)	Sitting (91.4%)	Sitting (91%)	Sitting (91.3%)
	Fall	Standing (86.2%)	Standing (91.8%)	Standing (93.3%)	Standing (92.6%)	Standing (93%)
	Winter	Standing (89.5%)	Standing (95.7%)	Standing (83.3%)	Sitting (80.9%)	Sitting (81.5%)
	Annual	Standing (91.3%)	Sitting (82.7%)	Sitting (86%)	Sitting (84.7%)	Sitting (85.1%)

Table 3: Pedestrian Level Wind Conditions for the Tamar Development

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
31	Spring	Standing (93.2%)	Sitting (88.5%)	Sitting (88.6%)	Sitting (90.3%)	Sitting (88.6%)
	Summer	Sitting (85.5%)	Sitting (89.7%)	Sitting (89.9%)	Sitting (91.3%)	Sitting (90.3%)
	Fall	Standing (85.4%)	Standing (91.9%)	Standing (91.8%)	Standing (92.9%)	Standing (91.8%)
	Winter	Standing (89.7%)	Standing (96.1%)	Standing (95.8%)	Sitting (82.2%)	Standing (95.7%)
	Annual	Standing (90.8%)	Sitting (83%)	Sitting (83%)	Sitting (85.6%)	Sitting (83%)
32	Spring	Standing (93.3%)	Sitting (86.8%)	Sitting (83.7%)	Sitting (88.1%)	Sitting (83.2%)
	Summer	Sitting (82.9%)	Sitting (89%)	Sitting (89.2%)	Sitting (90.4%)	Sitting (89.2%)
	Fall	Standing (85%)	Standing (93.3%)	Standing (91%)	Standing (94%)	Standing (90.2%)
	Winter	Standing (89.7%)	Sitting (80.4%)	Standing (94%)	Sitting (82%)	Standing (93%)
	Annual	Standing (90.7%)	Sitting (82.8%)	Standing (94.1%)	Sitting (83.5%)	Standing (93.5%)
33	Spring	Sitting (80.2%)	Sitting (87.4%)	Sitting (85.9%)	Sitting (87.7%)	Sitting (85.6%)
	Summer	Sitting (87%)	Sitting (92.3%)	Sitting (91.7%)	Sitting (92.7%)	Sitting (91.8%)
	Fall	Standing (86.7%)	Standing (93.3%)	Standing (93.2%)	Standing (93.1%)	Standing (92.7%)
	Winter	Standing (91.5%)	Sitting (80.3%)	Standing (95.2%)	Sitting (80.4%)	Standing (94.3%)
	Annual	Standing (92.4%)	Sitting (83.5%)	Sitting (83.7%)	Sitting (84.1%)	Sitting (83.6%)
34	Spring	Sitting (82%)	Standing (90.2%)	Standing (87.5%)	Standing (89.6%)	Standing (87.5%)
	Summer	Sitting (86.6%)	Sitting (87.1%)	Sitting (86%)	Sitting (87.2%)	Sitting (86.5%)
	Fall	Standing (89.2%)	Standing (84.8%)	Standing (81.6%)	Standing (84%)	Standing (81.6%)
	Winter	Standing (92.8%)	Standing (86.8%)	Standing (82.9%)	Standing (85.7%)	Standing (82.7%)
	Annual	Standing (93.3%)	Standing (89.2%)	Standing (86.3%)	Standing (88.5%)	Standing (86.5%)
35	Spring	Standing (92.4%)	Walking (90.8%)	Walking (88.8%)	Walking (91.2%)	Walking (89%)
	Summer	Sitting (86.2%)	Standing (88.4%)	Standing (87.5%)	Standing (89.2%)	Standing (88.3%)
	Fall	Standing (85.4%)	Walking (85.3%)	Walking (83.2%)	Walking (86%)	Walking (83.7%)
	Winter	Standing (87.4%)	Walking (88.1%)	Walking (85.2%)	Walking (88.6%)	Walking (85.3%)
	Annual	Standing (90%)	Walking (89.9%)	Walking (87.6%)	Walking (90.4%)	Walking (88.2%)
36	Spring	Standing (84.9%)	Standing (84.2%)	Standing (86.3%)	Standing (89.5%)	Standing (85.9%)
	Summer	Sitting (83.3%)	Sitting (81.7%)	Sitting (83.4%)	Sitting (85.7%)	Sitting (83.9%)
	Fall	Walking (91.5%)	Walking (90.8%)	Walking (92.7%)	Standing (82.6%)	Walking (91.9%)
	Winter	Walking (93.8%)	Walking (93.1%)	Walking (95.2%)	Standing (85.1%)	Walking (94.1%)
	Annual	Standing (82.6%)	Standing (81.9%)	Standing (83.8%)	Standing (87.7%)	Standing (83.3%)
37	Spring	Standing (86.7%)	Standing (85.2%)	Standing (86.1%)	Standing (87.9%)	Standing (85.1%)
	Summer	Sitting (81%)	Sitting (83.9%)	Sitting (85.8%)	Sitting (87.1%)	Sitting (85.9%)
	Fall	Walking (92.5%)	Walking (90.8%)	Walking (91.1%)	Walking (92.9%)	Walking (89.6%)
	Winter	Walking (96.2%)	Walking (93.3%)	Walking (93.4%)	Standing (80%)	Walking (92.3%)
	Annual	Standing (83.1%)	Standing (81.4%)	Standing (83%)	Standing (85.1%)	Standing (81.6%)
38	Spring	Standing (88.7%)	Standing (83.8%)	Standing (83.8%)	Standing (84.4%)	Standing (84.2%)
	Summer	Sitting (84.5%)	Sitting (80.1%)	Sitting (80.6%)	Sitting (81.8%)	Sitting (81.2%)
	Fall	Standing (80.3%)	Walking (90.4%)	Walking (90.3%)	Walking (90.6%)	Walking (90.3%)
	Winter	Standing (81.5%)	Walking (94.3%)	Walking (94%)	Walking (93.8%)	Walking (93.6%)
	Annual	Standing (86%)	Standing (80.6%)	Standing (80.6%)	Standing (81.2%)	Standing (80.9%)
39	Spring	Standing (87.9%)	Standing (87.8%)	Standing (86.6%)	Standing (88.7%)	Standing (87.7%)
	Summer	Sitting (85.4%)	Sitting (85.8%)	Sitting (85.2%)	Sitting (87.1%)	Sitting (86.9%)
	Fall	Standing (80.1%)	Standing (81.2%)	Walking (93%)	Standing (82.9%)	Standing (81.7%)
	Winter	Standing (81.3%)	Standing (83.8%)	Standing (81.9%)	Standing (85.1%)	Standing (83.3%)
	Annual	Standing (86.2%)	Standing (86.1%)	Standing (85%)	Standing (87.3%)	Standing (86.7%)
40	Spring	Standing (86.4%)	Sitting (82.6%)	Sitting (82.2%)	Sitting (83.7%)	Sitting (81.5%)
	Summer	Sitting (82.2%)	Sitting (89.8%)	Sitting (90%)	Sitting (90.9%)	Sitting (90.3%)
	Fall	Walking (92.6%)	Standing (90.7%)	Standing (90.2%)	Standing (91.3%)	Standing (89%)
	Winter	Walking (95.3%)	Standing (93.6%)	Standing (92.7%)	Standing (93.8%)	Standing (90.6%)
	Annual	Standing (83.6%)	Standing (94.1%)	Standing (93.6%)	Sitting (80.5%)	Standing (92.4%)

Table 3: Pedestrian Level Wind Conditions for the Tamar Development

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
41	Spring	Standing (85.9%)	Standing (88.7%)	Standing (93%)	Standing (90.6%)	Standing (92.8%)
	Summer	Sitting (82.6%)	Sitting (87.9%)	Sitting (90%)	Sitting (89.5%)	Sitting (90.6%)
	Fall	Walking (92%)	Standing (80.9%)	Standing (85.3%)	Standing (83.1%)	Standing (85.5%)
	Winter	Walking (94.7%)	Standing (82.6%)	Standing (87.4%)	Standing (84.9%)	Standing (87.7%)
	Annual	Standing (83.2%)	Standing (86.6%)	Standing (90.3%)	Standing (88.7%)	Standing (90.4%)
42	Spring	Standing (86.1%)	Standing (92.1%)	Sitting (80.3%)	Standing (93.6%)	Sitting (80.4%)
	Summer	Sitting (83.5%)	Sitting (88.2%)	Sitting (89.6%)	Sitting (89.9%)	Sitting (90.4%)
	Fall	Walking (92.1%)	Standing (83.8%)	Standing (86.5%)	Standing (84.7%)	Standing (85.7%)
	Winter	Walking (94.2%)	Standing (86.9%)	Standing (90.6%)	Standing (87.8%)	Standing (89.1%)
	Annual	Standing (84%)	Standing (89.6%)	Standing (92.1%)	Standing (90.5%)	Standing (90.8%)
43	Spring	Standing (88%)	Sitting (81%)	Sitting (83.1%)	Sitting (82.6%)	Sitting (84.5%)
	Summer	Sitting (82.2%)	Sitting (88.9%)	Sitting (90%)	Sitting (90.8%)	Sitting (91.4%)
	Fall	Standing (80.3%)	Standing (85.2%)	Standing (85.6%)	Standing (86.3%)	Standing (87%)
	Winter	Standing (81.2%)	Standing (86.9%)	Standing (86.6%)	Standing (88.6%)	Standing (89.2%)
	Annual	Standing (86.1%)	Standing (90.5%)	Standing (90.9%)	Standing (91.2%)	Standing (92%)
44	Spring	Standing (92.3%)	Sitting (86.6%)	Sitting (89.5%)	Sitting (92%)	Sitting (93%)
	Summer	Sitting (87.8%)	Sitting (93.9%)	Sitting (94.9%)	Sitting (95.2%)	Sitting (95.4%)
	Fall	Standing (85.4%)	Standing (90.4%)	Standing (91.7%)	Sitting (81%)	Sitting (82.1%)
	Winter	Standing (87.3%)	Standing (93.2%)	Standing (94.2%)	Sitting (83.2%)	Sitting (86%)
	Annual	Standing (90%)	Sitting (82.6%)	Sitting (85.3%)	Sitting (87.6%)	Sitting (88.6%)
45	Spring	Standing (92.6%)	Sitting (93.9%)	Sitting (95.3%)	Sitting (96.5%)	Sitting (96.5%)
	Summer	Sitting (86.8%)	Sitting (95.4%)	Sitting (95.9%)	Sitting (96.6%)	Sitting (96.7%)
	Fall	Standing (85.3%)	Sitting (84.2%)	Sitting (89.3%)	Sitting (90.3%)	Sitting (92.4%)
	Winter	Standing (88.4%)	Sitting (89.4%)	Sitting (93.6%)	Sitting (94.7%)	Sitting (96.1%)
	Annual	Standing (90.3%)	Sitting (90.2%)	Sitting (93.6%)	Sitting (94.5%)	Sitting (95.5%)
46	Spring	Standing (90.4%)	Standing (87.1%)	Standing (90.1%)	Standing (92.2%)	Standing (89.8%)
	Summer	Sitting (82%)	Sitting (83.6%)	Sitting (85.9%)	Sitting (87.7%)	Sitting (87.1%)
	Fall	Standing (82.4%)	Walking (91.6%)	Standing (80.3%)	Standing (83.7%)	Standing (84.7%)
	Winter	Standing (84.5%)	Walking (94.3%)	Standing (83.2%)	Standing (87.2%)	Standing (86.5%)
	Annual	Standing (87.8%)	Standing (82.7%)	Standing (87.3%)	Standing (89.8%)	Standing (89.4%)
47	Spring	Standing (88.1%)	Sitting (89.8%)	Sitting (90.6%)	Sitting (92.9%)	Sitting (93.1%)
	Summer	Sitting (84.8%)	Sitting (87.7%)	Sitting (88.5%)	Sitting (90.7%)	Sitting (90.8%)
	Fall	Standing (80.5%)	Standing (94.2%)	Sitting (80.6%)	Sitting (83.7%)	Sitting (85%)
	Winter	Standing (81.1%)	Sitting (84.8%)	Sitting (86.1%)	Sitting (89.4%)	Sitting (90.4%)
	Annual	Standing (85.8%)	Sitting (84.3%)	Sitting (85.7%)	Sitting (89.2%)	Sitting (90%)
48	Spring	Standing (86.2%)	Sitting (89.3%)	Standing (91%)	Sitting (81.5%)	Standing (90.9%)
	Summer	Sitting (84.9%)	Sitting (89%)	Sitting (84.2%)	Sitting (87.7%)	Sitting (85.6%)
	Fall	Walking (92.7%)	Standing (94.6%)	Standing (86.3%)	Standing (89.3%)	Standing (86.7%)
	Winter	Walking (94.6%)	Sitting (83.8%)	Standing (89%)	Standing (91.6%)	Standing (89%)
	Annual	Standing (84.2%)	Sitting (84.4%)	Standing (90.2%)	Standing (92.7%)	Standing (90.3%)
49	Spring	Standing (82.1%)	Sitting (85.4%)	Standing (93.3%)	Standing (90.8%)	Standing (91.6%)
	Summer	Sitting (81.7%)	Sitting (91.2%)	Sitting (88.2%)	Sitting (88.5%)	Sitting (88.6%)
	Fall	Walking (88.9%)	Standing (90.5%)	Standing (87.8%)	Standing (85.6%)	Standing (86.9%)
	Winter	Walking (91.8%)	Standing (94.3%)	Standing (90.8%)	Standing (87.9%)	Standing (89.1%)
	Annual	Walking (92.9%)	Sitting (80.1%)	Standing (92.2%)	Standing (90%)	Standing (91.2%)
50	Spring	Standing (90%)	Sitting (85.9%)	Sitting (87.2%)	Sitting (86.1%)	Sitting (86%)
	Summer	Sitting (82%)	Sitting (87.1%)	Sitting (88.2%)	Sitting (88.6%)	Sitting (88.9%)
	Fall	Standing (81.4%)	Standing (91.7%)	Standing (92.7%)	Standing (92.3%)	Standing (92.2%)
	Winter	Standing (84.2%)	Standing (95.2%)	Standing (95.7%)	Standing (95.4%)	Standing (95%)
	Annual	Standing (87.1%)	Standing (94.9%)	Sitting (81.8%)	Sitting (80.9%)	Sitting (81.5%)

Table 3: Pedestrian Level Wind Conditions for the Tamar Development

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
51	Spring	Standing (91.7%)	Sitting (83.7%)	Sitting (84.3%)	Sitting (85.6%)	Sitting (85.2%)
	Summer	Sitting (86.2%)	Sitting (91.1%)	Sitting (91.9%)	Sitting (92.6%)	Sitting (92.7%)
	Fall	Standing (83.4%)	Standing (88%)	Standing (88.6%)	Standing (88.8%)	Standing (89%)
	Winter	Standing (86%)	Standing (91.1%)	Standing (90.8%)	Standing (91.6%)	Standing (91.2%)
	Annual	Standing (88.6%)	Standing (92.4%)	Sitting (80.5%)	Sitting (81.9%)	Sitting (81.4%)
52	Spring	Standing (92.4%)	Sitting (82.9%)	Sitting (83.4%)	Sitting (83%)	Sitting (82.4%)
	Summer	Sitting (89.5%)	Sitting (92.6%)	Sitting (93%)	Sitting (93.1%)	Sitting (93%)
	Fall	Standing (83.9%)	Standing (90.3%)	Standing (90.1%)	Standing (90.1%)	Standing (89.2%)
	Winter	Standing (86.5%)	Standing (92.5%)	Standing (91.8%)	Standing (92%)	Standing (90.9%)
	Annual	Standing (89.9%)	Standing (93.6%)	Sitting (80%)	Standing (93.5%)	Standing (92.7%)
53	Spring	Standing (91.4%)	Sitting (82.9%)	Sitting (83.9%)	Sitting (83.5%)	Sitting (83.4%)
	Summer	Sitting (86.7%)	Sitting (90.6%)	Sitting (91.3%)	Sitting (91.9%)	Sitting (91.9%)
	Fall	Standing (81.4%)	Standing (87%)	Standing (87.5%)	Standing (87.3%)	Standing (87.2%)
	Winter	Standing (83.9%)	Standing (90.2%)	Standing (90.3%)	Standing (89.6%)	Standing (89.4%)
	Annual	Standing (87.6%)	Standing (91.9%)	Standing (92%)	Standing (91.8%)	Standing (91.6%)
54	Spring	Standing (89.5%)	Standing (92.3%)	Sitting (81.4%)	Sitting (80.6%)	Sitting (81.2%)
	Summer	Sitting (85.3%)	Sitting (89.3%)	Sitting (90.3%)	Sitting (90.3%)	Sitting (91%)
	Fall	Standing (80.3%)	Standing (88.3%)	Standing (89.1%)	Standing (88.5%)	Standing (88.9%)
	Winter	Standing (83.2%)	Standing (90.3%)	Standing (90.3%)	Standing (90.2%)	Standing (90.3%)
	Annual	Standing (86.8%)	Standing (92%)	Standing (92.3%)	Standing (92%)	Standing (92.3%)
55	Spring	Standing (89.9%)	Standing (94.1%)	Sitting (81.4%)	Sitting (85.7%)	Sitting (85.5%)
	Summer	Sitting (83.5%)	Sitting (88.2%)	Sitting (89.5%)	Sitting (91.2%)	Sitting (91.5%)
	Fall	Standing (81.1%)	Standing (86.2%)	Standing (87.9%)	Standing (91.6%)	Standing (91.8%)
	Winter	Standing (84%)	Standing (89.6%)	Standing (91.1%)	Standing (94.4%)	Standing (94.2%)
	Annual	Standing (86.9%)	Standing (91.4%)	Standing (92.5%)	Sitting (81.5%)	Sitting (81.4%)
56	Spring	Standing (89.4%)	Sitting (85.3%)	Sitting (88.1%)	Sitting (88.4%)	Sitting (88.3%)
	Summer	Sitting (81.5%)	Sitting (87.8%)	Sitting (89.2%)	Sitting (90%)	Sitting (90.2%)
	Fall	Standing (80.8%)	Standing (92.2%)	Standing (94.1%)	Standing (94%)	Standing (94.2%)
	Winter	Standing (83.8%)	Standing (95.4%)	Sitting (82.2%)	Sitting (82.3%)	Sitting (82.3%)
	Annual	Standing (87.2%)	Sitting (80.7%)	Sitting (84.4%)	Sitting (84.3%)	Sitting (85.1%)
57	Spring	Standing (91.5%)	Sitting (95.7%)	Sitting (96.9%)	Sitting (80.5%)	Sitting (82.2%)
	Summer	Sitting (85%)	Sitting (93.9%)	Sitting (94.8%)	Sitting (90.4%)	Sitting (91.3%)
	Fall	Standing (82.8%)	Sitting (90.9%)	Sitting (92.9%)	Standing (88.1%)	Standing (89.6%)
	Winter	Standing (86%)	Sitting (95.3%)	Sitting (97%)	Standing (89.3%)	Standing (90.9%)
	Annual	Standing (88.9%)	Sitting (94.3%)	Sitting (95.5%)	Standing (91.8%)	Standing (92.9%)
58	Spring	Standing (93.2%)	Sitting (81.2%)	Sitting (83.5%)	Sitting (81.3%)	Sitting (82.1%)
	Summer	Sitting (84.3%)	Sitting (86.3%)	Sitting (87.5%)	Sitting (87%)	Sitting (87.6%)
	Fall	Standing (84.7%)	Standing (88.9%)	Standing (90.6%)	Standing (88.5%)	Standing (89%)
	Winter	Standing (89%)	Standing (91.8%)	Standing (93.3%)	Standing (91.3%)	Standing (91.7%)
	Annual	Standing (90.7%)	Standing (92.8%)	Standing (93.9%)	Standing (92.4%)	Standing (92.7%)
59	Spring	Standing (93.8%)	Standing (88.5%)	Standing (89.6%)	Standing (87.7%)	Standing (88.5%)
	Summer	Sitting (87.9%)	Sitting (85%)	Sitting (86.2%)	Sitting (85.3%)	Sitting (86%)
	Fall	Standing (84.5%)	Walking (93.2%)	Walking (93.9%)	Walking (92.7%)	Walking (93.3%)
	Winter	Standing (87.9%)	Standing (81.4%)	Standing (82.9%)	Standing (80.1%)	Standing (81.3%)
	Annual	Standing (90.1%)	Standing (84.5%)	Standing (86.2%)	Standing (84%)	Standing (85.2%)
60	Spring	Standing (90.1%)	Standing (82.6%)	Standing (84%)	Standing (83.2%)	Standing (84.2%)
	Summer	Sitting (85.9%)	Sitting (82%)	Sitting (83.7%)	Sitting (83.1%)	Sitting (84%)
	Fall	Standing (81%)	Walking (88.8%)	Walking (89.9%)	Walking (89.3%)	Walking (90%)
	Winter	Standing (82.8%)	Walking (91.2%)	Walking (91.8%)	Walking (91.8%)	Walking (92.2%)
	Annual	Standing (87.5%)	Walking (92.5%)	Standing (81.7%)	Standing (80.2%)	Standing (80.9%)

Table 3: Pedestrian Level Wind Conditions for the Tamar Development

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
61	Spring	Standing (91.6%)	Standing (82.7%)	Standing (84.1%)	Standing (83.2%)	Standing (84%)
	Summer	Sitting (87.5%)	Sitting (84.6%)	Sitting (85.7%)	Sitting (85%)	Sitting (85.8%)
	Fall	Standing (84.2%)	Walking (89.3%)	Walking (90.4%)	Walking (89.7%)	Walking (90.1%)
	Winter	Standing (86.2%)	Walking (90.7%)	Walking (91.5%)	Walking (91.1%)	Walking (91.4%)
	Annual	Standing (89.5%)	Standing (80.8%)	Standing (82.5%)	Standing (81.3%)	Standing (82%)
62	Spring	Sitting (80.5%)	Standing (86.7%)	Standing (86.2%)	Standing (88.8%)	Standing (89.4%)
	Summer	Sitting (86.2%)	Sitting (83.9%)	Sitting (84.4%)	Sitting (85.5%)	Sitting (85.7%)
	Fall	Standing (87.6%)	Standing (80%)	Walking (92.2%)	Standing (82.8%)	Standing (83.6%)
	Winter	Standing (91.2%)	Standing (80.4%)	Walking (93.5%)	Standing (83.6%)	Standing (84.9%)
	Annual	Standing (92.3%)	Standing (85.1%)	Standing (84.5%)	Standing (87.2%)	Standing (88.4%)
63	Spring	Standing (90.9%)	Standing (83.8%)	Standing (84.6%)	Standing (85.2%)	Standing (86%)
	Summer	Sitting (84.6%)	Sitting (81.1%)	Sitting (82.6%)	Sitting (82.7%)	Sitting (83.6%)
	Fall	Standing (80.9%)	Walking (89.2%)	Walking (89.9%)	Walking (90.4%)	Walking (90.9%)
	Winter	Standing (81.8%)	Walking (91.8%)	Walking (91.7%)	Walking (93.1%)	Walking (93.4%)
	Annual	Standing (86.9%)	Walking (93.1%)	Standing (81.3%)	Standing (81.8%)	Standing (82.4%)
64	Spring	Standing (92.6%)	Standing (83.6%)	Standing (84.9%)	Standing (83.4%)	Standing (84.4%)
	Summer	Sitting (85.3%)	Sitting (82.7%)	Sitting (83.7%)	Sitting (83%)	Sitting (83.8%)
	Fall	Standing (84.6%)	Walking (89.8%)	Walking (90.6%)	Walking (89.5%)	Walking (90.2%)
	Winter	Standing (87.6%)	Walking (91.2%)	Walking (91.8%)	Walking (91.2%)	Walking (91.5%)
	Annual	Standing (90.1%)	Standing (81%)	Standing (82.6%)	Standing (80.9%)	Standing (82.3%)
65	Spring	Standing (89.1%)	Standing (89.2%)	Standing (89.6%)	Standing (89.4%)	Standing (89.4%)
	Summer	Sitting (80.3%)	Sitting (82.2%)	Sitting (82.6%)	Sitting (82.8%)	Sitting (83%)
	Fall	Standing (82%)	Standing (83.5%)	Standing (83.9%)	Standing (83.8%)	Standing (83.9%)
	Winter	Standing (84.3%)	Standing (85.2%)	Standing (85.4%)	Standing (85.5%)	Standing (85.8%)
	Annual	Standing (87%)	Standing (87.8%)	Standing (88%)	Standing (88%)	Standing (88.1%)
66	Spring	Standing (83.5%)	Standing (81.6%)	Standing (82.6%)	Standing (82.1%)	Standing (82.1%)
	Summer	Standing (89.8%)	Standing (90%)	Standing (90.2%)	Standing (90.3%)	Standing (90.4%)
	Fall	Walking (88%)	Walking (86.9%)	Walking (87.7%)	Walking (87.3%)	Walking (87.1%)
	Winter	Walking (91.6%)	Walking (89.7%)	Walking (90.2%)	Walking (89.7%)	Walking (89.7%)
	Annual	Walking (92.7%)	Walking (91.7%)	Walking (92.1%)	Walking (91.8%)	Walking (91.7%)
67	Spring	Standing (87.8%)	Standing (85.6%)	Standing (85.8%)	Standing (86.4%)	Standing (86%)
	Summer	Standing (90.8%)	Standing (90.4%)	Standing (90.3%)	Standing (90.6%)	Standing (90.5%)
	Fall	Walking (92%)	Walking (91%)	Walking (90.9%)	Walking (91.3%)	Walking (91.4%)
	Winter	Walking (94.9%)	Walking (93%)	Walking (92.9%)	Walking (93.3%)	Walking (93.4%)
	Annual	Standing (82.8%)	Standing (81.8%)	Standing (82%)	Standing (82.6%)	Standing (82.3%)
68	Spring	Standing (88.4%)	Standing (88.2%)	Standing (88.9%)	Standing (89.7%)	Standing (89%)
	Summer	Standing (91.8%)	Standing (92.2%)	Standing (92.5%)	Sitting (80.1%)	Standing (92.5%)
	Fall	Walking (93.5%)	Standing (80.9%)	Standing (82.1%)	Standing (83%)	Standing (82.2%)
	Winter	Standing (82.8%)	Standing (82.4%)	Standing (83.4%)	Standing (84.4%)	Standing (83.8%)
	Annual	Standing (85.3%)	Standing (86.5%)	Standing (87.2%)	Standing (87.8%)	Standing (87.3%)
69	Spring	Standing (89.4%)	Standing (89.1%)	Standing (90.8%)	Standing (91.2%)	Standing (89.9%)
	Summer	Standing (91.6%)	Standing (92.1%)	Standing (92.9%)	Standing (93.1%)	Standing (92.7%)
	Fall	Walking (93.6%)	Walking (93.4%)	Standing (81.1%)	Standing (81.1%)	Walking (94%)
	Winter	Standing (83.2%)	Standing (82.2%)	Standing (84.8%)	Standing (85.3%)	Standing (83%)
	Annual	Standing (84.7%)	Standing (84.3%)	Standing (86.7%)	Standing (87.3%)	Standing (84.9%)
70	Spring	Sitting (81.7%)	Sitting (82.5%)	Sitting (82.7%)	Sitting (83%)	Sitting (81.7%)
	Summer	Sitting (82.3%)	Sitting (83.5%)	Sitting (83.7%)	Sitting (84.6%)	Sitting (84.2%)
	Fall	Standing (89.6%)	Standing (90.6%)	Standing (90.6%)	Standing (90.4%)	Standing (89.9%)
	Winter	Standing (93.6%)	Standing (94.5%)	Standing (94.3%)	Standing (94%)	Standing (93.3%)
	Annual	Standing (93.2%)	Standing (93.9%)	Standing (93.8%)	Standing (93.7%)	Standing (93.4%)

Table 3: Pedestrian Level Wind Conditions for the Tamar Development

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
71	Spring	Standing (91.6%)	Standing (93.4%)	Standing (93.9%)	Standing (93.7%)	Standing (94.5%)
	Summer	Sitting (81.9%)	Sitting (83%)	Sitting (83.8%)	Sitting (83.8%)	Sitting (84.2%)
	Fall	Standing (82.9%)	Standing (86.2%)	Standing (87%)	Standing (86.8%)	Standing (88.4%)
	Winter	Standing (87.1%)	Standing (90.2%)	Standing (90.6%)	Standing (90.2%)	Standing (91.7%)
	Annual	Standing (88.3%)	Standing (91.1%)	Standing (91.5%)	Standing (91.3%)	Standing (92.2%)
72	Spring	Sitting (82.1%)	Sitting (83.3%)	Sitting (86.3%)	Sitting (84.8%)	Sitting (85.3%)
	Summer	Sitting (89.8%)	Sitting (91.2%)	Sitting (92%)	Sitting (91.9%)	Sitting (92.1%)
	Fall	Standing (89%)	Standing (90.9%)	Standing (92.4%)	Standing (91.6%)	Standing (92.2%)
	Winter	Standing (92.1%)	Standing (94.2%)	Standing (95.4%)	Standing (94%)	Standing (94.9%)
	Annual	Standing (93%)	Standing (94.3%)	Sitting (81.4%)	Sitting (80.6%)	Sitting (81.3%)
73	Spring	Standing (84.3%)	Standing (86.9%)	Standing (88.5%)	Standing (86.5%)	Standing (87%)
	Summer	Standing (87.1%)	Standing (88%)	Standing (88.6%)	Standing (87.9%)	Standing (88.4%)
	Fall	Walking (90.5%)	Walking (92.2%)	Walking (92.9%)	Walking (92%)	Walking (92.6%)
	Winter	Walking (93.7%)	Walking (95.7%)	Standing (81.4%)	Walking (95%)	Walking (95.9%)
	Annual	Walking (93.8%)	Standing (81.3%)	Standing (83.9%)	Standing (82.2%)	Standing (82.1%)
74	Spring	Standing (91.1%)	Standing (92.7%)	Standing (93.4%)	Standing (93.6%)	Standing (93.2%)
	Summer	Sitting (80.1%)	Sitting (81.8%)	Sitting (82.5%)	Sitting (82.9%)	Sitting (83%)
	Fall	Standing (82.1%)	Standing (84.3%)	Standing (85.3%)	Standing (85.7%)	Standing (85.1%)
	Winter	Standing (85.9%)	Standing (89%)	Standing (90%)	Standing (90.1%)	Standing (89.7%)
	Annual	Standing (87.9%)	Standing (89.9%)	Standing (90.9%)	Standing (91.1%)	Standing (90.7%)
75	Spring	Standing (93.6%)	Standing (90%)	Standing (91.2%)	Standing (91.2%)	Standing (91.1%)
	Summer	Standing (93.5%)	Standing (92.3%)	Standing (92.7%)	Standing (93.1%)	Sitting (80.5%)
	Fall	Standing (87.1%)	Standing (80.9%)	Standing (82.6%)	Standing (82.9%)	Standing (82.6%)
	Winter	Standing (91.1%)	Standing (85.2%)	Standing (87%)	Standing (86.9%)	Standing (86.8%)
	Annual	Standing (91.5%)	Standing (86.5%)	Standing (88.4%)	Standing (88.6%)	Standing (88.1%)
76	Spring	Standing (92.1%)	Sitting (81%)	Sitting (83%)	Sitting (82.4%)	Sitting (83.1%)
	Summer	Sitting (85%)	Sitting (86.3%)	Sitting (87.4%)	Sitting (87%)	Sitting (87.3%)
	Fall	Standing (83.1%)	Standing (87.5%)	Standing (88.3%)	Standing (88.6%)	Standing (88.6%)
	Winter	Standing (86.8%)	Standing (92.2%)	Standing (92.8%)	Standing (92.8%)	Standing (92.8%)
	Annual	Standing (89.2%)	Standing (92.6%)	Standing (93.3%)	Standing (93.2%)	Standing (92.7%)
77	Spring	Standing (85.8%)	Standing (89.6%)	Standing (90.2%)	Standing (89.6%)	Standing (89.2%)
	Summer	Standing (92.2%)	Standing (93%)	Sitting (80.5%)	Sitting (80.2%)	Sitting (80.4%)
	Fall	Walking (88.1%)	Walking (92.9%)	Walking (92.5%)	Walking (92.8%)	Walking (91.6%)
	Winter	Walking (91.2%)	Standing (81.1%)	Standing (81.1%)	Standing (80.9%)	Walking (94.7%)
	Annual	Standing (81.5%)	Standing (85.2%)	Standing (86%)	Standing (85.1%)	Standing (84.5%)
78	Spring	Standing (89.5%)	Standing (91.6%)	Standing (93.6%)	Standing (93.3%)	Standing (93.9%)
	Summer	Standing (92.3%)	Sitting (81.8%)	Sitting (83.2%)	Sitting (82.7%)	Sitting (83.7%)
	Fall	Standing (80.2%)	Standing (82.2%)	Standing (87.6%)	Standing (84.5%)	Standing (87.8%)
	Winter	Standing (84.5%)	Standing (87.2%)	Standing (91.4%)	Standing (89.8%)	Standing (91.9%)
	Annual	Standing (86.3%)	Standing (88.1%)	Standing (91.8%)	Standing (90.8%)	Standing (92.3%)
79	Spring	Standing (84.3%)	Standing (85.8%)	Standing (88.2%)	Standing (89.5%)	Standing (90.4%)
	Summer	Standing (90.2%)	Standing (90.8%)	Standing (91.6%)	Standing (91.9%)	Standing (92.3%)
	Fall	Walking (88.4%)	Walking (90.2%)	Walking (93.1%)	Walking (92.5%)	Standing (80.4%)
	Winter	Walking (92.5%)	Walking (94.1%)	Standing (83.2%)	Standing (82.6%)	Standing (85.5%)
	Annual	Walking (93.1%)	Standing (81.6%)	Standing (85.3%)	Standing (84.4%)	Standing (86.1%)
80	Spring	Standing (83.7%)	Standing (85.2%)	Standing (86.5%)	Standing (87.2%)	Standing (87.5%)
	Summer	Standing (90.8%)	Standing (91.8%)	Sitting (80.1%)	Sitting (80.1%)	Sitting (80.2%)
	Fall	Walking (89.1%)	Walking (90.5%)	Walking (92.3%)	Walking (92.1%)	Walking (93%)
	Winter	Walking (92.4%)	Walking (93.9%)	Standing (81.7%)	Standing (80.6%)	Standing (82.8%)
	Annual	Walking (93.2%)	Standing (81.5%)	Standing (84.4%)	Standing (83.5%)	Standing (85.1%)

Table 3: Pedestrian Level Wind Conditions for the Tamar Development

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
81	Spring	Standing (83.8%)	Standing (83.5%)	Standing (83.5%)	Standing (84.8%)	Standing (83.7%)
	Summer	Standing (89.7%)	Standing (90.2%)	Standing (90.2%)	Standing (90.6%)	Standing (90.5%)
	Fall	Walking (90.3%)	Walking (90%)	Walking (90.1%)	Walking (90.9%)	Walking (90.3%)
	Winter	Walking (93.5%)	Walking (93.1%)	Walking (93%)	Walking (94.2%)	Walking (93.2%)
	Annual	Standing (81.3%)	Standing (80.9%)	Standing (81%)	Standing (82.2%)	Standing (81.3%)
82	Spring	Standing (89.1%)	Standing (87.7%)	Standing (89.1%)	Standing (89.4%)	Standing (89.4%)
	Summer	Standing (92.4%)	Standing (92.1%)	Standing (92.3%)	Standing (92.7%)	Standing (92.5%)
	Fall	Walking (93.3%)	Walking (91.9%)	Standing (80.1%)	Walking (92.4%)	Standing (80.4%)
	Winter	Standing (82.7%)	Standing (80.3%)	Standing (84.1%)	Standing (82.9%)	Standing (84.7%)
	Annual	Standing (84.7%)	Standing (83.3%)	Standing (86.3%)	Standing (84.9%)	Standing (86.4%)
83	Spring	Standing (91.3%)	Standing (90%)	Standing (90.7%)	Standing (91.2%)	Standing (90.2%)
	Summer	Sitting (83.1%)	Sitting (81.7%)	Sitting (81.9%)	Sitting (82.2%)	Sitting (82.2%)
	Fall	Standing (84.5%)	Standing (82.3%)	Standing (84.3%)	Standing (84.5%)	Standing (83.5%)
	Winter	Standing (87.1%)	Standing (85.6%)	Standing (86.8%)	Standing (87.6%)	Standing (86.2%)
	Annual	Standing (89.1%)	Standing (87.7%)	Standing (89.5%)	Standing (89.9%)	Standing (89%)
84	Spring	Standing (85%)	Standing (83.2%)	Standing (83.7%)	Standing (84.6%)	Standing (83.5%)
	Summer	Standing (91.5%)	Standing (91.3%)	Standing (91.3%)	Standing (91.5%)	Standing (91.5%)
	Fall	Walking (91.1%)	Walking (89.4%)	Walking (90%)	Walking (90.3%)	Walking (89.4%)
	Winter	Walking (93.6%)	Walking (92.1%)	Walking (92.4%)	Walking (92.8%)	Walking (91.4%)
	Annual	Standing (82%)	Walking (93.3%)	Standing (80.6%)	Standing (81.2%)	Walking (92.9%)
85	Spring	Standing (85.7%)	Standing (84.4%)	Standing (85.1%)	Standing (85.7%)	Standing (84.6%)
	Summer	Standing (88.3%)	Standing (87.8%)	Standing (88.3%)	Standing (88.4%)	Standing (88.2%)
	Fall	Walking (91.7%)	Walking (90.6%)	Walking (91.2%)	Walking (91.5%)	Walking (90.6%)
	Winter	Walking (94.6%)	Walking (93.5%)	Walking (93.9%)	Walking (94.2%)	Walking (93.1%)
	Annual	Standing (82%)	Walking (93.9%)	Standing (80.4%)	Standing (81.1%)	Standing (80%)
86	Spring	Sitting (81.8%)	Sitting (84.1%)	Sitting (84.4%)	Sitting (84.3%)	Sitting (83.6%)
	Summer	Sitting (86.2%)	Sitting (85.5%)	Sitting (85.5%)	Sitting (85.3%)	Sitting (85%)
	Fall	Standing (86.4%)	Standing (91.4%)	Standing (92%)	Standing (91.3%)	Standing (91.2%)
	Winter	Standing (89.4%)	Standing (94.5%)	Standing (94.7%)	Standing (93.9%)	Standing (93.3%)
	Annual	Standing (91%)	Standing (94.3%)	Standing (94.7%)	Standing (94%)	Standing (93.9%)
87	Spring	Standing (89.6%)	Standing (90.1%)	Standing (90.3%)	Standing (91.4%)	Standing (90.2%)
	Summer	Standing (92.3%)	Standing (91.8%)	Standing (92%)	Standing (92.4%)	Standing (92%)
	Fall	Walking (92%)	Standing (82.1%)	Standing (83%)	Standing (83.6%)	Standing (82.8%)
	Winter	Standing (80.2%)	Standing (85.6%)	Standing (86%)	Standing (87.4%)	Standing (85.8%)
	Annual	Standing (85.2%)	Standing (87.9%)	Standing (87.9%)	Standing (88.4%)	Standing (88.1%)
88	Spring	Standing (89.2%)	Standing (92.9%)	Standing (93.1%)	Standing (92.9%)	Standing (92.4%)
	Summer	Sitting (80.6%)	Sitting (81.1%)	Sitting (81.8%)	Sitting (81.7%)	Sitting (81.2%)
	Fall	Walking (90.4%)	Standing (83.1%)	Standing (83.1%)	Standing (83.1%)	Standing (82.1%)
	Winter	Walking (92.8%)	Standing (86.5%)	Standing (85.9%)	Standing (85.5%)	Standing (84.5%)
	Annual	Standing (84.7%)	Standing (88.5%)	Standing (88.5%)	Standing (88.1%)	Standing (87.6%)
89	Spring	Standing (92.1%)	Standing (92.8%)	Standing (93.3%)	Standing (92.9%)	Standing (92.6%)
	Summer	Standing (93.3%)	Sitting (81.7%)	Sitting (82.4%)	Sitting (82.2%)	Sitting (82.4%)
	Fall	Standing (81.3%)	Standing (83.6%)	Standing (85.2%)	Standing (83.6%)	Standing (84.8%)
	Winter	Standing (85.4%)	Standing (87.8%)	Standing (89.4%)	Standing (87.6%)	Standing (88.4%)
	Annual	Standing (87.7%)	Standing (89.2%)	Standing (90.8%)	Standing (89.1%)	Standing (90.1%)
90	Spring	Standing (83.5%)	Standing (83.5%)	Standing (83.4%)	Standing (85%)	Standing (84%)
	Summer	Standing (90.6%)	Sitting (80.2%)	Sitting (80.1%)	Sitting (80.7%)	Sitting (80.4%)
	Fall	Walking (89.9%)	Walking (89.7%)	Walking (89.7%)	Walking (91.2%)	Walking (90.4%)
	Winter	Walking (92.6%)	Walking (92.2%)	Walking (92%)	Standing (80.7%)	Walking (92.9%)
	Annual	Standing (82.1%)	Standing (82.3%)	Standing (82.3%)	Standing (83.8%)	Standing (82.8%)

Table 3: Pedestrian Level Wind Conditions for the Tamar Development

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
91	Spring	Standing (87.3%)	Standing (87.7%)	Standing (87.7%)	Standing (86.6%)	Standing (86.1%)
	Summer	Sitting (82.3%)	Sitting (81.1%)	Sitting (81.4%)	Sitting (80.9%)	Sitting (81%)
	Fall	Standing (80.8%)	Standing (80.9%)	Standing (80.8%)	Walking (92.6%)	Walking (92.4%)
	Winter	Standing (81.8%)	Standing (82.1%)	Standing (81.9%)	Standing (80.6%)	Walking (93.9%)
	Annual	Standing (85.7%)	Standing (85.9%)	Standing (85.8%)	Standing (84.5%)	Standing (84.4%)
92	Spring	Standing (87.5%)	Standing (87.3%)	Standing (87.8%)	Standing (86%)	Standing (85.6%)
	Summer	Sitting (83.6%)	Sitting (81.5%)	Sitting (82.3%)	Sitting (81.2%)	Sitting (81.3%)
	Fall	Walking (92.1%)	Walking (92%)	Walking (92.5%)	Walking (90.7%)	Walking (90.4%)
	Winter	Walking (94%)	Walking (94.1%)	Walking (94.8%)	Walking (92.1%)	Walking (92.2%)
	Annual	Standing (84.4%)	Standing (84.1%)	Standing (84.7%)	Standing (82.8%)	Standing (82%)
93	Spring	Standing (91.8%)	Standing (90.3%)	Standing (91.2%)	Standing (91.3%)	Standing (90.5%)
	Summer	Sitting (82.3%)	Sitting (81.7%)	Sitting (82.9%)	Sitting (83.3%)	Sitting (82.7%)
	Fall	Standing (80.5%)	Walking (91.4%)	Walking (91.4%)	Standing (80.3%)	Walking (90.9%)
	Winter	Standing (84.7%)	Standing (81.5%)	Standing (82.8%)	Standing (82.8%)	Standing (81.4%)
	Annual	Standing (87.2%)	Standing (85.5%)	Standing (87%)	Standing (87.1%)	Standing (85.9%)
94	Spring	Walking (92%)	Walking (91.1%)	Standing (80.3%)	Standing (80.5%)	Standing (80.1%)
	Summer	Sitting (80.9%)	Sitting (81.3%)	Sitting (82.1%)	Sitting (82.5%)	Sitting (82.4%)
	Fall	Walking (86.1%)	Walking (85.9%)	Walking (87.1%)	Walking (87.1%)	Walking (86.7%)
	Winter	Walking (88.5%)	Walking (88.4%)	Walking (89.4%)	Walking (88.9%)	Walking (88.5%)
	Annual	Walking (90.7%)	Walking (90.7%)	Walking (91.4%)	Walking (91.2%)	Walking (90.9%)
95	Spring	Walking (91.4%)	Standing (81.5%)	Standing (81.8%)	Standing (81.3%)	Standing (81.8%)
	Summer	Standing (88.8%)	Standing (90.1%)	Standing (90.3%)	Standing (90.1%)	Standing (90.6%)
	Fall	Walking (87.2%)	Walking (87.7%)	Walking (88%)	Walking (87.8%)	Walking (87.9%)
	Winter	Walking (89.3%)	Walking (90.8%)	Walking (90.7%)	Walking (90%)	Walking (90.1%)
	Annual	Walking (91.3%)	Walking (92%)	Walking (92.1%)	Walking (91.8%)	Walking (91.9%)
96	Spring	Standing (80.6%)	Standing (80.1%)	Standing (81%)	Standing (80.4%)	Standing (80.8%)
	Summer	Standing (89.3%)	Standing (89.5%)	Standing (89.9%)	Standing (89.7%)	Standing (90%)
	Fall	Walking (85.4%)	Walking (84.7%)	Walking (86.2%)	Walking (84.9%)	Walking (85.6%)
	Winter	Walking (88.8%)	Walking (88.5%)	Walking (89.3%)	Walking (88.1%)	Walking (88.9%)
	Annual	Walking (90.7%)	Walking (90.5%)	Walking (91.1%)	Walking (90.4%)	Walking (90.8%)
97	Spring	Walking (91.3%)	Walking (90%)	Walking (90.8%)	Standing (80.2%)	Walking (92.2%)
	Summer	Standing (86.4%)	Standing (86.9%)	Standing (87.4%)	Standing (88%)	Standing (88.2%)
	Fall	Walking (83.1%)	Walking (81.9%)	Walking (83.2%)	Walking (84.2%)	Walking (84.3%)
	Winter	Walking (86.9%)	Walking (85.4%)	Walking (86.7%)	Walking (88.3%)	Walking (87.9%)
	Annual	Walking (88.7%)	Walking (87.6%)	Walking (89.3%)	Walking (89.8%)	Walking (90.1%)
98	Spring	Standing (81.2%)	Standing (88.8%)	Standing (88.7%)	Standing (88.1%)	Standing (86.9%)
	Summer	Standing (88.8%)	Standing (92.5%)	Standing (92.8%)	Standing (92.6%)	Standing (92.5%)
	Fall	Walking (88.2%)	Walking (92.6%)	Walking (91.6%)	Walking (92.5%)	Walking (90.7%)
	Winter	Walking (91.4%)	Standing (80.2%)	Walking (94.9%)	Walking (95.5%)	Walking (93.9%)
	Annual	Walking (92.5%)	Standing (84%)	Standing (84.5%)	Standing (84.3%)	Standing (82.7%)
99	Spring	Sitting (83%)	Standing (80.9%)	Standing (80.4%)	Standing (81.2%)	Standing (80.7%)
	Summer	Sitting (88%)	Sitting (81.4%)	Sitting (81.2%)	Sitting (81.7%)	Sitting (81.6%)
	Fall	Standing (89.3%)	Walking (86.5%)	Walking (86.7%)	Walking (86.9%)	Walking (86.9%)
	Winter	Standing (92.6%)	Walking (89.2%)	Walking (89%)	Walking (89.2%)	Walking (89.1%)
	Annual	Standing (93.5%)	Walking (91.2%)	Walking (91.3%)	Walking (91.5%)	Walking (91.2%)
100	Spring	Standing (86.3%)	Standing (89.5%)	Standing (91.6%)	Standing (90.7%)	Standing (90.5%)
	Summer	Standing (91.2%)	Sitting (82.1%)	Sitting (84.3%)	Sitting (83.6%)	Sitting (84.2%)
	Fall	Walking (91%)	Walking (91.3%)	Standing (83.1%)	Walking (92.2%)	Standing (82.4%)
	Winter	Walking (95%)	Standing (81.9%)	Standing (87.2%)	Standing (83.3%)	Standing (86.4%)
	Annual	Standing (82.4%)	Standing (84.8%)	Standing (89.3%)	Standing (86.1%)	Standing (88.8%)

Table 3: Pedestrian Level Wind Conditions for the Tamar Development

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
101	Spring	Standing (87%)	Standing (89.9%)	Standing (91%)	Standing (90%)	Standing (90.6%)
	Summer	Standing (88.6%)	Standing (87.9%)	Standing (88.3%)	Standing (88.2%)	Standing (87.9%)
	Fall	Walking (90.4%)	Walking (93.7%)	Standing (82.6%)	Standing (80.1%)	Standing (82%)
	Winter	Walking (93.9%)	Standing (84.1%)	Standing (86.9%)	Standing (84.2%)	Standing (86%)
	Annual	Standing (82.4%)	Standing (85.2%)	Standing (87.5%)	Standing (85.3%)	Standing (87%)
102	Spring	Sitting (88.7%)	Sitting (89.1%)	Sitting (89.3%)	Sitting (88.9%)	Sitting (88.4%)
	Summer	Sitting (88.7%)	Sitting (88.8%)	Sitting (88.9%)	Sitting (89%)	Sitting (89%)
	Fall	Standing (93.8%)	Standing (94.6%)	Sitting (80.4%)	Standing (94.8%)	Standing (94.6%)
	Winter	Sitting (81.6%)	Sitting (83.5%)	Sitting (84.8%)	Sitting (83.8%)	Sitting (83.4%)
	Annual	Sitting (83%)	Sitting (84.6%)	Sitting (86.2%)	Sitting (85.3%)	Sitting (84.6%)
103	Spring	Sitting (83.2%)	Sitting (81.5%)	Sitting (82.6%)	Sitting (84.6%)	Sitting (83.8%)
	Summer	Sitting (85.1%)	Sitting (85%)	Sitting (85.4%)	Sitting (87.1%)	Sitting (86.7%)
	Fall	Standing (90.7%)	Standing (88.6%)	Standing (89.8%)	Standing (92%)	Standing (91.1%)
	Winter	Standing (94.3%)	Standing (92.2%)	Standing (93.3%)	Standing (95.5%)	Standing (94.7%)
	Annual	Standing (94.1%)	Standing (91.9%)	Standing (93.5%)	Sitting (81.1%)	Sitting (80.3%)
104	Spring	Sitting (81.7%)	Sitting (82.1%)	Sitting (82.8%)	Sitting (83.6%)	Sitting (83.8%)
	Summer	Sitting (83.7%)	Sitting (83.1%)	Sitting (83.8%)	Sitting (84.2%)	Sitting (84.3%)
	Fall	Standing (90.2%)	Standing (90.4%)	Standing (91%)	Standing (92%)	Standing (91.9%)
	Winter	Standing (94%)	Standing (93.9%)	Standing (94.4%)	Standing (95.4%)	Standing (95.3%)
	Annual	Standing (93.6%)	Standing (93.8%)	Standing (94.1%)	Standing (94.7%)	Sitting (80%)
105	Spring	Sitting (86.1%)	Sitting (86.2%)	Sitting (87.1%)	Sitting (87.5%)	Sitting (86.6%)
	Summer	Sitting (84.6%)	Sitting (85.4%)	Sitting (85.5%)	Sitting (85.9%)	Sitting (86%)
	Fall	Standing (93.1%)	Standing (93.3%)	Standing (93.9%)	Standing (94.1%)	Standing (93.6%)
	Winter	Sitting (80.4%)	Sitting (80.4%)	Sitting (81.7%)	Sitting (82.5%)	Sitting (80.9%)
	Annual	Sitting (80.9%)	Sitting (81.1%)	Sitting (82.6%)	Sitting (83.1%)	Sitting (82.4%)
106	Spring	Standing (89.8%)	Standing (88.5%)	Standing (88.8%)	Standing (90%)	Standing (89.2%)
	Summer	Standing (92.5%)	Standing (91.8%)	Standing (91.9%)	Standing (92.4%)	Standing (92.1%)
	Fall	Standing (82.4%)	Standing (81.3%)	Standing (81.6%)	Standing (83.2%)	Standing (82.4%)
	Winter	Standing (85.5%)	Standing (84.2%)	Standing (84.5%)	Standing (86.6%)	Standing (85.3%)
	Annual	Standing (87.4%)	Standing (86.5%)	Standing (86.7%)	Standing (88%)	Standing (87.2%)
107	Spring	Standing (91.8%)	Standing (91.6%)	Standing (91.8%)	Standing (92.9%)	Standing (93.4%)
	Summer	Standing (91.7%)	Standing (90.8%)	Standing (91%)	Standing (91.7%)	Standing (91.5%)
	Fall	Standing (85.8%)	Standing (86.5%)	Standing (86.6%)	Standing (88.3%)	Standing (88.1%)
	Winter	Standing (89.8%)	Standing (90.6%)	Standing (90.6%)	Standing (92.4%)	Standing (92.2%)
	Annual	Standing (90%)	Standing (89.9%)	Standing (90.5%)	Standing (91.7%)	Standing (91.5%)
108	Spring	Sitting (81.3%)	Standing (94.5%)	Sitting (80.6%)	Sitting (81.4%)	Sitting (80.9%)
	Summer	Standing (89%)	Standing (87.8%)	Standing (88.2%)	Standing (88.3%)	Standing (88.3%)
	Fall	Standing (90.7%)	Standing (90.6%)	Standing (91%)	Standing (91.6%)	Standing (91.2%)
	Winter	Standing (95.8%)	Standing (95.4%)	Standing (95.5%)	Sitting (80.1%)	Standing (95.9%)
	Annual	Standing (92.9%)	Standing (92.3%)	Standing (92.6%)	Standing (93%)	Standing (92.7%)
109	Spring	Sitting (87.5%)	Sitting (86.5%)	Sitting (87.4%)	Sitting (87.9%)	Sitting (86.7%)
	Summer	Sitting (85.2%)	Sitting (86.4%)	Sitting (86.8%)	Sitting (86.9%)	Sitting (86.8%)
	Fall	Standing (93.9%)	Standing (93.6%)	Standing (94.1%)	Standing (94.4%)	Standing (93.6%)
	Winter	Sitting (82.3%)	Sitting (81.1%)	Sitting (82.2%)	Sitting (83.3%)	Sitting (81%)
	Annual	Sitting (82.7%)	Sitting (82.6%)	Sitting (83.3%)	Sitting (83.9%)	Sitting (82.6%)
110	Spring	Sitting (81.3%)	Standing (94.7%)	Sitting (80.6%)	Sitting (81.3%)	Sitting (80.4%)
	Summer	Standing (93.6%)	Standing (93.3%)	Standing (93.6%)	Standing (93.7%)	Standing (93.4%)
	Fall	Standing (89.2%)	Standing (87.9%)	Standing (88.6%)	Standing (89%)	Standing (88.4%)
	Winter	Standing (93.8%)	Standing (92.4%)	Standing (92.7%)	Standing (93.1%)	Standing (92.6%)
	Annual	Standing (93.1%)	Standing (92.1%)	Standing (92.5%)	Standing (92.7%)	Standing (92.3%)

Table 3: Pedestrian Level Wind Conditions for the Tamar Development

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
111	Spring	Standing (90.9%)	Standing (92.9%)	Standing (93.2%)	Standing (92.9%)	Standing (92.7%)
	Summer	Standing (90.5%)	Standing (90.6%)	Standing (91.1%)	Standing (91.2%)	Standing (91.1%)
	Fall	Standing (82.4%)	Standing (85.1%)	Standing (85.5%)	Standing (85.3%)	Standing (85%)
	Winter	Standing (85.3%)	Standing (89%)	Standing (89.1%)	Standing (88.2%)	Standing (88%)
	Annual	Standing (86.8%)	Standing (88.7%)	Standing (89%)	Standing (88.7%)	Standing (88.4%)
112	Spring	Sitting (95%)	Sitting (95.8%)	Sitting (96%)	Sitting (95.6%)	Sitting (96.1%)
	Summer	Sitting (95.2%)	Sitting (95%)	Sitting (95.5%)	Sitting (95.4%)	Sitting (95.4%)
	Fall	Sitting (85.8%)	Sitting (87.2%)	Sitting (87.3%)	Sitting (87.1%)	Sitting (87.7%)
	Winter	Sitting (88.4%)	Sitting (90.9%)	Sitting (90.7%)	Sitting (90.4%)	Sitting (91.3%)
	Annual	Sitting (90.4%)	Sitting (91.6%)	Sitting (91.7%)	Sitting (91.5%)	Sitting (92%)
113	Spring	Sitting (84.2%)	Sitting (84.5%)	Sitting (85.6%)	Sitting (85.6%)	Sitting (85.8%)
	Summer	Sitting (85.1%)	Sitting (85.3%)	Sitting (85.8%)	Sitting (86.1%)	Sitting (86.3%)
	Fall	Standing (90.2%)	Standing (90.7%)	Standing (91.8%)	Standing (91.2%)	Standing (91.6%)
	Winter	Standing (94.6%)	Standing (94.8%)	Standing (95.1%)	Standing (95%)	Standing (95.4%)
	Annual	Standing (94.3%)	Standing (94.4%)	Sitting (80%)	Sitting (80.1%)	Sitting (80.4%)
114	Spring	Standing (90.7%)	Standing (94.5%)	Standing (94.7%)	Standing (94%)	Standing (94%)
	Summer	Standing (91.8%)	Sitting (81%)	Sitting (81.2%)	Sitting (80.7%)	Sitting (81.2%)
	Fall	Standing (82%)	Standing (87.2%)	Standing (87.5%)	Standing (86.6%)	Standing (86.5%)
	Winter	Standing (85%)	Standing (91.2%)	Standing (91.1%)	Standing (90%)	Standing (90.2%)
	Annual	Standing (87.8%)	Standing (91.7%)	Standing (91.8%)	Standing (91%)	Standing (91.1%)
115	Spring	Standing (84.9%)	Standing (93.6%)	Sitting (82%)	Standing (93.7%)	Standing (94.1%)
	Summer	Sitting (81.5%)	Sitting (85.4%)	Sitting (86.5%)	Sitting (85.7%)	Sitting (85.5%)
	Fall	Walking (91.7%)	Standing (87.8%)	Standing (90.4%)	Standing (88%)	Standing (88.6%)
	Winter	Walking (94.1%)	Standing (90.2%)	Standing (92.9%)	Standing (90.2%)	Standing (91%)
	Annual	Standing (82.2%)	Standing (91.6%)	Standing (93.4%)	Standing (91.7%)	Standing (92%)
116	Spring	Standing (90.5%)	Standing (93.7%)	Standing (94.3%)	Standing (93.9%)	Standing (94%)
	Summer	Standing (92.4%)	Standing (93.5%)	Sitting (80.1%)	Sitting (80.1%)	Standing (93.5%)
	Fall	Standing (81.8%)	Standing (84.9%)	Standing (85.4%)	Standing (84.9%)	Standing (85.2%)
	Winter	Standing (83.7%)	Standing (88.8%)	Standing (89.2%)	Standing (88.5%)	Standing (89%)
	Annual	Standing (86.6%)	Standing (89.7%)	Standing (90%)	Standing (89.6%)	Standing (89.8%)
117	Spring	Standing (83.6%)	Standing (92.3%)	Standing (92.8%)	Standing (92.9%)	Standing (92.4%)
	Summer	Standing (91.4%)	Sitting (82%)	Sitting (82.5%)	Sitting (83%)	Sitting (82.6%)
	Fall	Walking (90.3%)	Standing (84.2%)	Standing (84.8%)	Standing (85%)	Standing (84.2%)
	Winter	Walking (92.3%)	Standing (87.9%)	Standing (88.1%)	Standing (88.6%)	Standing (87.9%)
	Annual	Standing (81%)	Standing (89.8%)	Standing (90%)	Standing (90.2%)	Standing (89.8%)
118	Spring	Standing (87.2%)	Sitting (82.9%)	Sitting (84.1%)	Sitting (84.2%)	Sitting (84.4%)
	Summer	Sitting (82.3%)	Sitting (86.8%)	Sitting (87.4%)	Sitting (87.3%)	Sitting (87%)
	Fall	Walking (91.4%)	Standing (86.9%)	Standing (87.8%)	Standing (87.6%)	Standing (87.9%)
	Winter	Walking (94.7%)	Standing (90.2%)	Standing (90.7%)	Standing (90.5%)	Standing (91%)
	Annual	Standing (83.6%)	Standing (92%)	Standing (92.4%)	Standing (92.4%)	Standing (92.6%)
119	Spring	Standing (90.2%)	Standing (93%)	Standing (93.2%)	Standing (93.1%)	Standing (93.4%)
	Summer	Sitting (83.4%)	Sitting (85.5%)	Sitting (85.9%)	Sitting (86%)	Sitting (86.4%)
	Fall	Standing (80.3%)	Standing (83.3%)	Standing (83.7%)	Standing (83.5%)	Standing (83.7%)
	Winter	Walking (94.7%)	Standing (83.4%)	Standing (83.4%)	Standing (83%)	Standing (83.4%)
	Annual	Standing (86%)	Standing (88.7%)	Standing (88.8%)	Standing (88.5%)	Standing (88.8%)
120	Spring	Standing (88.1%)	Standing (91.4%)	Standing (91.5%)	Standing (92%)	Standing (92%)
	Summer	Standing (92.4%)	Standing (93.3%)	Sitting (80.5%)	Sitting (80.5%)	Sitting (80.6%)
	Fall	Walking (93.4%)	Standing (82.6%)	Standing (82.4%)	Standing (83.1%)	Standing (83.8%)
	Winter	Standing (81%)	Standing (86.2%)	Standing (85.9%)	Standing (86.7%)	Standing (87%)
	Annual	Standing (84.1%)	Standing (87.5%)	Standing (88.6%)	Standing (89%)	Standing (89.2%)

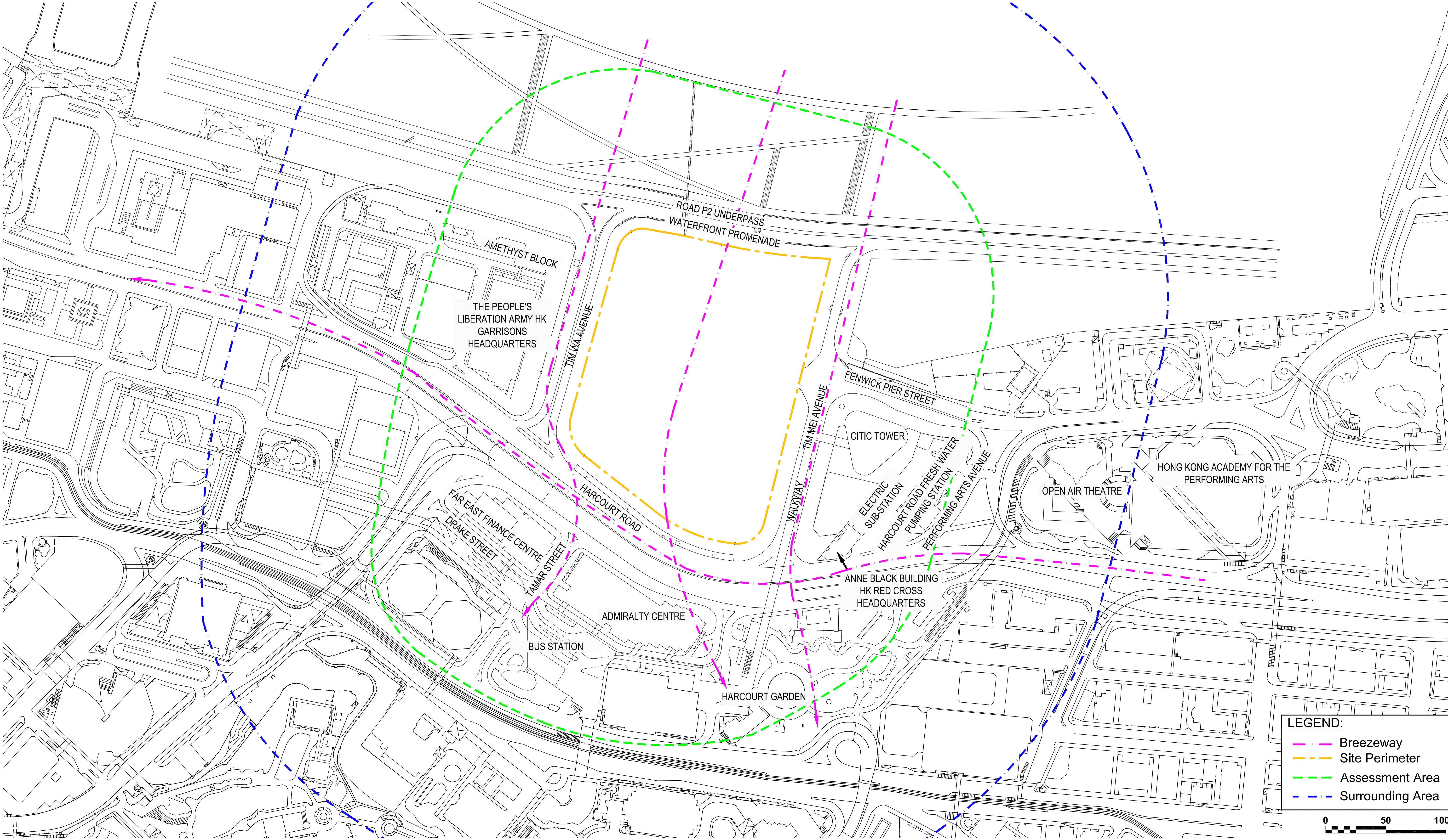
Table 3: Pedestrian Level Wind Conditions for the Tamar Development

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
121	Spring	Standing (90.7%)	Standing (91.8%)	Standing (92.4%)	Standing (92.5%)	Standing (91.7%)
	Summer	Standing (89.5%)	Standing (89.9%)	Standing (90.4%)	Standing (90.3%)	Standing (89.8%)
	Fall	Standing (80.9%)	Standing (81.9%)	Standing (82.8%)	Standing (82.7%)	Standing (82.2%)
	Winter	Standing (84.1%)	Standing (85.3%)	Standing (85.9%)	Standing (85.6%)	Standing (85.1%)
	Annual	Standing (86%)	Standing (86.9%)	Standing (87.4%)	Standing (87.1%)	Standing (86.8%)
122	Spring	Standing (81.8%)	Standing (88.6%)	Standing (89.6%)	Standing (91.2%)	Standing (90.7%)
	Summer	Standing (89.3%)	Standing (90.4%)	Standing (90.6%)	Standing (91.3%)	Standing (90.9%)
	Fall	Walking (89.3%)	Standing (81.8%)	Standing (82.9%)	Standing (84.6%)	Standing (84.1%)
	Winter	Walking (90.5%)	Standing (84.4%)	Standing (85.5%)	Standing (87.5%)	Standing (86.8%)
	Annual	Walking (92.3%)	Standing (86%)	Standing (86.8%)	Standing (88.4%)	Standing (87.9%)
123	Spring	Standing (83.8%)	Standing (85.8%)	Standing (86.2%)	Standing (87.4%)	Standing (86.6%)
	Summer	Standing (85.9%)	Standing (85.5%)	Standing (85.9%)	Standing (86.2%)	Standing (85.8%)
	Fall	Walking (91%)	Walking (92.1%)	Walking (92.4%)	Walking (93.3%)	Walking (93%)
	Winter	Walking (93.4%)	Walking (94.8%)	Standing (80%)	Standing (82%)	Standing (81.1%)
	Annual	Walking (93.8%)	Standing (82%)	Standing (82.4%)	Standing (83.7%)	Standing (82.9%)
124	Spring	Standing (82.7%)	Standing (82.3%)	Standing (82.7%)	Standing (82.4%)	Standing (82.9%)
	Summer	Standing (88.2%)	Standing (87.4%)	Standing (87.7%)	Standing (87.5%)	Standing (87.6%)
	Fall	Walking (89.9%)	Walking (89.2%)	Walking (89.1%)	Walking (89%)	Walking (89%)
	Winter	Walking (92.3%)	Walking (91.5%)	Walking (91.2%)	Walking (91%)	Walking (91%)
	Annual	Walking (93.1%)	Walking (92.5%)	Walking (92.4%)	Walking (92.3%)	Walking (92.4%)
125	Spring	Standing (85.5%)	Standing (85.3%)	Standing (85.4%)	Standing (85%)	Standing (85.1%)
	Summer	Standing (89.8%)	Standing (89.9%)	Standing (89.9%)	Standing (89.7%)	Standing (89.4%)
	Fall	Walking (91.5%)	Walking (91.6%)	Walking (91.6%)	Walking (91.3%)	Walking (91.4%)
	Winter	Walking (94.4%)	Walking (94.1%)	Walking (94.1%)	Walking (93.7%)	Walking (93.8%)
	Annual	Standing (82.2%)	Standing (82.3%)	Standing (82.3%)	Standing (81.9%)	Standing (82.1%)
126	Spring	Standing (93.1%)	Standing (89.1%)	Standing (89.7%)	Standing (89.8%)	Standing (89.7%)
	Summer	Sitting (82.2%)	Sitting (80.3%)	Sitting (80.9%)	Sitting (80.6%)	Sitting (81%)
	Fall	Standing (83.2%)	Walking (92.3%)	Walking (93.2%)	Walking (92.4%)	Walking (92.5%)
	Winter	Standing (87.1%)	Standing (81.1%)	Standing (82.1%)	Standing (81.3%)	Standing (81.9%)
	Annual	Standing (89.1%)	Standing (85.4%)	Standing (86.2%)	Standing (85.2%)	Standing (86.1%)
127	Spring	Standing (85.8%)	Standing (84.3%)	Standing (84.2%)	Standing (84.1%)	Standing (83.7%)
	Summer	Standing (87.9%)	Standing (87.5%)	Standing (87.7%)	Standing (87.9%)	Standing (87.8%)
	Fall	Walking (91.6%)	Walking (90.7%)	Walking (90.5%)	Walking (90.4%)	Walking (90.1%)
	Winter	Walking (94.9%)	Walking (93.6%)	Walking (93.4%)	Walking (93.3%)	Walking (92.9%)
	Annual	Standing (81.9%)	Standing (81.2%)	Standing (81.1%)	Standing (81%)	Standing (80.6%)
128	Spring	Standing (87.9%)	Standing (87.7%)	Standing (88%)	Standing (87.2%)	Standing (88%)
	Summer	Standing (89.9%)	Standing (89.7%)	Standing (90%)	Standing (90.1%)	Standing (90.1%)
	Fall	Walking (93.5%)	Walking (93.5%)	Standing (80.3%)	Walking (93.1%)	Standing (80.2%)
	Winter	Standing (82.9%)	Standing (83.1%)	Standing (83.7%)	Standing (82.2%)	Standing (83.5%)
	Annual	Standing (84.6%)	Standing (84.6%)	Standing (85.1%)	Standing (84.2%)	Standing (85%)
129	Spring	Standing (89.5%)	Standing (91.3%)	Standing (91.5%)	Standing (89.8%)	Standing (90.7%)
	Summer	Standing (90.7%)	Standing (91.4%)	Standing (91.6%)	Standing (91.2%)	Standing (91.7%)
	Fall	Standing (81.8%)	Standing (83.8%)	Standing (83.9%)	Standing (82.9%)	Standing (84%)
	Winter	Standing (85.7%)	Standing (87.9%)	Standing (88%)	Standing (86.4%)	Standing (88%)
	Annual	Standing (86.4%)	Standing (87.9%)	Standing (88.5%)	Standing (87.4%)	Standing (88.9%)
130	Spring	Standing (89.3%)	Standing (86.5%)	Standing (88.2%)	Standing (88.3%)	Standing (88.6%)
	Summer	Standing (91%)	Standing (90.2%)	Standing (90.8%)	Standing (91.3%)	Standing (91.1%)
	Fall	Standing (81.9%)	Walking (92.7%)	Standing (81%)	Standing (81.2%)	Standing (81.7%)
	Winter	Standing (85.9%)	Standing (82.2%)	Standing (84.5%)	Standing (84.2%)	Standing (85.3%)
	Annual	Standing (86.7%)	Standing (84.1%)	Standing (86%)	Standing (85.7%)	Standing (86.4%)

Table 3: Pedestrian Level Wind Conditions for the Tamar Development

Sensor Location	Sensor Type	**Configuration 1** Existing Site	**Configuration 2** Proposed Development	**Configuration 3** Proposed Development with Extensions	**Configuration 4** Proposed Development with Mitigation	**Configuration 5** Proposed Development with Mitigation and Extensions
131	Spring	Standing (92.6%)	Standing (92.8%)	Standing (93%)	Standing (93.1%)	Standing (92.4%)
	Summer	Standing (88.8%)	Standing (88.8%)	Standing (88.8%)	Standing (89%)	Standing (88.8%)
	Fall	Standing (85.9%)	Standing (86.7%)	Standing (87.1%)	Standing (86.9%)	Standing (86.2%)
	Winter	Standing (90.3%)	Standing (90.9%)	Standing (91.4%)	Standing (91.1%)	Standing (90.3%)
	Annual	Standing (89.6%)	Standing (90.3%)	Standing (90.5%)	Standing (90.3%)	Standing (89%)

FIGURES



Assessment & Surrounding Area

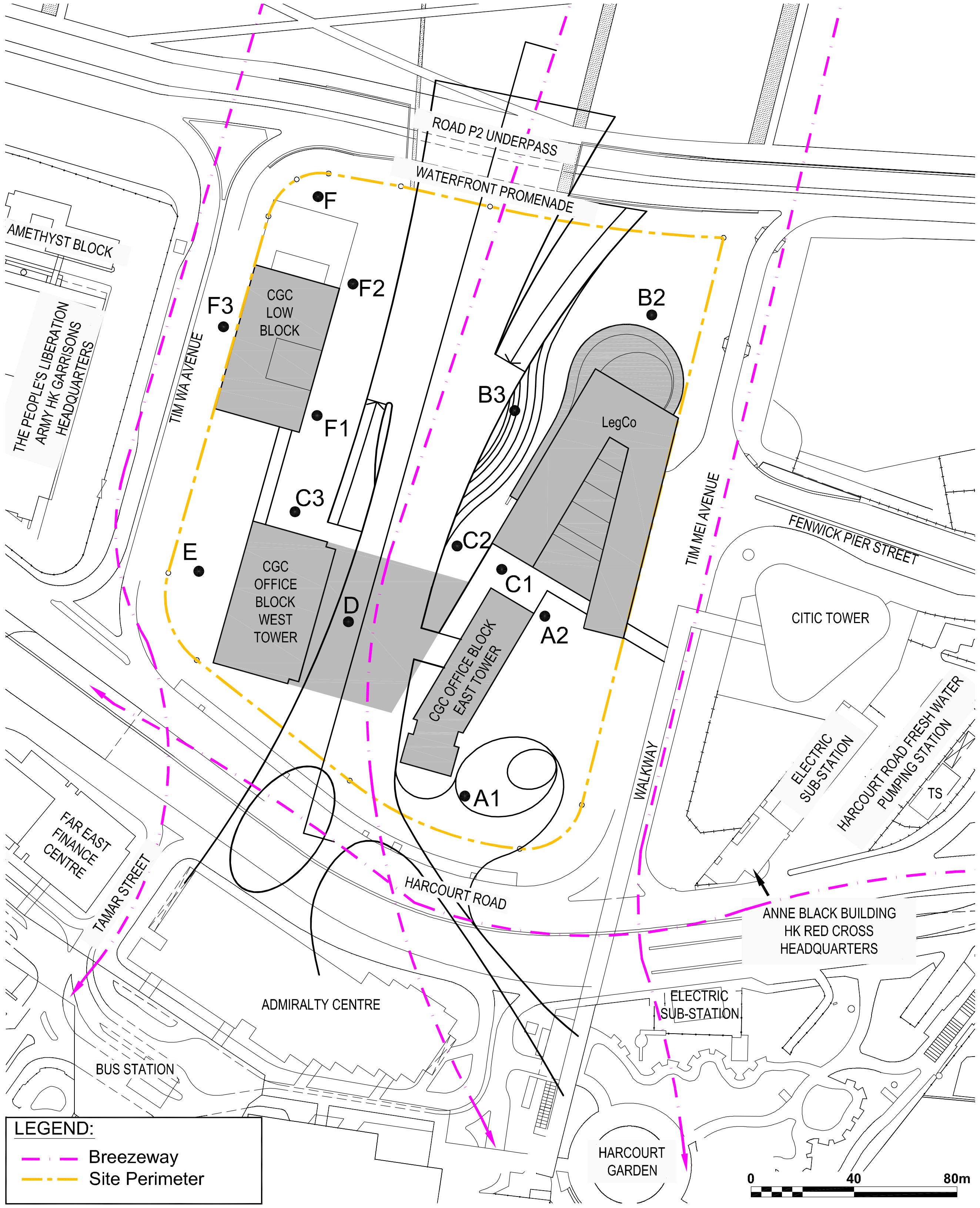
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJT	Figure: 1a
Approx. Scale:	1:3000
Date Revised:	Jan. 18, 2007

RWDI



Site Plan for Expert Evaluation

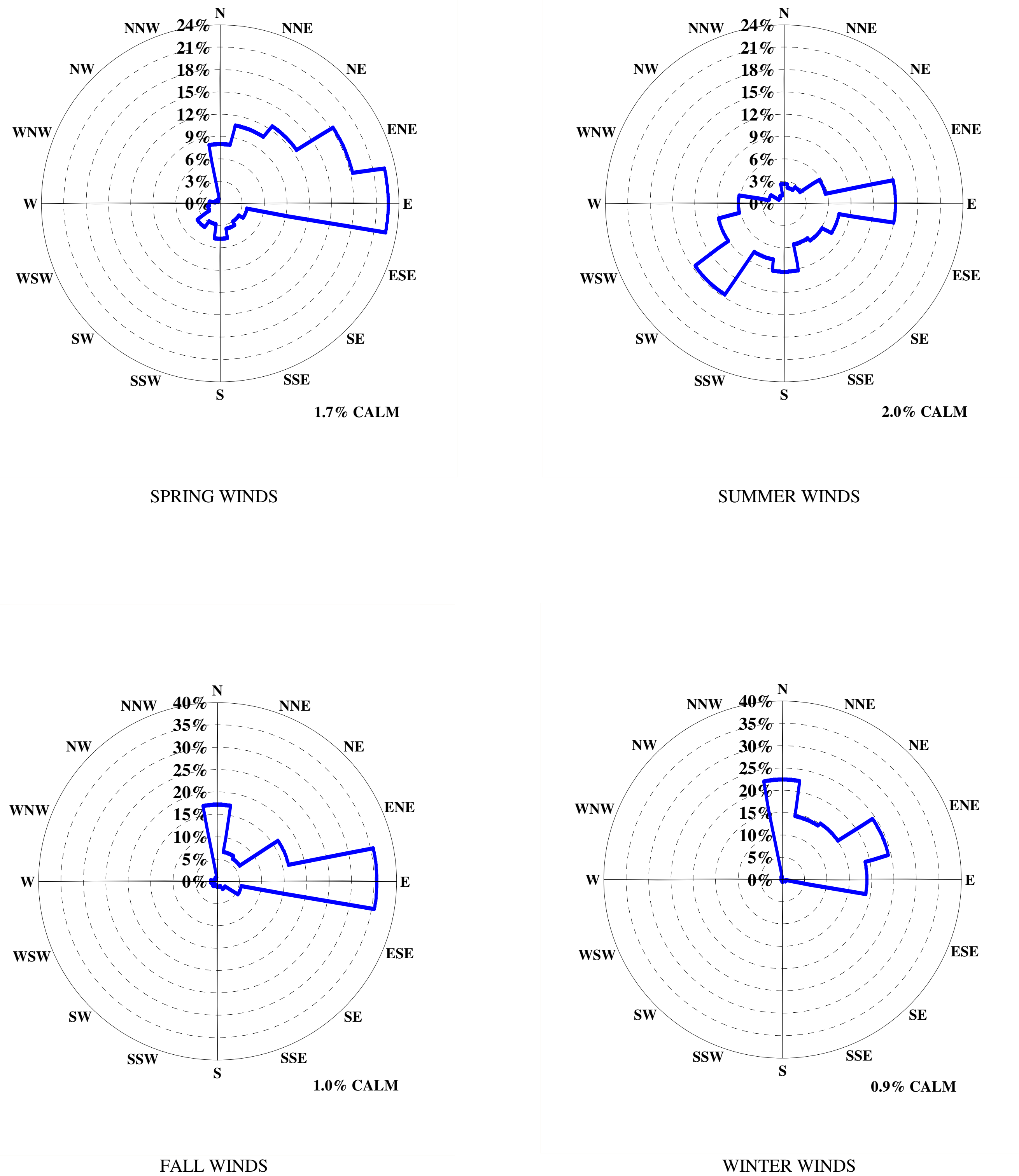
True North

Drawn by: DJT	Figure: **1b**
Approx. Scale:	1:2000
Date Revised:	Jan. 18, 2007

Tamar Development - Hong Kong

Project #07-1033

RWDI



Directional Distribution (%) of Winds (Blowing From)

Station: Waglan Island, Hong Kong (1975 - 2005)

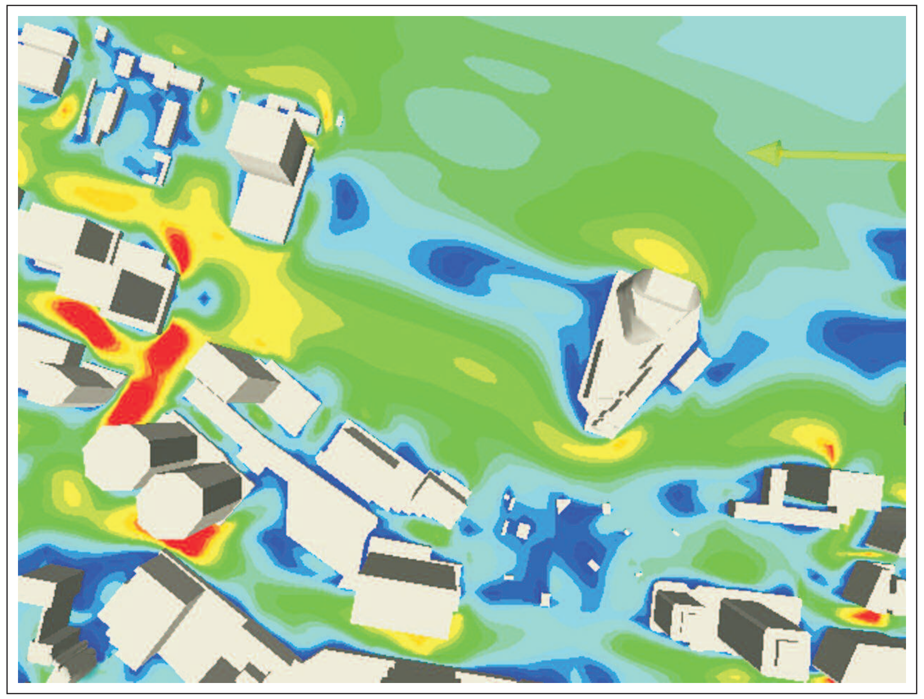
Tamar Development - Hong Kong, China

Project #: 07-1033

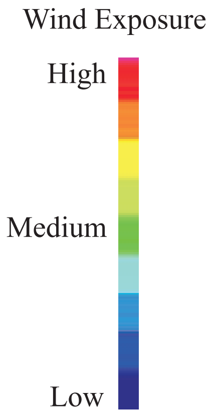
Figure No. 2

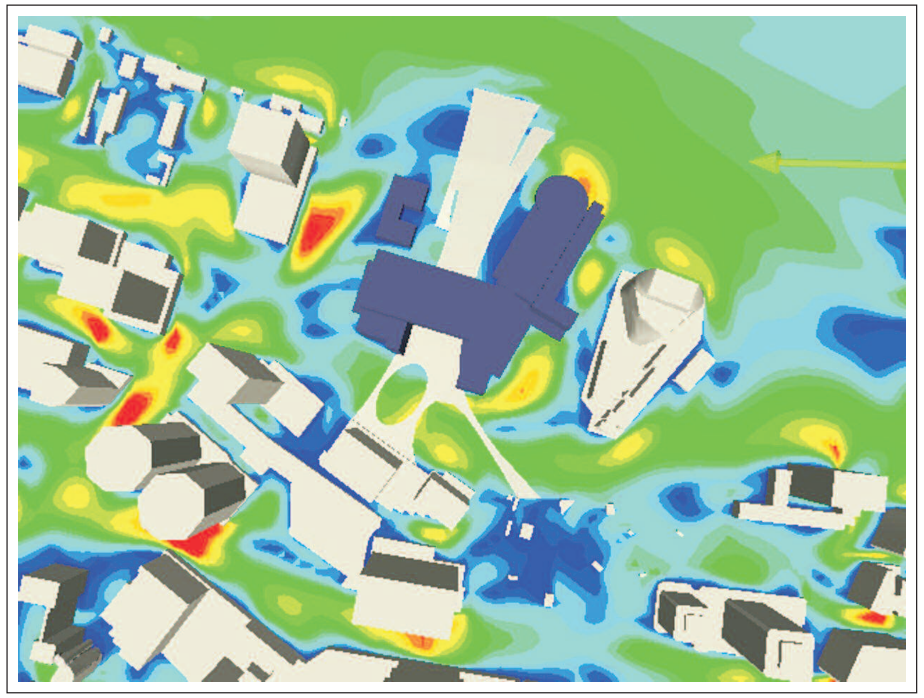
Date: Nov. 5, 2006

RWDI



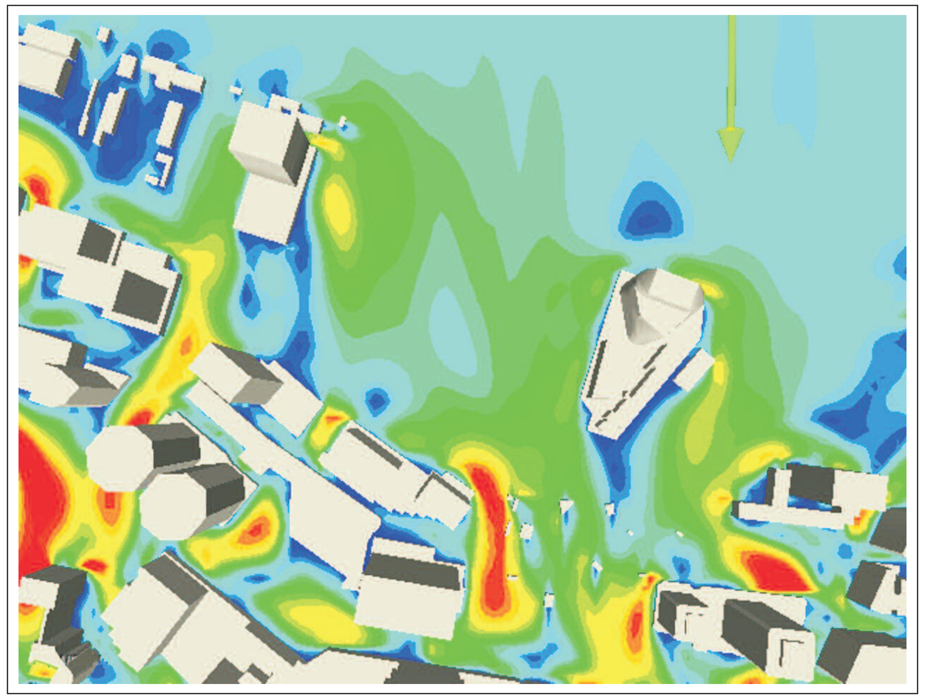
Existing Site



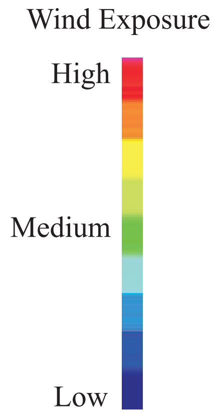


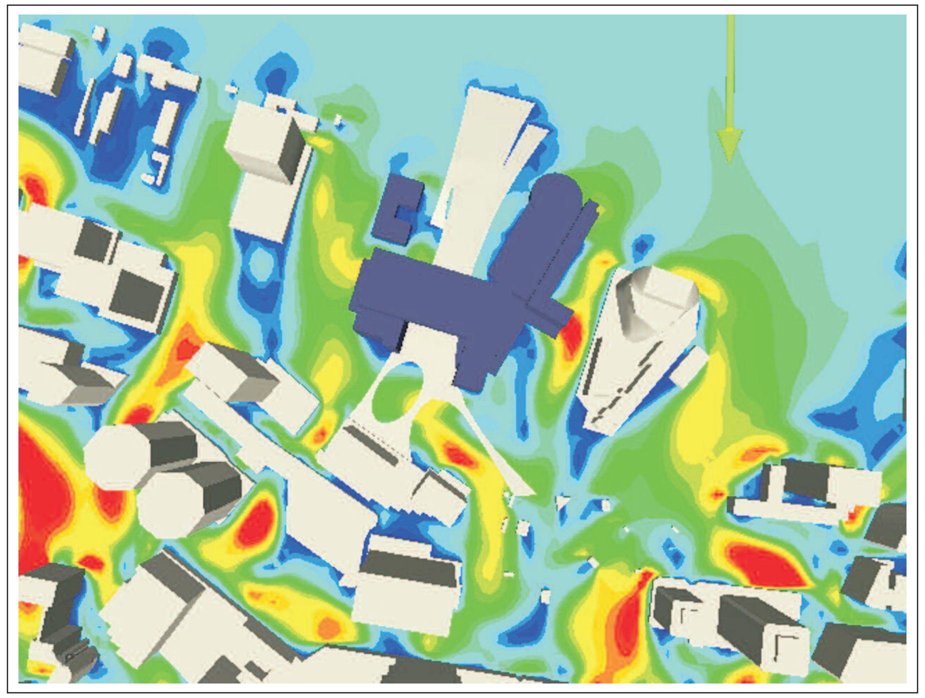
Initial Design - Base Configuration

Wind Exposure at Pedestrian Level (East Wind)	True North	Figure: 3a	RWDI
Tamar Development, Hong Kong	Project #07-1033	Date: January 18, 2007	



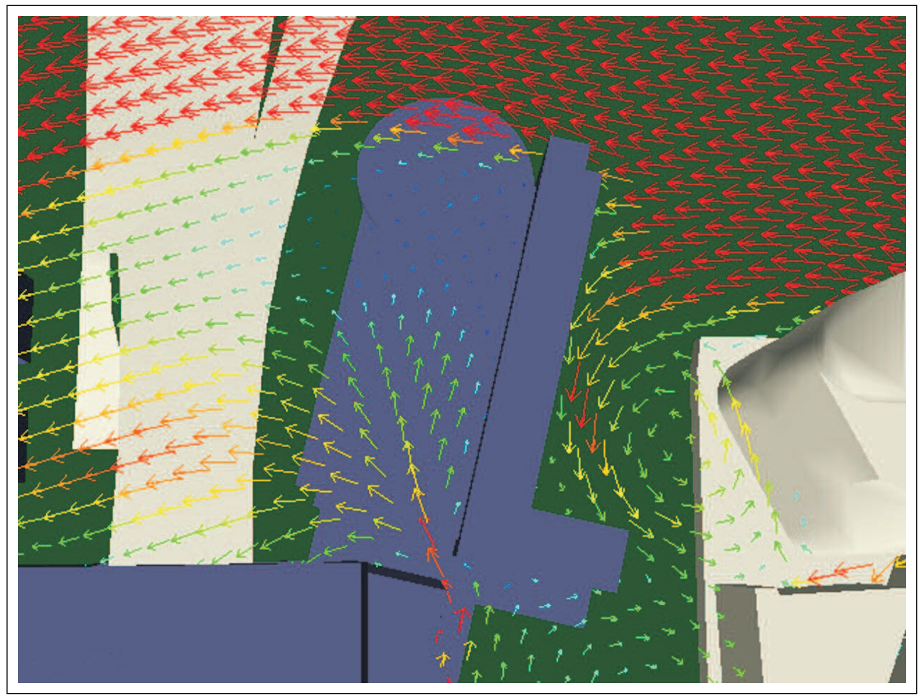
Existing Site



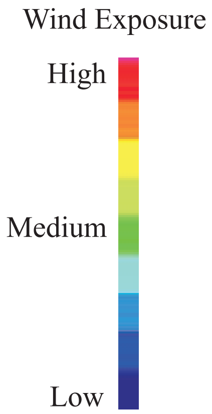


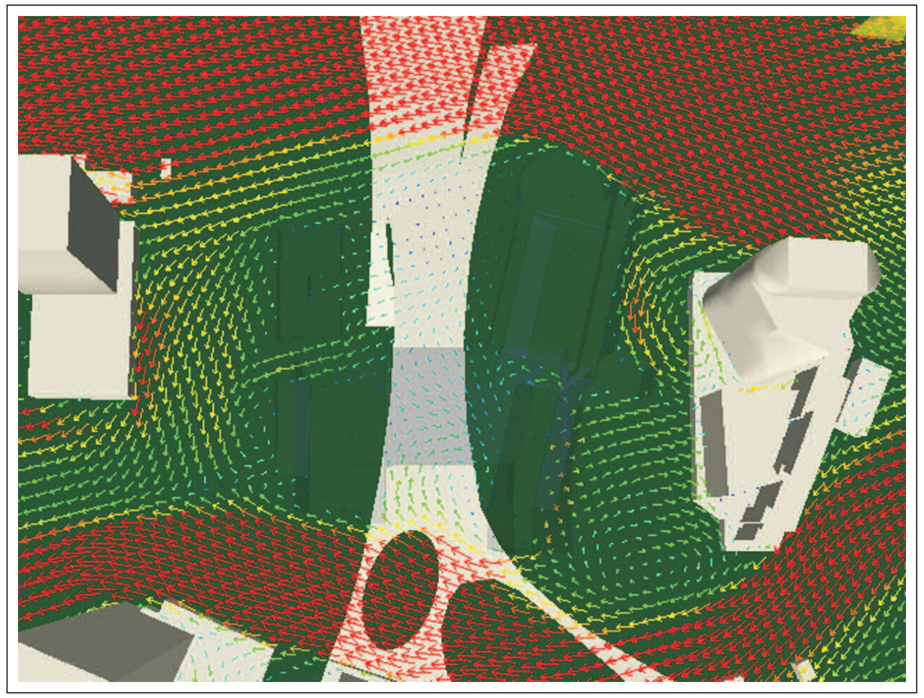
Initial Design - Base Configuration

Wind Exposure at Pedestrian Level (North Wind)	True North	Figure: 3b	RWDI
Tamar Development, Hong Kong	Project #07-1033	Date: January 18, 2007	



Pedestrian level above the LegCo roof garden





Pedestrian level above the Green Carpet

Wind Velocity Vectors (East Wind)
Initial Design - Base Configuration

Tamar Development, Hong Kong

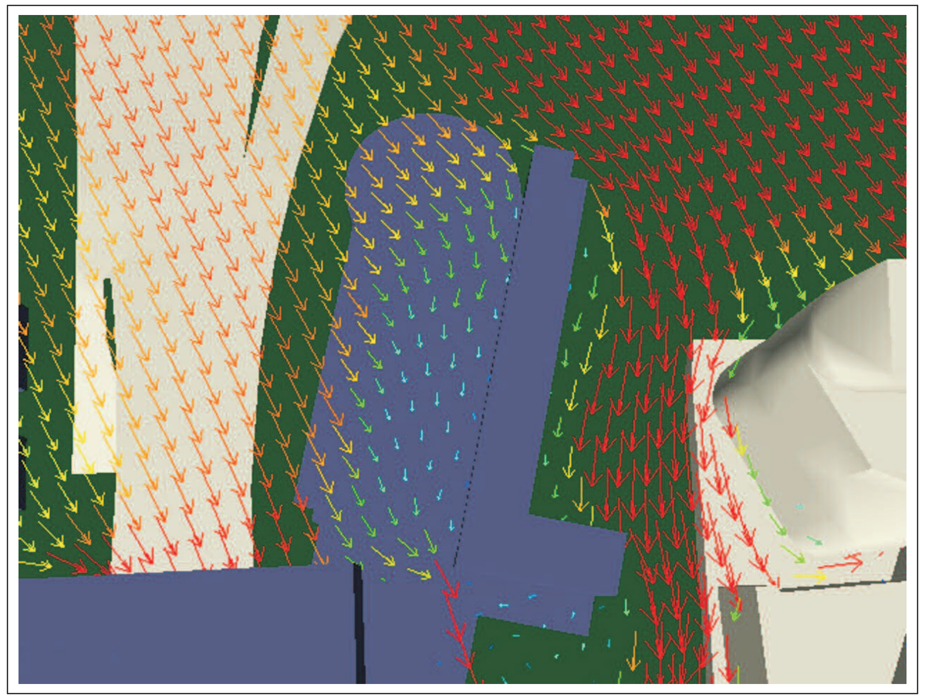
True North

Project #07-1033

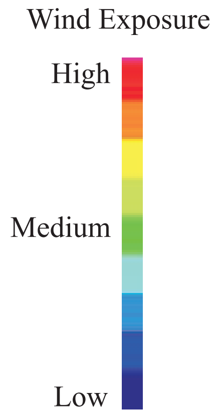
Figure: 4a

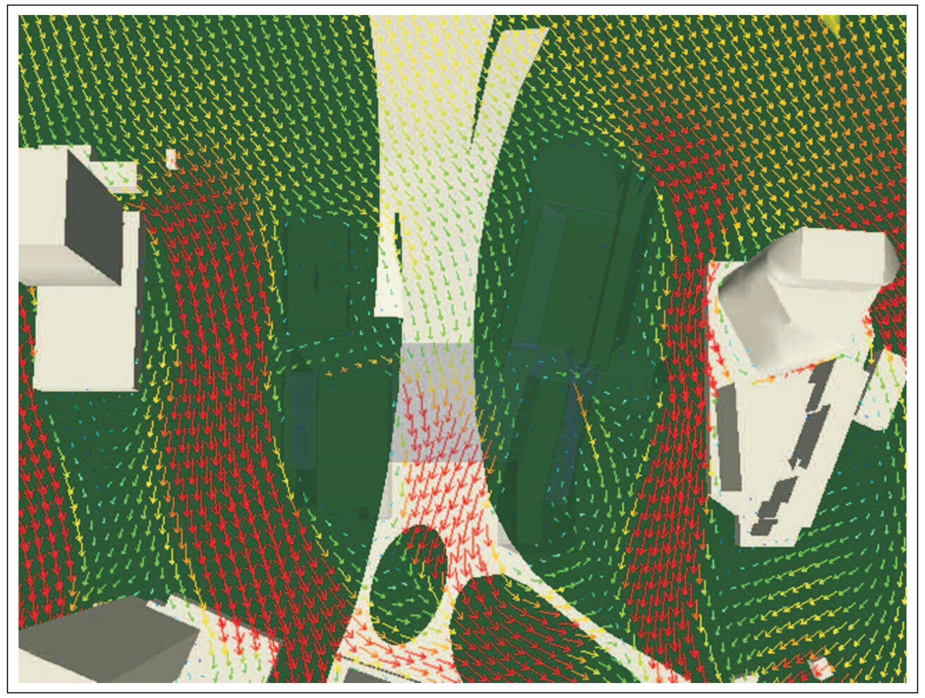
Date: January 18, 2007

RWDI



Pedestrian level above the LegCo roof garden





Pedestrian level above the Green Carpet

Wind Velocity Vectors (North Wind)
Initial Design - Base Configuration

Tamar Development, Hong Kong

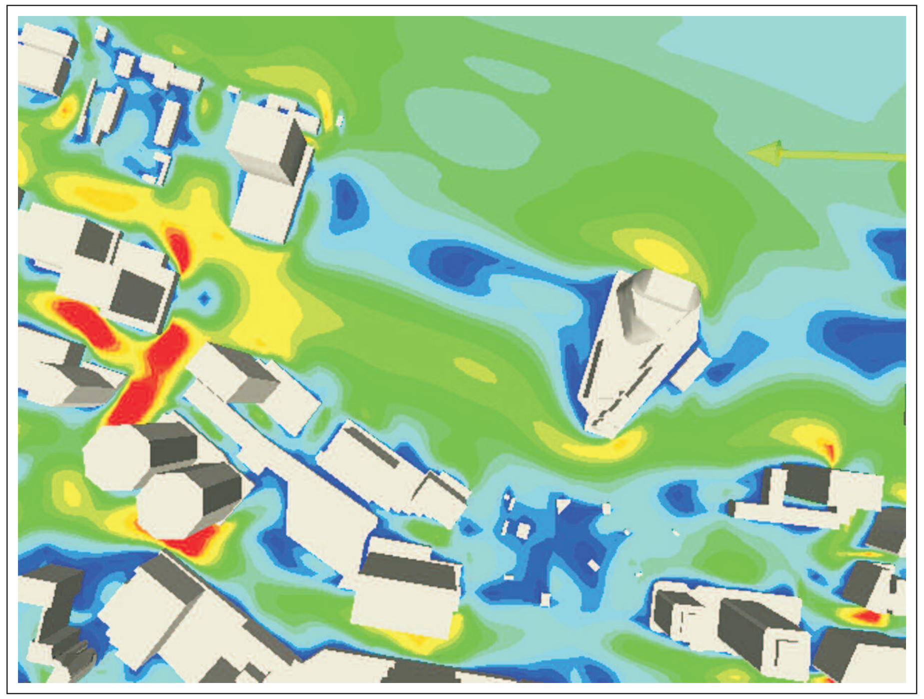
True North

Project #07-1033

Figure: 4b

Date: January 18, 2007

RWDI



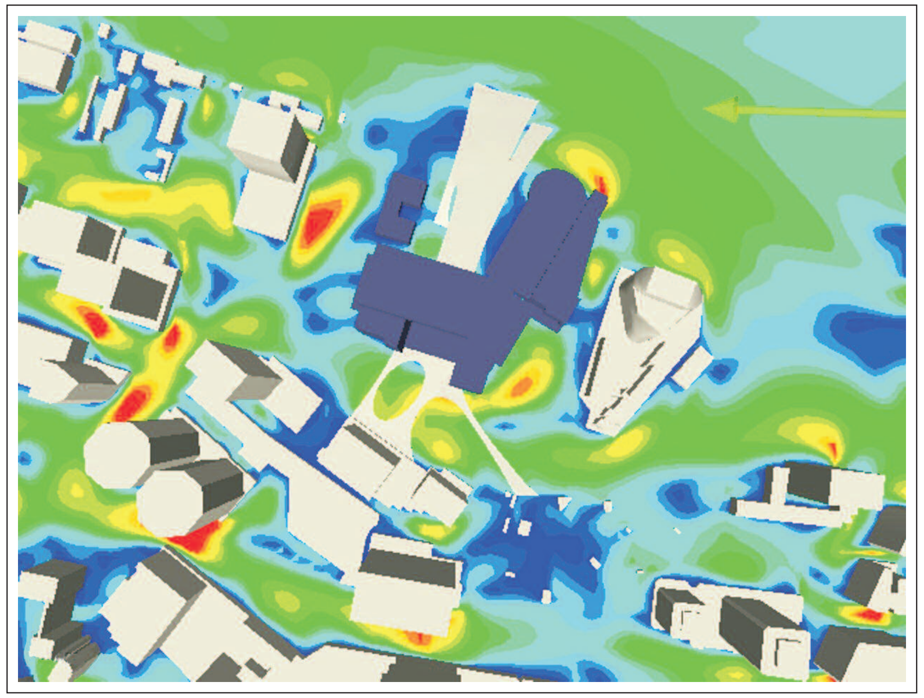
Existing Site

Wind Exposure

High

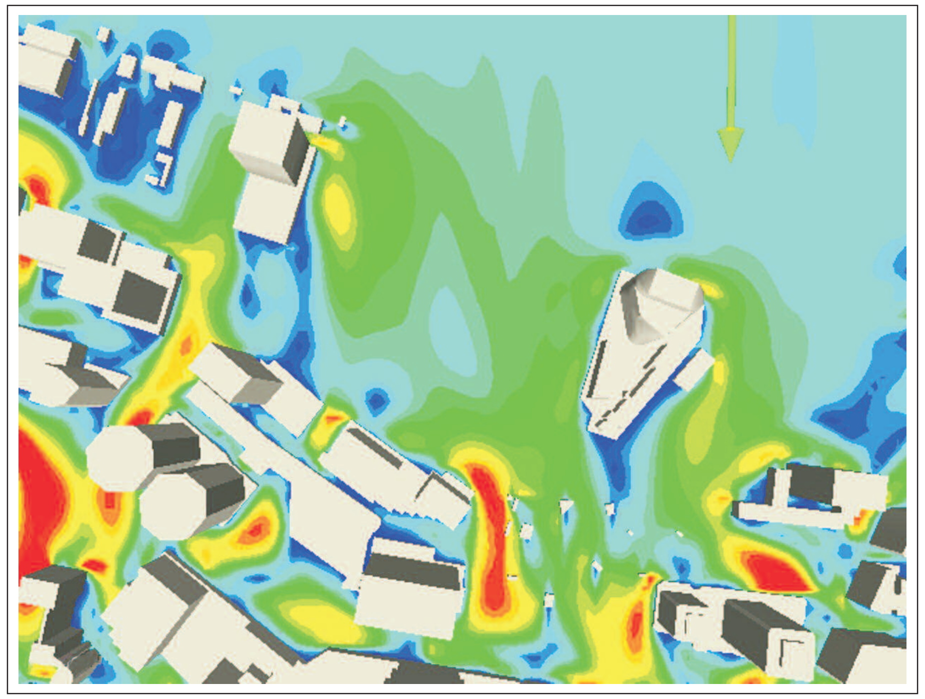
Medium

Low



Amended Initial Design - Base Configuration with Mitigation

Wind Exposure at Pedestrian Level (East Wind)	True North	Figure: 5a	RWDI
Tamar Development, Hong Kong	Project #07-1033	Date: January 18, 2007	



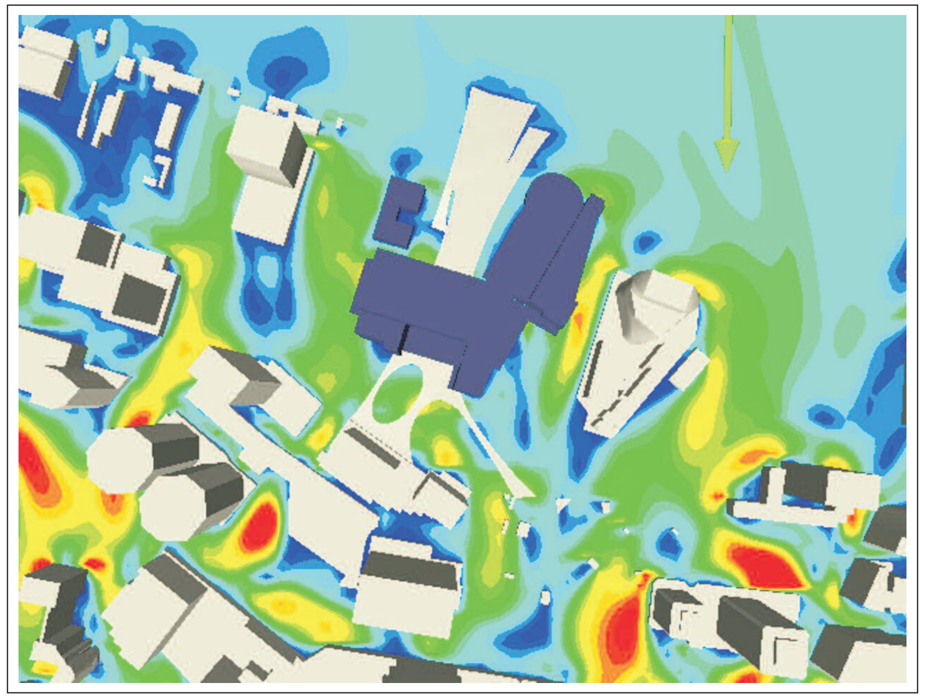
Existing Site

Wind Exposure

High

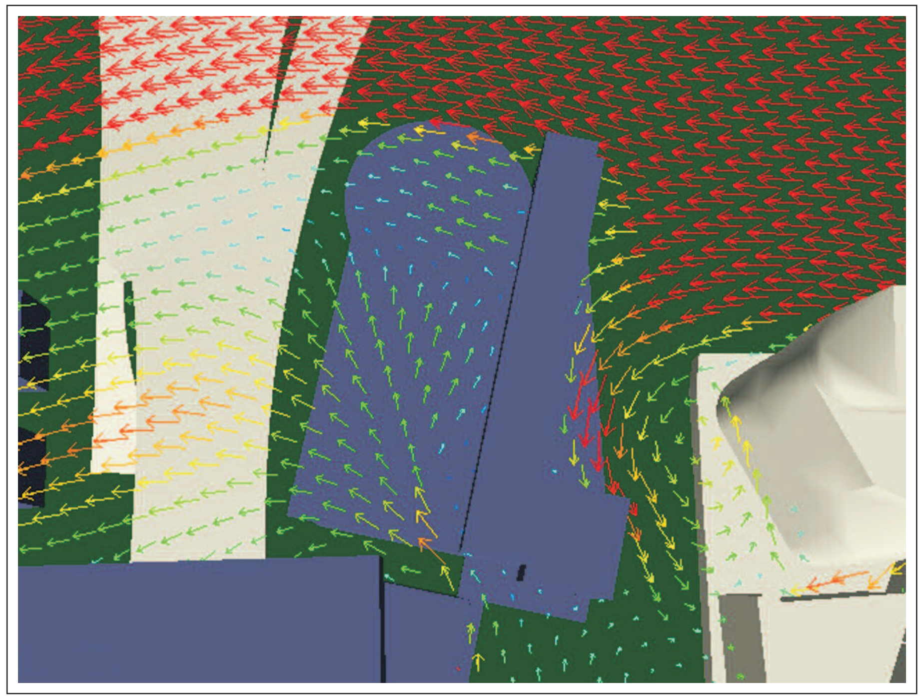
Medium

Low



Amended Initial Design - Base Configuration with Mitigation

Wind Exposure at Pedestrian Level (North Wind)	True North	Figure: 5b	RWDI
Tamar Development, Hong Kong	Project #07-1033	Date: January 18, 2007	



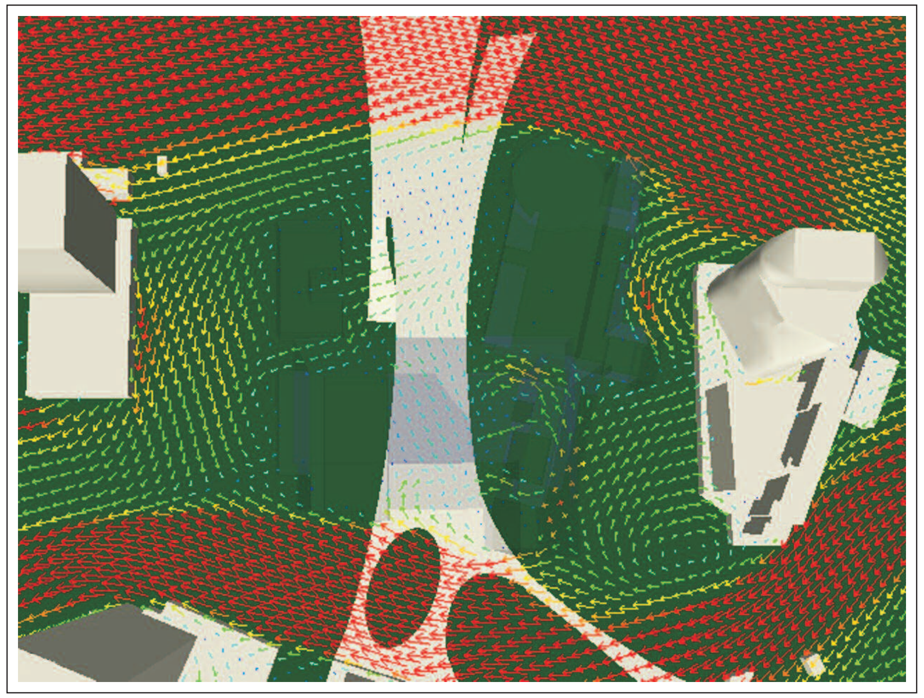
Pedestrian level above the LegCo roof garden

Wind Exposure

High

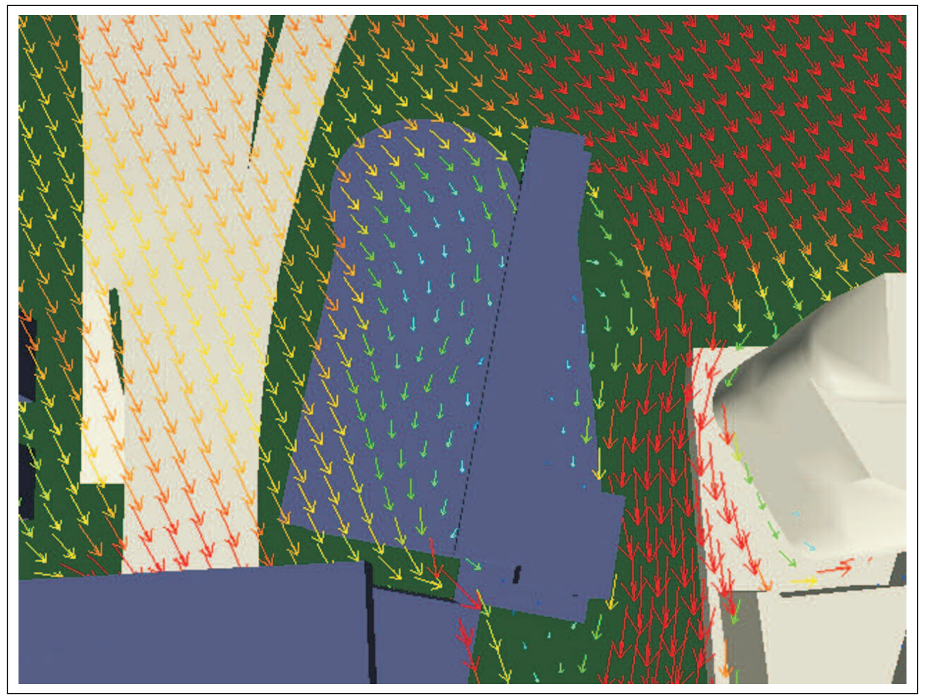
Medium

Low



Pedestrian level above the Green Carpet

Wind Velocity Vectors (East Wind) **Amended Initial Design - Base Configuration with Mitigation** Tamar Development, Hong Kong	True North Project #07-1033	Figure: 6a Date: January 18, 2007	RWDI



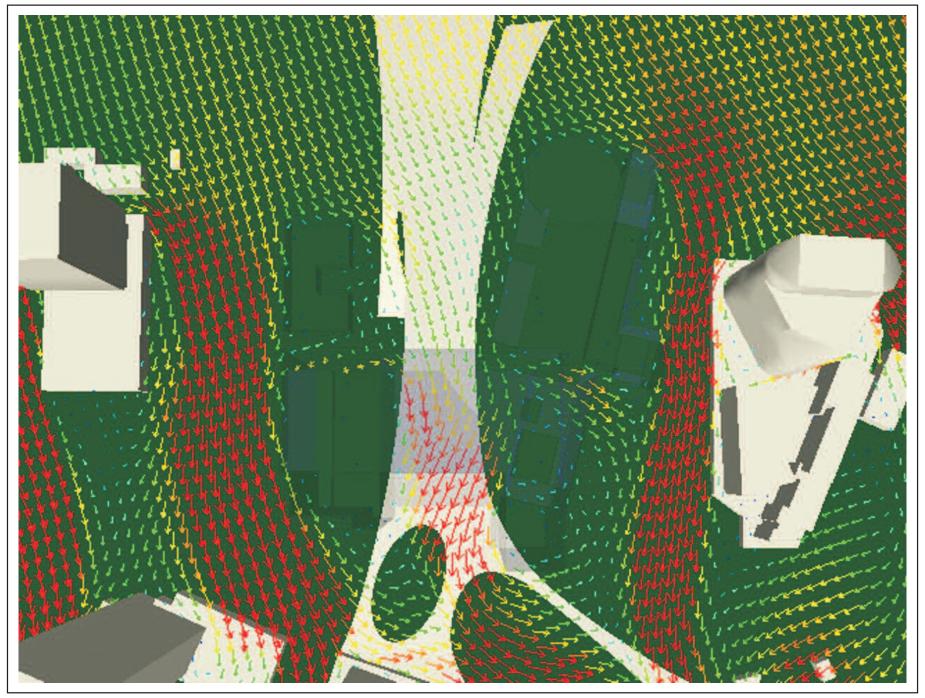
Pedestrian level above the LegCo roof garden

Wind Exposure

High

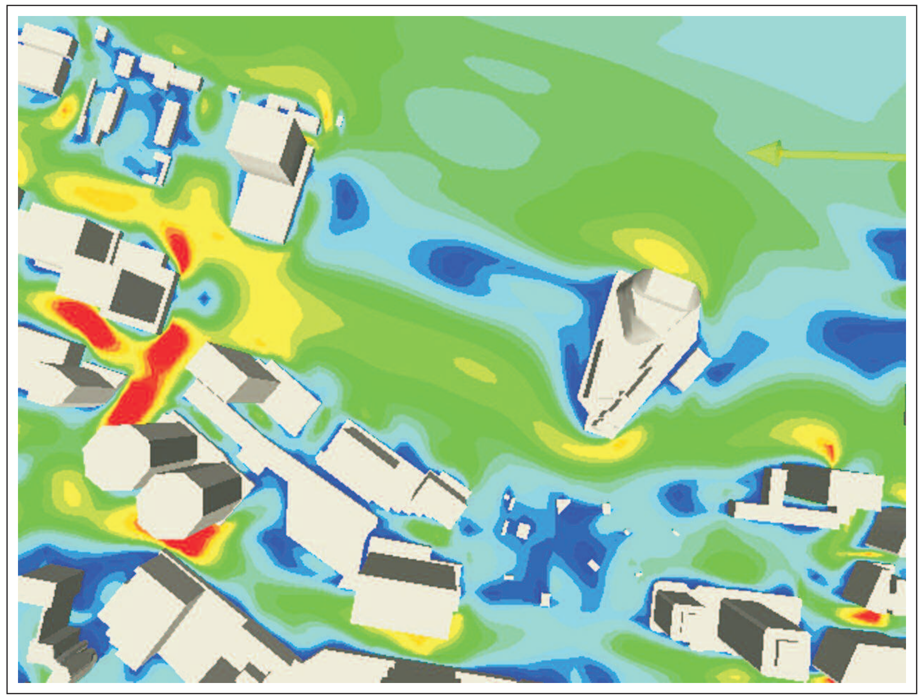
Medium

Low

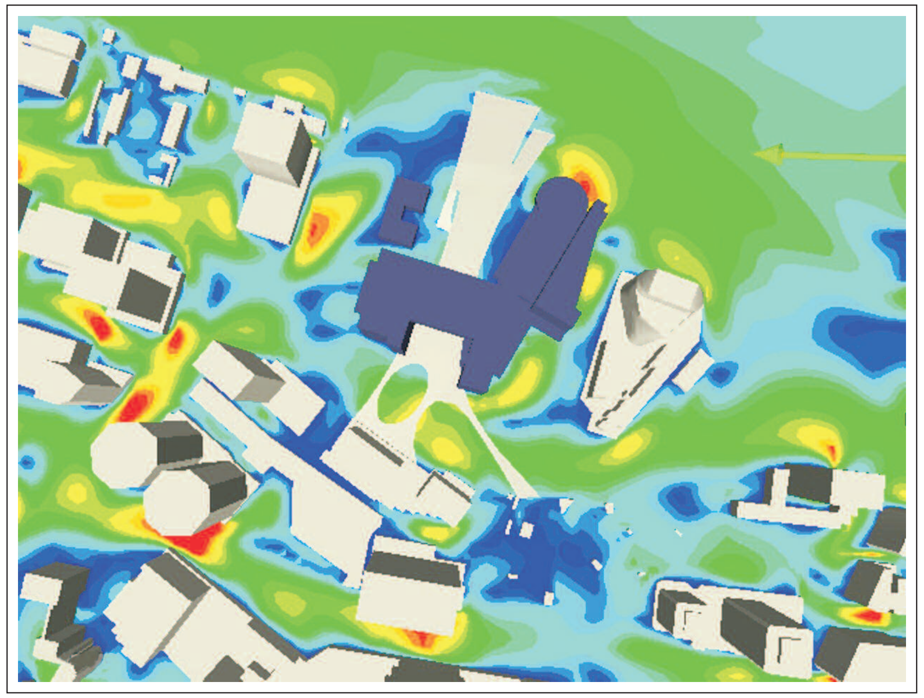


Pedestrian level above the Green Carpet

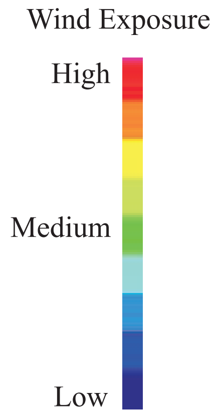
Wind Velocity Vectors (North Wind) **Amended Initial Design - Base Configuration with Mitigation** Tamar Development, Hong Kong	True North Project #07-1033	Figure: 6b Date: January 18, 2007	RWDI



Existing Site



Initial Design with Extensions



Wind Exposure at Pedestrian Level (East Wind)

True North

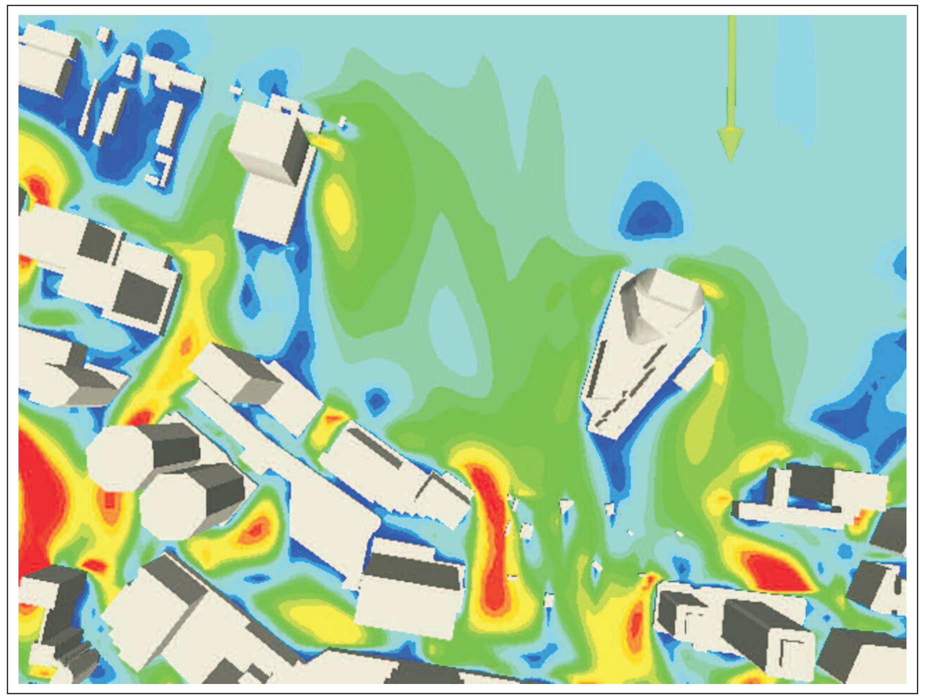
Figure: 7a

Tamar Development - Hong Kong

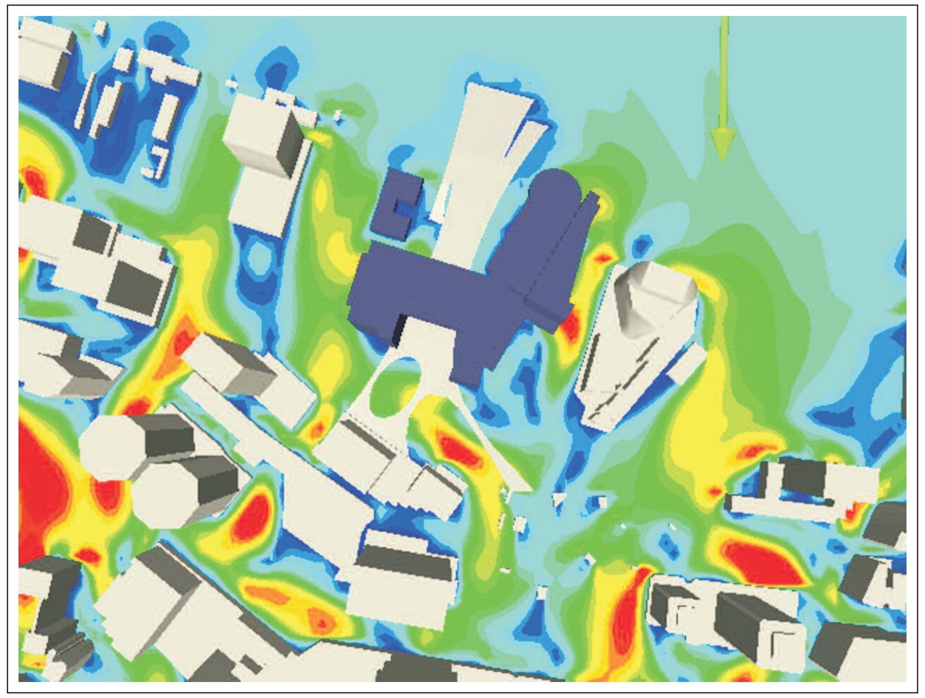
Project #07-1033

Date: January 18, 2007

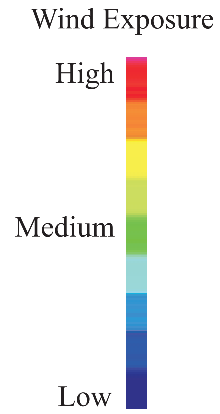
RWDI



Existing Site



Initial Design with Extensions



Wind Exposure at Pedestrian Level (North Wind)

True North

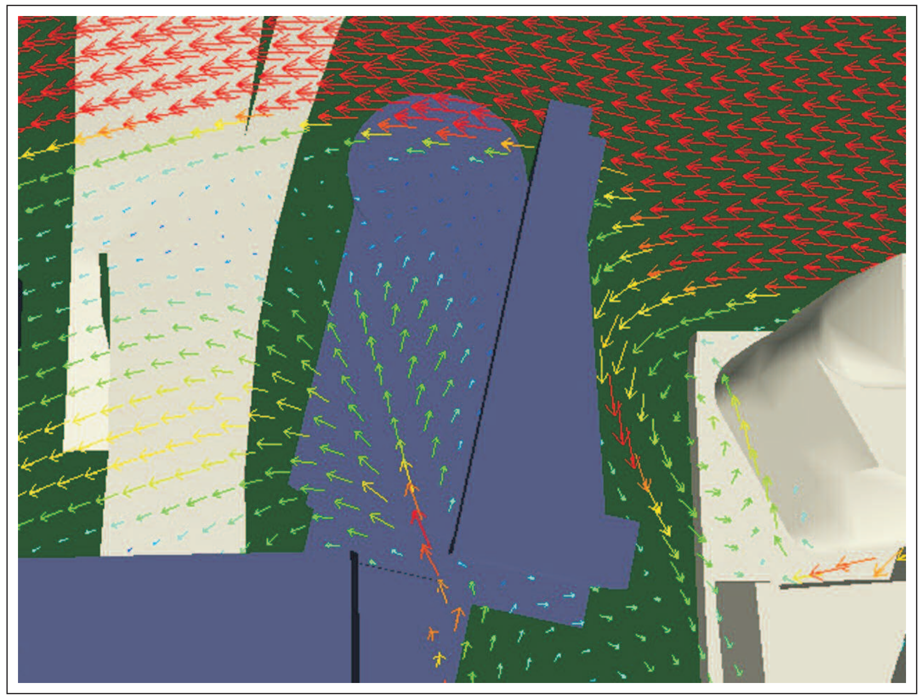
Figure: 7b

Tamar Development - Hong Kong

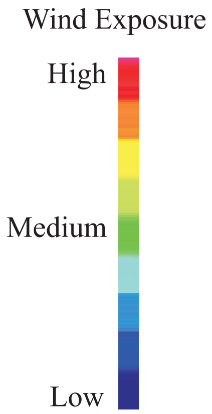
Project #07-1033

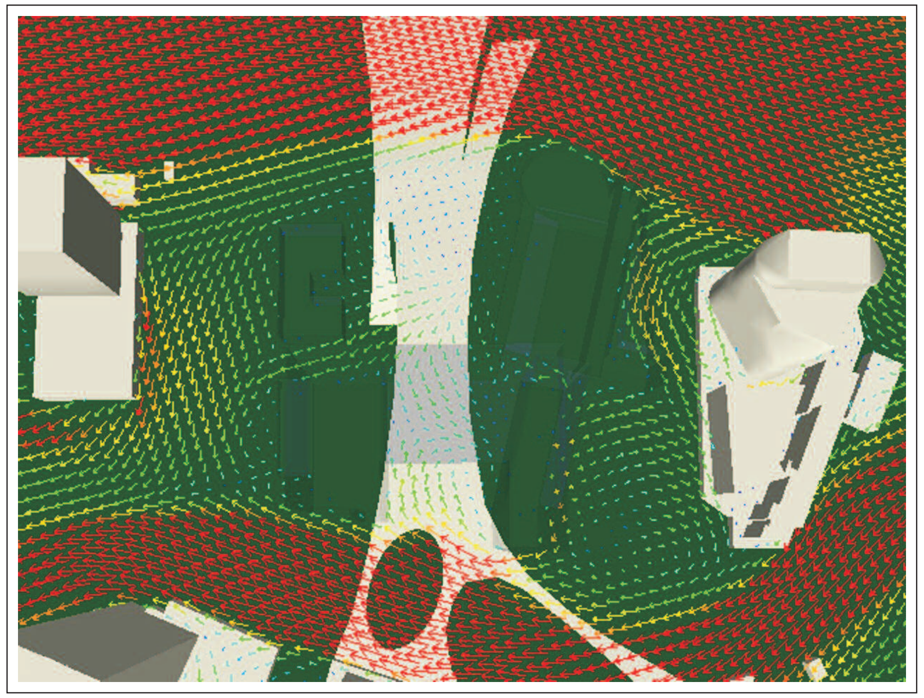
Date: January 18, 2007

RWDI



Pedestrian level above the LegCo roof garden





Pedestrian level above the Green Carpet

Wind Velocity Vectors (East Wind)
Initial Design with Extensions

Tamar Development - Hong Kong

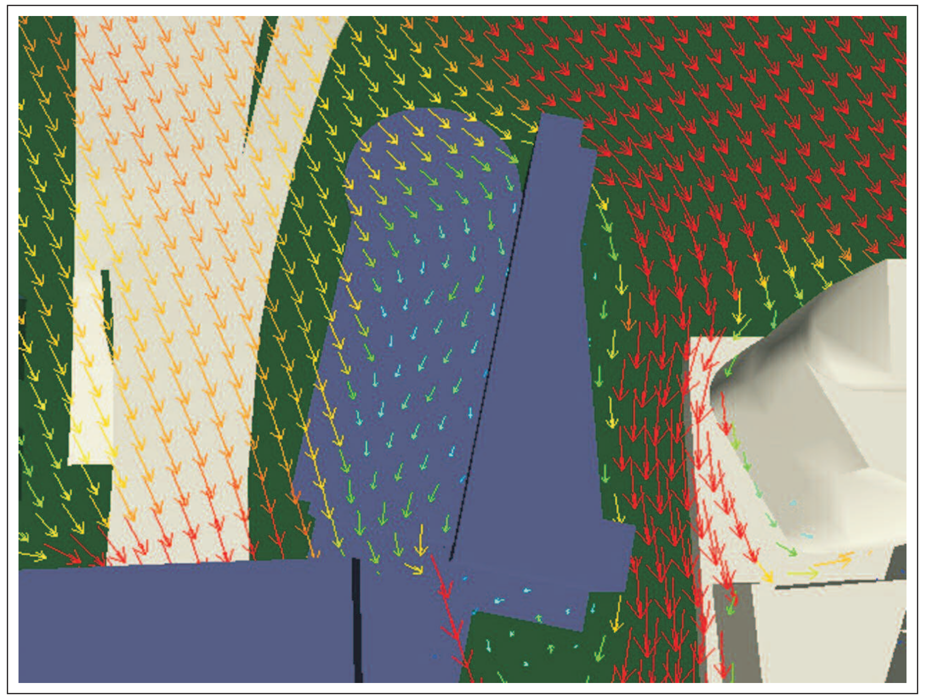
True North

Project #07-1033

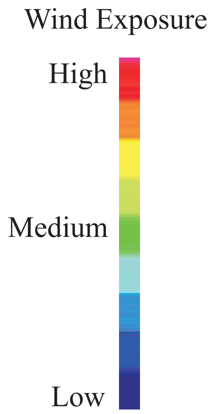
Figure: 8a

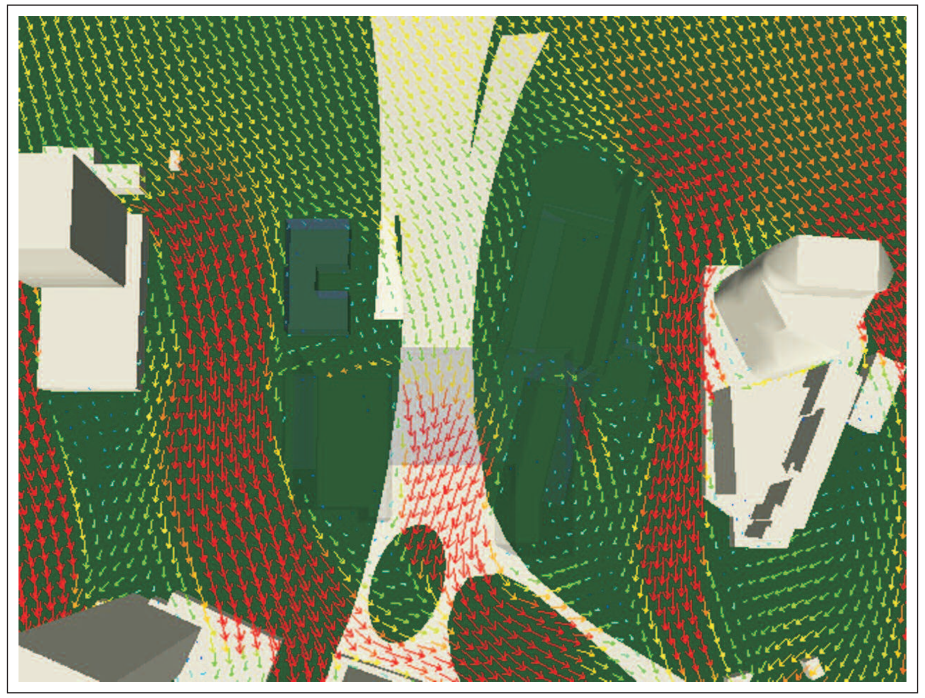
Date: January 18, 2007

RWDI



Pedestrian level above the LegCo roof garden





Pedestrian level above the Green Carpet

Wind Velocity Vectors (North Wind)
Initial Design with Extensions

Tamar Development - Hong Kong

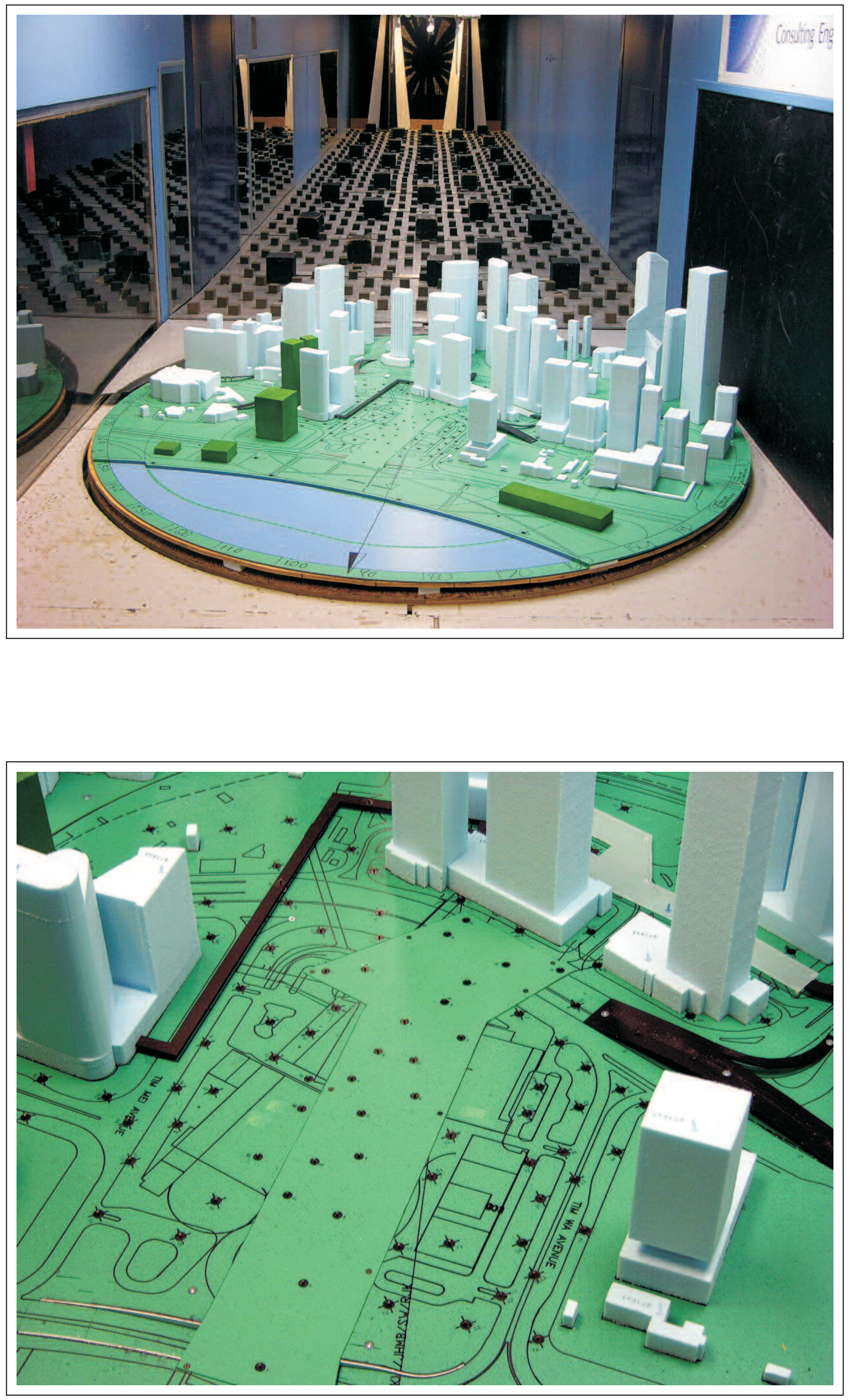
True North

Project #07-1033

Figure: 8b

Date: January 18, 2007

RWDI



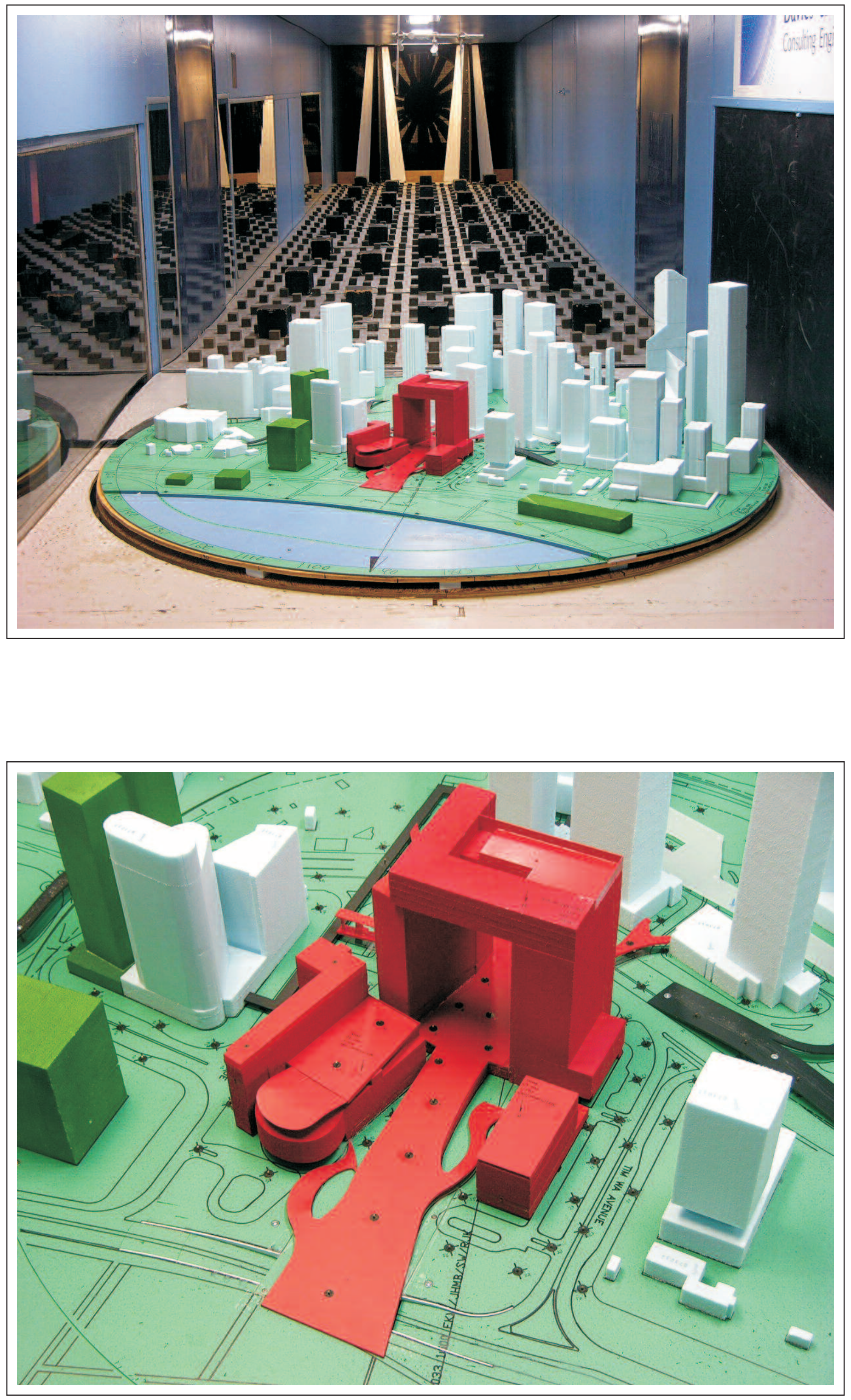
Wind Tunnel Study Model
Configuration 1 - Existing Site

Tamar Development - Hong Kong | Project #07-1033

Figure: 9a

Date: January 18, 2007

RWDI



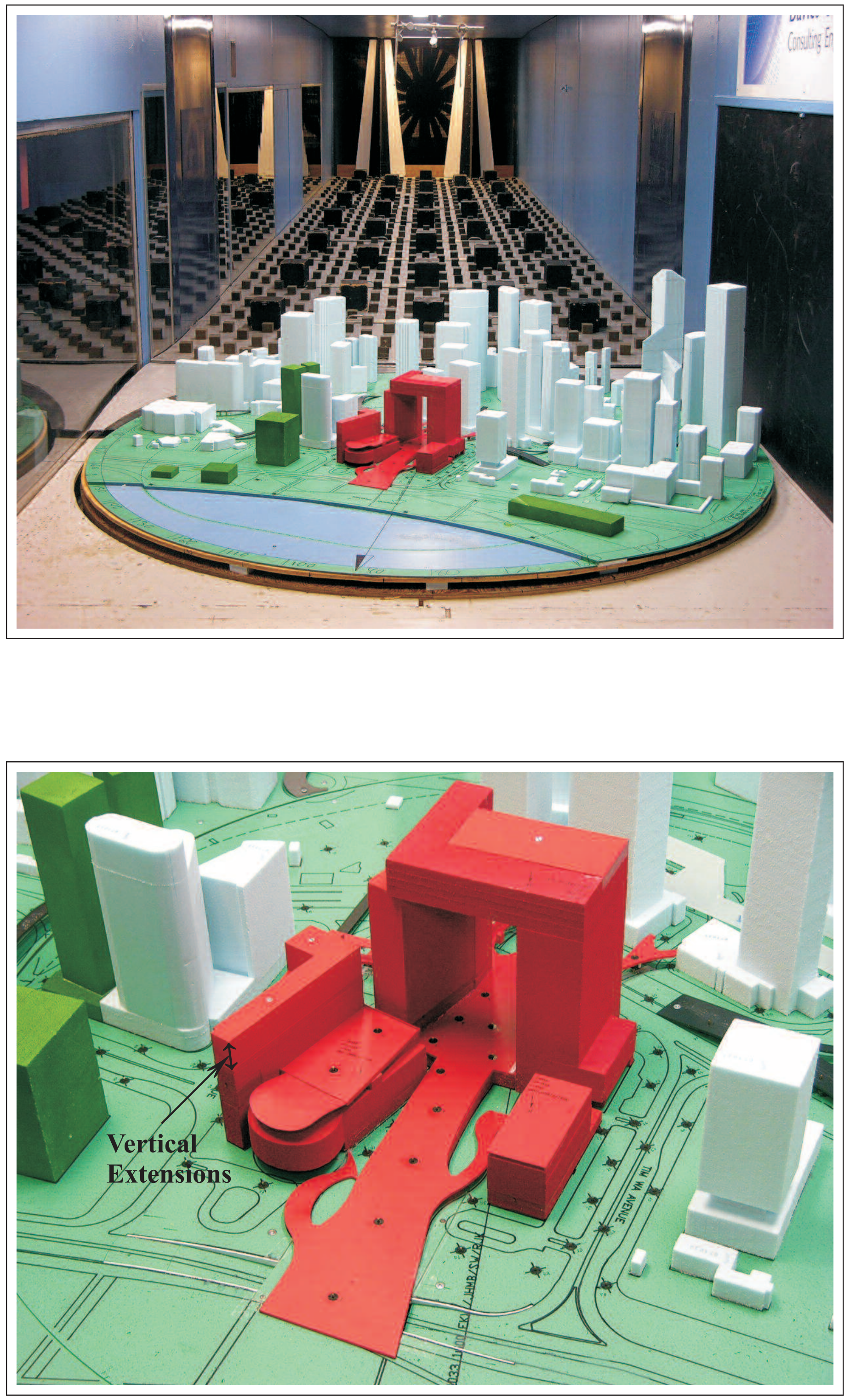
Wind Tunnel Study Model
Configuration 2 - Initial Design

Tamar Development - Hong Kong | Project #07-1033

Figure: 9b

Date: January 18, 2007

RWDI



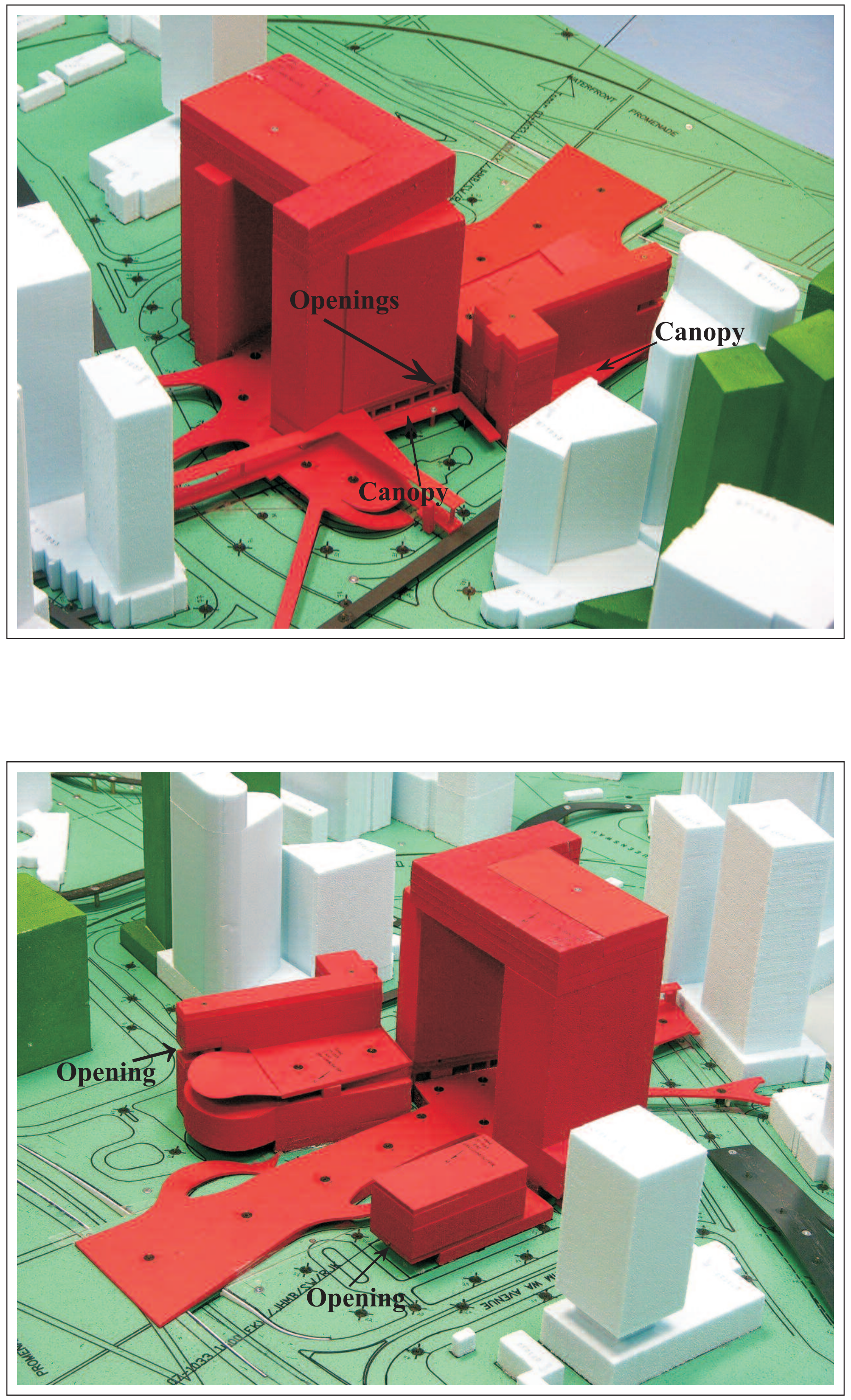
Wind Tunnel Study Model
Configuration 3 - Initial Design with Extensions

Tamar Development - Hong Kong | Project #07-1033

Figure: 9c

Date: January 18, 2007

RWDI



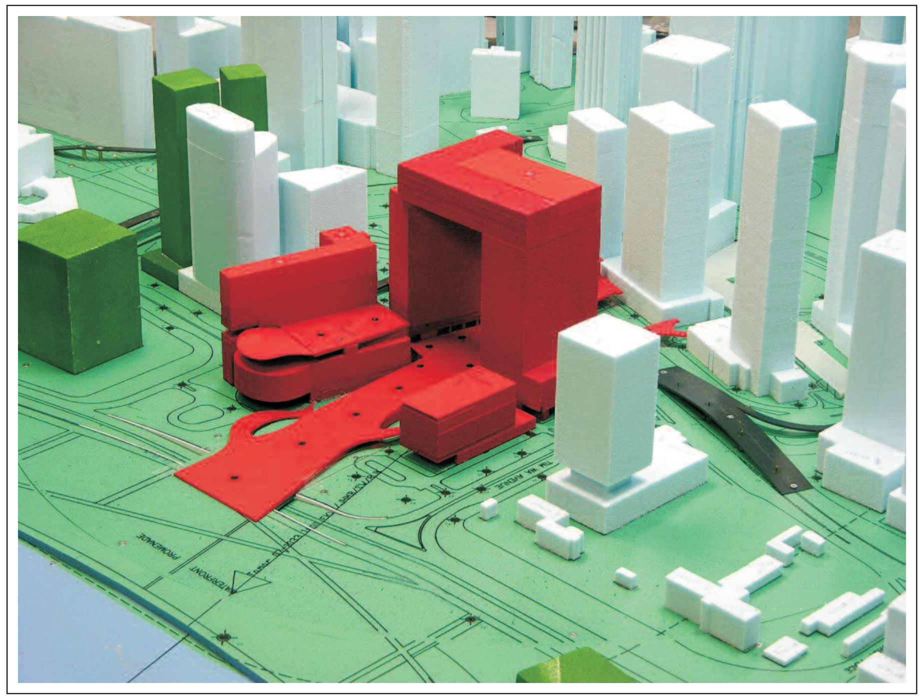
Wind Tunnel Study Model
Configuration 4 - Amended Initial Design Including Mitigation

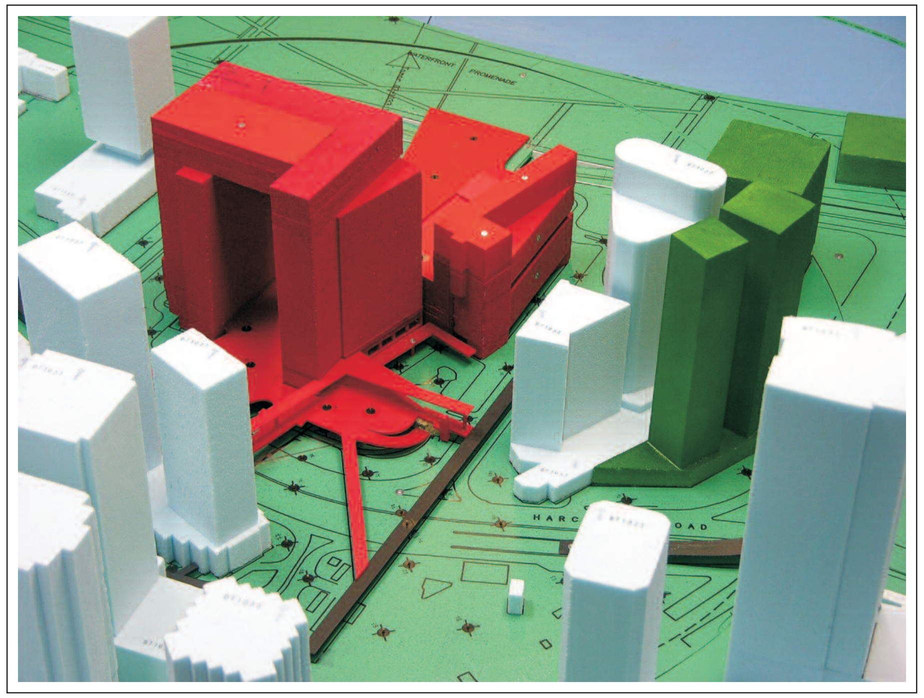
Tamar Development - Hong Kong | Project #07-1033

Figure: 9d

Date: January 18, 2007

RWDI





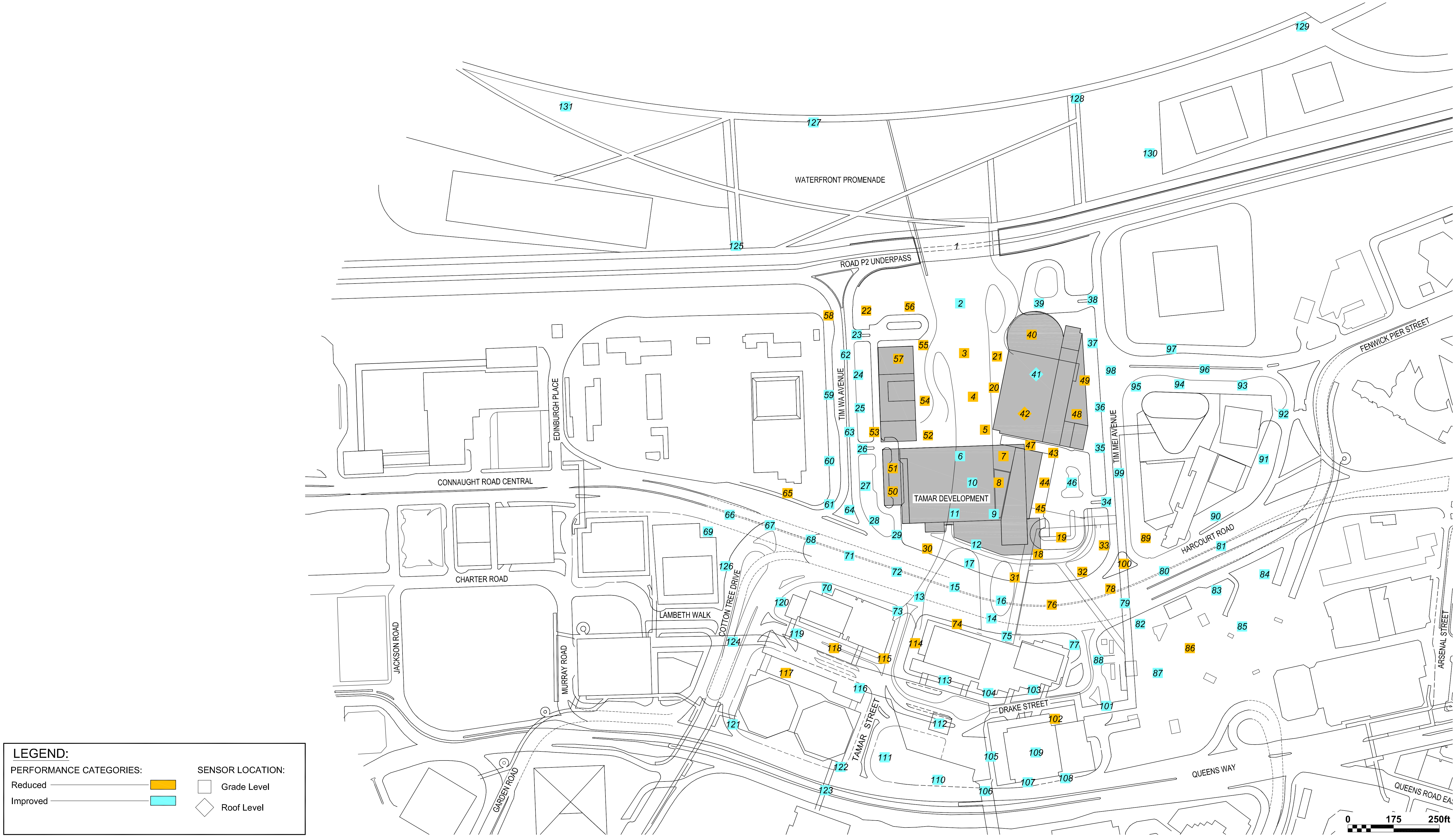
Wind Tunnel Study Model
Configuration 5 - Amended Initial Design Including Extensions and Mitigation
Tamar Development - Hong Kong

Project #07-1033

Figure: 9e

Date: January 18, 2007

RWDI



Wind Velocity Ratio Relative to Existing Configuration (Annual)

Configuration 2 - Initial Design

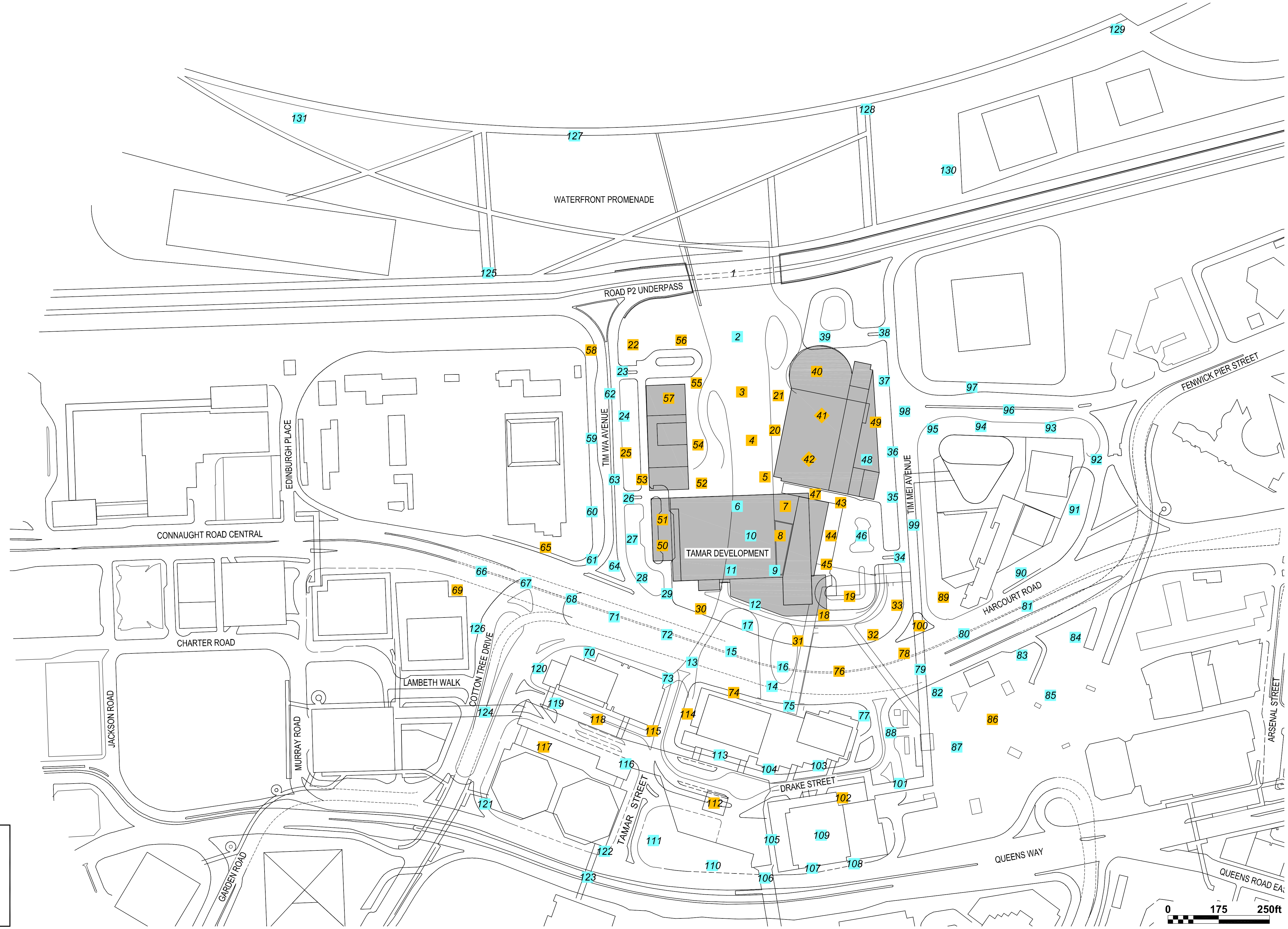
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by:	DJM	Fig:	10a
Approx. Scale:	1"=250'		
Date Revised:	Jan. 12, 2007		

RWDI



LEGEND:

PERFORMANCE CATEGORIES:
- Reduced
- Improved

SENSOR LOCATION:
- Grade Level
- Roof Level

Wind Velocity Ratio Relative to Existing Configuration (Annual)
Configuration 3 - Initial Design with Extension

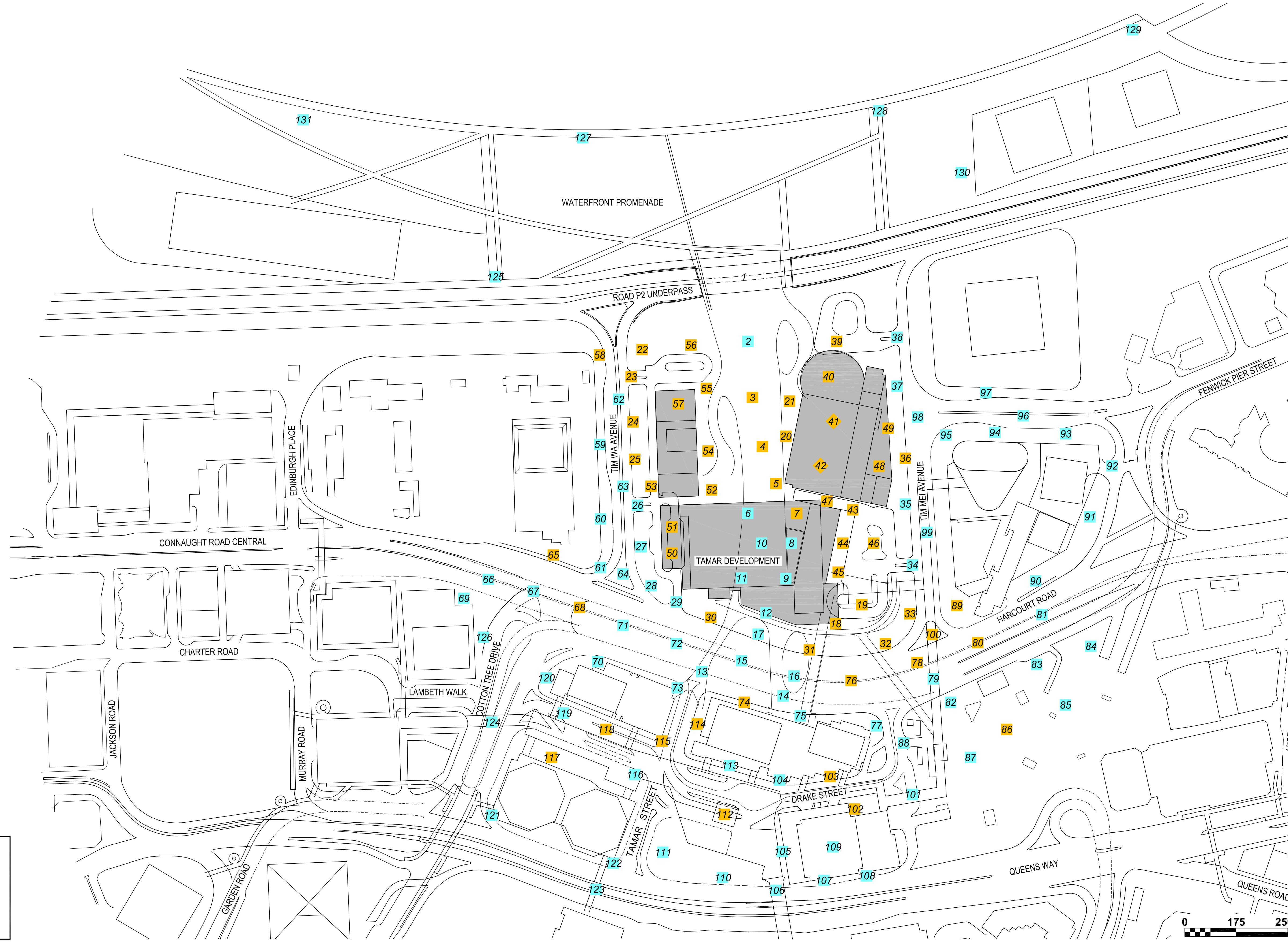
Tamar Development - Hong Kong

Project #07-1033

True North

Drawn by: DJM	Fig: **10b**
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



LEGEND:

PERFORMANCE CATEGORIES:
Reduced
Improved

SENSOR LOCATION:
Grade Level
Roof Level

Wind Velocity Ratio Relative to Existing Configuration (Annual)
Configuration 4 - Amended Initial Design including Mitigation

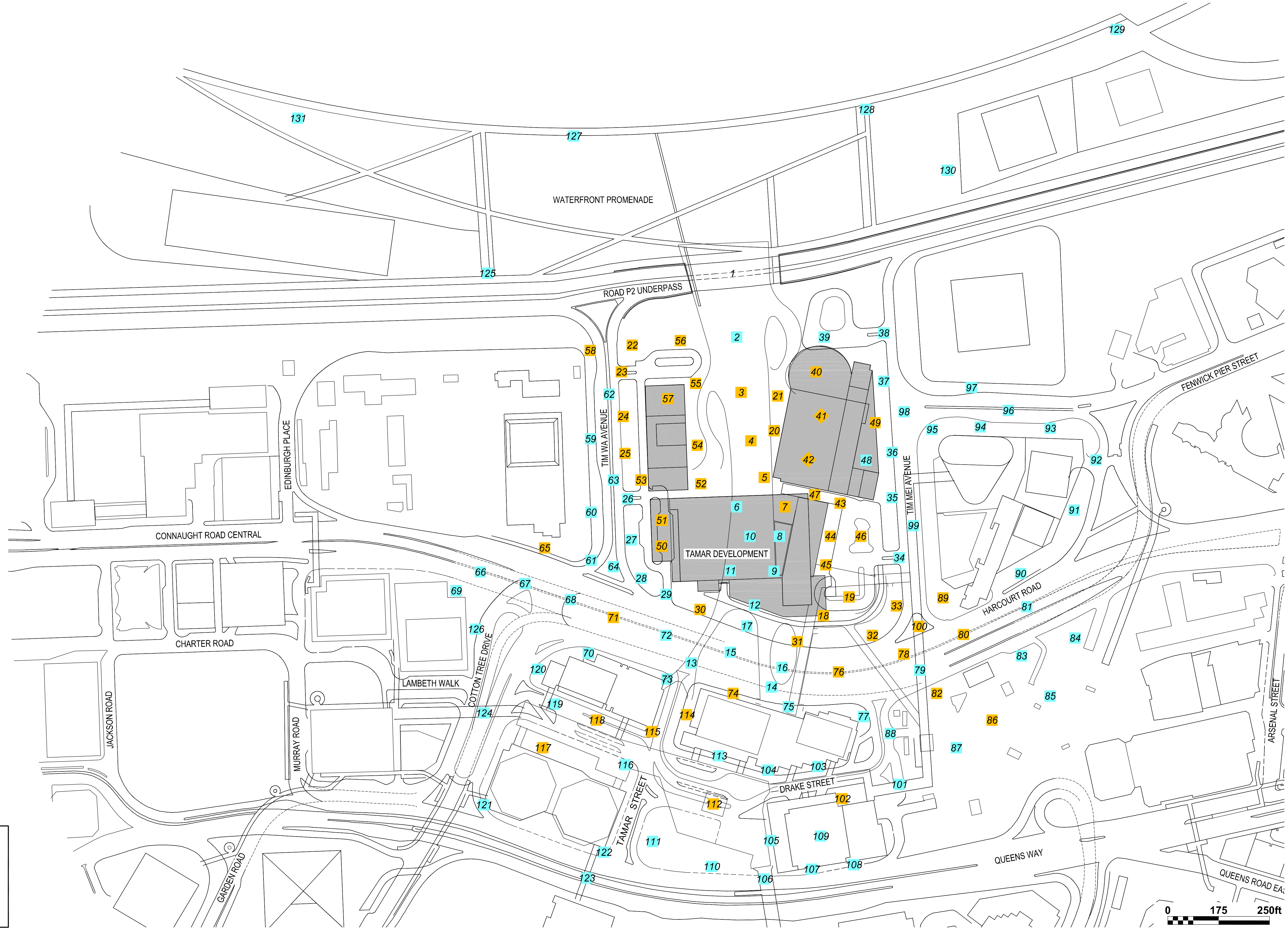
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJM	Fig: **10c**
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



LEGEND:

PERFORMANCE CATEGORIES:
- Reduced
- Improved

SENSOR LOCATION:
- Grade Level
- Roof Level

Wind Velocity Ratio Relative to Existing Configuration (Annual)

Configuration 5 - Amended Initial Design with Extension including Mitigation

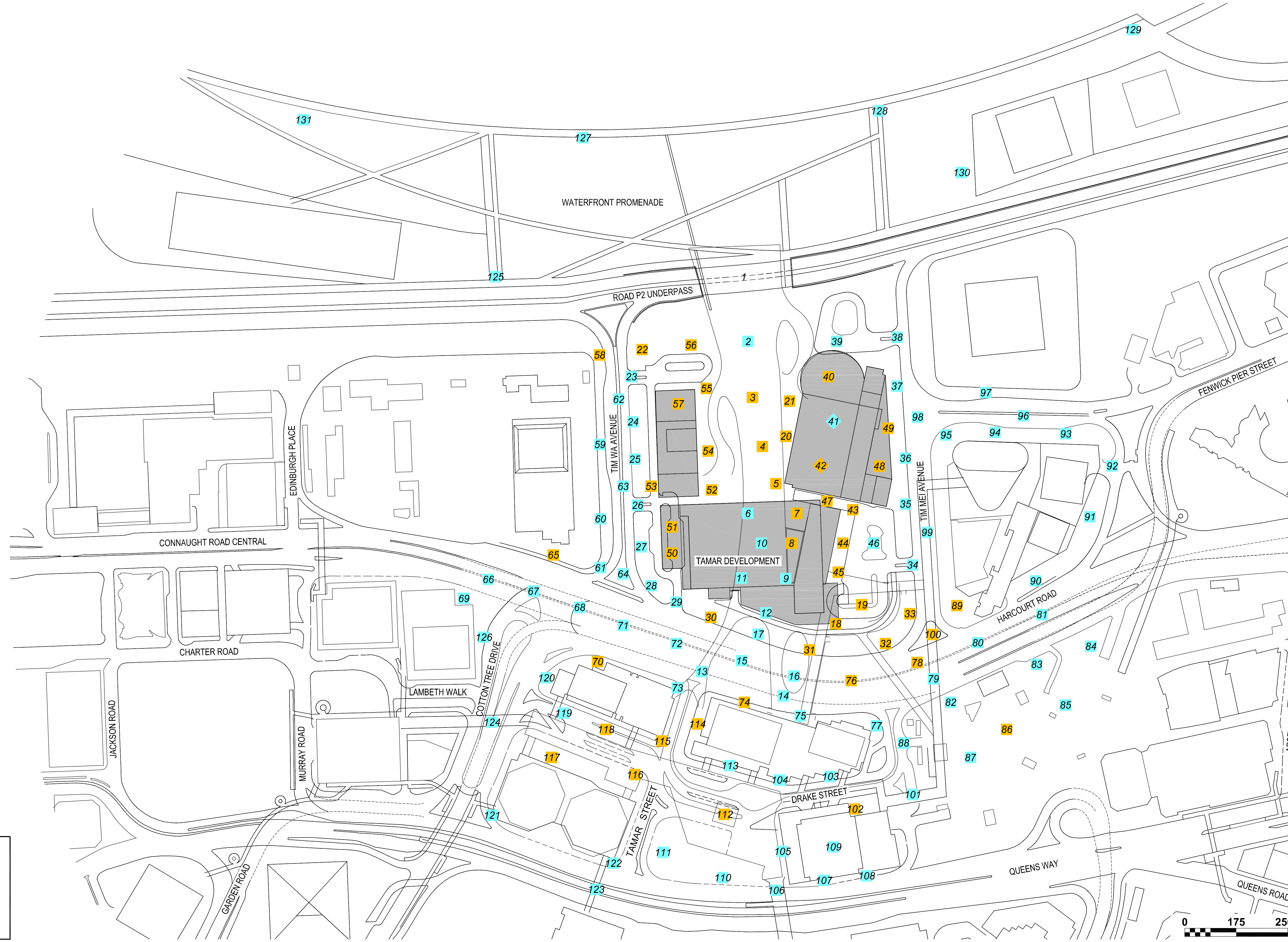
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJM	Fig: **10d**
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



LEGEND:

PERFORMANCE CATEGORIES:
- Reduced
- Improved

SENSOR LOCATION:
- Grade Level
- Roof Level

Wind Velocity Ratio Relative to Existing Configuration (Spring)
Configuration - Initial Design

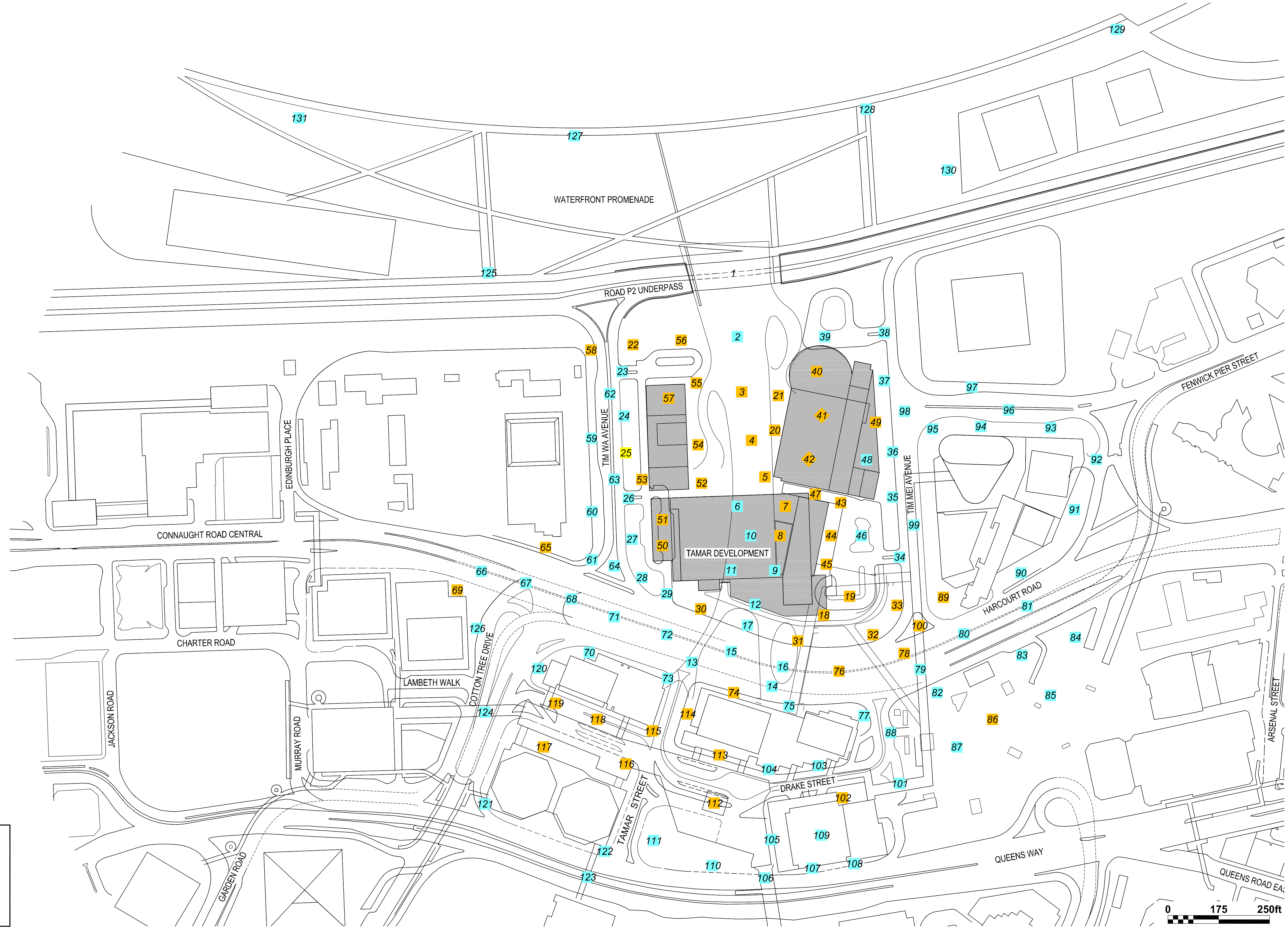
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJM	Fig: 11a
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



LEGEND:

PERFORMANCE CATEGORIES:
Reduced
Improved

SENSOR LOCATION:
Grade Level
Roof Level

Wind Velocity Ratio Relative to Existing Configuration (Spring)
Configuration - Initial Design with Extension

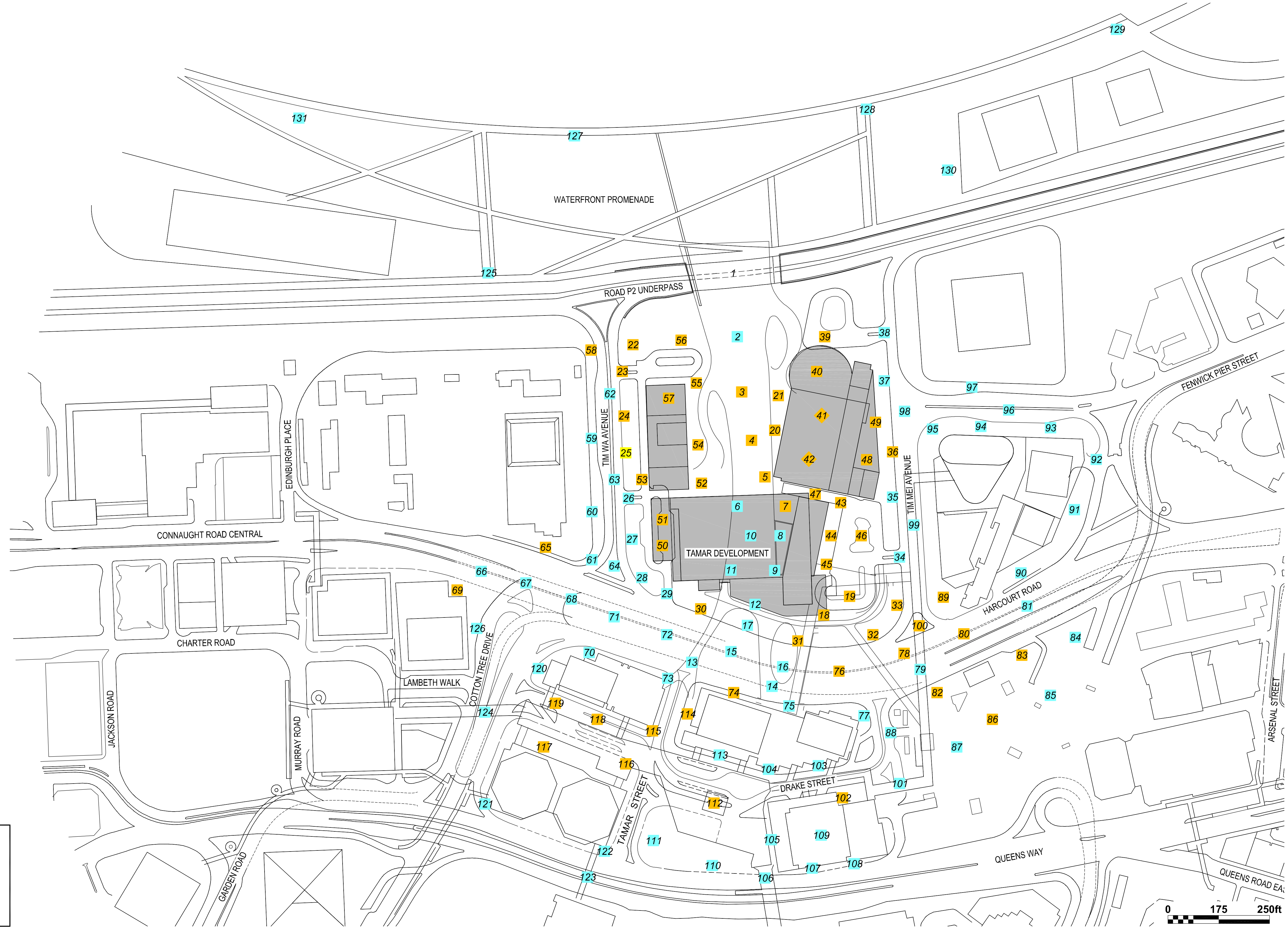
Tamar Development - Hong Kong

Project #07-1033

True North

Drawn by: DJM	Fig: **11b**
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



LEGEND:

PERFORMANCE CATEGORIES:
- Reduced
- Improved

SENSOR LOCATION:
- Grade Level
- Roof Level

Wind Velocity Ratio Relative to Existing Configuration (Spring)
Configuration - Amended Initial Design including Mitigation

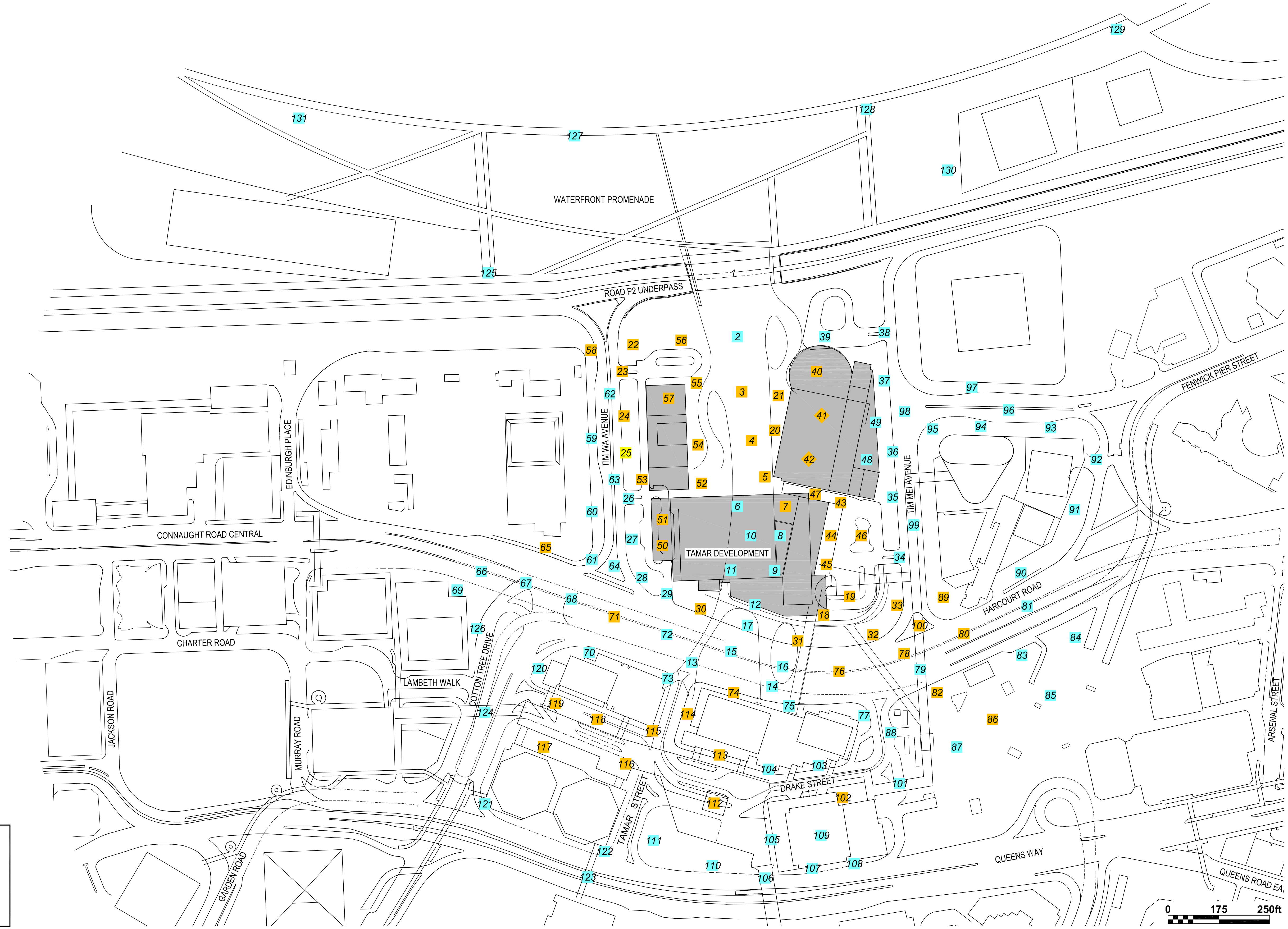
Tamar Development - Hong Kong

Project #07-1033

True North

Drawn by: DJM	Fig: **11c**
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



LEGEND:

PERFORMANCE CATEGORIES:
Reduced
Improved

SENSOR LOCATION:
Grade Level
Roof Level

Wind Velocity Ratio Relative to Existing Configuration (Spring)

Configuration - Amended Initial Design with Extension including Mitigation

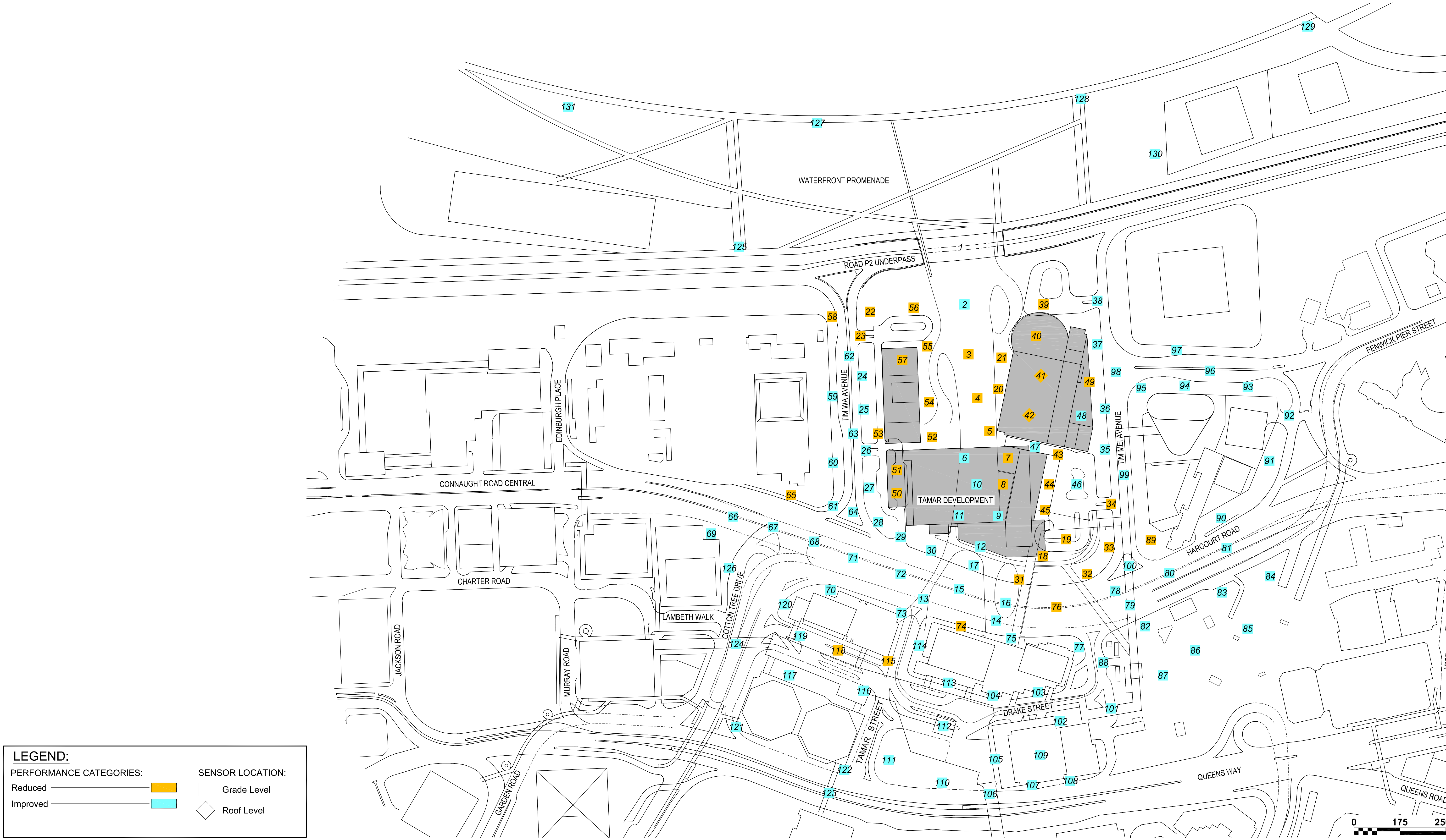
Tamar Development - Hong Kong

Project #07-1033

True North

Drawn by: DJM	Fig: **11d**
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



Wind Velocity Ratio Relative to Existing Configuration (Summer)

Configuration - Initial Design

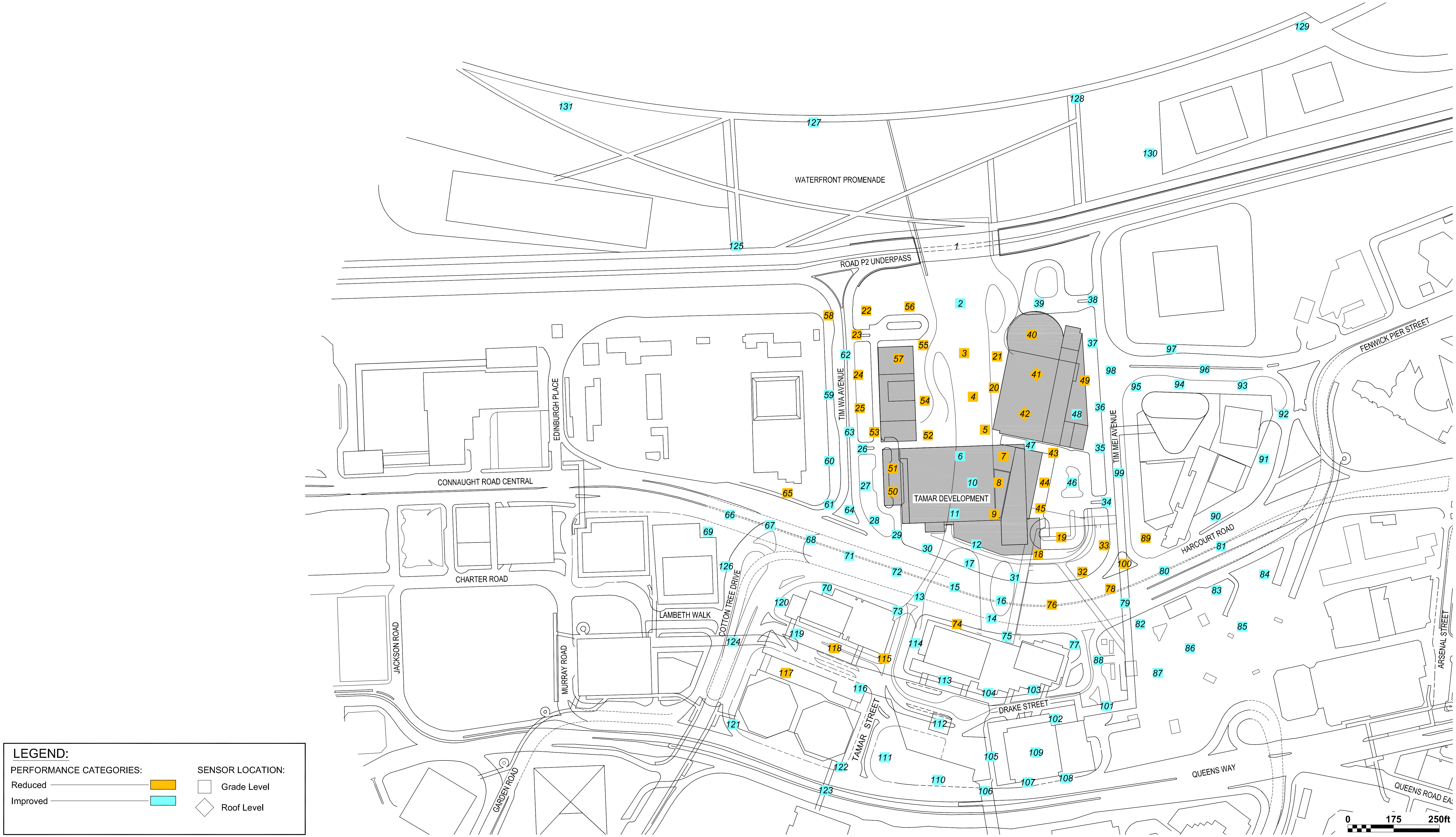
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJM	Fig: **12a**
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



Wind Velocity Ratio Relative to Existing Configuration (Summer)

Configuration - Initial Design with Extension

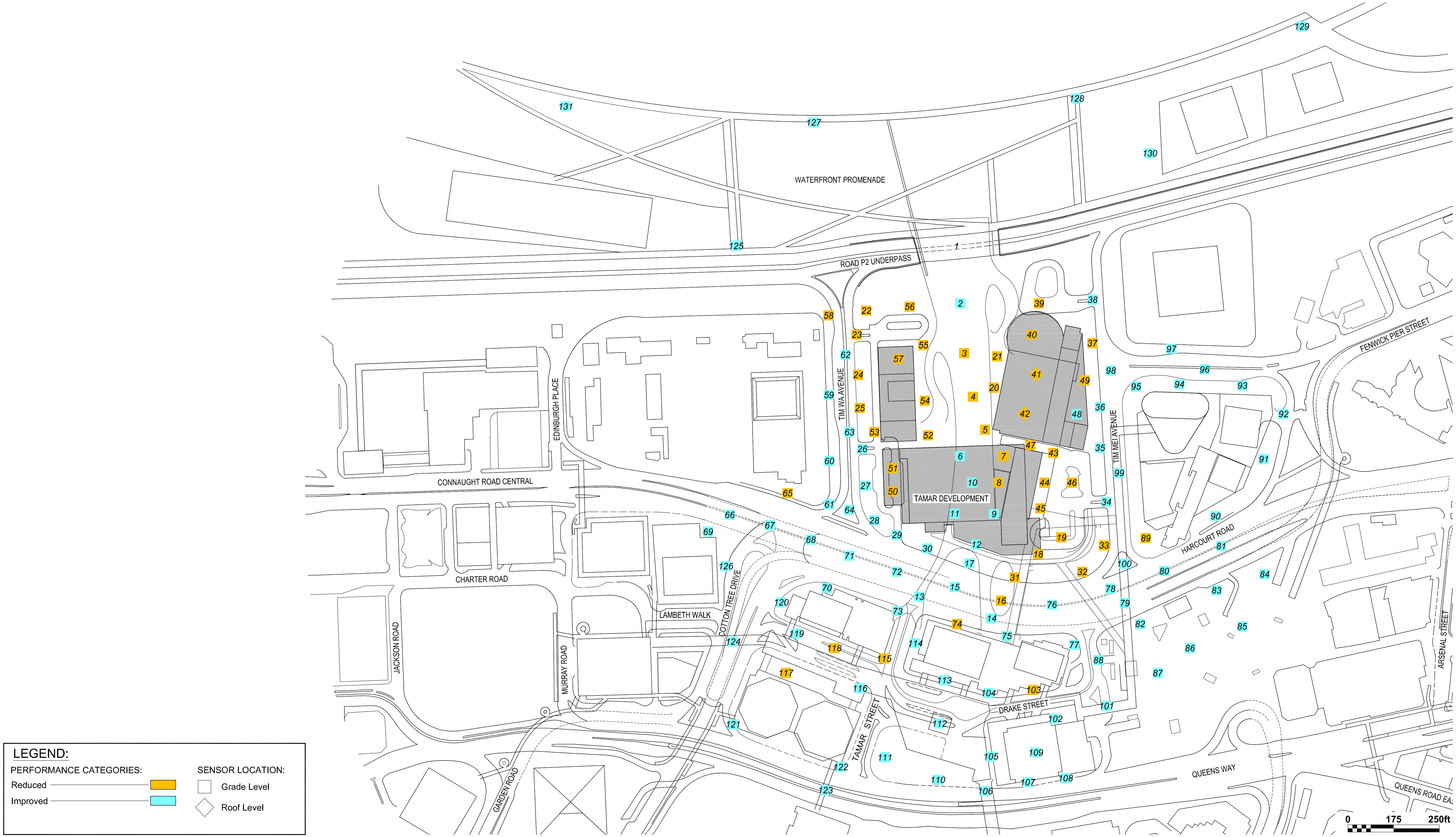
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by:	DJM	Fig:	12b
Approx. Scale:	1"=250'		
Date Revised:	Jan. 12, 2007		

RWDI



Wind Velocity Ratio Relative to Existing Configuration (Summer)
Configuration - Amended Initial Design including Mitigation

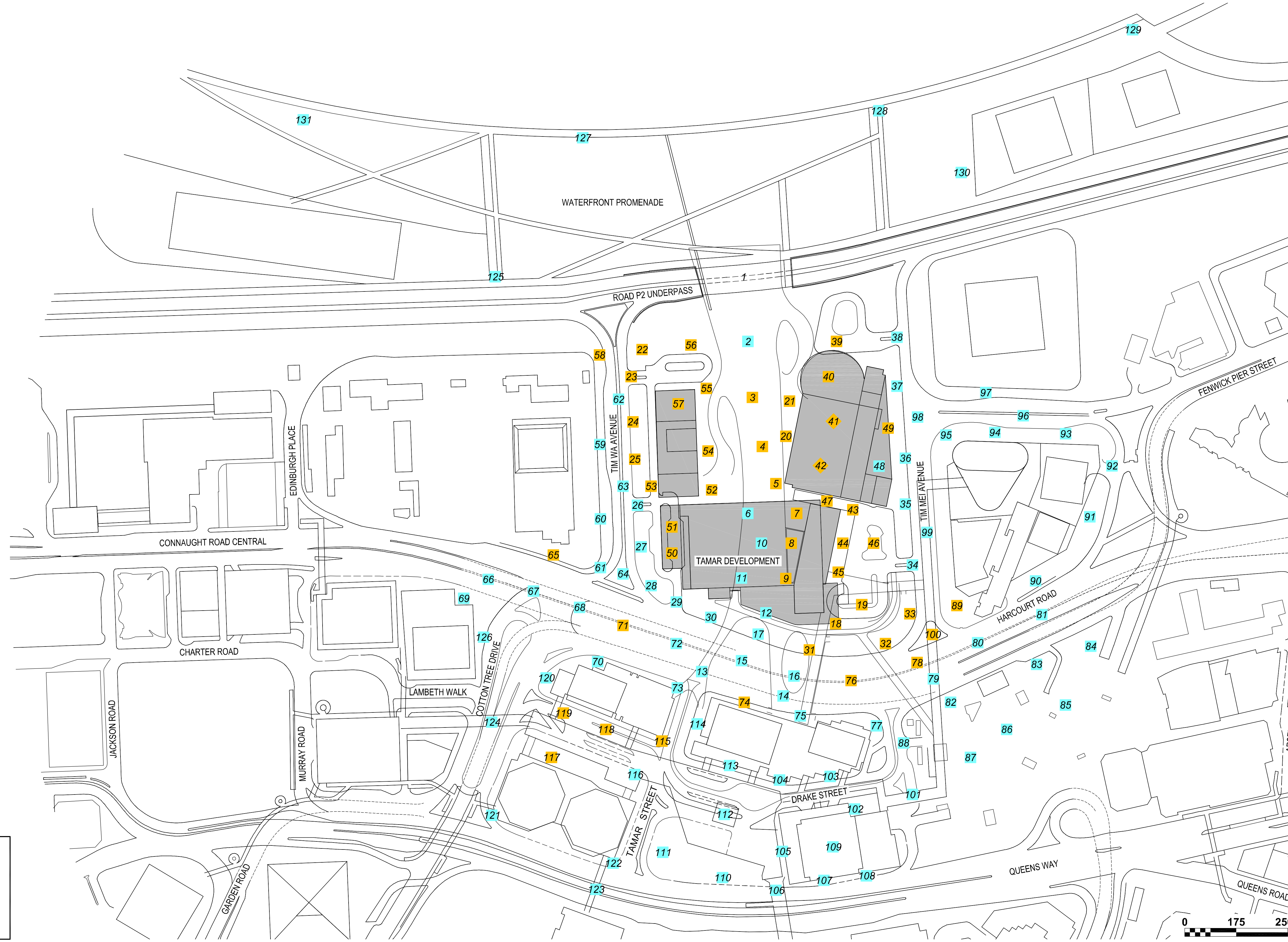
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJM	Fig: 12c
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



LEGEND:

PERFORMANCE CATEGORIES:
- Reduced
- Improved

SENSOR LOCATION:
- Grade Level
- Roof Level

Wind Velocity Ratio Relative to Existing Configuration (Summer)
Configuration - Amended Initial Design with Extension including Mitigation

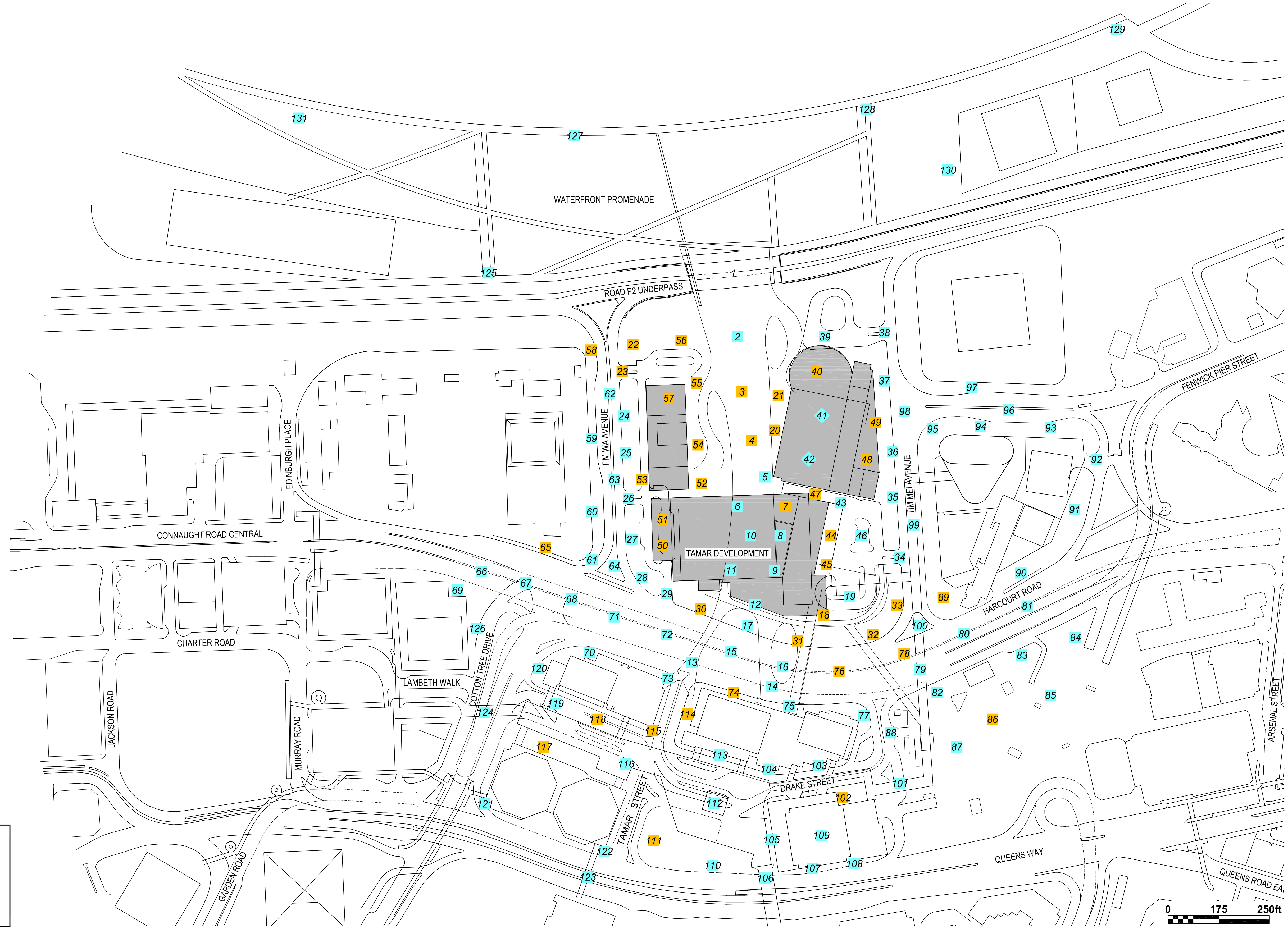
Tamar Development - Hong Kong

Project #07-1033

True North

Drawn by:	DJM	Fig:	**12d**
Approx. Scale:	1"=250'		
Date Revised:	Jan. 12, 2007		

RWDI



LEGEND:

PERFORMANCE CATEGORIES:
- Reduced
- Improved

SENSOR LOCATION:
- Grade Level
- Roof Level

Wind Velocity Ratio Relative to Existing Configuration (Fall)
Configuration - Initial Design

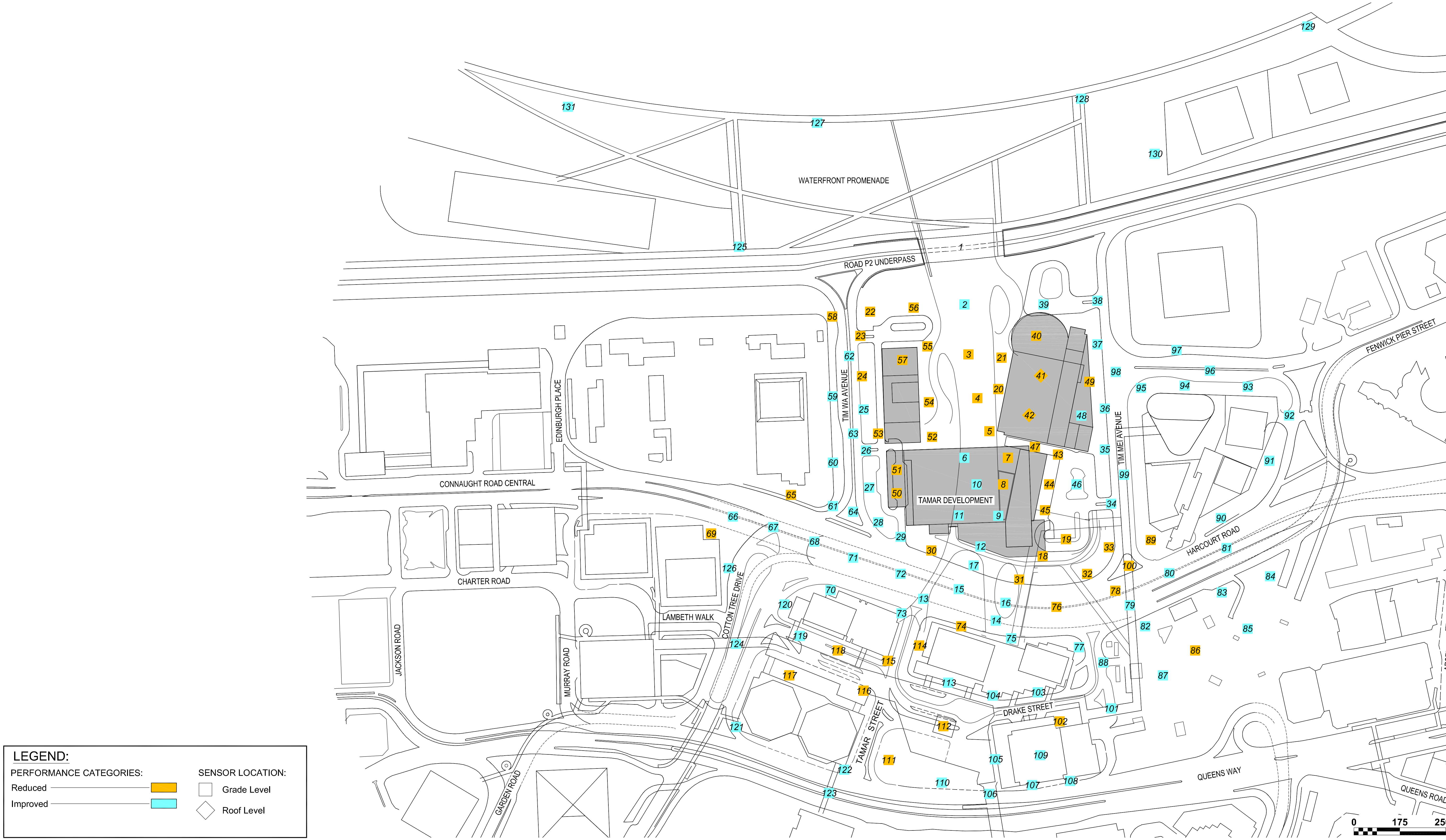
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJM	Fig: 13a		
Approx. Scale:	1"=250'		
Date Revised:	Jan. 12, 2007		

RWDI



Wind Velocity Ratio Relative to Existing Configuration (Fall)

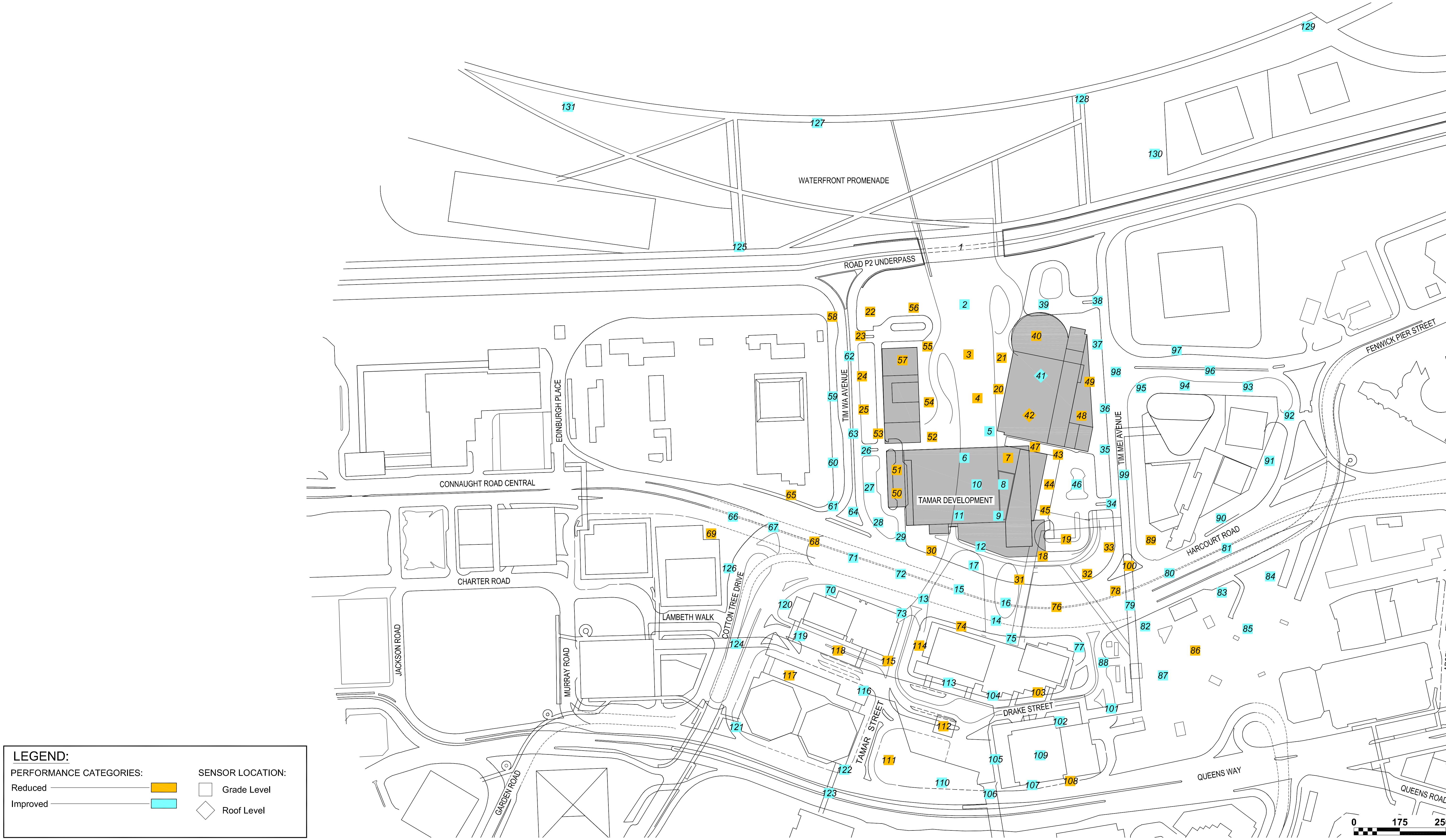
Configuration - Initial Design with Extension

Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJM	Fig: **13b**		RWDI
Approx. Scale:	1"=250'		
Date Revised:	Jan. 12, 2007		



Wind Velocity Ratio Relative to Existing Configuration (Fall)

Configuration - Amended Initial Design including Mitigation

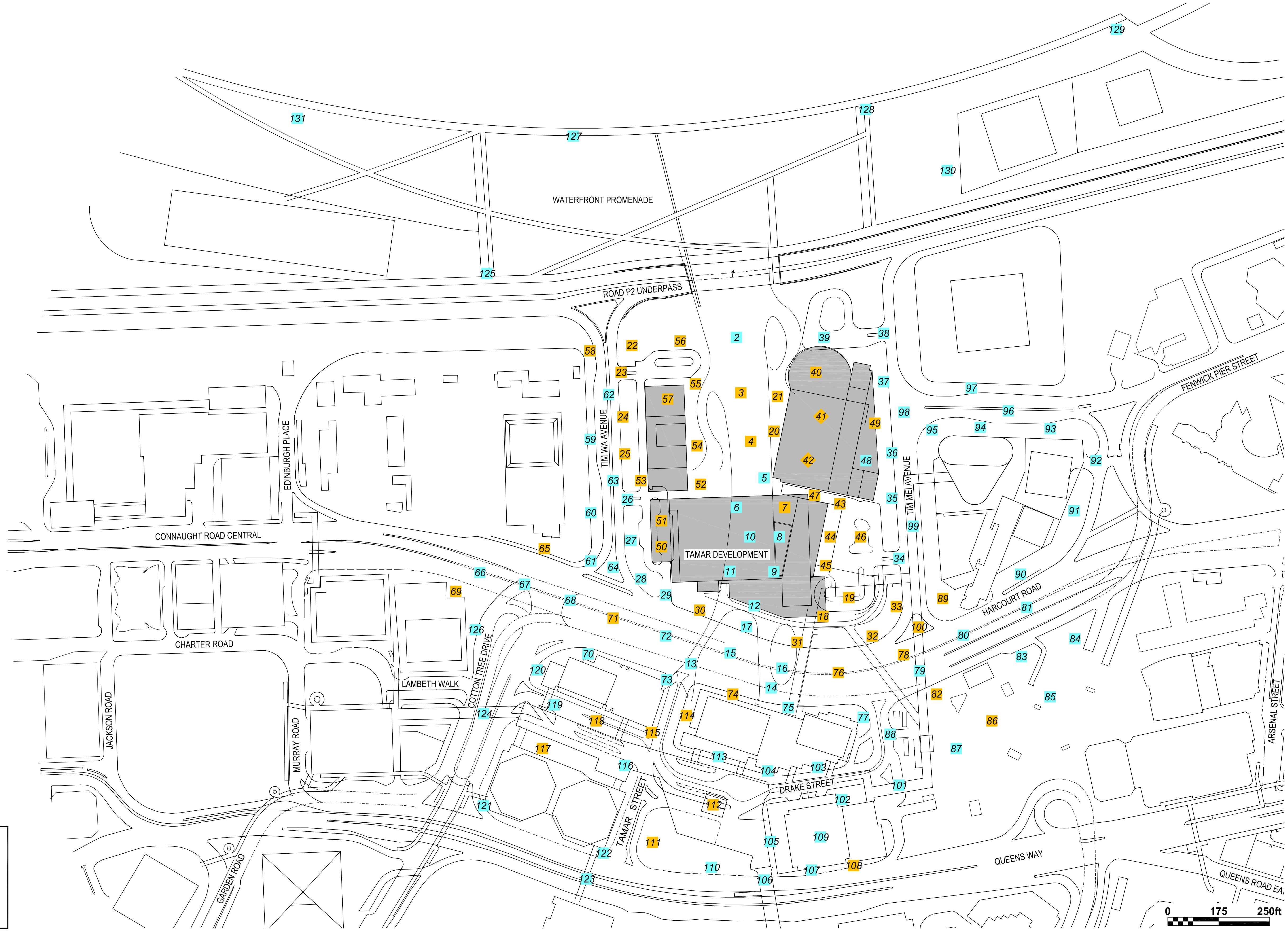
Tamar Development - Hong Kong

Project #07-1033

True North

Drawn by:	DJM	Fig:	13c
Approx. Scale:	1"=250'		
Date Revised:	Jan. 12, 2007		

RWDI



LEGEND:

PERFORMANCE CATEGORIES:

Reduced

Improved

SENSOR LOCATION:

Grade Level

Roof Level

Wind Velocity Ratio Relative to Existing Configuration (Fall)

Configuration - Amended Initial Design with Extension including Mitigation

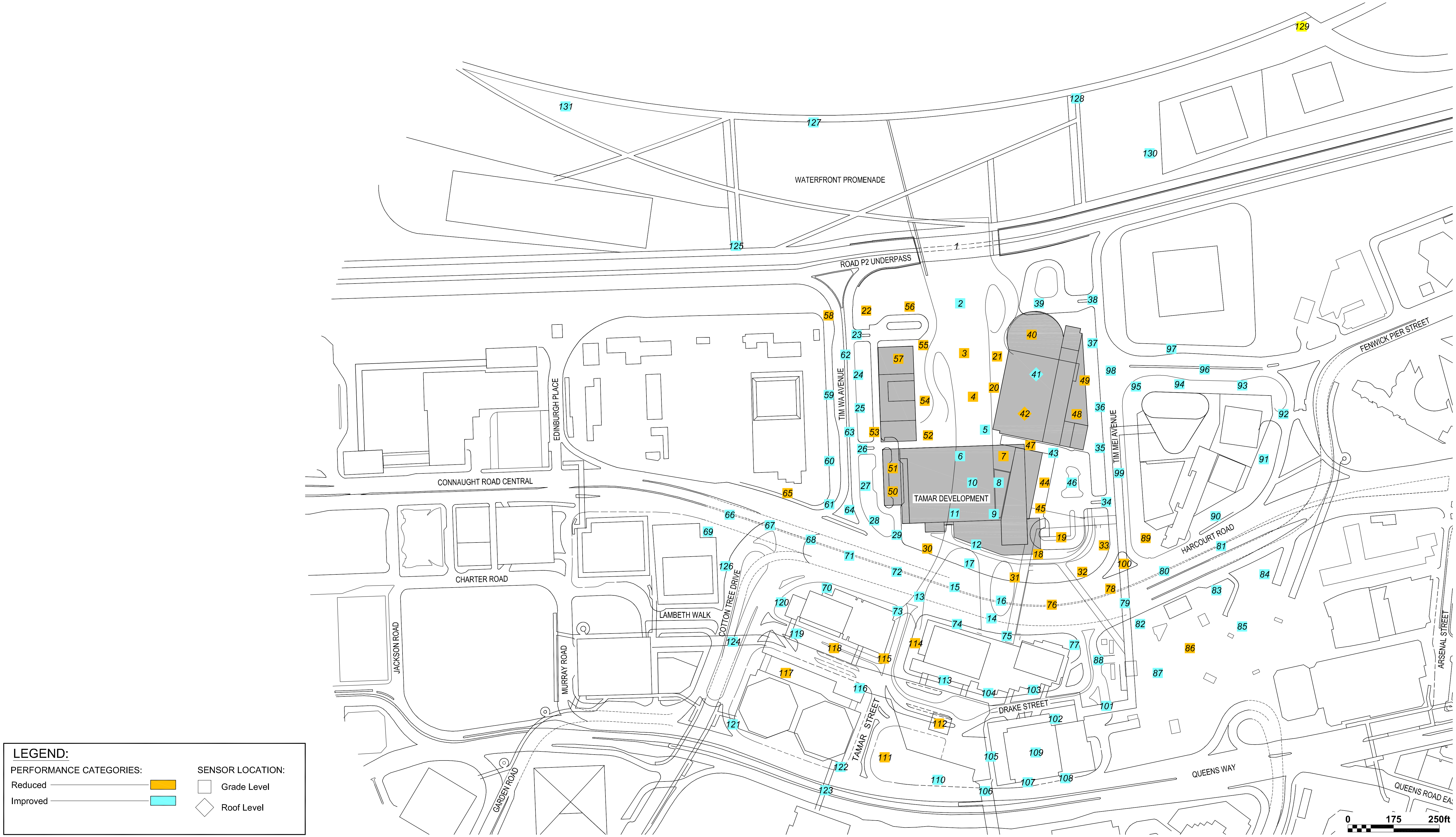
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJM	Fig: 13d
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



Wind Velocity Ratio Relative to Existing Configuration (Winter)
Configuration - Initial Design

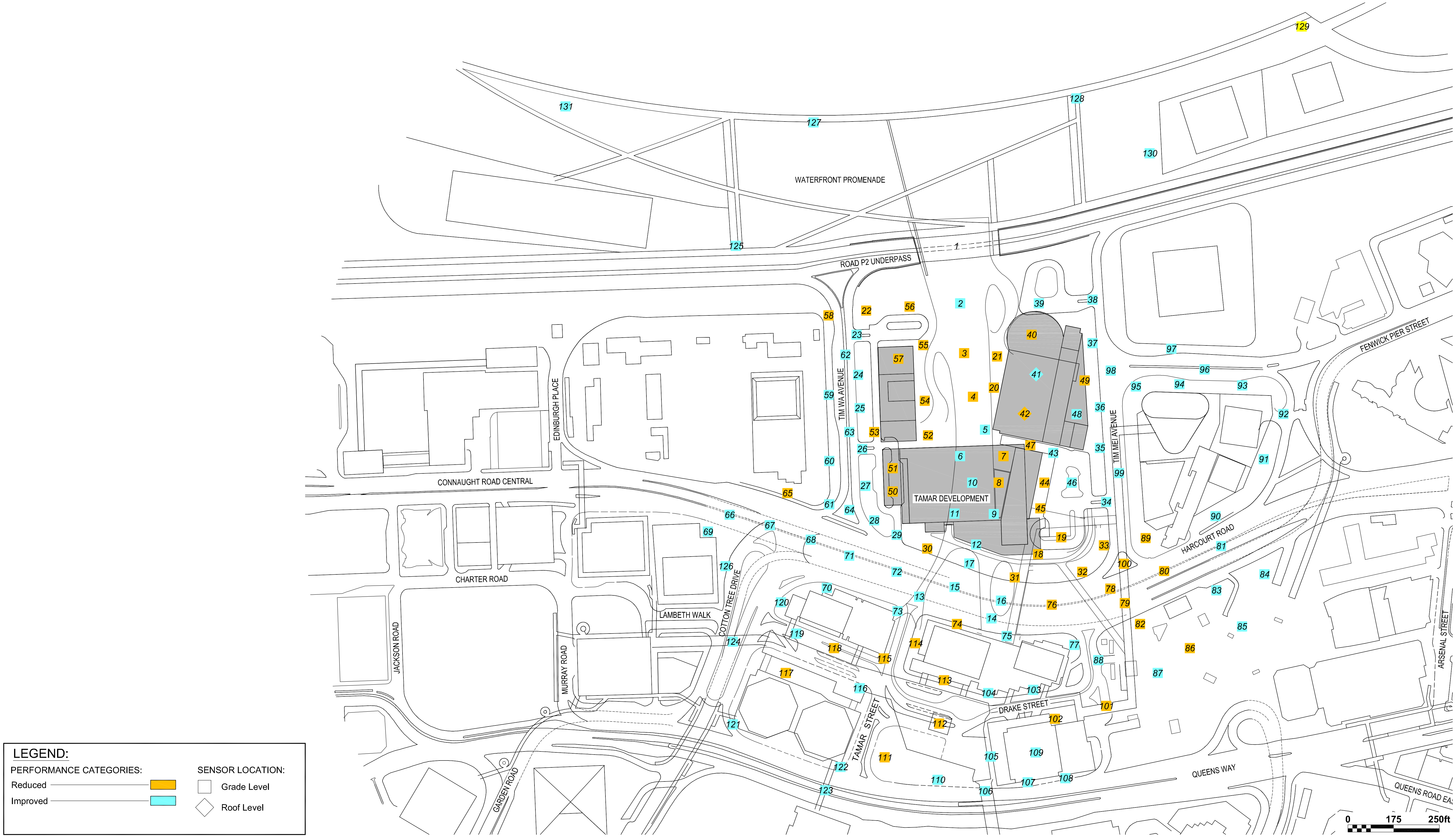
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJM	Fig: **14a**
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



Wind Velocity Ratio Relative to Existing Configuration (Winter)

Configuration - Initial Design with Extension

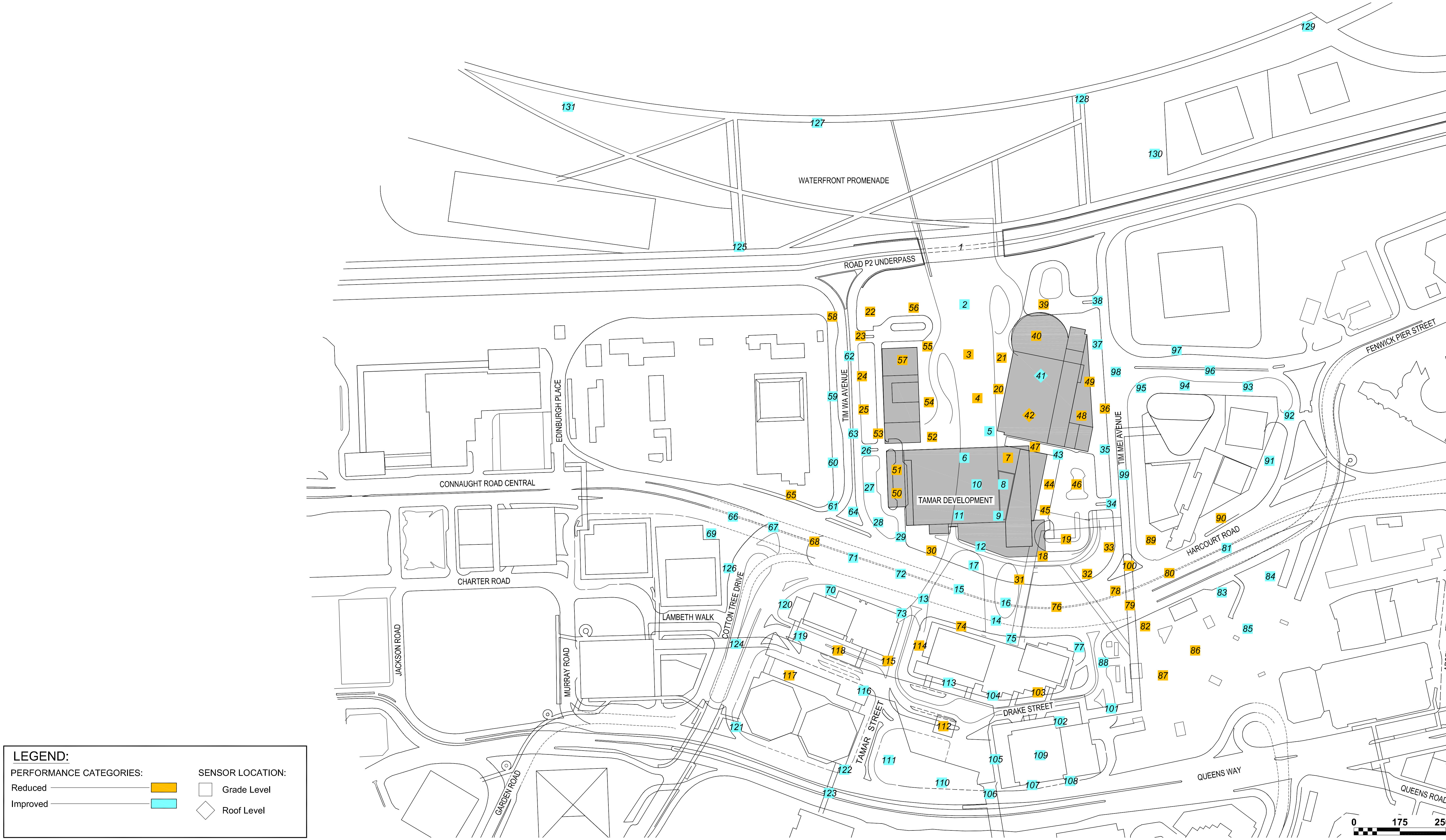
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by:	DJM	Fig:	**14b**
Approx. Scale:	1"=250'		
Date Revised:	Jan. 12, 2007		

RWDI



Wind Velocity Ratio Relative to Existing Configuration (Winter)

Configuration - Amended Initial Design including Mitigation

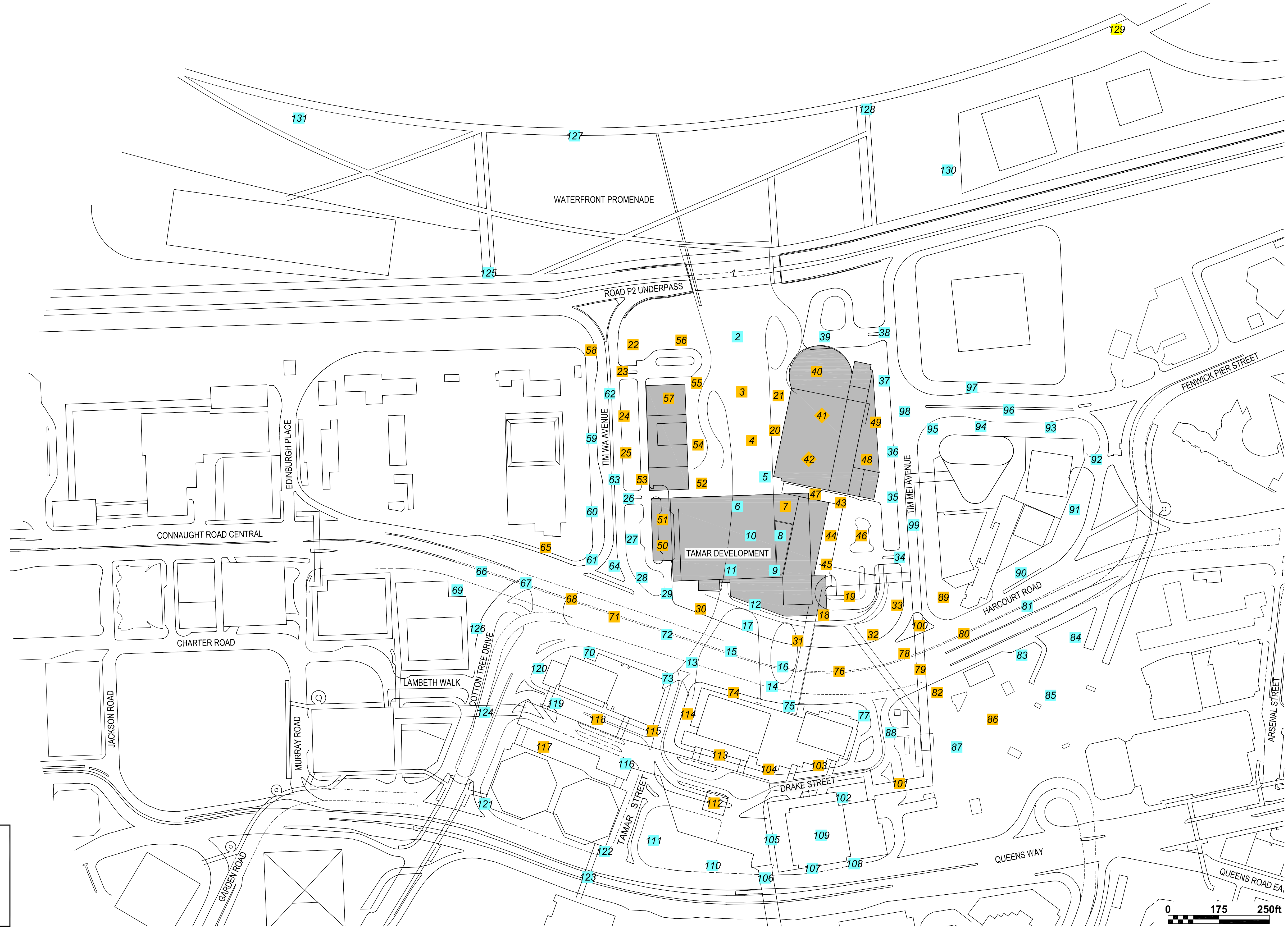
Tamar Development - Hong Kong

Project #07-1033

True North

Drawn by: DJM	Fig: **14c**
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



LEGEND:

PERFORMANCE CATEGORIES:
Reduced
Improved

SENSOR LOCATION:
Grade Level
Roof Level

Wind Velocity Ratio Relative to Existing Configuration (Winter)
Configuration - Amended Initial Design with Extension including Mitigation

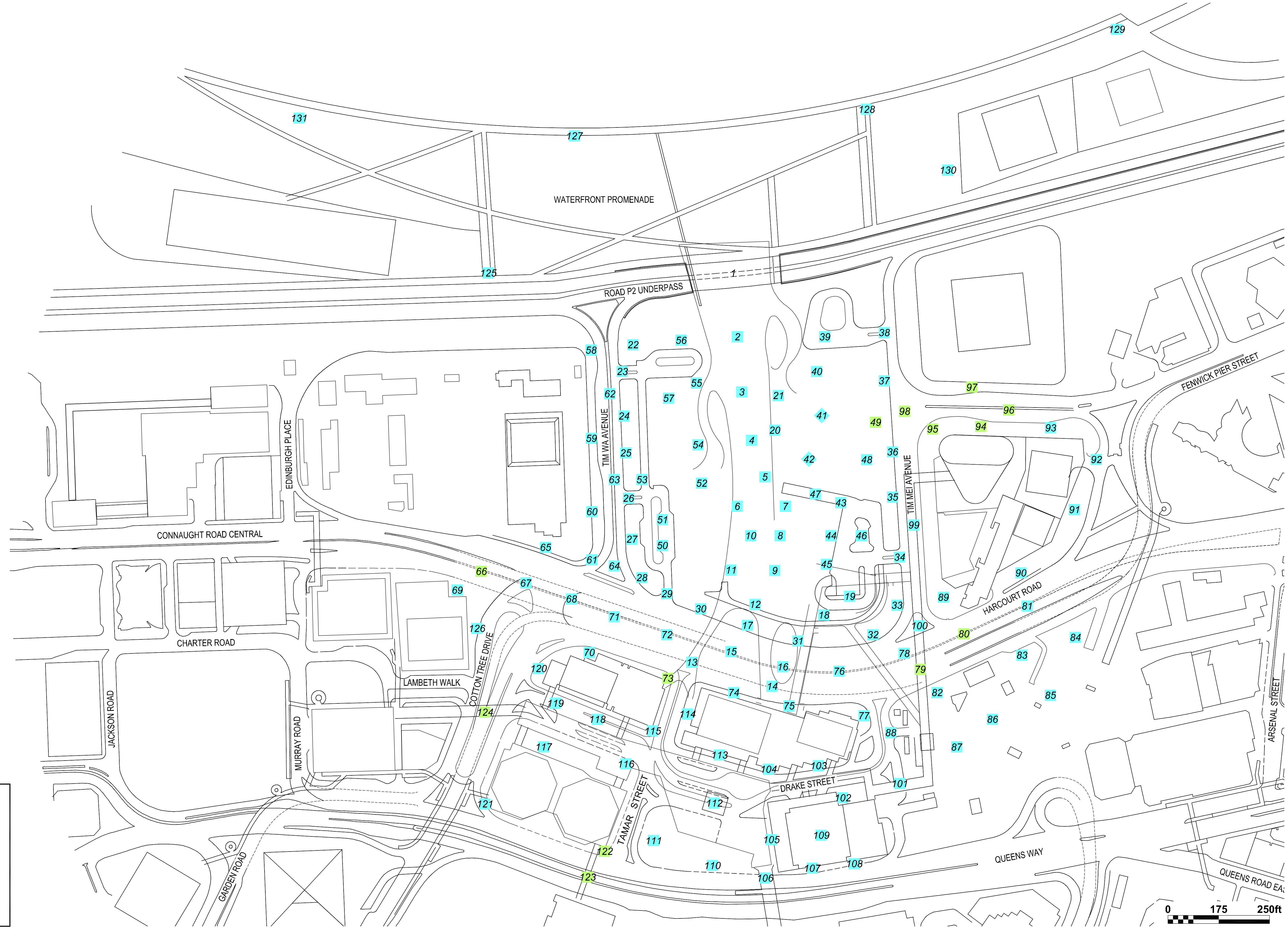
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJM	Fig: **14d**
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



LEGEND:

COMFORT CATEGORIES:

- Sitting/Standing
- Walking
- Uncomfortable
- "FAILURE" of Safety Criterion

SENSOR LOCATION:

- Grade Level
- Roof Level

Pedestrian Wind Conditions (Annual)
Configuration 1 - Existing

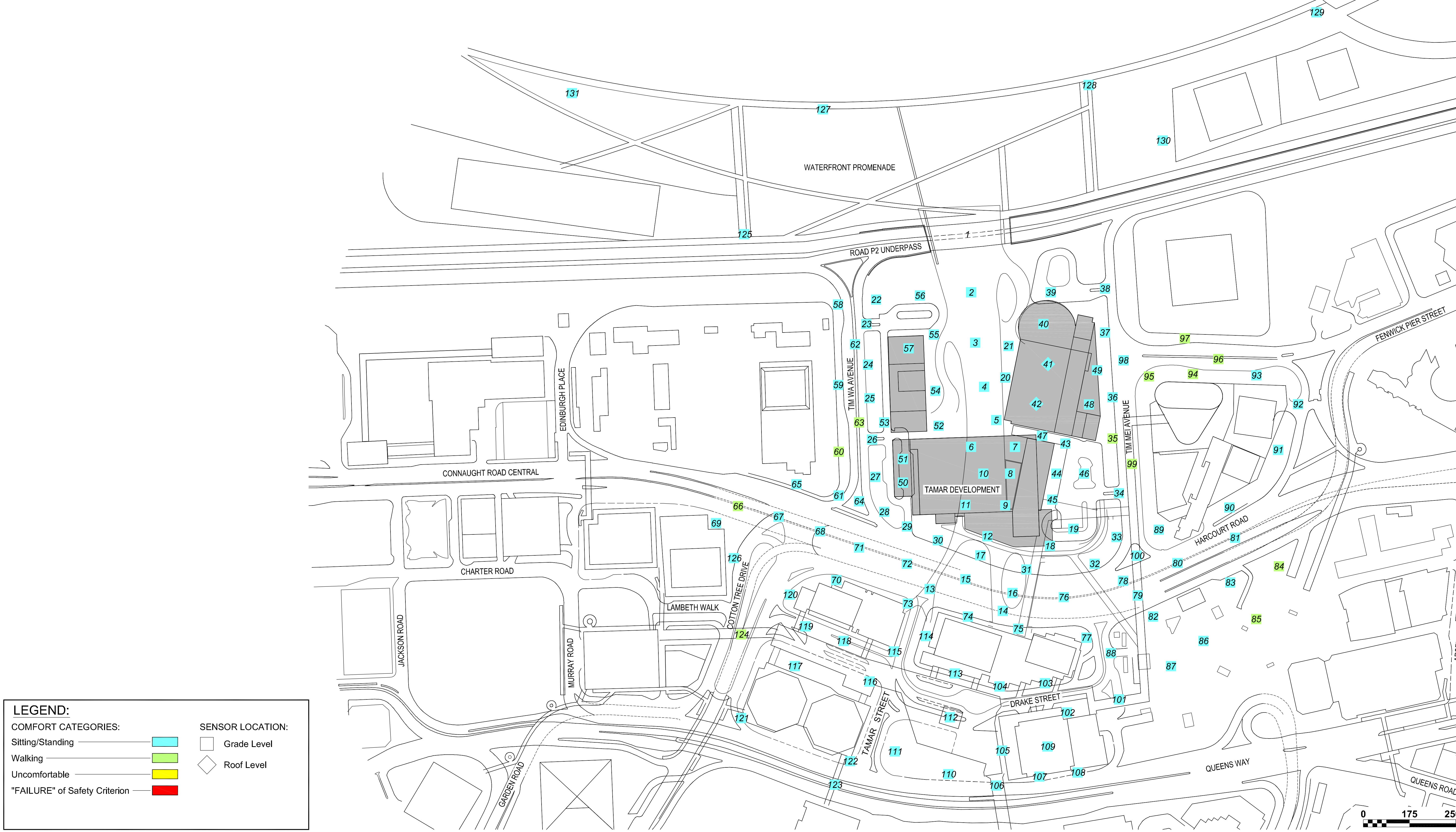
Tamar Development - Hong Kong

Project #07-1033

True North

Drawn by: DJM	Fig: 15a
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



Pedestrian Wind Conditions (Annual)
Configuration 2 - Initial Design

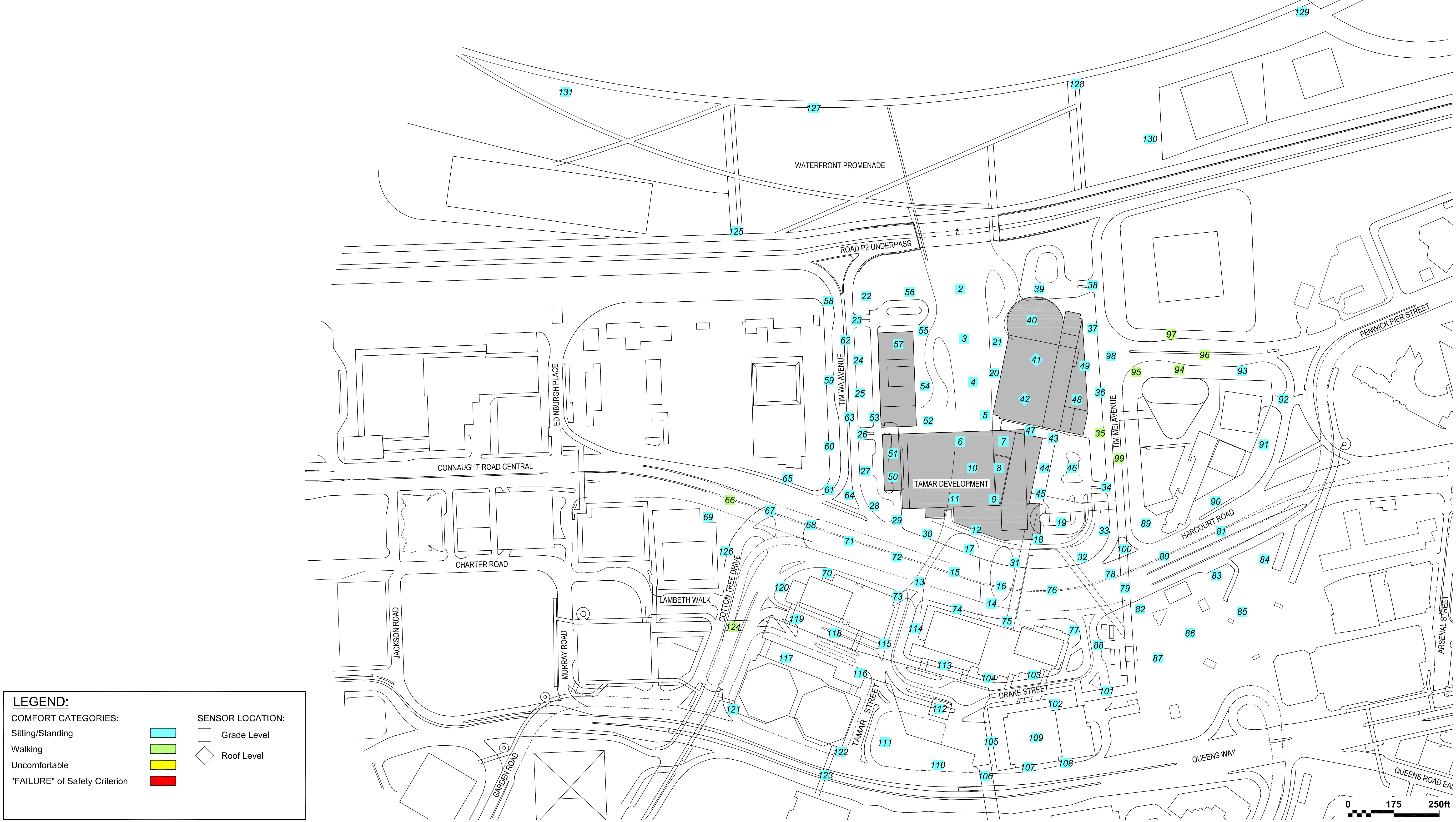
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJM	Fig: **15b**
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



Pedestrian Wind Conditions (Annual)

Configuration 3 - Proposed Development with Extension

Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by:	DJM	Fig:	**15c**
Approx. Scale:			1"=250'
Date Revised:			Jan. 12, 2007

RWDI

LEGEND:

COMFORT CATEGORIES:

- Sitting/Standing
- Walking
- Uncomfortable
- "FAILURE" of Safety Criterion

SENSOR LOCATION:

- Grade Level
- Roof Level

Pedestrian Wind Conditions (Annual)

Configuration 4 - Amended Initial Design including Mitigation

Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by:	DJM	Fig:	15d
Approx. Scale:	1"=250'		
Date Revised:	Jan. 12, 2007		

RWDI

LEGEND:

COMFORT CATEGORIES:

- Sitting/Standing
- Walking
- Uncomfortable
- "FAILURE" of Safety Criterion

SENSOR LOCATION:

- Grade Level
- Roof Level

Pedestrian Wind Conditions (Annual)

Configuration 5 - Amended Initial Design with Extension including Mitigation

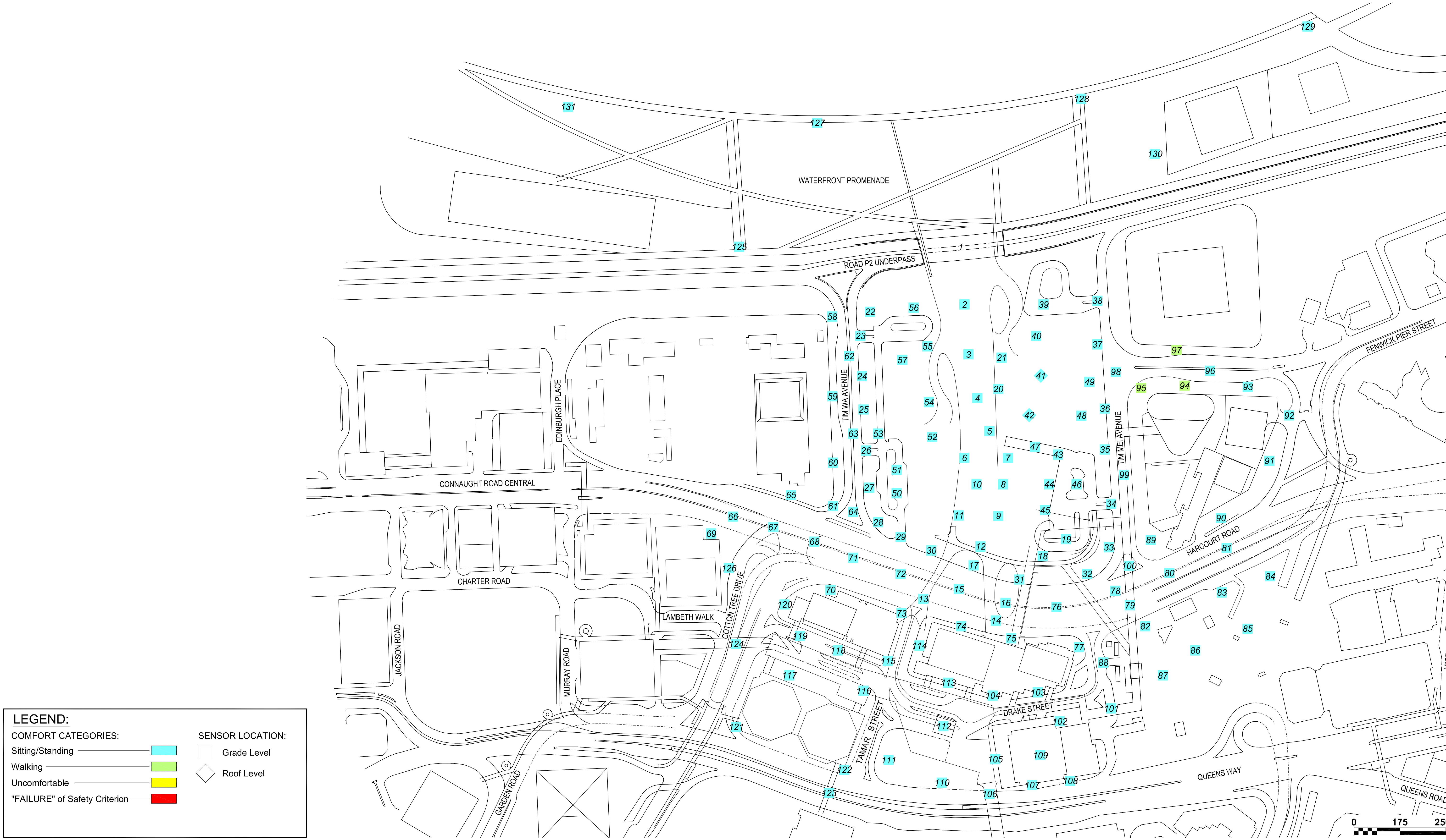
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJM	Fig: **15e**
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



Pedestrian Wind Conditions (Spring)

Configuration 1 - Existing

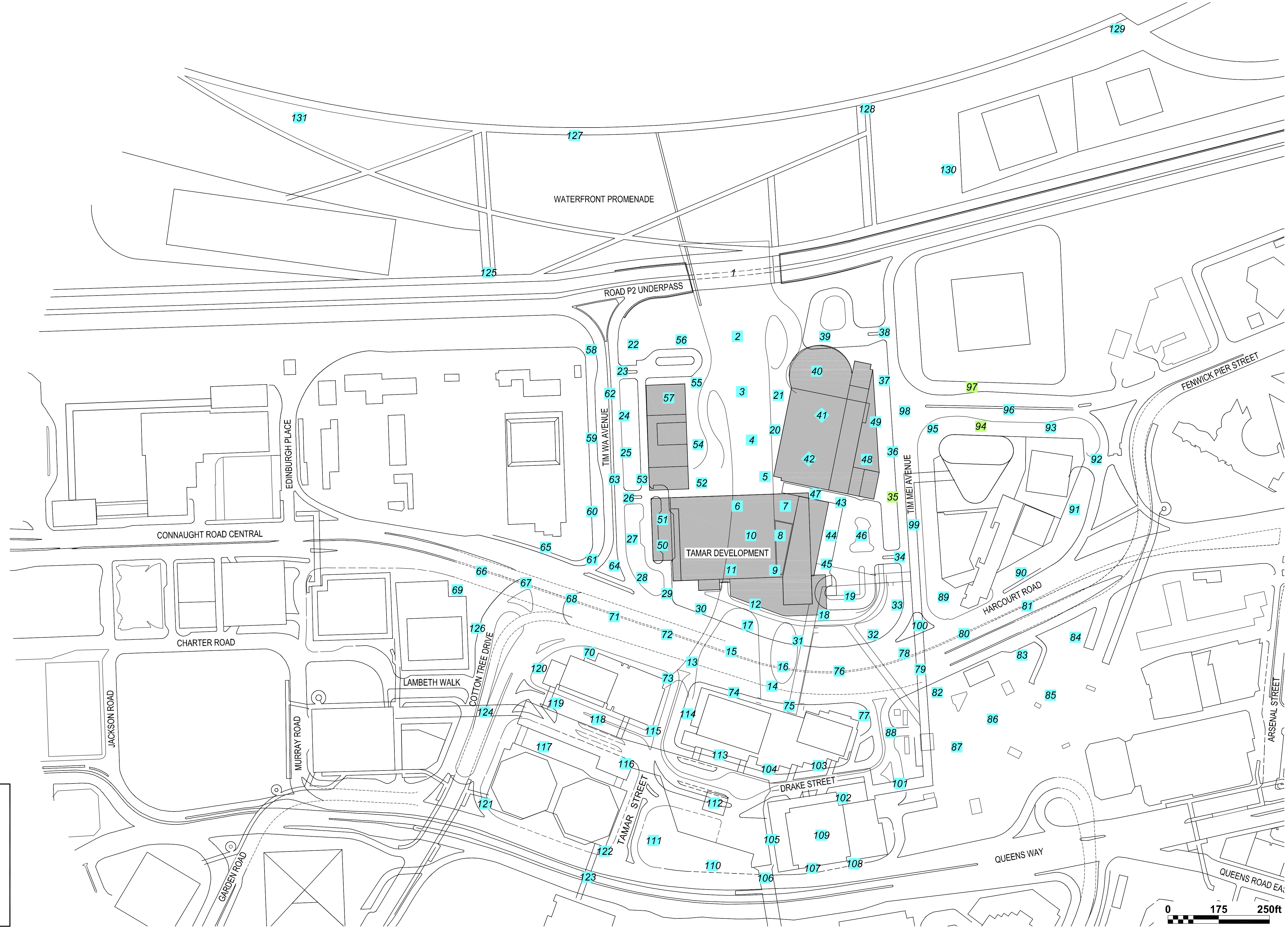
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by:	DJM	Fig:	16a
Approx. Scale:	1"=250'		
Date Revised:	Jan. 12, 2007		

RWDI



LEGEND:

COMFORT CATEGORIES:
- Sitting/Standing
- Walking
- Uncomfortable
- "FAILURE" of Safety Criterion

SENSOR LOCATION:
- Grade Level
- Roof Level

Pedestrian Wind Conditions (Spring)

Configuration 2 - Initial Design

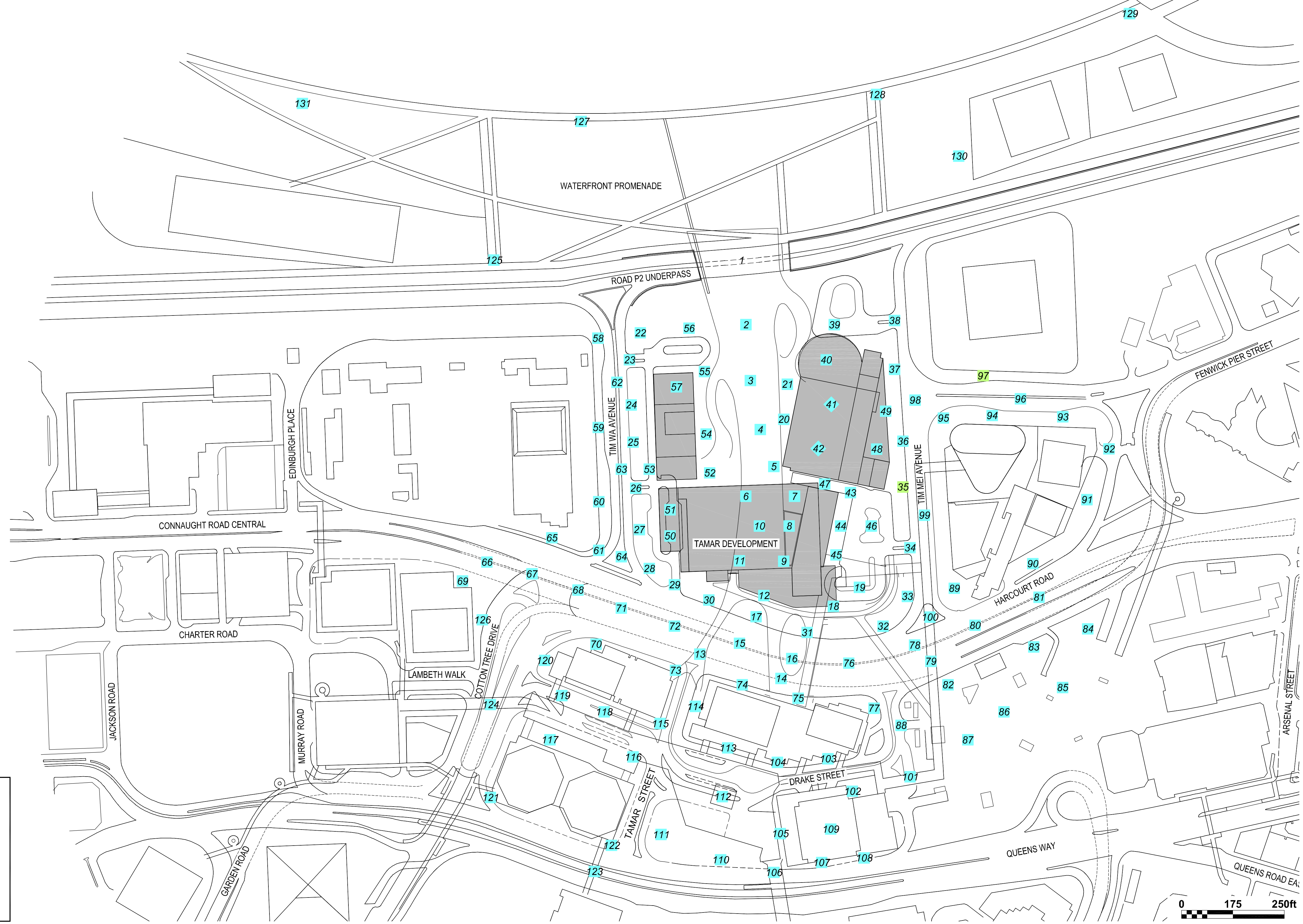
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJM	Fig: **16b**
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



LEGEND:

COMFORT CATEGORIES:		SENSOR LOCATION:
Sitting/Standing	(cyan)	Grade Level
Walking	(green)	Roof Level
Uncomfortable	(yellow)	
"FAILURE" of Safety Criterion	(red)	

Pedestrian Wind Conditions (Spring)

Configuration 3 - Initial Design with Extension

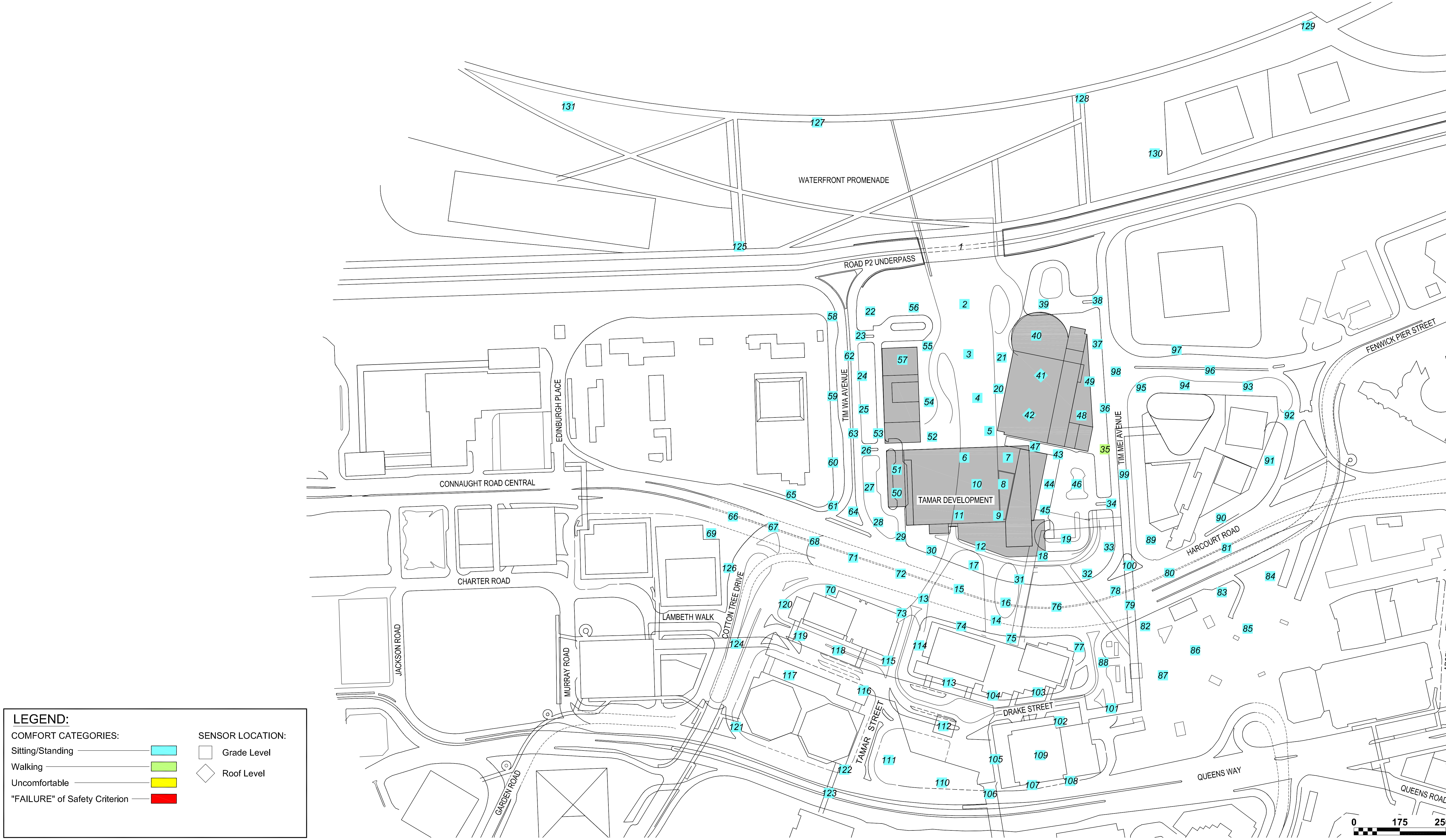
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by:	DJM	Fig:	**16c**
Approx. Scale:	1"=250'		
Date Revised:	Jan. 12, 2007		

RWDI



Pedestrian Wind Conditions (Spring)
Configuration 4 - Amended Initial Design including Mitigation

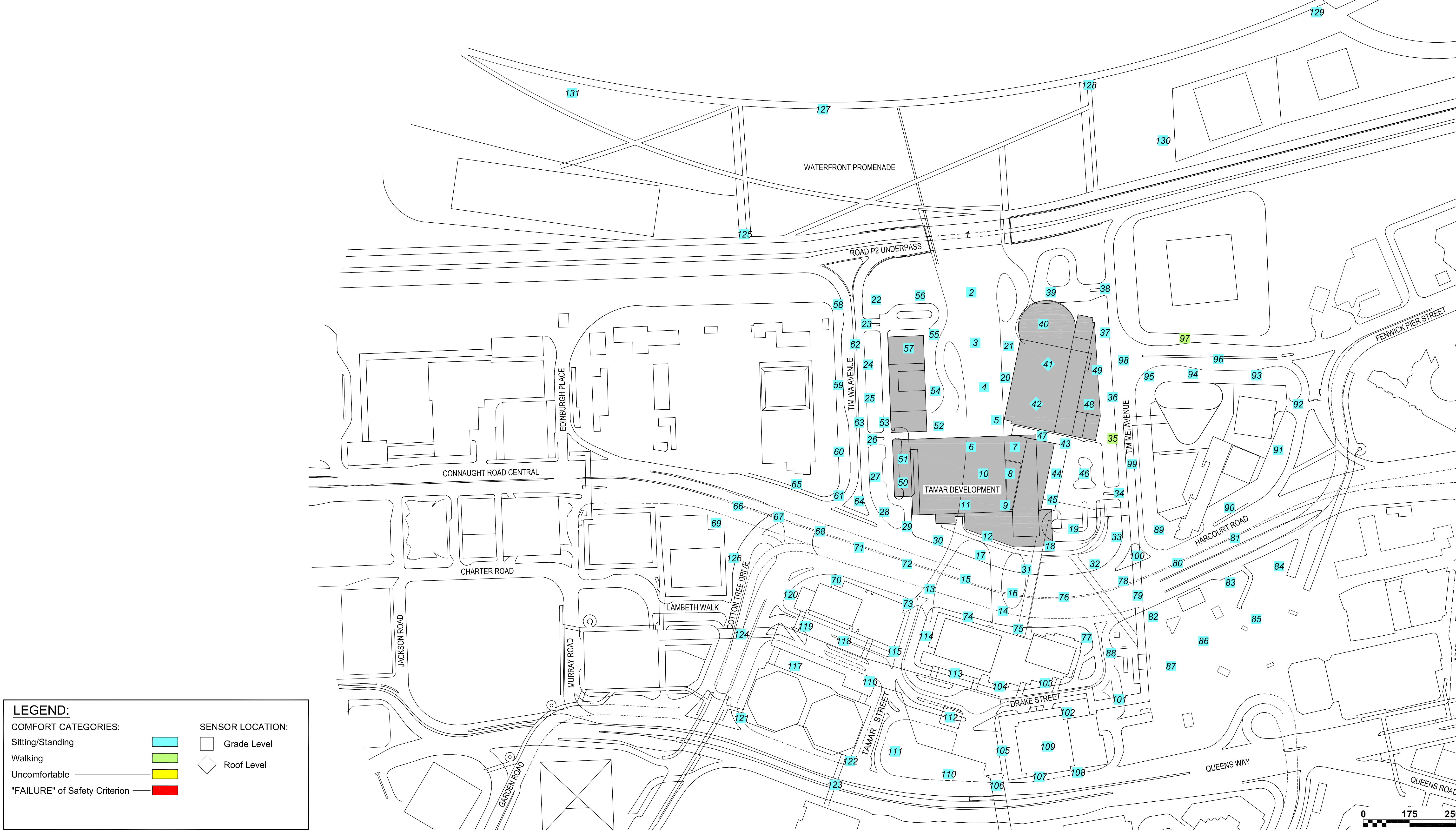
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by:	DJM	Fig:	16d
Approx. Scale:	1"=250'		
Date Revised:	Jan. 12, 2007		

RWDI



Pedestrian Wind Conditions (Spring)

Configuration 5 - Amended Initial Design with Extension including Mitigation

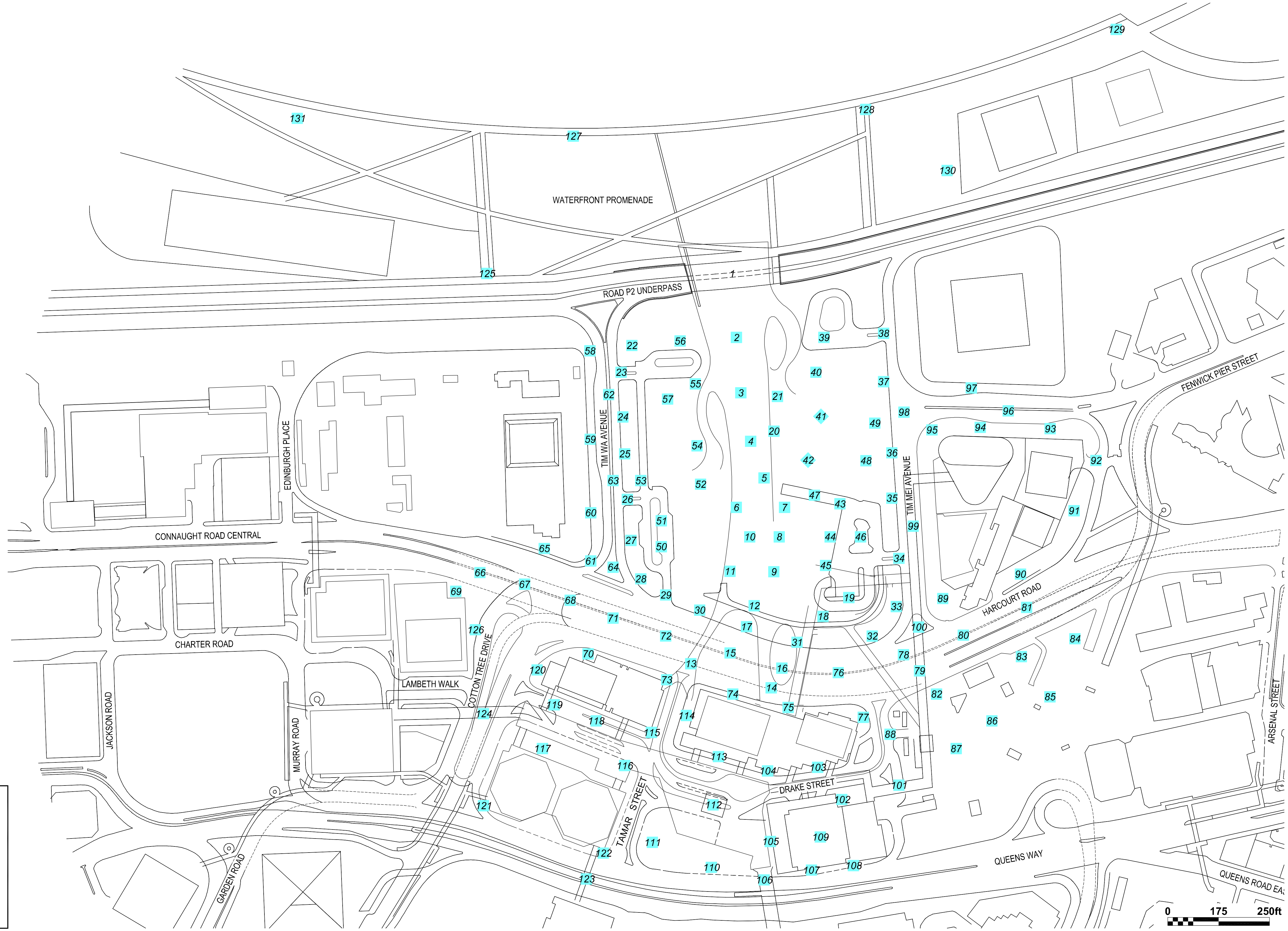
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJM	Fig: **16e**
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



LEGEND:

COMFORT CATEGORIES:
- Sitting/Standing
- Walking
- Uncomfortable
- "FAILURE" of Safety Criterion

SENSOR LOCATION:
- Grade Level
- Roof Level

Pedestrian Wind Conditions (Summer)
Configuration 1 - Existing

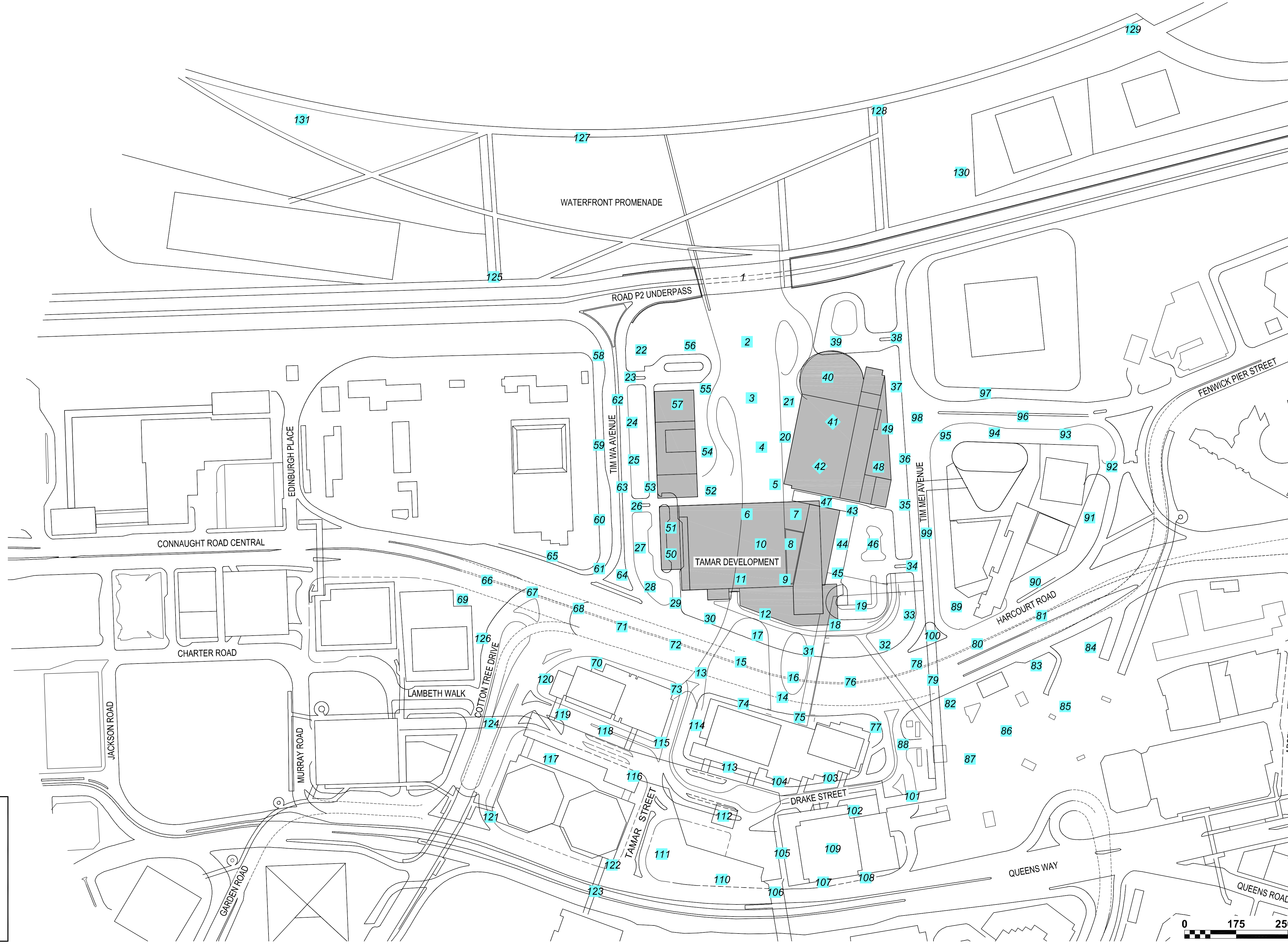
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJM	Fig: **17a**
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



LEGEND:

COMFORT CATEGORIES:

- Sitting/Standing
- Walking
- Uncomfortable
- "FAILURE" of Safety Criterion

SENSOR LOCATION:

- Grade Level
- Roof Level

Pedestrian Wind Conditions (Summer)

Configuration 2 - Initial Design

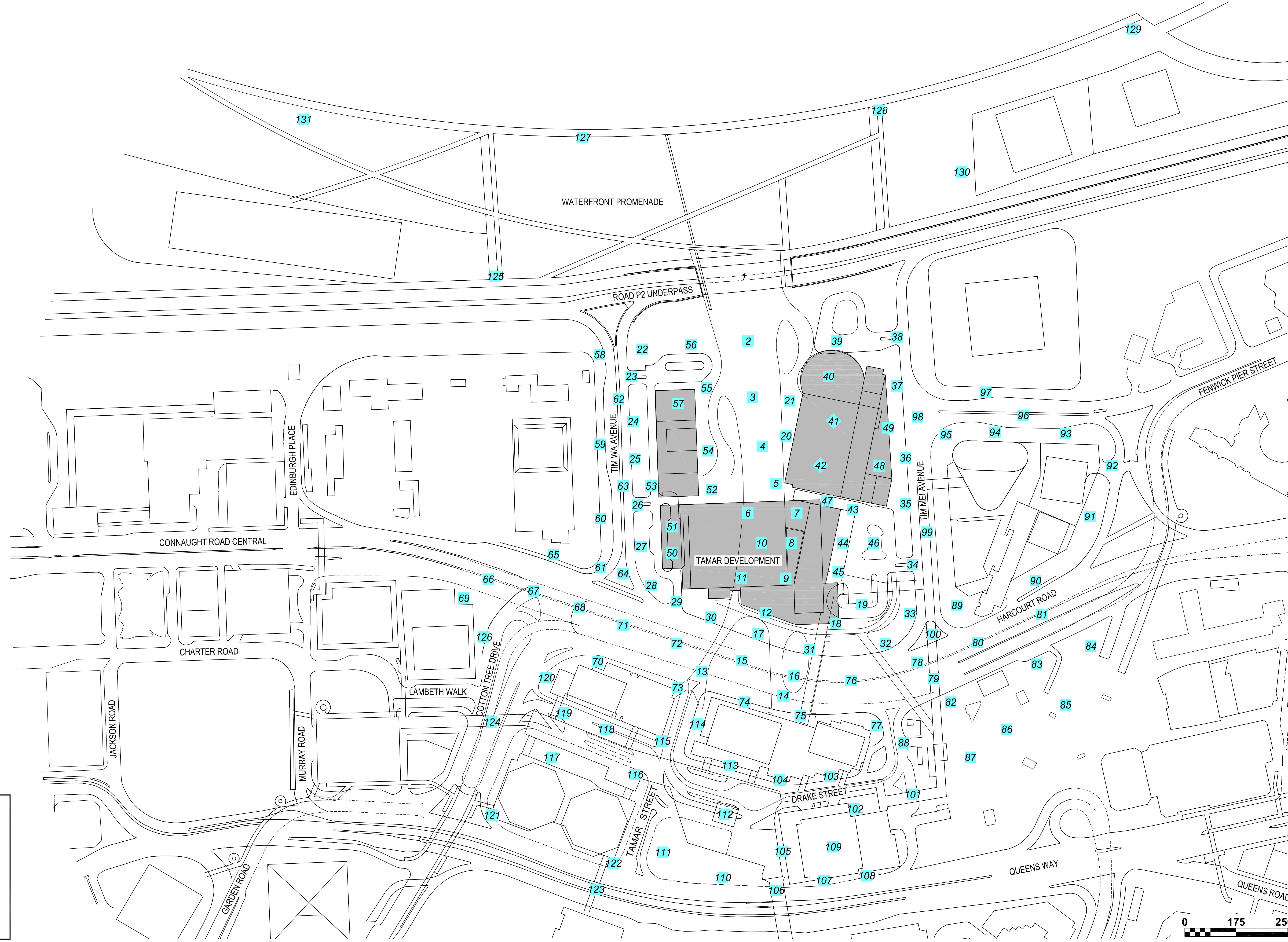
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJM	Fig: **17b**
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



LEGEND:

COMFORT CATEGORIES:
- Sitting/Standing
- Walking
- Uncomfortable
- "FAILURE" of Safety Criterion

SENSOR LOCATION:
- Grade Level
- Roof Level

Pedestrian Wind Conditions (Summer)

Configuration 3 - Initial Design with Extension

Tamar Development - Hong Kong

True North

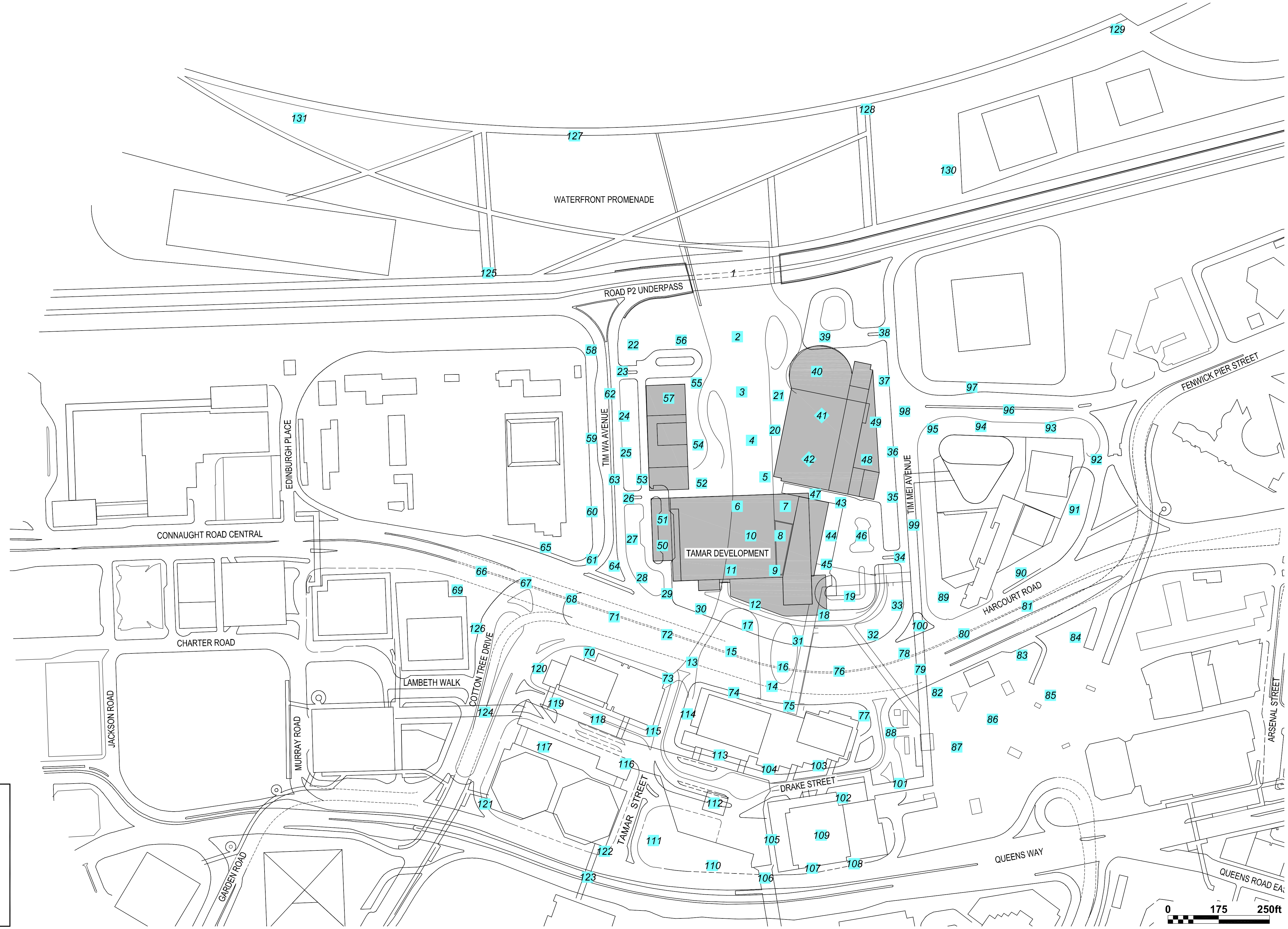
Project #07-1033

Drawn by: DJM | Fig: **17c**

Approx. Scale: 1"=250'

Date Revised: Jan. 12, 2007

RWDI



LEGEND:

COMFORT CATEGORIES:
- Sitting/Standing
- Walking
- Uncomfortable
- "FAILURE" of Safety Criterion

SENSOR LOCATION:
- Grade Level
- Roof Level

Pedestrian Wind Conditions (Summer)

Configuration 4 - Amended Initial Design including Mitigation

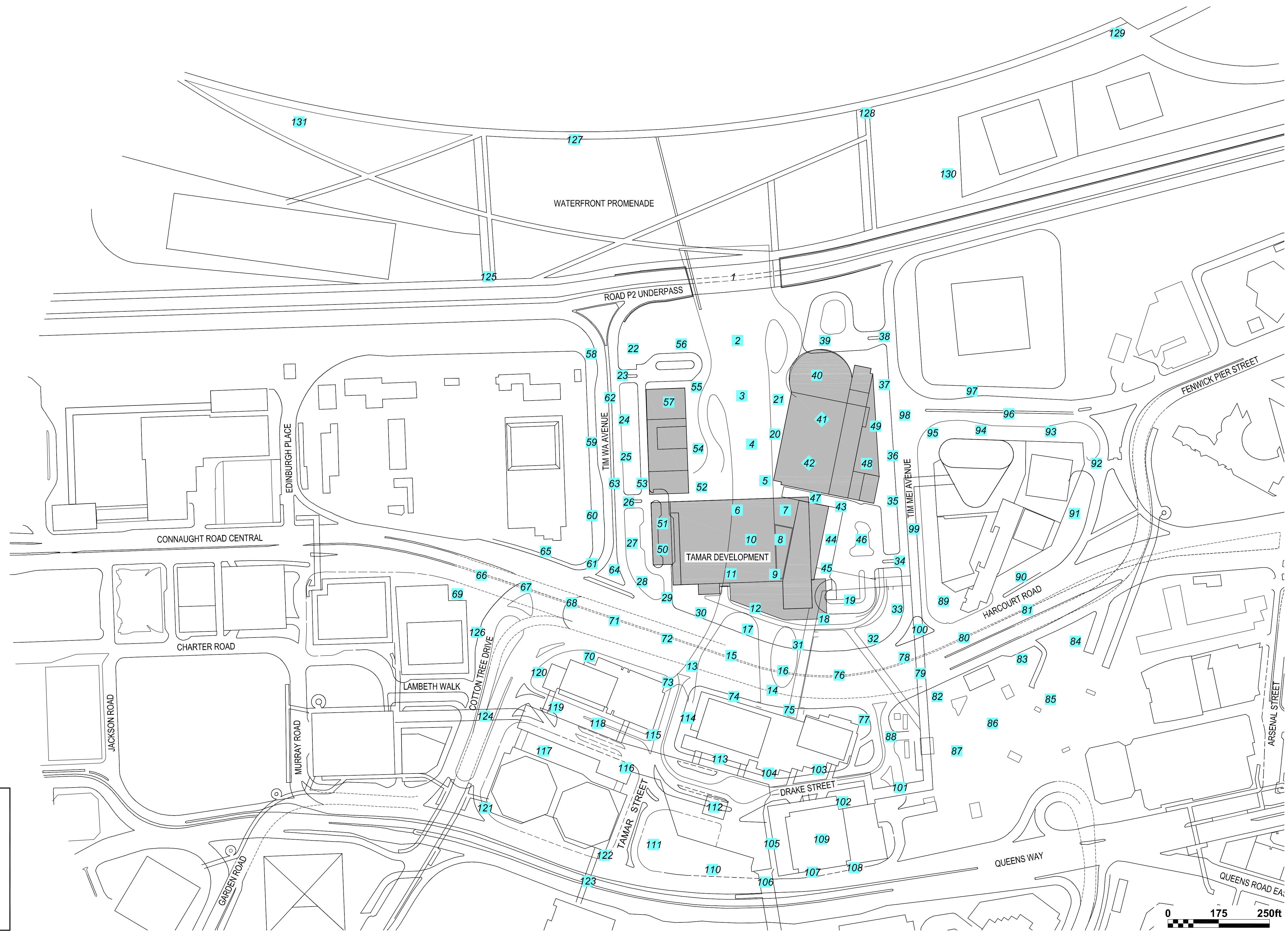
Tamar Development - Hong Kong

Project #07-1033

True North

Drawn by:	DJM	Fig:	**17d**
Approx. Scale:	1"=250'		
Date Revised:	Jan. 12, 2007		

RWDI



LEGEND:

COMFORT CATEGORIES:
- Sitting/Standing
- Walking
- Uncomfortable
- "FAILURE" of Safety Criterion

SENSOR LOCATION:
- Grade Level
- Roof Level

Pedestrian Wind Conditions (Summer)

Configuration 5 - Amended Initial Design with Extension including Mitigation

Tamar Development - Hong Kong

Project #07-1033

True North

Drawn by:	DJM	Fig:	17e
Approx. Scale:	1"=250'		
Date Revised:	Jan. 12, 2007		

RWDI

Pedestrian Wind Conditions (Fall)
Configuration 1 - Existing

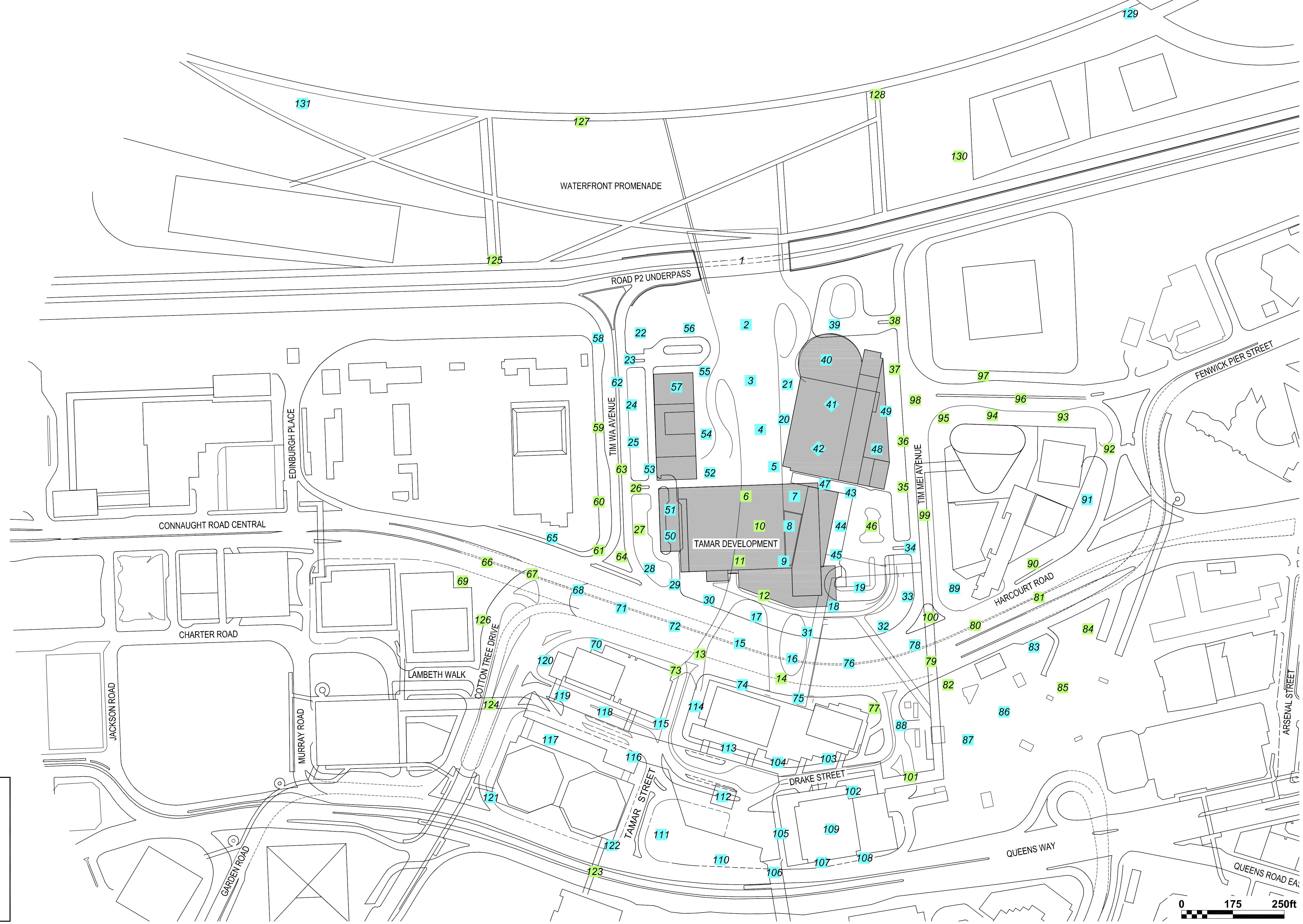
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by:	DJM	Fig:	**18a**
Approx. Scale:	1"=250'		
Date Revised:	Jan. 12, 2007		

RWDI



LEGEND:

COMFORT CATEGORIES:
- Sitting/Standing
- Walking
- Uncomfortable
- "FAILURE" of Safety Criterion

SENSOR LOCATION:
- Grade Level
- Roof Level

Pedestrian Wind Conditions (Fall) Configuration 2 - Initial Design Tamar Development - Hong Kong	True North Project #07-1033
Drawn by: DJM	Fig: **18b**
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI

LEGEND:

COMFORT CATEGORIES:		SENSOR LOCATION:
Sitting/Standing	(cyan)	Grade Level (square)
Walking	(green)	Roof Level (diamond)
Uncomfortable	(yellow)	
"FAILURE" of Safety Criterion	(red)	

Pedestrian Wind Conditions (Fall)

Configuration 3 - Initial Design with Extension

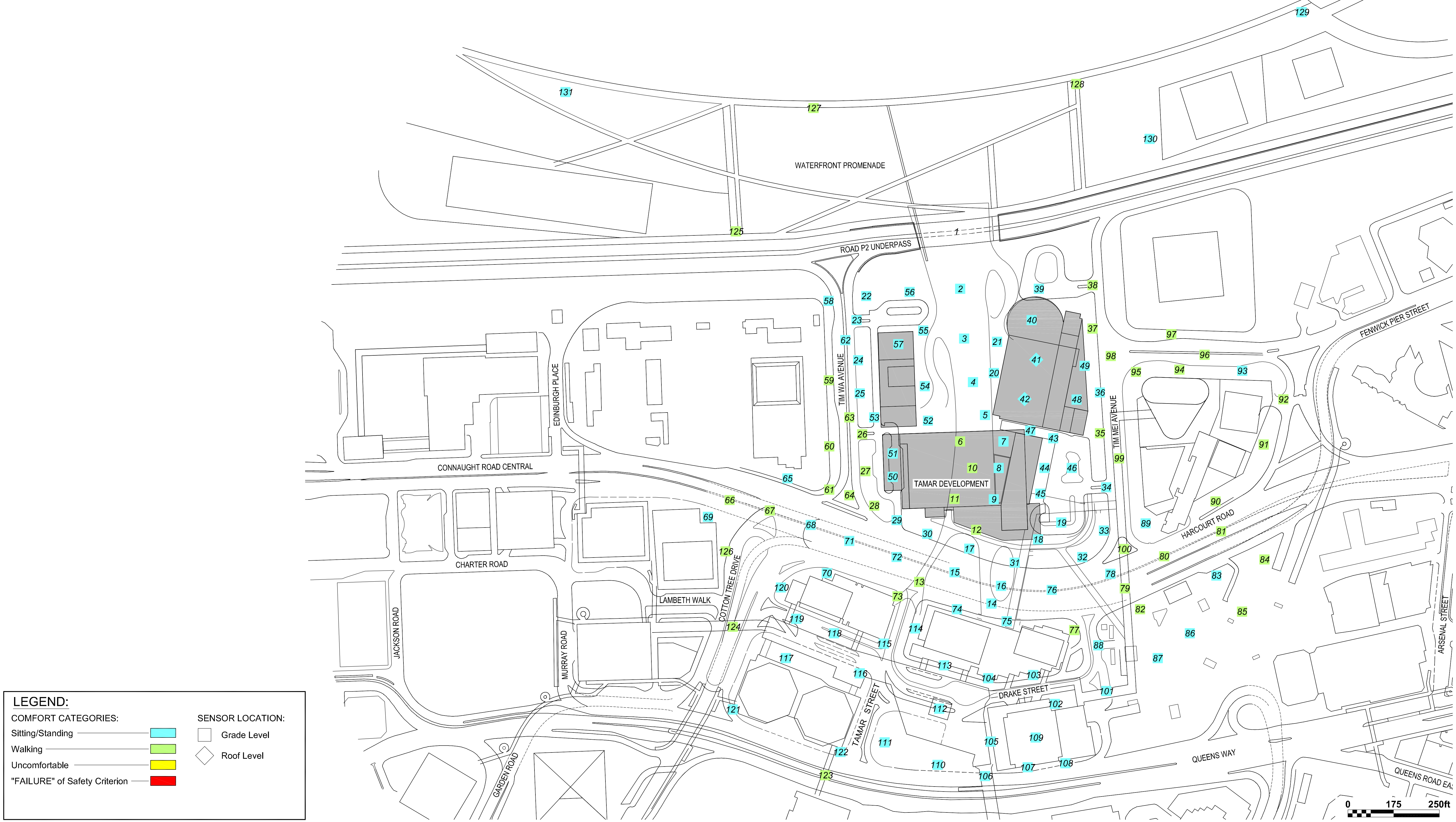
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by:	DJM	Fig:	**18c**
Approx. Scale:	1"=250'		
Date Revised:	Jan. 12, 2007		

RWDI



Pedestrian Wind Conditions (Fall)

Configuration 4 - Amended Initial Design including Mitigation

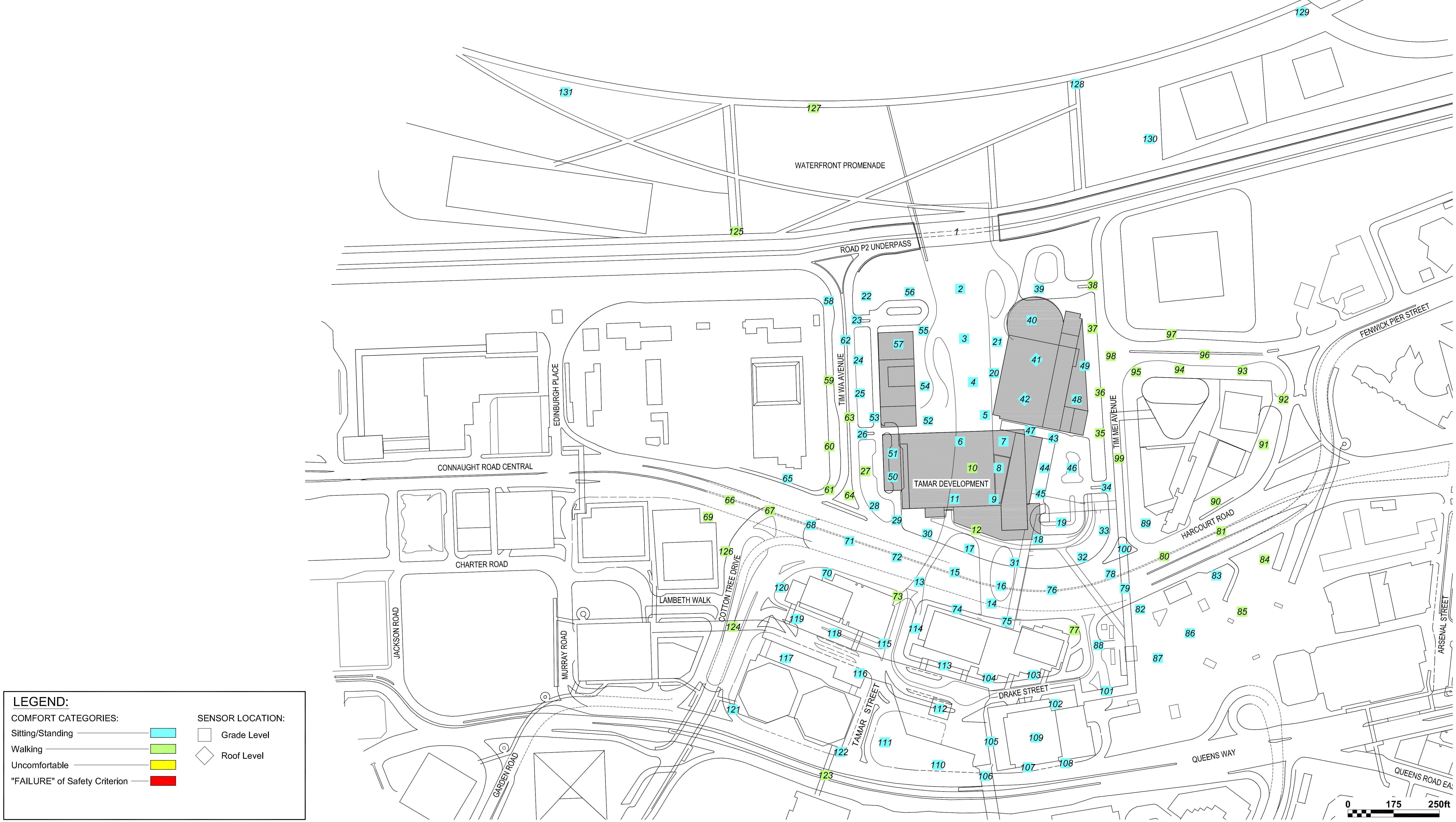
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJM	Fig: **18d**
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



Pedestrian Wind Conditions (Fall)

Configuration 5 - Amended Initial Design with Extension including Mitigation

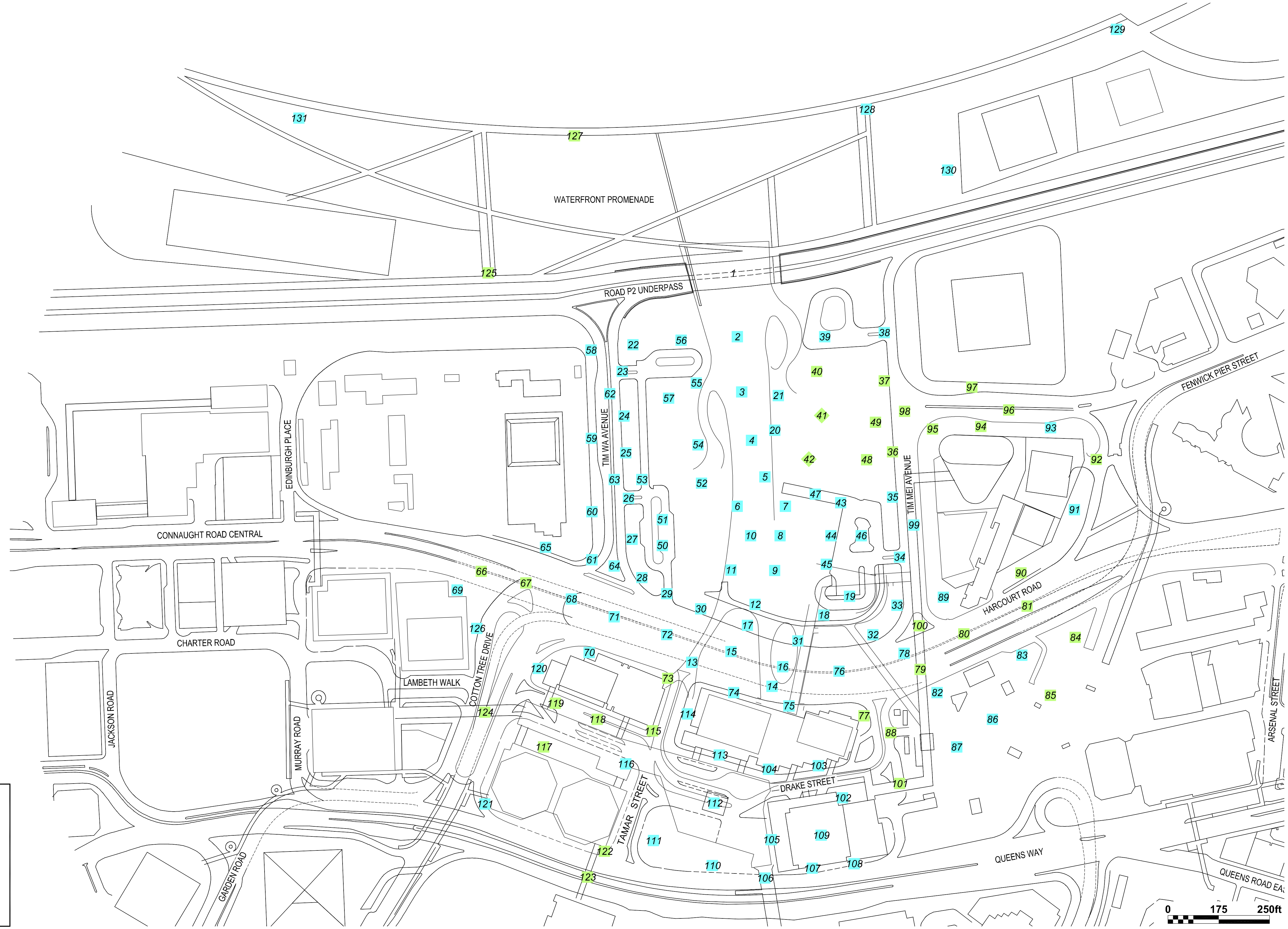
Tamar Development - Hong Kong

Project #07-1033

True North

Drawn by:	DJM	Fig:	18e
Approx. Scale:	1"=250'		
Date Revised:	Jan. 12, 2007		

RWDI



LEGEND:

COMFORT CATEGORIES:

- Sitting/Standing
- Walking
- Uncomfortable
- "FAILURE" of Safety Criterion

SENSOR LOCATION:

- Grade Level
- Roof Level

Pedestrian Wind Conditions (Winter)

Configuration 1 - Existing

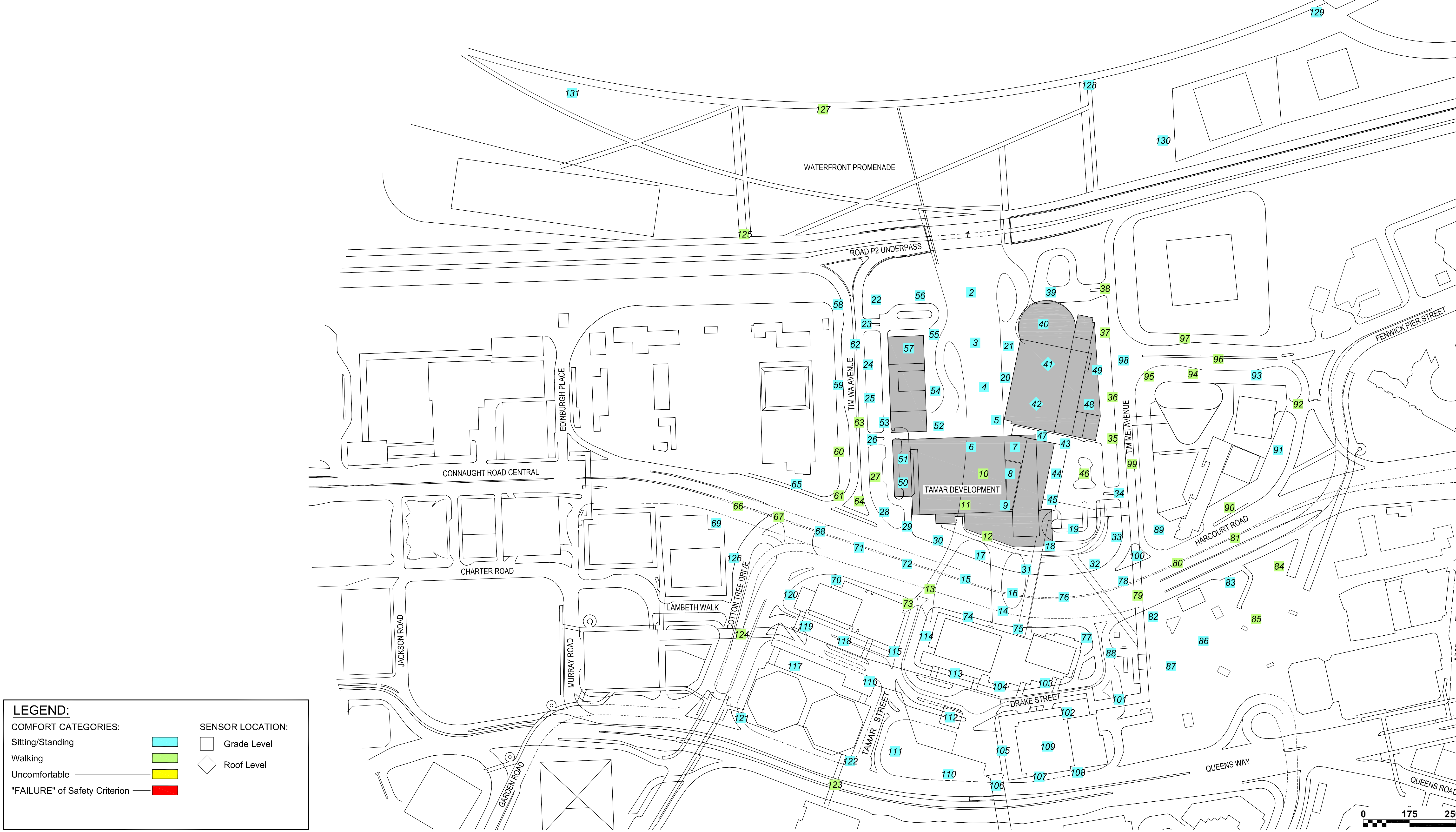
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJM	Fig: **19a**
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



Pedestrian Wind Conditions (Winter)

Configuration 2 - Initial Design

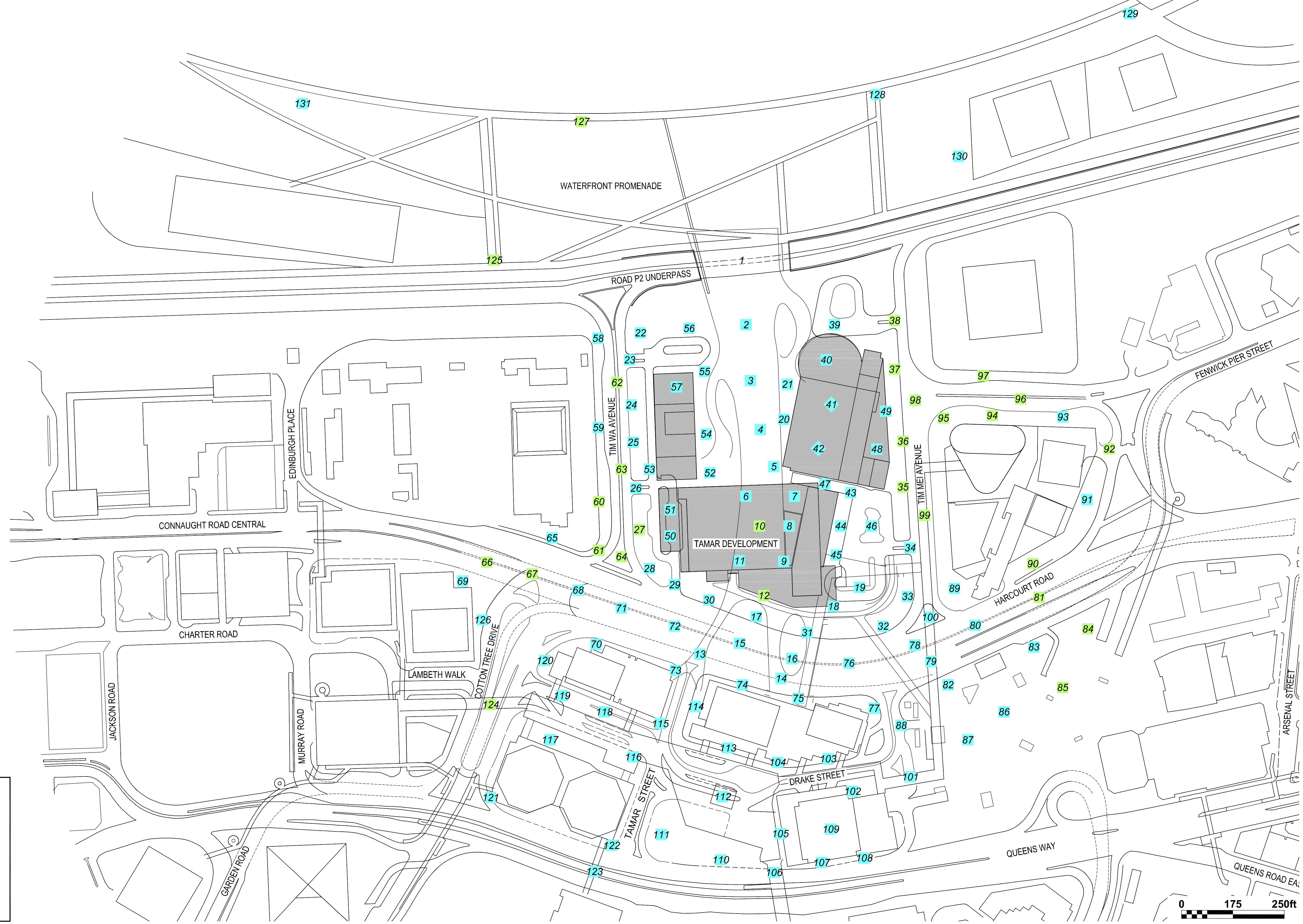
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJM	Fig: 19b
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



LEGEND:

COMFORT CATEGORIES:

- Sitting/Standing
- Walking
- Uncomfortable
- "FAILURE" of Safety Criterion

SENSOR LOCATION:

- Grade Level
- Roof Level

Pedestrian Wind Conditions (Winter)

Configuration 3 - Initial Design with Extension

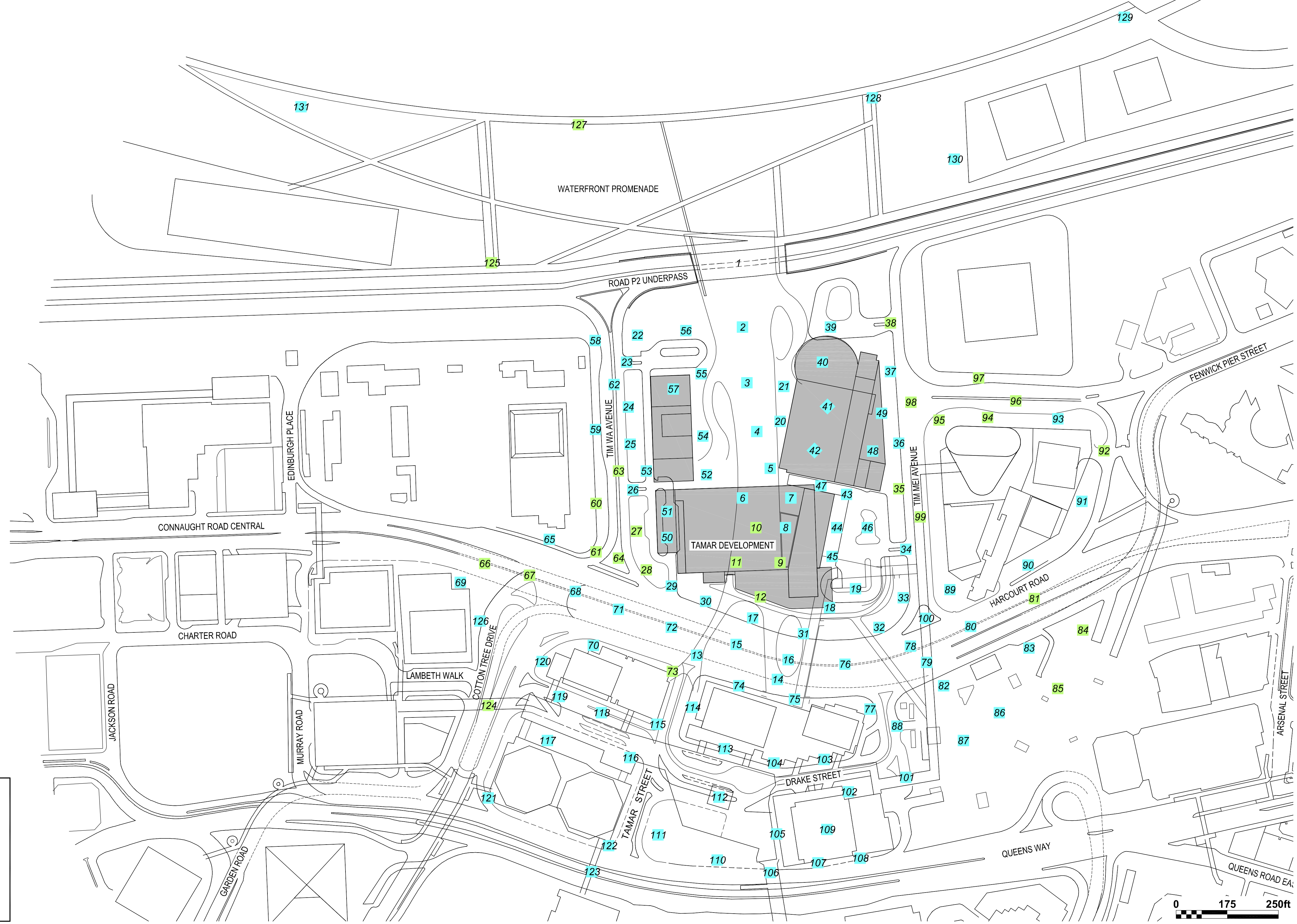
Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by: DJM	Fig: 19c
Approx. Scale:	1"=250'
Date Revised:	Jan. 12, 2007

RWDI



LEGEND:

COMFORT CATEGORIES:	SENSOR LOCATION:
Sitting/Standing	Grade Level
Walking	Roof Level
Uncomfortable	
"FAILURE" of Safety Criterion	

Pedestrian Wind Conditions (Winter)

Configuration 4 - Amended Initial Design including Mitigation

Tamar Development - Hong Kong

Project #07-1033

True North

Drawn by:	DJM	Fig:	**19d**
Approx. Scale:	1"=250'		
Date Revised:	Jan. 12, 2007		

RWDI

LEGEND:

COMFORT CATEGORIES:	SENSOR LOCATION:
Sitting/Standing	Grade Level
Walking	Roof Level
Uncomfortable	
"FAILURE" of Safety Criterion	

Pedestrian Wind Conditions (Winter)

Configuration 5 - Amended Initial Design with Extension including Mitigation

Tamar Development - Hong Kong

True North

Project #07-1033

Drawn by:	DJM	Fig:	19e
Approx. Scale:	1"=250'		
Date Revised:	Jan. 12, 2007		

RWDI

APPENDIX A

APPENDIX A: LIST OF DRAWINGS

The drawings and information listed below were received from Gammon Construction Limited and were used to construct the scale model of the proposed Tamar Development.

Table A.1: List of Drawings and Information Used for Model Construction

File Name	Drawing/File Format	Date Drawn (Last Revision)	Date Received
1681_061204_Site05a	.dxf		12/06/06
1681_061204_Site05	.dxf		12/06/06
1681_061205_dxf	.dxf		12/05/06
1681_before_expansion	.pdf		12/04/06
1681_after_expansion	.pdf		12/04/06
1681_061208_EXCO-01-1	.jpeg		12/14/06
1681_061211_LEGtest04copy	.jpeg		12/14/06
1681_elev	.pdf		12/14/06
1681_ExCo_elev_20031213	.pdf		12/14/06
AVA_curtain-wall_legco	.pdf		12/14/06
AVA_Mark-up_mitigation	.pdf		12/14/06

APPENDIX B

APPENDIX B: RWDI WIND COMFORT

The RWDI wind criteria deal with both pedestrian safety and comfort, as they relate to the force of the wind. Thermal effects (e.g., temperature, humidity, sun/shade, etc.) are not considered in these comfort criteria. Gust speeds over a short period are critical in some circumstances, particularly where winds are very strong and pedestrians' footing and balance are involved. The mean wind speed can also affect pedestrian comfort in areas such as an outdoor cafe. The combined effect of mean and gust speeds can be quantified by a Gust Equivalent Mean (GEM) speed. GEM is the greater of either the mean speed, or the gust speed divided by 1.85, which is a gust factor typically used for wind comfort (References 1, 5, 7 and 8 in Section 7).

The GEM wind speed predicted for each test location on the model is compared to the RWDI wind criteria to determine pedestrian comfort, while the gust speed is used for the wind safety evaluation. The following table is an example of how these predicted results are presented in this report.

Example Table: Pedestrian Wind Comfort and Safety Categories

COMFORT CATEGORY			Sitting	Standing	Walking	Uncomfortable		**SAFETY CATEGORY**	
GEM Wind Speed (km/h)			0 - 10	0 - 14	0 - 19	> 19		Gust Speed ≥ 88km/h	
Category Limit			≥ 80%	≥ 80%	≥ 80%	> 20%		> 2 Events Seasonally	
Loc.	Config.	Season	%	%	%	%	**RATING**	Events	**RATING**
999	A	Summer	75	85	95	5	Standing	0	PASS
		Winter	50	70	85	15	Walking	1	PASS
	B	Summer	65	80	90	10	Standing	2	PASS
		Winter	45	65	75	25	Uncomfortable	4	FAIL

Across the top of the Example Table there are four comfort categories:

- **Sitting:** wind speeds up to 10 km/h - Low wind speeds during which one can read a newspaper without having it blown away. Recommended for outdoor cafes and other amenity spaces that promote sitting.

- **Standing:** wind speeds up to 14 km/h - Slightly higher wind speeds that are strong enough to rustle leaves. These wind speeds are appropriate at major building entrances, bus stops or other areas, such as a bench along a sidewalk, where people may want to linger but not necessarily sit for extended periods of time.

- **Walking:** wind speeds up to 19 km/h - Winds that would lift leaves, move litter, hair and loose clothing. Appropriate for sidewalks, intersections, plazas, parks or playing fields where people are more likely to be active and receptive to some wind activity.

- **Uncomfortable:** wind speeds greater than 19 km/h - The effects of wind speeds at this level range from small trees swaying and wind force being felt on the body to whole trees being in motion and inconvenience being felt when walking. Winds of this magnitude are considered a nuisance for most activities, but can be acceptable depending upon the season and use of an area.

Along the left side of the Example Table, the sensor location, test configuration and season are listed. The subsequent four columns show the percentage of time that the winds are predicted to fall within the wind speed ranges for each comfort category. The percentage has been rounded to the closest 5% to reflect the general public's insensitivity to a small change in wind speed. Wind conditions are considered acceptable for sitting, standing or walking if the wind speeds are within their specified ranges at least 80% of the time. Using this criterion, each location has been given a comfort RATING on the right side of the "COMFORT CATEGORY" section of the table. Pedestrian activities other than the wind comfort category rating can still take place in the area; however, the percentages of time that the wind will be comfortable for other activities may be less than the desired 80% criterion.

For example, at Location 999 in the Example Table, the summer wind conditions are identified as comfortable for sitting 75% of the time and suitable for standing 85% of the time for Configuration A. While these percentages become lower in Configuration B (65% and 80%, respectively), the summer wind conditions for both configurations are considered to be in the same

category, i.e., comfortable for standing. The winter wind conditions for Configuration B are rated uncomfortable, since the 80% criterion is not satisfied for walking. Wind speed reduction may be needed if the comfort designation is uncomfortable or if the wind conditions are not consistent with the intended use of an area.

Safety is also considered by the criteria. Gust speeds in excess of 88 km/h can adversely affect a pedestrian's balance and footing. If winds of this magnitude occur more than two times per season, a "FAIL" RATING is indicated in the "SAFETY CATEGORY" section. Location 999 for Configuration B in the Example Table fails the safety criterion in the winter. Wind control measures are typically required at locations that receive the "FAIL" RATING.

These guidelines represent average wind tolerance. Regional differences in wind climate and variations in age, health, clothing, etc. can affect people's perception of the wind climate. For example, on very hot days, higher winds can be tolerated because the cooling effect of the wind would be considered pleasant. On colder days, people's tolerance of wind would be reduced, especially if they are unprepared or without appropriate clothing.

References

1) ASCE Task Committee on Outdoor Human Comfort (2004). *Outdoor Human Comfort and Its Assessment*, 68 pages, American Society of Civil Engineers, Reston, Virginia, USA.

2) Williams, C.J., Hunter, M.A. and Waechter, W.F. (1990). "Criteria for Assessing the Pedestrian Wind Environment," *Journal of Wind Engineering and Industrial Aerodynamics,* Vol.36, pp.811-815.

3) Williams, C.J., Soligo M.J. and Cote, J. (1992). "A Discussion of the Components for a Comprehensive Pedestrian Level Comfort Criteria," *Journal of Wind Engineering and Industrial Aerodynamics,* Vol.41-44, pp.2389-2390.

4) Soligo, M.J., Irwin, P.A., and Williams, C.J. (1993). "Pedestrian Comfort Including Wind and Thermal Effects," *Third Asia-Pacific Symposium on Wind Engineering*, Hong Kong.

5) Soligo, M.J., Irwin, P.A., Williams, C.J. and Schuyler, G.D. (1998). "A Comprehensive Assessment of Pedestrian Comfort Including Thermal Effects," *Journal of Wind Engineering and Industrial Aerodynamics,* Vol.77&78, pp.753-766.

6) Williams, C.J., Wu, H., Waechter, W.F. and Baker, H.A. (1999). "Experiences with

7) Remedial Solutions to Control Pedestrian Wind Problems," *Tenth International Conference on Wind Engineering,* Copenhagen, Denmark.

8) Lawson, T.V. (1973). "Wind Environment of Buildings: A Logical Approach to the Establishment of Criteria", *Report No. TVL 7321*, Department of Aeronautic Engineering, University of Bristol, Bristol, England.

9) Durgin, F. H. (1997). "Pedestrian Level Wind Criteria Using the Equivalent average", Journal of Wind Engineering and Industrial Aerodynamics, Vol. 66, pp. 215-226.

APPENDIX C

APPENDIX C: AIR VENTILATION ASSESSMENT (AVA) QUANTITATIVE ANALYSIS METHODOLOGY

For the AVA, two quantitative guidelines facilitate the assessment of the impact of the proposed development on the urban air ventilation. These guidelines are the wind velocity ratio and the wind availability.

C.1 WIND VELOCITY RATIO

The wind velocity ratio (VR_w) for each individual sensor is defined as the sum of the product of the wind velocity ratio measured for each test angle and the directional probability of wind for that direction as described in the AVA technical guidelines [2] and given in equation 1 below,

$$VR_w = \sum_{i=1}^{36} VR_i \times F_i \qquad (1)$$

where F_i is the wind directional probability for the ith wind tunnel test direction, VR_i is the measured wind velocity ratio at the sensor for each wind tunnel test direction. The measured velocity ratio is the ratio of the velocity at pedestrian height and at reference height i.e.

$$VR_i = \frac{V_{1.8}}{V_{500}} \qquad (2)$$

Where V_{500} is the velocity at the scaled gradient height of 500m and $V_{1.8}$ is the velocity measured at the scaled pedestrian height of 1.8m. The technical guidelines suggest that a high VR_w indicates a small impact of a proposed development and generally a better design. The VR_w is used as a relative measure to assess the performance of proposed configuration against existing conditions.

Each of the sensors is classified as either a perimeter sensor (located on the development site boundary), as an overall sensor (located within the site boundary and within the surrounding area) or as a special sensor (located a specific points of interest).

The spatial average of the VR_w values is calculated to determine the overall air ventilation performance of the tested configuration. To determine the spatial averages, the perimeter sensors are grouped to calculate a Site Spatial Average Velocity Ratio (SVR_w) and the perimeter and overall sensors are grouped to determine a Local Spatial Average Velocity Ratio (LVR_w). The SVR_w evaluates the air ventilation effects of the development on the conditions in the immediate vicinity of the site. The LVR_w is an indicator of the overall impact of the development and includes the effects measured locally as well as further into the surrounding area and inner city. The LVR_w takes precedence over the SVR_w.

To determine the undisturbed VR_w value one may determine the value for an exposed site given the different upwind profiles determined from topographical studies. Since these profiles deliver the velocity ratio for each approaching wind direction one may calculate a VR_w in the absence of buildings using equation (1). The weighted velocity ratio is calculated using the velocity ratios and the wind directional probability available from the Hong Kong University topographical wind tunnel test data [1] and is given in Table C.1. The benchmark value of VR_b can be used to assess how close the wind availability approximates conditions at the site without any buildings or flow obstructions in the vicinity. This benchmark value represents the annual existing conditions at the site.

Table C.1: Benchmark VR_w for the Tamar Development for an undisturbed site for annual conditions.

Wind Angle	Wind Directional Probability F_i	Exposed Site Velocity ratio [1] $(V_{1.8}/V_{500})_i$	Weighted Velocity Ratio $(V_{1.8}/V_{500})_i \times F_i$
360	0.12	0.33	0.040
22.5	0.08	0.36	0.030
45	0.08	0.36	0.030
67.5	0.15	0.30	0.045
90	0.24	0.17	0.042
112.5	0.05	0.19	0.009
135	0.03	0.19	0.006
157.5	0.03	0.19	0.006
180	0.04	0.14	0.006
202.5	0.03	0.15	0.004
225	0.05	0.20	0.009
247.5	0.03	0.22	0.007
270	0.03	0.14	0.004
292.5	0.01	0.13	0.001
315	0.01	0.19	0.001
337.5	0.02	0.31	0.005
		$VR_b = \sum_{i=1}^{16} (V_2/V_{500}) F_i$	**0.25**

The velocity ratio used in Table C.1 is found from the power law profile describing an atmospheric boundary layer,

$$\frac{V_{1.8}}{V_{500}} = \frac{V_{25}}{V_{500}}\left(\frac{z_{25}}{z_{500}}\right)^{\alpha} \qquad (3)$$

where α=0.25, appropriate for suburban type terrain, assumed constant for all wind angles, V_{500} is the reference velocity at gradient height of z_{500}=500m. The velocity ratio V_{25}/V_{500} is the measured velocity ratio at Position 2, the Tamar Development site, as determined from the results of the topographical wind tunnel study performed by Hong Kong University [2].

C.2 WIND AVAILABILITY

The wind availability is defined as the percentage probability that the wind velocity at pedestrian height exceeds 1.5m/s. The technical guidelines [2] suggest that suitable ventilation of the urban environment requires the wind availability to exceed 1.5m/s for at least 50% of the time throughout the year. For this purpose, the measured wind speed at each sensor is combined with the meteorological data to determine the wind availability. The results are evaluated to determine whether the wind availability has improved or deteriorated from existing conditions, i.e. whether the probability that the wind speed at pedestrian level exceed 1.5m/s is higher than 50%. For this work the comparison was made whether the 50% probability value was exceeded or whether the wind availability increased from the value recorded at each sensor for existing conditions.

APPENDIX D

APPENDIX D: LIST OF ANIMATIONS

The animations listed below were produced for the initial study of the AVA for the Tamar Development.

Table D.1: List of Animations produced for the Tamar Development AVA.

Animation file name	Animation description
Existing Site: D1-071033-NoTamar-Contour1-East.avi D2-071033-NoTamar-Contour1-North.avi E1-071033-NoTamar-Smoke1-East.avi E2-071033-NoTamar-Smoke1-North.avi F1-071033-NoTamar-Vectors-East.avi F2-071033-NoTamar-Vectors-North.avi	Wind speed contour plot, East wind Wind speed contour plot, North wind Smoke visualization, East wind Smoke visualization, North wind Wind speed vector plot, East wind Wind speed vector plot, North wind
Tamar Development - Initial Design: 071033-TamarBase-Contour1-East-G1.avi 071033-TamarBase-Contour1-North-G2.avi 071033-TamarBase-Smoke1-East-H1.avi 071033-TamarBase-Smoke1-North-H2.avi 071033-TamarBase-Vectors-East-I1.avi 071033-TamarBase-Vectors-North-I2.avi	Wind speed contour plot, East wind Wind speed contour plot, North wind Smoke visualization, East wind Smoke visualization, North wind Wind speed vector plot, East wind Wind speed vector plot, North wind
Tamar Development - Amended Initial Design including Mitigation: 071033-TamarMit1-Contour1-East-J1.avi 071033-TamarMit1-Contour1-North-J2.avi 071033-TamarMit1-Smoke1-East-K1.avi 071033-TamarMit1-Smoke1-North-K2.avi 071033-TamarMit1-Vectors-East-L1.avi 071033-TamarMit1-Vectors-North-L2.avi	Wind speed contour plot, East wind Wind speed contour plot, North wind Smoke visualization, East wind Smoke visualization, North wind Wind speed vector plot, East wind Wind speed vector plot, North wind
Tamar Development - Amended Initial Design including Mitigation with Building Extensions: A1-071033-TamarExt-Contour1-East.avi A2-071033-TamarExt-Contour1-North.avi B1-071033-TamarExt-Smoke1-East.avi B2-071033-TamarExt-Smoke1-North.avi C1-071033-TamarExt-Vectors-East.avi C2-071033-TamarExt-Vectors-North.avi	Wind speed contour plot, East wind Wind speed contour plot, North wind Smoke visualization, East wind Smoke visualization, North wind Wind speed vector plot, East wind Wind speed vector plot, North wind