AIR VENTILATION ASSESSMENT – INITIAL STUDY (DRAFT)

PUBLIC HOUSING REDEVELOPMENT AT PAK TIN ESTATE PHASE 12

MAY 29, 2024

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DATE: 29 MAY 2024
REV. 0 (DRAFT)

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Remarks				
Date	May 29 2024			
Prepared by	Various			
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1 INTRODUCTION

1.1 BACKGROUND

1.1.1 WSP (Asia) Ltd was commissioned by Hong Kong Housing Authority to undertake an Air Ventilation Assessment (AVA) Study – Initial Study for the Public Housing Redevelopment at Pak Tin Estate Phase 12 (hereafter "the Project") to assess the air ventilation performance of the Project. The AVA study was conducted by using Computational Fluid Dynamics (CFD) in accordance with the methodology stipulated in the Technical Guide for Air Ventilation Assessment for Developments in Hong Kong (hereafter "the Technical Guide") in Annex A of the Housing, Planning and Lands Bureau and Environment, Transport and Works Bureau Technical Circular No. 1/06.

1.2 OBJECTIVES

1.2.1 The objective of this report is to compare the air ventilation and wind environment of the Design Scheme and Baseline Scheme of the Project. This serves to provide a scientific and objective basis for identifying climatically sensitive areas and assessing the impacts of the project and planning proposals on the local wind environment.

1.2.2 Based on the methodology in the Technical Guide, the impacts of the proposed development on pedestrian level wind environment were analyzed and investigated. CFD simulation was employed as the assessment tool for quantitative ventilation performance evaluation in the study. Meanwhile, the main objects of this assessment, referring to the Technical Guide include:

- To assess characteristics of the wind availability (V_∞) of the site;
- To study the general wind pattern and compare the ventilation performance of the Design Scheme and Baseline Scheme at pedestrian levels such as streets and open areas through the Wind Velocity Ratio (VR); and
- To identify areas of concerns in the neighbourhood based on the Design Scheme.

1.3 STRUCTURE OF REPORT

1.3.1 The AVA report contains the following sections:

- Section 1 presents the introduction of the report including the background and objectives;
- Section 2 presents the project description and studied schemes (i.e. Baseline Scheme and Design Scheme);
- Section 3 presents the CFD simulation methodology;
- Section 4 presents the results and discussion of the AVA study; and
- Section 5 presents the conclusion of the AVA study.

2 PROJECT DESCRIPTION

2.1 SITE ENVIRONMENT

2.1.1 The Project is located within the Pak Tin Estate, Shek Kip Mei. The area of the project site is approximately 1.91 hectares (19,100 sq.m.). The project site is located in the northeast portion of the Pak Tin Estate, situated north of Pak Tin Phase 11, Tsui Tin House, Yue Tin House, Fu Tin House, Chak Tin House and Yun Tin House and south of the G/IC facilities towards the north of the Pak Tin Estate.

2.1.2 The site is zoned as "Residential (Group A)" in the approved Shek Kip Mei Outline Zoning Plan No. S/K4/31 (the "OZP").

2.1.3 The project site abuts Nam Cheung Street to the east and northeast of the project site. The project site is bounded by high-rise residential buildings including Pak Tin Phase 11 and 13 with maximum building height of up to 130 mPD and 157 mPD respectively. Towards the south of the site is the main access route abutting Estate Road, which is at a height of around 32 mPD, whilst spanning from east to north is the Nam Cheong Street with a height ranging from around +33mPD to +67 mPD.

2.1.4 Figure 1 and Figure 2 shows the overview of the project (marked as blue) and its surrounding development in the outline zoning plan and GeoInfo map respectively.

Figure 1: Overview of the Project Area and its Immediate Surroundings (Source: Town Planning Board)

Figure 2: Overview of the Project Area and its Surroundings (Source: GeoInfo Map)

2.2 THE PROJECT

2.2.1 The proposed development (i.e. Pak Tin Phase 12) is expected to consist of three (3) domestic blocks on top of a common podium; namely Pak Tin Block 11, Block 12 and Block 13. Block 11, Block 12 and Block 13 comprises of 36-storeys, 37-storeys and 37-storeys respectively. The podium varies from 3-storeys to 4-storeys with facilities such as covered carpark, play area, welfare facilities, etc. The proposed development also includes a footbridge accessible via the lift tower to the west of the site, which leads to the future Pak Tin Extension. A footbridge on the 3/F podium is also proposed towards the east of the site that provides access to Nam Cheong Street.

2.3 STUDY SCHEME

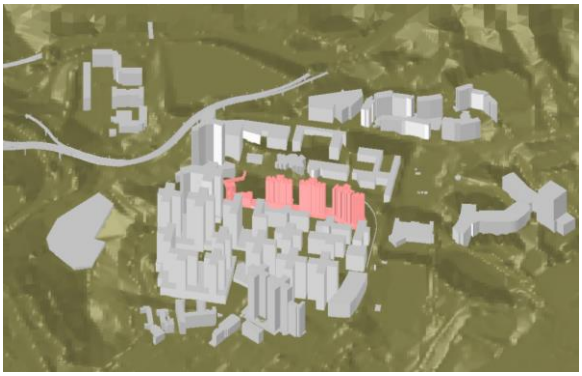
2.3.1 Two schemes were studied in the AVA study; the Baseline Scheme (B) and the Design Scheme (D).

2.3.2 The Baseline Scheme is a code compliant scheme with a podium that varies from 2-storeys to 4-storeys with facilities such as covered carpark, play area, welfare facilities, etc. and 1-storey carpark at the 30m Air Ventilation Corridor[1]. On top of the podium is Block 11, Block 12 and Block 13 with 21-storeys, 26-storeys and 26-storeys respectively with maximum building height of not more than 118mPD. Figure 3 and Figure 4 shows the 3D model of the Baseline Scheme.

[1] Under the approved application No. A/K4/63 for minor relaxation of building height restriction in the estate, a north-south NBA of 30m wide was incorporated between blocks 6 and 7 and blocks 4 and 5 across the estate. Meanwhile, under the approved application No. A/K4/70 for minor relaxation of building height restriction in the estate, low-rise podiums/ structures were proposed in the same 30m-wide NBA. An AVA-Initial Study using computational fluid dynamics was conducted to support the application and concluded that no significant impact from the Proposed Scheme is anticipated.

View from North

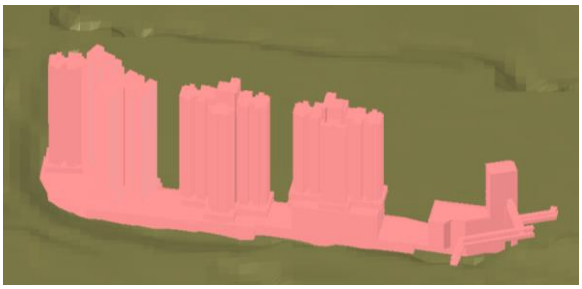
View from East



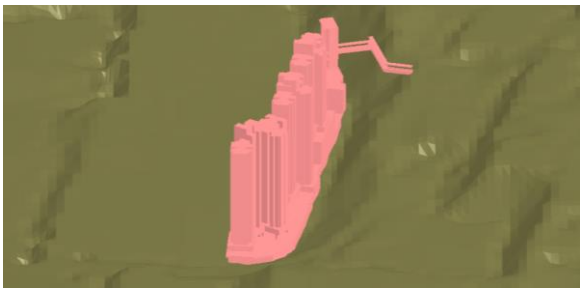
View from South

View from West

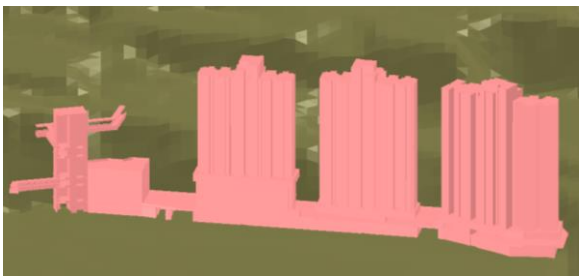
Figure 3: Base Scheme 3D Model of Surroundings



View from North



View from East

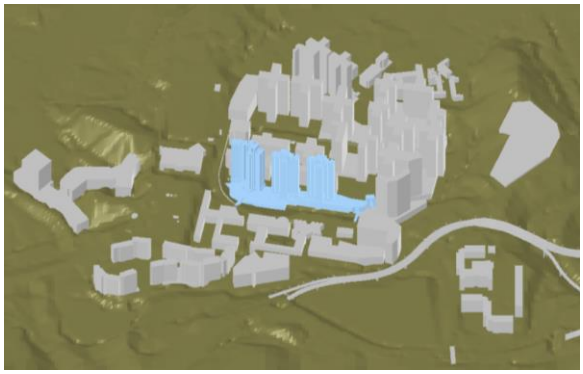


View from South

View from West

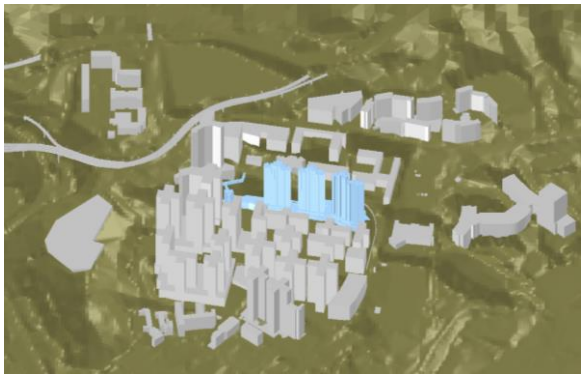
Figure 4: Base Scheme Zoomed-in 3D Model of Project Building

2.3.3 The Design Scheme is based on the proposed design as described in paragraph 2.2.1. Figure 5 and Figure 6 shows the 3D model of the Design Scheme.



View from North

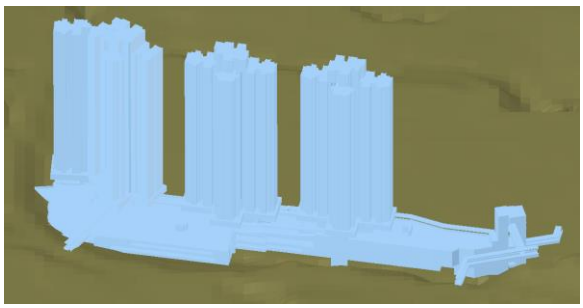
View from East



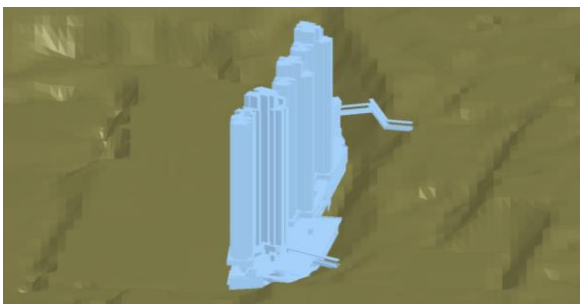
View from South

View from West

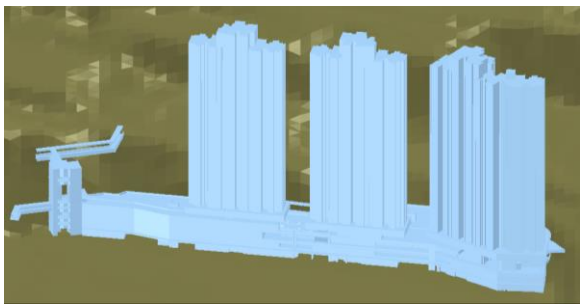
Figure 5: Design Scheme 3D Model of Surroundings



View from North



View from East



View from South

View from West

Figure 6: Design Scheme Zoomed-in 3D Model of Project Building

2.3.4 To facilitate the approval and construction of the Design Scheme, the Project seeks relaxation for the following through comparison with the Baseline Scheme through this AVA study:

- Maximum building height from the OZP approved limit of +120 mPD to +160 mPD;
- Extension of podium mass over the “Non-Building Area”
- Allow structure at the “30m Ventilation Corridor”

2.3.5 The OZP compliant scheme is adopted as the Baseline Scheme, whilst the newly proposed layout with adjustments is nominated as the Design Scheme. The major modifications and predicted implications to the pedestrian wind of the design features are as follows:

- Maximum building height increased from +118 mPD to not more than +160 mPD. The main areas of concern are the pedestrian accessible areas within the vicinity of the Project, which are generally with a street level of around +32mPD within the Pak Tin Estate and ranging from around +33mPD to +67 mPD for development around Nam Cheong Street. The relaxation of the maximum building height shall unlikely have a significant impact to the pedestrian wind performance as the location with modification is relatively far from the assessed street level.
- Extension of podium mass over the “Non-Building Area” towards the northeast of the project site. The height of the extended podium shall not be higher than the street level of Nam Cheong Street at the point of connection via added walkway. The modification will likely obstruct the incoming annual prevailing easterlies from entering the Non-Building Area towards the northwest of the project site and channeled towards Nam Cheong Street. Since the Non-Building Area is within the project site and not intended to be accessible by pedestrian, the predicted decline of wind performance in the Non-Building Area would not affect the AVA performance parameter.
- Additional podium structure at the “30m Ventilation Corridor”. Under the summer prevailing southwesterly wind, it is predicted that the added structure would obstruct the incoming wind causing a downwash effect, which will locally provide increased wind performance at the Extension of Pak Wan Street. This will result in less wind reaching Nam Cheong Street under the summer conditions. Under the northeasterly wind, the added structure would likely obstruct the wind from reaching the Extension of Pak Wan Street.
- Inclusion of permeable elements throughout the podium structure. The podium level has been designed to allow cross-ventilation through permeable elements, where practicably feasible. This will encourage more wind to enter the Extension of Pak Wan Street from the reduced blockage effect.

2.3.6 The differences in key parameters of the Design Scheme as compared against the Baseline Scheme are summarised in Table 1 below.

Table 1: Design Restrictions Seeking Relaxation under S16

Development Parameters	Baseline Scheme [A] (Plan 3a)	Design Scheme [B] (Plan 3b)	Difference [B] - [A]
Gross Site Area (ha)	1.91	1.91	-
Net Site Area (ha)	0.974	About 1.14	+0.166 ha (+17%)
Achievable Total PR	About 7.97	About 9.00	+1.03 (+11.4%)
Domestic	*About 6.91*	*About 7.50*	
Non-domestic	*About 1.06*	*About 1.50*	
Maximum Building Height (main roof level)	Not exceeding +120mPD	Not exceeding +160mPD	+40m (+33.3%)
Relaxed NBA to be decked over	0 m^2	About 1,460m^2	+1,460 m^2
Absolute Building Height	86.7m	128m	+41.3m (+47.6%)
Flat Production	1,350	2,091	+741 (+55%)
Design Population	About 3,645	About 5,646	+2,001 (+55%)
Private Car Parking Space	53	161	+108 (+203%)

2.4 ASSESSMENT AND SURROUNDING AREA

2.4.1 According to the Technical Guide, the Assessment Area should normally be up to a perpendicular distance of 1H from the project site boundary. H is the height of the tallest building on site. In this assessment, the building height of the tallest building of the Project is approximately 128m. The assessment area was therefore modelled to be at least 1H distance from the Project site boundary and includes the large objects, structures and terrain. The extent of the Assessment Area is marked by blue line in Figure 7 **(Assessment Area)**.

2.4.2 Furthermore, the Surrounding Area shall be extended to 256m (2H) which is marked by green line in Figure 7 **(Surrounding Area)**. Large objects, structures and terrain are included within the Surrounding Area. The topographical features beyond the Surrounding Area shall also be included in the model to consider the topographic effect.

2.4.3 The model input of the surrounding buildings and the site topography was obtained as 3D spatial data from the Lands Department through Hong Kong Map Service.

2.4.4 Figure 7 shows the covered area of the Project Area (Blue), Assessment Area (Red) and Surrounding Area (Green).

Figure 7: The Covered Area of the Project Area, Assessment Area and Surrounding Area

2.5 SITE WIND AVAILABILITY

2.5.1 For the AVA Initial Study by CFD, it is appropriate and cost effective to reduce the number of wind directions in the modelling process. The probability of wind coming from the reduced set of directions exceeds 75% of the time in a typical reference year.

2.5.2 The wind data used in the study refers to the Site Wind Availability Data published by the Planning Department, which was simulated by the meso-scale numerical model Regional Atmospheric Modeling System (RAMS), as recommended in the Technical Guide. Annual and summer wind velocities at 500m above the terrain level ranges from 0 to 15m/s from 16 wind directions. The project site abuts the grids of (X079, Y046) and (X079, Y047) as shown in Figure 8 with the Project location marked with the blue dot. As majority of the built development is within the grid of (X079, Y046) and that the main occurrences of wind direction of the summer winds lies in the southern quadrant, the wind data of grid (X079, Y046) has been selected for this study to better represent the predicted pedestrian wind performance. The wind roses are also shown under the annual and summer wind condition in Figure 9 and Figure 10 respectively.

Figure 8: Location of Grid (X079, 046) (Planning Department Site Wind Availability Data)

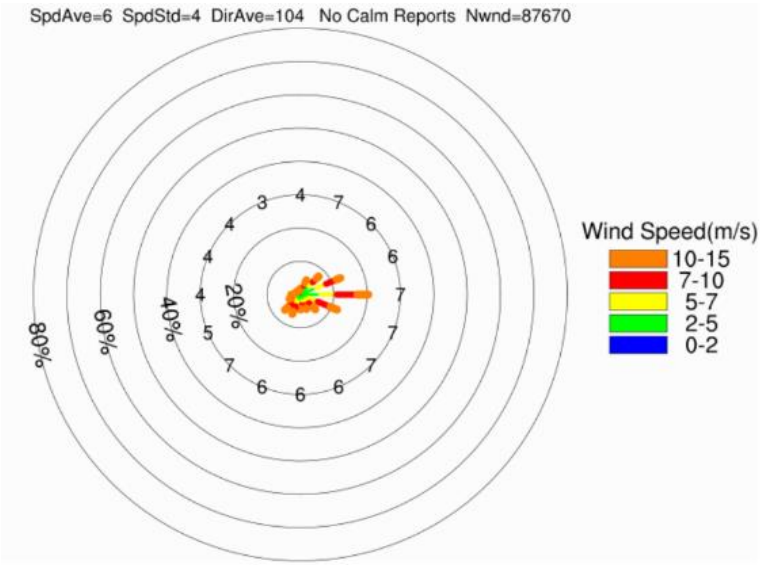


Figure 9: Annual Windrose at 500m (X079, Y046)

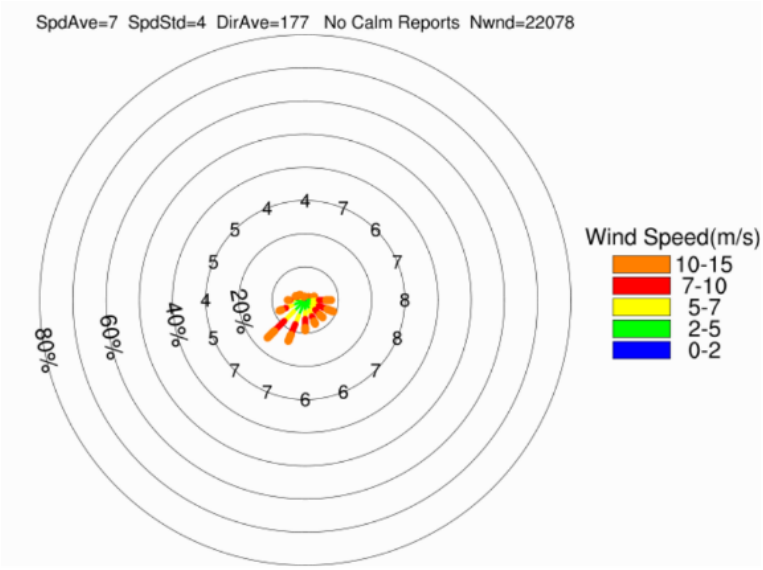


Figure 10: Summer Windrose at 500m (X079, Y046)

2.5.3 Table 2 shows the frequencies of occurrences of the 16 wind directions under the annual wind condition. The annual prevailing wind directions E, ENE, ESE, NE, SW, SE, SSW and NNE (marked as green in Table 2), which have corresponding frequencies of occurrences of 20.8%, 13.2%, 12.1%, 7.9%, 6.6%, 6.4%, 6.4% and 5.0% respectively, shall be selected. The winds studied totals to 78.4% occurrence.

Table 2: Annual Wind Frequency at 500m Level

Wind Direction	Percentage of Occurrence (%)	Wind Direction	Percentage of Occurrence (%)	Wind Direction	Percentage of Occurrence (%)	Wind Direction	Percentage of Occurrence (%)
N	1.8	**E**	**20.8**	S	4.6	W	2.8
NNE	**5.0**	**ESE**	**12.1**	**SSW**	**6.4**	WNW	1.6
NE	**7.9**	**SE**	**6.4**	**SW**	**6.6**	NW	1.4
ENE	**13.2**	SSE	4.8	WSW	3.5	NNW	1.1

2.5.4 Table 3 shows the frequencies of occurrences of the 16 wind directions under the summer wind condition. The summer prevailing wind directions SW, SSW, ESE, S, E, WSW, SSE and SE (marked as green in Table 3), which have corresponding frequencies of occurrences of 16.4%, 13.5%, 9.5%, 9.4%, 8.4%, 8.4%, 7.8% and 7.6% respectively, shall be selected. The winds studied totals to 81.0% occurrence.

Table 3: Summer Wind Frequency at 500m Level

Wind Direction	Percentage of Occurrence (%)	Wind Direction	Percentage of Occurrence (%)	Wind Direction	Percentage of Occurrence (%)	Wind Direction	Percentage of Occurrence (%)
N	1.0	**E**	**8.4**	**S**	**9.4**	W	5.3
NNE	1.0	**ESE**	**9.5**	**SSW**	**13.5**	WNW	3.2
NE	1.5	**SE**	**7.6**	**SW**	**16.4**	NW	2.3
ENE	3.2	**SSE**	**7.8**	**WSW**	**8.4**	NNW	1.1

2.6 WIND PROFILE

2.6.1 According to the RAMS wind data from the planning department, the wind profile data from 20 – 500m can be directly adopted in the AVA initial study while the wind profile near the ground from 0 – 20m has been estimated through the power law equation. The wind velocity above 500m is assumed to be the same as that at 500m in the wind profile data. Figure 11 shows the wind profile curve for the 4 different direction ranges from the rams database and (22.5^o – 112.4^o, 112.5^o – 202.4^o, 202.5^o – 292.4^o and 292.5^o – 22.4^o).

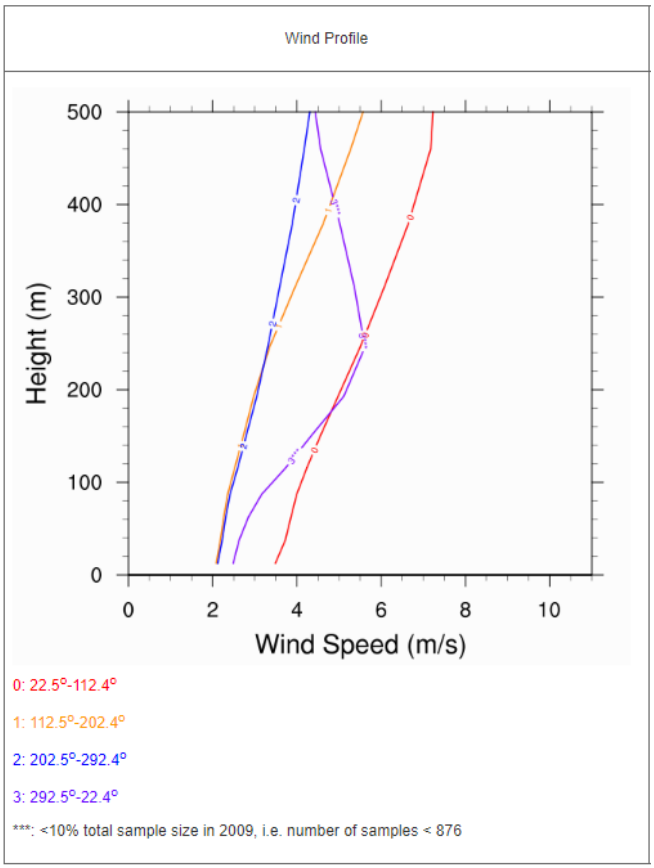


Figure 11: Wind Profile Curve (X079, Y046)

2.6.2 The equation of Power Law wind profile used in the study can be explained as below.

$$U_z = U_G\left(\frac{z}{z_G}\right)^n \quad \text{(Equation 1)}$$

where,

UG = reference velocity at height zG

Uz = velocity at height z

zG = reference height

z = height above ground

n = power law exponent

2.6.3 The power law exponent, n-value, is related to the ground roughness representing the type of terrain. A larger n-value represents higher roughness of the ground. Alternatively, smaller n-value represents lower ground roughness. Table 4 shows the roughness n-values for the different types of terrain.

Table 4: Terrain Roughness Value

Terrain crossed by approaching wind	n-value
Sea and open space	~0.15
Sub-urban or mid-rise	~0.35
City centre or high-rise	~0.50

2.7 ASSESSMENT PARAMETER FOR AVA STUDY

2.7.1 The Velocity Ratio (VR) as proposed by the Technical Guide shall be employed to assess the impact of the Project on the pedestrian wind environment of the surroundings and the site. The calculation of VR is given by the following formula:

$$VR = \frac{V_p}{V_\infty}$$

V∞ = the wind velocity at the top of the wind boundary layer (typically assumed to be around 500m above the street level of the centre of the site of concern, or at a height where wind is unaffected by the urban roughness below).

Vp = the wind velocity at the pedestrian level (2m above ground) after taking into account the effect of buildings.

2.7.2 The Average VR is defined as the weighted average VR with respect to the percentage of occurrence of all considered wind directions. The overall wind performance in this study is assessed by comparing the weighted-average wind velocity ratio (VR) to account for conditions under studied wind directions. This gives a general figure of the ventilation performance at the considered location on the annual and summer basis.

2.8 TEST POINTS FOR LOCAL AND SITE VENTILATION ASSESSMENT

2.8.1 The test points are located in the roads and the open areas where the pedestrians can frequently access to evaluate the ventilation performance. There are three types of test points at 2m above the ground, namely perimeter test points, overall test points and special test points.

2.8.2 Perimeter test points are the points positioned along the site boundary of the Project as shown in Figure 12. As stipulated in Technical Guide, tests points must be located at the junctions of all roads leading to the Project site, at main entrances to the Project, and at corners of the Project site. There are 43 perimeter points (red dots) located at the interval around 20m along the site boundary.

2.8.3 Overall test points are those points evenly positioned in streets/roads and open area around the site boundary within the assessment area where there is frequent pedestrian access. Total 60 overall test points (blue dots) are selected and shown in Figure 12.

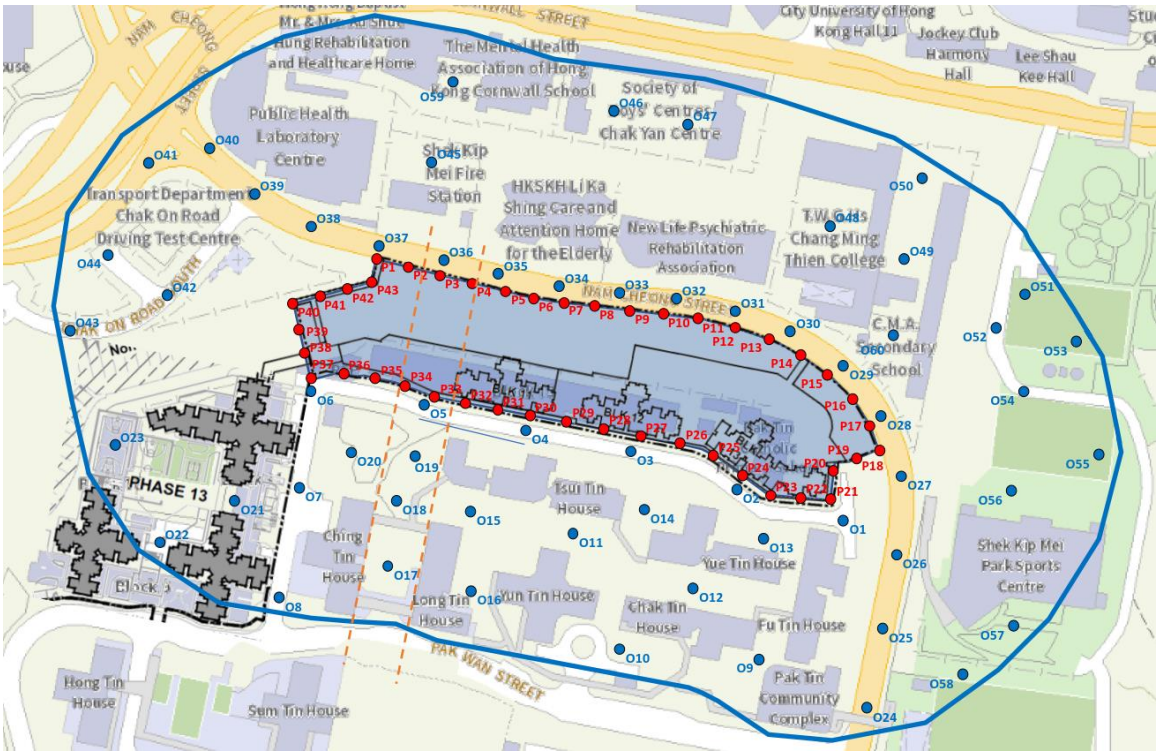


Figure 12: Perimeter and Overall Test Point Locations for the Assessment

2.8.4 Apart from the overall test points and perimeter test points, special test points (S1-S14) are selected within the site boundary for garden and walkway. Total 14 special test points (green dots) are shown in Figure 13 to Figure 15.

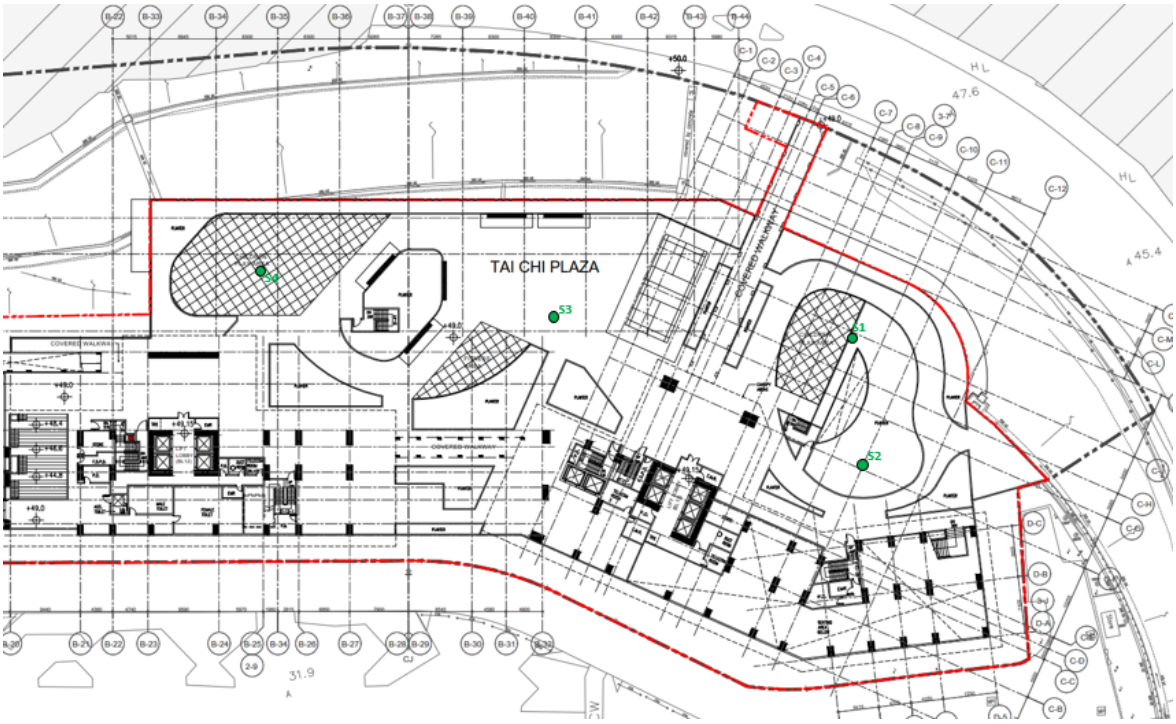


Figure 13: Special Test Point Locations for the Assessment (3/F)

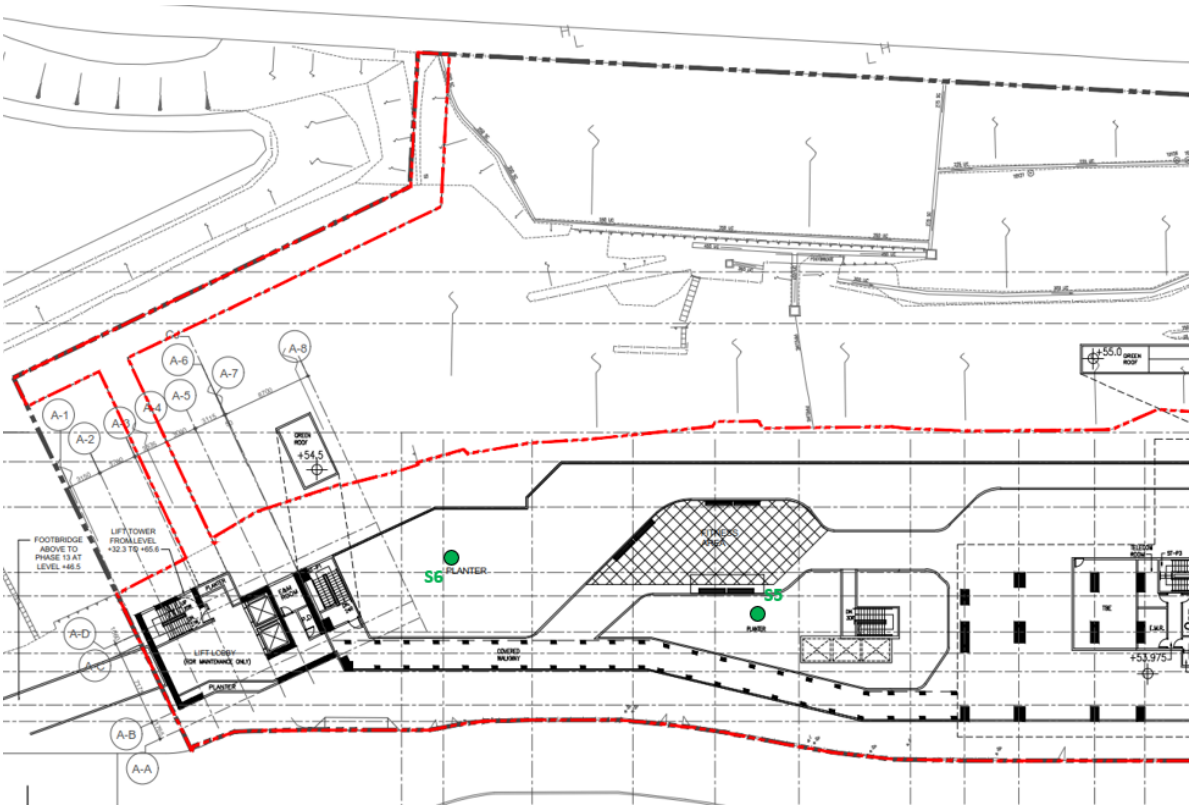


Figure 14: Special Test Point Locations for the Assessment (4/F)

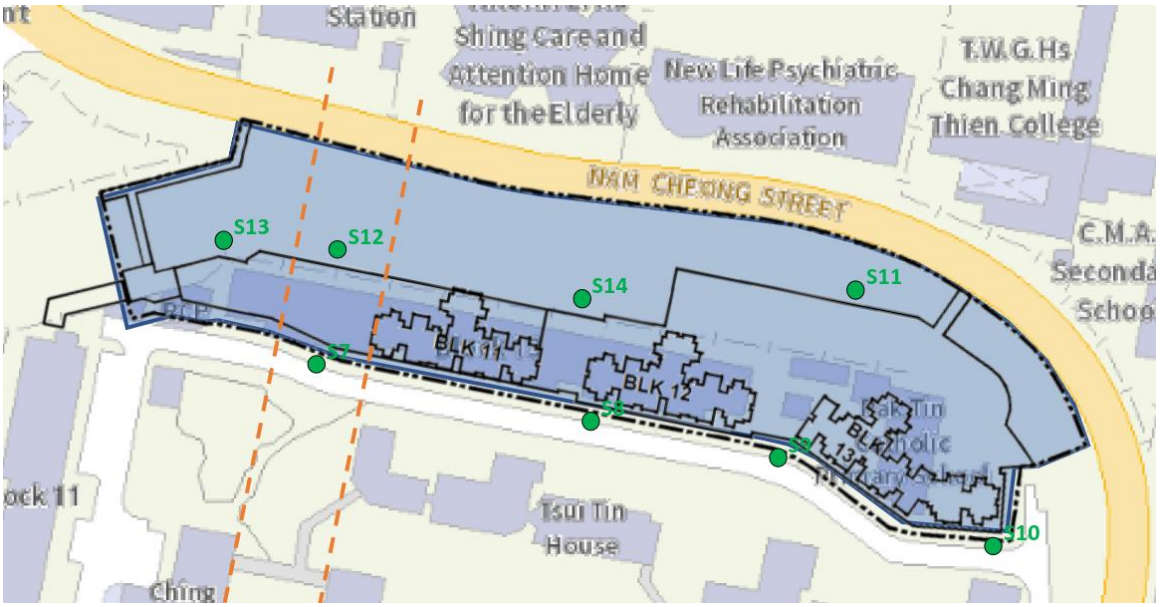


Figure 15: Special Test Point Locations for the Assessment (G/F)

2.8.5 Apart from perimeter and overall test points, the location of overall test points is grouped as various focus areas. The spatial average wind velocity ratio is used for further analysis. Table 5 and Figure 16 shows the list of focus areas and its corresponding test points of the Project.

Table 5: Summary of the Zone of the Test Points

Focus Area	Test Points
Zone 1a. Extension of Pak Wan Street (Overall Test Points)	O1 – O4, O6 – O8
Zone 1b. Extension of Pak Wan Street (Perimeter Test Points)	P21 – P37
Zone 2. 30m Ventilation Corridor	O5, O17 – O19, O36
Zone 3. Pak Tin Community Complex, Fu Tin House, Yue Tin House, Chak Tin House, Yun Tin House, Tsui Tin House, Long Tin House, Ching Ting House	O9 – O16, O20
Zone 4. Pak Tin Phase 13	O21 – O23
Zone 5a. Nam Cheong Street (Overall Test Points)	O24 – O35, O37 – O41
Zone 5b. Nam Cheong Street (Perimeter Test Points)	P1 – P18
Zone 6. Chak On Road South	O42 – O44
Zone 7: Open Space of Shek Kip Mei Fire Station	O45
Zone 8: Open Space of Society of Boys' Centres Chak Yan Centre	O46 – O47
Zone 9: Open Space of The Mental Health Association of Hong Kong Cornwall School	O59
Zone 10: Open Spaces of C.M.A. Secondary School	O49 – O50, O60
Zone 11: Open Spaces of T.W.G.Hs Chang Ming Thien	O48
Zone 12: Shek Kip Mei Park	O51 – O58
Zone 13: Pak Tin Phase 12 3/F Podium Open Space	S1 – S4
Zone 14: Pak Tin Phase 12 4/F Podium Open Space	S5 – S6
Zone 15: Pak Tin Phase 12 Street Level Permeable Elements	S7 – S14

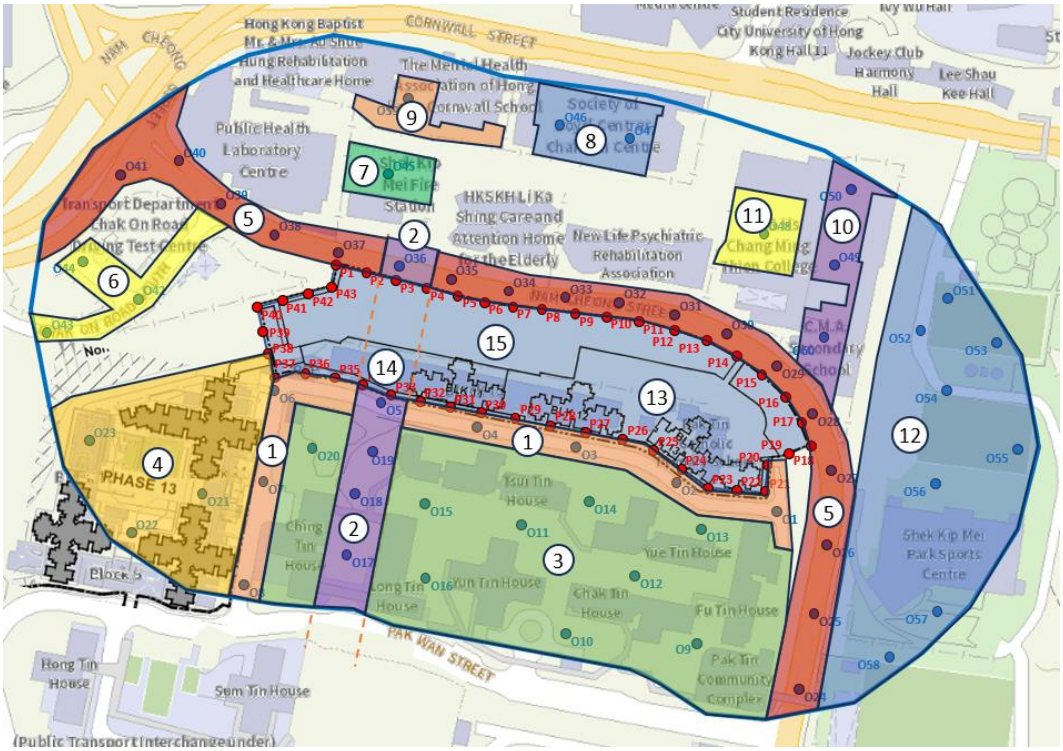


Figure 16: Focus Area Location Plan

3 PROJECT DESCRIPTION

3.1 INTRODUCTION

3.1.1 The methodology of the study follows the Technical Guide for Air Ventilation Assessment for Developments in Hong Kong in the annex A of the Technical Circular no. 1/06.

3.1.2 CFD technique is utilized for this study. With the use of three-dimensional CFD method, the local wind distribution is visualized in detail. The velocity distribution within the flow domain, being affected by the site-specific design and the nearby topography, is simulated under the selected annual and summer prevailing wind conditions considered.

3.1.3 The software of FLUENT Version 2021 shall be used for the CFD. FLUENT has been widely and adequately applied to simulate the outdoor air ventilation and air quality by the consultants or researchers. The accuracy level of the FLUENT modelling tool has been accepted by the industry for AVA application.

3.2 SIMULATION MODEL

3.2.1 According to the Technical Guide, buildings within the surrounding area need to be built in the CFD model. In order to simulate the approaching wind turbulence effect more accurately, the CFD model is built to include the site and surroundings that may affect the approaching wind, including some falling outside the surrounding area. In addition, the model is built even with large-area topography to account for the effect of the hill.

3.2.2 The domain of the CFD model is extended to approximately 4000m (L) x 4000m (W) x 1500m (H). The overview of the CFD domain is provided in Figure 17.

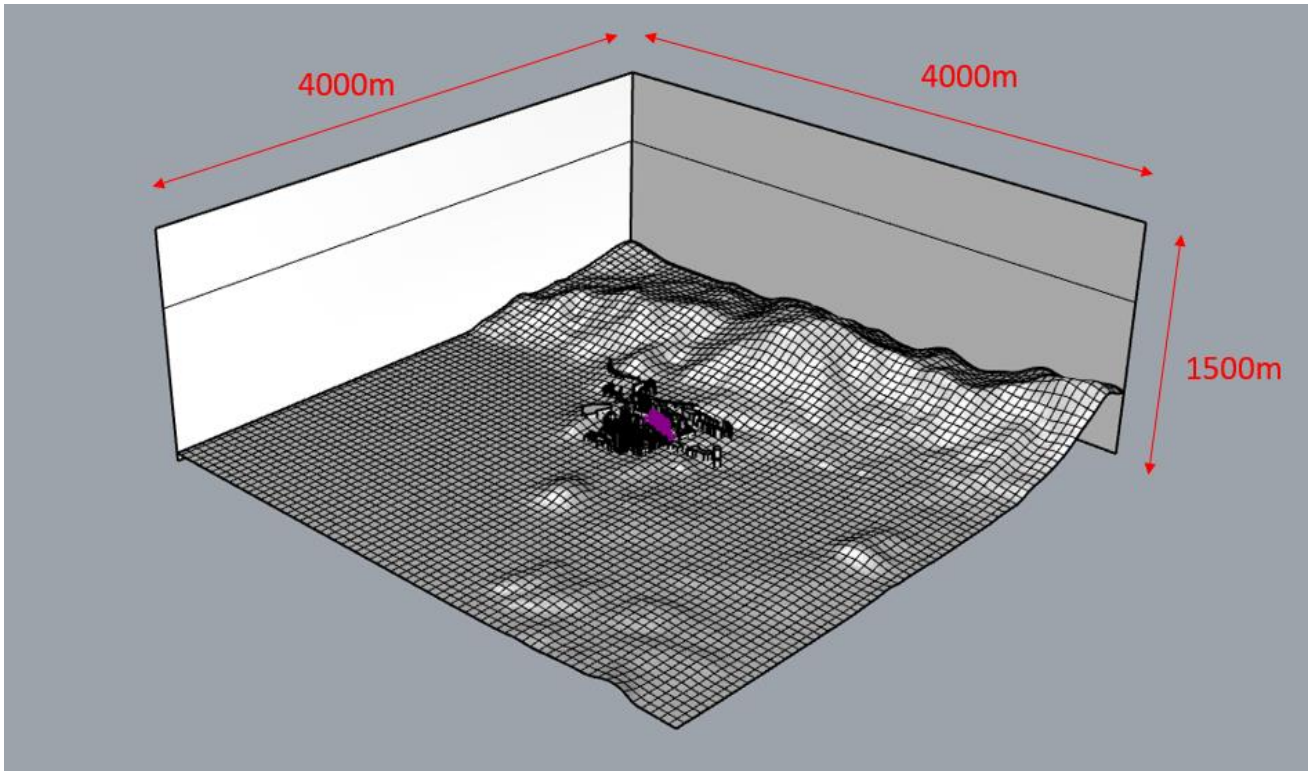


Figure 17: CFD Model Overview

3.2.3 The CFD model of the Project contains more than 9 million cells. It covers the entire simulation domain and provides sufficient consideration of the site and surrounding topography. A prism layer of 3m above ground (total 6 layers each of 0.5m thick) is incorporated in the CFD meshing to better capture the wind profiles near the ground level. The mesh expansion ratio is less than 1.3, while the blockage ratio is less than 2%. Details of the meshing is shown in Figure 18 to Figure 19.

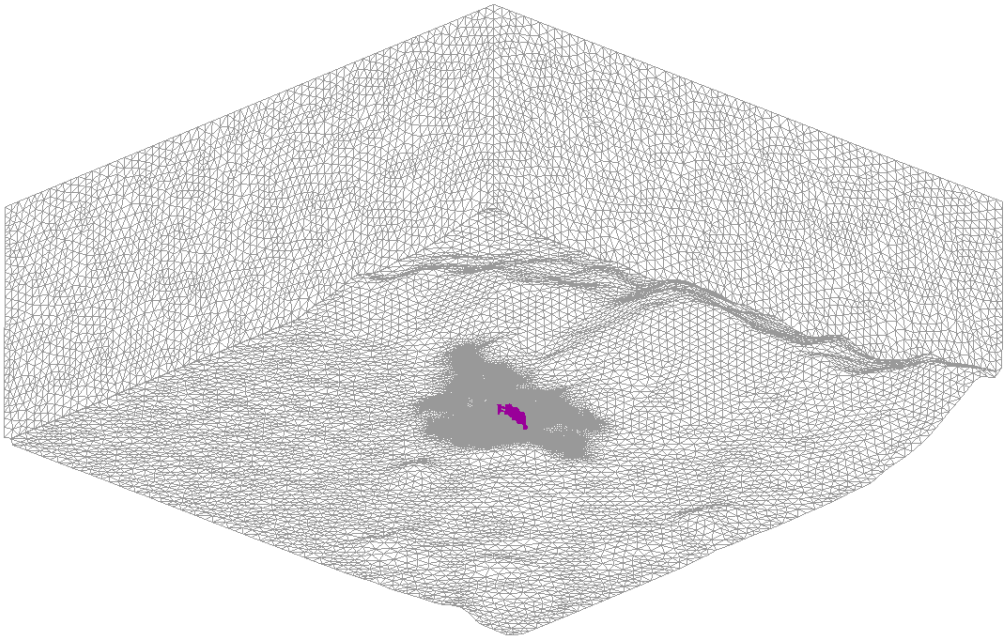


Figure 18: CFD Model Meshing of Computational Domain

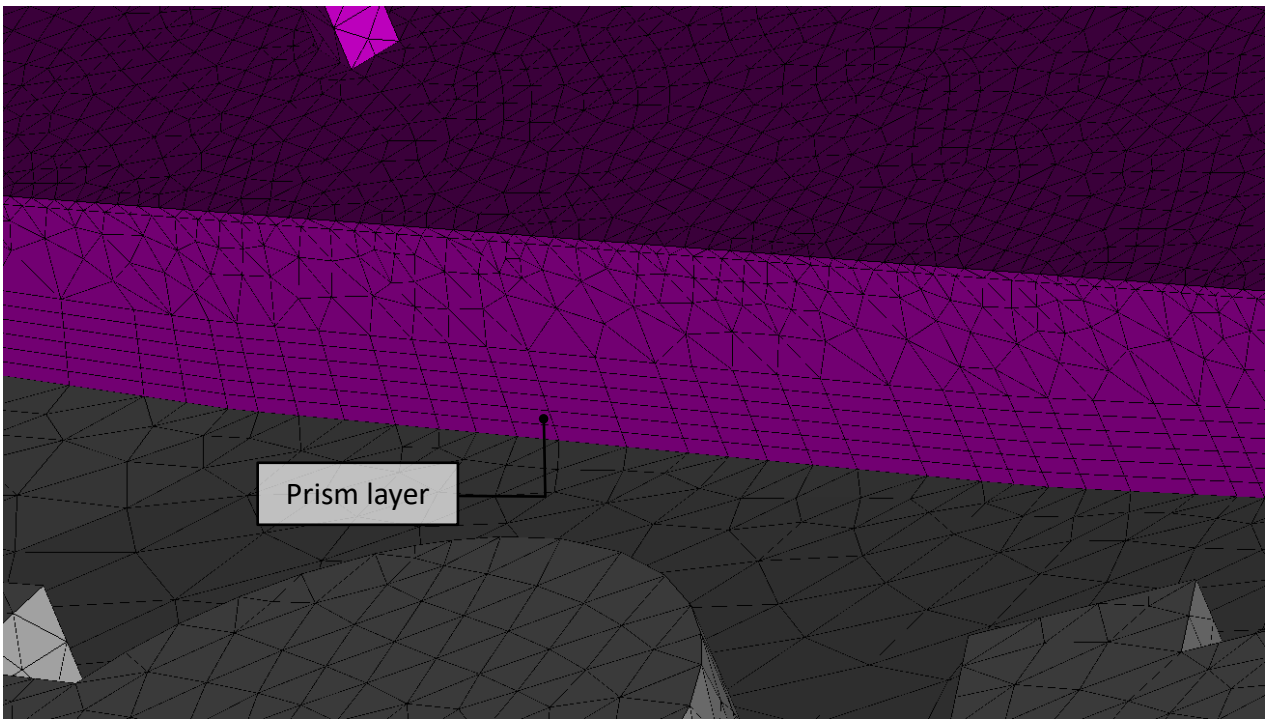


Figure 19: CFD Model Prism Layer

3.3 TURBULENCE MODEL

3.3.1 As advised in AVA recommendations of COST Action C14 (2004), the widely used standard k-ε turbulence model technique may not adequately simulate the effects of large-scale turbulence around buildings and may ignore the wind gusts leading to the relatively poor prediction in the recirculation regions around building. Therefore, Realizable k-ε turbulence modelling method is applied. This technique provides a more accurate representation of the levels of turbulence.

3.4 CALCULATION MODEL

3.4.1 The SIMPLE algorithm shall be adopted to solver the pressure-velocity linked equations. The calculation loops repeat until the margin of error satisfy the convergence criterion. The overall CFD settings for this study are summarised in Table 6.

Table 6: Summary of the CFD Settings

Model Scale	1:1 Scale
Model Details	Include topography, building blocks and other major structure, no landscape is included
Domain	4,000m (L) x 4,000m (W) x 1,500m (H)
Assessment Area	Min. 128m (1H) from the site boundary
Surrounding Area	Min. 256m (2H) from the site boundary
Number of Mesh	More than 14 million cells
Grid Expansion Ratio	Maximum expansion ratio of 1.3
Mesh Type	6 layer of prismatic layers and 0.5m each (total 3m above ground)
Turbulence model	Realizable k-ε model
Inflow Boundary Condition	Respective wind profile obtained from RAMS
Outflow Boundary Condition	Pressure boundary condition with pressure equal to zero
Wall Boundary Condition	Logarithmic law boundary
Solving Algorithms	Rhie and Chow SIMPLE for momentum equation, hybrid model for all other equations
Blockage ratio	≤ 2%
Convergence criteria	Below $1.0E^{-4}$

4 RESULTS AND DISCUSSION

4.1 OVERALL RESULT OF VENTILATION PERFORMANCE

4.1.1 This section presents the overall results of SVR, LVR and spatial average velocity ration (SAVR) of the focus areas in the Baseline Scheme and Design Scheme of the Project under annual and summer wind conditions.

4.1.2 The SVR and LVR values of the Baseline Scheme and Design Scheme under the annual and summer wind conditions are summarised in Table 7.

Table 7: Summary of SVR and LVR for Baseline Scheme and Design Scheme

Wind Condition	Baseline Scheme		Design Scheme	
	SVR	LVR	SVR	LVR
Annual	0.20	0.19	0.21	0.20
Summer	0.25	0.22	0.25	0.22

Overall Velocity Ratio under Annual Wind Condition

4.1.3 The SVR and LVR values and SAVR values of the focus areas of the Baseline Scheme and Design Scheme are summarized in Table 8. Under the annual wind condition, the SVR for the Baseline Scheme and Design Scheme are 0.20 and 0.21 respectively and the LVR for the Baseline Scheme and the Design Scheme are 0.19 and 0.20 respectively.

Table 8: Summary of Spatial Average Velocity Ratio (VR) for Baseline Scheme and Design Scheme (Annual)

Focus Area	Description	Test Points	Annual	
			Baseline	Design
-	SVR	P1 – P43	0.20	0.21
-	LVR	P1 – P43, O1 – O58	0.19	0.20
1a	Extension of Pak Wan Street	O1 – O4, O6 – O8	0.16	0.17
1b	Extension of Pak Wan Street	P21 – P37	0.14	0.16
2	30m Ventilation Corridor	O5, O17 – O19, O36	0.18	0.19
3	Pak Tin Community Complex, Fu Tin House, Yue Tin House, Chak Tin House, Yun Tin House, Tsui Tin House, Long Tin House, Ching Ting House	O9 – O16, O20	0.13	0.14
4	Pak Tin Phase 13	O21 – O23	0.13	0.15
5a	Nam Cheong Street	O24 – O35, O37 – O41	0.28	0.28
5b	Nam Cheong Street	P1 – P18	0.28	0.28
6	Chak On Road South	O42 – O44	0.28	0.28
7	Open Space of Shek Kip Mei Fire Station	O45	0.26	0.26
8	Open Space of Society of Boys' Centres Chak Yan Centre	O46 – O47	0.11	0.13
9	Open Space of The Mental Health Association of Hong Kong Cornwall School	O59	0.06	0.07
10	Open Space of C.M.A. Secondary School	O49 – O50, O60	0.11	0.11
11	Open Space of T.W.G.Hs Chang Ming Thien	O48	0.12	0.11
12	Shek Kip Mei Park	O51 – O58	0.25	0.24
13	Pak Tin Phase 12 3/F Podium Open Space	S1 – S4	0.24	0.26
14	Pak Tin Phase 12 4/F Podium Open Space	S5 – S6	0.14	0.18
15	Pak Tin Phase 12 Street Level Permeable Elements	S7 – S14	0.17	0.18

4.1.4 Both SVR and LVR in the Design Scheme are similar compared with the Baseline Scheme under the annual wind condition, which demonstrates the Design Scheme can provide a comparable annual pedestrian wind environment for the site and surroundings.

4.1.5 The detailed analysis for each wind is provided in Section 4.2. The wind velocity ratios of individual test points for each wind direction are provided in Appendix A.

4.1.6 The Design Scheme can provide similar VRs for the identified focus areas as the Baseline Scheme under the annual wind conditions. As the Project is located within an urbanised zone, the surrounding environment would be dominated by the existing buildings under the annual wind conditions.

Overall Velocity Ratio under Summer Wind Condition

4.1.7 The SVR and LVR values and SAVR values of the focus areas of the Baseline Scheme and Design Scheme are summarized in Table 9. Under the summer wind condition, the SVR for the Baseline Scheme and Design Scheme are 0.25 and the LVR for the Baseline Scheme and the Design Scheme are 0.22.

Table 9: Summary of Spatial Average Velocity Ratio (VR) for Baseline Scheme and Design Scheme (Summer)

Focus Area	Description	Test Points	Summer	
			Baseline	Design
-	SVR	P1 – P43	0.25	0.25
-	LVR	P1 – P43, O1 – O58	0.22	0.22
1a	Extension of Pak Wan Street	O1 – O4, O6 – O8	0.20	0.18
1b	Extension of Pak Wan Street	P21 – P37	0.21	0.22
2	30m Ventilation Corridor	O5, O17 – O19, O36	0.21	0.20
3	Pak Tin Community Complex, Fu Tin House, Yue Tin House, Chak Tin House, Yun Tin House, Tsui Tin House, Long Tin House, Ching Ting House	O9 – O16, O20	0.12	0.11
4	Pak Tin Phase 13	O21 – O23	0.15	0.15
5a	Nam Cheong Street	O24 – O35, O37 – O41	0.27	0.28
5b	Nam Cheong Street	P1 – P18	0.28	0.29
6	Chak On Road South	O42 – O44	0.34	0.34
7	Open Space of Shek Kip Mei Fire Station	O45	0.25	0.26
8	Open Space of Society of Boys' Centres Chak Yan Centre	O46 – O47	0.13	0.12
9	Open Space of The Mental Health Association of Hong Kong Cornwall School	O59	0.08	0.08
10	Open Space of C.M.A. Secondary School	O49 – O50, O60	0.11	0.10
11	Open Space of T.W.G.Hs Chang Ming Thien	O48	0.11	0.12
12	Shek Kip Mei Park	O51 – O58	0.17	0.16
13	Pak Tin Phase 12 3/F Podium Open Space	S1 – S4	0.23	0.19
14	Pak Tin Phase 12 4/F Podium Open Space	S5 – S6	0.17	0.17
15	Pak Tin Phase 12 Street Level Permeable Elements	S7 – S14	0.21	0.20

4.1.8 Both SVR and LVR in the Design Scheme are similar compared with the Baseline Scheme under the summer wind condition, which demonstrates the Design Scheme can provide a comparable summer pedestrian wind environment for the site and surroundings.

4.1.9 The detailed analysis for each wind is provided in Section 4.2. The wind velocity ratios of individual test points for each wind direction is provided in Appendix A.

4.1.10 The Design Scheme can provide similar VRs for the identified focus areas as the Baseline Scheme under the summer wind conditions. As the Project is located within an urbanised zone, the surrounding environment would be dominated by the existing buildings under the summer wind conditions.

4.2 DIRECTIONAL ANALYSIS

Annual Weighted Average Wind

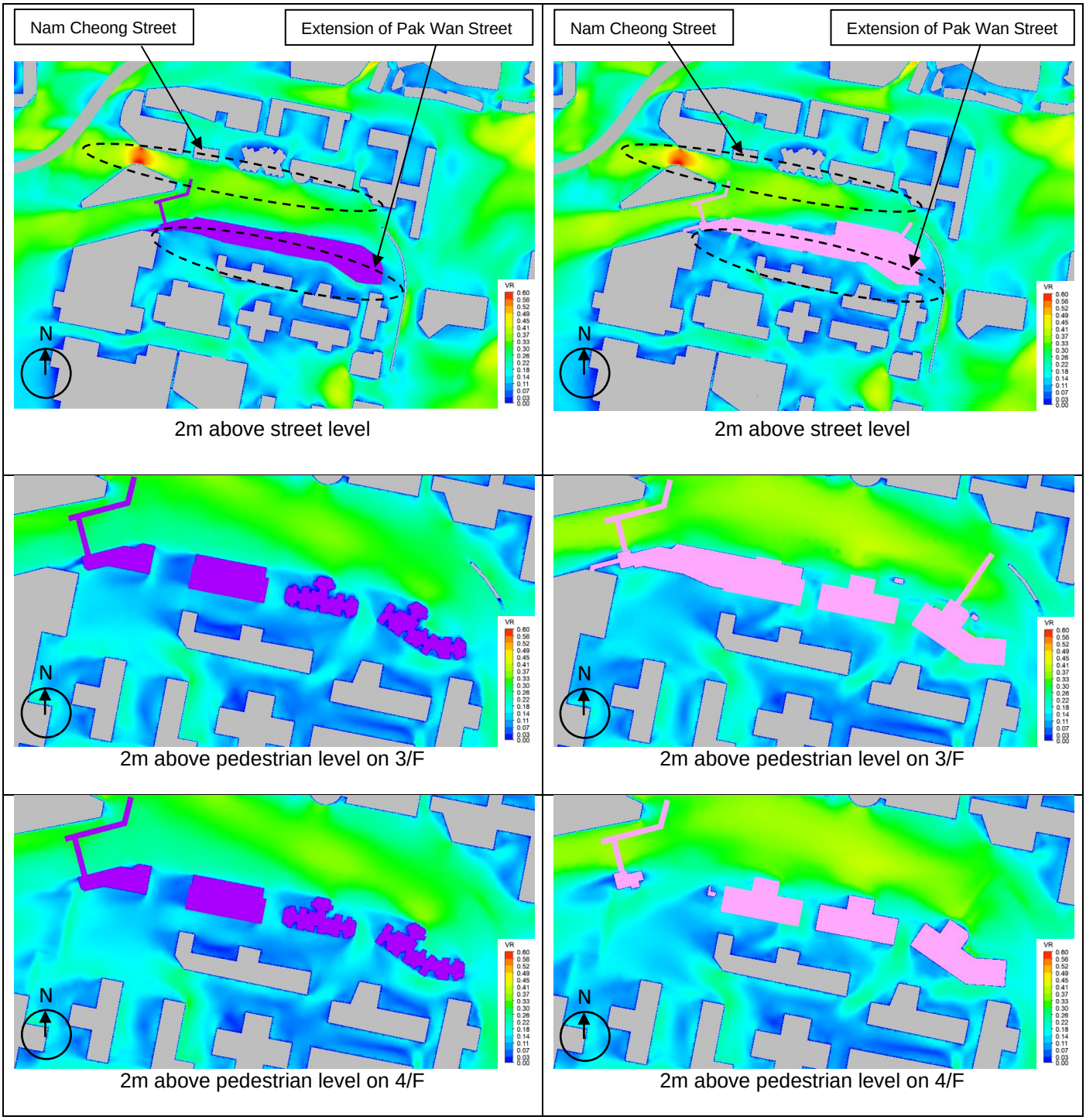


Figure 20: VR Contour Plot of Pedestrian Wind under Annual Weighted Average Wind Conditions for Baseline Scheme (Left) & Design Scheme (Right)

4.2.1 Figure 20 presents the VR contour plot under the annual weighted average wind conditions for the Baseline Scheme and Design Scheme.

4.2.2 Majority of the annual weighted average wind is contributed by the winds from NNE to SE and with minor contribution from the winds from SSW to SW. Under the Design Scheme, slight increased wind is observed partially along the northern section of Nam Cheong Street primarily due to the extended podium block in the Non-Building Area. As the incoming wind cannot access the Non-Building Area, it is channeled along Nam Cheong Street, causing the leeward Non-Building Area without building block to exhibit less wind, however, would not affect the pedestrian wind performance as the Non-Building Area towards the north to northwest of the project site is not accessible by pedestrians and is within the project site boundary.

4.2.3 The pedestrian wind along the eastern portion of the Extension of Pak Wan Street located south of the project site has improved under the Design Scheme due to the designed permeable elements at the podium level allowing more wind to enter the Extension of Pak Wan Street, whilst worsened in the western portion of the Extension of Pak Wan Street due to the added structure on the podium at the 30m Ventilation Corridor. Overall, the pedestrian wind environment of the Extension of Pak Wan Street is comparable for the Design Scheme and Baseline Scheme.

4.2.4 The pedestrian wind along the 3/F podium of the project site exhibits significant improvement under the Design Scheme compared with the Baseline Scheme primarily due to the extended podium block in the Non-Building Area causing the incoming winds from the east to be redistributed towards Nam Cheong Street and skimming over the podium deck. The pedestrian wind along 4/F podium of the project site exhibits slight improvement under the Design Scheme compared with the Baseline Scheme due to the increased building separation above the podium level. The permeable elements at the podium level under the Design Scheme exhibits comparable wind performance under the Baseline Scheme at the same locations demonstrating that the blockage effect of the larger podium massing has been mitigated.

Summer Weighted Average Wind

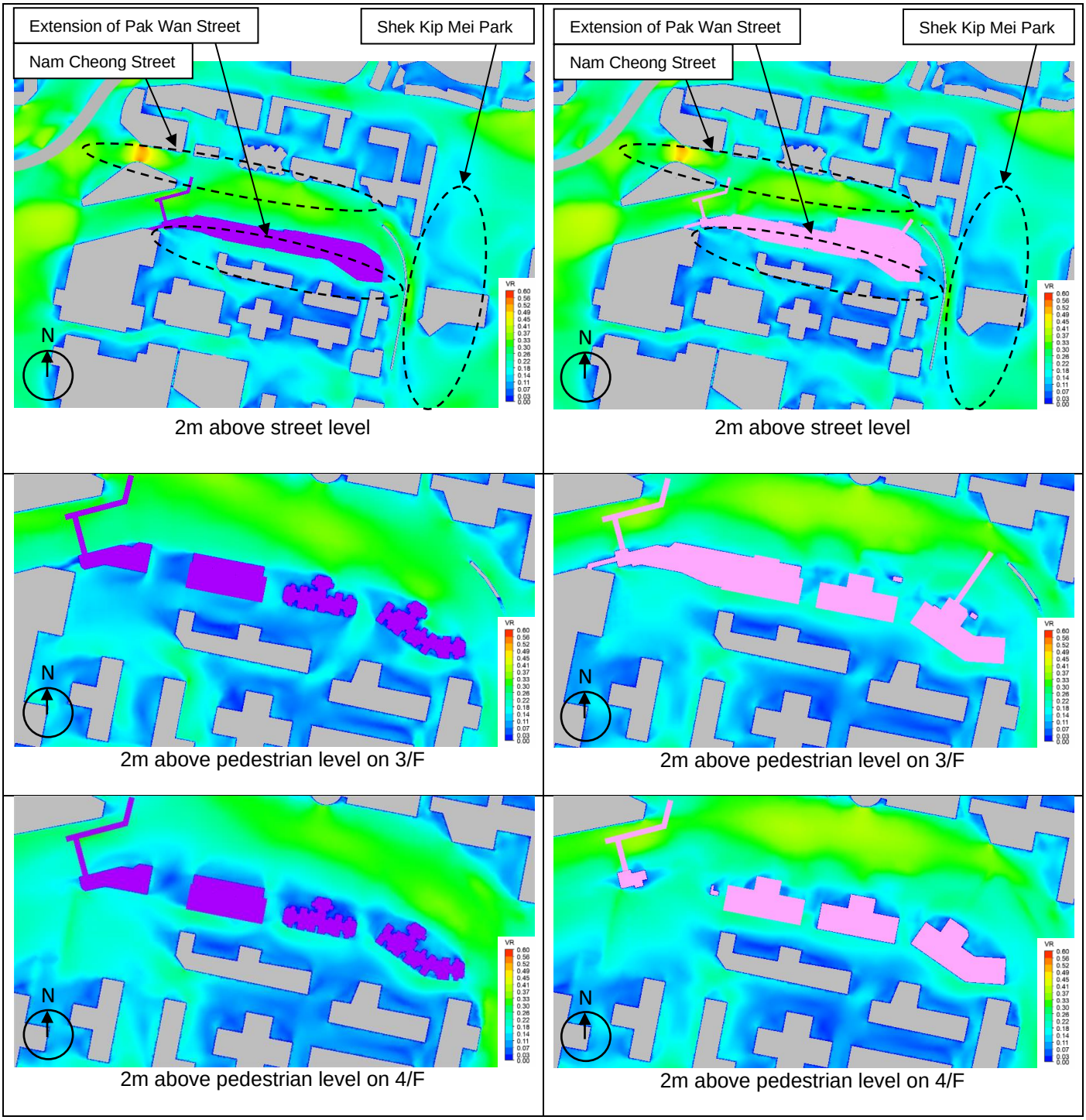


Figure 21: VR Contour Plot of Pedestrian Wind under Summer Weighted Average Wind Conditions for Baseline Scheme (Left) & Design Scheme (Right)

4.2.5 Figure 21 presents the VR contour plot and vector plot under the summer weighted average wind conditions for the Baseline Scheme and Design Scheme.

4.2.6 The summer weighted average wind is contributed by the winds from E to WSW. Under the Design Scheme, pedestrian wind along Nam Cheong Street is comparable with the Baseline Scheme.

4.2.7 The pedestrian wind along the Extension of Pak Wan Street located south of the project site has worsened under the Design Scheme primarily due increased wind being channeled through the increased building separation above the podium level towards the west of the project site. This resulted in less wind flowing to the Extension of Pak Wan Street.

4.2.8 Under the Design Scheme, the pedestrian wind in the Shek Kip Mei Park located east of the project site has reduced wind speed compared to the Baseline Scheme, primarily due to the extended podium block in the Non-Building Area, which reduces the overall street width of Nam Cheong Street towards the northeast of the project site, restricting the allowable angle of re-orientation of the incoming wind from the west of Nam Cheong Street, limiting the pedestrian wind to ventilate the Shek Kip Mei Park located east of the project site.

4.2.9 The pedestrian wind along the 3/F podium of the project site exhibits reduced pedestrian wind under the Design Scheme compared with the Baseline Scheme due to the extended podium block in the Non-Building Area, which reduces the overall street width of Nam Cheong Street towards the northeast of the project site, restricting the allowable angle of re-orientation of the incoming wind from the west of Nam Cheong Street to ventilate Nam Cheong Street. The pedestrian wind along 4/F podium of the project site under the Design Scheme is comparable with the Baseline Scheme due to the increased building separation above the podium level. The permeable elements at the podium level under the Design Scheme exhibits reduced wind compared to the Baseline Scheme primarily due to reduced wind performance along the Extension of Pak Wan Street.

E Wind

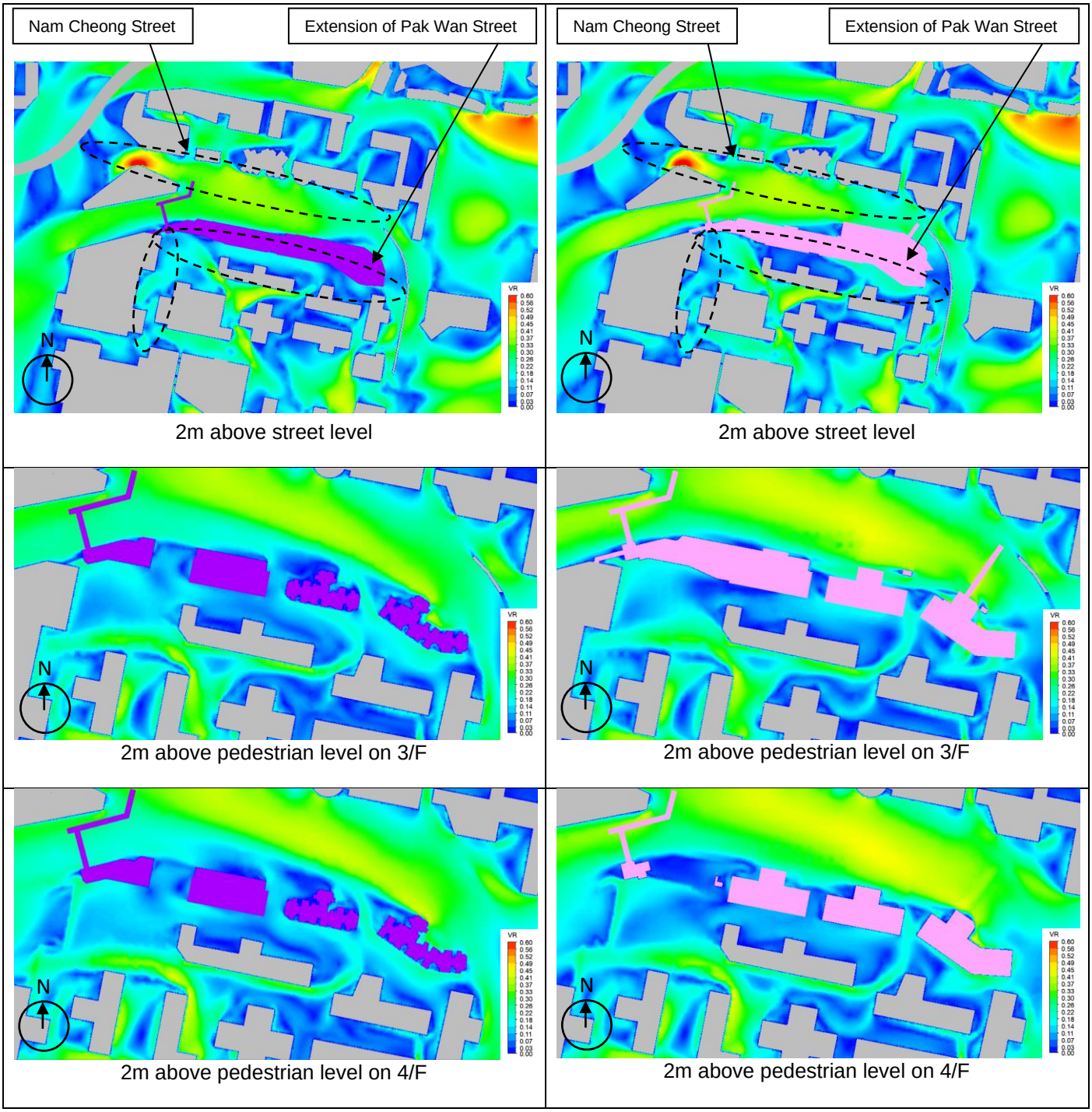


Figure 22: VR Contour Plot of Pedestrian Wind under E Wind for Baseline Scheme (Left) & Design Scheme (Right)

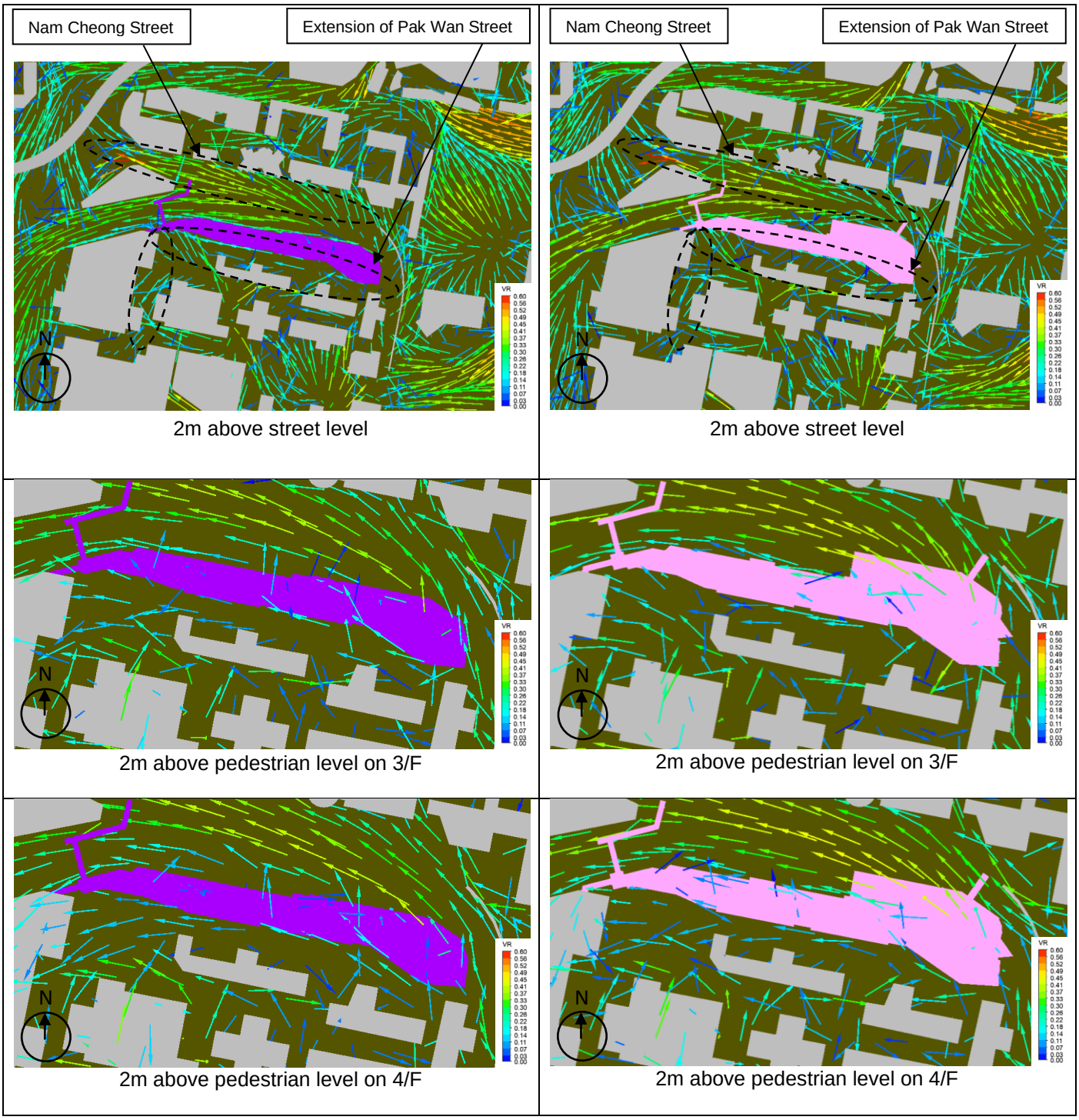


Figure 23: VR Vector Plot of Pedestrian Wind under E Wind for Baseline Scheme (Left) & Design Scheme (Right)

4.2.10 Figure 22 and Figure 23 presents the VR contour plot and vector plot under the E wind conditions respectively for the Baseline Scheme and Design Scheme.

4.2.11 The incoming wind from E approaches the Project from Skep Kip Mei Park and along the Nam Cheong Street from the southeast. Under the Design Scheme, increased wind is observed along Nam Cheong Street particularly towards the northwest of the project site primarily due the extended podium block in the Non-Building Area. As the incoming wind cannot access the Non-Building Area, it is redistributed along Nam Cheong Street, causing the leeward Non-Building Area without building block to exhibit significantly less wind, however, would not affect the pedestrian wind performance as the Non-Building Area towards the northwest of the project site is not accessible by pedestrians and is within the project site boundary.

4.2.12 The pedestrian wind along the Extension of Pak Wan Street located south of the project site is comparable under the Baseline Scheme and Design Scheme. The Extension of Pak Wan Street adjacent to Pak Tin Phase 13 has reduced pedestrian wind environment under the Design Scheme due to reduced wind from Nam Cheong Street via the 30m Ventilation Corridor, however, has improved pedestrian wind environment along Extension of Pak Wan Street immediately south of the project site due to the designed permeable elements at the podium level allowing the redistributed wind from Pak Tin Estate towards the south to better ventilate the Extension of Pak Wan Street.

NNE Wind

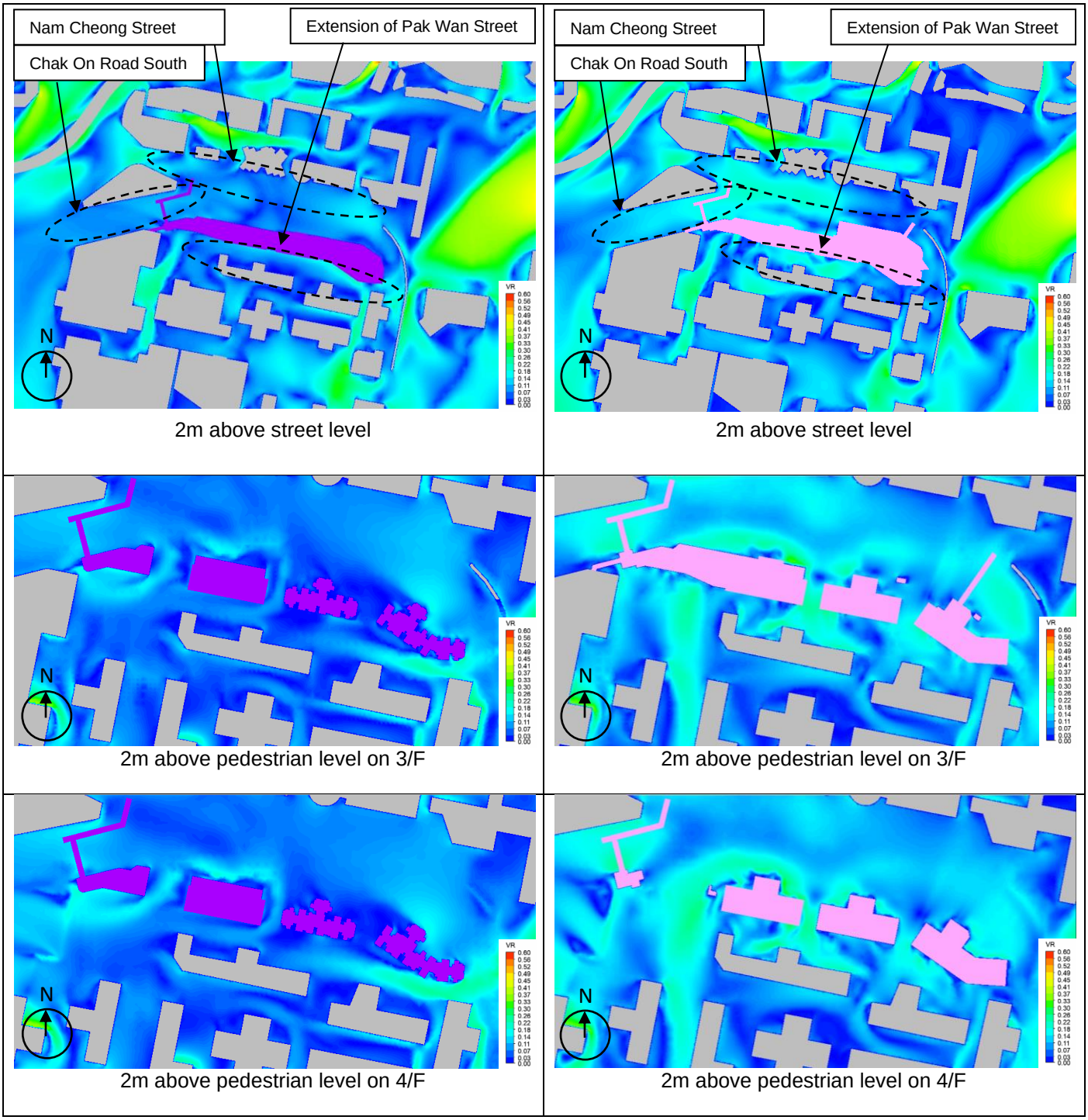


Figure 24: VR Contour Plot of Pedestrian Wind under NNE Wind for Baseline Scheme (Left) & Design Scheme (Right)

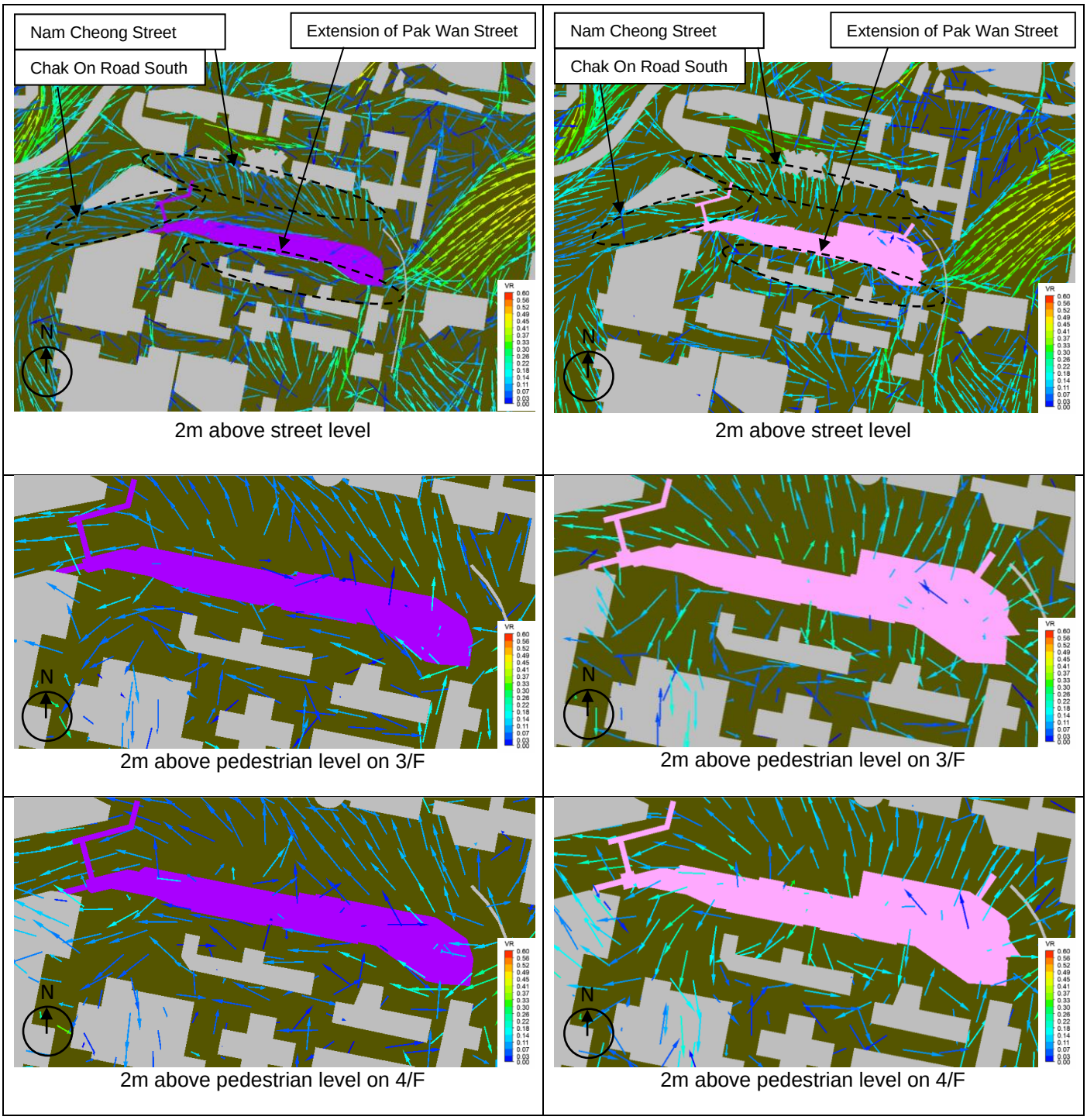


Figure 25: VR Vector Plot of Pedestrian Wind under NNE Wind for Baseline Scheme (Left) & Design Scheme (Right)

4.2.13 Figure 24 and Figure 25 presents the VR contour plot and vector plot under the NNE wind conditions respectively for the Baseline Scheme and Design Scheme.

4.2.14 The incoming wind from NNE approaches the Project from the north, skimming over the low-rise G/IC facilities and approaches the street level from the downwash effect of the Public Health Laboratory Centre to the northwest, Future Pak Tin Extension to the west and the buildings within the project site. Under the Design Scheme, the pedestrian wind performance along Nam Cheong Street spanning from northeast to the northwest of the project site has improved compared to the Baseline Scheme as benefitted from the increased downwash effect from the larger building mass of the buildings within the project site. As observed under the Design Scheme, with the additional structure at the podium level of the 30m Ventilation Corridor, the incoming NNE wind is redistributed along Nam Cheong Street and Chak On Road South.

4.2.15 The pedestrian wind along the Extension of Pak Wan Street and open areas at the south of the project site has improved under the Design Scheme due to the permeable elements at the podium level particularly at the podium roof where the podium transitions to the domestic towers. The increased wind penetrating through the project building allows improved ventilation at the Extension of Pak Wan Street via the downwash effect of Tsui Tin House, Yue Tin House and Fu Tin House immediately south of the project site.

NE Wind

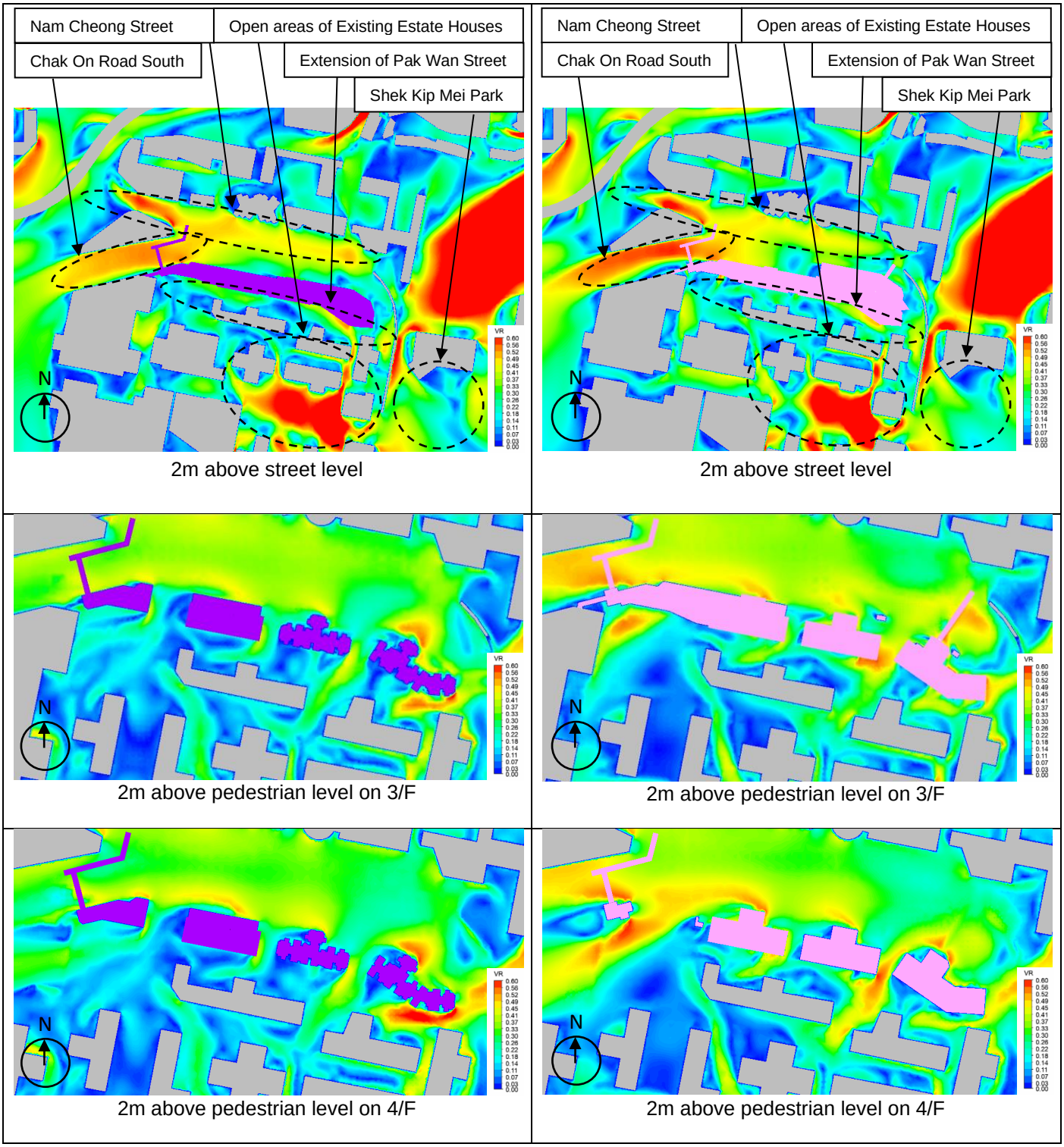


Figure 26: VR Contour Plot of Pedestrian Wind under NE Wind for Baseline Scheme (Left) & Design Scheme (Right)

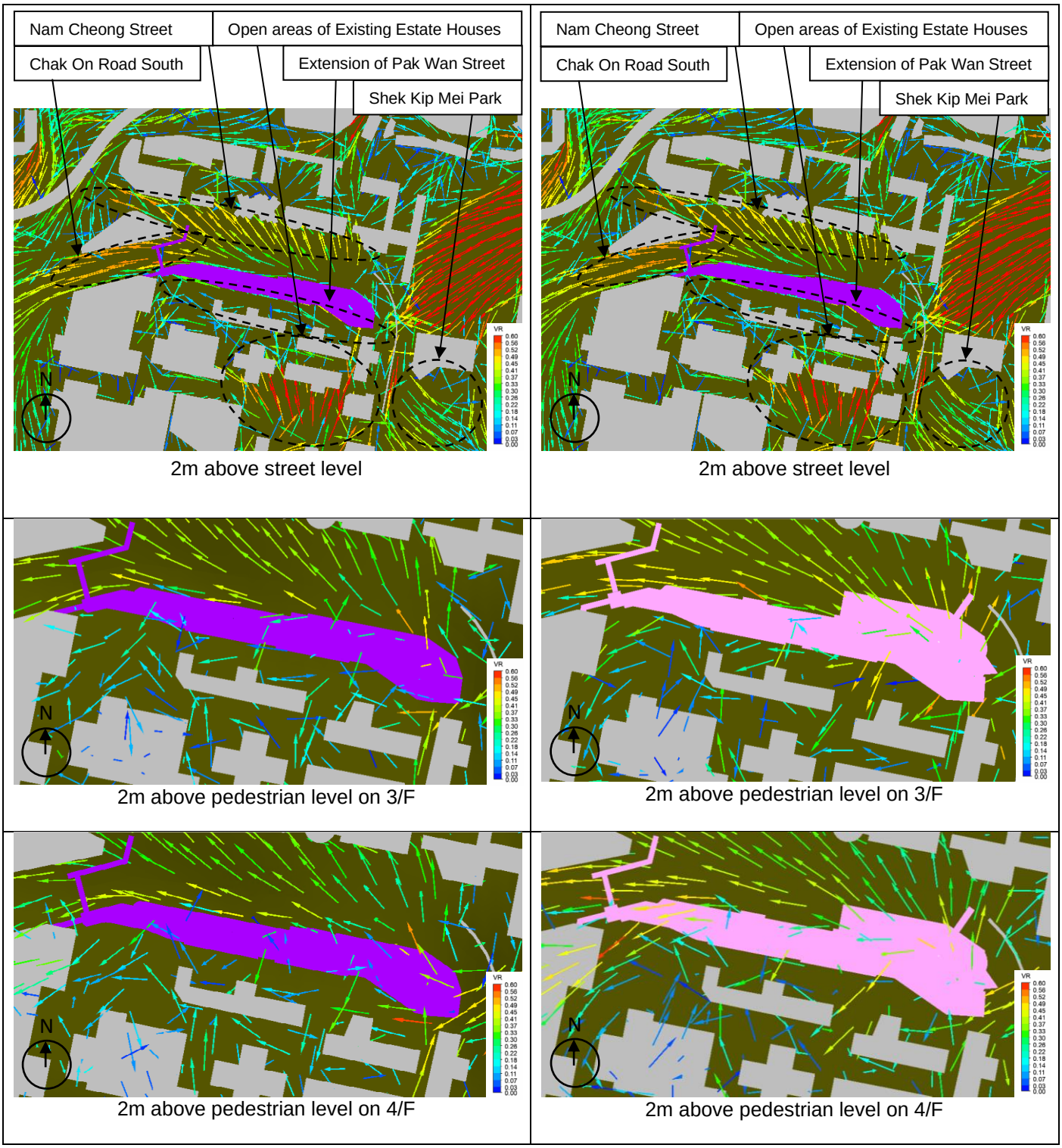


Figure 27: VR Vector Plot of Pedestrian Wind under NE Wind for Baseline Scheme (Left) & Design Scheme (Right)

4.2.16 Figure 26 and Figure 27 presents the VR contour plot and vector plot under the NE wind conditions respectively for the Baseline Scheme and Design Scheme.

4.2.17 The incoming wind from NE approaches the Project from Skep Kip Mei Park from the east and from the north skimming over the low-rise G/IC facilities resulting in downwash effect from the project buildings within the site, ventilating Nam Cheong Street towards the north. Under the Design Scheme, reduced wind is observed along the northeast portion of Nam Cheong Street primarily due the extended podium block in the Non-Building Area.

4.2.18 The increased building separation at 4/F between Block 13 and the lift tower towards the west of the project site allows increased wind to penetrate through the project site, skimming over the podium of Pak Tin Phase 13 and improve the pedestrian wind performance of the Chak On Street South.

4.2.19 The pedestrian wind performance directly south of the 30m Ventilation Corridor under the Design Scheme is comparable to the Baseline Scheme. The 30m Ventilation Corridor at the podium of the Baseline Scheme allows wind to penetrate through the project site and improve the pedestrian wind performance in the open area directly south of the project site and the Open areas of the Existing Estate Houses. Under the Design Schem, the permeable elements at the podium level helps mitigate the additional blockage at the 30m Ventilation Corridor, providing comparable pedestrian wind performance at the Extension of Pak Wan Street, however, worsened pedestrian wind performance in the Open areas of the Existing Estate Houses located south of the project site compared to the Baseline Scheme.

4.2.20 Under the Design Scheme, the pedestrian wind flow of Shek Kip Mei Park has improved compared to the Baseline Scheme due to the permeable elements at the podium level particularly at the east of the project site, which in turn increases the pedestrian wind flow along the southeast portion of Nam Cheong Street towards the Shek Kip Mei Park.

ENE Wind

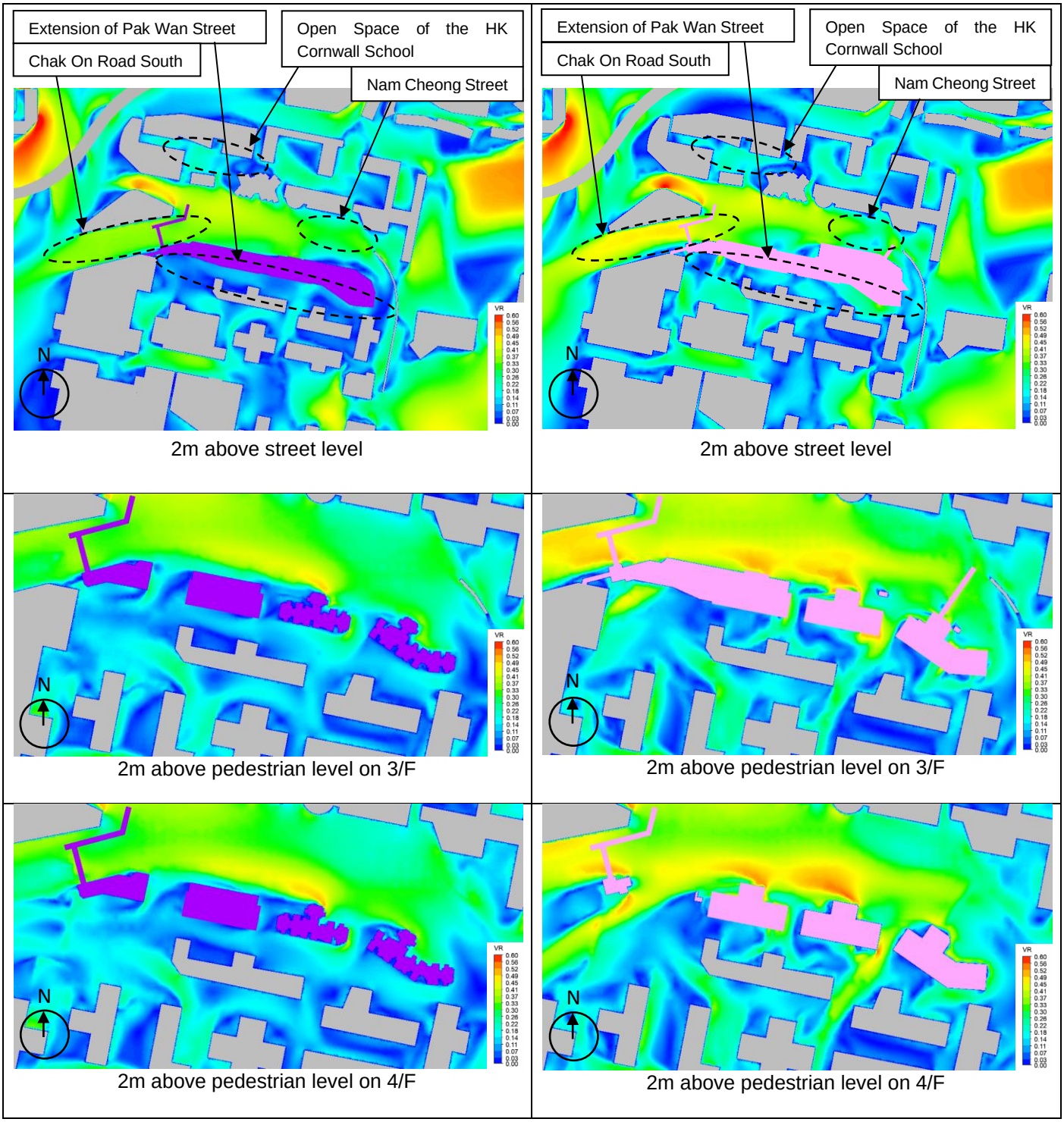


Figure 28: VR Contour Plot of Pedestrian Wind under ENE Wind for Baseline Scheme (Left) & Design Scheme (Right)

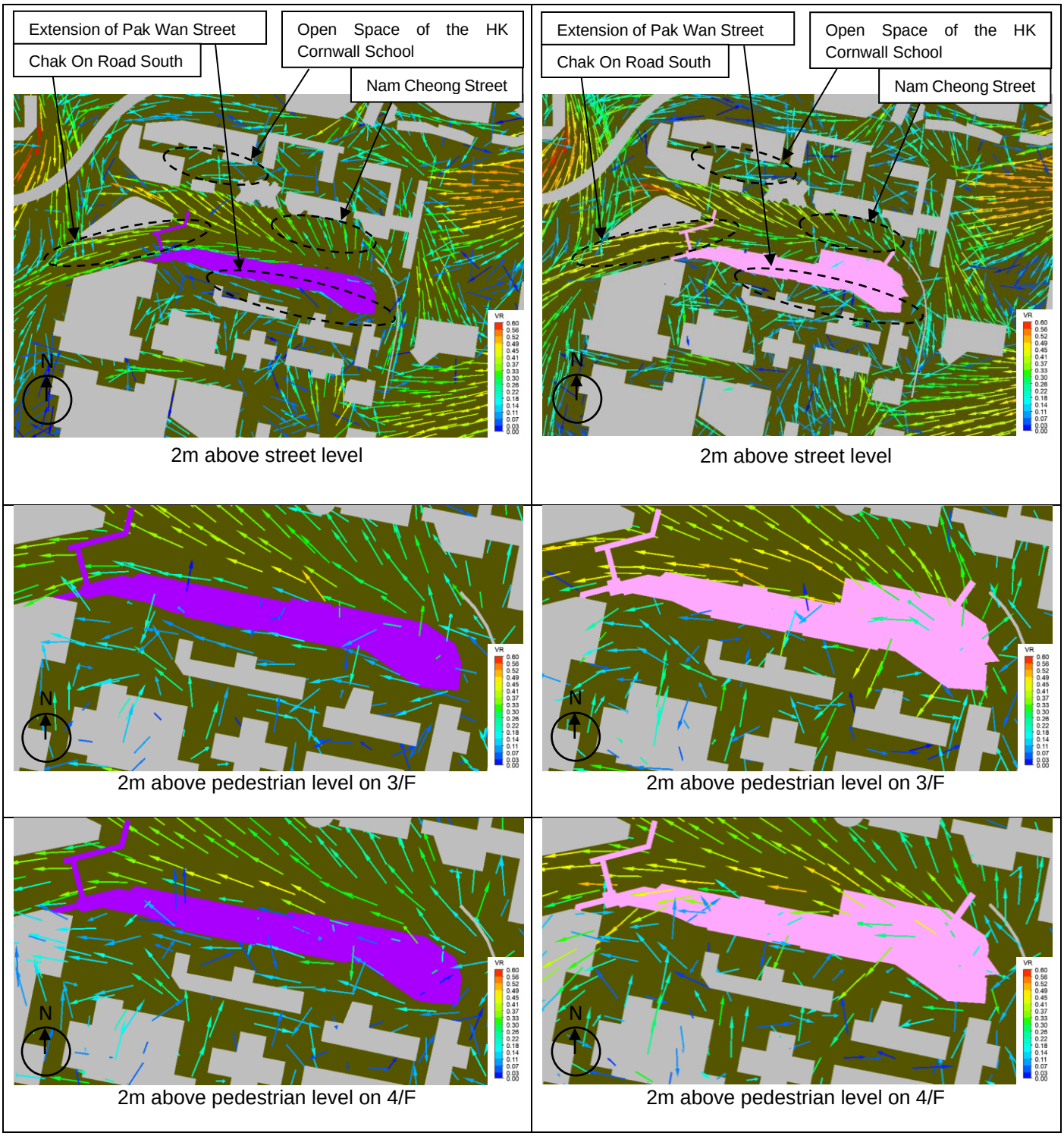


Figure 29: VR Vector Plot of Pedestrian Wind under ENE Wind for Baseline Scheme (Left) & Design Scheme (Right)

4.2.21 Figure 28 and Figure 29 presents the VR contour plot and vector plot under the ENE wind conditions respectively for the Baseline Scheme and Design Scheme.

4.2.22 The incoming wind from ENE approaches the Project from Skep Kip Mei Park from the east. Under the Design Scheme, the wind along Nam Cheong Street spanning from east to west is generally comparable to the Baseline Scheme. The increased building separation at 4/F between Block 13 and the lift tower towards the west of the project site allows increased wind to penetrate through the project site, skimming over the podium of Pak Tin Phase 13 and improve the pedestrian wind performance of the Chak On Street South. The extended podium block in the Non-Building Area re-orientates the incoming wind from the eastern portion of Nam Cheong Street by reducing the effective street width allowing more pedestrian wind to ventilate the Open Space of the Mental Health Association of Hong Kong Cornwall School. The extended podium block in the Non-Building Area also restricts the incoming wind from the easter portion of Nam Cheong Street resulting in worsened pedestrian wind performance at the northeastern portion of Nam Cheong Street in the Design Scheme compared to the Baseline Scheme.

4.2.23 The pedestrian wind along the Extension of Pak Wan Street located south of the project site has improved under the Design Scheme due to the designed permeable elements at the podium level allowing the wind from Pak Tin Estate towards the south to better ventilate the Extension of Pak Wan Street.

S Wind

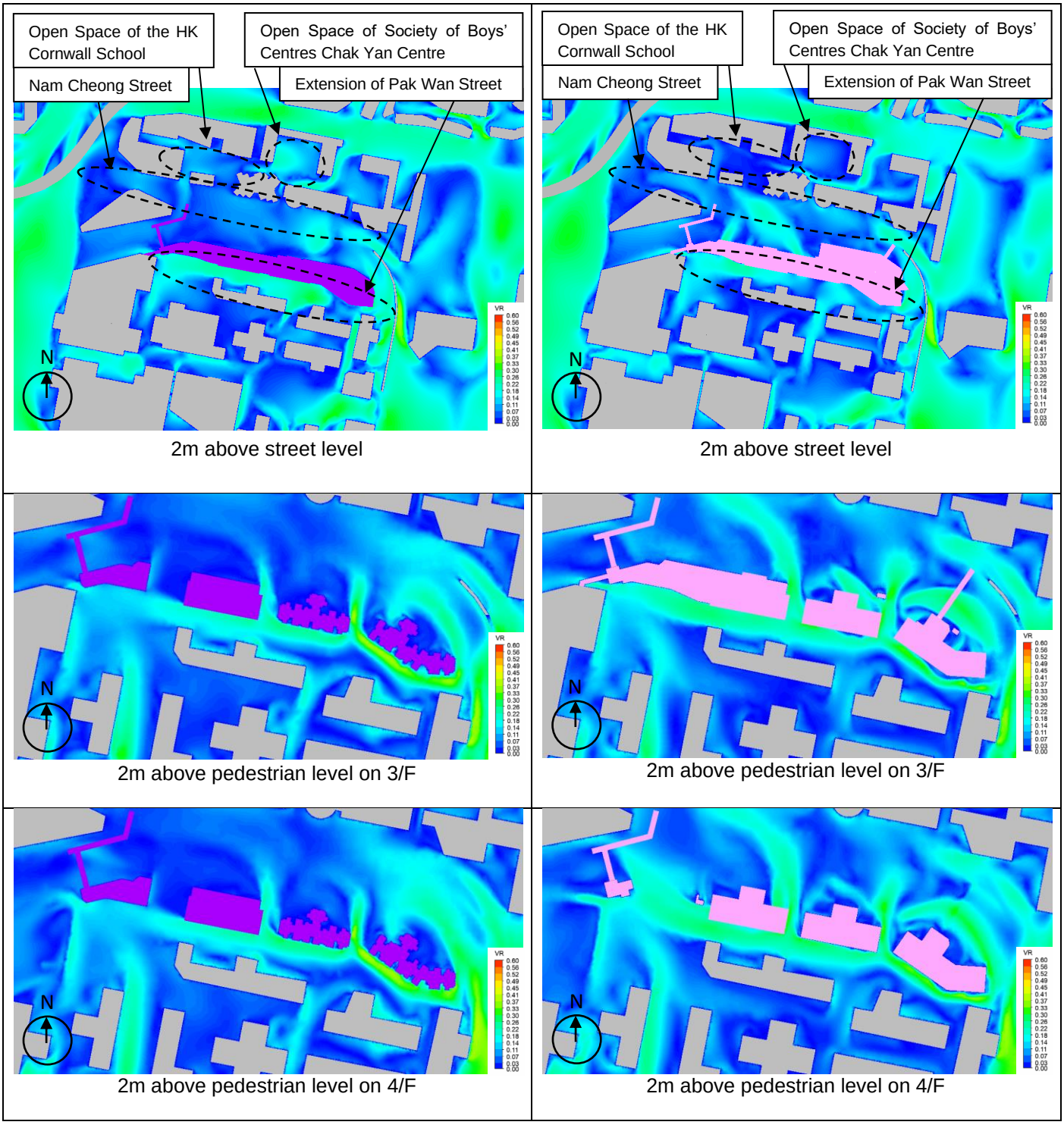


Figure 30: VR Contour Plot of Pedestrian Wind under S Wind for Baseline Scheme (Left) & Design Scheme (Right)

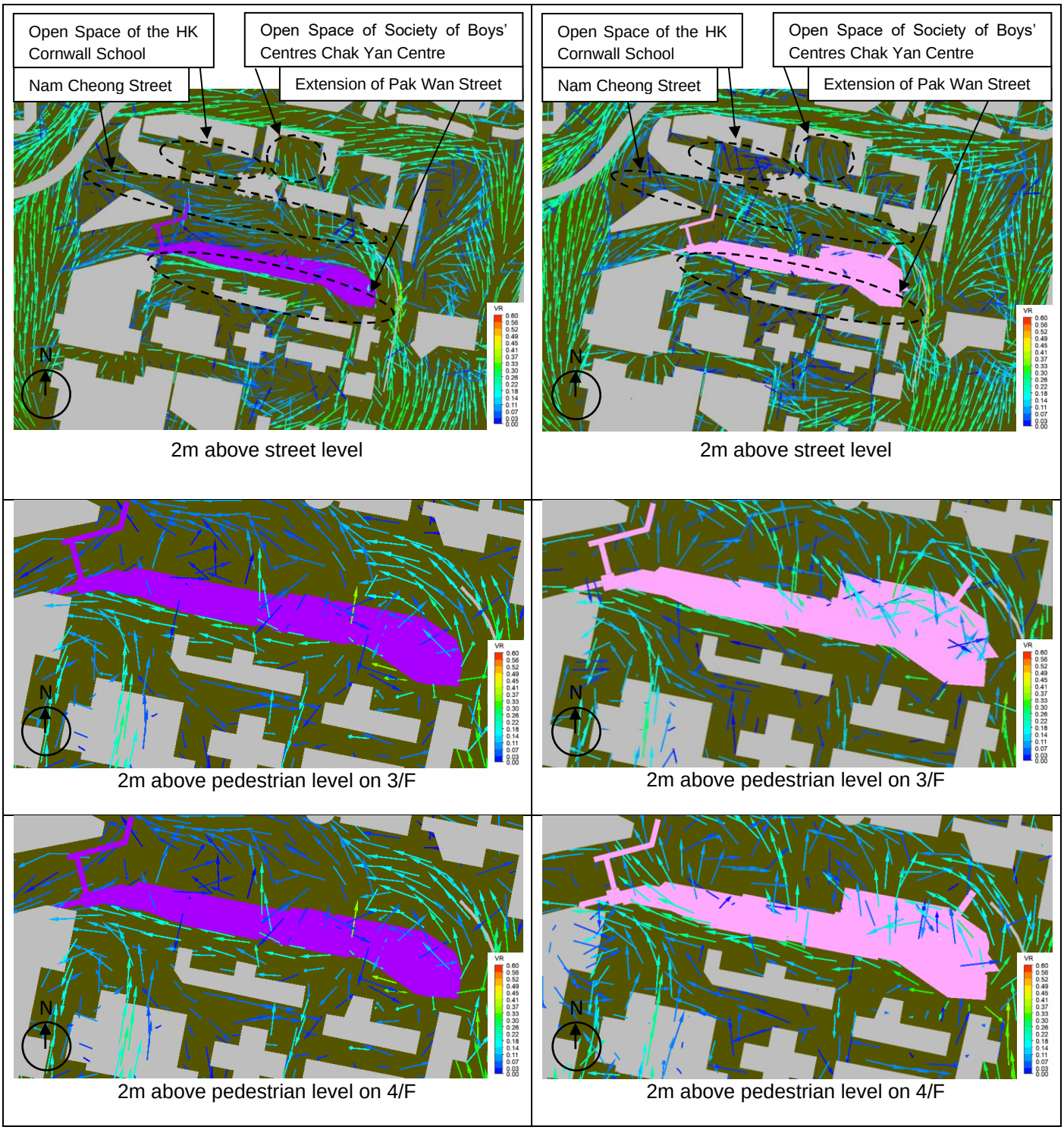


Figure 31: VR Vector Plot of Pedestrian Wind under S Wind for Baseline Scheme (Left) & Design Scheme (Right)

4.2.24 Figure 30 and Figure 31 presents the VR contour plot and vector plot under the S wind conditions respectively for the Baseline Scheme and Design Scheme.

4.2.25 The pedestrian wind along the Extension of Pak Wan Street located southeast of the project site has improved under the Design Scheme as benefitted from the downwash effect by the podium massing from the southerly winds and permeable elements at the podium level allowing the wind from Pak Tin Estate towards the south to better ventilate the eastern portion of the Extension of Pak Wan Street. Under the Baseline Scheme, the Extension of Pak Wan Street towards the southwest of the project site exhibits improved pedestrian wind performance primarily from the 30m Ventilation Corridor. Overall, the pedestrian wind performance of the Extension of Pak Wan Street is comparable under the Design Scheme and Baseline Scheme.

4.2.26 The incoming wind from S approaches the Project from Nam Cheong Street and traverses across Nam Cheong Street from south, along the noise barrier and towards the northwest of the project site. Under the Design Scheme, the pedestrian wind performance has improved compared to the Baseline Scheme along Nam Cheong Street particularly to the north of the project site due to the permeable elements at the podium level allowing the wind from Pak Tin Estate towards the south to penetrate through the podium and improve the ventilation along Nam Cheong Street.

4.2.27 Despite the improved pedestrian wind performance along Nam Cheong Street under the Design Scheme compared to the Baseline Scheme, the pedestrian wind performance in the Open Space of the Mental Health Association of Hong Kong Cornwall School and Open Space of Society of Boys' Centres Chak Yan Centre has worsened under the Design Scheme compared to the Baseline Scheme. This is due to the added structure at the podium level of the Project at the 30m Ventilation Corridor, preventing the wind from penetrating through the Project and into the building gaps of the GI/C developments to the north of the project site.

SSE Wind

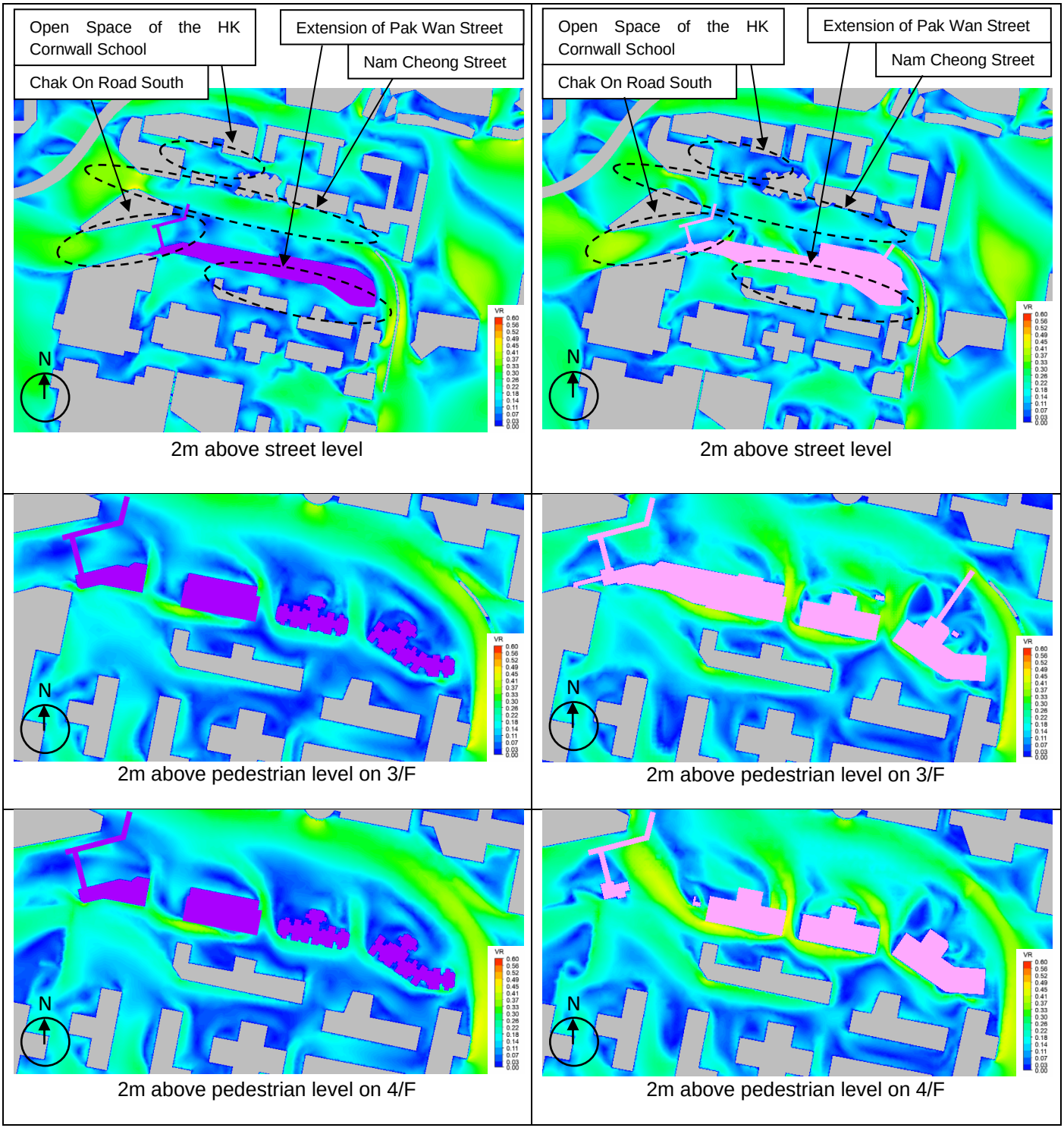


Figure 32: VR Contour Plot of Pedestrian Wind under SSE Wind for Baseline Scheme (Left) & Design Scheme (Right)

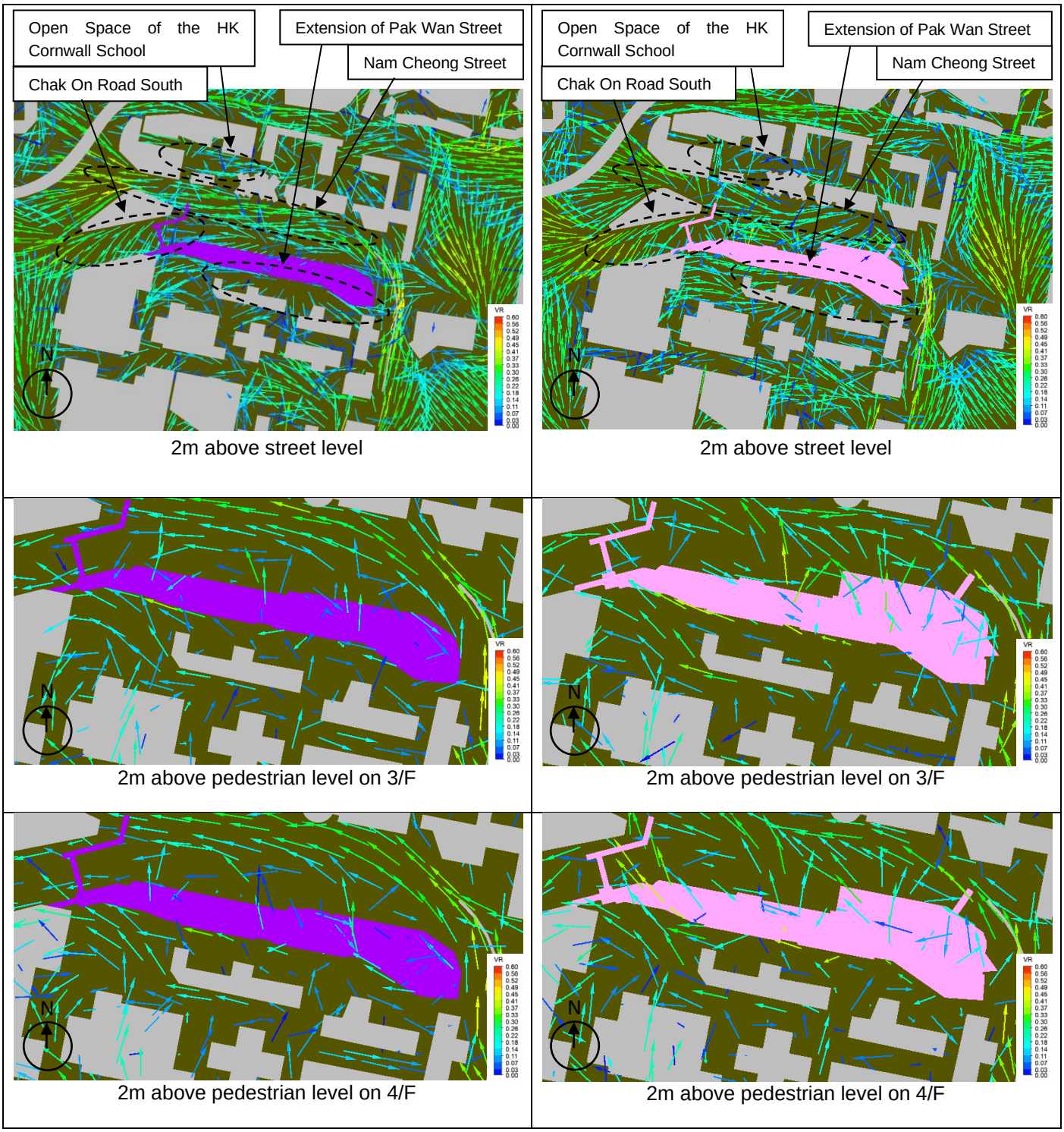


Figure 33: VR Vector Plot of Pedestrian Wind under SSE Wind for Baseline Scheme (Left) & Design Scheme (Right)

4.2.28 Figure 32 and Figure 33 presents the VR contour plot and vector plot under the SSE wind conditions respectively for the Baseline Scheme and Design Scheme.

4.2.29 The incoming SSE wind from south of Nam Cheong Street shows slight reduction in wind speed towards the northern portion of Nam Cheong Street and Open Space of the Mental Health Association of Hong Kong Cornwall School under the Design Scheme. Although there is wind penetrating through the permeable elements of the podium under the Design Scheme, the overall pedestrian wind environment for northern portion of Nam Cheong Street and Open Space of the Mental Health Association of Hong Kong Cornwall School has worsened compared to the Baseline Scheme.

4.2.30 Under the Design Scheme, the increased building separation at 4/F between Block 13 and the lift tower towards the west of the project site allows increased wind to penetrate through the project site to improve the pedestrian wind environment of Chak On Road South.

4.2.31 The pedestrian wind along the Extension of Pak Wan Street located south of the project site has improved slightly under the Design Scheme as benefitted from the downwash effect by the podium massing from the southerly winds and permeable elements at the podium level allowing the wind from Pak Tin Estate towards the south to better ventilate the eastern portion of the Extension of Pak Wan Street.

SE Wind

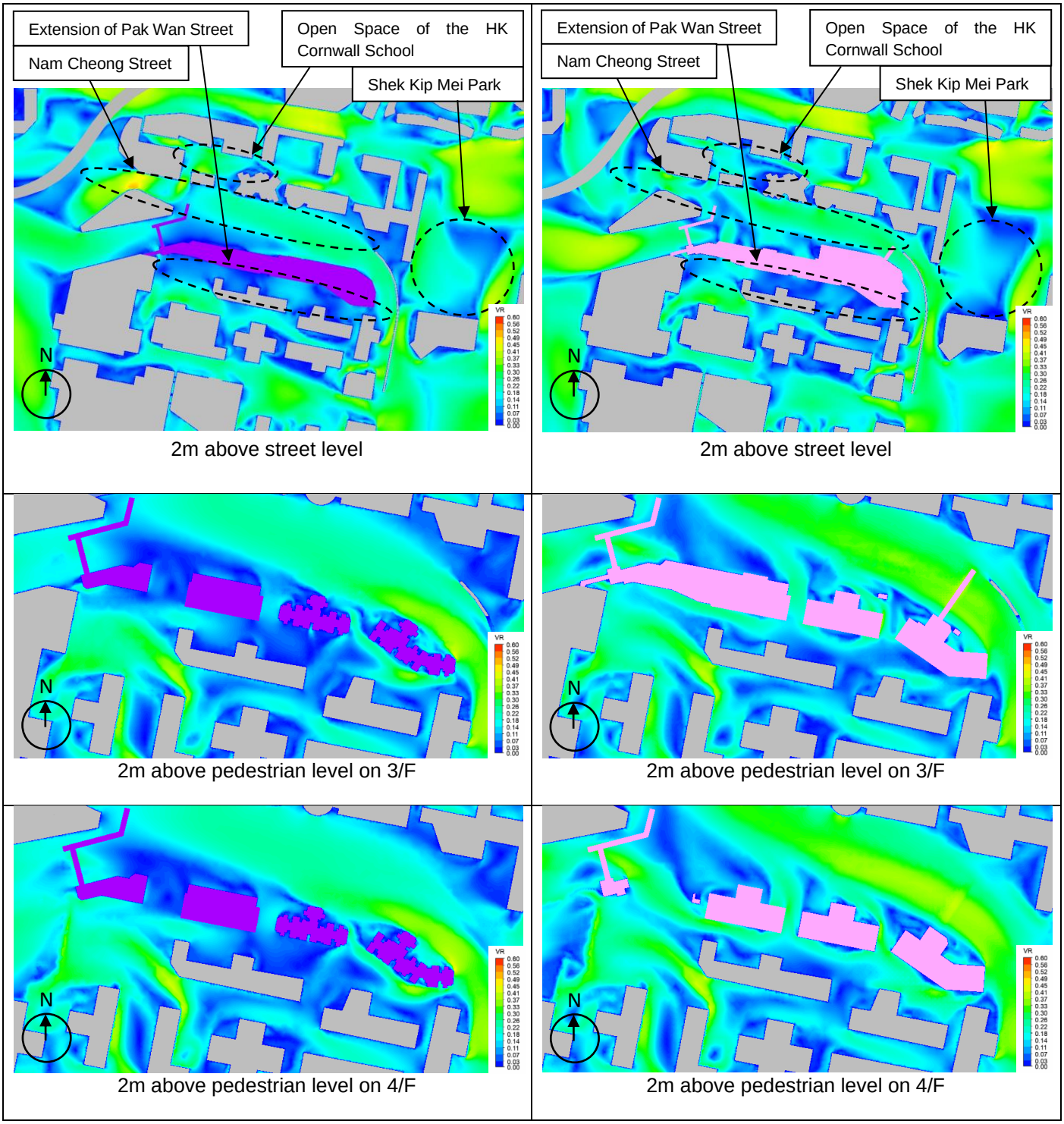


Figure 34: VR Contour Plot of Pedestrian Wind under SE Wind for Baseline Scheme (Left) & Design Scheme (Right)

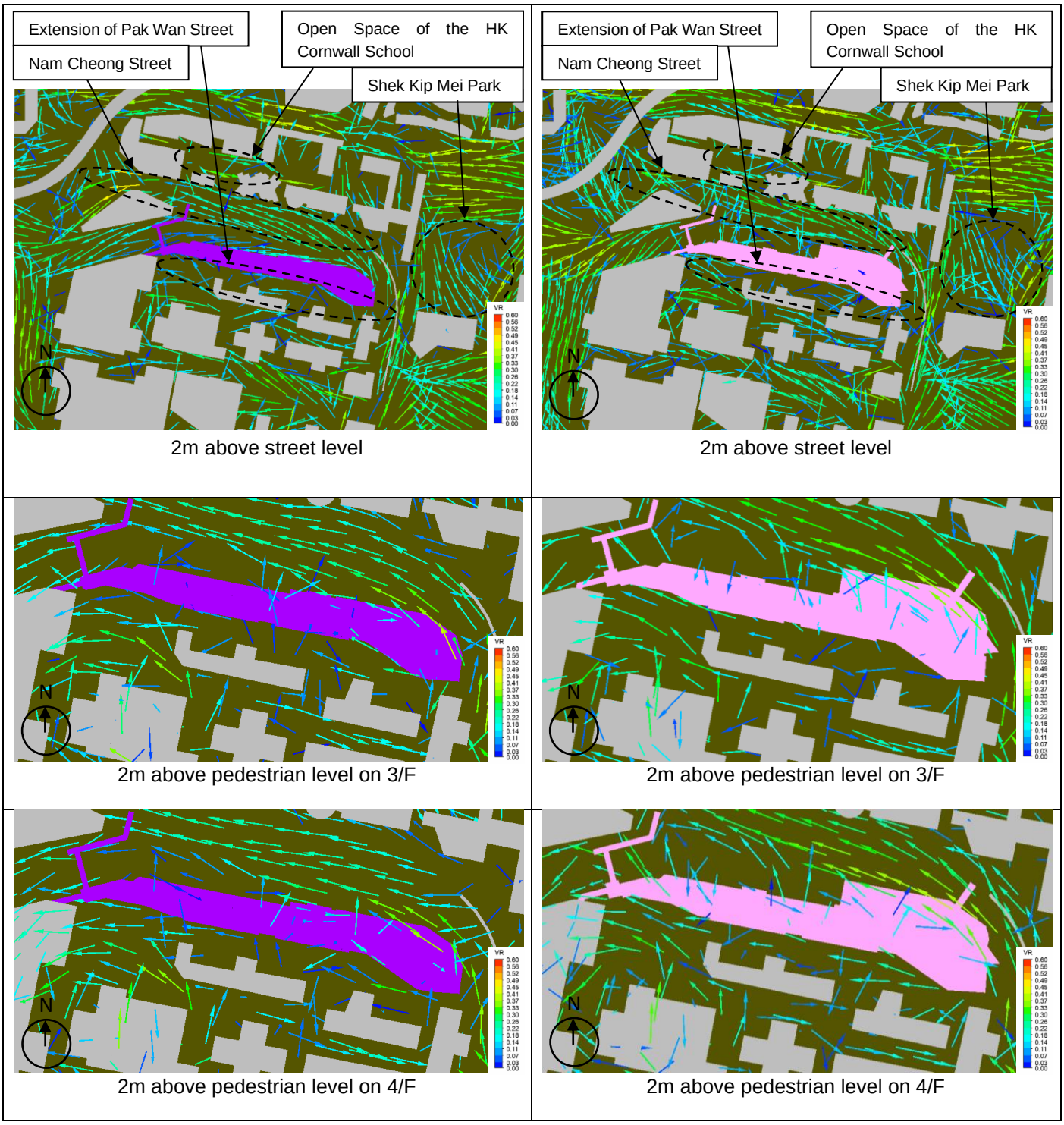


Figure 35: VR Vector Plot of Pedestrian Wind under SE Wind for Baseline Scheme (Left) & Design Scheme (Right)

4.2.32 Figure 34 and Figure 35 presents the VR contour plot and vector plot under the SE wind conditions respectively for the Baseline Scheme and Design Scheme.

4.2.33 The pedestrian wind environment at the northwestern portion of Nam Cheong Street shows reduction in pedestrian wind speed under the Design Scheme compared to the Baseline Scheme due the extended podium block in the Non-Building Area. As the extended podium block reduces the overall street width of Nam Cheong Street towards the northeast of the project site, the incoming SE wind from the southern portion of Nam Cheong Street is restricted, limiting the pedestrian wind to ventilate the remaining portion of Nam Cheong Street area towards the northwest of the project site. The permeable elements in the podium level of the Design Scheme helps to mitigate the effect and replenish the pedestrian wind along the northwest portion of Nam Cheong Street.

4.2.34 The pedestrian wind in the Shek Kip Mei Park located east of the project site has worsened under the Design Scheme compared to the Baseline Scheme. With the extended podium block, the overall street width of Nam Cheong Street towards the northeast of the project site has reduced, restricting a portion of the pedestrian wind from entering the northwest section of Nam Cheong Street. Instead, the pedestrian wind traverses north towards Shek Kip Mei Park but as there is also incoming wind from the north due to the effect of downwash of the buildings to the north of the project site, the overall pedestrian wind in Shek Kip Mei Park has reduced in the Design Scheme compared to the Baseline Scheme.

4.2.35 Under the Design Scheme, the pedestrian wind environment at the Open Space of the Mental Health Association of Hong Kong Cornwall School has worsened compared to the Baseline Scheme. The additional structure at the 30m Ventilation Corridor reduces the incoming wind from the SE penetrating through the 30m Ventilation Corridor, which results in reduced pedestrian wind at the Open Space of the Mental Health Association of Hong Kong Cornwall School.

4.2.36 The pedestrian wind along the Extension of Pak Wan Street located south of the project site has improved slightly under the Design Scheme as benefitted from the downwash effect by the podium massing from the southerly winds and permeable elements at the podium level allowing the wind from Pak Tin Estate towards the south to better ventilate the eastern portion of the Extension of Pak Wan Street.

ESE Wind

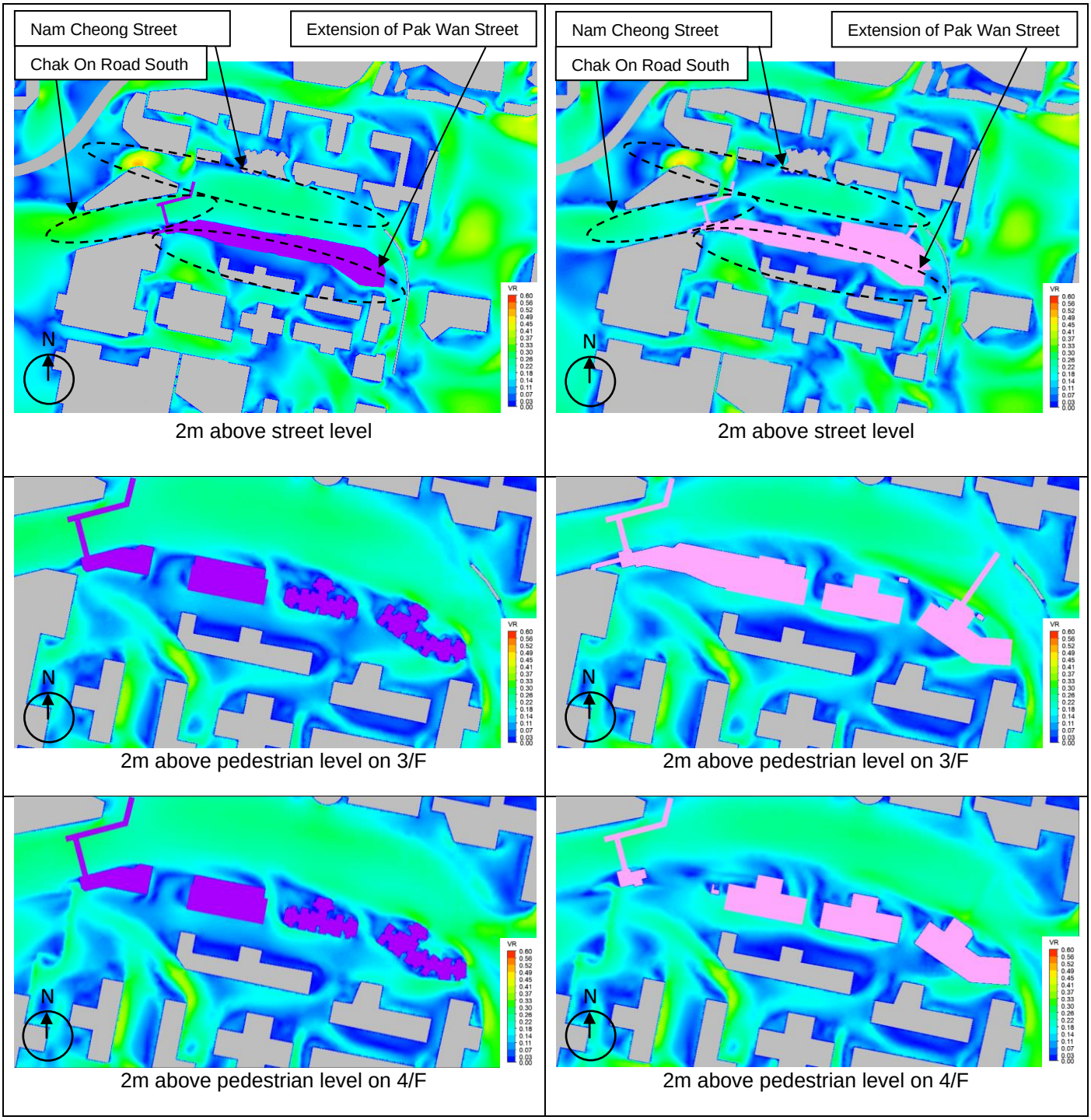


Figure 36: VR Contour Plot of Pedestrian Wind under ESE Wind for Baseline Scheme (Left) & Design Scheme (Right)

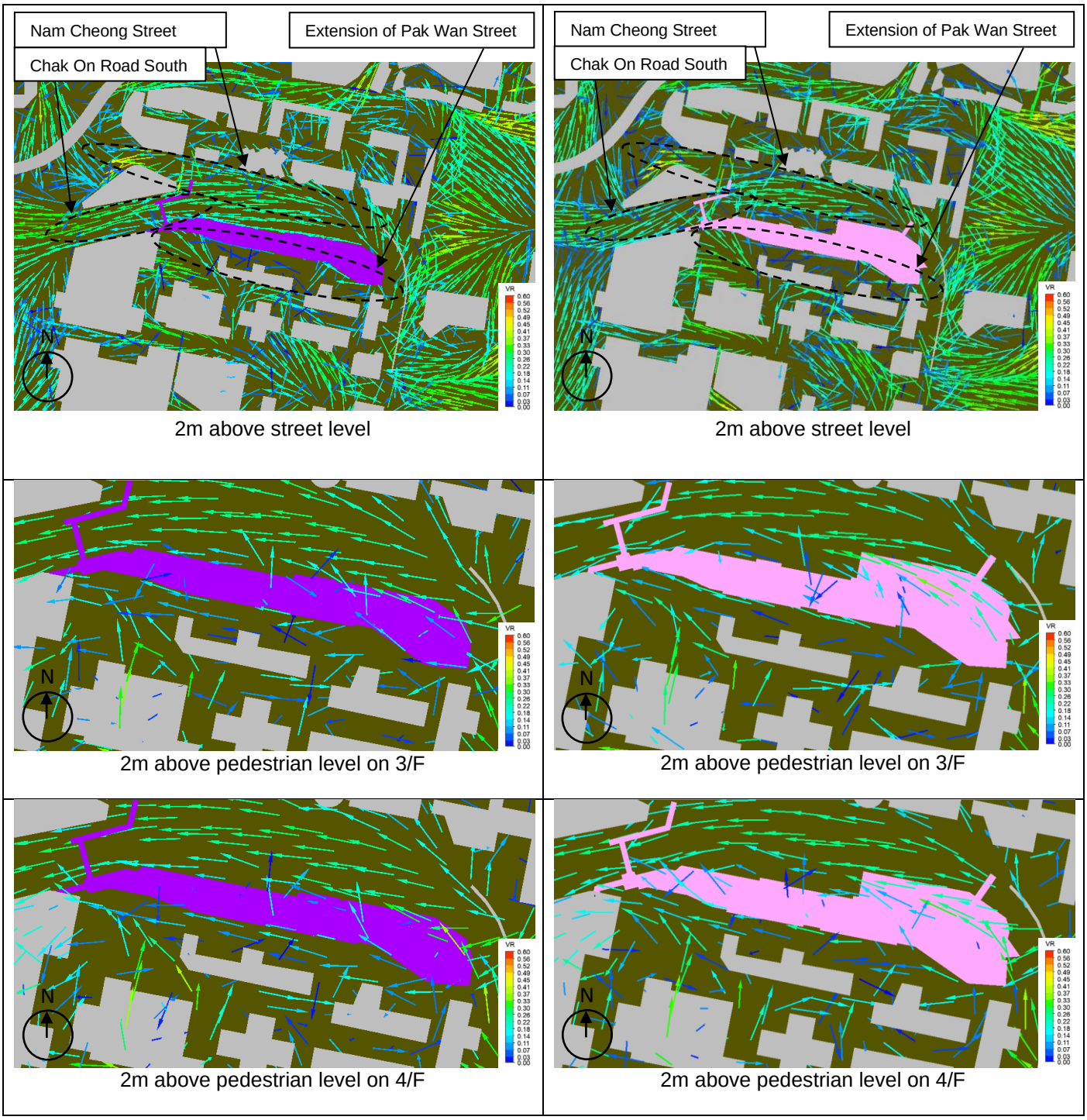


Figure 37: VR Vector Plot of Pedestrian Wind under ESE Wind for Baseline Scheme (Left) & Design Scheme (Right)

4.2.37 Figure 36 and Figure 37 presents the VR contour plot and vector plot under the ESE wind conditions respectively for the Baseline Scheme and Design Scheme.

4.2.38 The incoming wind from ESE approaches the Project from Skep Kip Mei Park from the east and south of Nam Cheong Street. Under the Design Scheme, slight reduction in pedestrian wind is observed along Nam Cheong Street particularly towards the north of the project site primarily due the extended podium block in the Non-Building Area, which effectively reduces the street width of Nam Cheong Street towards the northeast of the project site. As a result, the overall pedestrian wind performance at the northern section of Nam Cheong Street and Chak On Road South has worsened under the Design Scheme compared to the Baseline Scheme.

4.2.39 The pedestrian wind along the Extension of Pak Wan Street located south of the project site has improved under the Design Scheme due to the designed permeable elements at the podium level allowing the redistributed wind from Pak Tin Estate towards the south to better ventilate the Extension of Pak Wan Street.

SSW Wind

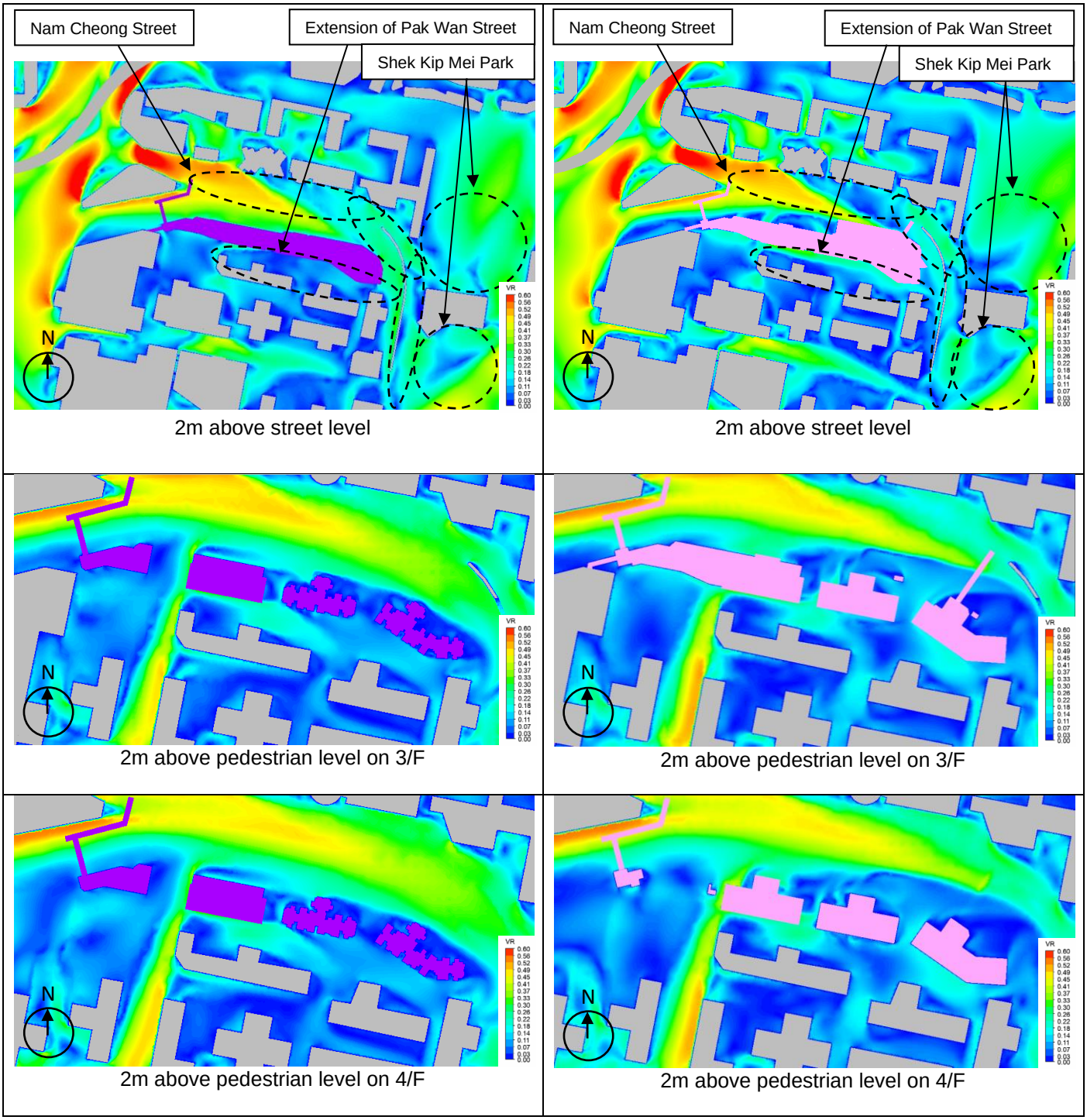


Figure 38: VR Contour Plot of Pedestrian Wind under SSW Wind for Baseline Scheme (Left) & Design Scheme (Right)

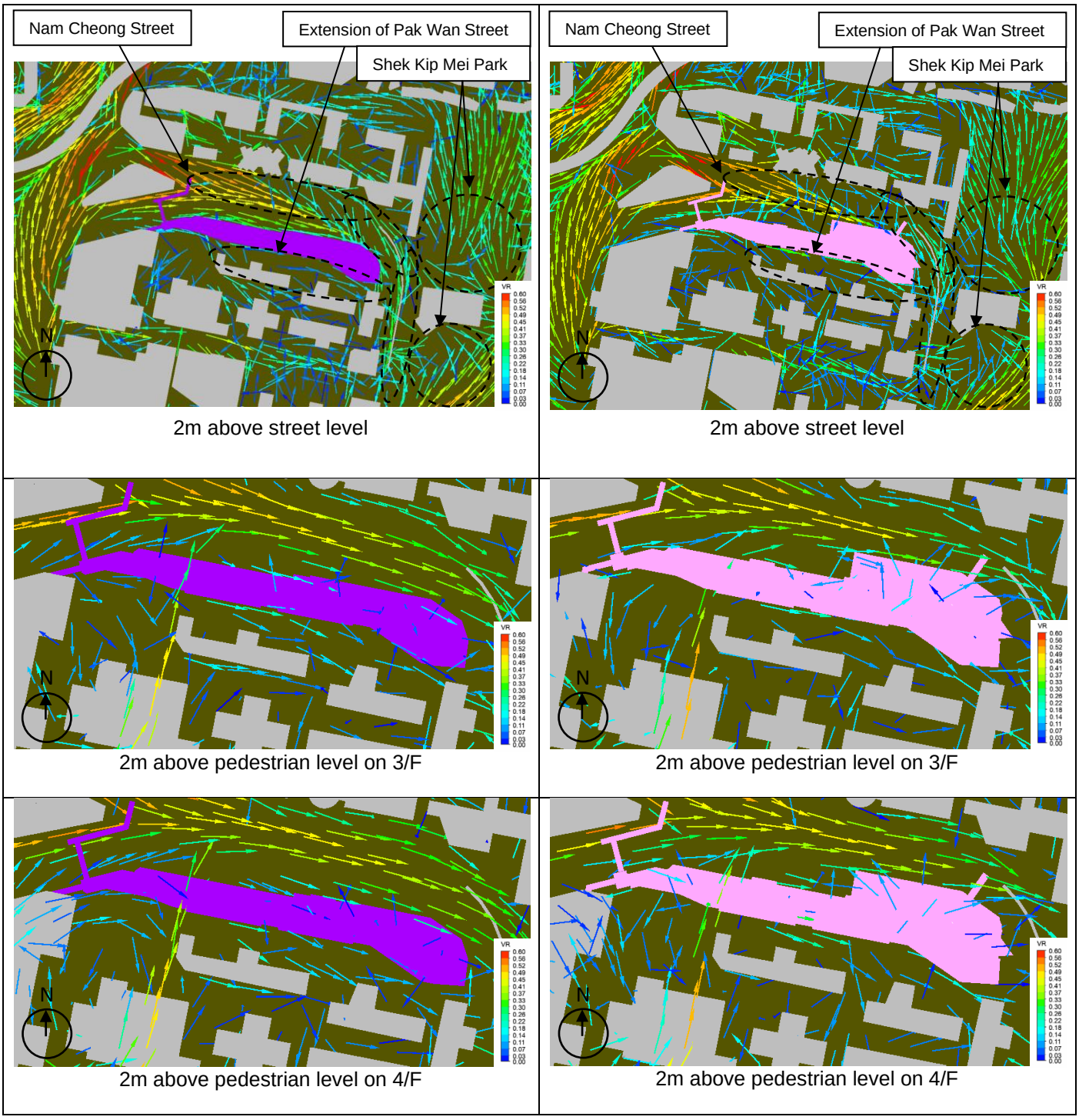


Figure 39: VR Vector Plot of Pedestrian Wind under SSW Wind for Baseline Scheme (Left) & Design Scheme (Right)

4.2.40 Figure 38 and Figure 39 presents the VR contour plot and vector plot under the SSW wind conditions respectively for the Baseline Scheme and Design Scheme.

4.2.41 The incoming wind from SSW traverses along Nam Cheong Street from west to east. Under the Design Scheme, the extended podium block reduces the overall street width of Nam Cheong Street towards the northeast of the project site, which restricts the allowable angle of re-orientation of the incoming wind, limiting the pedestrian wind to ventilate up Nam Cheong Street up to the area towards the north and northeast of the project site, whereas under the Baseline Scheme, the extent of ventilation reaches up to the Noise Barrier and in turn improves the overall ventilation of the entire extent Nam Cheong Street from northeast to southeast of the project site.

4.2.42 Under the Design Scheme, with the reduced pedestrian wind traversing from west to east of Nam Cheong Street, the pedestrian wind performance of Shek Kip Mei Park has also slightly worsened compared to the Baseline Scheme due to less incoming wind from Nam Cheong Street.

4.2.43 The pedestrian wind along the Extension of Pak Wan Street has improved under the Design Scheme due to more wind being channeled towards Nam Cheong Street from the west through the increased building separation above the podium level, which results in less wind along the Extension of Pak Wan Street and south of the 30m Ventilation Corridor.

4.2.44 The pedestrian wind along the Extension of Pak Wan Street located south of the project site has improved under the Design Scheme as benefitted from the downwash effect by the podium massing from the incoming SSW winds and permeable elements at the podium level allowing the wind from Pak Tin Estate towards the south to better ventilate the eastern portion of the Extension of Pak Wan Street.

SW Wind

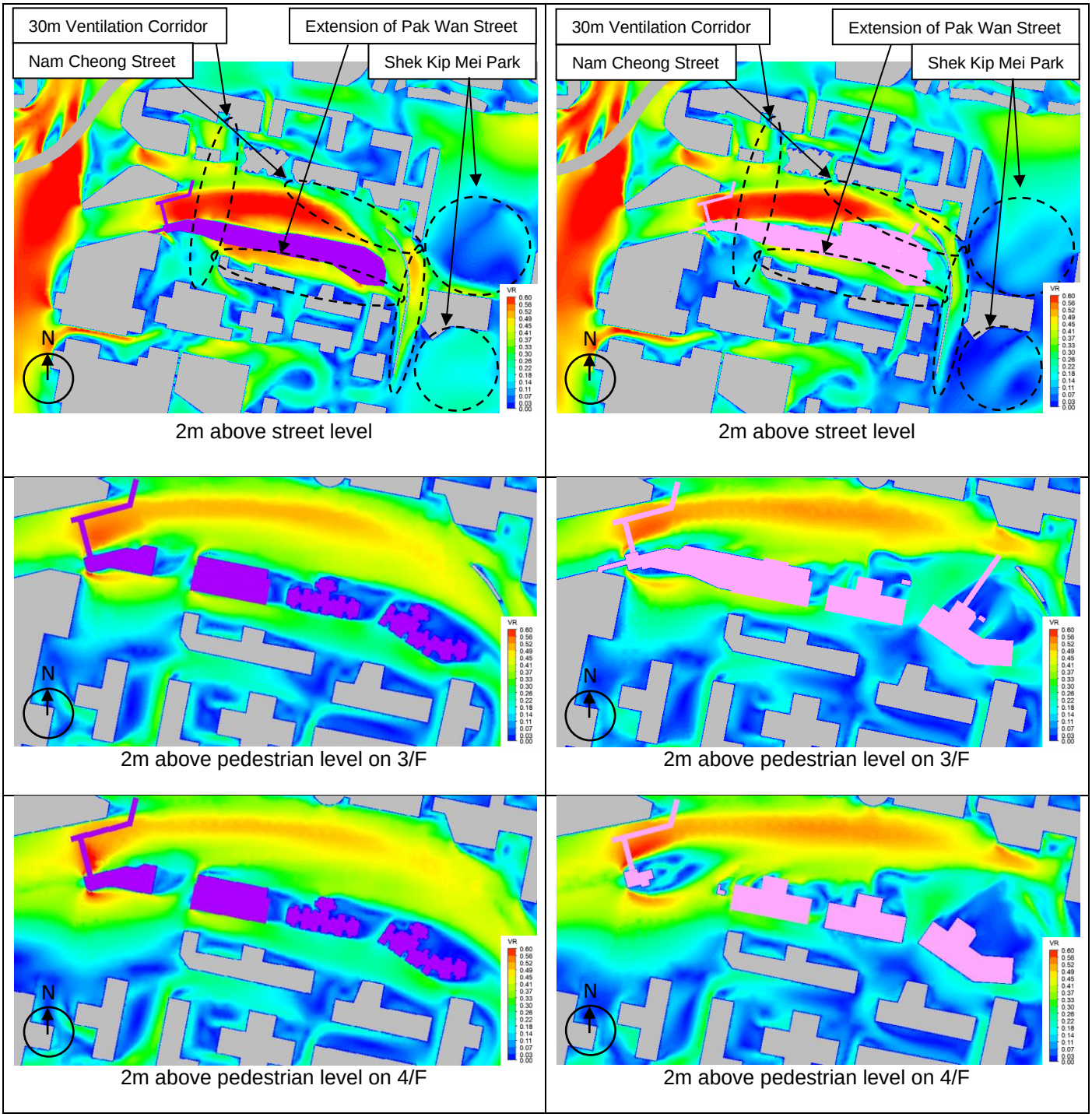


Figure 40: VR Contour Plot of Pedestrian Wind under SW Wind for Baseline Scheme (Left) & Design Scheme (Right)

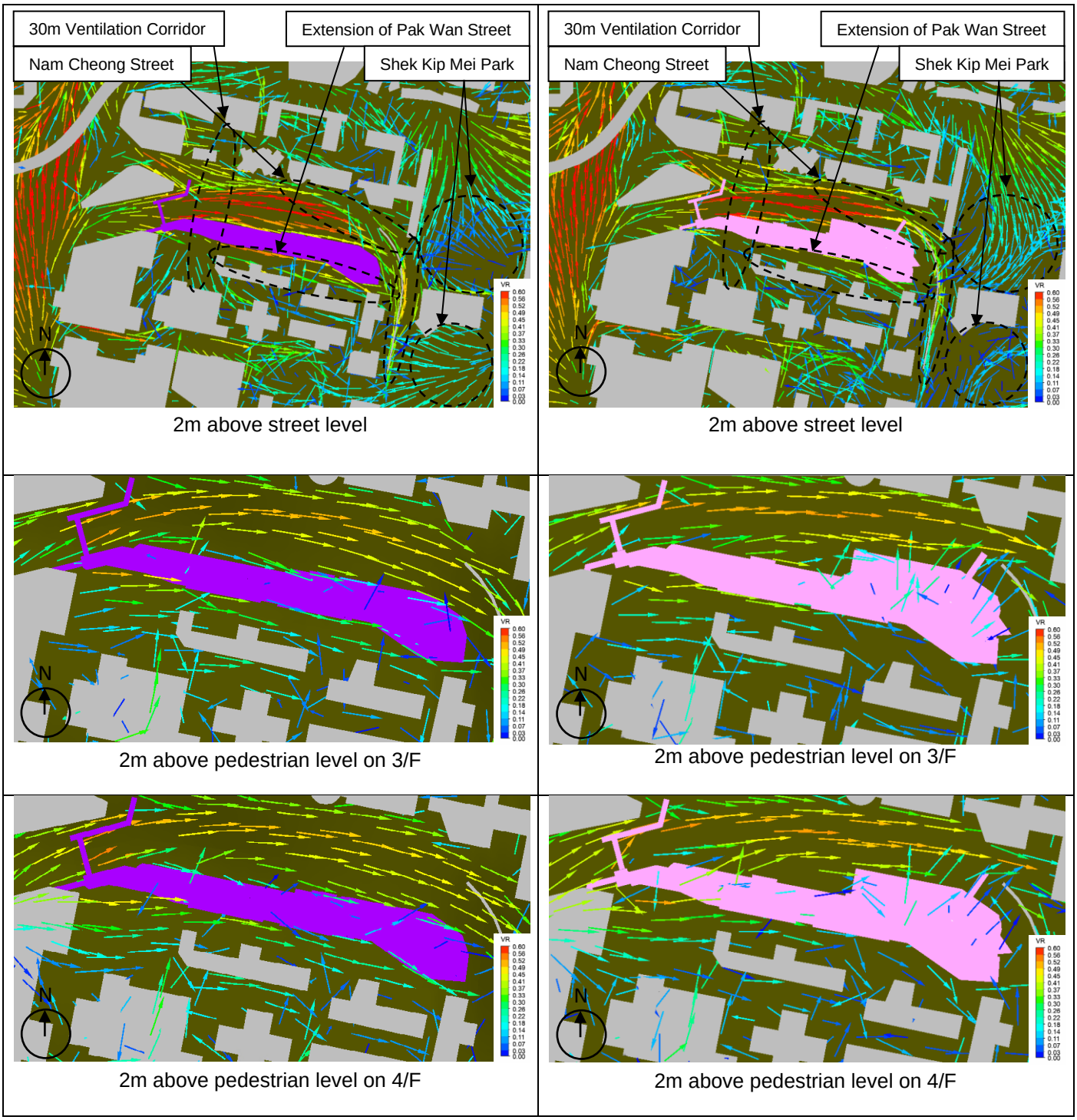


Figure 41: VR Vector Plot of Pedestrian Wind under SW Wind for Baseline Scheme (Left) & Design Scheme (Right)

4.2.45 Figure 40 and Figure 41 presents the VR contour plot and vector plot under the SW wind conditions respectively for the Baseline Scheme and Design Scheme.

4.2.46 The incoming wind from SW traverses along Nam Cheong Street from west to east. Under the Design Scheme, the extended podium block reduces the overall street width of Nam Cheong Street towards the northeast of the project site, which restricts the allowable angle of re-orientation of the incoming wind, slightly reducing the pedestrian wind to ventilate Nam Cheong Street pass the area towards the northeast of the project site. The overall pedestrian wind environment at Nam Cheong Street has worsened from the northeast to the southeast portion of Nam Cheong Street compared to the Baseline Scheme.

4.2.47 Under the Design Scheme, the increased building separation at 4/F between Block 13 and the lift tower towards the west of the project site allows increased wind to penetrate through the project site to improve the pedestrian wind environment at the northwestern and northern portion of Nam Cheong Street resulting in a comparable pedestrian wind environment as the Baseline Scheme.

4.2.48 Under the Design Scheme, the permeable elements at the podium level particularly at the podium roof where the podium transitions to the domestic towers allows more wind to penetrate through the project site compared to the Baseline Scheme. The additional wind is observed to skim pass the low-rice GI/C developments to the north of the project site and approaching the mid-rise developments along Cornwall Street. Due to the downwash effect, additional pedestrian wind is observed to ventilate the northern portion of Shek Kip Mei Park from Cornwall Street under the Design Scheme. The extended podium block of the Design Scheme reduces the pedestrian wind traversing from northeast to southeast of Nam Cheong Street, resulting in worsened pedestrian wind environment at the southern portion of the Skek Kip Mei Park compared to the Baseline Scheme. Overall, the pedestrian wind performance of Shek Kip Mei Park under the Design Scheme is comparable to the Baseline Scheme.

4.2.49 The pedestrian wind along the Extension of Pak Wan Street and open areas at the south of the 30m Ventilation Corridor has worsened under the Design Scheme due to more wind being channeled towards Nam Cheong Street from the west through the increased building separation above the podium level, which results in less wind along the Extension of Pak Wan Street and south of the 30m Ventilation Corridor.

WSW Wind

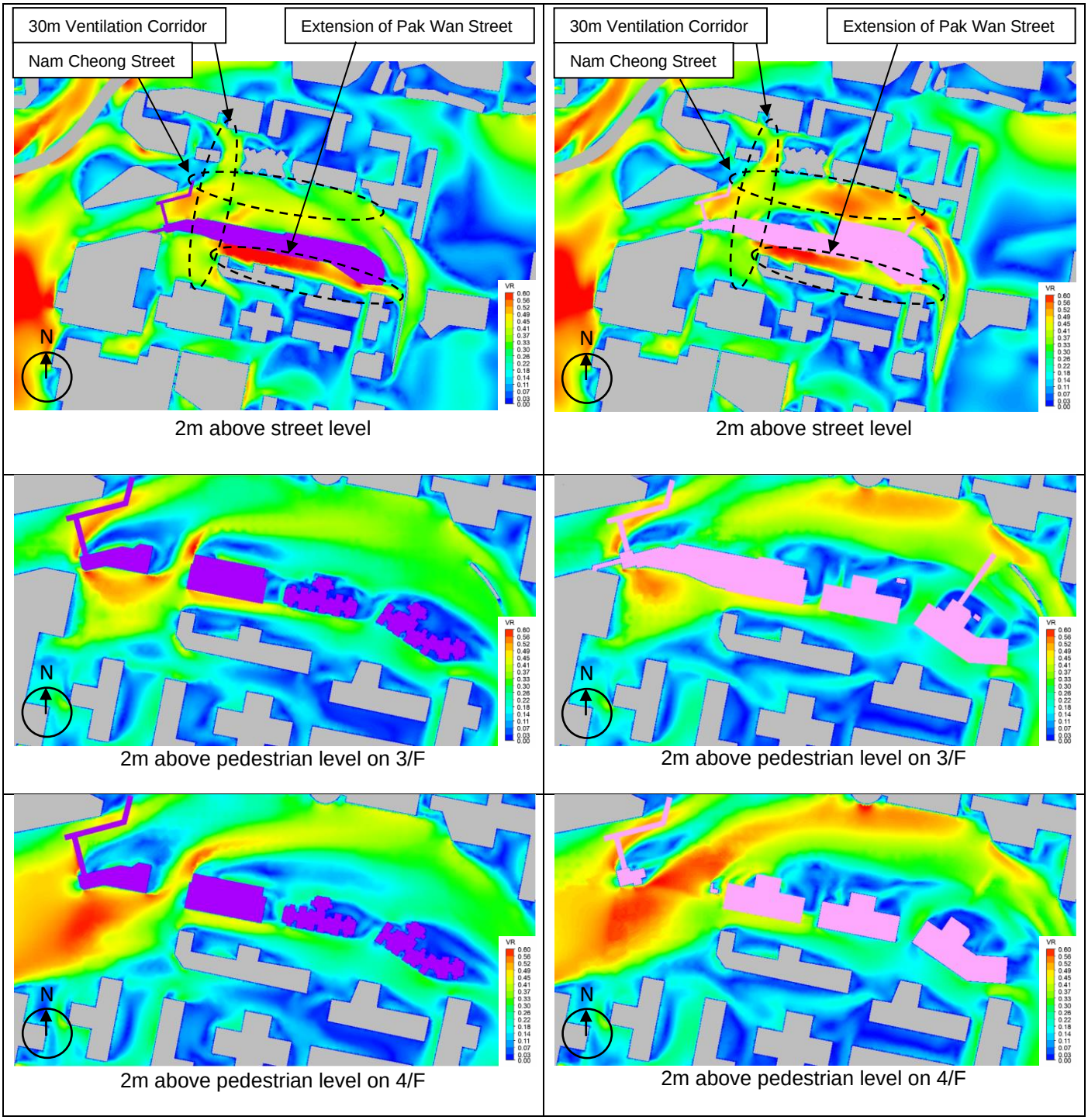


Figure 42: VR Contour Plot of Pedestrian Wind under WSW Wind for Baseline Scheme (Left) & Design Scheme (Right)

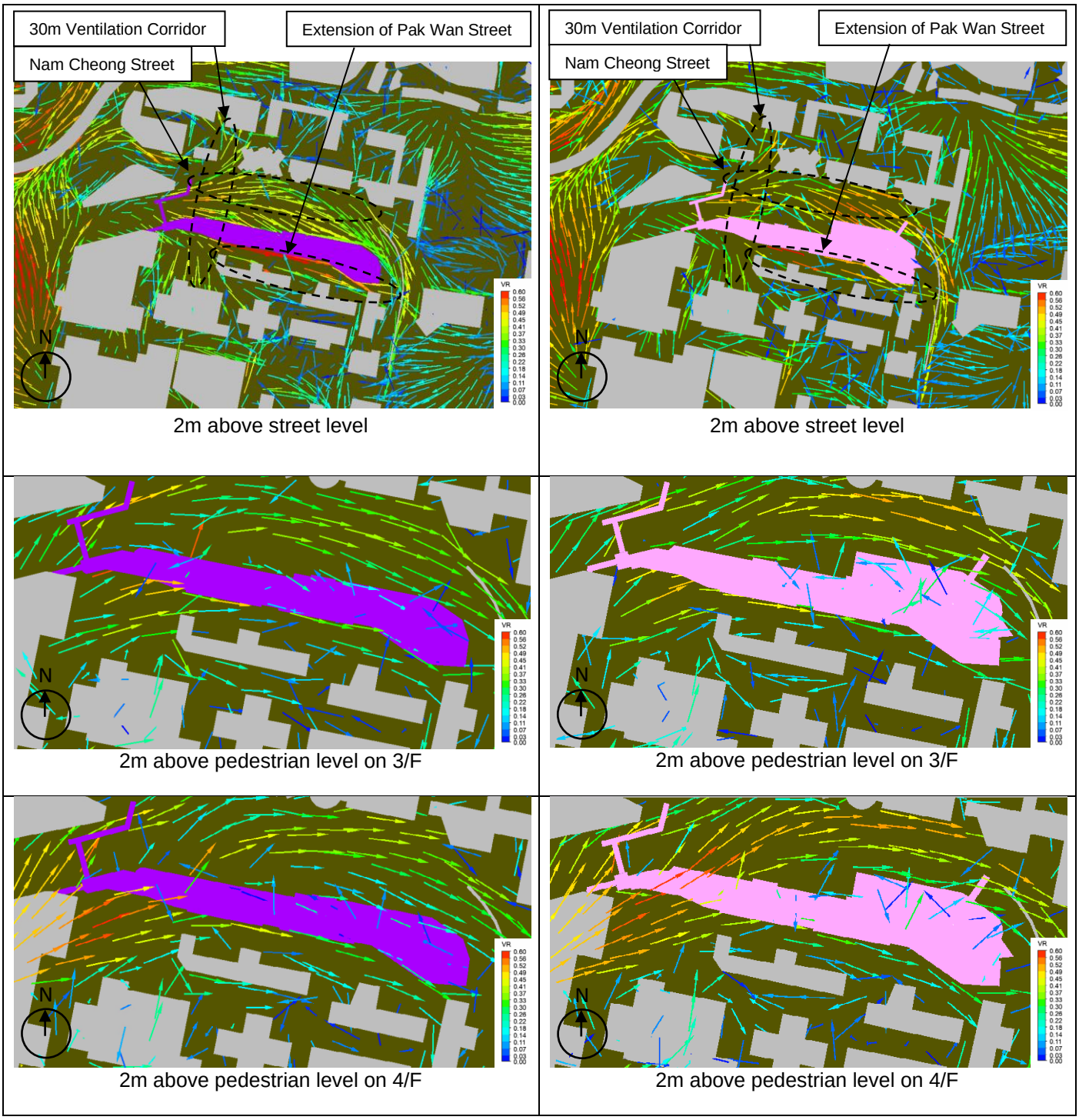


Figure 43: VR Vector Plot of Pedestrian Wind under WSW Wind for Baseline Scheme (Left) & Design Scheme (Right)

4.2.50 Figure 42 and Figure 43 presents the VR contour plot and vector plot under the WSW wind conditions respectively for the Baseline Scheme and Design Scheme.

4.2.51 The incoming wind from WSW traverses along Nam Cheong Street from west to east. Under the Design Scheme, with the increased podium footprint in the Non-Building Area and increased building separation above the podium level towards the west of the project site, increased wind is observed at the north and northeast portion of Nam Cheong Street compared to the Baseline Scheme.

4.2.52 The pedestrian wind along the Extension of Pak Wan Street and open areas at the south of the 30m Ventilation Corridor has worsened under the Design Scheme due to more wind being channeled towards Nam Cheong Street from the west through the increased building separation above the podium level, which results in less wind along the Extension of Pak Wan Street and south of the 30m Ventilation Corridor.

5 CONCLUSION

5.1.1 The Air Ventilation Assessment Initial Study was conducted for the Public Housing Redevelopment at Pak Tin Estate Phase 12 by using Computational Fluid Dynamics (CFD) in accordance with the methodology stipulated in the Technical Guide for Air Ventilation Assessment for Developments in Hong Kong (hereafter "the Technical Guide") in Annex A of the Housing, Planning and Lands Bureau and Environment, Transport and Works Bureau Technical Circular No. 1/06.

5.1.2 A series of CFD simulation using Realizable k-ε turbulence model were performed based on this methodology as stipulated in the Technical Guide. Eleven wind directions covering around 78.4% occurrence of annual wind and 81.0% occurrence of summer wind were studied. The ventilation performance for the Baseline Scheme and Design Scheme along the site boundary and within the assessment area were assessed.

5.1.3 According to the Technical Guide, the weighted Velocity Ratio (VR) of testing points were assessed in terms of SVR and LVR. A total of 43 perimeter test points, 60 overall test points and 14 special points were selected to assess the ventilation performance of the two schemes, i.e. the Baseline Scheme and the Design Scheme.

5.1.4 The major findings of this study are summarized as follows:

- The annual SVR for the Baseline Scheme and Design Scheme are 0.20 and 0.21 respectively. The summer SVR for the Baseline Scheme and Design Scheme are 0.25. The results show the Design Scheme could provide similar air ventilation performance along the site boundary compared with the Baseline Scheme.
- The annual LVR for the Baseline Scheme and Design Scheme are 0.19 and 0.20 respectively. The summer LVR for the Baseline Scheme and Design Scheme are 0.22. The results show the Design Scheme could provide similar air ventilation performance along at the surrounding areas compared with the Baseline Scheme.

APPENDIX A – DETAILED VR RESULTS

Design Scheme

Test Point	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	Annual Weighted VR	Summer Weighted VR
P01	0.19	0.47	0.40	0.34	0.08	0.06	0.08	0.05	0.50	0.37	0.21	0.31	0.24
P02	0.19	0.48	0.42	0.36	0.17	0.14	0.16	0.07	0.50	0.36	0.43	0.33	0.30
P03	0.19	0.48	0.42	0.39	0.21	0.21	0.23	0.16	0.49	0.37	0.40	0.36	0.32
P04	0.19	0.46	0.42	0.40	0.23	0.25	0.24	0.21	0.48	0.46	0.33	0.37	0.35
P05	0.19	0.44	0.40	0.39	0.24	0.26	0.23	0.18	0.48	0.55	0.39	0.37	0.37
P06	0.20	0.42	0.39	0.37	0.24	0.25	0.17	0.09	0.48	0.59	0.46	0.37	0.37
P07	0.19	0.43	0.38	0.35	0.24	0.26	0.18	0.06	0.38	0.60	0.51	0.35	0.35
P08	0.17	0.44	0.39	0.33	0.25	0.27	0.20	0.06	0.20	0.59	0.55	0.34	0.33
P09	0.13	0.43	0.38	0.29	0.24	0.28	0.21	0.09	0.08	0.58	0.55	0.31	0.30
P10	0.10	0.42	0.36	0.23	0.21	0.27	0.20	0.10	0.05	0.54	0.53	0.28	0.28
P11	0.08	0.40	0.33	0.19	0.17	0.27	0.17	0.08	0.07	0.45	0.50	0.24	0.25
P12	0.06	0.36	0.27	0.19	0.11	0.27	0.16	0.06	0.13	0.38	0.48	0.22	0.23
P13	0.04	0.19	0.25	0.25	0.14	0.27	0.18	0.19	0.14	0.33	0.47	0.21	0.25
P14	0.07	0.47	0.34	0.21	0.22	0.23	0.06	0.19	0.23	0.37	0.51	0.27	0.26
P15	0.07	0.23	0.18	0.20	0.21	0.27	0.35	0.15	0.15	0.34	0.45	0.21	0.26
P16	0.08	0.16	0.10	0.17	0.17	0.24	0.32	0.15	0.15	0.35	0.44	0.17	0.25
P17	0.05	0.23	0.11	0.13	0.16	0.22	0.32	0.18	0.17	0.34	0.47	0.16	0.25
P18	0.07	0.03	0.14	0.08	0.17	0.18	0.30	0.21	0.19	0.07	0.43	0.12	0.19
P19	0.11	0.20	0.13	0.09	0.16	0.15	0.16	0.20	0.16	0.22	0.09	0.14	0.16
P20	0.11	0.08	0.13	0.04	0.08	0.13	0.14	0.21	0.12	0.20	0.24	0.10	0.15
P21	0.09	0.23	0.10	0.14	0.15	0.10	0.19	0.24	0.07	0.29	0.32	0.15	0.19
P22	0.08	0.21	0.19	0.12	0.24	0.06	0.20	0.15	0.15	0.35	0.45	0.17	0.22
P23	0.04	0.36	0.28	0.19	0.22	0.08	0.18	0.08	0.16	0.31	0.42	0.22	0.21
P24	0.05	0.54	0.27	0.20	0.20	0.04	0.06	0.09	0.21	0.32	0.42	0.24	0.21
P25	0.11	0.46	0.22	0.19	0.13	0.05	0.14	0.07	0.17	0.24	0.33	0.20	0.17
P26	0.14	0.47	0.17	0.22	0.11	0.10	0.17	0.14	0.24	0.39	0.51	0.22	0.25
P27	0.11	0.47	0.06	0.22	0.10	0.03	0.06	0.02	0.25	0.40	0.52	0.19	0.22
P28	0.13	0.34	0.10	0.16	0.08	0.08	0.23	0.13	0.26	0.40	0.52	0.18	0.25
P29	0.11	0.26	0.11	0.04	0.05	0.07	0.22	0.12	0.32	0.48	0.60	0.14	0.26
P30	0.14	0.10	0.15	0.05	0.06	0.02	0.26	0.17	0.34	0.46	0.60	0.14	0.27
P31	0.15	0.18	0.15	0.04	0.08	0.08	0.21	0.18	0.33	0.45	0.60	0.15	0.27
P32	0.12	0.16	0.09	0.04	0.11	0.19	0.32	0.24	0.17	0.38	0.50	0.13	0.25
P33	0.02	0.06	0.04	0.04	0.05	0.19	0.27	0.24	0.17	0.30	0.50	0.09	0.22
P34	0.15	0.31	0.27	0.08	0.18	0.16	0.21	0.18	0.20	0.09	0.39	0.17	0.18
P35	0.14	0.11	0.07	0.16	0.15	0.12	0.18	0.17	0.21	0.15	0.28	0.14	0.18
P36	0.06	0.18	0.06	0.15	0.14	0.11	0.19	0.15	0.19	0.16	0.26	0.13	0.17
P37	0.05	0.25	0.13	0.15	0.15	0.12	0.23	0.17	0.19	0.18	0.30	0.15	0.18
P38	0.13	0.29	0.25	0.27	0.16	0.21	0.07	0.05	0.07	0.45	0.34	0.24	0.22
P39	0.16	0.58	0.46	0.37	0.17	0.28	0.19	0.07	0.35	0.51	0.37	0.37	0.31
P40	0.17	0.55	0.44	0.32	0.06	0.21	0.28	0.12	0.52	0.48	0.29	0.34	0.32
P41	0.17	0.52	0.40	0.30	0.04	0.06	0.25	0.10	0.52	0.55	0.39	0.31	0.32
P42	0.16	0.43	0.34	0.35	0.08	0.13	0.14	0.06	0.52	0.57	0.51	0.32	0.33
P43	0.18	0.42	0.33	0.29	0.19	0.15	0.09	0.06	0.28	0.27	0.39	0.28	0.23
O01	0.03	0.39	0.13	0.04	0.18	0.17	0.08	0.14	0.10	0.34	0.43	0.15	0.19

O02	0.08	0.55	0.24	0.21	0.17	0.03	0.11	0.07	0.17	0.33	0.43	0.23	0.20
O03	0.16	0.39	0.10	0.16	0.09	0.02	0.10	0.03	0.25	0.42	0.55	0.18	0.23
O04	0.17	0.12	0.16	0.05	0.06	0.03	0.26	0.17	0.28	0.45	0.60	0.14	0.26
O05	0.04	0.04	0.02	0.12	0.12	0.20	0.28	0.24	0.20	0.17	0.39	0.11	0.21
O06	0.02	0.24	0.14	0.08	0.14	0.08	0.17	0.14	0.15	0.28	0.34	0.13	0.18
O07	0.24	0.40	0.25	0.14	0.21	0.26	0.20	0.13	0.07	0.04	0.21	0.20	0.14
O08	0.25	0.24	0.17	0.14	0.17	0.16	0.09	0.08	0.04	0.02	0.04	0.15	0.08
O09	0.22	0.49	0.20	0.23	0.05	0.21	0.08	0.01	0.03	0.19	0.06	0.20	0.11
O10	0.04	0.51	0.11	0.08	0.05	0.07	0.17	0.15	0.11	0.12	0.18	0.13	0.11
O11	0.01	0.05	0.08	0.29	0.23	0.20	0.12	0.01	0.03	0.02	0.16	0.15	0.11
O12	0.08	0.19	0.03	0.10	0.05	0.14	0.12	0.07	0.05	0.10	0.06	0.09	0.08
O13	0.04	0.25	0.16	0.06	0.12	0.09	0.09	0.12	0.02	0.06	0.08	0.10	0.07
O14	0.08	0.19	0.12	0.04	0.02	0.05	0.17	0.15	0.10	0.10	0.06	0.08	0.09
O15	0.18	0.24	0.15	0.28	0.14	0.20	0.19	0.03	0.11	0.30	0.28	0.21	0.19
O16	0.04	0.07	0.11	0.16	0.09	0.02	0.05	0.02	0.07	0.11	0.04	0.10	0.07
O17	0.17	0.05	0.04	0.12	0.13	0.06	0.05	0.06	0.45	0.12	0.27	0.13	0.17
O18	0.13	0.17	0.19	0.17	0.29	0.27	0.18	0.09	0.12	0.13	0.24	0.19	0.18
O19	0.11	0.12	0.21	0.29	0.26	0.20	0.15	0.01	0.03	0.14	0.36	0.20	0.16
O20	0.05	0.14	0.21	0.13	0.30	0.24	0.23	0.07	0.05	0.13	0.33	0.17	0.17
O21	0.18	0.22	0.14	0.09	0.09	0.05	0.04	0.04	0.06	0.05	0.41	0.11	0.09
O22	0.24	0.02	0.11	0.07	0.07	0.03	0.02	0.02	0.11	0.08	0.26	0.08	0.08
O23	0.17	0.33	0.31	0.27	0.22	0.22	0.26	0.01	0.07	0.46	0.53	0.26	0.26
O24	0.15	0.37	0.11	0.14	0.10	0.27	0.27	0.17	0.16	0.23	0.42	0.17	0.21
O25	0.29	0.55	0.20	0.28	0.22	0.26	0.33	0.21	0.07	0.25	0.42	0.26	0.24
O26	0.34	0.68	0.08	0.29	0.31	0.34	0.42	0.35	0.20	0.36	0.34	0.30	0.32
O27	0.06	0.32	0.21	0.22	0.20	0.28	0.32	0.18	0.12	0.38	0.48	0.23	0.27
O28	0.12	0.33	0.27	0.26	0.31	0.32	0.09	0.15	0.25	0.35	0.40	0.28	0.27
O29	0.05	0.21	0.27	0.23	0.24	0.25	0.07	0.21	0.24	0.38	0.53	0.24	0.28
O30	0.04	0.27	0.25	0.25	0.15	0.26	0.17	0.20	0.14	0.31	0.47	0.22	0.24
O31	0.08	0.39	0.31	0.17	0.16	0.26	0.15	0.08	0.09	0.38	0.52	0.23	0.23
O32	0.11	0.42	0.36	0.24	0.22	0.27	0.22	0.12	0.08	0.48	0.52	0.27	0.27
O33	0.17	0.46	0.40	0.32	0.24	0.28	0.22	0.07	0.14	0.56	0.53	0.33	0.31
O34	0.20	0.44	0.40	0.36	0.24	0.27	0.17	0.08	0.46	0.54	0.43	0.36	0.35
O35	0.19	0.46	0.42	0.40	0.23	0.26	0.25	0.21	0.49	0.41	0.31	0.37	0.34
O36	0.18	0.48	0.41	0.36	0.15	0.15	0.16	0.07	0.50	0.37	0.41	0.33	0.29
O37	0.16	0.47	0.42	0.32	0.32	0.15	0.24	0.09	0.51	0.38	0.12	0.35	0.29
O38	0.09	0.56	0.48	0.46	0.25	0.20	0.07	0.07	0.59	0.49	0.15	0.41	0.32
O39	0.19	0.51	0.47	0.41	0.38	0.27	0.31	0.10	0.58	0.47	0.41	0.42	0.39
O40	0.16	0.13	0.06	0.13	0.07	0.11	0.30	0.04	0.17	0.22	0.34	0.12	0.18
O41	0.06	0.17	0.26	0.01	0.08	0.18	0.29	0.11	0.33	0.15	0.44	0.13	0.20
O42	0.13	0.56	0.46	0.36	0.19	0.30	0.31	0.10	0.47	0.29	0.16	0.36	0.28
O43	0.07	0.15	0.23	0.05	0.21	0.35	0.34	0.28	0.48	0.63	0.46	0.23	0.38
O44	0.20	0.16	0.26	0.14	0.14	0.23	0.18	0.24	0.59	0.69	0.28	0.26	0.37
O45	0.25	0.18	0.19	0.32	0.23	0.16	0.11	0.03	0.35	0.41	0.28	0.26	0.26
O46	0.17	0.25	0.20	0.04	0.12	0.18	0.10	0.08	0.13	0.08	0.02	0.13	0.09
O47	0.11	0.03	0.06	0.17	0.23	0.14	0.08	0.03	0.13	0.17	0.15	0.14	0.14
O48	0.13	0.32	0.05	0.04	0.12	0.15	0.21	0.07	0.13	0.12	0.12	0.11	0.12
O49	0.02	0.16	0.15	0.03	0.03	0.07	0.03	0.09	0.03	0.01	0.03	0.06	0.04

O50	0.05	0.27	0.16	0.06	0.05	0.05	0.10	0.18	0.04	0.04	0.30	0.09	0.09
O51	0.34	0.68	0.36	0.32	0.29	0.01	0.30	0.11	0.27	0.21	0.11	0.32	0.21
O52	0.18	0.45	0.34	0.28	0.15	0.17	0.15	0.20	0.27	0.03	0.13	0.25	0.16
O53	0.37	0.72	0.28	0.38	0.33	0.06	0.33	0.08	0.27	0.16	0.08	0.34	0.21
O54	0.34	0.59	0.28	0.31	0.31	0.15	0.24	0.16	0.25	0.15	0.05	0.30	0.20
O55	0.35	0.70	0.03	0.15	0.26	0.09	0.38	0.12	0.14	0.12	0.10	0.20	0.16
O56	0.20	0.46	0.24	0.14	0.18	0.09	0.10	0.04	0.13	0.08	0.13	0.19	0.11
O57	0.06	0.11	0.26	0.04	0.09	0.12	0.05	0.08	0.18	0.05	0.18	0.11	0.10
O58	0.14	0.30	0.28	0.26	0.27	0.19	0.18	0.06	0.12	0.02	0.11	0.22	0.14
O59	0.06	0.05	0.02	0.05	0.16	0.03	0.01	0.01	0.05	0.15	0.15	0.07	0.08
O60	0.08	0.11	0.30	0.09	0.18	0.09	0.23	0.04	0.13	0.29	0.35	0.16	0.18
S1	0.21	0.55	0.33	0.28	0.16	0.33	0.11	0.20	0.04	0.16	0.36	0.27	0.19
S2	0.18	0.35	0.27	0.18	0.28	0.34	0.05	0.22	0.05	0.09	0.10	0.22	0.15
S3	0.09	0.47	0.31	0.30	0.30	0.13	0.14	0.24	0.12	0.30	0.27	0.28	0.23
S4	0.13	0.38	0.32	0.39	0.27	0.16	0.25	0.06	0.08	0.25	0.08	0.29	0.19
S5	0.15	0.36	0.30	0.08	0.04	0.11	0.03	0.02	0.19	0.25	0.28	0.17	0.14
S6	0.10	0.56	0.45	0.01	0.08	0.21	0.41	0.16	0.08	0.14	0.63	0.19	0.19
S7	0.03	0.03	0.02	0.11	0.11	0.20	0.28	0.24	0.20	0.20	0.40	0.11	0.21
S8	0.18	0.26	0.05	0.08	0.07	0.10	0.23	0.14	0.27	0.40	0.52	0.14	0.25
S9	0.12	0.50	0.24	0.19	0.14	0.04	0.12	0.08	0.18	0.22	0.33	0.21	0.17
S10	0.06	0.31	0.15	0.20	0.23	0.07	0.19	0.21	0.13	0.37	0.47	0.20	0.24
S11	0.03	0.14	0.13	0.16	0.06	0.13	0.03	0.04	0.05	0.12	0.18	0.11	0.09
S12	0.15	0.46	0.32	0.24	0.06	0.04	0.08	0.03	0.04	0.41	0.49	0.23	0.19
S13	0.20	0.57	0.45	0.31	0.07	0.07	0.08	0.04	0.04	0.67	0.50	0.30	0.25
S14	0.11	0.21	0.10	0.04	0.11	0.17	0.29	0.20	0.11	0.29	0.28	0.12	0.19

Baseline Scheme

Test Point	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	Annual Weighted VR	Summer Weighted VR
P01	0.07	0.45	0.40	0.33	0.20	0.16	0.21	0.04	0.50	0.37	0.04	0.32	0.26
P02	0.07	0.48	0.41	0.35	0.23	0.18	0.23	0.05	0.50	0.38	0.39	0.34	0.31
P03	0.09	0.50	0.42	0.37	0.25	0.21	0.25	0.07	0.49	0.39	0.44	0.35	0.33
P04	0.10	0.50	0.41	0.38	0.25	0.22	0.26	0.08	0.48	0.48	0.42	0.36	0.35
P05	0.08	0.49	0.40	0.37	0.25	0.23	0.25	0.08	0.48	0.56	0.39	0.36	0.36
P06	0.06	0.49	0.38	0.35	0.25	0.24	0.24	0.09	0.48	0.58	0.39	0.36	0.36
P07	0.06	0.50	0.37	0.34	0.25	0.24	0.24	0.08	0.39	0.59	0.39	0.34	0.34
P08	0.08	0.50	0.35	0.33	0.26	0.23	0.25	0.07	0.22	0.59	0.39	0.33	0.32
P09	0.09	0.51	0.32	0.30	0.25	0.23	0.25	0.11	0.14	0.54	0.32	0.30	0.28
P10	0.10	0.52	0.30	0.26	0.22	0.22	0.22	0.16	0.13	0.39	0.31	0.27	0.25
P11	0.12	0.54	0.29	0.23	0.17	0.21	0.18	0.15	0.16	0.32	0.33	0.25	0.22
P12	0.13	0.59	0.30	0.22	0.12	0.20	0.15	0.12	0.18	0.23	0.34	0.25	0.20
P13	0.15	0.59	0.32	0.23	0.11	0.18	0.14	0.16	0.19	0.23	0.36	0.25	0.20
P14	0.14	0.50	0.31	0.20	0.19	0.10	0.07	0.18	0.25	0.32	0.40	0.25	0.23
P15	0.05	0.14	0.18	0.19	0.19	0.26	0.34	0.15	0.17	0.29	0.30	0.19	0.23
P16	0.06	0.13	0.12	0.16	0.18	0.24	0.31	0.15	0.18	0.30	0.29	0.17	0.23
P17	0.06	0.30	0.11	0.14	0.19	0.26	0.29	0.19	0.23	0.33	0.31	0.19	0.25
P18	0.06	0.17	0.07	0.11	0.23	0.25	0.29	0.21	0.26	0.36	0.33	0.17	0.26
P19	0.05	0.23	0.11	0.13	0.21	0.23	0.25	0.16	0.26	0.36	0.34	0.18	0.26
P20	0.05	0.18	0.04	0.09	0.10	0.19	0.21	0.18	0.26	0.35	0.26	0.13	0.22
P21	0.16	0.12	0.06	0.13	0.15	0.13	0.15	0.21	0.21	0.15	0.29	0.13	0.18
P22	0.08	0.21	0.12	0.18	0.23	0.07	0.13	0.16	0.04	0.37	0.45	0.17	0.21
P23	0.06	0.30	0.12	0.12	0.20	0.08	0.14	0.07	0.08	0.39	0.47	0.16	0.21
P24	0.20	0.48	0.12	0.06	0.15	0.05	0.16	0.04	0.11	0.44	0.50	0.17	0.21
P25	0.16	0.38	0.11	0.03	0.07	0.06	0.13	0.16	0.08	0.37	0.42	0.13	0.18
P26	0.14	0.34	0.12	0.17	0.07	0.12	0.05	0.24	0.09	0.48	0.58	0.18	0.24
P27	0.13	0.23	0.08	0.18	0.11	0.13	0.07	0.23	0.05	0.47	0.57	0.16	0.24
P28	0.12	0.15	0.06	0.16	0.11	0.09	0.05	0.22	0.03	0.50	0.60	0.14	0.24
P29	0.12	0.22	0.09	0.15	0.08	0.02	0.14	0.23	0.03	0.52	0.63	0.15	0.25
P30	0.13	0.21	0.12	0.16	0.07	0.02	0.11	0.24	0.20	0.53	0.64	0.17	0.27
P31	0.11	0.24	0.11	0.17	0.07	0.03	0.11	0.23	0.26	0.55	0.63	0.18	0.29
P32	0.10	0.26	0.10	0.16	0.06	0.07	0.14	0.24	0.12	0.54	0.59	0.16	0.26
P33	0.09	0.24	0.09	0.09	0.05	0.07	0.13	0.23	0.10	0.44	0.49	0.13	0.22
P34	0.02	0.22	0.09	0.06	0.10	0.04	0.08	0.19	0.14	0.29	0.35	0.11	0.17
P35	0.10	0.16	0.05	0.10	0.13	0.05	0.18	0.19	0.16	0.18	0.25	0.11	0.16
P36	0.06	0.12	0.04	0.13	0.13	0.04	0.19	0.15	0.12	0.10	0.26	0.10	0.14
P37	0.07	0.12	0.04	0.12	0.13	0.05	0.18	0.16	0.05	0.09	0.33	0.09	0.13
P38	0.07	0.45	0.34	0.22	0.18	0.11	0.17	0.04	0.23	0.47	0.39	0.26	0.25
P39	0.11	0.48	0.35	0.30	0.26	0.15	0.22	0.08	0.39	0.49	0.35	0.32	0.31
P40	0.10	0.48	0.37	0.30	0.21	0.14	0.22	0.08	0.52	0.48	0.27	0.32	0.31
P41	0.10	0.44	0.35	0.28	0.18	0.11	0.13	0.03	0.53	0.54	0.37	0.31	0.31
P42	0.12	0.35	0.31	0.33	0.26	0.14	0.08	0.03	0.54	0.56	0.48	0.33	0.34
P43	0.05	0.41	0.33	0.27	0.20	0.10	0.06	0.07	0.31	0.34	0.40	0.26	0.24
O01	0.14	0.35	0.02	0.16	0.17	0.19	0.18	0.17	0.21	0.26	0.43	0.17	0.22

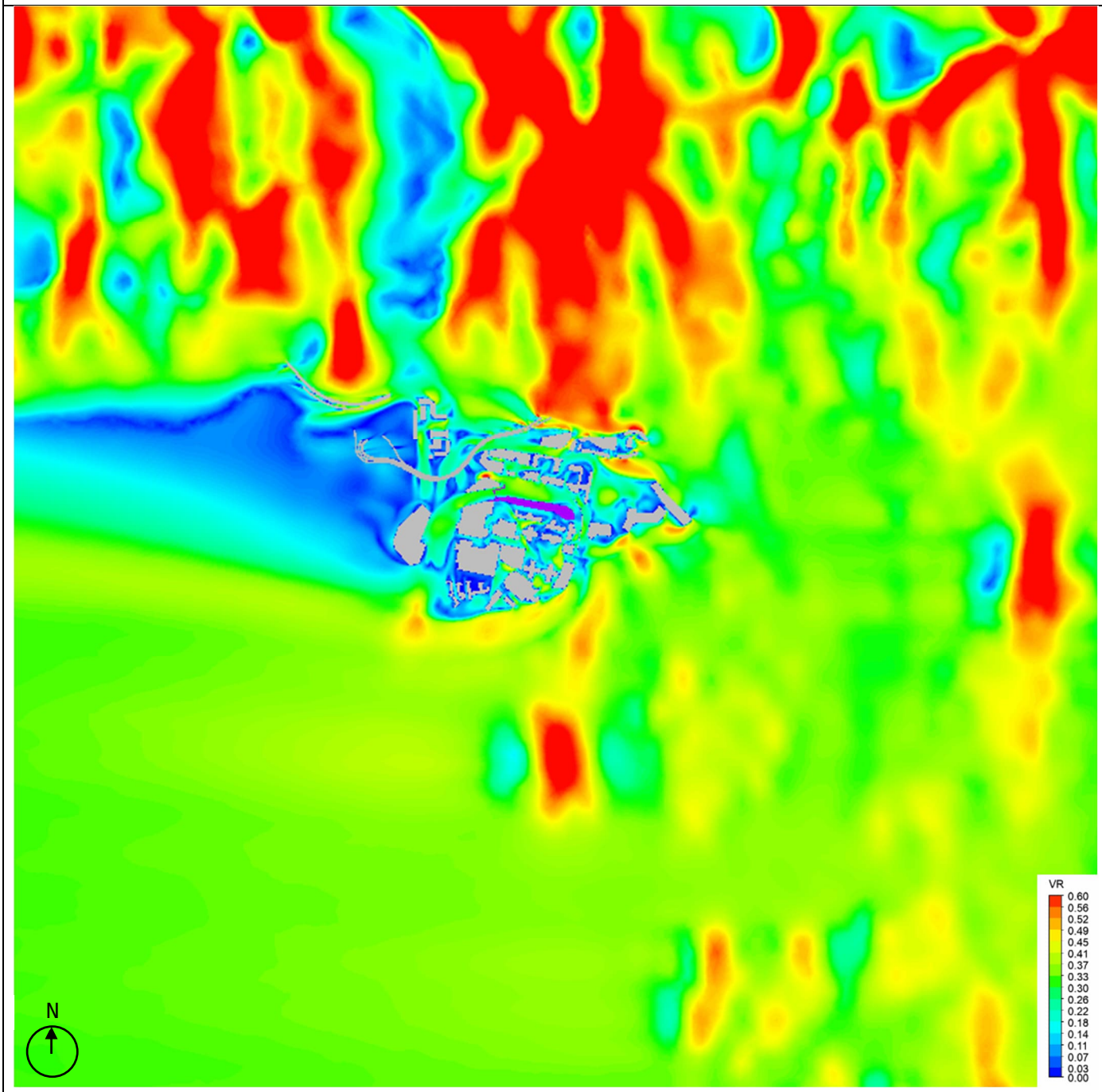
O02	0.15	0.41	0.09	0.07	0.07	0.04	0.14	0.13	0.12	0.44	0.52	0.15	0.21
O03	0.10	0.05	0.06	0.17	0.10	0.12	0.08	0.21	0.05	0.48	0.59	0.14	0.24
O04	0.11	0.28	0.12	0.17	0.06	0.03	0.11	0.24	0.05	0.53	0.64	0.16	0.25
O05	0.08	0.22	0.10	0.06	0.11	0.06	0.13	0.23	0.11	0.39	0.47	0.12	0.21
O06	0.05	0.17	0.08	0.08	0.14	0.08	0.20	0.17	0.07	0.40	0.32	0.12	0.20
O07	0.21	0.34	0.17	0.18	0.22	0.24	0.21	0.12	0.04	0.19	0.25	0.20	0.17
O08	0.21	0.33	0.26	0.12	0.16	0.11	0.10	0.08	0.05	0.09	0.04	0.17	0.09
O09	0.23	0.42	0.21	0.22	0.08	0.20	0.11	0.07	0.09	0.15	0.11	0.20	0.13
O10	0.11	0.39	0.07	0.04	0.13	0.02	0.22	0.05	0.07	0.09	0.17	0.10	0.10
O11	0.08	0.19	0.14	0.17	0.22	0.18	0.11	0.04	0.11	0.05	0.20	0.15	0.13
O12	0.06	0.11	0.05	0.02	0.03	0.12	0.03	0.06	0.03	0.04	0.02	0.05	0.04
O13	0.02	0.16	0.07	0.06	0.12	0.07	0.12	0.05	0.07	0.02	0.05	0.08	0.07
O14	0.03	0.21	0.16	0.08	0.04	0.11	0.15	0.25	0.09	0.11	0.12	0.10	0.12
O15	0.09	0.22	0.12	0.31	0.15	0.18	0.05	0.02	0.20	0.35	0.39	0.21	0.22
O16	0.08	0.11	0.08	0.11	0.09	0.04	0.05	0.02	0.04	0.16	0.01	0.09	0.07
O17	0.03	0.05	0.05	0.11	0.07	0.05	0.16	0.07	0.39	0.32	0.27	0.12	0.21
O18	0.08	0.11	0.13	0.11	0.28	0.26	0.13	0.07	0.08	0.18	0.36	0.15	0.18
O19	0.06	0.21	0.03	0.25	0.23	0.14	0.07	0.05	0.05	0.20	0.36	0.17	0.17
O20	0.09	0.15	0.06	0.12	0.30	0.18	0.15	0.10	0.08	0.16	0.42	0.14	0.18
O21	0.11	0.07	0.05	0.08	0.07	0.06	0.02	0.06	0.05	0.02	0.33	0.07	0.08
O22	0.19	0.15	0.06	0.05	0.13	0.11	0.04	0.01	0.21	0.20	0.37	0.11	0.15
O23	0.10	0.26	0.19	0.23	0.19	0.18	0.21	0.03	0.18	0.34	0.44	0.21	0.23
O24	0.15	0.39	0.10	0.13	0.08	0.23	0.27	0.17	0.20	0.34	0.32	0.18	0.23
O25	0.25	0.53	0.20	0.27	0.19	0.27	0.34	0.22	0.02	0.34	0.33	0.26	0.24
O26	0.32	0.65	0.16	0.33	0.31	0.34	0.44	0.34	0.21	0.40	0.34	0.33	0.34
O27	0.02	0.33	0.25	0.25	0.23	0.04	0.37	0.28	0.09	0.49	0.43	0.23	0.28
O28	0.18	0.41	0.29	0.30	0.31	0.05	0.30	0.11	0.24	0.36	0.42	0.28	0.27
O29	0.09	0.23	0.28	0.22	0.26	0.07	0.14	0.21	0.23	0.34	0.41	0.23	0.25
O30	0.15	0.59	0.32	0.23	0.12	0.17	0.11	0.17	0.18	0.22	0.35	0.25	0.19
O31	0.11	0.53	0.27	0.19	0.16	0.19	0.17	0.12	0.16	0.27	0.35	0.23	0.20
O32	0.09	0.48	0.29	0.26	0.23	0.21	0.25	0.12	0.13	0.30	0.30	0.26	0.23
O33	0.08	0.50	0.35	0.33	0.25	0.22	0.27	0.06	0.16	0.54	0.35	0.32	0.29
O34	0.06	0.49	0.38	0.35	0.25	0.24	0.26	0.09	0.46	0.53	0.38	0.35	0.35
O35	0.10	0.50	0.41	0.38	0.25	0.23	0.27	0.08	0.49	0.43	0.41	0.36	0.34
O36	0.07	0.47	0.41	0.35	0.23	0.19	0.24	0.05	0.51	0.37	0.34	0.34	0.30
O37	0.09	0.46	0.42	0.33	0.24	0.19	0.20	0.07	0.51	0.38	0.14	0.34	0.28
O38	0.14	0.51	0.47	0.44	0.25	0.20	0.22	0.07	0.61	0.49	0.06	0.40	0.33
O39	0.21	0.38	0.42	0.43	0.40	0.42	0.38	0.10	0.59	0.46	0.43	0.42	0.42
O40	0.15	0.08	0.05	0.12	0.11	0.14	0.34	0.03	0.17	0.23	0.33	0.12	0.18
O41	0.03	0.23	0.27	0.02	0.08	0.15	0.33	0.04	0.42	0.12	0.44	0.14	0.20
O42	0.07	0.46	0.37	0.31	0.28	0.21	0.25	0.08	0.45	0.32	0.17	0.32	0.28
O43	0.09	0.22	0.25	0.09	0.27	0.27	0.28	0.24	0.50	0.64	0.41	0.25	0.38
O44	0.21	0.18	0.29	0.17	0.12	0.19	0.29	0.19	0.61	0.70	0.22	0.27	0.36
O45	0.26	0.23	0.18	0.29	0.16	0.30	0.14	0.08	0.30	0.43	0.10	0.26	0.25
O46	0.10	0.24	0.17	0.09	0.07	0.16	0.15	0.17	0.19	0.13	0.05	0.13	0.13
O47	0.06	0.04	0.04	0.05	0.22	0.12	0.10	0.09	0.14	0.15	0.10	0.10	0.13
O48	0.08	0.39	0.07	0.05	0.15	0.16	0.16	0.09	0.14	0.04	0.19	0.12	0.11
O49	0.05	0.13	0.18	0.03	0.04	0.08	0.06	0.06	0.03	0.13	0.04	0.08	0.06

O50	0.06	0.21	0.19	0.03	0.06	0.03	0.04	0.16	0.06	0.23	0.16	0.10	0.11
O51	0.33	0.69	0.36	0.32	0.29	0.16	0.21	0.11	0.29	0.11	0.03	0.33	0.19
O52	0.12	0.47	0.32	0.29	0.13	0.23	0.21	0.13	0.22	0.14	0.04	0.25	0.17
O53	0.38	0.73	0.29	0.38	0.34	0.06	0.25	0.05	0.33	0.06	0.06	0.34	0.19
O54	0.35	0.60	0.24	0.33	0.31	0.20	0.30	0.11	0.23	0.08	0.03	0.30	0.19
O55	0.35	0.70	0.03	0.18	0.28	0.17	0.38	0.15	0.14	0.06	0.10	0.22	0.17
O56	0.18	0.48	0.24	0.15	0.20	0.15	0.11	0.13	0.20	0.10	0.06	0.21	0.14
O57	0.07	0.07	0.26	0.06	0.10	0.16	0.09	0.11	0.21	0.19	0.20	0.13	0.15
O58	0.15	0.26	0.28	0.29	0.26	0.17	0.13	0.08	0.14	0.19	0.13	0.24	0.17
O59	0.06	0.03	0.01	0.03	0.17	0.05	0.02	0.01	0.01	0.18	0.15	0.06	0.08
O60	0.05	0.16	0.26	0.09	0.15	0.07	0.21	0.08	0.13	0.19	0.22	0.14	0.15
S1	0.10	0.35	0.24	0.23	0.19	0.25	0.21	0.15	0.25	0.36	0.34	0.24	0.26
S2	0.07	0.39	0.27	0.28	0.22	0.29	0.07	0.10	0.05	0.18	0.09	0.24	0.15
S3	0.06	0.41	0.10	0.13	0.20	0.15	0.04	0.06	0.25	0.39	0.35	0.19	0.22
S4	0.06	0.34	0.28	0.32	0.23	0.13	0.15	0.12	0.33	0.52	0.41	0.29	0.30
S5	0.09	0.07	0.05	0.11	0.05	0.07	0.05	0.01	0.20	0.37	0.50	0.11	0.19
S6	0.06	0.42	0.30	0.12	0.04	0.11	0.22	0.07	0.06	0.18	0.44	0.16	0.15
S7	0.08	0.21	0.10	0.09	0.08	0.06	0.15	0.21	0.11	0.40	0.47	0.13	0.21
S8	0.11	0.11	0.07	0.15	0.10	0.07	0.09	0.22	0.03	0.51	0.61	0.14	0.24
S9	0.16	0.41	0.12	0.02	0.06	0.07	0.13	0.16	0.08	0.37	0.44	0.13	0.18
S10	0.15	0.16	0.13	0.17	0.22	0.08	0.14	0.20	0.09	0.37	0.46	0.17	0.23
S11	0.06	0.19	0.14	0.10	0.08	0.13	0.11	0.01	0.10	0.24	0.16	0.12	0.12
S12	0.09	0.33	0.29	0.24	0.16	0.01	0.10	0.01	0.24	0.45	0.37	0.24	0.22
S13	0.10	0.48	0.36	0.26	0.21	0.02	0.08	0.04	0.30	0.68	0.50	0.30	0.31
S14	0.07	0.07	0.14	0.15	0.06	0.11	0.18	0.01	0.24	0.41	0.27	0.15	0.20

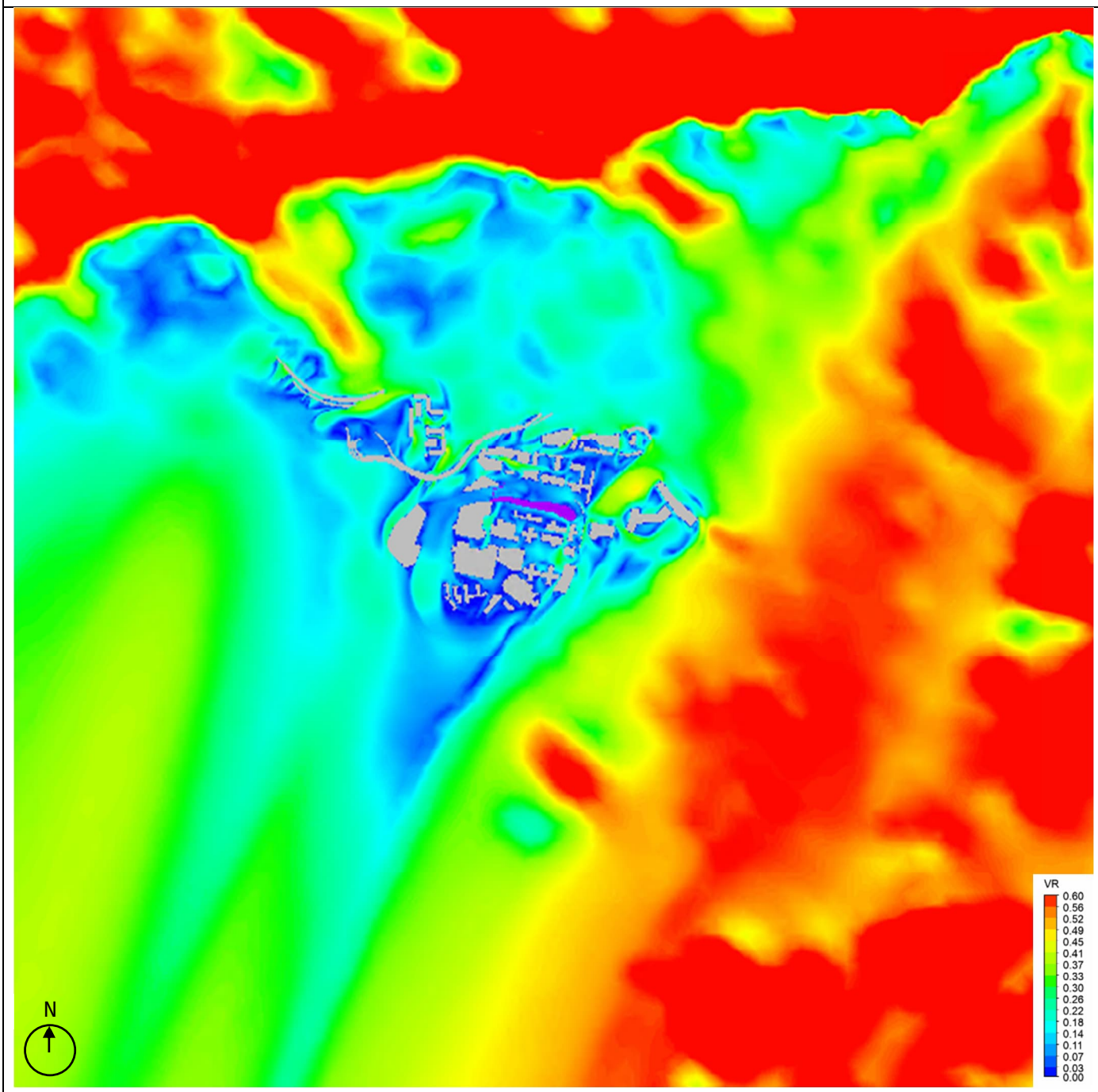
APPENDIX B1 – WIND VELOCITY RATIO CONTOUR – WHOLE COMPUTATIONAL DOMAIN UNDER PREVAILING WIND DIRECTIONS (VR 0 – 0.6)

Baseline Scheme

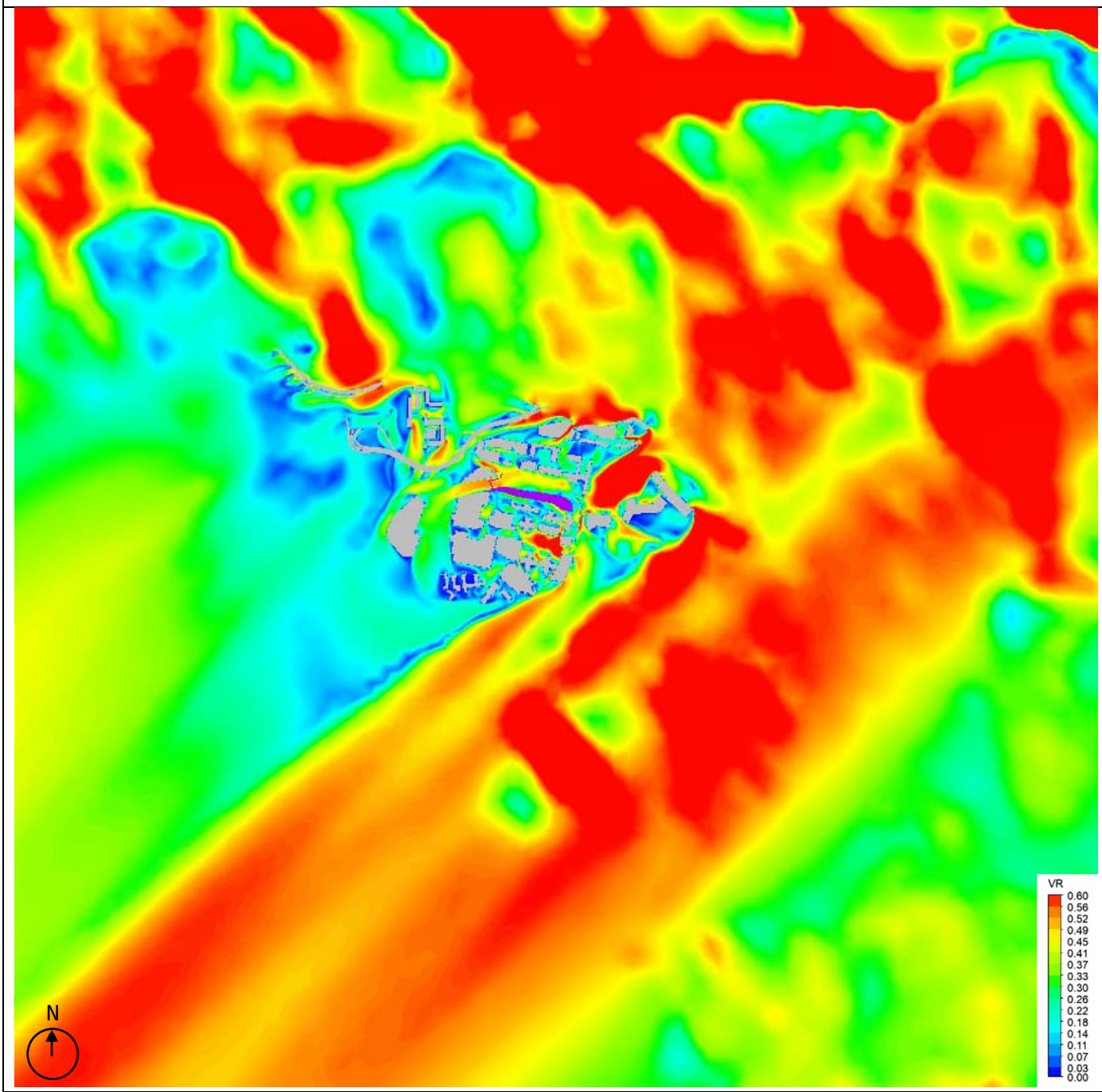
VR Contour Plot at Pedestrian Level under E Wind



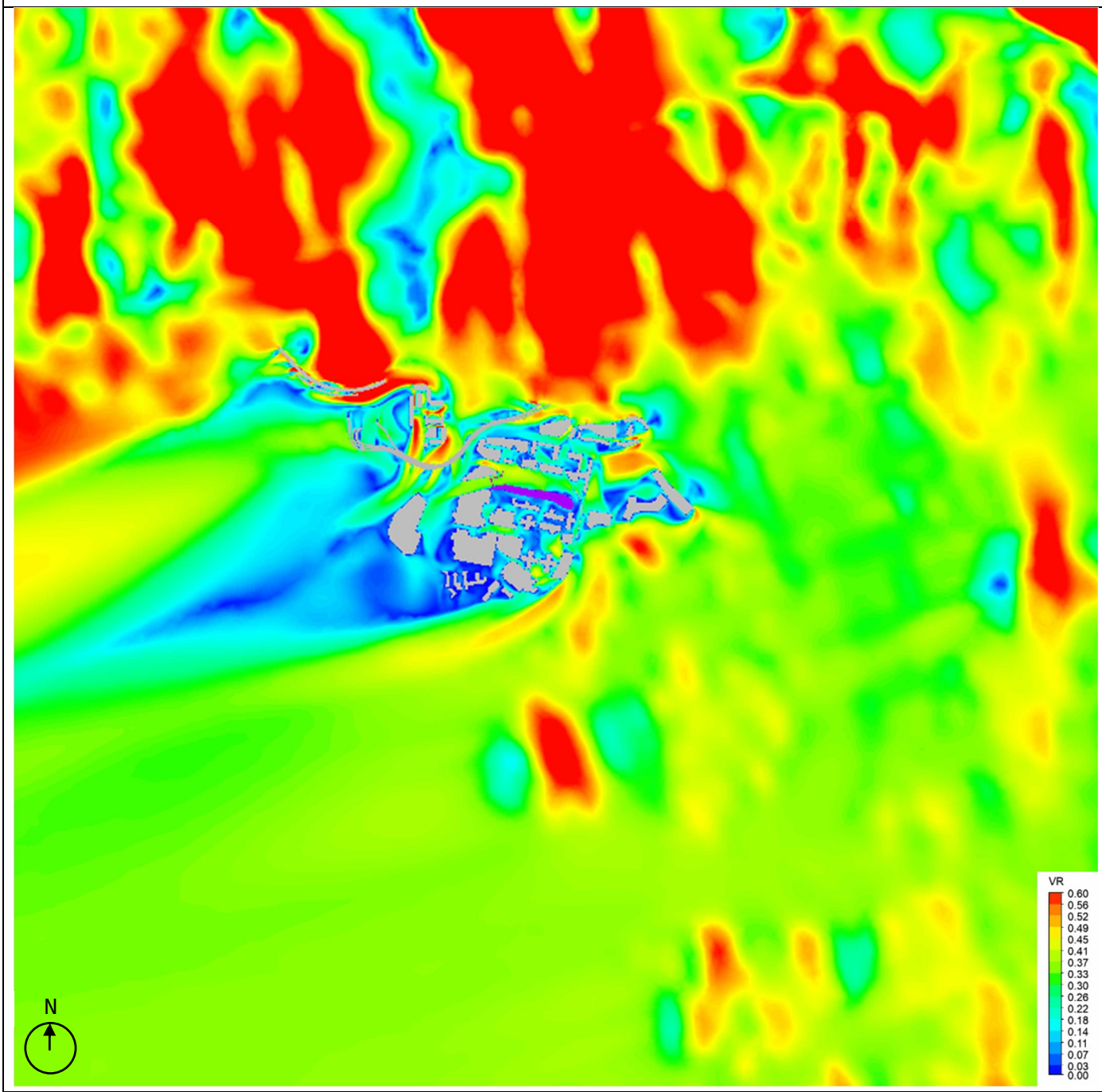
VR Contour Plot at Pedestrian Level under NNE Wind



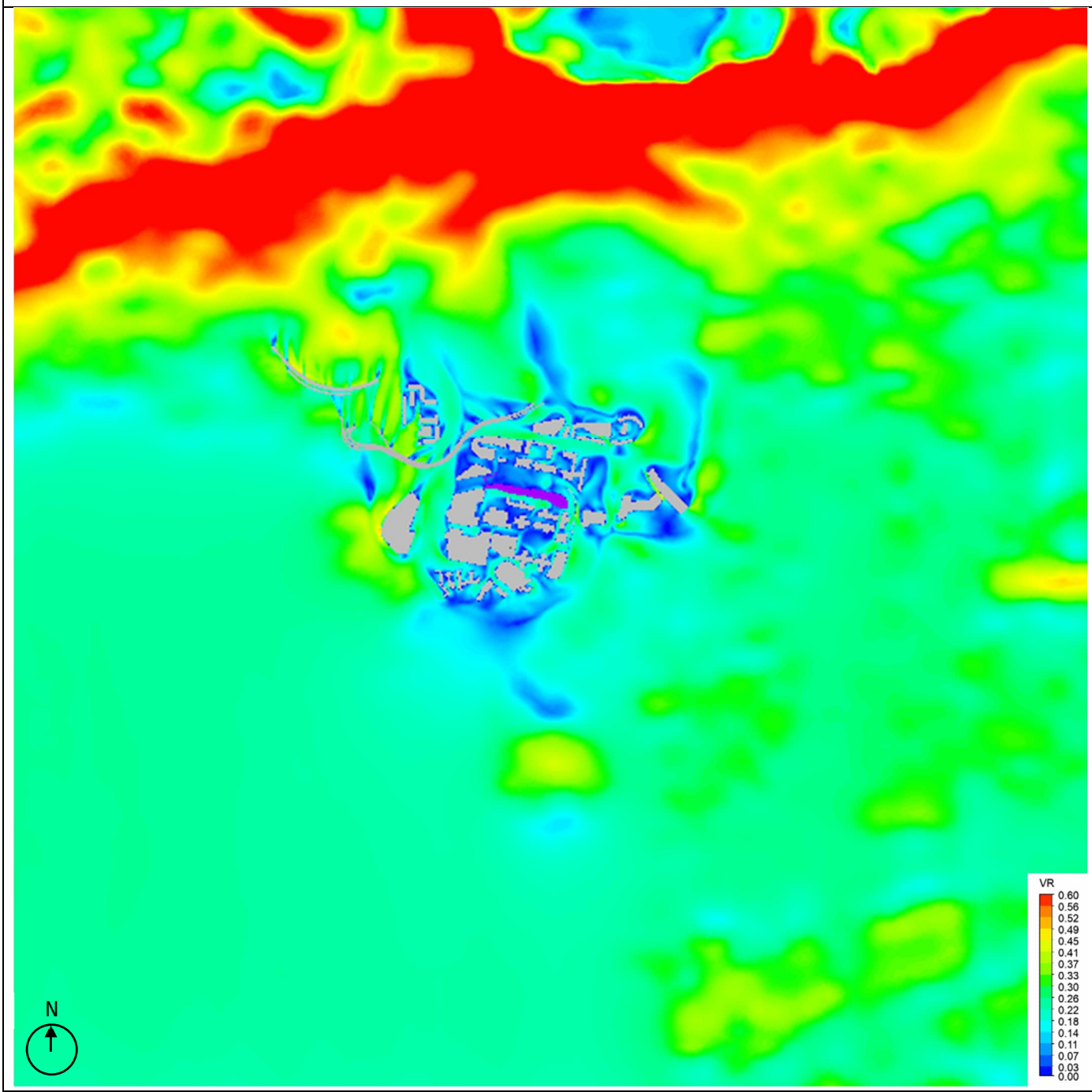
VR Contour Plot at Pedestrian Level under NE Wind



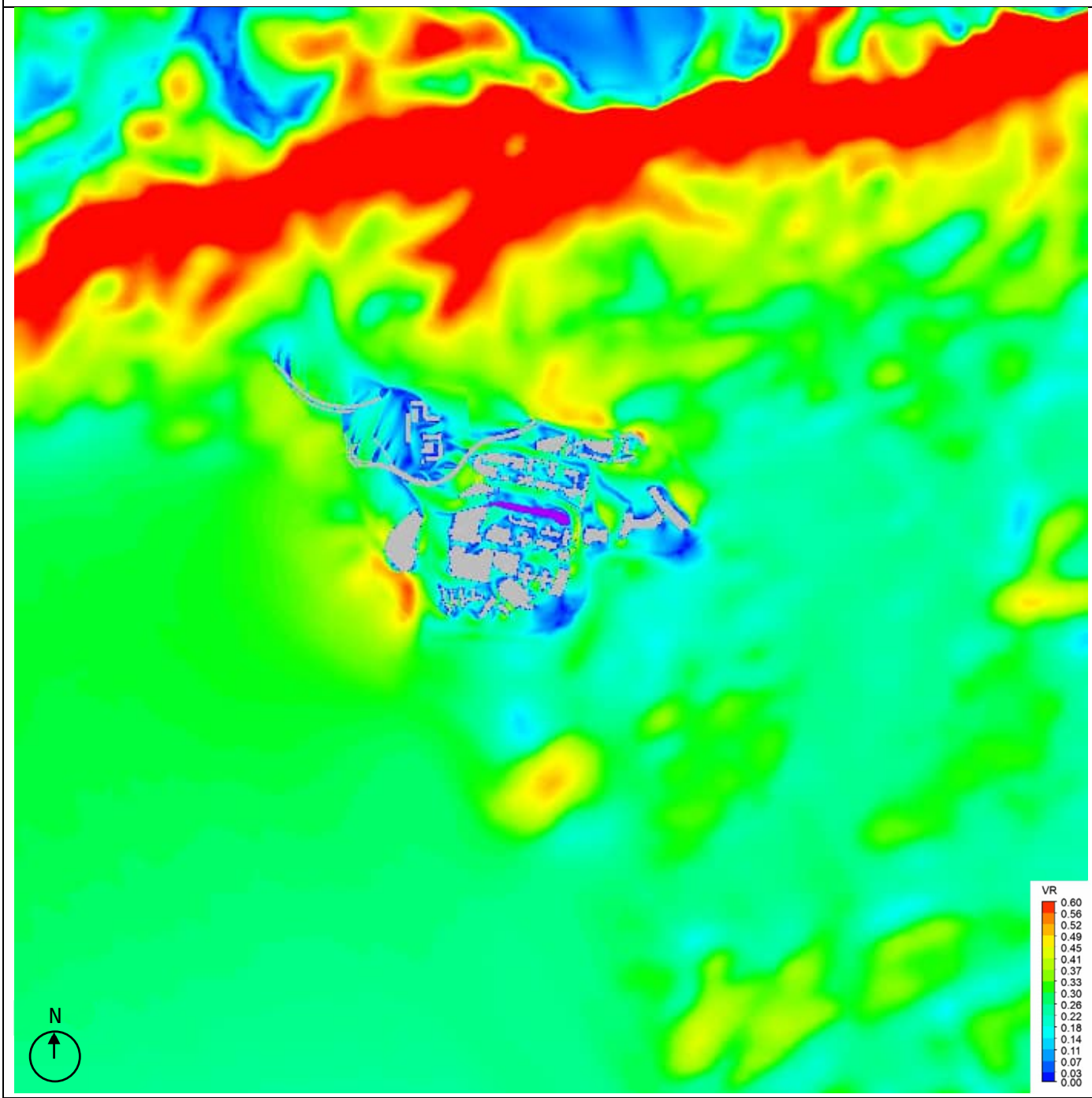
VR Contour Plot at Pedestrian Level under ENE Wind



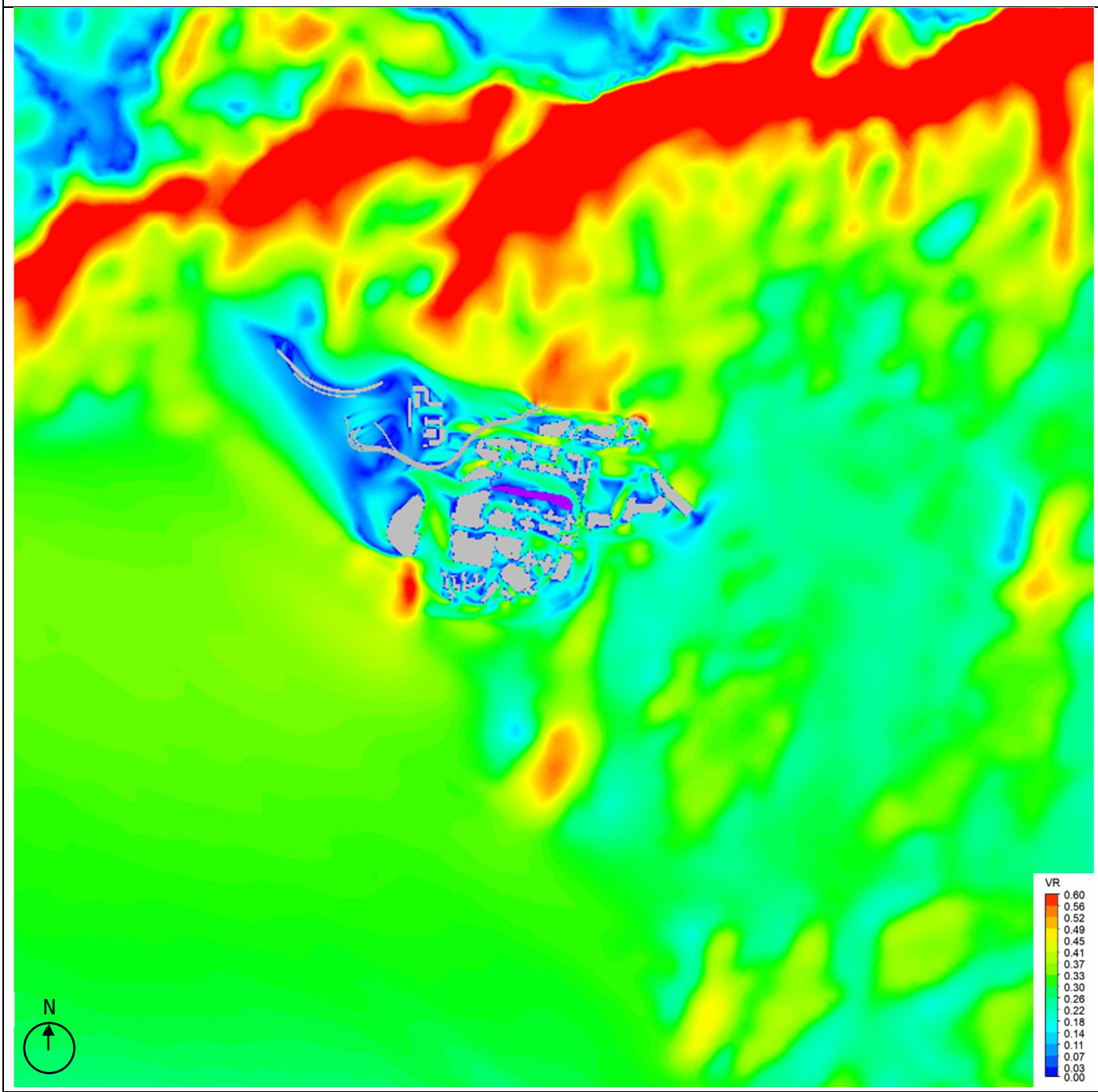
VR Contour Plot at Pedestrian Level under S Wind



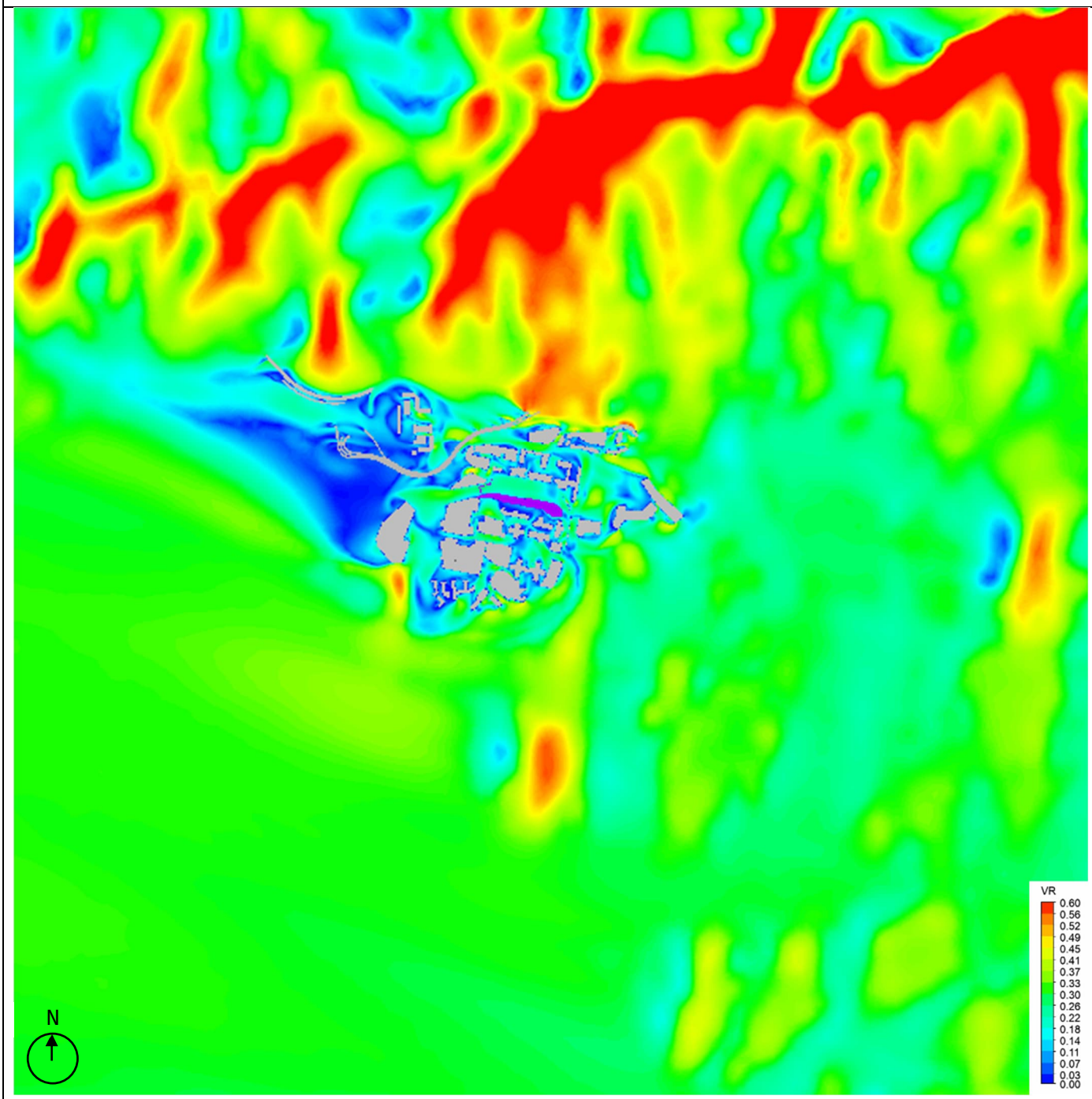
VR Contour Plot at Pedestrian Level under SSE Wind



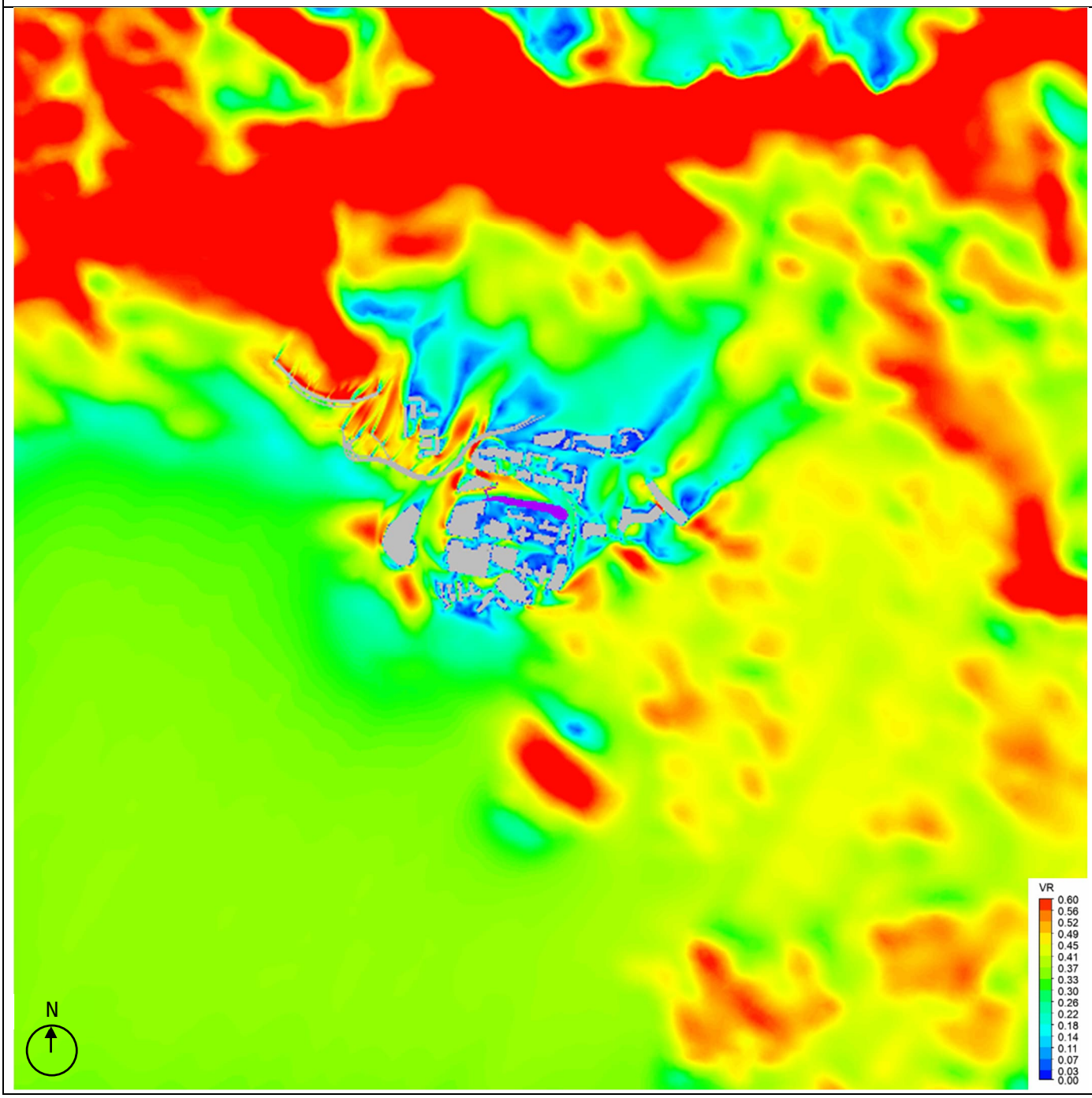
VR Contour Plot at Pedestrian Level under SE Wind



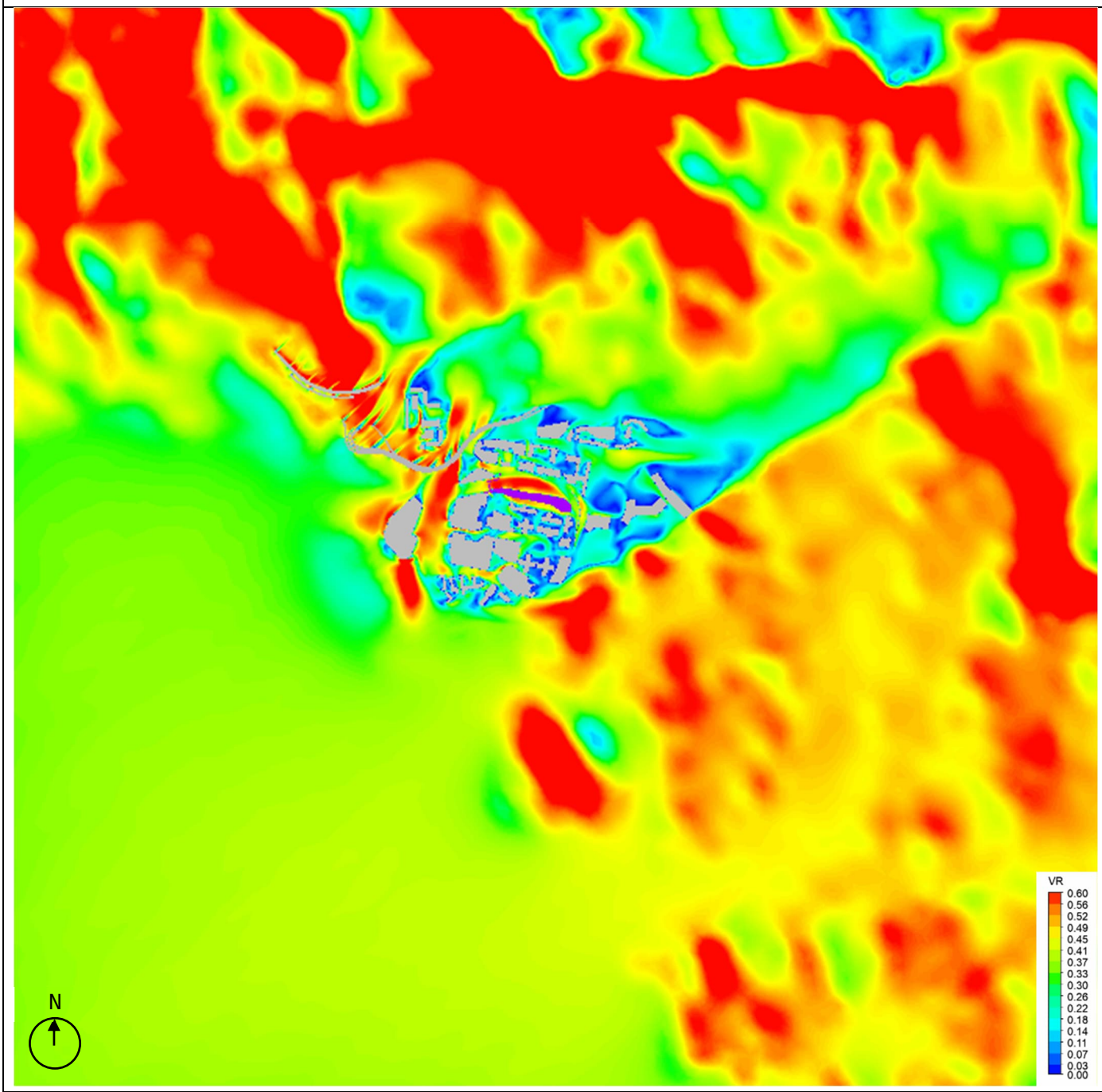
VR Contour Plot at Pedestrian Level under ESE Wind



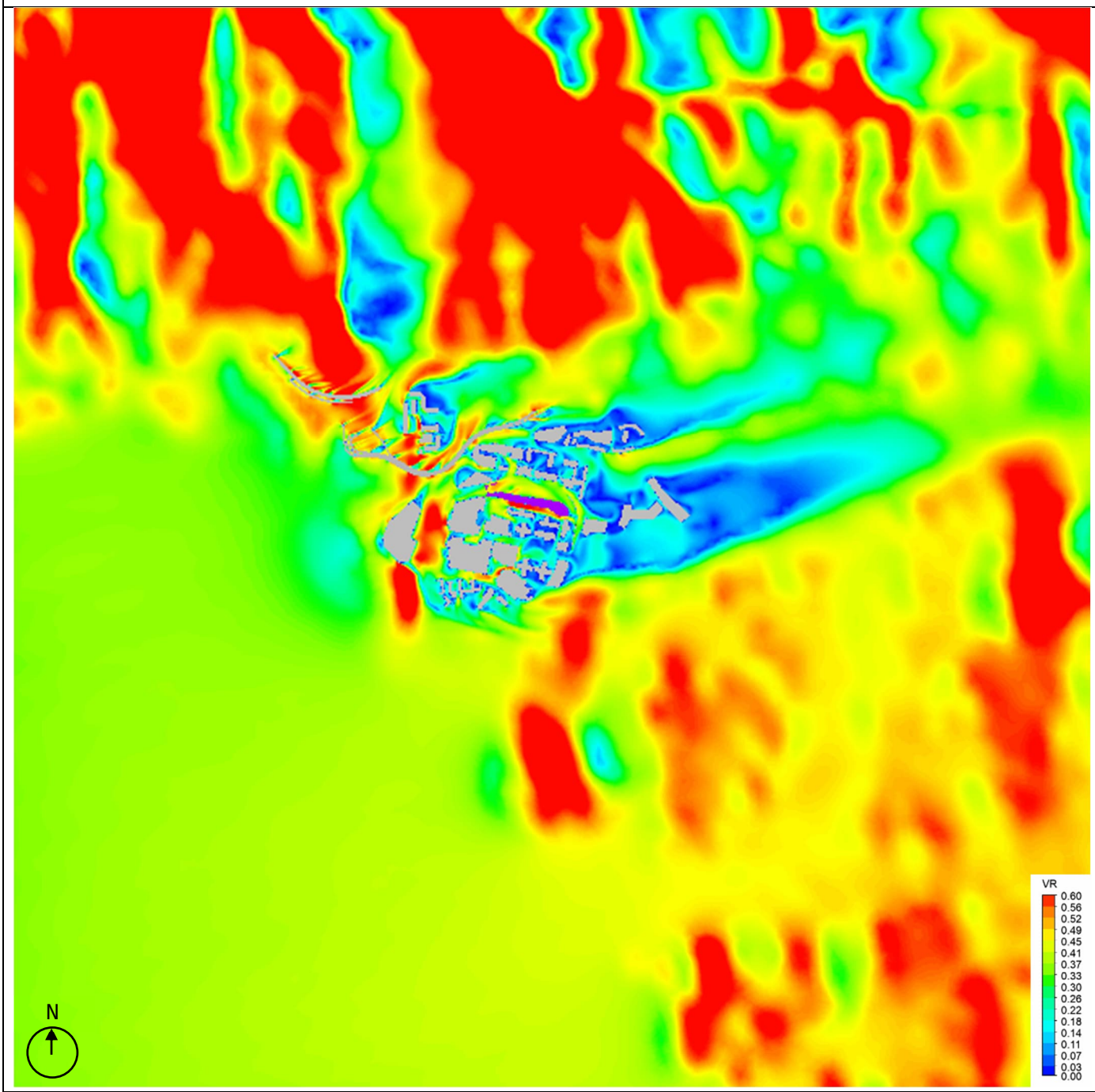
VR Contour Plot at Pedestrian Level under SSW Wind



VR Contour Plot at Pedestrian Level under SW Wind

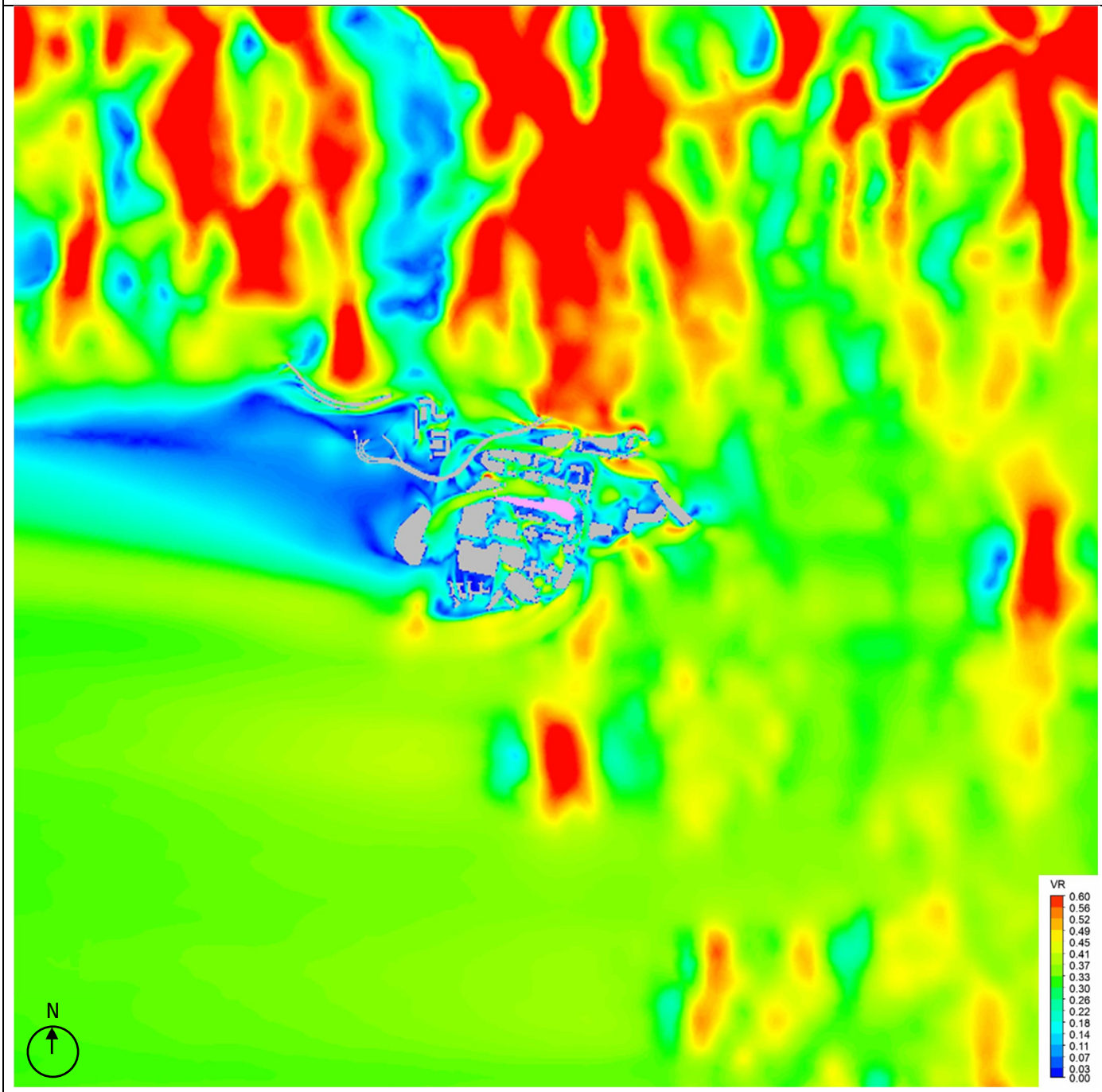


VR Contour Plot at Pedestrian Level under WSW Wind

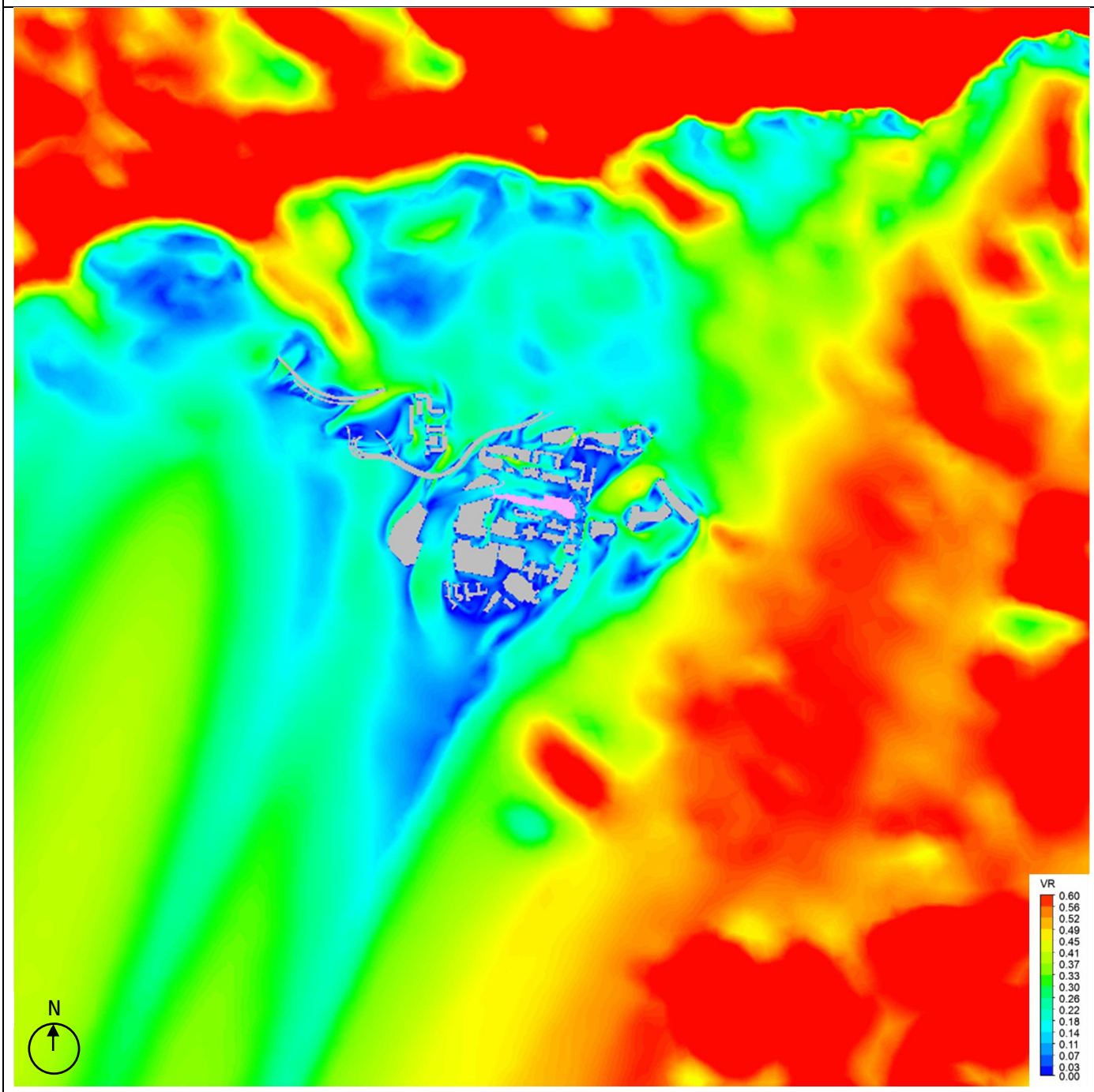


Proposed Scheme

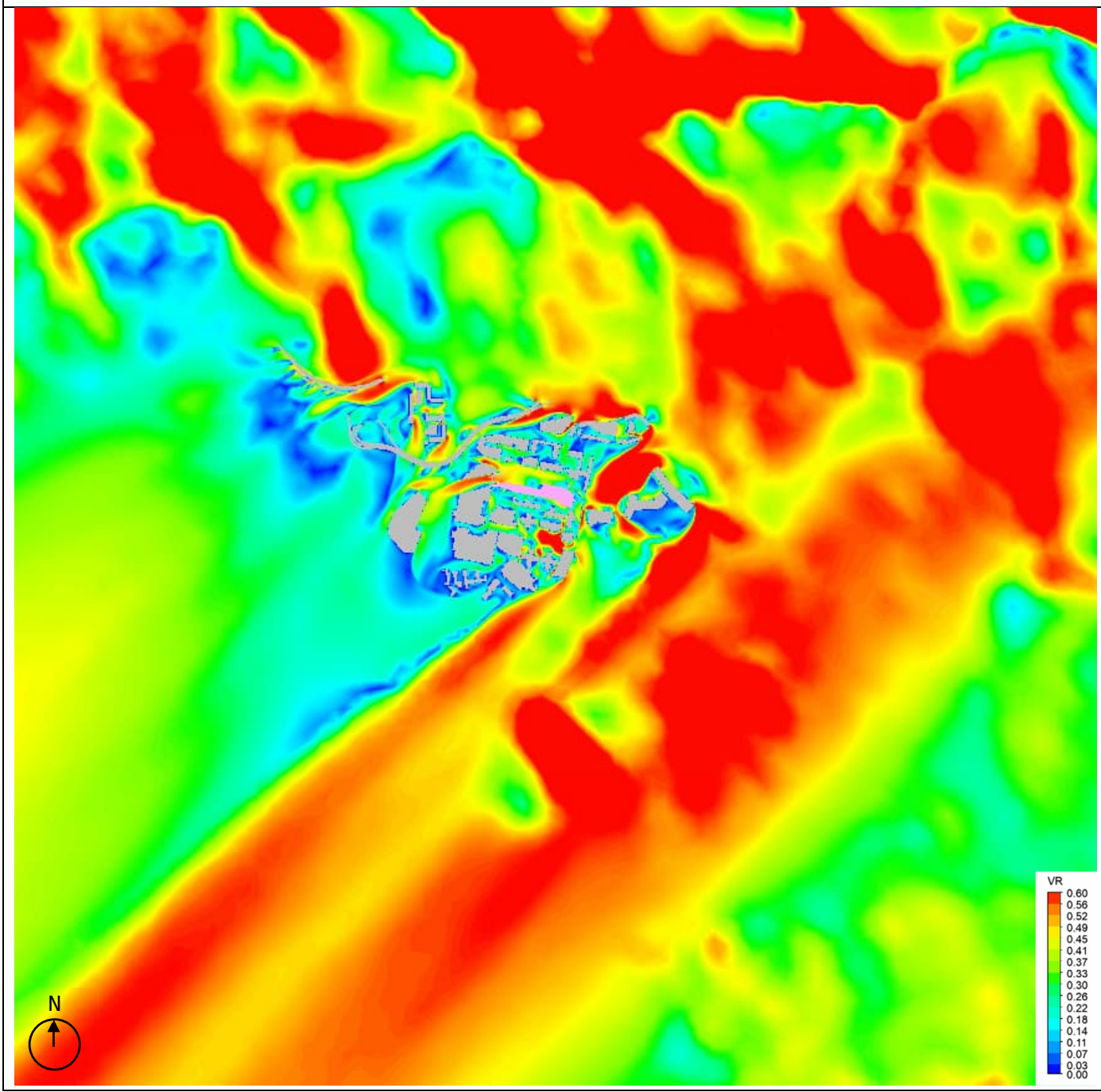
VR Contour Plot at Pedestrian Level under E Wind



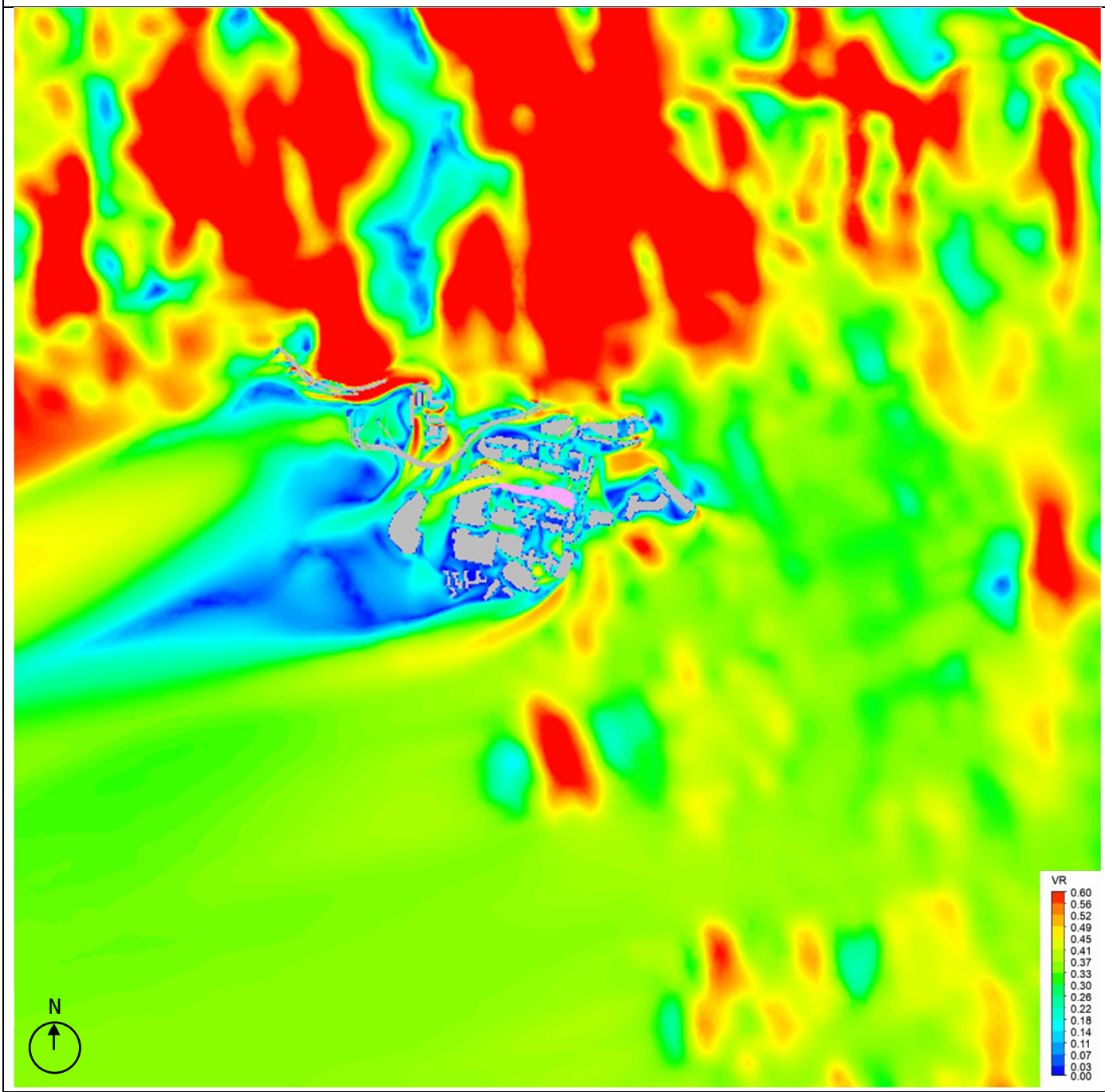
VR Contour Plot at Pedestrian Level under NNE Wind



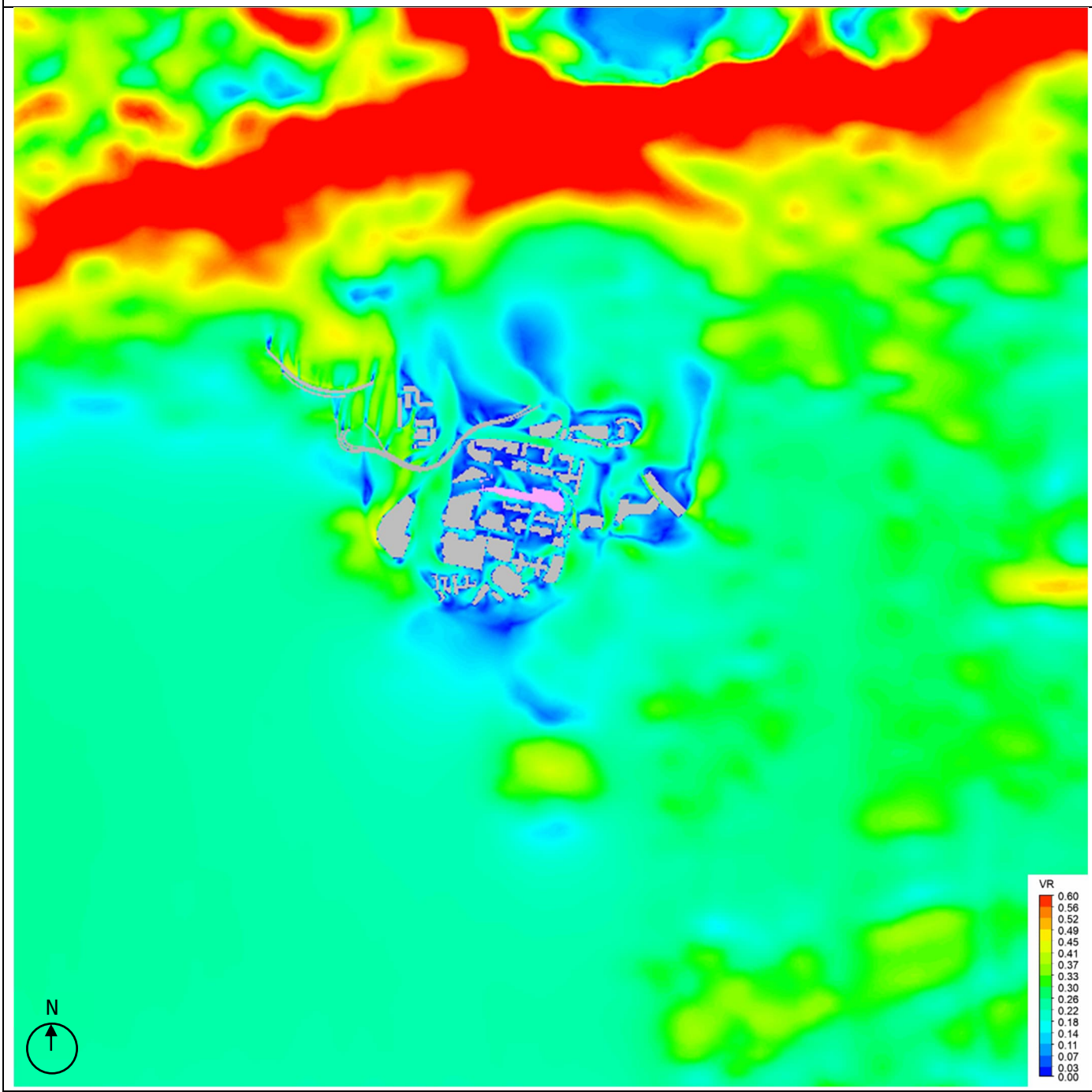
VR Contour Plot at Pedestrian Level under NE Wind



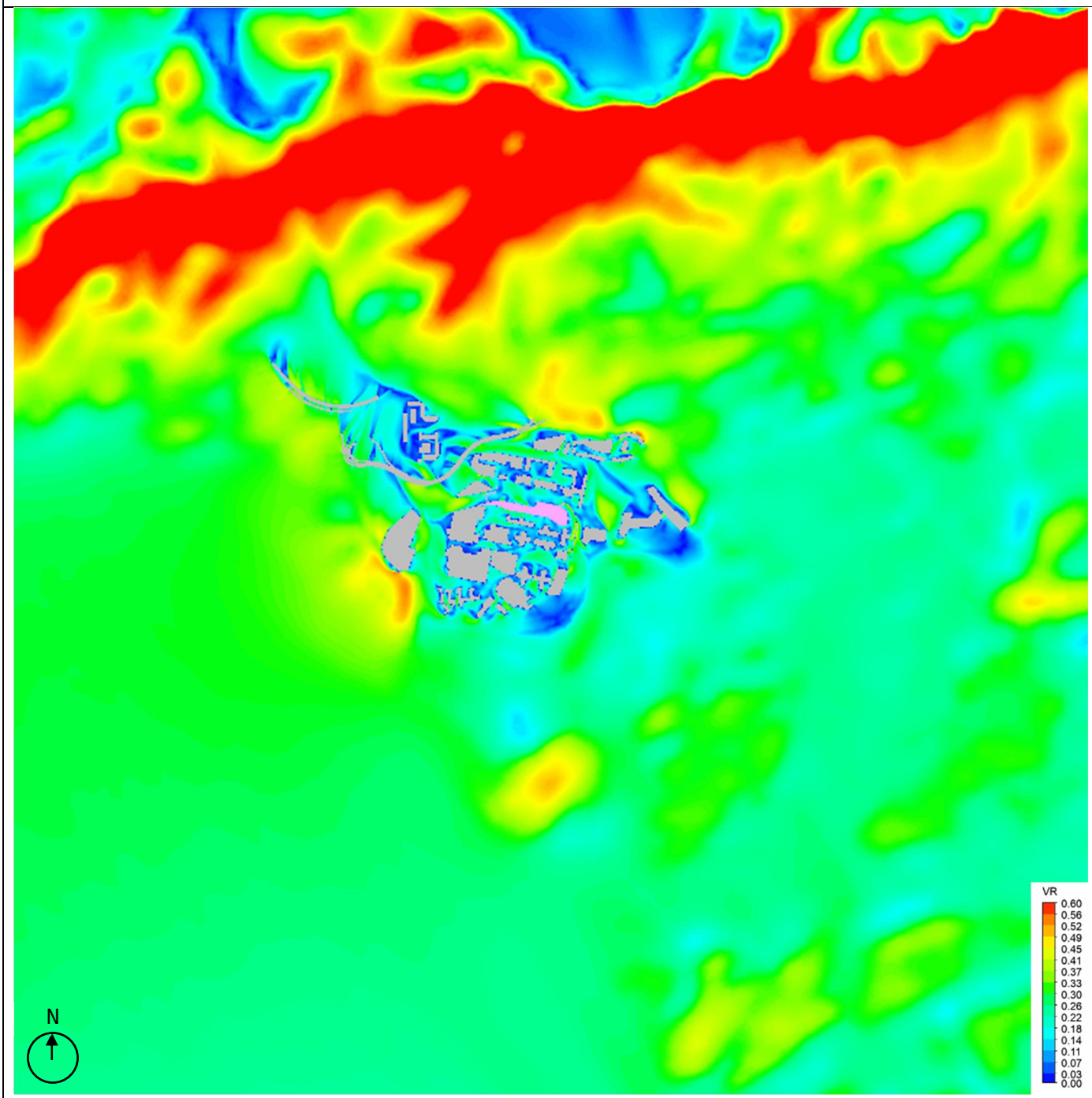
VR Contour Plot at Pedestrian Level under ENE Wind



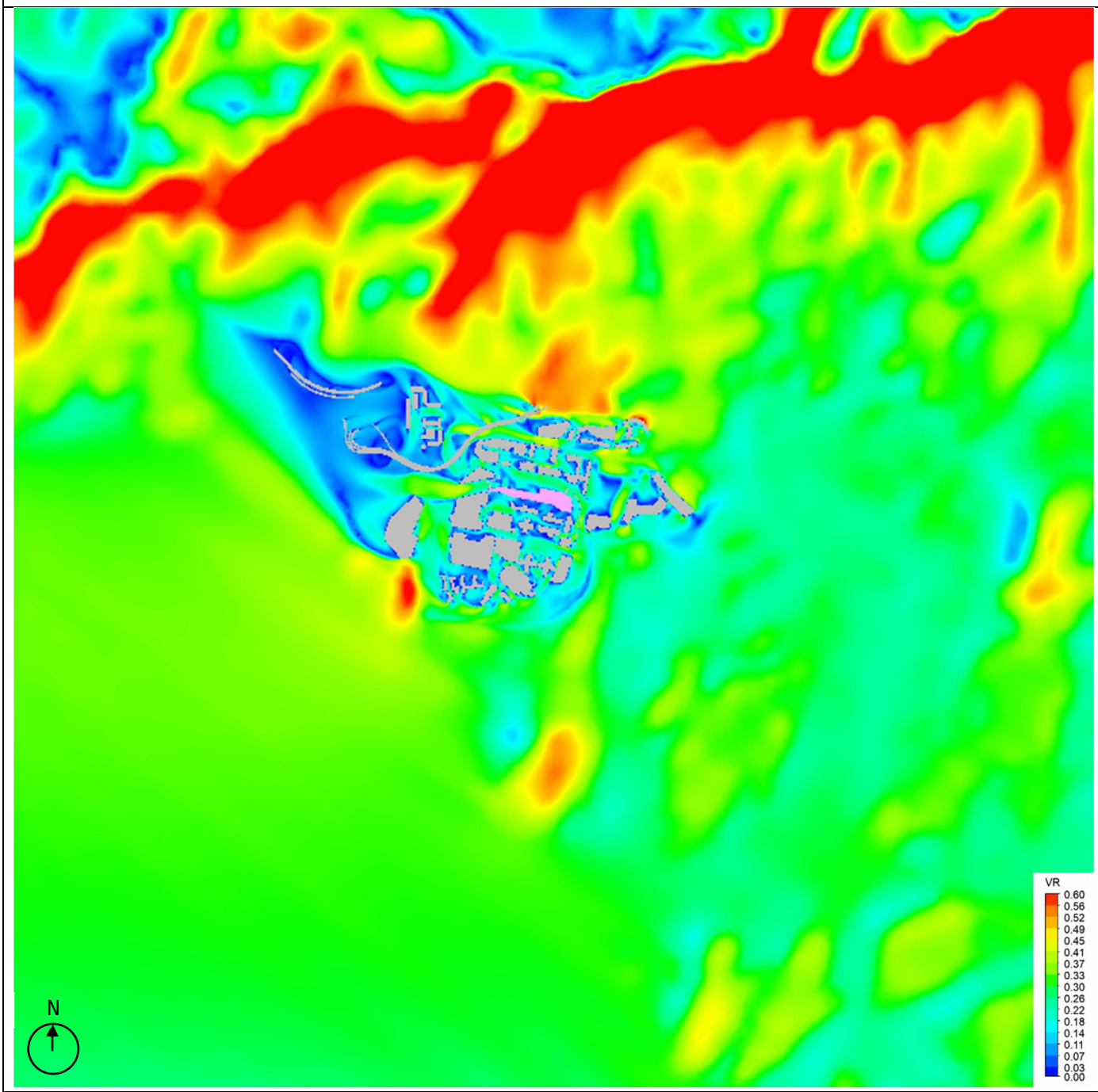
VR Contour Plot at Pedestrian Level under S Wind



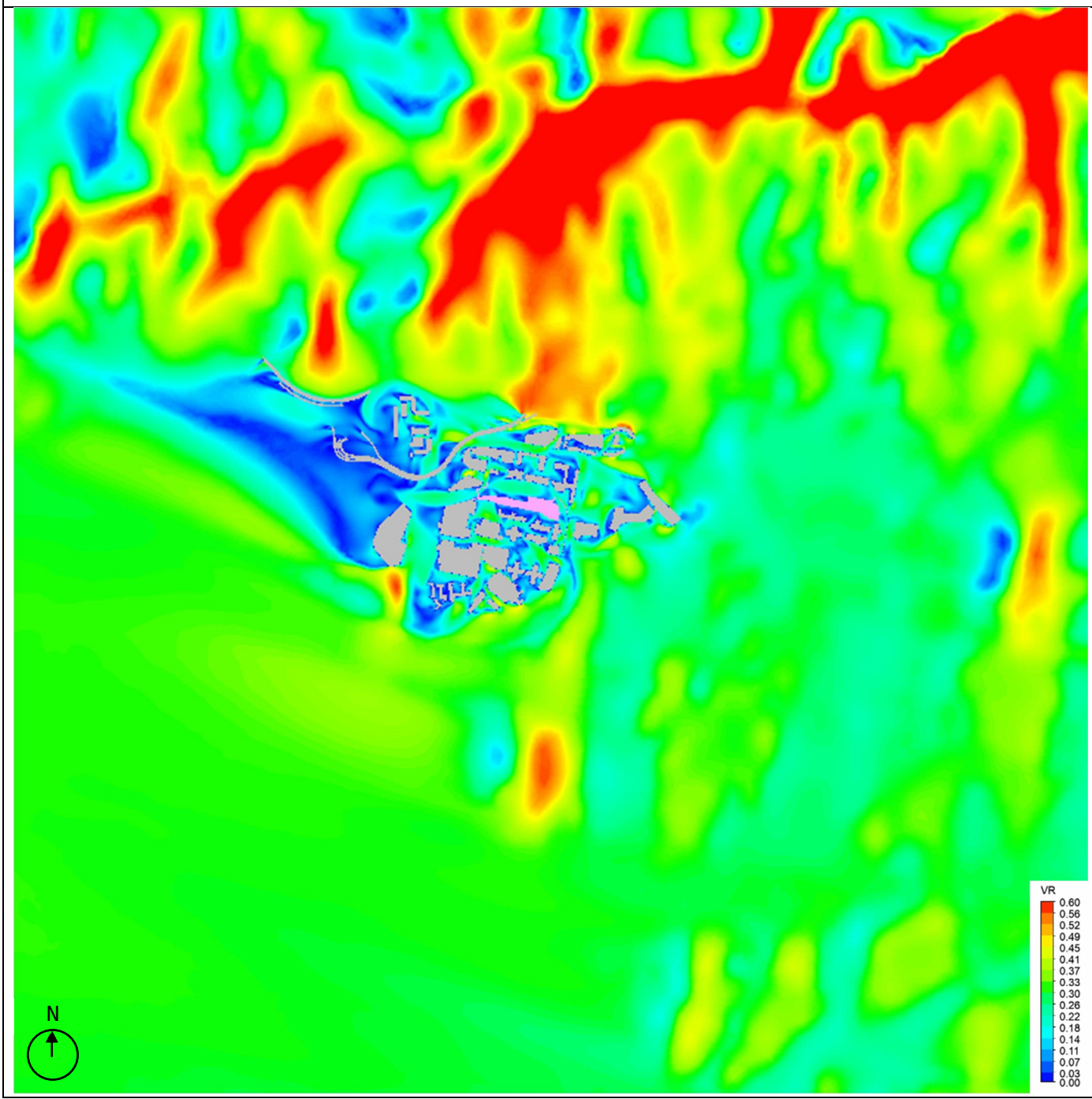
VR Contour Plot at Pedestrian Level under SSE Wind



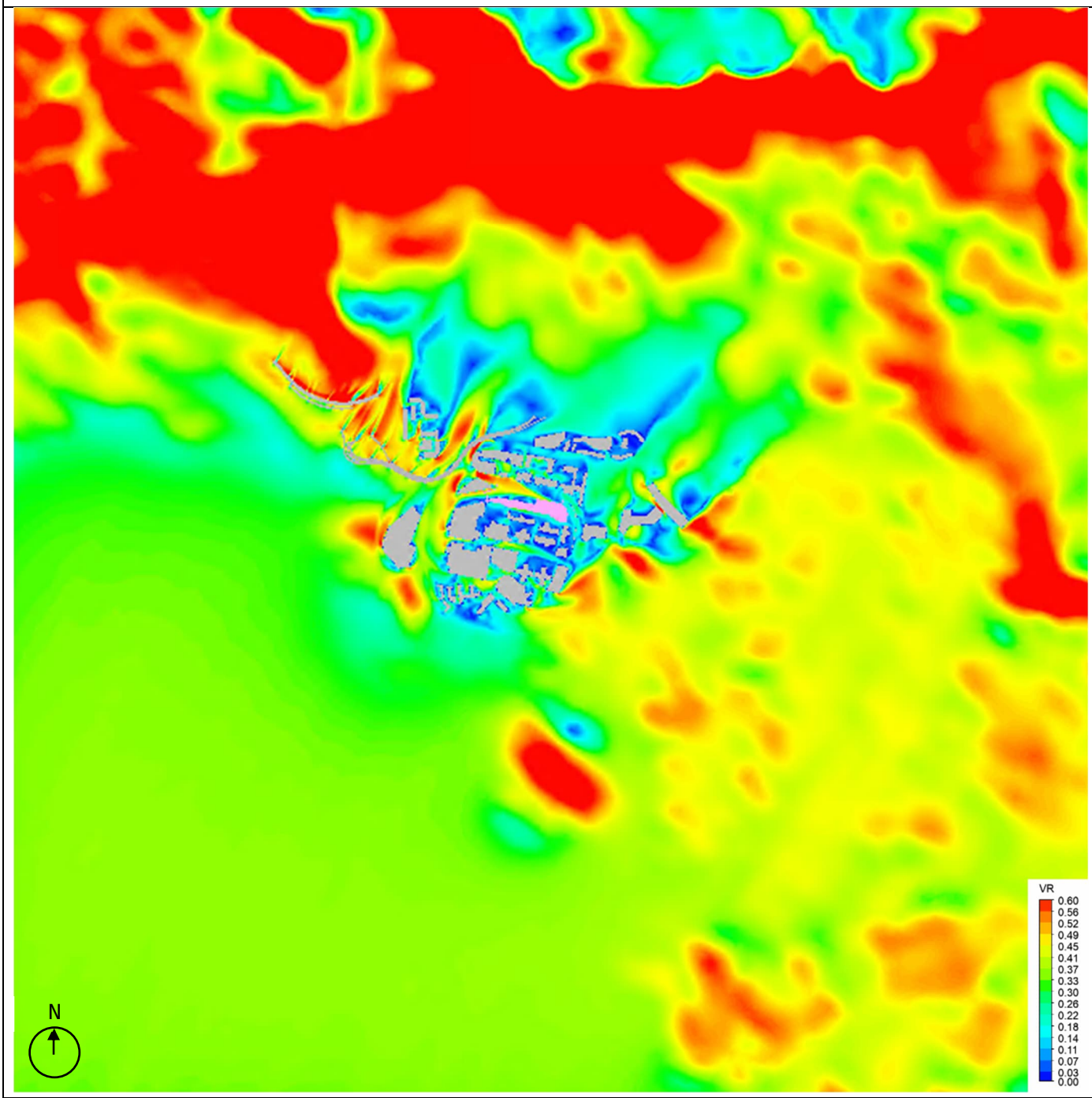
VR Contour Plot at Pedestrian Level under SE Wind



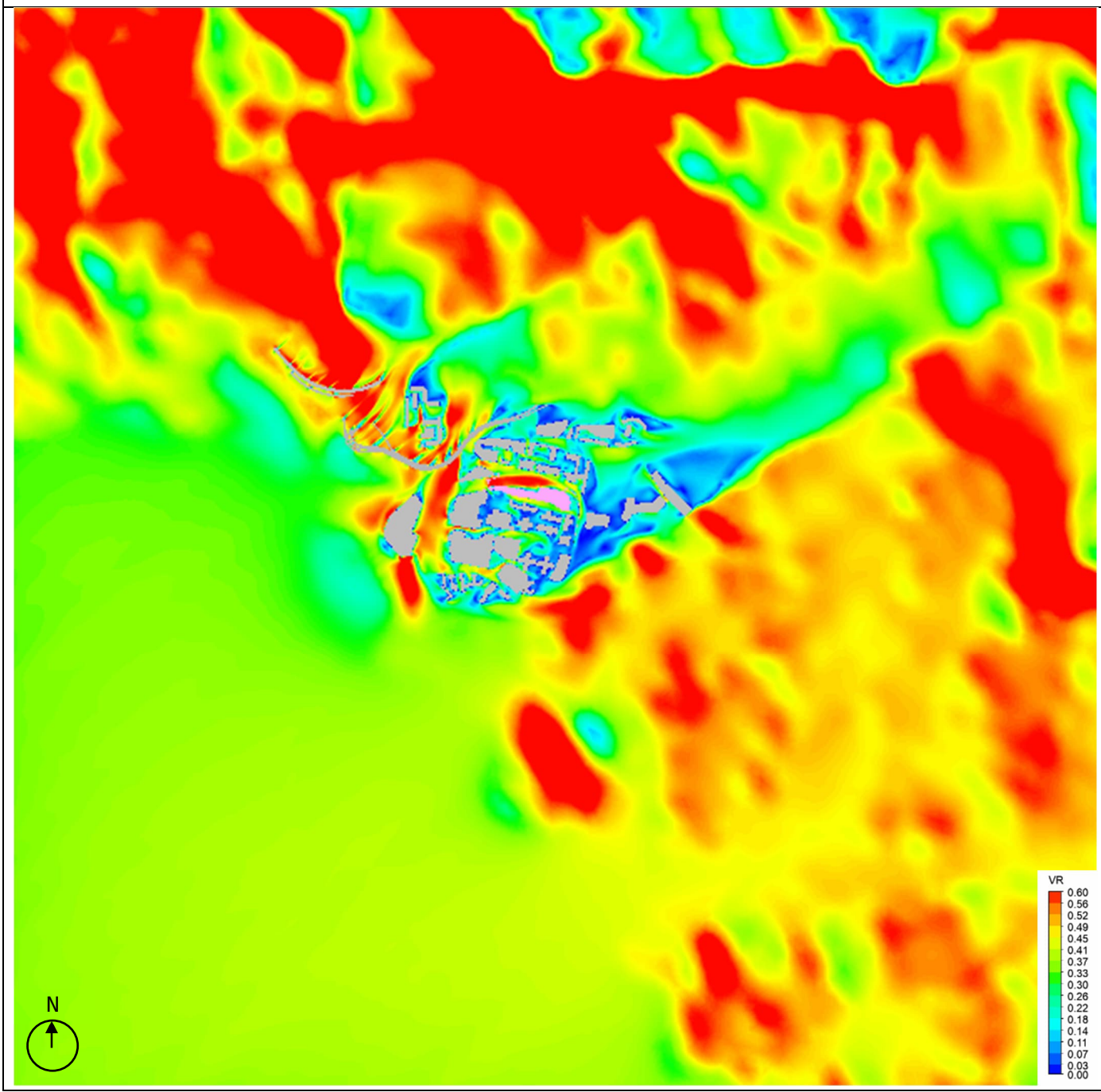
VR Contour Plot at Pedestrian Level under ESE Wind



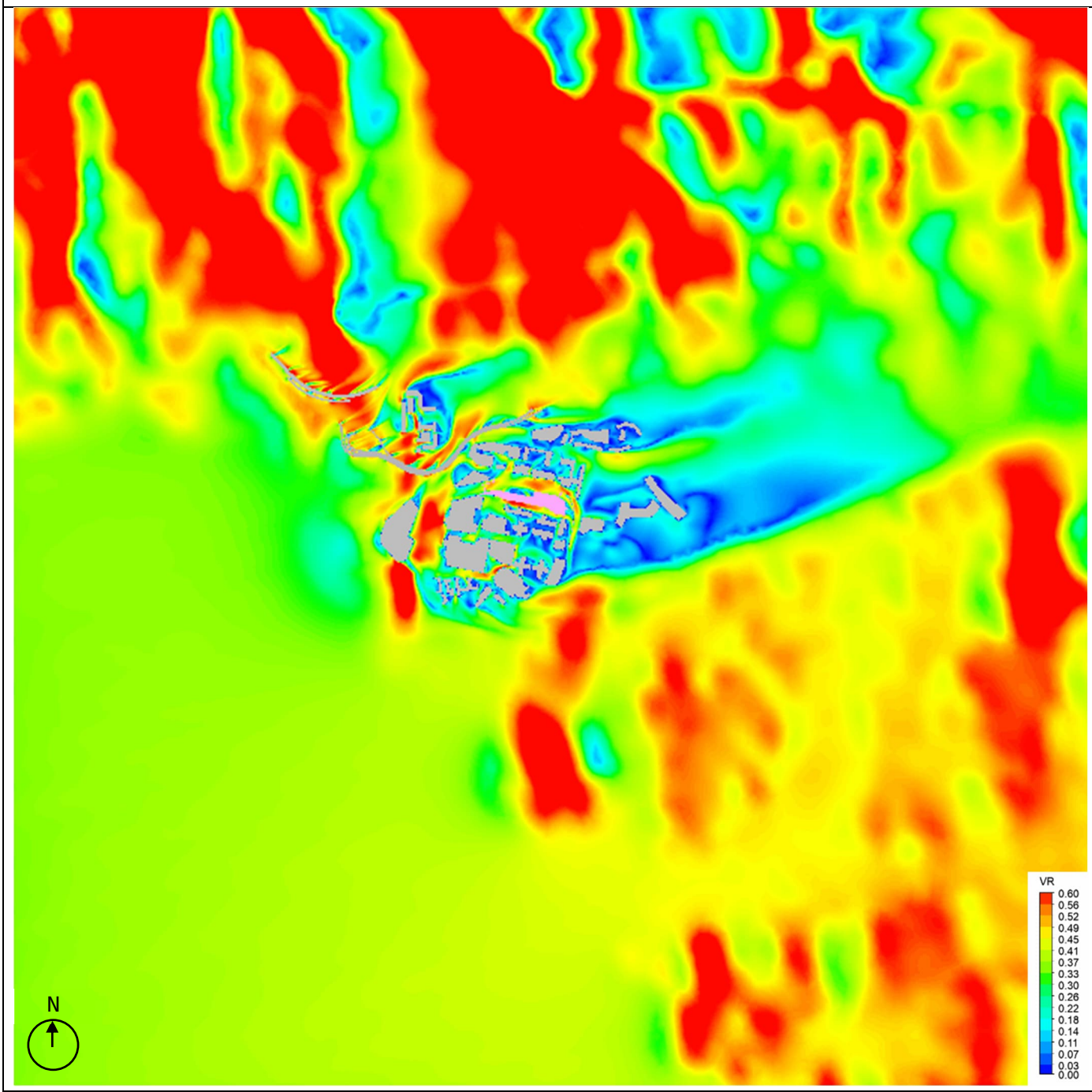
VR Contour Plot at Pedestrian Level under SSW Wind



VR Contour Plot at Pedestrian Level under SW Wind



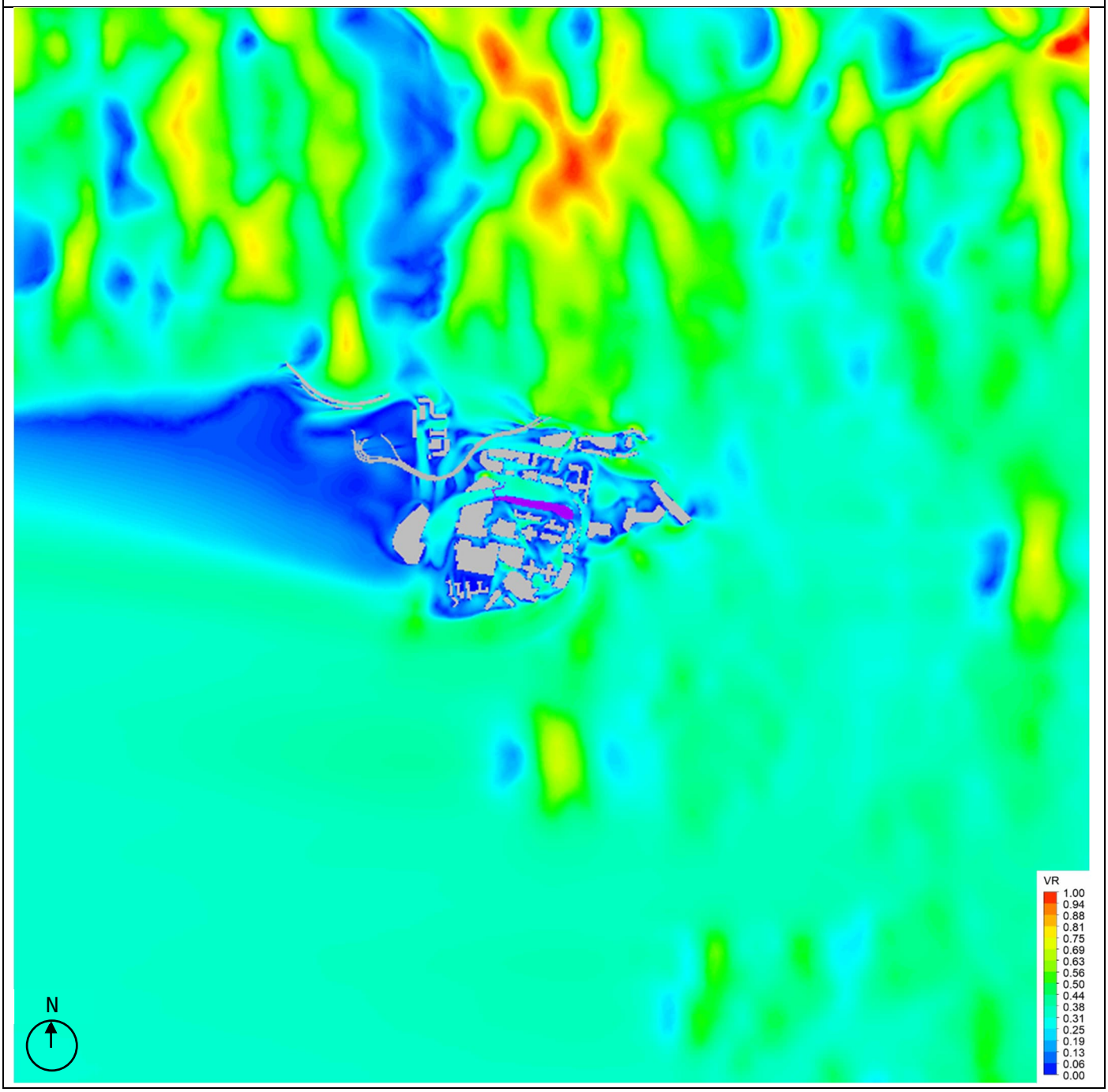
VR Contour Plot at Pedestrian Level under WSW Wind



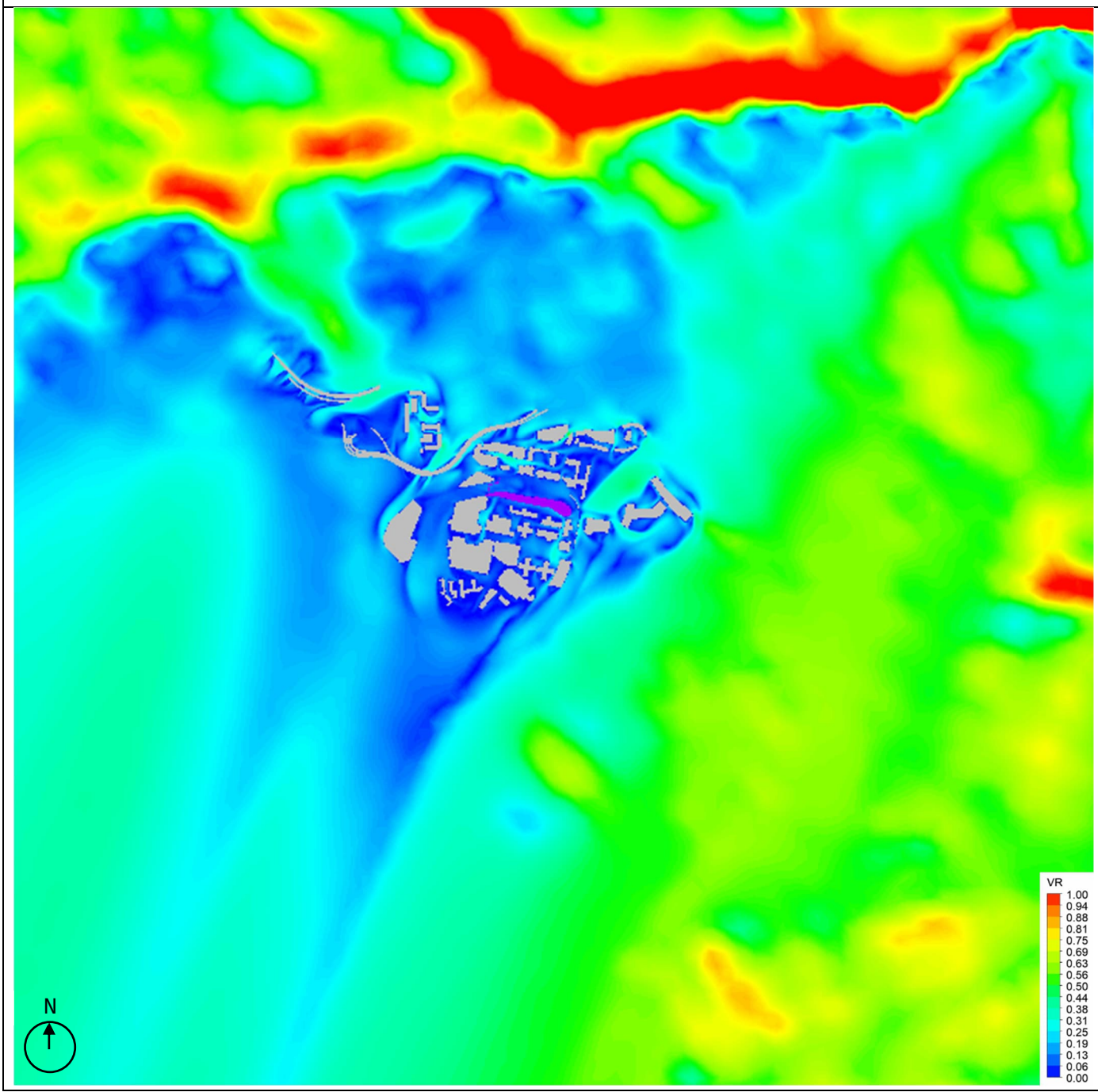
APPENDIX B2 – WIND VELOCITY RATIO CONTOUR – WHOLE COMPUTATIONAL DOMAIN UNDER PREVAILING WIND DIRECTIONS (VR 0 – 1.0)

Baseline Scheme

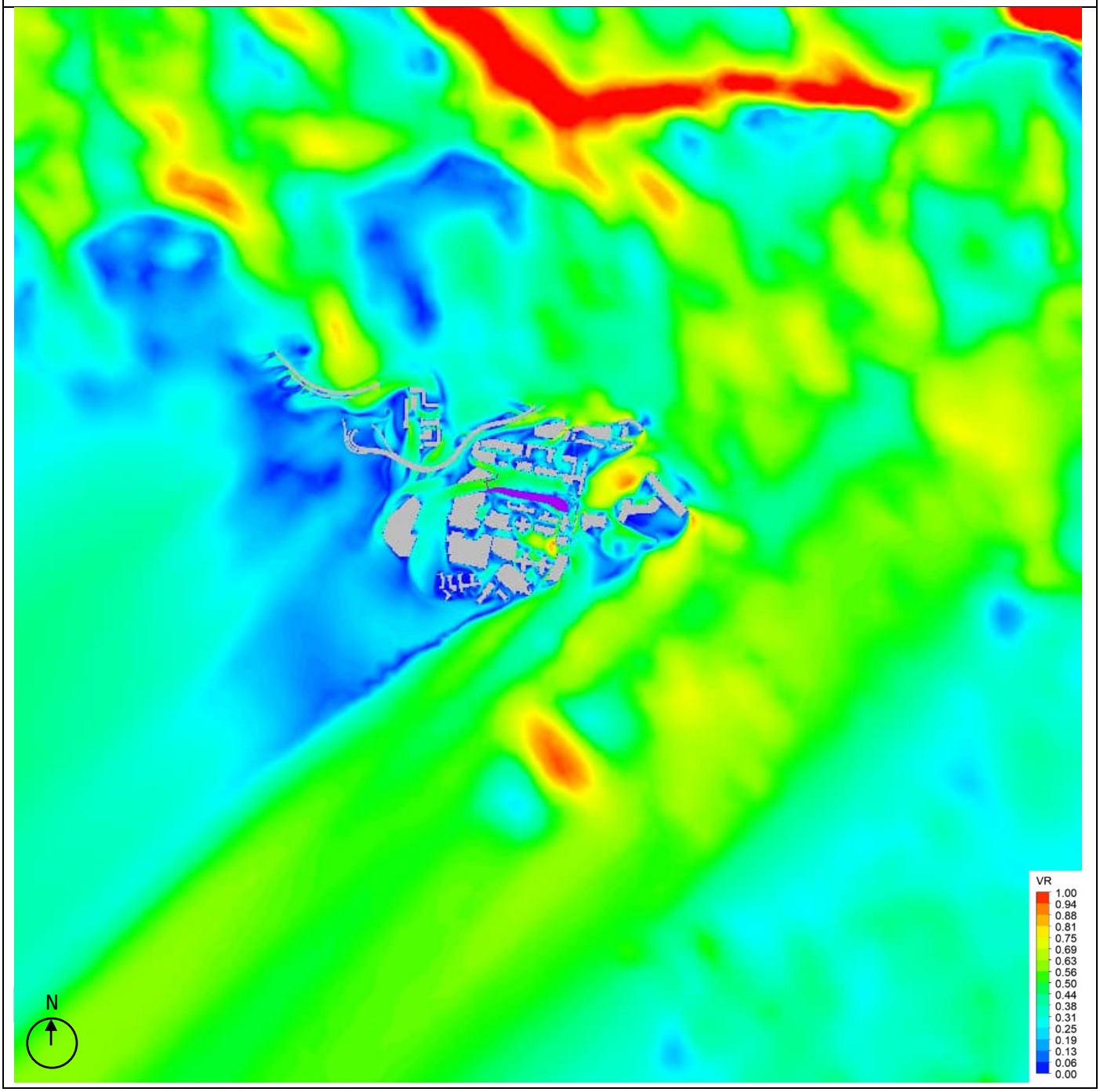
VR Contour Plot at Pedestrian Level under E Wind



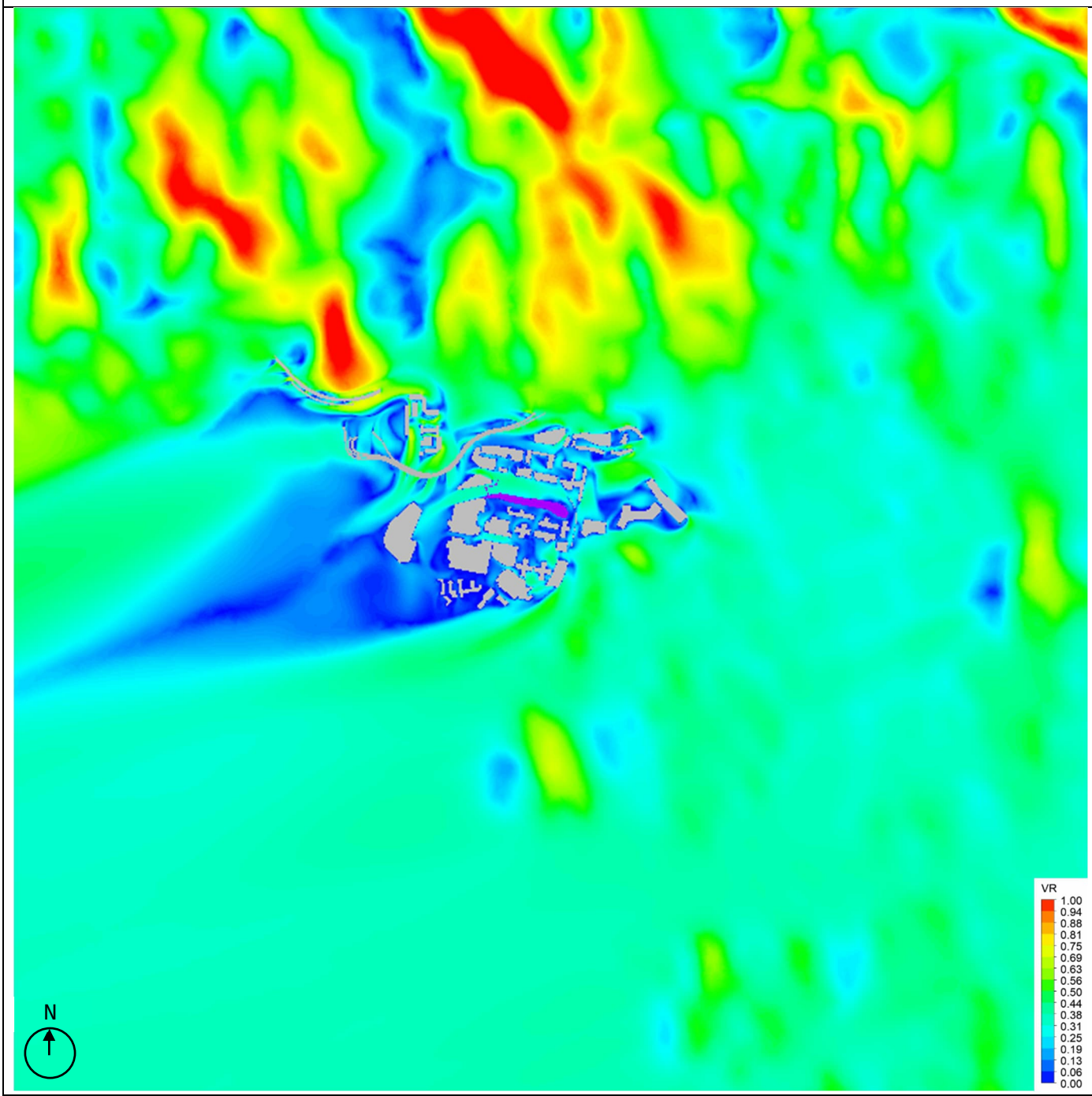
VR Contour Plot at Pedestrian Level under NNE Wind



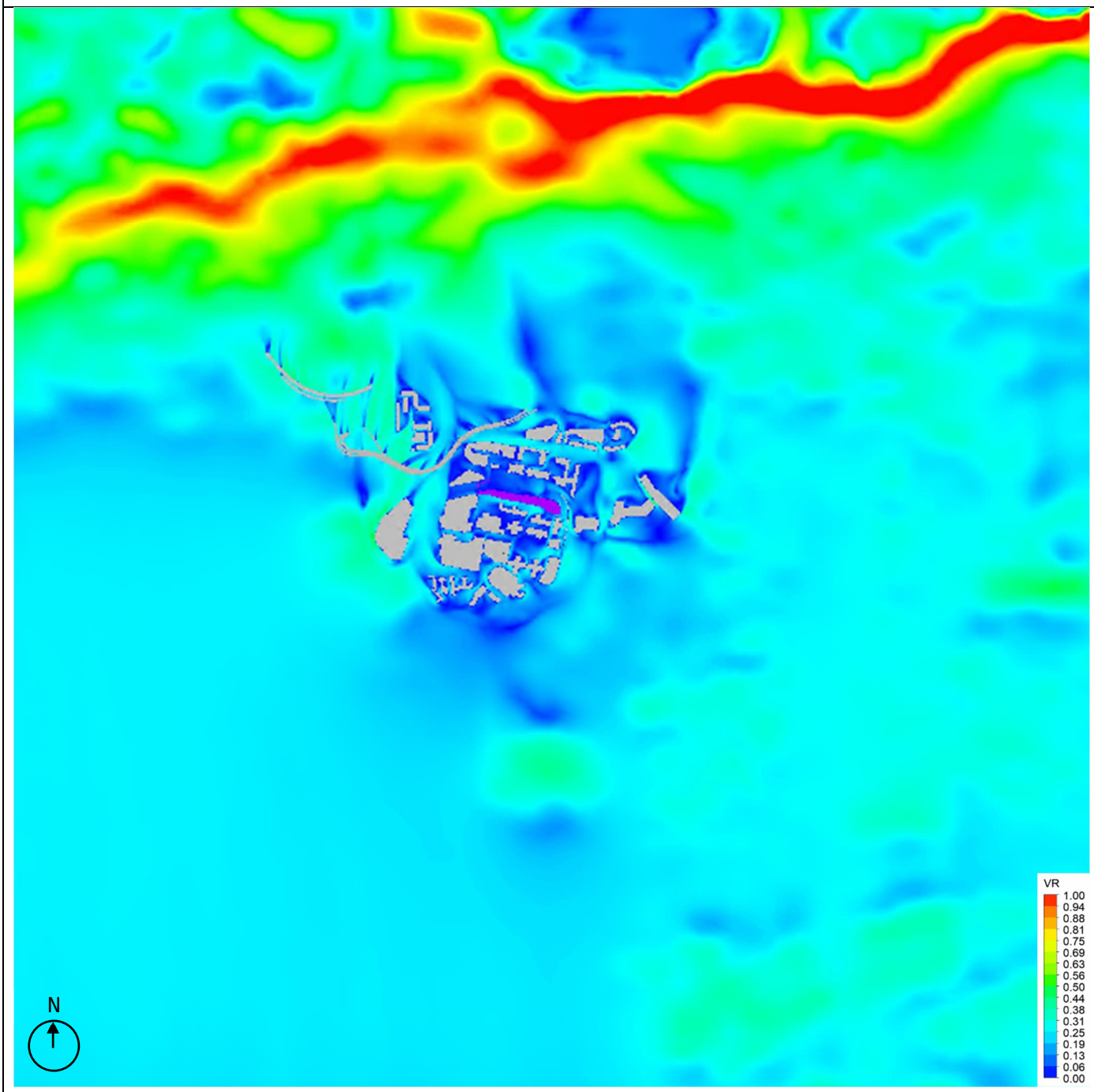
VR Contour Plot at Pedestrian Level under NE Wind



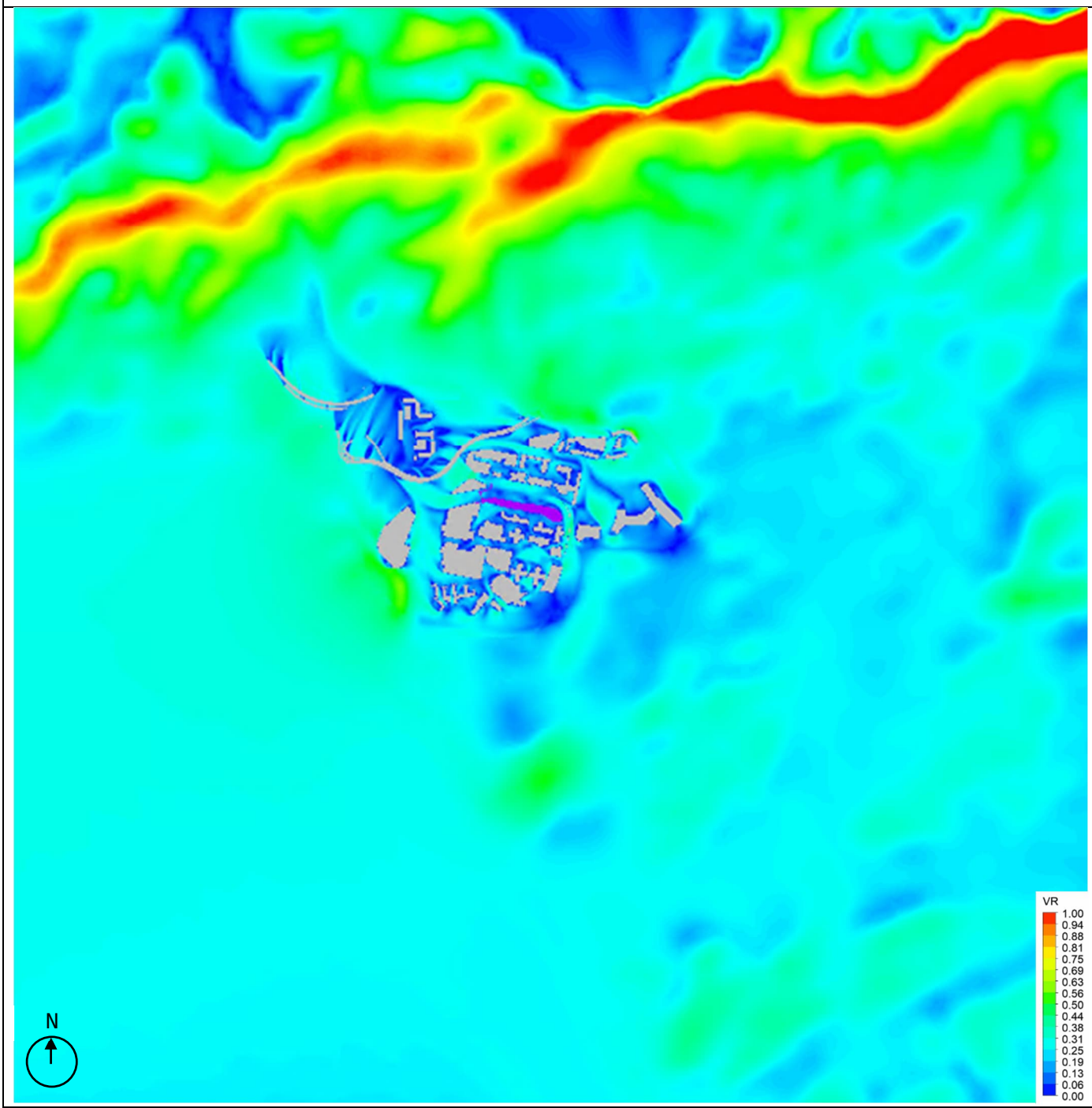
VR Contour Plot at Pedestrian Level under ENE Wind



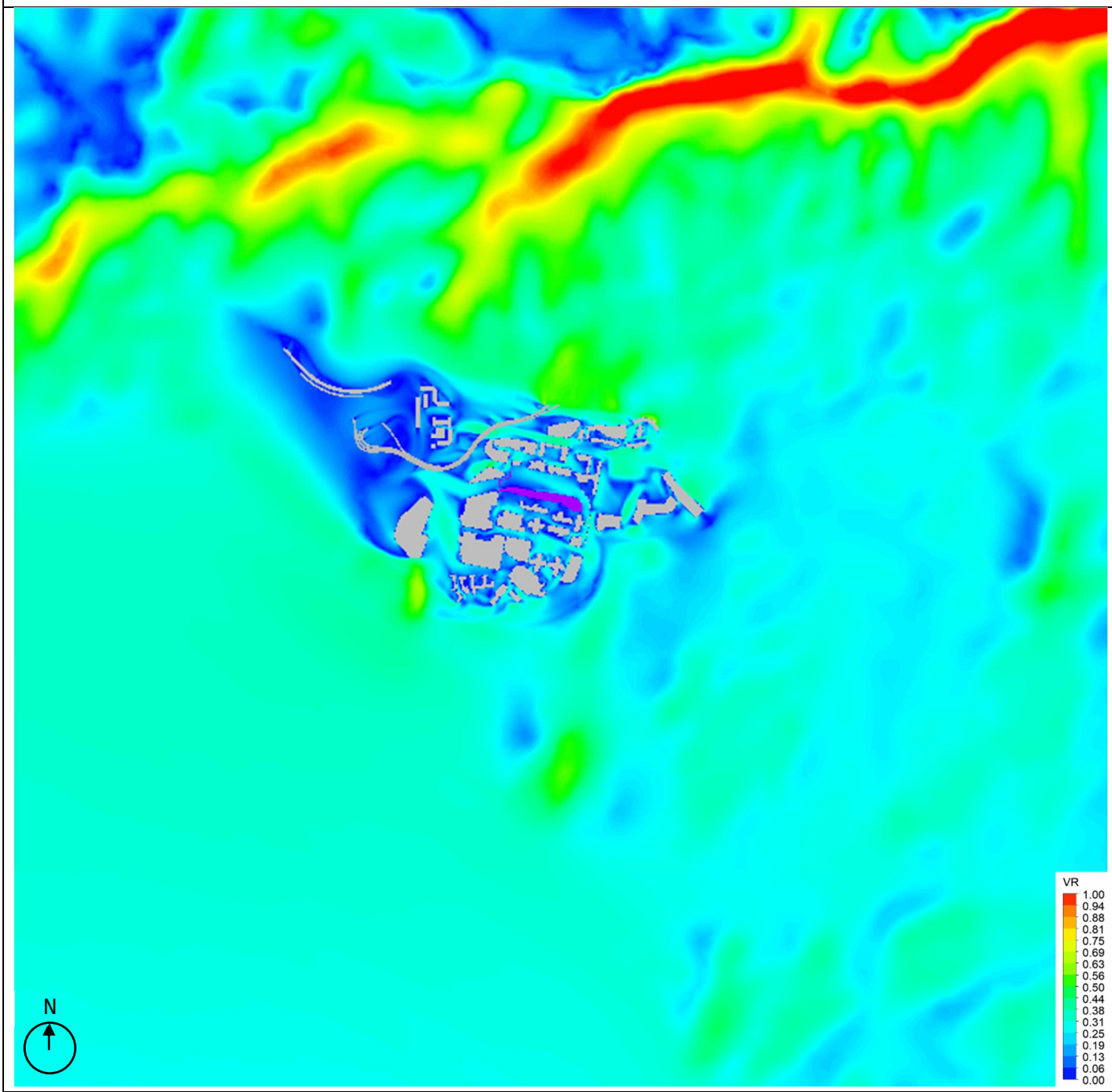
VR Contour Plot at Pedestrian Level under S Wind



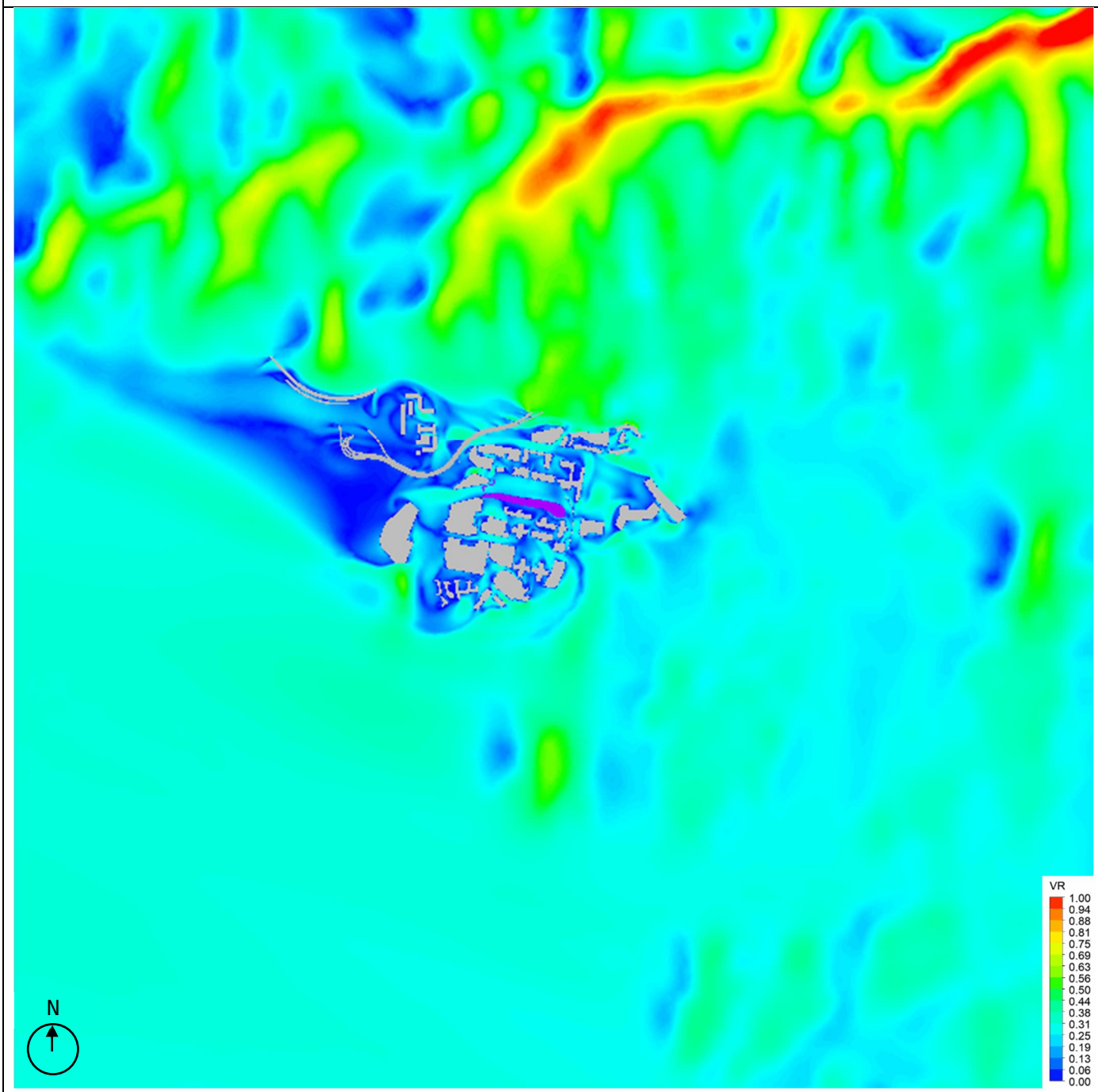
VR Contour Plot at Pedestrian Level under SSE Wind



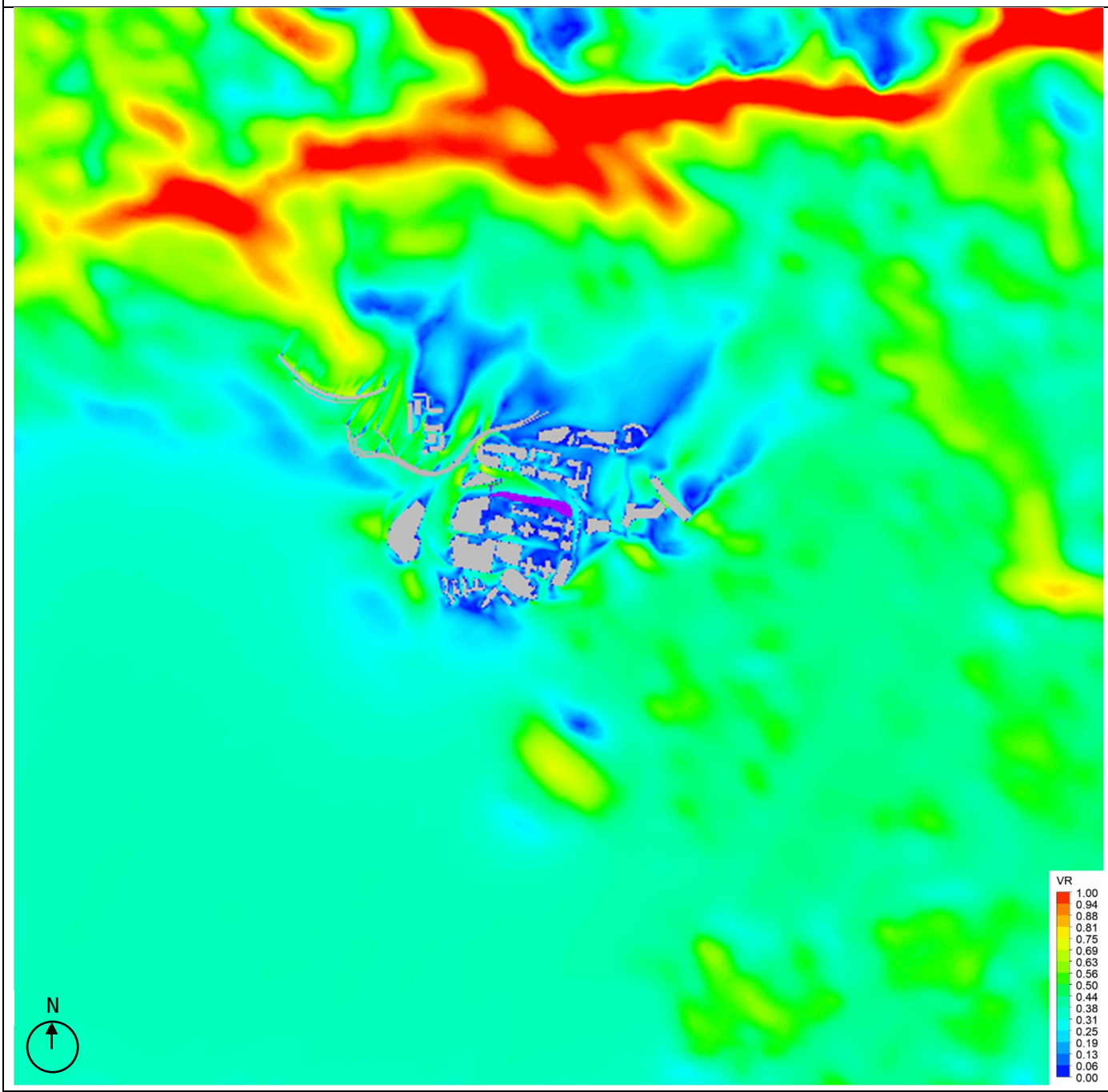
VR Contour Plot at Pedestrian Level under SE Wind



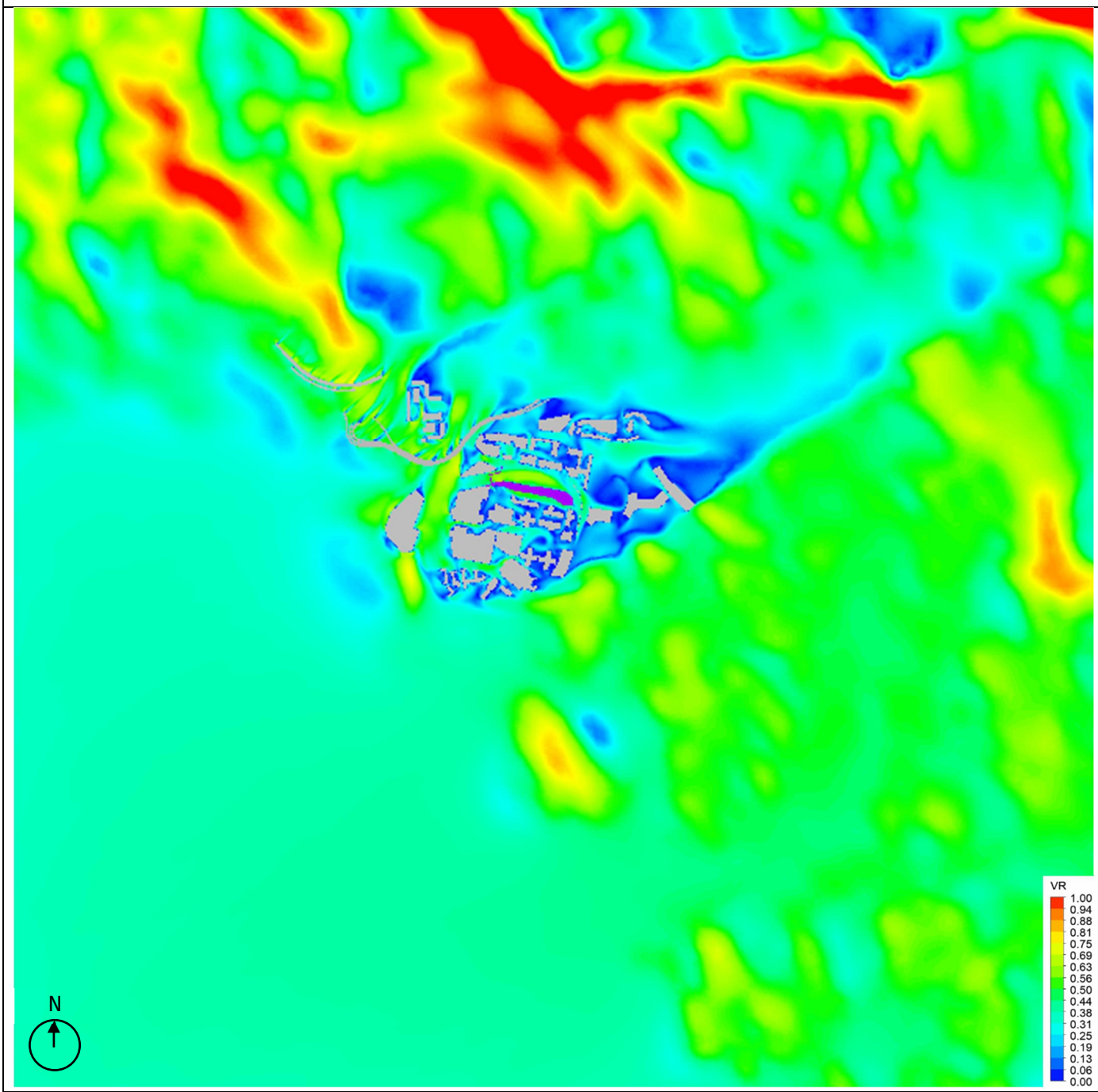
VR Contour Plot at Pedestrian Level under ESE Wind



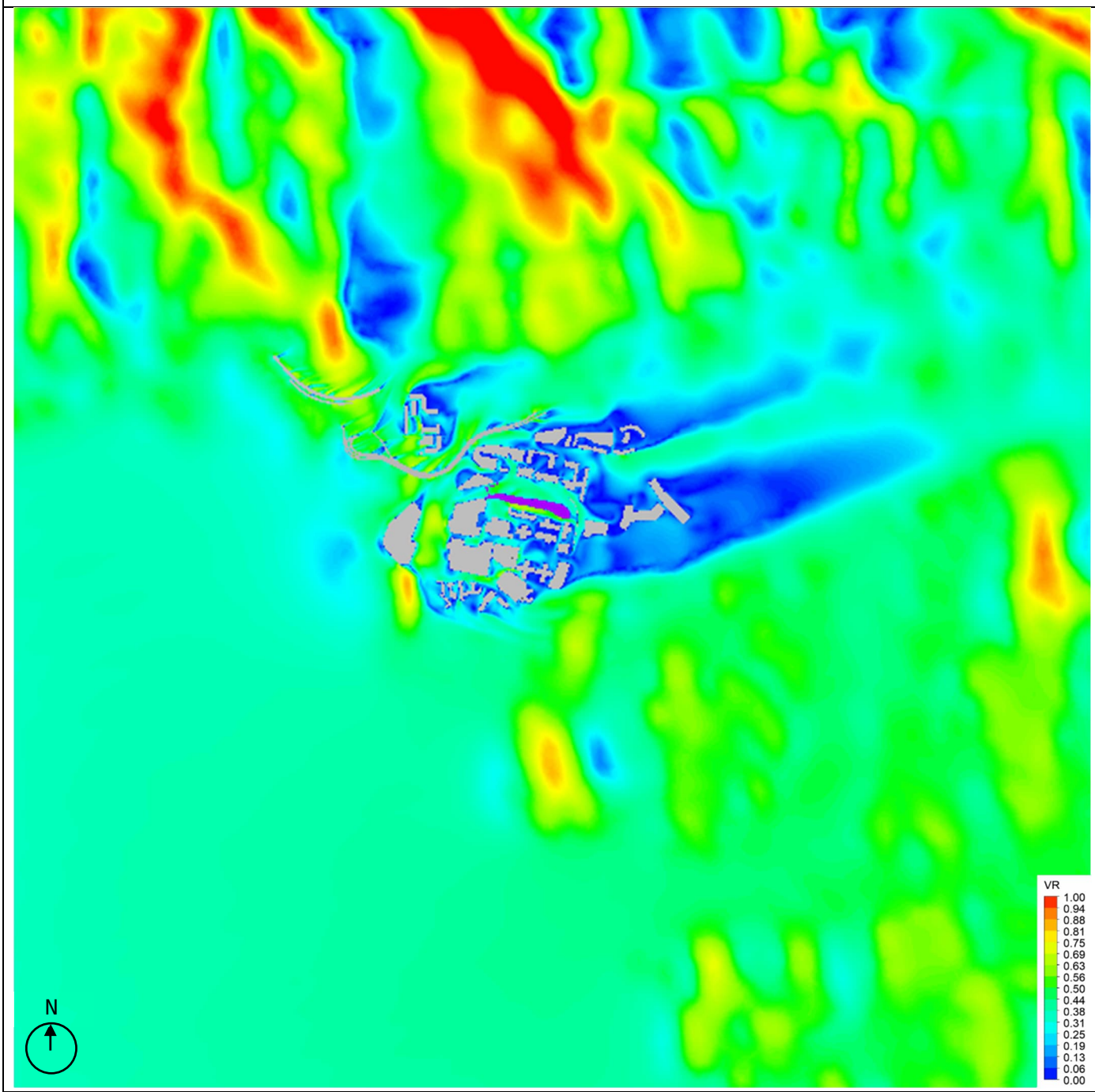
VR Contour Plot at Pedestrian Level under SSW Wind



VR Contour Plot at Pedestrian Level under SW Wind

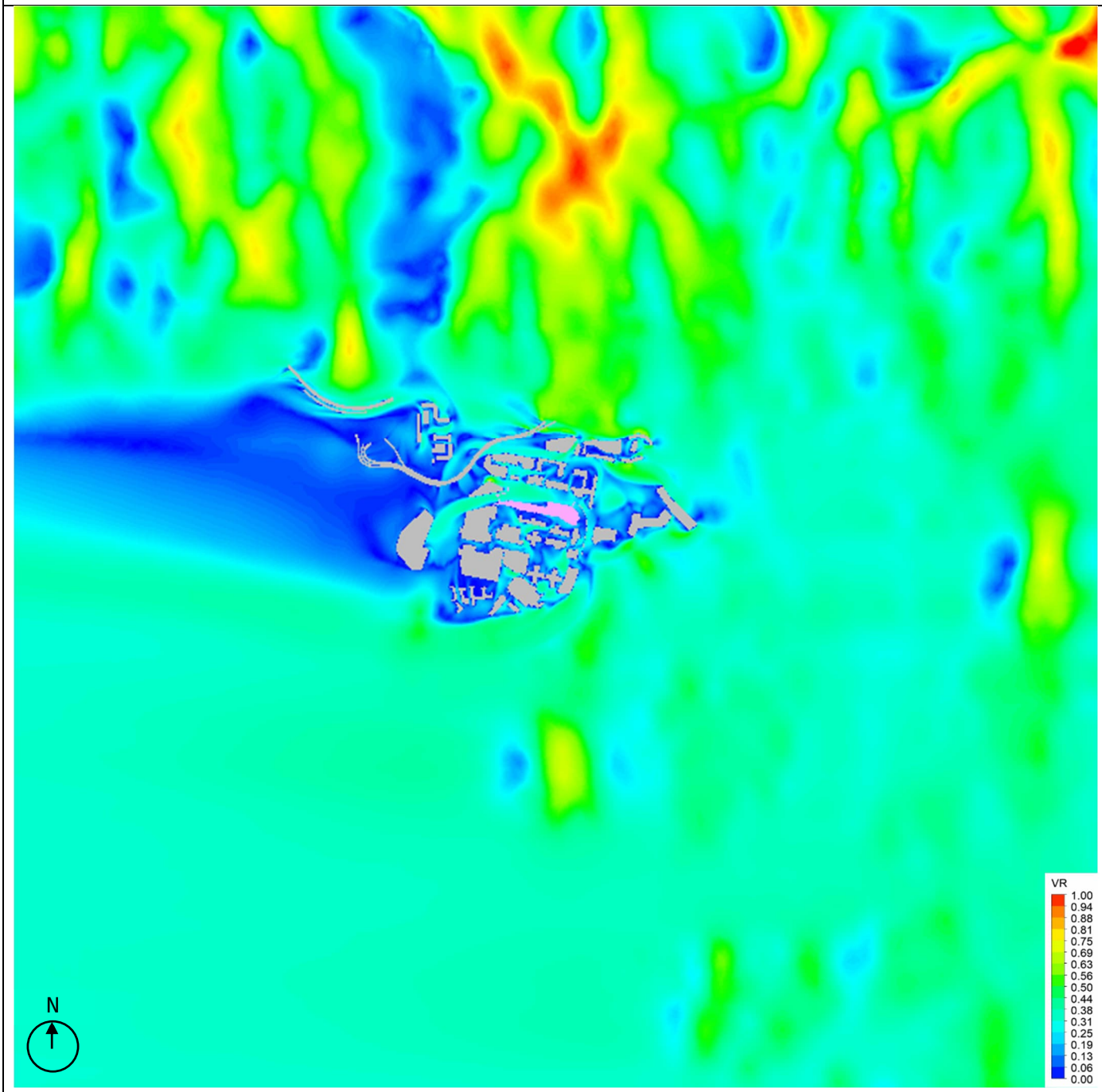


VR Contour Plot at Pedestrian Level under WSW Wind

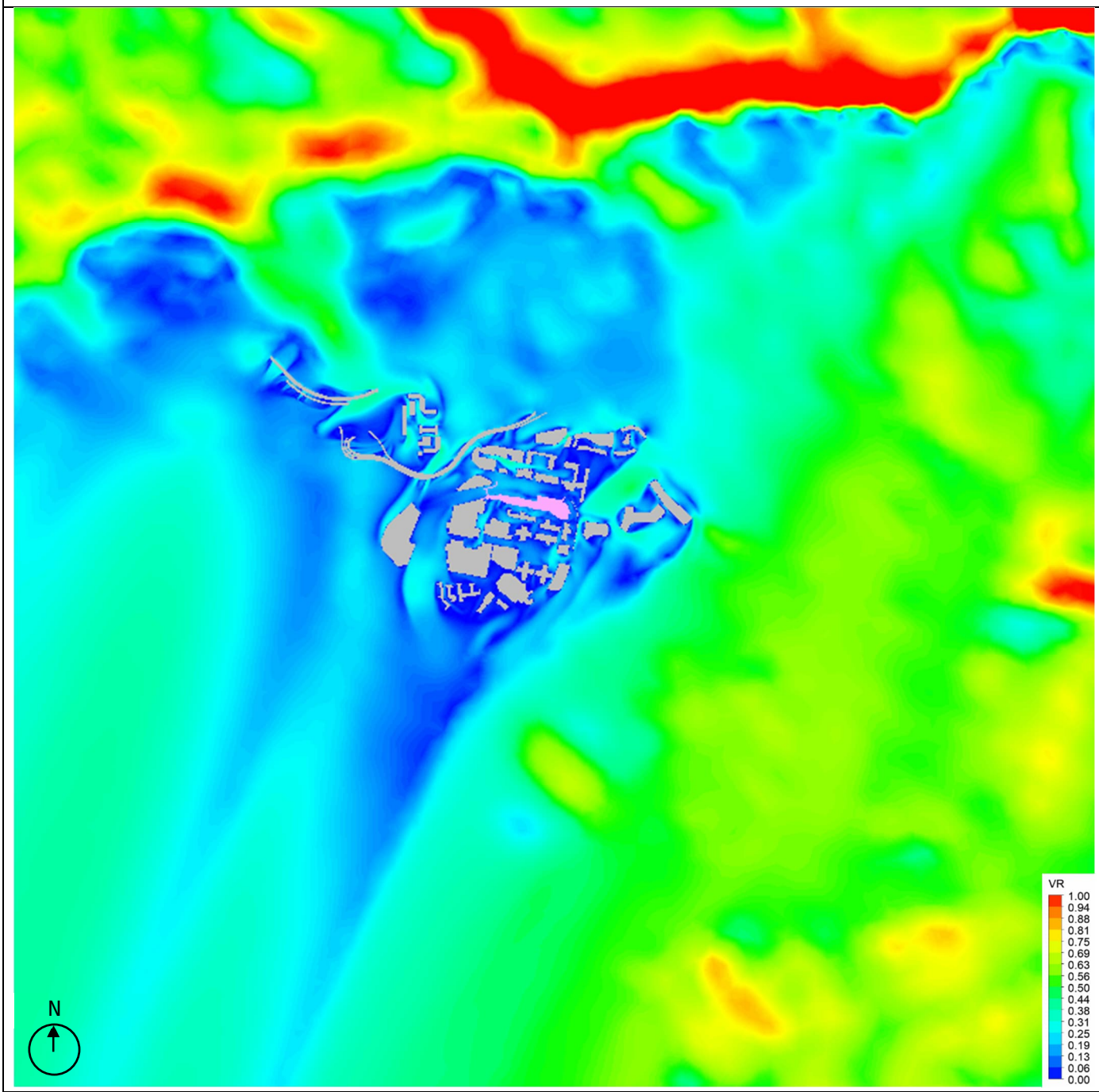


Proposed Scheme

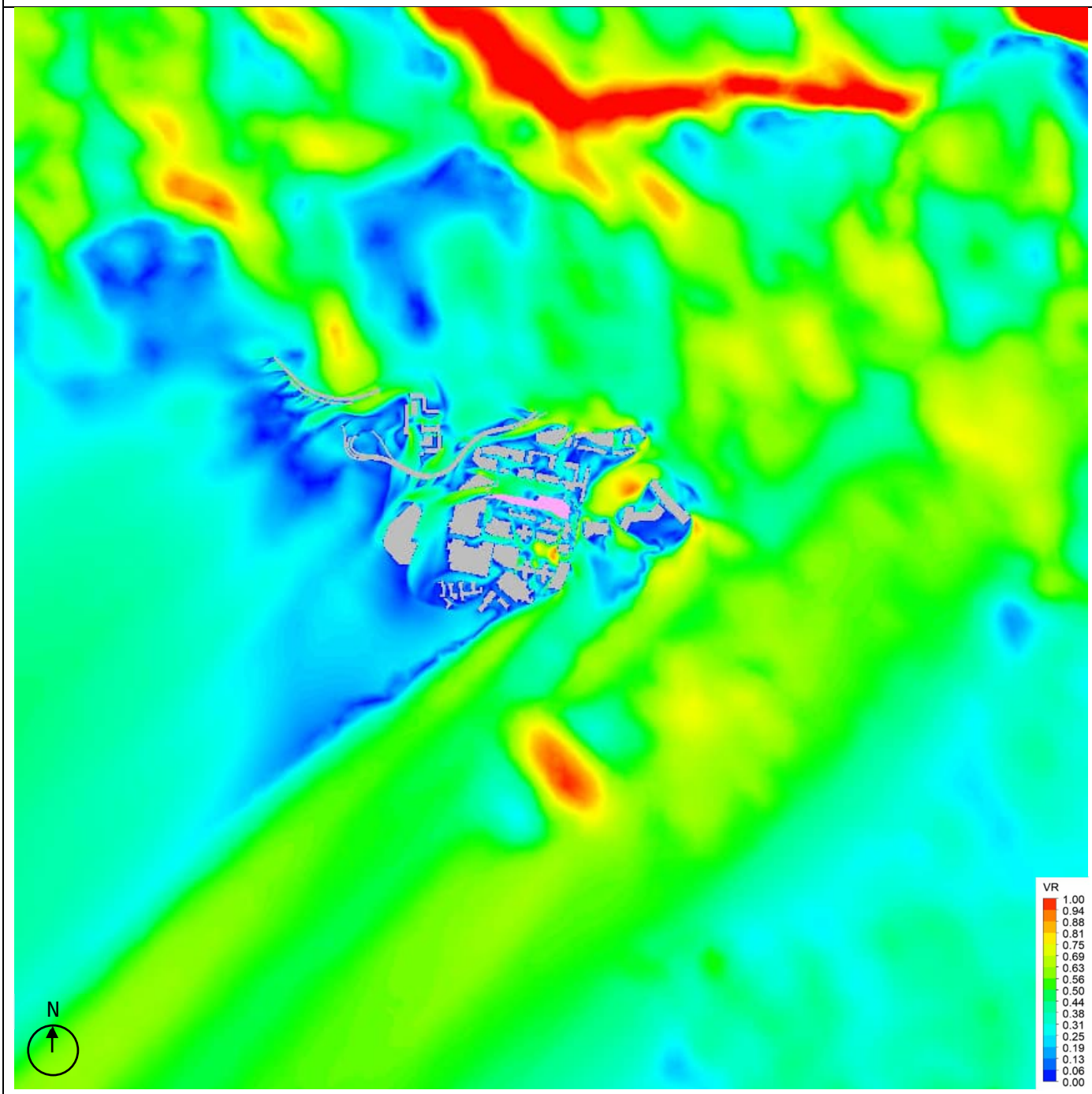
VR Contour Plot at Pedestrian Level under E Wind



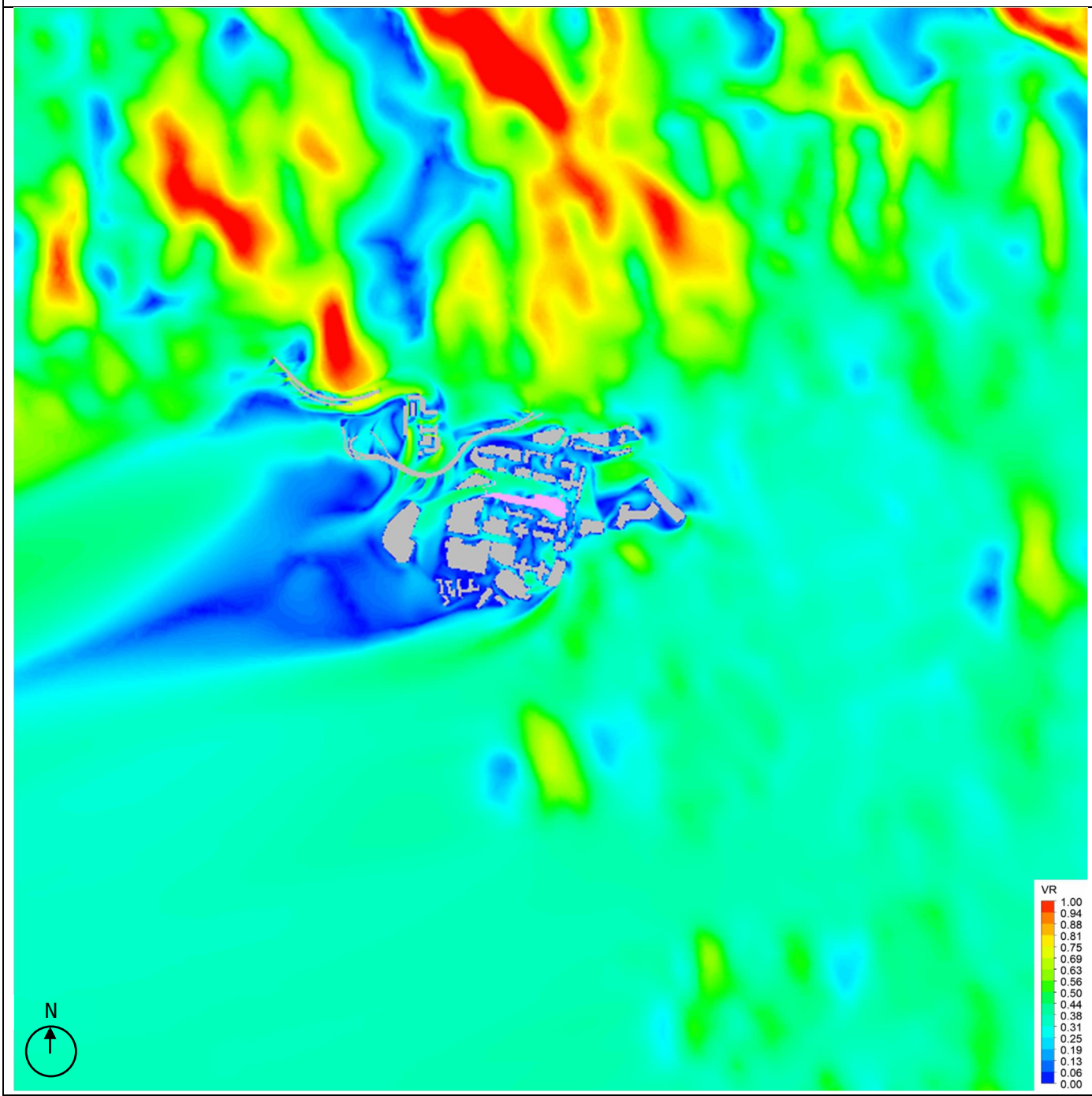
VR Contour Plot at Pedestrian Level under NNE Wind



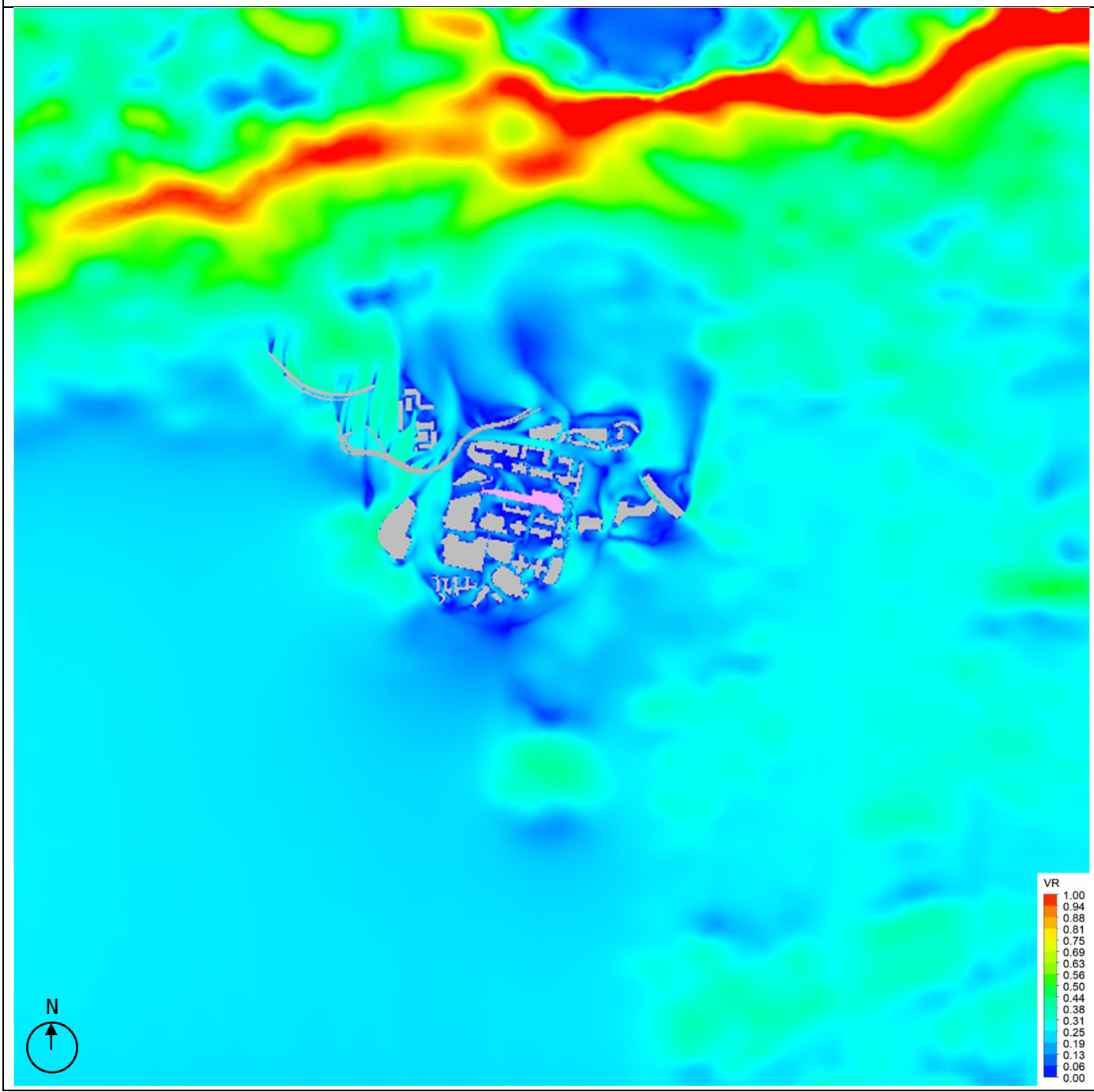
VR Contour Plot at Pedestrian Level under NE Wind



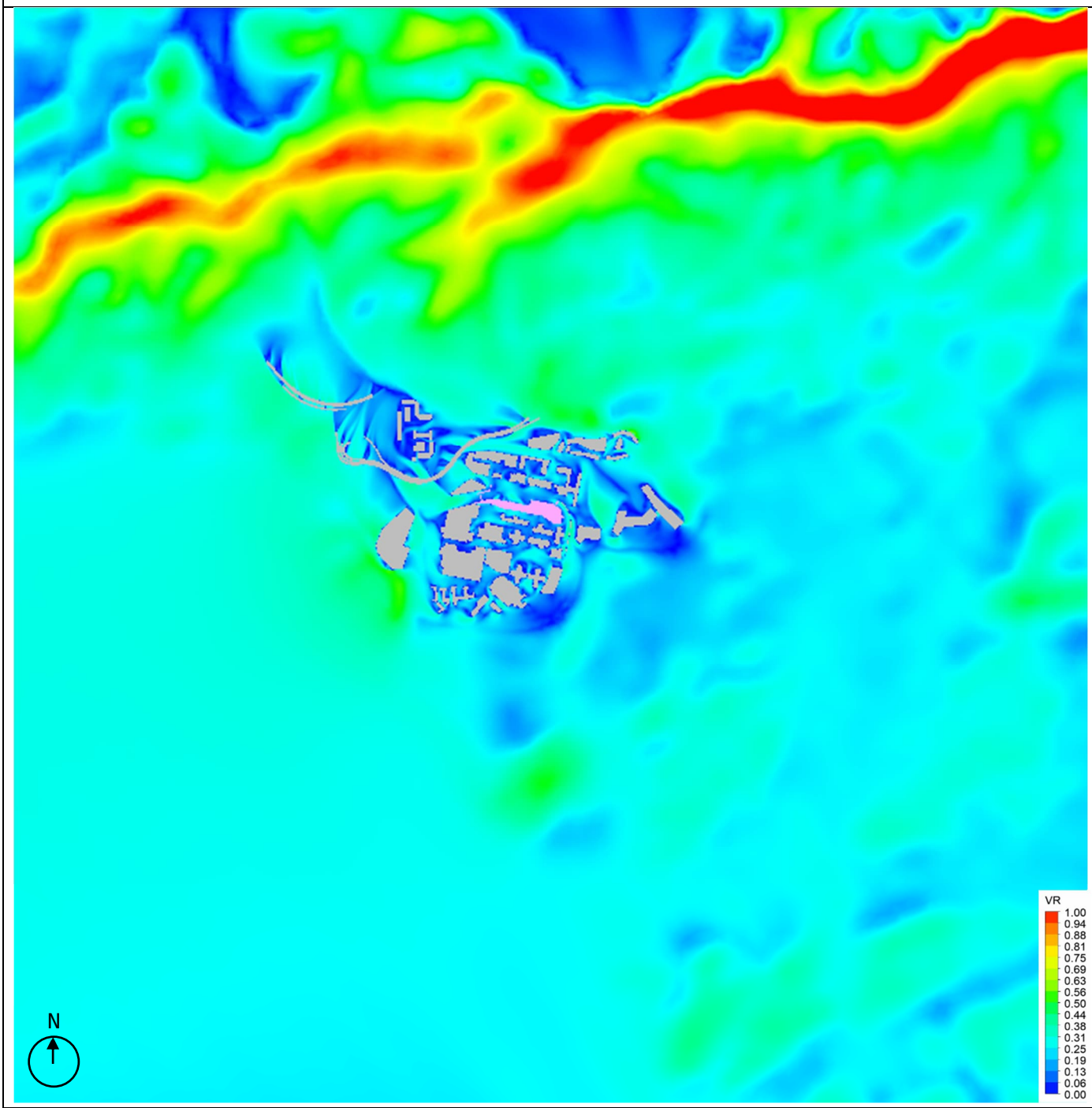
VR Contour Plot at Pedestrian Level under ENE Wind



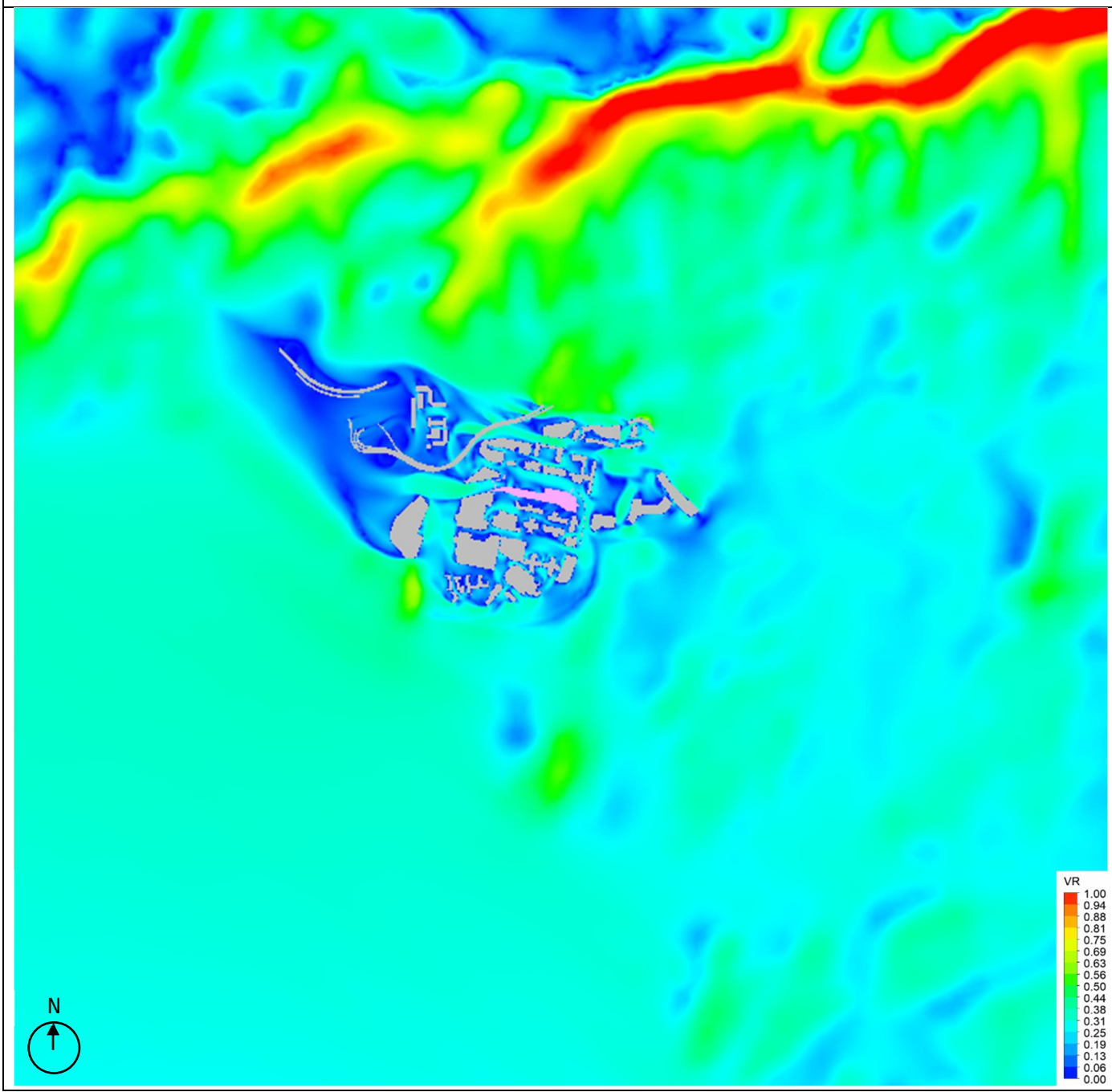
VR Contour Plot at Pedestrian Level under S Wind



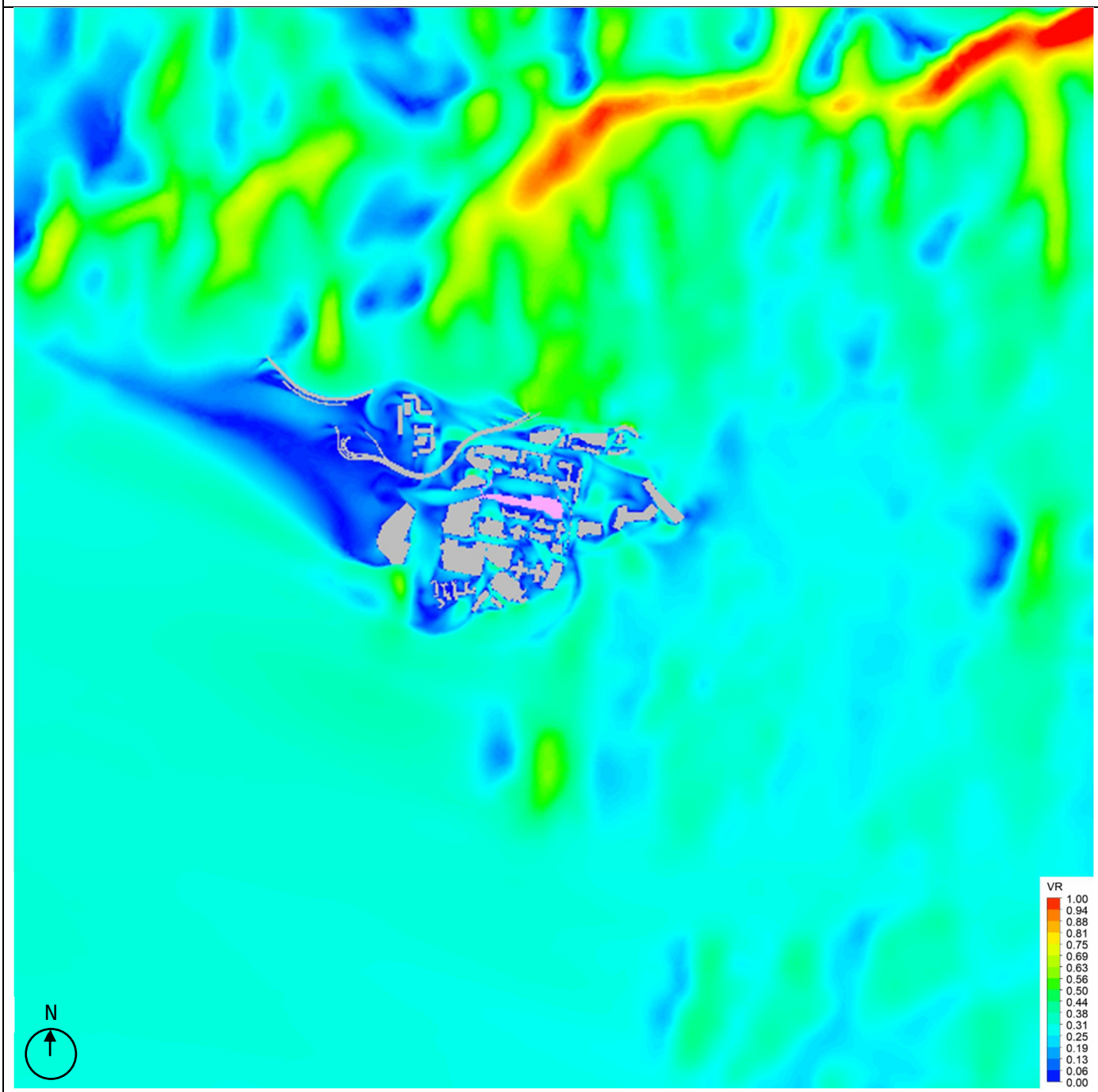
VR Contour Plot at Pedestrian Level under SSE Wind



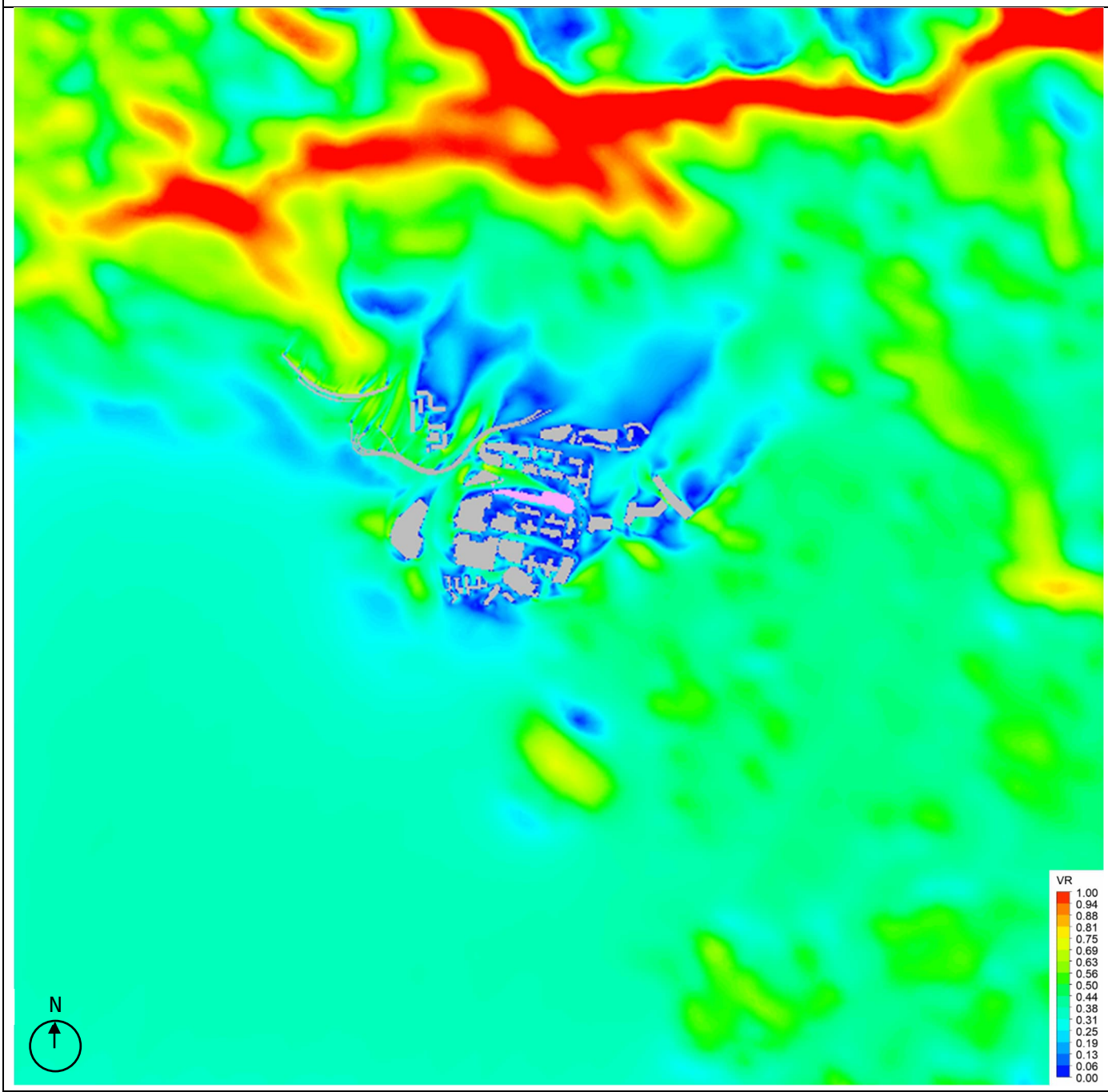
VR Contour Plot at Pedestrian Level under SE Wind



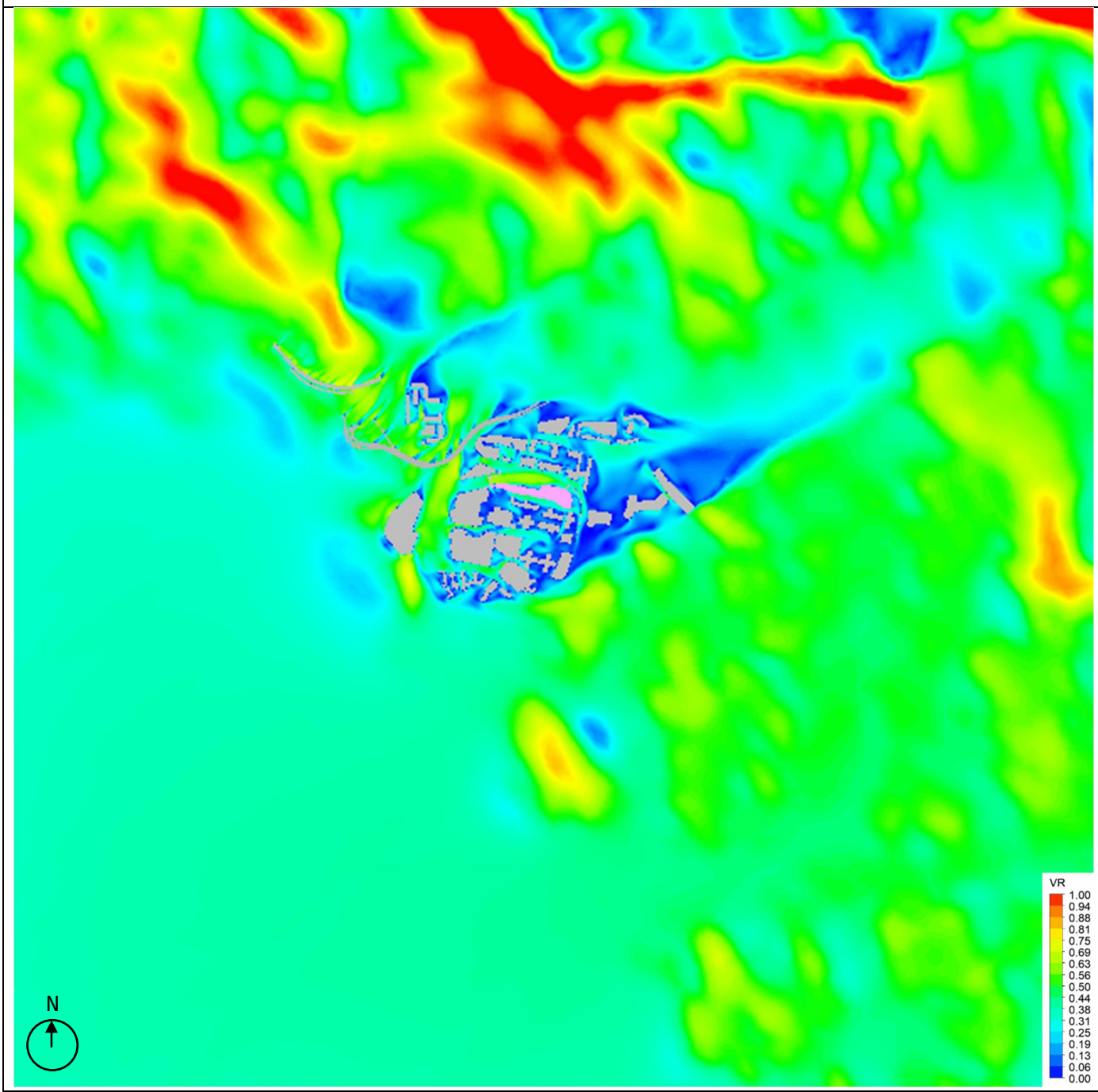
VR Contour Plot at Pedestrian Level under ESE Wind



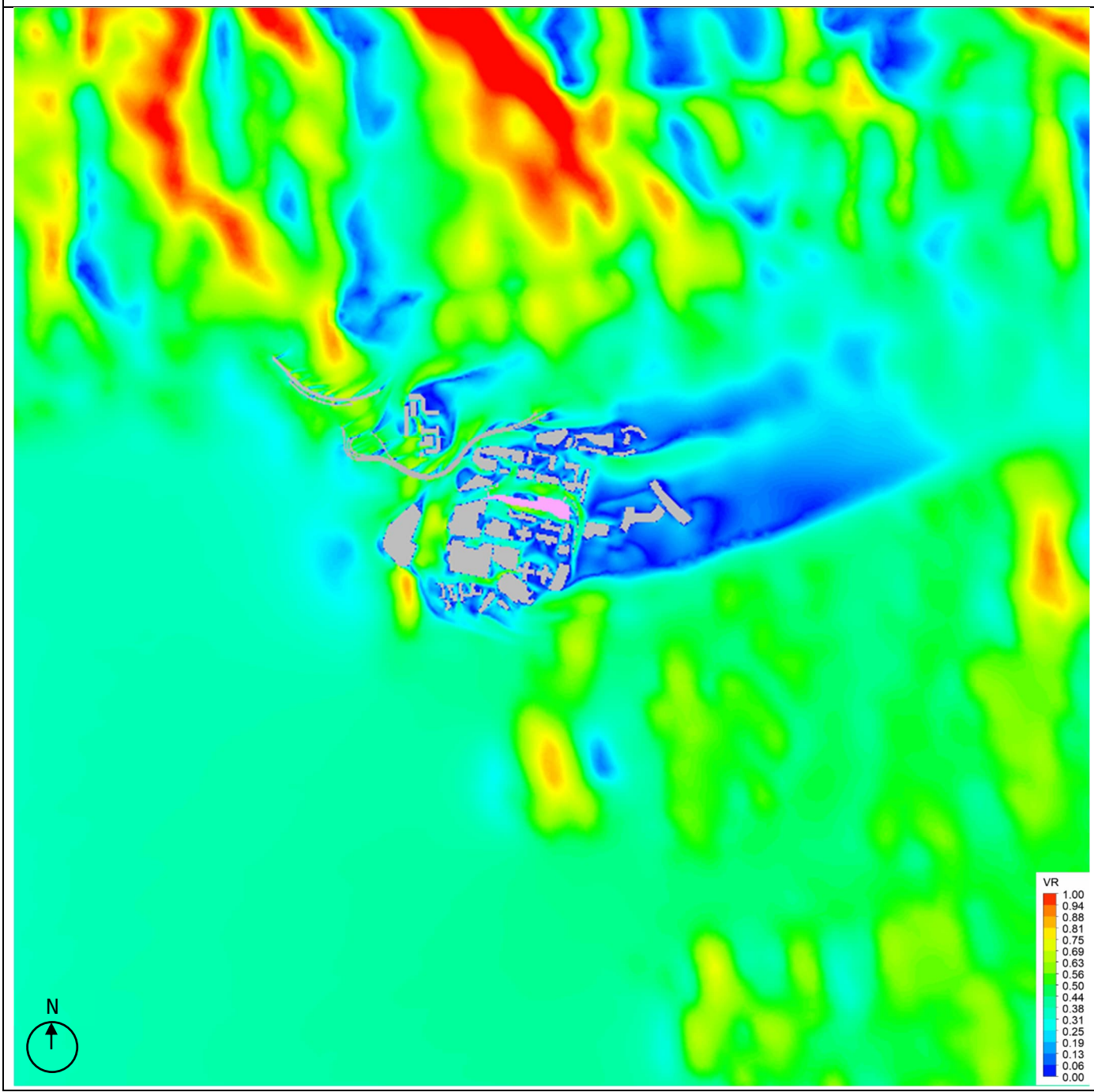
VR Contour Plot at Pedestrian Level under SSW Wind



VR Contour Plot at Pedestrian Level under SW Wind



VR Contour Plot at Pedestrian Level under WSW Wind



APPENDIX C – BASELINE SCHEME AND DESIGN SCHEME DRAWINGS

Baseline Scheme

N

Plan 3a-1

PROPOSED PUBLIC HOUSING SITE (CHAK ON ROAD SOUTH & PAK TIN EXTENSION)

PHASE 12

PHASE 11

PHASE 13

PHASES 7&8

PHASE 10

PHASE 9

11 12 13

10 9 8 7 6 5 4 3 2 1

NAM CHEONG STREET 南昌街

PAK WAN STREET 白雲街

Pak Tin Street 白田街

NAM CHEONG STREET 南昌街

CHAK ON ROAD

澤安道南

運輸署 澤安道考試中心 Transport Department

石硤尾消防局 Shek Kip Mei Fire Station

聖公會李嘉誠護理安老院 SKH Li Ka Shing Care And Attention Home For The Elderly

賽馬會新生精神康復學院 Jockey Club New Life Institute of Psychiatric Rehabilitation Association

T.W.G.Hs. Chang Ming Thien College 東華三院張明添中學

C.M.A. Second

Tennis Courts 網球場

Shek Kip Mei Park Sports Centre 石硤尾公園運動場

Football Field 球場

TSUI TIN HOUSE 翠田樓

YUE TIN HOUSE 裕田樓

FU TIN HOUSE 富田樓

YUN TIN HOUSE 潤田樓

CHAK TIN HOUSE 澤田樓

PAK TIN COMMUNITY COMPLEX

SHING TIN HOUSE 盛田樓

CHEUNG TIN HOUSE 昌田樓

SHUI TIN HOUSE 瑞田樓

TAI TIN HOUSE 太田樓

Pak Tin Ambulance Depot (Under)

FOOTBRIDGE

FOOT-BRIDGE

30m

ABOUT 15m

ABOUT 15m

NBA

Note: All levels are indicated as Finished Floor Level

Pak Tin Estate Redevelopment - Phase 12

Scenario 1 - Master Layout Plan (Block Plan) (for illustration only)

Phase 12 Block

LEGEND

Application Site Boundary

Phase Boundary

Net Site Boundary

Non-building Area

Proposed Air Ventilation Corridor

Underground Link

Drawing Number : SP14/12/SITE/A/TPB/LO-21/P00

CAD Reference : SP14/12/SITE/A/PLO-03/A

Scale : 1:1500 @ A3

Date : 14/04/2023

N

Plan

3a-2

UNEXCAVATED

CARPARK

WELFARE

LIFT TOWER

E&M / OTHERS SERVICES

LIFT LOBBY +32.15

+32.00

CW

31.9

32.2

翠田樓

Tsui Tin House

裕田樓

Yue Tin House

Note: All levels are indicated as Finished Floor Level

Pak Tin Estate Redevelopment - Phase 12

Scenario 1 - Ground Floor Plan (for illustration only)

LEGEND

- Application Site Boundary
- Net Site Boundary
- Lift Lobby
- Lift Tower
- Welfare
- E&M/ Others Services/ Carpark

Drawing Number : SP14/12/SITE/A/TPB/LO-22/P00

CAD Reference : SP14/12/SITE/A/S17/PLO-04/A/P02

Scale : 1:800 @ A3

Date : 14/04/2023

N

Plan

3a-3

UNEXCAVATED

WELFARE

+37.50

+37.50

WELFARE

+37.50

E&M / OTHERS SERVICES

LIFT LOBBY

LIFT TOWER

E&M / OTHERS SERVICES

+37.50

E&M / OTHERS SERVICES

LIFT LOBBY

LIFT LOBBY

LIFT LOBBY

CW

31.9

31.9

CW

翠田樓

Tsui Tin House

CW

32.2

裕田樓

Yue Tin House

Note: All levels are indicated as Finished Floor Level

Pak Tin Estate Redevelopment - Phase 12

Scenario 1 - First Floor Plan (for illustration only)

LEGEND

- Application Site Boundary
- Net Site Boundary
- Lift Lobby
- Lift Tower
- Welfare
- E&M/ Others Services/ Carpark

Drawing Number : SP14/12/SITE/A/TPB/LO-23/P00

CAD Reference : SP14/12/SITE/A/S17/PLO-05/A/P02

Scale : 1:800 @ A3

Date : 14/04/2023

N

Plan

3a-4

UNEXCAVATED

WELFARE

LIFT TOWER

E&M / OTHERS SERVICES

+37.50

WELFARE

LIFT LOBBY

E&M / OTHERS SERVICES

+37.50

12

+37.50

13

CW

31.9

翠田樓

Tsui Tin House

31.9

CW

32.2

CW

裕田樓

Yue Tin House

House

Note: All levels are indicated as Finished Floor Level

Pak Tin Estate Redevelopment - Phase 12

Scenario 1 - Second to Fourth Floor Plan (for illustration only)

LEGEND

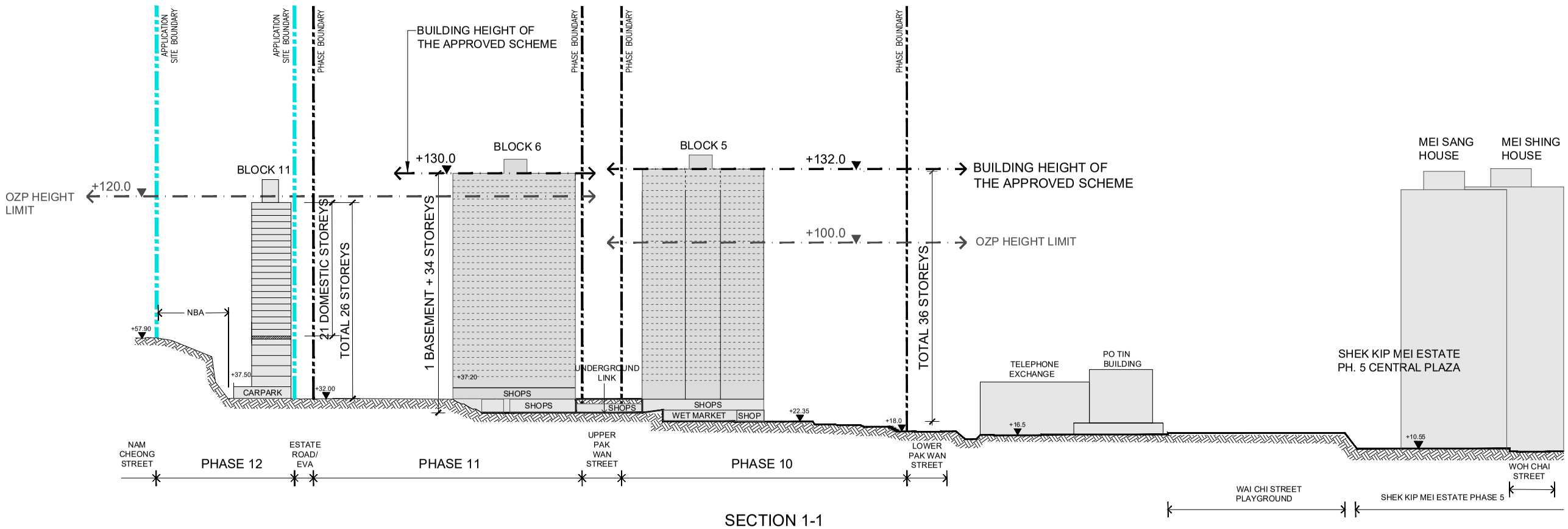
- Application Site Boundary
- Net Site Boundary
- Lift Lobby
- Lift Tower
- Welfare
- Domestic

Drawing Number : SP14/12/SITE/A/TPB/LO-24/P00

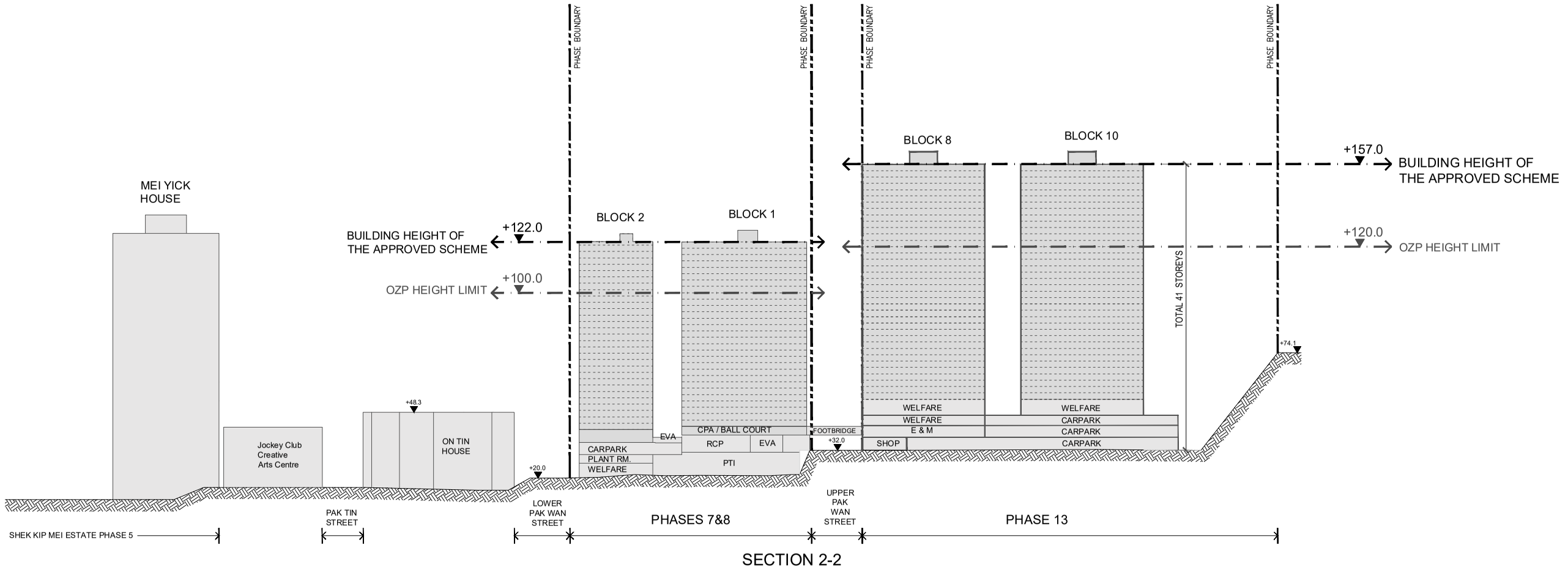
CAD Reference : SP14/12/SITE/A/S17/PLO-06/A/P02

Scale : 1:800 @ A3

Date : 14/04/2023



SECTION 1-1



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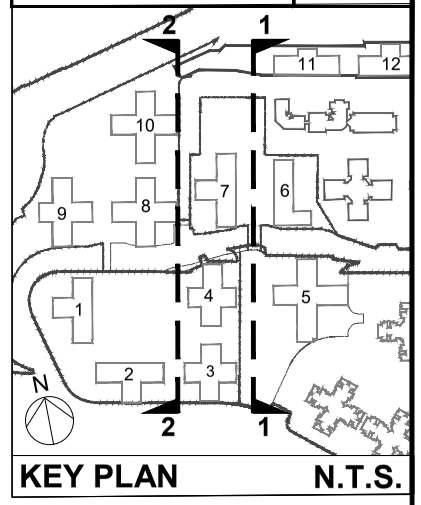


Note: All levels are indicated as Finished Floor Level

Pak Tin Estate Redevelopment - Phase 12

Scenario 1 - Site Section (for illustration only)

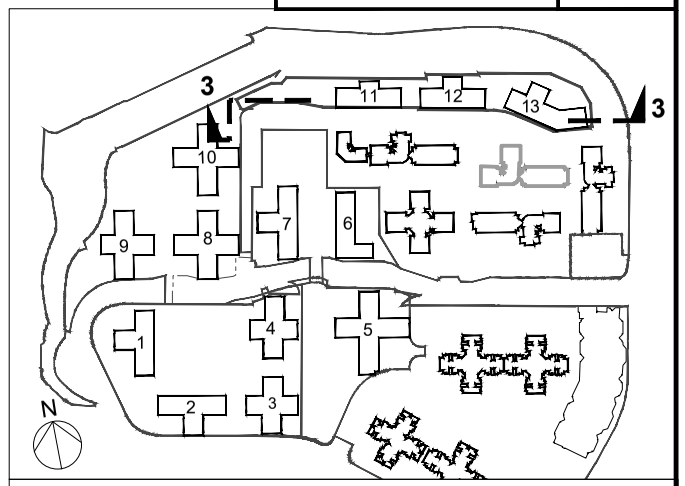
LEGEND
- Application Site Boundary
- Phase Boundary

Drawing Number : SP14/12/SITE/A/TPB/LO-31

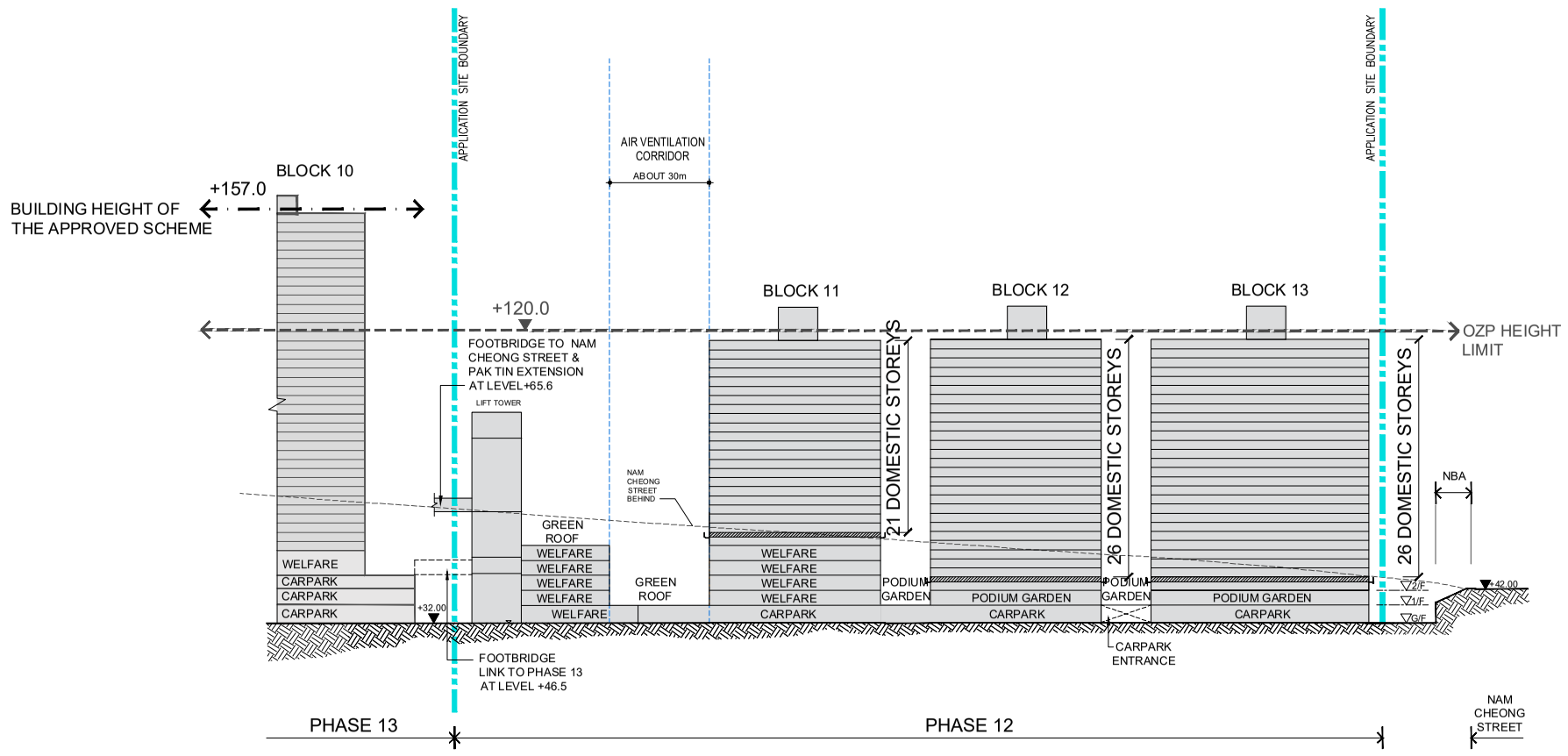
CAD Reference : SP14/HR/SITE/A/TPB-03/P14

Scale : 1:2000 @ A3

Date : 22/08/2023



KEY PLAN N.T.S.



SECTION 3-3

Note: All levels are indicated as Finished Floor Level

Pak Tin Estate Redevelopment - Phase 12

Scenario 1 - Site Section (for illustration only)

LEGEND

Application Site Boundary

Drawing Number : SP14/12/SITE/A/TPB/LO-32/P00

CAD Reference : SP14/12/SITE/A/S17/PLO-11/P02

Scale : 1:2000 @ A3

Date : 14/04/2023

Design Scheme

N

Plan 3b-1

PROPOSED PUBLIC HOUSING SITE (CHAK ON ROAD SOUTH & PAK TIN EXTENSION)

PHASE 12

PHASE 11

PHASE 13 +46.70

PHASES 7&8

PHASE 10

PHASE 9

11 12 13 10 9 8 7 6 5 4 3 2 1

NAM CHEONG STREET 南昌街

PAK WAN STREET 白雲街

南昌街

白雲街

CHAK ON ROAD

澤安道南

運輸署 澤安道考試中心 Transport Department Driving Test Centre

石硤尾消防局 Shek Kip Mei Fire Station

聖公會李嘉誠護理安老院 SKH Li Ka Shing Care And Attention Home For The Elderly

賽馬會新生精神康復學院 Jockey Club New Life Institute of Psychiatric Rehabilitation Association

T.W.G.Hs. Chang Ming Thien College 東華三院張明添中學

C.M.A. Second

Tennis Courts 網球場

Shek Kip Mei Park Sports Centre 石硤尾公園運動場

Football Field 球場

Pak Tin Ambulance Depot (Under)

TSUI TIN HOUSE 翠田樓

YUE TIN HOUSE 裕田樓

FU TIN HOUSE 富田樓

YUN TIN HOUSE 潤田樓

CHAK TIN HOUSE 澤田樓

PAK TIN COMMUNITY COMPLEX

SHING TIN HOUSE 盛田樓

CHEUNG TIN HOUSE 昌田樓

SHUI TIN HOUSE 瑞田樓

TAI TIN HOUSE 太田樓

Pak Tin Street

FOOTBRIDGE

FOOT-BRIDGE

30m

ABOUT 15m

NBA

Note: All levels are indicated as Finished Floor Level

Pak Tin Estate Redevelopment - Phase 12

Scenario 2 - Master Layout Plan (Block Plan) (for illustration only)

Phase 12 Block

LEGEND

- Application Site Boundary
- Phase Boundary
- Net Site Boundary
- Non-building Area
- Proposed Air Ventilation Corridor
- Underground Link

Drawing Number : SP14/12/SITE/A/TPB/LO-01/P00

CAD Reference : SP14/12/SITE/A/PLO-03/A

Scale : 1:1500 @ A3

Date : 14/04/2023

N

Plan

3b-2

UNEXCAVATED

CARPARK

LIFT TOWER

E&M / OTHERS SERVICES

LIFT LOBBY +32.15

+32.00

31.9

32.2

CW

翠田樓

Tsui Tin House

裕田樓

Yue Tin House

Note: All levels are indicated as Finished Floor Level

Pak Tin Estate Redevelopment - Phase 12

Scenario 2 - Ground Floor Plan (for illustration only)

LEGEND

- Application Site Boundary
- Net Site Boundary
- Lift Lobby
- Lift Tower
- E&M/ Others Services/ Carpark

Drawing Number : SP14/12/SITE/A/TPB/LO-02/P00

CAD Reference : SP14/12/SITE/A/S17/PLO-04/A/P02

Scale : 1:800 @ A3

Date : 14/04/2023

N

Plan

3b-3

UNEXCAVATED

WELFARE
+38.40

E&M / OTHERS SERVICES

LIFT TOWER

LIFT LOBBY

CARPARK
+38.40

LIFT LOBBY

翠田樓

Tsui Tin House

裕田樓

Yue Tin House

31.9

32.2

CW

Note: All levels are indicated as Finished Floor Level

Pak Tin Estate Redevelopment - Phase 12

Scenario 2 - First Floor Plan (for illustration only)

LEGEND

- Application Site Boundary
- Net Site Boundary
- Lift Lobby
- Lift Tower
- Welfare
- E&M/ Others Services/ Carpark

Drawing Number : SP14/12/SITE/A/TPB/LO-03/P00

CAD Reference : SP14/12/SITE/A/S17/PLO-05/A/P02

Scale : 1:800 @ A3

Date : 14/04/2023

N

Plan

3b-4

UNEXCAVATED

E&M / OTHERS SERVICES

E&M / OTHERS SERVICES

E&M / OTHERS SERVICES

CARPARK

+43.00

WELFARE

+43.00

E&M / OTHERS SERVICES

LIFT TOWER

E&M / OTHERS SERVICES

LIFT LOBBY

LIFT LOBBY

E&M / OTHERS SERVICES

LIFT LOBBY

LIFT LOBBY

LIFT LOBBY

+42.70

CW

31.9

翠田樓

Tsui Tin House

31.9

CW

CW

32.2

裕田樓

Yue Tin House

House

Note: All levels are indicated as Finished Floor Level

Pak Tin Estate Redevelopment - Phase 12

Scenario 2 - Second Floor Plan (for illustration only)

LEGEND

- Application Site Boundary
- Net Site Boundary
- Lift Lobby
- Lift Tower
- Welfare
- E&M/ Others Services/ Carpark

Drawing Number : SP14/12/SITE/A/TPB/LO-04/P00

CAD Reference : SP14/12/SITE/A/S17/PLO-06/A/P02

Scale : 1:800 @ A3

Date : 14/04/2023

N	Plan	3b-5

UNEXCAVATED

NAM CHEONG STREET

HA's OFFICE

+47.50

LIFT TOWER

E&M / OTHERS SERVICES

LIFT LOBBY

+47.50

LIFT LOBBY

+49.15

+49.00

翠田樓

Tsui Tin House

裕田樓

Yue Tin House

Note: All levels are indicated as Finished Floor Level

Pak Tin EstateRedevelopment - Phase 12

Scenario 2 - Third Floor Plan (for illustration only)

LEGEND

- Application Site Boundary
- Net Site Boundary
- Lift Lobby
- Lift Tower
- Welfare
- HA's Office
- E&M/ Others Services/ Carpark

Drawing Number : SP14/12/SITE/A/TPB/LO-05/P00

CAD Reference : SP14/12/SITE/A/S17/PLO-07/A/P02

Scale : 1:800 @ A3

Date : 14/04/2023

N

Plan

3b-6

lic Health
atory Centre
生檢測中心

Shek Kip Mei
Fire Station
石硤尾消防局

ESS

SKH Li Ka Shing
Care And Attention Home
For The Elderly
聖公會李嘉誠護理安老院

新生精神康復會
New Life Psychiatric Rehabilitation Association

T.W.G.Hs.
Chang Ming Thien College
東華三院張明添中學

NAM CHEONG STREET

BUS STOP

BUS STOP

FOOTBRIDGE TO
NAM CHEONG STREET &
PAK TIN EXTENSION
AT LEVEL +65.6

LIFT TOWER

E&M /
OTHERS
SERVICES

+52.00

E&M /
OTHERS
SERVICES

LIFT
LOBBY
+52.15

+49.00

+49.00

12

13

翠田樓

Tsui Tin House

裕田樓

Yue Tin House

Note: All levels are indicated as Finished Floor Level

Pak Tin EstateRedevelopment - Phase 12

Scenario 2 - Fourth Floor Plan (for illustration only)

LEGEND

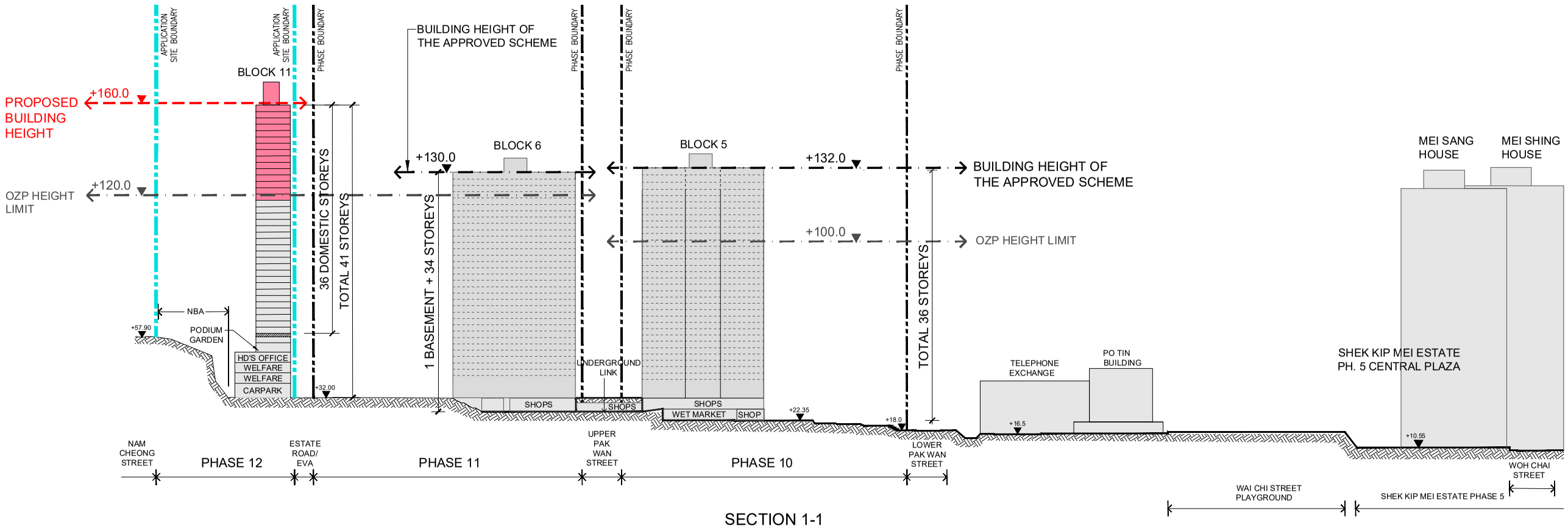
- Application Site Boundary
- Net Site Boundary
- Lift Lobby
- Lift Tower
- Domestic
- E&M/ Others Services/ Carpark

Drawing Number :
SP14/12/SITE/A/TPB/LO-06/P00

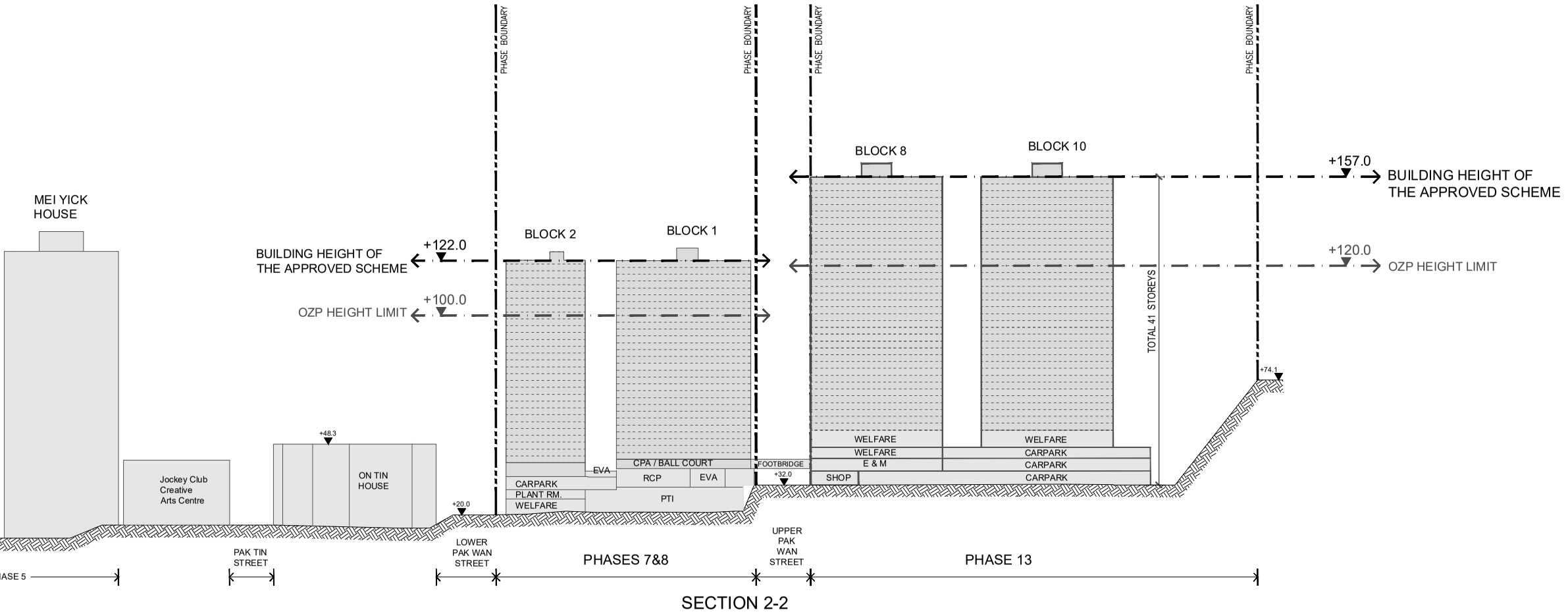
CAD Reference : SP14/12/SITE/A/S17/PLO-08/A/P02

Scale : 1:800 @ A3

Date : 14/04/2023



SECTION 1-1



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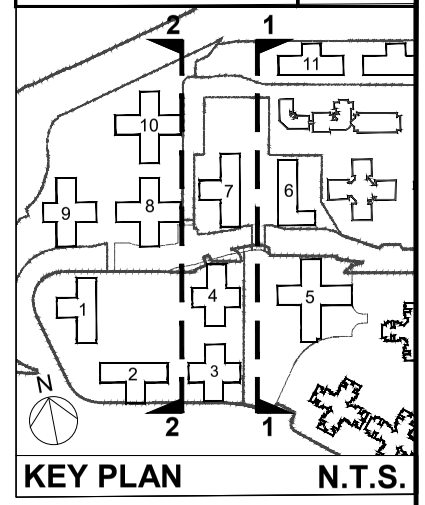


Note: All levels are indicated as Finished Floor Level

Pak Tin Estate Redevelopment - Phase 12

Scenario 2 - Site Section (for illustration only)

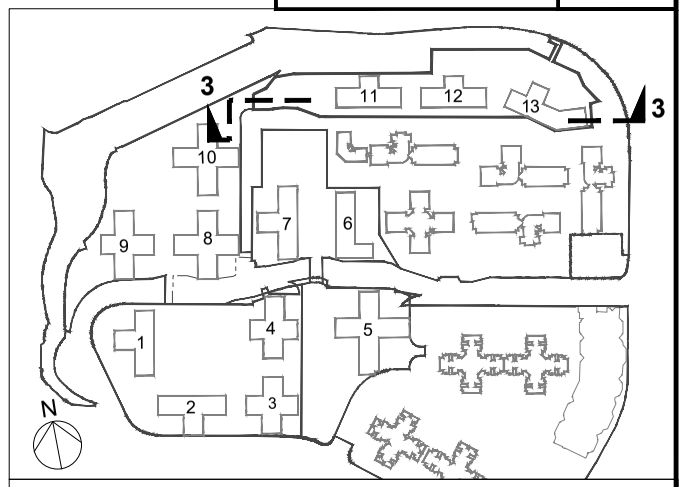
LEGEND
- Application Site Boundary
- Phase Boundary

Drawing Number : SP14/12/SITE/A/TPB/LO-11/P00

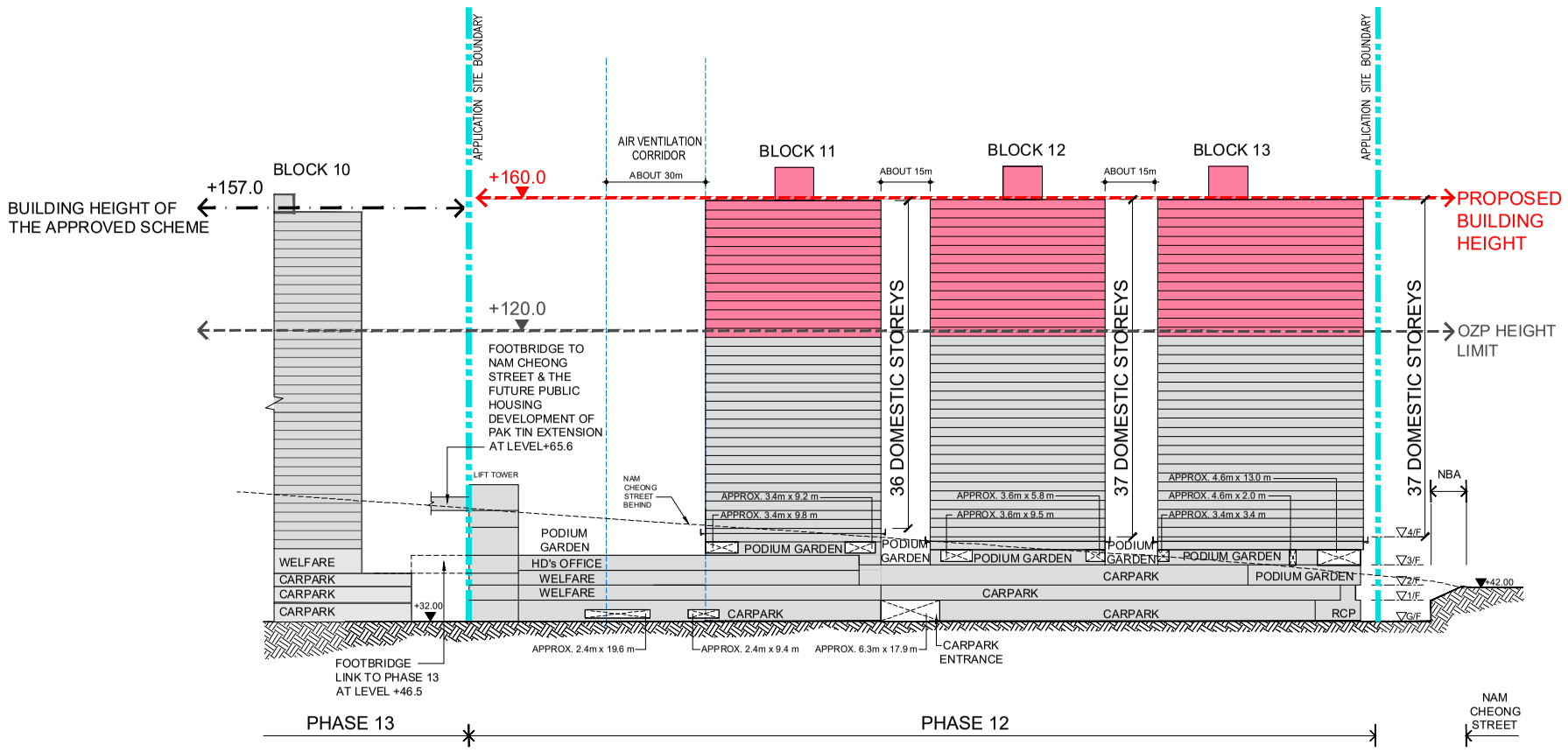
CAD Reference : SP14/HR/SITE/A/TPB-03/P14

Scale : 1:2000 @ A3

Date : 14/04/2023



KEY PLAN N.T.S.



SECTION 3-3

Note: All levels are indicated as Finished Floor Level

Pak Tin Estate Redevelopment - Phase 12

Scenario 2 - Site Section (for illustration only)

LEGEND

Application Site Boundary

Drawing Number : SP14/12/SITE/A/TPB/LO-121/A

CAD Reference : SP14/12/SITE/A/S17/PLO-11/P02

Scale : 1:2000 @ A3

Date : 28/08/2023

ANNEX 3

N

Shek Kip Mei
Fire Station
石硤尾消防局

ESS

SKH Li Ka Shing
Care And Attention Home
For The Elderly
聖公會李嘉誠護理安老院

新生精神康復會
New Life Psychiatric Rehabilitation Association

T.W.G.Hs.
Chang Ming Thien College
東華三院張明添中學

332

338

300

298

65.7

62.1

57.9

53.8

50.3

47.6

BUS STOP

BUS STOP

南昌街 NAM CHEONG STREET

ESS

FOOTBRIDGE ABOVE TO PAK TIN EXTENSION AT LEVEL +48.6

LIFT TOWER FROM LEVEL +32.3 TO +65.6

+51.5

GREEN ROOF

FOOTBRIDGE BELOW TO PHASE 13 AT LEVEL +46.5

TAI CHI PLAZA
(MULTI FUNCTION AREA)

COMMUNITY FARM

BLOCK 11

BLOCK 12

BLOCK 13

31.9

32.2

翠田樓 Tsui Tin House

裕田樓 Yue Tin House

CW

LEGEND:

- GROSS SITE BOUNDARY
- NET SITE BOUNDARY
- PLANTING AREA
- GREEN ROOF
- PROPOSED TREE
- COMMUNAL PLAY AREA
- FITNESS AREA

PROJECT
PUBLIC HOUSING REDEVELOPMENT AT PAK TIN ESTATE PHASE 12

DRAWING TITLE
LANDSCAPE MASTER LAYOUT PLAN

1:750 (A3)

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獲授權下發布、分發或複製該等圖則的行為，一律嚴格禁止。
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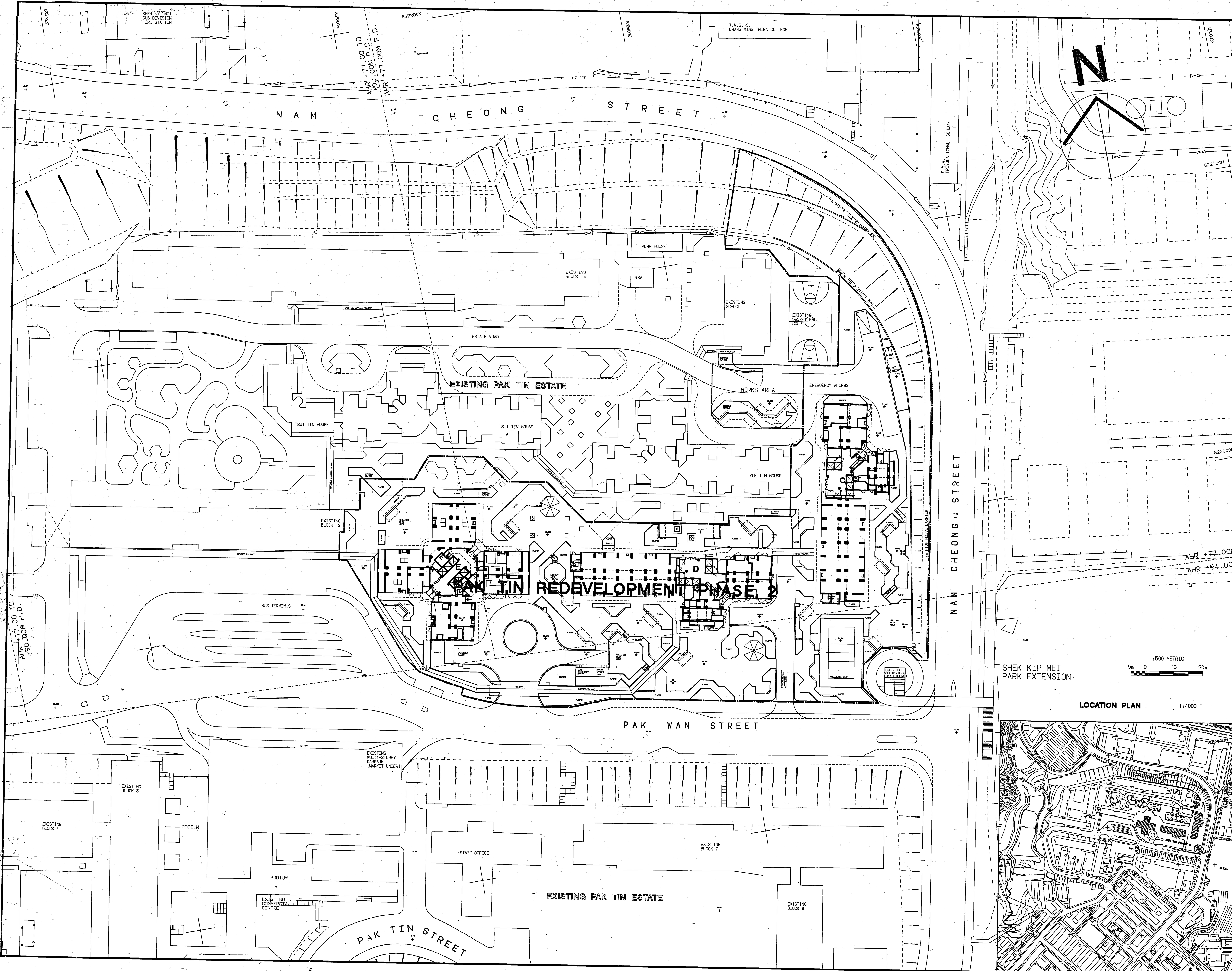
房屋署
HOUSING DEPARTMENT

DRAWING NO.: SP14/12/SITE/A/PLO-13/A

DATE: 10/02/2023

13

NOISE BARRIER ALONG NAM CHEONG STREET



NOTES

LEGEND

- PAK TIN PHASE 2 BOUNDARY LINE
- PAVILION
- PERGOLA
- TREE GRILLE
- SEATING BENCH
- EMERGENCY CRASH GATE
- SEATING BENCH AROUND TREE GRILLE
- CHESS TABLE & STOOLS

REVISIONS

NO	DESCRIPTION AND DATE	INITIAL/DESIGNATION DWN	CKD	AUTH

PT-2-001

	DESIGNATION		INITIAL	DATE
AUTHORISED	CA/4	J. LO	[signature]	10.5.95
CHECKED	SA/18	J. NG	[signature]	9.5.95
	A/20	P. CHOW	[signature]	4.5.95
	STOA/10	C.W. FUNG	[signature]	28.4.95
DRAWN	TOA/042	C.M. TAM	[signature]	28.4.95

PROJECT

PAK TIN
REDEVELOPMENT PHASE 2

DRAWING TITLE

MASTER LAYOUT PLAN AND LOCATION PLAN

SCALE 1:500

DRAWING NO

KL23/2/MSTR/A/LO-01

SOURCE

CADAM V3R2 B1 707 X 1000

CONSTRUCTION BRANCH
HOUSING DEPARTMENT

A65163

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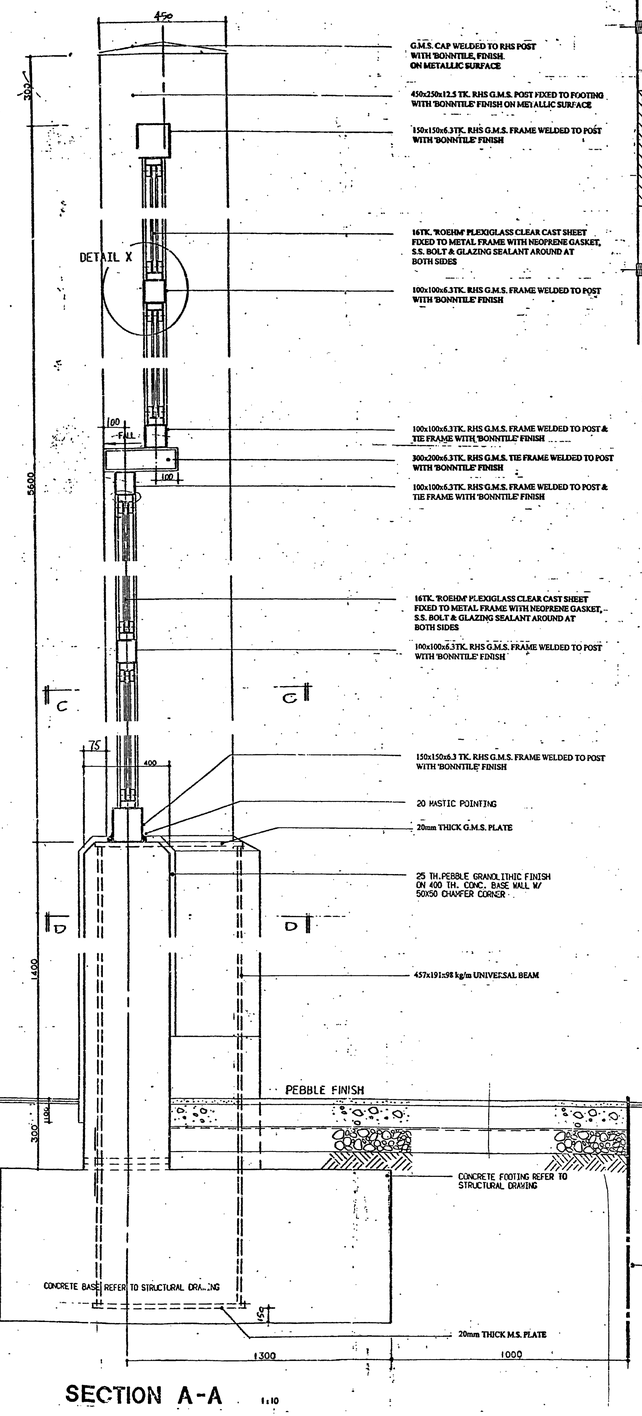
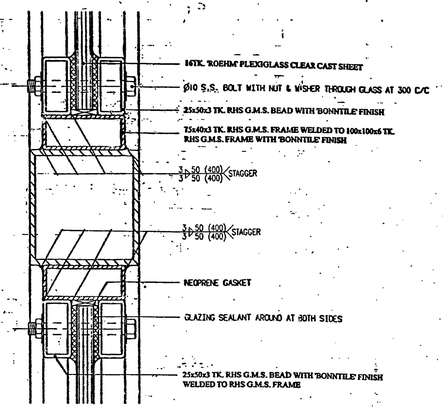
NOTES :

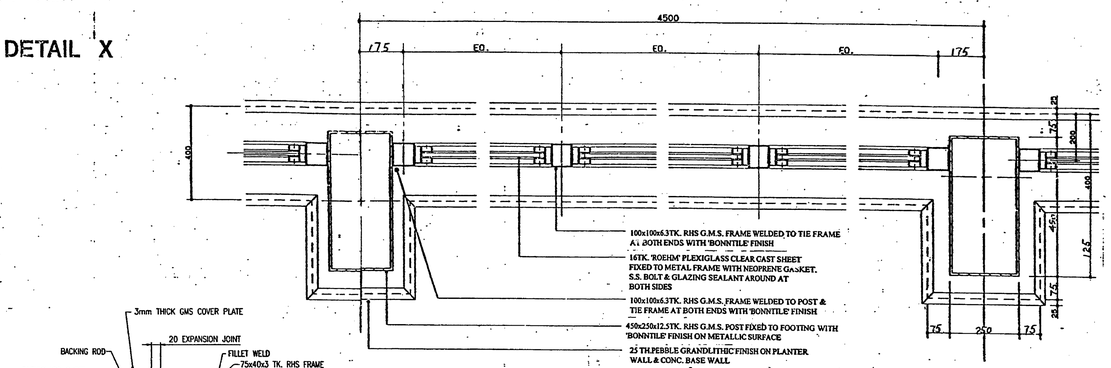
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DRAWING NO. 0124/B03/S01.
2. ALL WELDS ARE 5mm FILLET WELD FULL LENGTH ALL ROUND UNLESS OTHERWISE STATED.

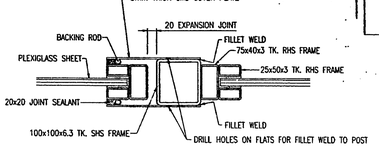


SECTION A-A 1:10

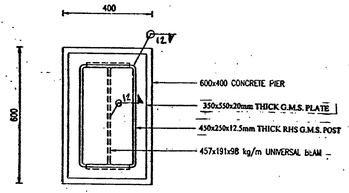


DETAIL X

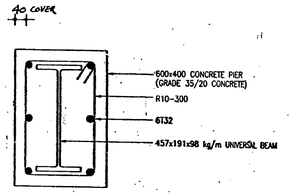




SECTION E-E 1:5

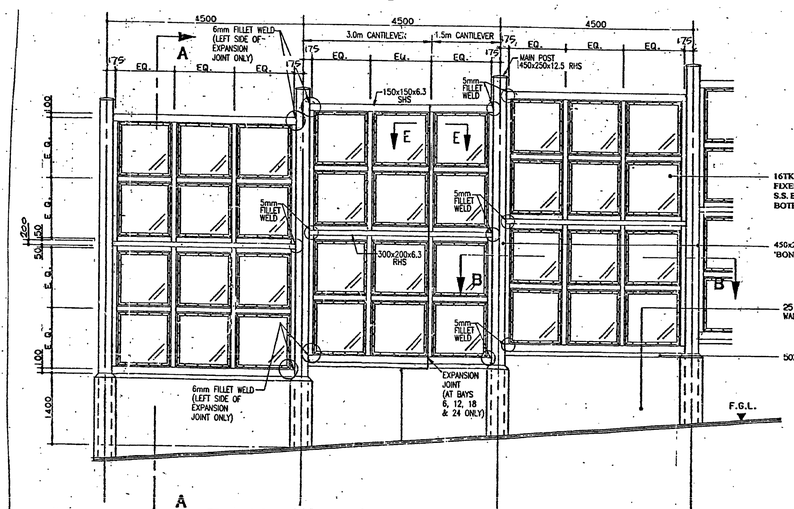


SECTION C-C



SECTION D-D

SECTION B-B 1:10



TYPICAL ELEVATION OF STRAIGHT NOISE BARRIER FACING NAM CHEONG STREET (FROM BAY 1 TO BAY 24) 1:50

S/7787

ORIGINAL

revision	date	description	drawn	initial
	1-8-98	AS-BUILT RECORD		
B	1-8-98	GENERAL REVISION	TKY	WKY
A	5-5-97	CONCRETE GRADE REVISED	WLS	WKY

	designed	checked	drawn	checked
initial	KYC	WKY	WLS	WKY
date	2/97	2/97	2/97	2/97

approved

project: REDEVELOPMENT OF PAK TIN ESTATE PHASE 2

drawing title: DETAILS OF NOISE BARRIER (SHEET 1)

plan register no.: 0124/B03/001

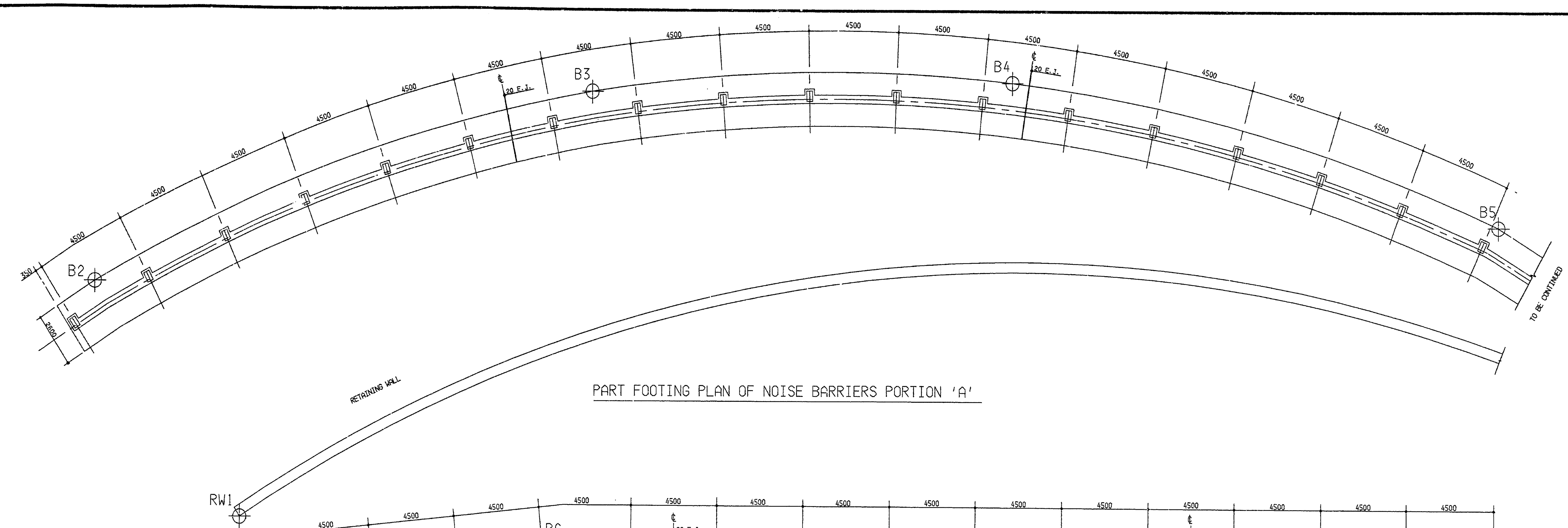
scale: AS SHOWN

revision: B

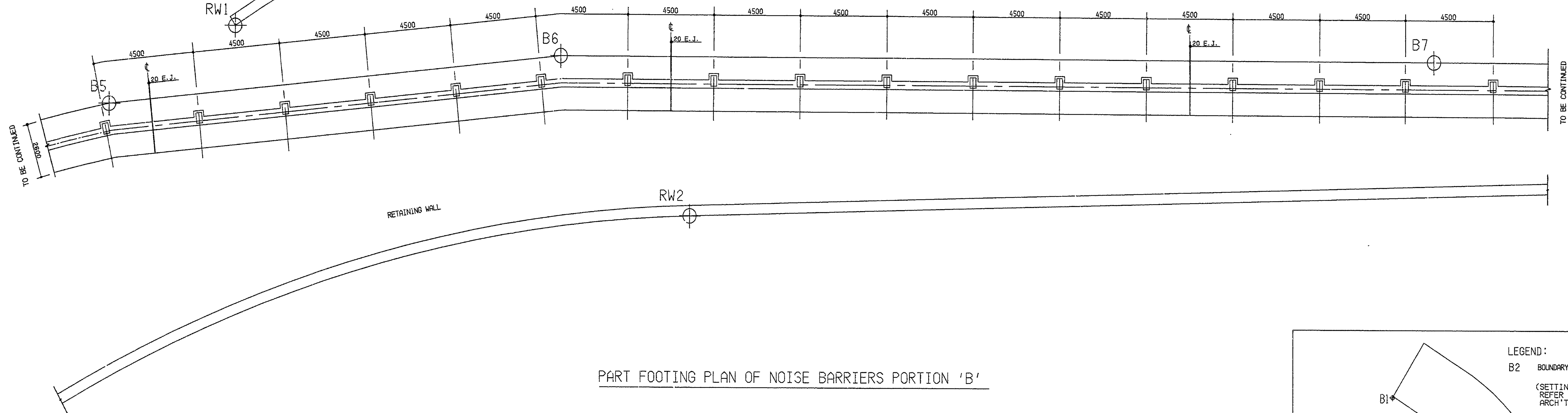
client: WECON LIMITED CONSTRUCTION & ENGINEERING

architect:

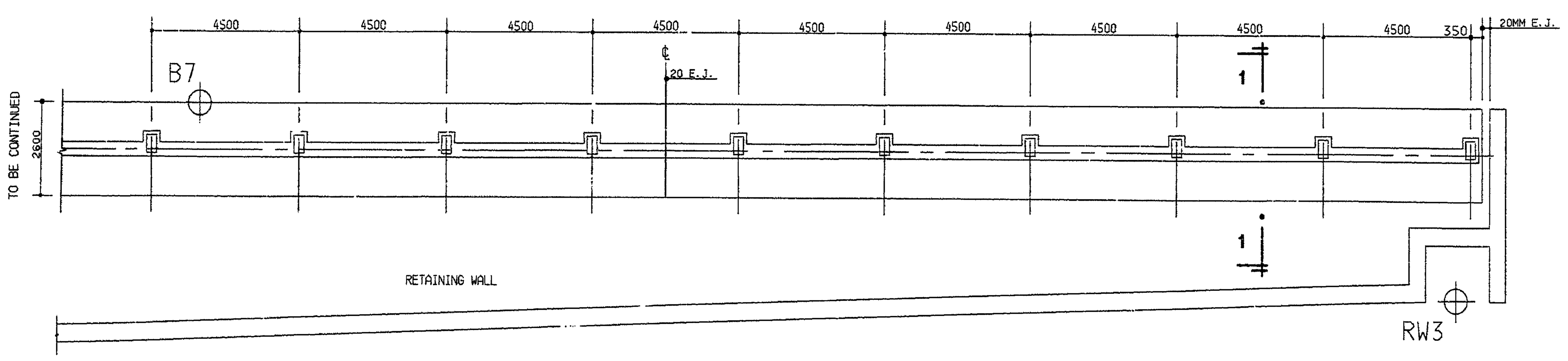
BINNIE CONSULTANTS LIMITED 賓尼工程顧問有限公司 CONSULTING ENGINEERS 賓尼



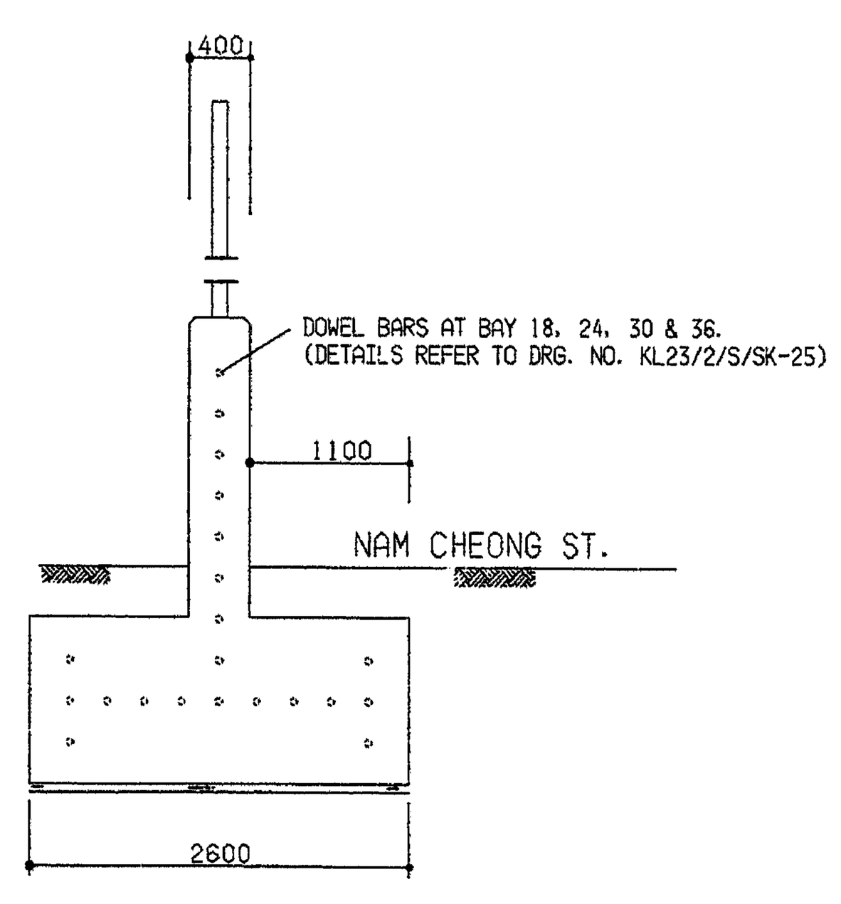
PART FOOTING PLAN OF NOISE BARRIERS PORTION 'A'



PART FOOTING PLAN OF NOISE BARRIERS PORTION 'B'

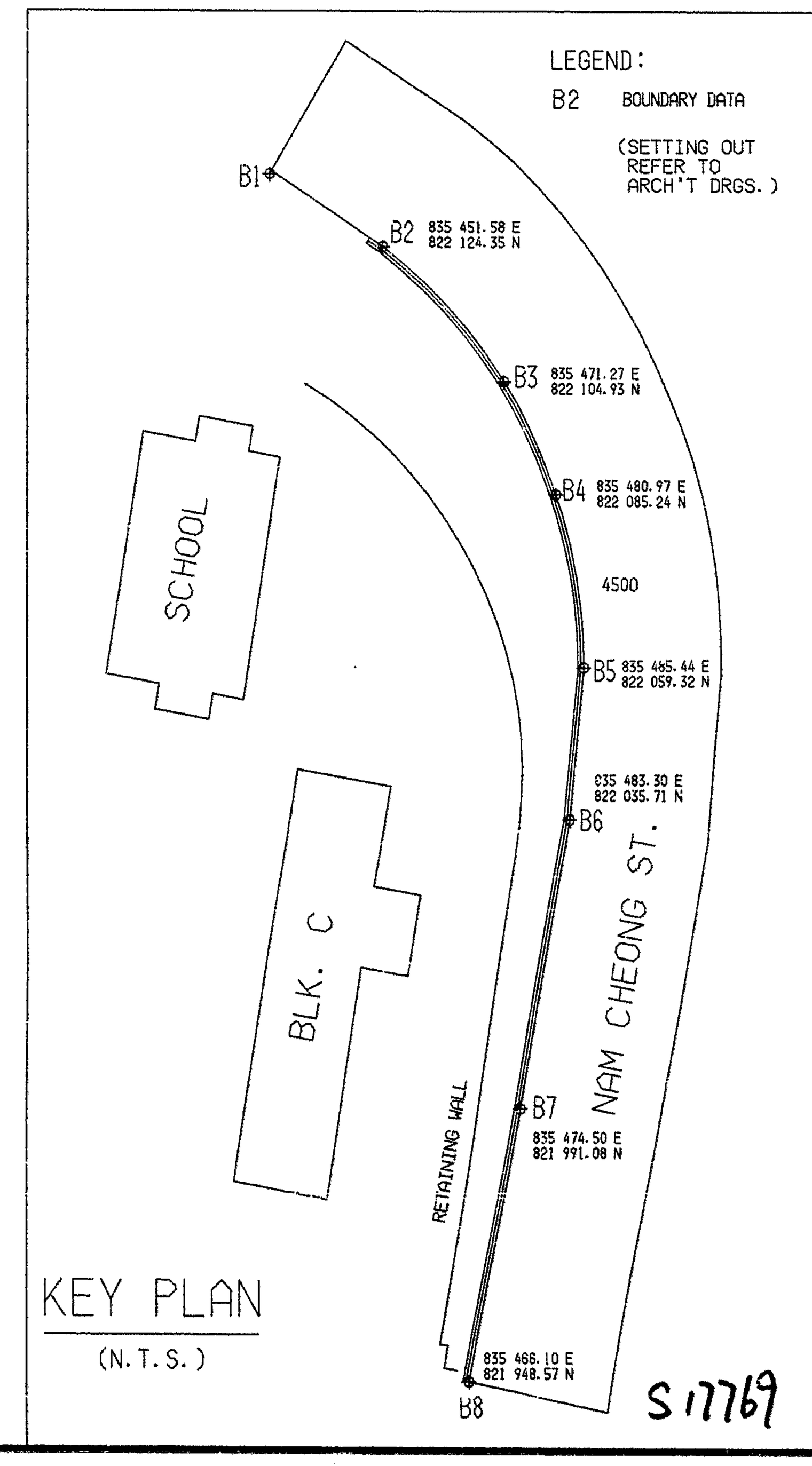


PART FOOTING PLAN OF NOISE BARRIERS PORTION 'C'



SEC 1 - 1

(FOR DETAILS SEE DRG. NO. KL23/2/EW/S/ED-07 & 08)



KEY PLAN

(N.T.S.)

S 17769

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS' AND ARCHITECT' DRAWINGS.
2. FOR SETTING OUT, REFER TO REVELANT ARCH'T DRGS.
3. THIS DRG. IS TO READ INCONJUNCTION WITH KL23/2/EW/S/ED-07 & KL23/2/EW/S/ED-08.
4. DESIGN BEARING CAPACITY OF SOIL FOR FOOTING IS 100 kpa.

ORIGINAL

REVISIONS

NO	DESCRIPTION AND DATE	DWN	CKD	AUTH
		INITIAL/ DESIGNATION		
A	1. SETTING OUT OF NOISE BARRIER CLARIFIED. (09/96)	TO(S)102	STO(S) 24	SE/23
		ORIGINAL SIGNED		
B	1. DOWEL BARS FOR EXPANSION JOINT ADDED. (11/97)	TO(S)53	STO(S) 24	SE/23

	DESIGNATION		INITIAL	DATE
AUTHORISED	D.S.C. LEE	CSE/1	ORIGINAL SIGNED	4/95
CHECKED	N.C.K. LO	SSE/3	ORIGINAL SIGNED	4/95
	K.H. LAM	SE/41	ORIGINAL SIGNED	3/95
	W.Y. HUI	STO(S)24	ORIGINAL SIGNED	3/95
DRAWN	T.K. LAM	TOS/102	ORIGINAL SIGNED	3/95

PROJECT

REDEVELOPMENT OF PAK TIN ESTATE PHASE 2

DRAWING TITLE

FOOTING PLAN OF NOISE BARRIERS (SH 1 OF 3)

SCALE 1 : 50 & 1 : 25

DRAWING NO

KL23/2/EW/S/ED-06/B

SOURCE

CADAM V3R2 B1 707 X 1000

CONSTRUCTION BRANCH
HOUSING DEPARTMENT