

Prepared for

Hong Kong Housing Authority

Prepared by

Ramboll Hong Kong Limited

PUBLIC HOUSING DEVELOPMENT AT WANG CHIU ROAD PHASE 2

AIR VENTILATION ASSESSMENT

Date **3 December 2021**

Prepared by **Echo Cao**
Assistant Environmental Consultant

Signed



Approved by **Steve Lo**
Senior Environmental Consultant

Signed



Project Reference **HD-EDSF3ED00**

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Ramboll Hong Kong Limited

21/F, BEA Harbour View Centre
56 Gloucester Road, Wan Chai, Hong Kong

Tel: (852) 3465 2888
Fax: (852) 3465 2899
Email: hkinfo@ramboll.com

Q:\Projects\HD-EDSF3ED00\08 Wang Chiu Road Phase 2\04 Deliverables\03 BEAM

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1. INTRODUCTION

1.1 Project Background

- 1.1.1 The Proposed Development is located at Wang Chiu Road, Kwun Tong.
- 1.1.2 Ramboll Hong Kong Limited has been commissioned by Hong Kong Housing Authority to undertake the CFD Simulation for the proposed housing development to show compliance with credit SS 8c under BEAM Plus New Buildings version 2.0.

1.2 Objectives

- 1.2.1 The objective of this document is to ensure the microclimate around and adjacent to the building has been adequately considered, and where appropriate, suitable mitigation measures are provided.

1.3 Subject Site and its Environs

- 1.3.1 The current status of the Subject Site is WIP (Working in Progress). The terrain near the Subject Site is generally flat with around 5-6mPD.
- 1.3.2 The Subject Site is zoned R(A) under Ngau Tau Kok & Kowloon Bay Outline Zoning Plan (OZP No. S/K13/30) gazetted under Section 9 on 08/05/2020.
- 1.3.3 Figure 1 shows the location and the environs of the Subject Site.

2. DEVELOPMENT SCHEMES TO BE STUDIED

2.1 Baseline Scheme

- 2.1.1 The Baseline Scheme is referenced to the layout identified in previous AVA EE report dated September 2016. There are two domestic blocks with main roof at height of not more than 120mPD. Also, there's one storey height podium (about 5.65m high) accommodating retails, social welfare and ancillary facilities. Appendix 1 shows the layout of the Baseline Scheme.

2.2 Proposed Scheme

- 2.2.1 **Appendix 2** shows the layout of the proposed scheme for assessment purposes. The proposed scheme comprises two high-rise residential blocks (including Podium Level 1 linking Block 1 and Block 2 and Podium Level 2 at Block 2 serving as social welfare such as elderly centre, pre-school rehabilitation, etc.), with the rooftop at 120mPD.

3. SITE WIND AVAILABILITY

3.1 Regional Atmospheric Modelling System (RAMS)

- 3.1.1 According to the Planning Department's website, a meso-scale Regional Atmospheric Modeling System (RAMS) was used to produce a simulated 10-year wind climate at the horizontal resolution of 0.5 km x 0.5 km covering the whole territory of Hong Kong. The simulated wind data represents the annual, winter and summer wind conditions at various levels, i.e. 200 m, 300 m, and 500 m above terrain.
- 3.1.2 It is considered an acceptable starting point to use the simulated RAMS data for site wind availability. The use of RAMS data (grid: X:087, Y:045) is preferred over measurement data at Waglan Island as it can reflect the effect of topography to wind availability.
- 3.1.3 The relevant annual windrose for the district under concern has been extracted from the Planning Department's website for Subject Site wind availability data. **Figure 2** shows the relevant windrose diagram (at 500 m) representing the frequency and wind speed distribution of the district concerned for both summer and annual conditions.
- 3.1.4 **Table 2.1** summarized the simulated wind availability data including probability of occurrence. The wind directions with highest probability of occurrence are selected for AVA purpose. A total of 11 wind directions have been selected (as highlighted in **Table 3.1**) with overall frequency of occurrence equivalent to 77% and 81.9% respectively of the time in a year (for both annual and summer conditions).

Table 3.1 Summary of RAMS Data and Wind Direction

Wind Direction	Probability for Annual Condition (%)	Probability for Summer Condition (%)
N	2.8	0.9
NNE	5.7	1.0
NE	8.0	1.4
ENE	11.9	2.6
E	19.8	8.5
ESE	10.8	9.3
SE	8.5	8.2
SSE	4.9	8.3
S	4.4	8.9
SSW	5.8	13.0
SW	6.5	15.3
WSW	4.1	10.4
W	2.6	5.5
WNW	1.5	3.0
NW	1.2	1.9
NNW	1.5	1.3

4. QUANTITATIVE ASSESSMENT METHODOLOGY

4.1 Atmospheric Conditions

- 4.1.1 Simulated wind profile curves are extracted from the Planning Department's website using RAMS site wind availability data and would be utilized for quantitative AVA according to the selected wind directions in **Table 2.1**. Figure 5 shows the wind profiles curves for grid X:087, Y:045.
- 4.1.2 For elevation from 0 to 10 m where wind profile information is not available, the wind speed is assumed based on fitted Log Law and measured wind speed value at 10 m from the RAMS site wind availability data for each wind profile curve.

4.2 CFD Code and Major Parameters

- 4.2.1 A quantitative assessment based on the requirement for Initial Study stipulated in the relevant Technical Guide has been conducted for the purpose of comparing the air ventilation performance between the Proposed and the Baseline Schemes.
- 4.2.2 The quantitative assessment is conducted by using a commercial CFD code, FLUENT. FLUENT model has been widely applied for various AVA research and studies worldwide. The accuracy level of the FLUENT model is well-accepted by the industry for AVA application.
- 4.2.3 Realizable K-epsilon turbulence providing better prediction of separation and vortexes has been adopted for air ventilation assessment as recommended in COST action C14.
- 4.2.4 The assessment area is determined by the height (H) of the highest building within the surrounding area (i.e. tallest building within Subject Site). Therefore, the assessment area shall be at least 1H (with H=120 m) from the project site boundary.
- 4.2.5 The domain covers the model area of over 550m. The surrounding area is determined by 2 times the height of the highest building within the model area which is equivalent to at least 2H of the highest building (i.e. >2H where H=120 m) from the project site boundary. It is confirmed that all major noise barriers, elevated structures, and planned / committed / existing developments in the model area have been modelled in the simulation.
- 4.2.6 The domain dimension is about 3300m x 3300m and with an elevation of 1000m. More than 7,470,000 grid cells have been defined to simulate the air flow. Given the large domain adopted in this assessment and the physical limitation on the computational resources of the CFD model, the horizontal and vertical grid size employed in the CFD model in the vicinity of the Project Area is taken as a global minimum size of 2m, and the size of the grid cells further away from the Project Area is increased by a growth ratio of 1.3. The global maximum size of cells is 32m while smaller cells size of 0.5m were used. Besides, four layers of prism cells (each layer of 0.5m thickness) are employed above the terrain of Subject Site. The blockage ratio is less than 3%.
- 4.2.7 The windward boundary is defined as inflow with the wind profile defined. The leeward boundary is defined as outflow. The sky and lateral boundaries are defined as a symmetric boundary condition.
- 4.2.8 The advection terms of the momentum and viscous terms are resolved with the second order numerical schemes. The scaled residuals are converged to an order of magnitude of at least 1×10^{-4} as recommended in COST action C14.

4.3 Test Point Location

- 4.3.1 A total of 80 test points are proposed including 30 numbers of perimeter test points defined along the boundary of the Subject Site and 50 numbers of overall test points within the assessment area. The overall test points generally represent important pedestrian areas.

All test points located at 2m above ground level. **Figure 4** shows the test points selected for quantitative air ventilation assessment.

5. KEY FINDINGS

5.1 Spatial Average Wind Velocity Ratios

- 5.1.1 The velocity ratio under a specific wind direction at a test point is calculated by dividing the simulated wind speed at the test point under this wind direction with the velocity at gradient height under the same wind direction. All test points are located at 2 m above ground level.
- 5.1.2 **Table 5-1 Error! Reference source not found.** shows the Application Sites spatial average velocity ratio (SVR), local spatial average velocity ratio (LVR) during both annual and summer condition for the Baseline Scheme (BS) and the Proposed Scheme (PS).
- 5.1.3 The SVR cover all perimeter test points and it gives a hint of how the development proposal impacts the environment of its immediate vicinity. On the other hand, the LVR cover all perimeter and overall test points and it gives a hint of how the development proposal impacts the wind environment of the local area.
- 5.1.4 **Appendix 4** shows detailed simulation results of the Baseline Scheme and the Proposed Scheme respectively.

5.2 Assessment Result

- 5.2.1 The simulated wind velocity ratio after development of the 10 selected wind directions is illustrated in **Table 5-1**. All test point results are taken at 2m above pedestrian level. Contour and vector plots at pedestrian level are shown in **Appendix 3**.

Table 5-1 Summary of Spatial Average Wind Velocity Ratios (VR) – Baseline Scheme and Proposed Scheme

Spatial Average Wind Velocity Ratio (VR)	Test Points	Annual Condition		Summer Condition	
		BS	PS	BS	PS
SVR	P01-P30	0.19	0.20	0.12	0.12
LVR	P01-P30, T01-T50	0.21	0.21	0.17	0.17

Note: Highlighted in **red** where VR is higher in the Proposed Scheme

- 5.2.2 According to **Table 5-1**, the SVR is improved in the Proposed Scheme under annual condition. While the SVR under summer condition and the LVR under both annual and summer conditions are comparable between two design options. It is believed that the ventilation performance improved near to the site boundary under annual condition.

6. CONCLUSION

- 6.1.1 The proposed development located at Wang Chiu Road has been evaluated from an air ventilation assessment.
- 6.1.2 The SVR is improved in the Proposed Scheme under annual condition as there is more permeable design at ground floor. While the SVR under summer condition and the LVR under both two conditions remains the same. It is believed that the ventilation performance improved near to the site boundary.
- 6.1.3 CFD model under both annual and summer condition has been demonstrated. For annual condition, one of these two ratios (i.e. SVR) increases while the other ratio (i.e. LVR) remains the same. For summer conditions, both the two ratios remains the same. Thus, the proposed building design complies with the air ventilation assessment requirements for BEAM Plus SS 8c v2.0 for New Buildings. **2 credits** shall therefore be attained for this portion.

Figures

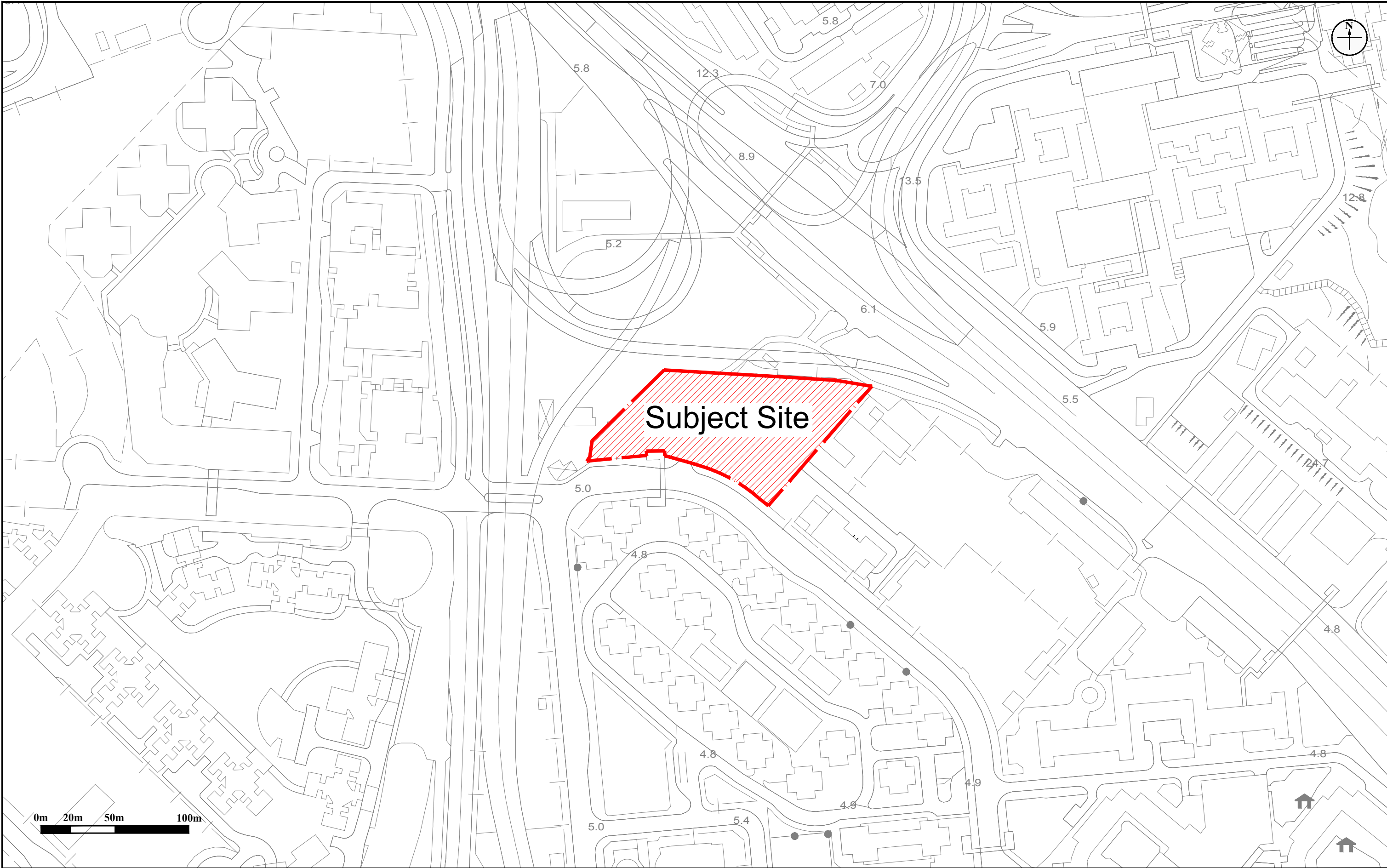


Figure: 1

Title: Location of Subject Site and its Environs

Project: Public Housing Development at Wang Chiu Road Phase 2

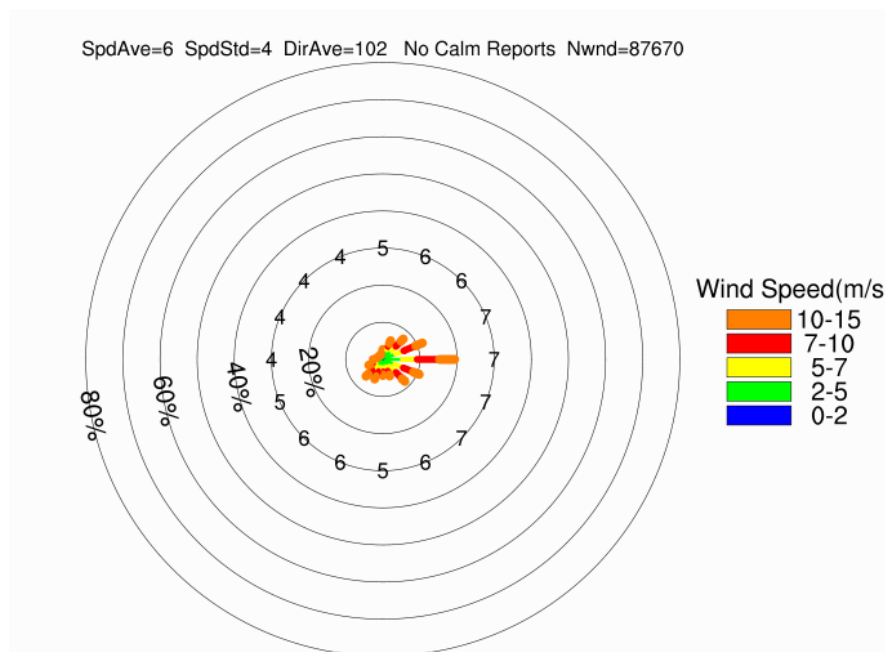
RAMBOLL

Drawn by: EC

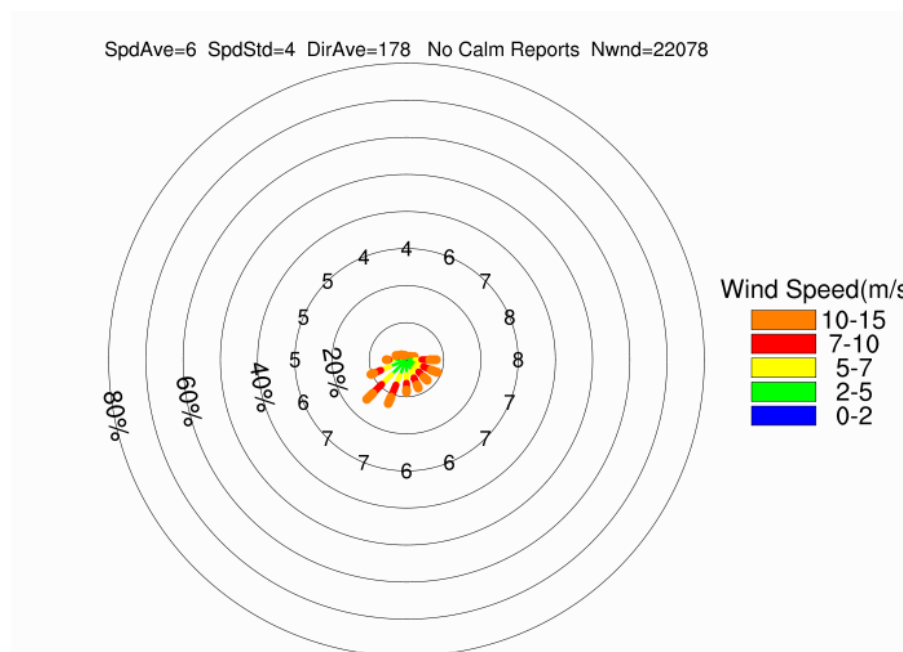
Checked by: SL

Rev.: 1.0

Date: Nov-18



Annual Condition



Summer Condition

Figure: 2

RAMBOLL

Title: Windrose Diagram representing V_{∞} of the Area under Concern

Drawn by: EC

Checked by: SL

Project: Public Housing Development at Wang Chiu Road Phase 2

Rev.: 1.0

Date: Mar 2019

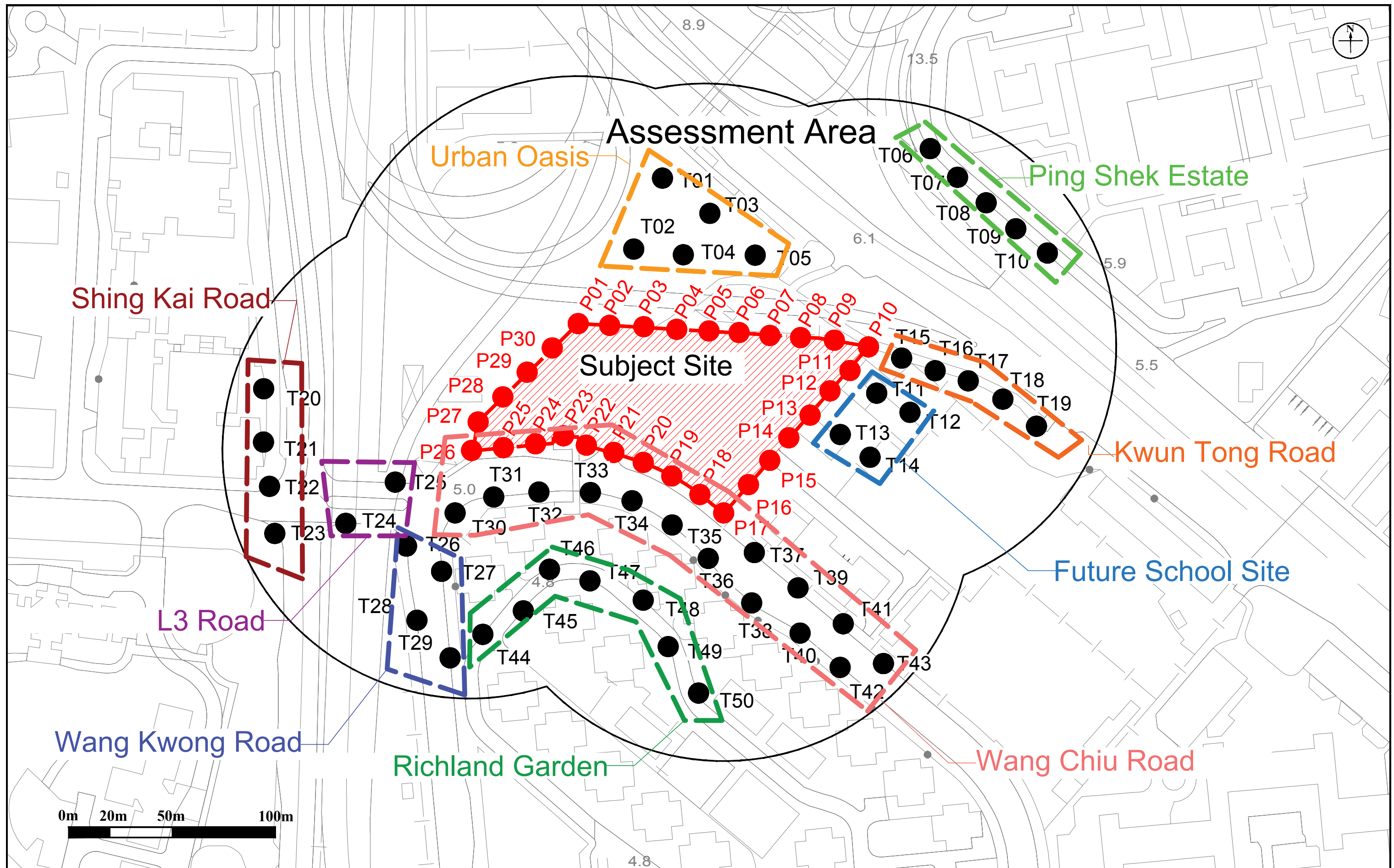


Figure: 3

Title: Test Points Selected for Quantitative Ventilation Assessment

Project: Public Housing Development at Wang Chiu Road Phase 2

RAMBOLL

Drawn by: EC

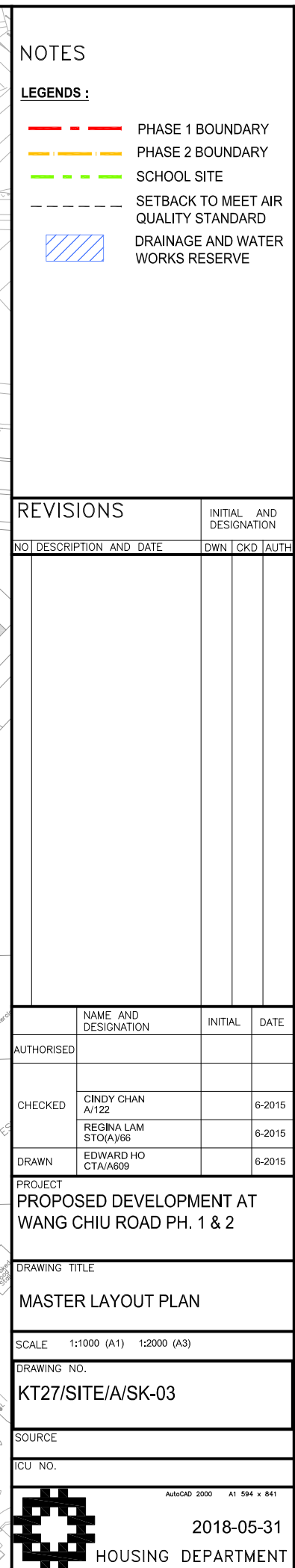
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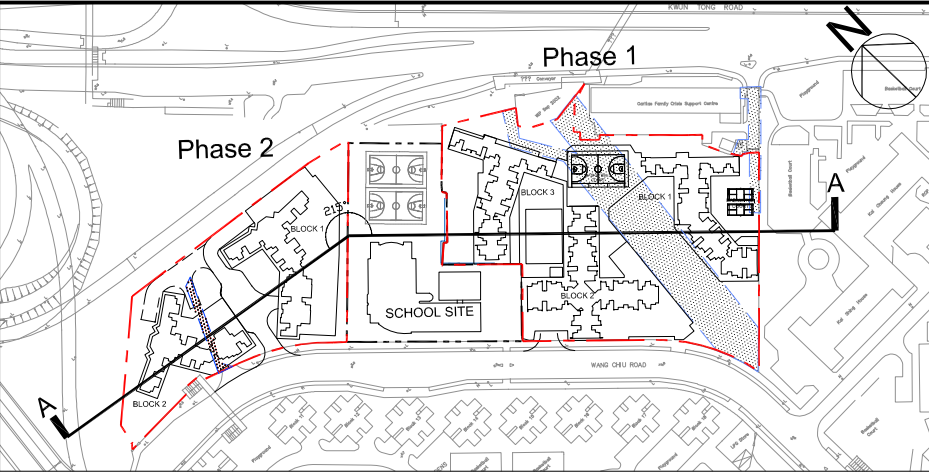
Rev.: 1.0

Date: Nov-18

Appendix 1

Master Layout Plan for the Baseline Scheme





KEY PLAN SCALE 1:2000

- NOTES
- LEGENDS :
- Boundary Line
 - School Site Boundary (Indicative layout for reference only)
 - Domestic Tower
 - Transfer Structure
 - Open Space and Landscape Area and Access Road
 - Retail
 - Kindergarten
 - Basement Carpark
 - Podium Garden
 - L/UL and Open Carpark
 - Social Welfare Facilities

REVISIONS

DESCRIPTION AND DATE

INITIAL AND DESIGNATION

DWN CKD AUTH

NAME AND DESIGNATION

INITIAL

DATE

AUTHORISED

CHECKED

Cindy CHAN
A/122
Regina LAM
STO(A)/66
Edward Ho
CTA/A609

DRAWN

PROJECT

PROPOSED DEVELOPMENT AT
WANG CHIU ROAD PH.1 & 2

DRAWING TITLE

SCHEMATIC SECTION

SCALE 1:750 (A1) : 1:1500 (A3)

DRAWING NO.

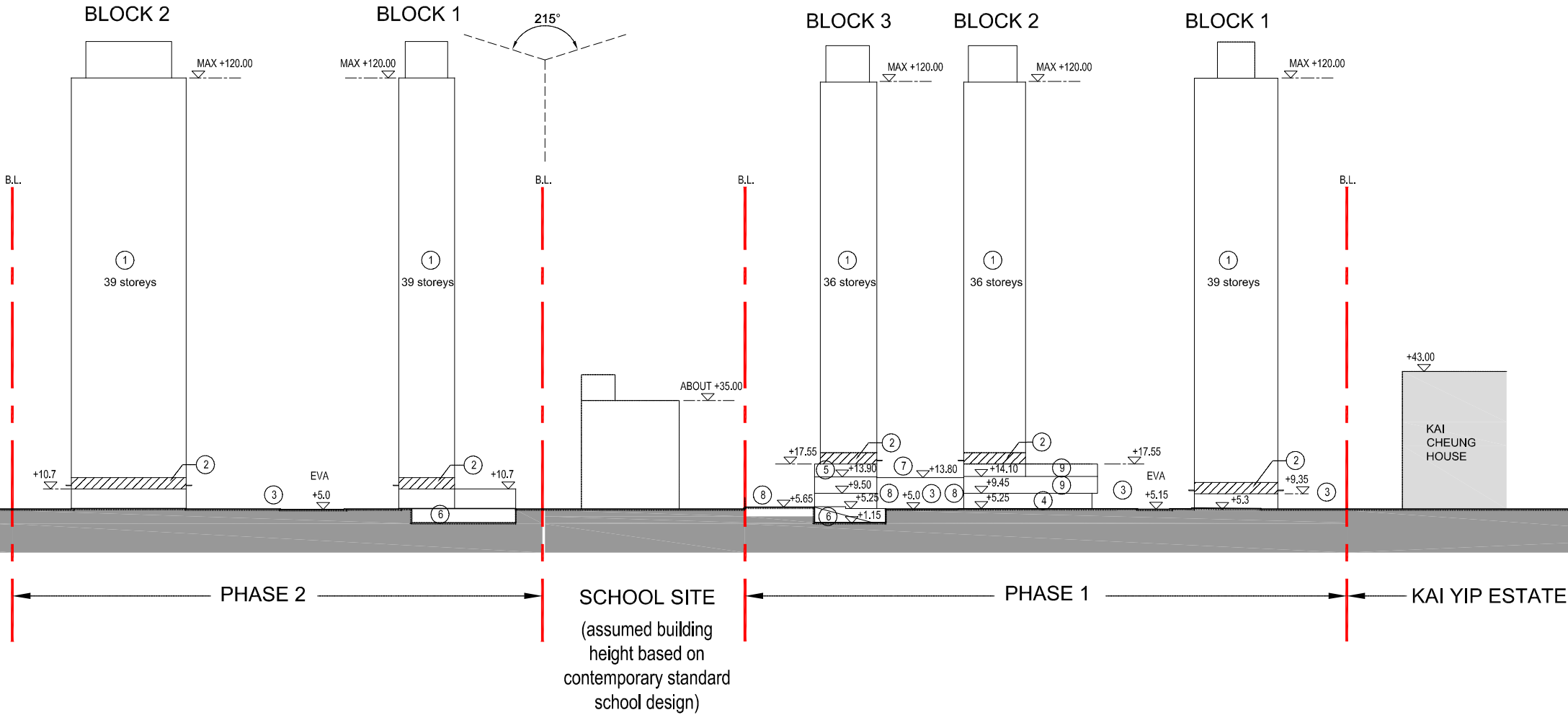
KT27/SITE/A/SK-04

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ICU NO.

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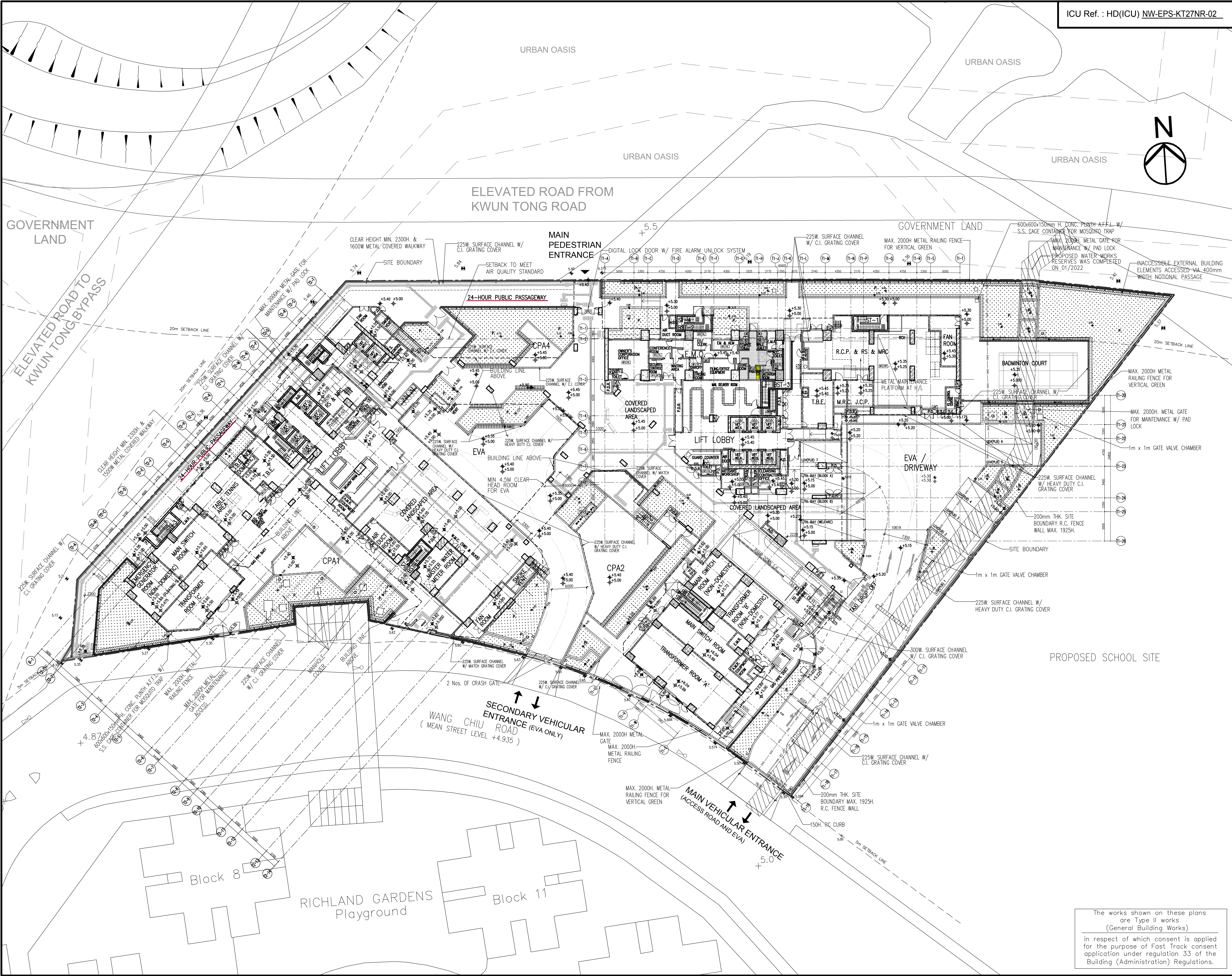
2018-05-31
HOUSING DEPARTMENT



SECTION A-A

Appendix 2

Master Layout Plan for the Proposed Scheme



ICU Ref. : HD(ICU) NW-EPS-KT27NR-02

Signature of Applicant (HD / PSP) :

ICU Approval Signature :

Signature for Record Plan :

REVISIONS

NO	DESCRIPTION AND DATE	DWN	CKD	AUTH
D	1. M.R.C. & J.C.P. ROOM REVISED 2. PLANTER REVISED 3. LEVEL REVISED 4. METAL FENCE PANEL REVISED 5. BENCH REVISED	(KEK)	(AH)	(VC)
E	1. TACTILE REVISED 2. FIRE HYDRANT ADDED 3. LOURVE REVISED 4. METAL FENCE PANEL REVISED	(KEK)	(AH)	(VC)
F	1. NAME REVISED 2. S.S. WIRE REMOVED	(KEK)	(AH)	(VC)

AUTHORISED FOR ISSUE BY HD	NAME AND DESIGNATION	INITIAL	DATE
PROFESSIONAL SERVICES PROVIDER (ARCHITECTURAL SERVICES)	DOMINIC WONG CA/6	ORIGINAL SIGNED	03/2021
AUTHORISED	GEORFFREY WONG SENIOR DESIGN PROFESSIONAL	ORIGINAL SIGNED	03/2021
ENDORSED	VINCENT CHOY SENIOR DESIGN PROFESSIONAL	ORIGINAL SIGNED	03/2021
CHECKED	RAYMOND LO SENIOR DESIGN MANAGER	ORIGINAL SIGNED	03/2021
DRAWN	CHEUNG KWAN FAT DESIGN MANAGER	ORIGINAL SIGNED	03/2021

PROJECT
PUBLIC HOUSING DEVELOPMENT AT
WANG CHIU ROAD PHASE 2
DRAWING TITLE
SITE LAYOUT PLAN - GROUND FLOOR

SCALE 1 : 300 (A1)

DRAWING NO.
KT27/2/SITE/A/ICU-05 /F

SOURCE

ICU NO.



CALCULATION FOR TRAVEL DISTANCE AND DEAD END

TRS 4
= Z15+Z16+Z17+Z18+Z19
(23.045+ 7.848 +24.883 + 3.455 +0.598)
=59.829 < 60m

NOTES:

1. THE DOTTED LINES ILLUSTRATE A NOTIONAL INTERNAL LAYOUT OF THE SOCIAL WELFARE ACCOMMODATIONS (SWA) FOR DEMONSTRATION OF COMPLIANCE WITH THE BUILDINGS ORDINANCE AND ITS ALLIED REGULATIONS FOR ICU'S REFERENCE ONLY. THE LAYOUT OF SWA, AND ITS ASSOCIATED FITMENTS AND FITTINGS, SHOULD BE BUILT TO COMPLY WITH THE BUILDINGS ORDINANCE AND ITS ALLIED REGULATIONS FOR ITS DESIGNATED USE.

ICU Ref. : HD(ICU) NW-EPS-KT27NR-02

Signature of Applicant (HD / PSP) :

ICU Approval Signature :

Signature for Record Plan :

REVISIONS

NO DESCRIPTION AND DATE		INITIAL AND DESIGNATION		
NO	DESCRIPTION AND DATE	DWN	CKD	AUTH
D	1. FIXED GLAZING REVISED 2. FLAT ROOF REVISED 3. PLANTER REVISED 4. MOVEMENT JOINT REVISED 5. TOILET REVISED 06/2025	(KEK) ORIGINAL SIGNED	(AH) ORIGINAL SIGNED	(VC) ORIGINAL SIGNED
E	1. PARTITION HIDDEN IN SWF 2. DOOR MARK & DIMENSION OMITTED IN SWF 10/2025	(KEK) ORIGINAL SIGNED	(AH) ORIGINAL SIGNED	(VC) ORIGINAL SIGNED
F	1. BLOCK B ST-2 WINDOW AT 1/F & 2/F REMOVED 2. NAME REVISED 06/2026	(KEK) ORIGINAL SIGNED	(AH) ORIGINAL SIGNED	(VC) ORIGINAL SIGNED

NAME AND DESIGNATION		INITIAL	DATE
AUTHORISED FOR ISSUE BY HD	DOMINIC WONG CA/6	ORIGINAL SIGNED	03/2021
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AUTHORISED	GEOFFREY WONG SENIOR DESIGN PROFESSIONAL	ORIGINAL SIGNED	03/2021
ENDORSED	VINCENT CHOY DESIGN PROFESSIONAL	ORIGINAL SIGNED	03/2021
CHECKED	RAYMOND LO SENIOR DESIGN MANAGER	ORIGINAL SIGNED	03/2021
DRAWN	CHEUNG KWAN FAT DESIGN MANAGER	ORIGINAL SIGNED	03/2021

PROJECT
PUBLIC HOUSING DEVELOPMENT AT
WANG CHIU ROAD PHASE 2
DRAWING TITLE
SITE LAYOUT PLAN –
FIRST FLOOR PLAN

SCALE 1 : 300 (A1)

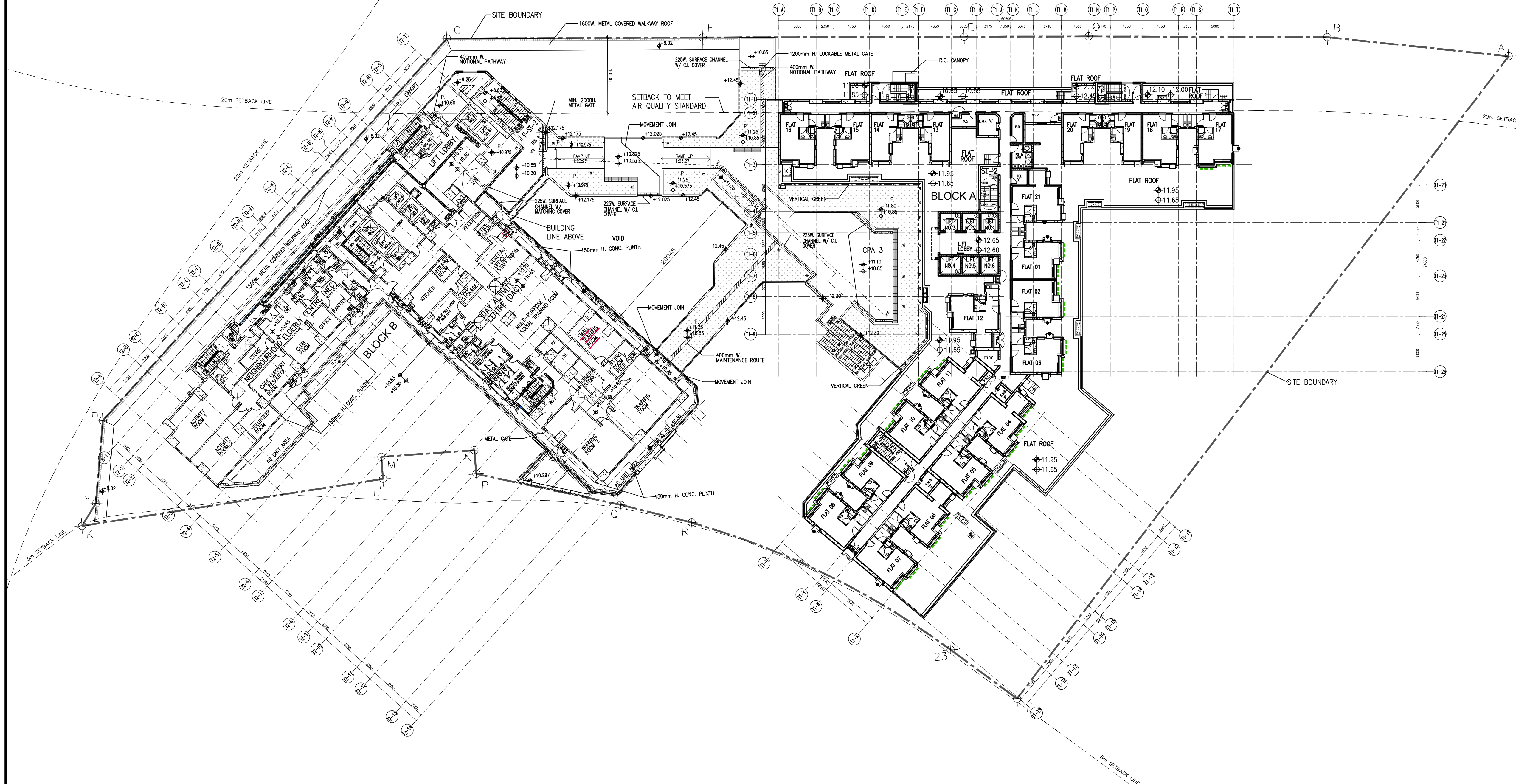
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SOURCE

ICU NO.



The works shown on these plans
are Type II works
(General Building Works)
in respect of which consent is applied
for the purpose of Fast Track consent
application under regulation 33 of the
Building (Administration) Regulations.

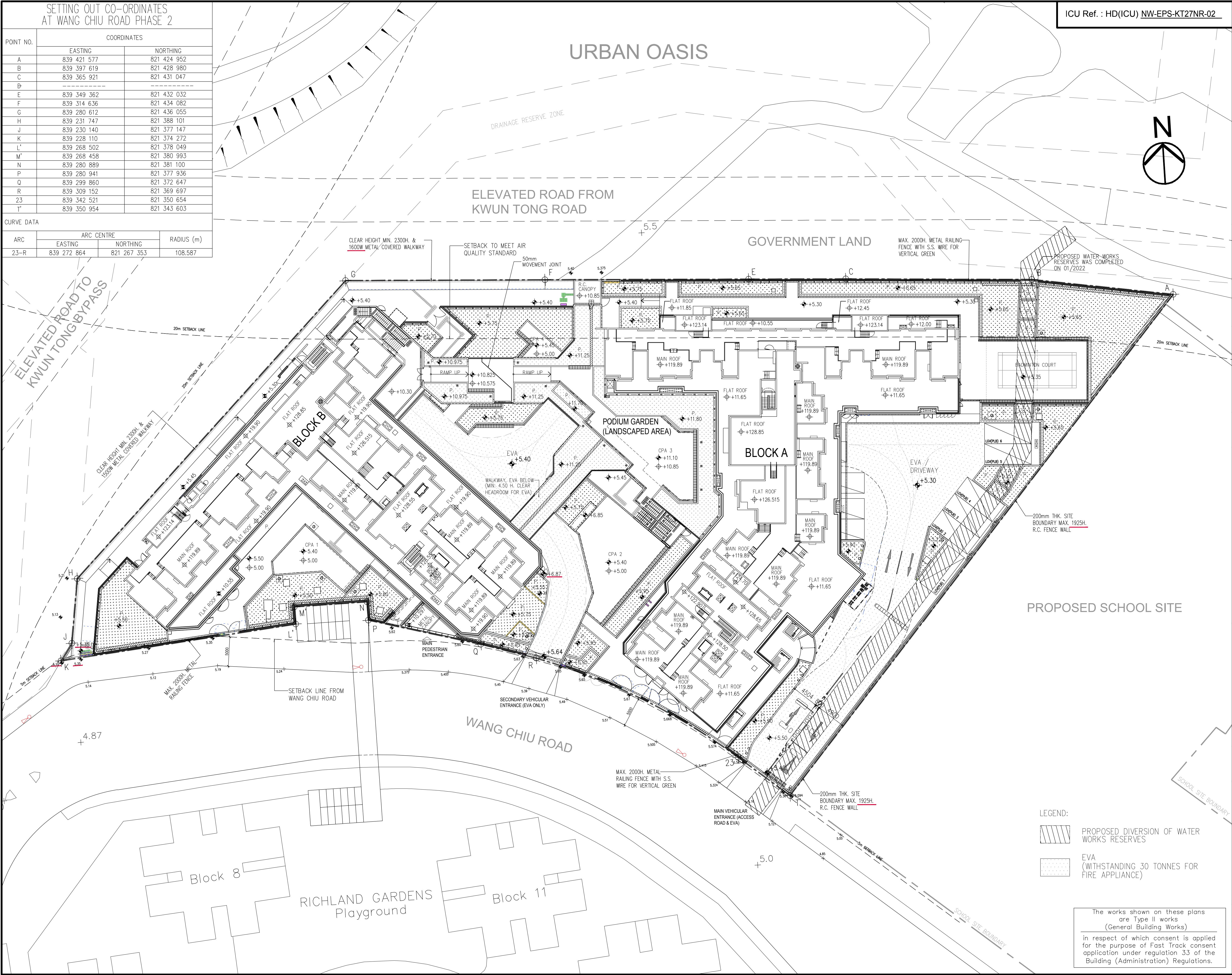


SETTING OUT CO-ORDINATES
AT WANG CHIU ROAD PHASE 2

POINT NO.	COORDINATES	
	EASTING	NORTHING
A	839 421 577	821 424 952
B	839 397 619	821 428 980
C	839 365 921	821 431 047
D		
E	839 349 362	821 432 032
F	839 314 636	821 434 082
G	839 280 612	821 436 055
H	839 231 747	821 388 101
J	839 230 140	821 377 147
K	839 228 110	821 374 272
L	839 268 502	821 378 049
M	839 268 458	821 380 993
N	839 280 889	821 381 100
P	839 280 941	821 377 936
Q	839 299 860	821 372 647
R	839 309 152	821 369 697
23	839 342 521	821 350 654
T	839 350 954	821 343 603

CURVE DATA

ARC	ARC CENTRE		RADIUS (m)
	EASTING	NORTHING	
23-R	839 272 864	821 267 353	108.587



Signature of Applicant (HD / PSP) :

ICU Ref. : HD(ICU) NW-EPS-KT27NR-02

Signature for Record Plan :

ICU Approval Signature :

REVISIONS		INITIAL AND DESIGNATION		
NO	DESCRIPTION AND DATE	DWN	CKD	AUTH
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D	1. LAYOUT REVISED 06/2025	(KEK)	(AH)	(VC)
E	1. LAYOUT REVISED 10/2025	(KEK)	(AH)	(VC)

NAME AND DESIGNATION		INITIAL	DATE
AUTHORISED FOR ISSUE BY HD	DOMINIC WONG CA/6	ORIGINAL SIGNED	03/2021
PROFESSIONAL SERVICES PROVIDER (ARCHITECTURAL SERVICES)	Ho & Partners Architects Engineers & Development Consultants, Ltd.	hpa	
AUTHORISED	GEOFFREY WONG SENIOR DESIGN PROFESSIONAL	ORIGINAL SIGNED	03/2021
ENDORSED	VINCENT CHOY SENIOR DESIGN PROFESSIONAL	ORIGINAL SIGNED	03/2021
CHECKED	RAYMOND LO SENIOR DESIGN MANAGER	ORIGINAL SIGNED	03/2021
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PROJECT
PUBLIC HOUSING DEVELOPMENT AT WANG CHIU ROAD PHASE 2

DRAWING TITLE
MASTER SITE LAYOUT PLAN AND SITE BOUNDARY COORDINATES

SCALE 1 : 300 (A1)

DRAWING NO.
KT27/2/SITE/A/ICU-03 /E

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ICU NO.

AutoCAD 2000 A1 594 x 841

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1. THE DOTTED LINES ILLUSTRATE A NOTIONAL INTERNAL LAYOUT OF THE SOCIAL WELFARE ACCOMMODATIONS (SWA) FOR DEMONSTRATION OF COMPLIANCE WITH THE BUILDINGS ORDINANCE AND ITS ALLIED REGULATIONS FOR ICU'S REFERENCE ONLY, THE LAYOUT OF SWA, AND ITS ASSOCIATED FITMENTS AND FITTINGS, SHOULD BE BUILT TO COMPLY WITH THE BUILDINGS ORDINANCE AND ITS ALLIED REGULATIONS FOR ITS DESIGNATED USE.

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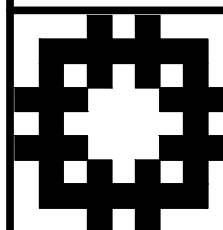
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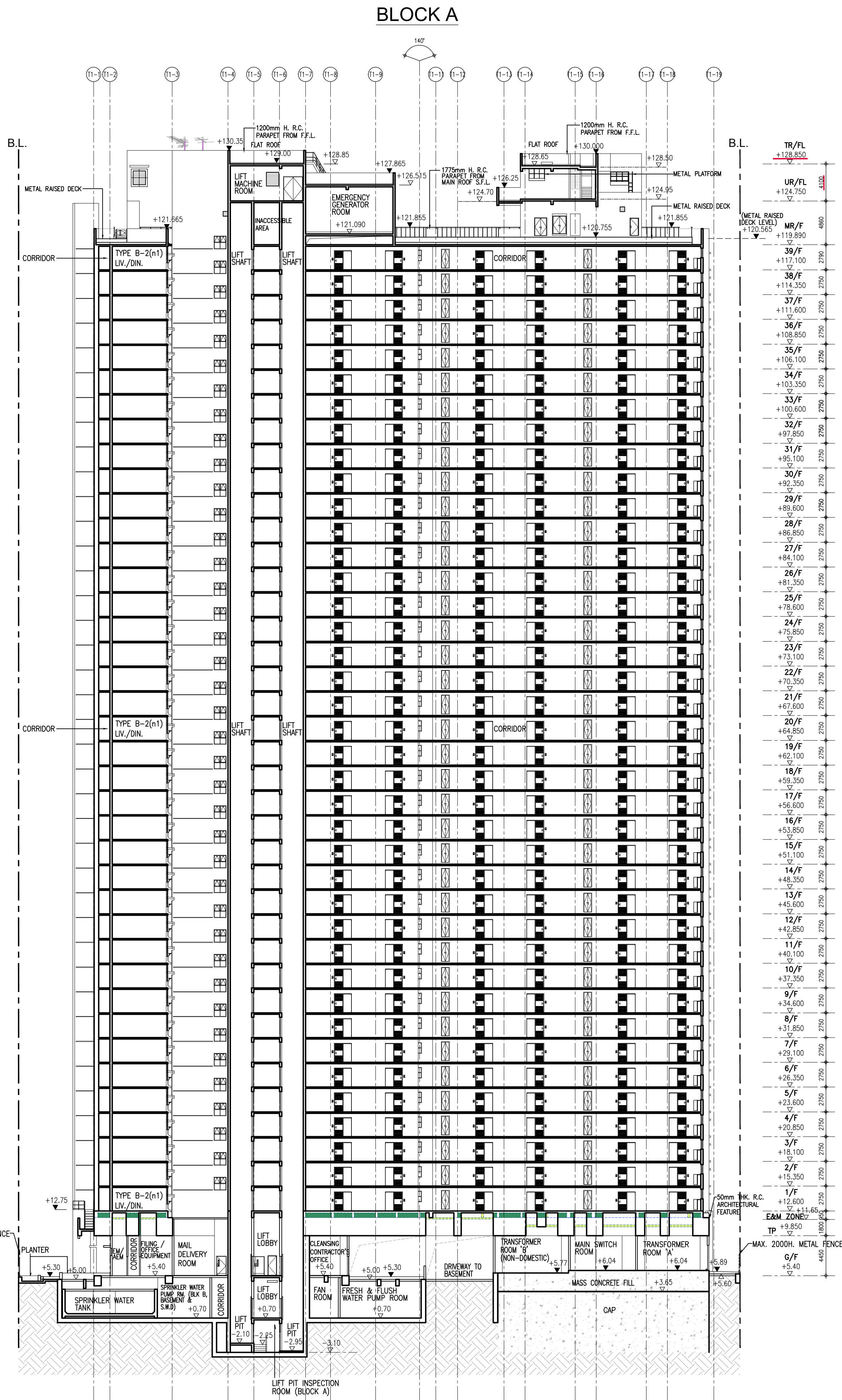
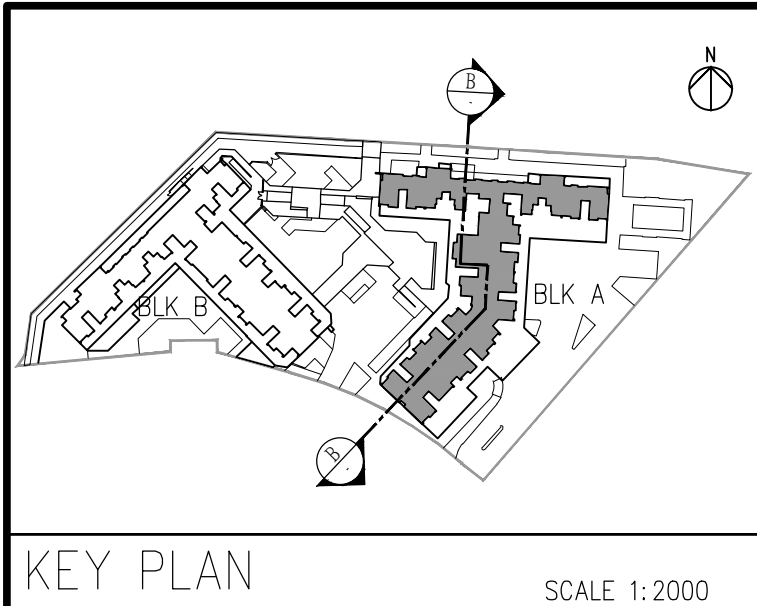
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in respect of which consent is applied
for the purpose of Fast Track consent
application under regulation 33 of the
Building (Administration) Regulations.

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SITE SECTION B-B

ICU Ref. : HD(ICU) NW-EPS-KT27NR-02

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ICU Approval Signature :

Signature for Record Plan :

REVISIONS

NO. DESCRIPTION AND DATE		INITIAL AND DESIGNATION		
NO.	DESCRIPTION AND DATE	DWN	CKD	AUTH
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		ORIGINAL SIGNED	ORIGINAL SIGNED	ORIGINAL SIGNED
	06/2025			
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	--/2026			

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ENDORSED		VINCENT CHOY DESIGN PROFESSIONAL	03/2021
CHECKED		RAYMOND LO SENIOR DESIGN MANAGER	03/2021
DRAWN		CHEUNG KWAN FAT DESIGN MANAGER	03/2021

PROJECT
PUBLIC HOUSING DEVELOPMENT AT
WANG CHIU ROAD PHASE 2
DRAWING TITLE
SITE SECTION B-B

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SOURCE

ICU NO.

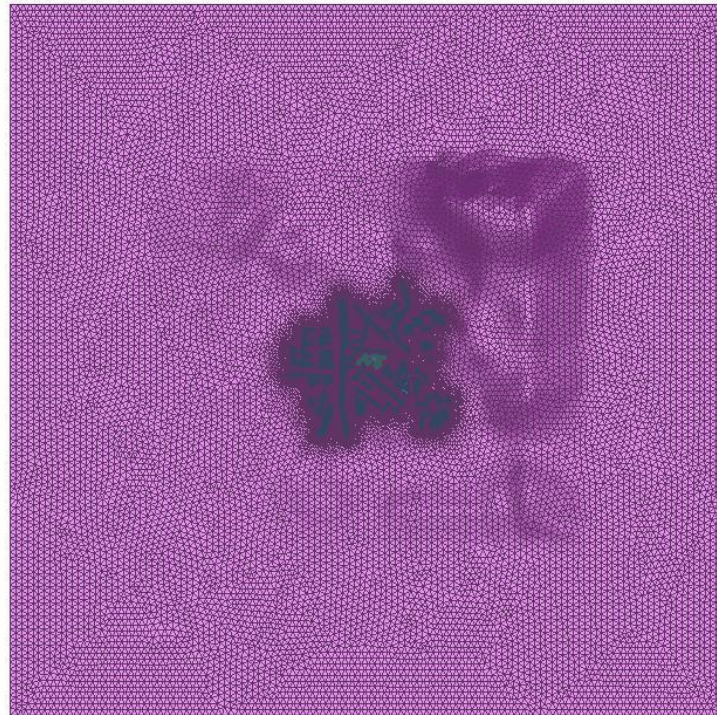


The works shown on these plans
are Type II works
(General Building Works)
in respect of which consent is applied
for the purpose of Fast Track consent
application under regulation 33 of the
Building (Administration) Regulations.

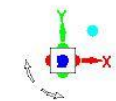
Appendix 3

Captured Pictures of the CFD Model

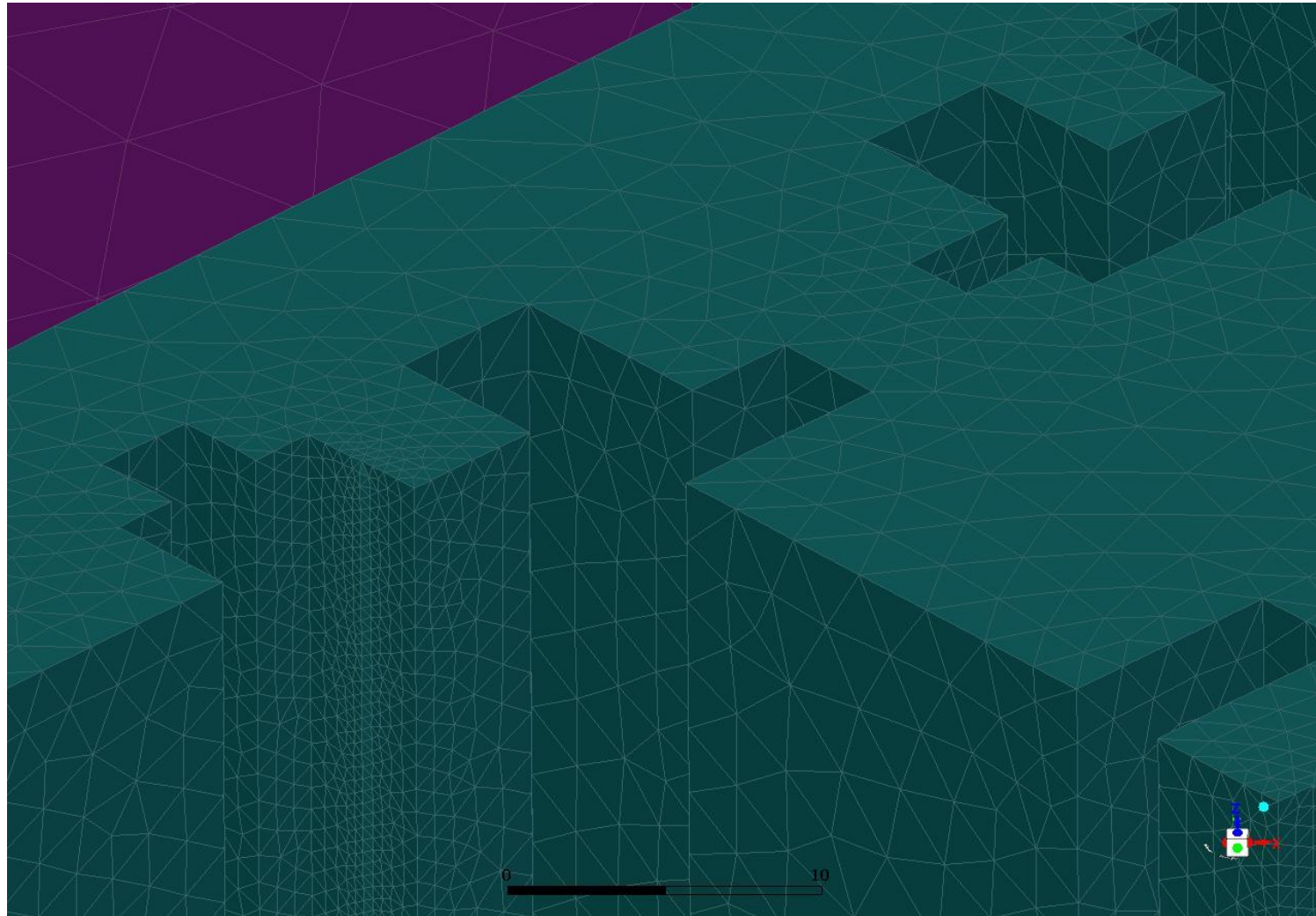
Domain View



0 2000



Mesh



Baseline Scheme

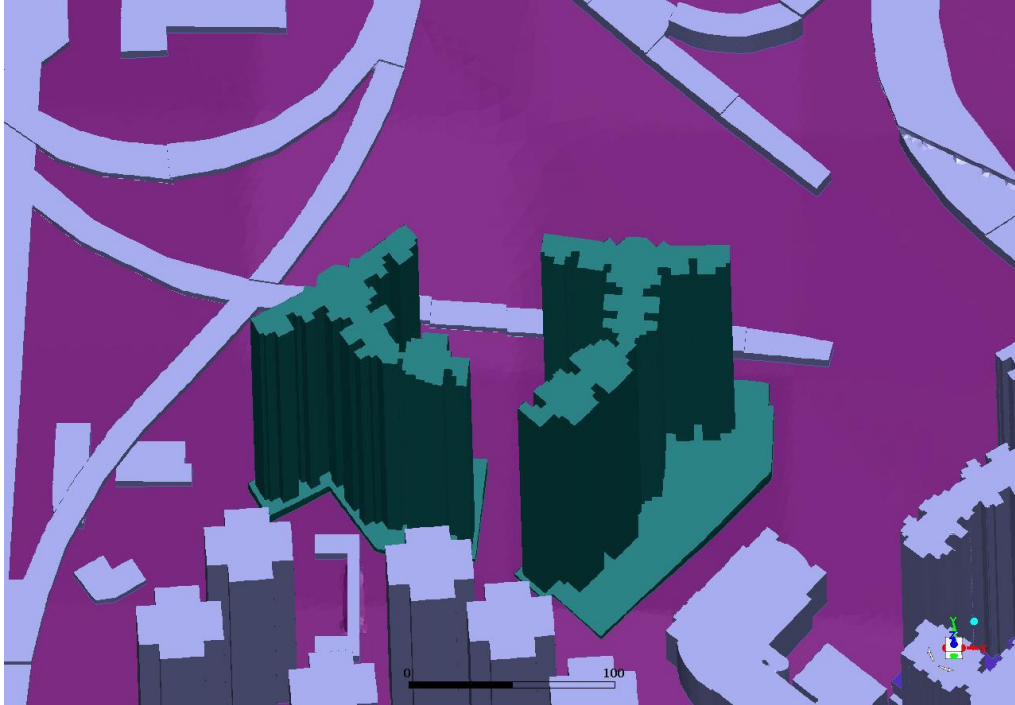


North View



East View

Baseline Scheme



South View

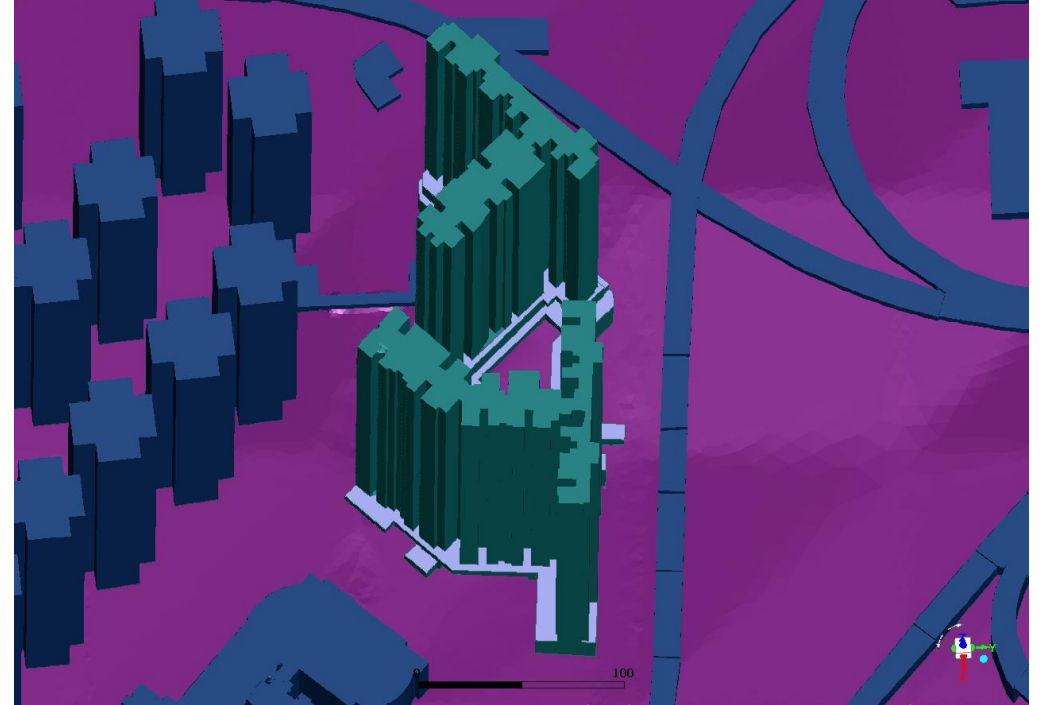


West View

Proposed Scheme



North View

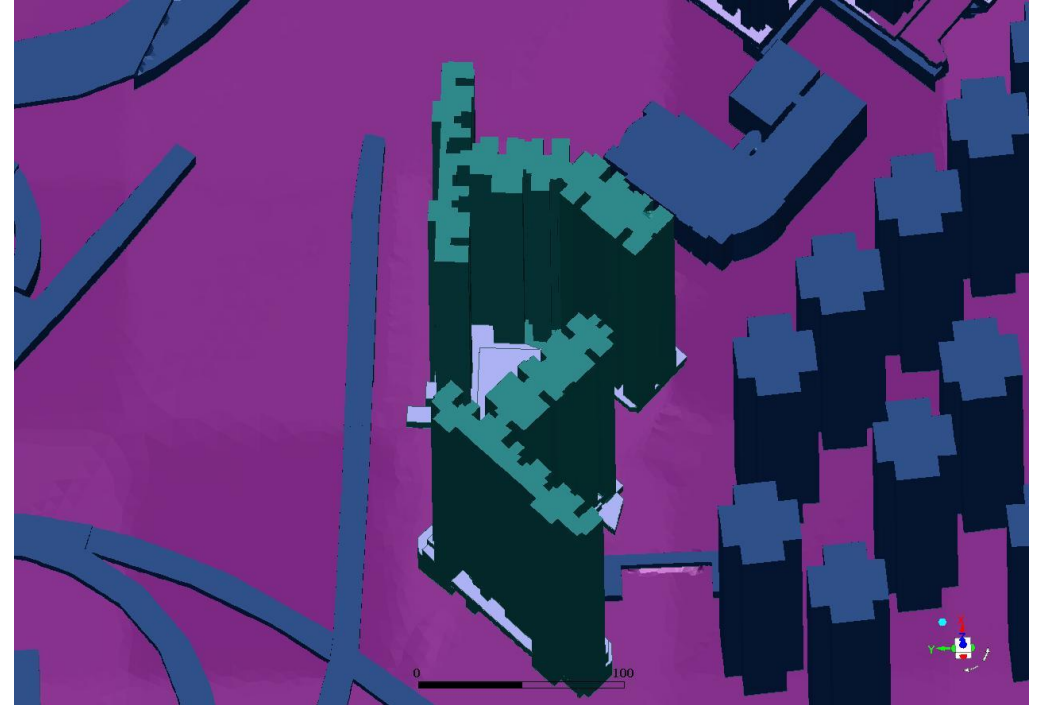


East View

Proposed Scheme



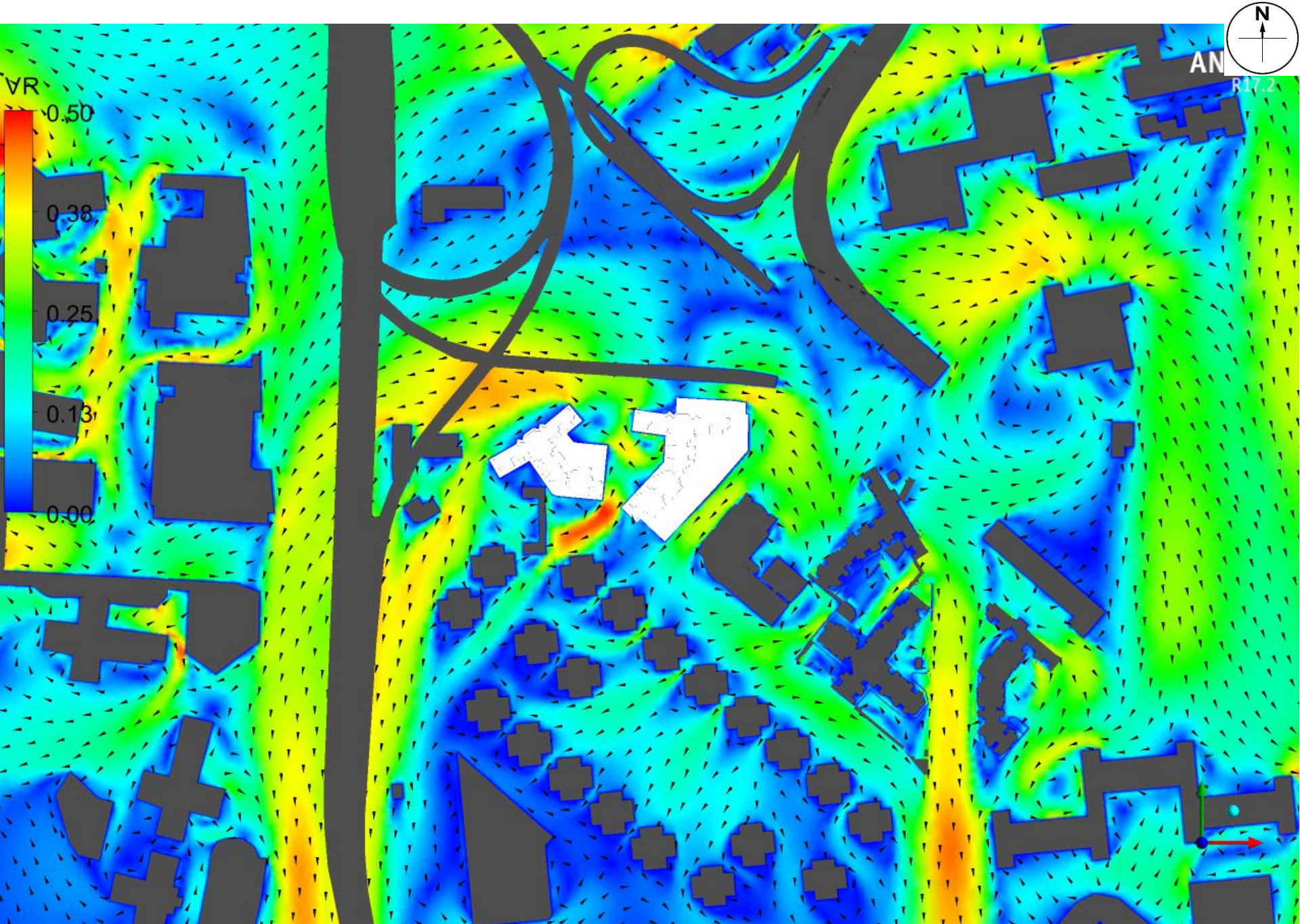
South View



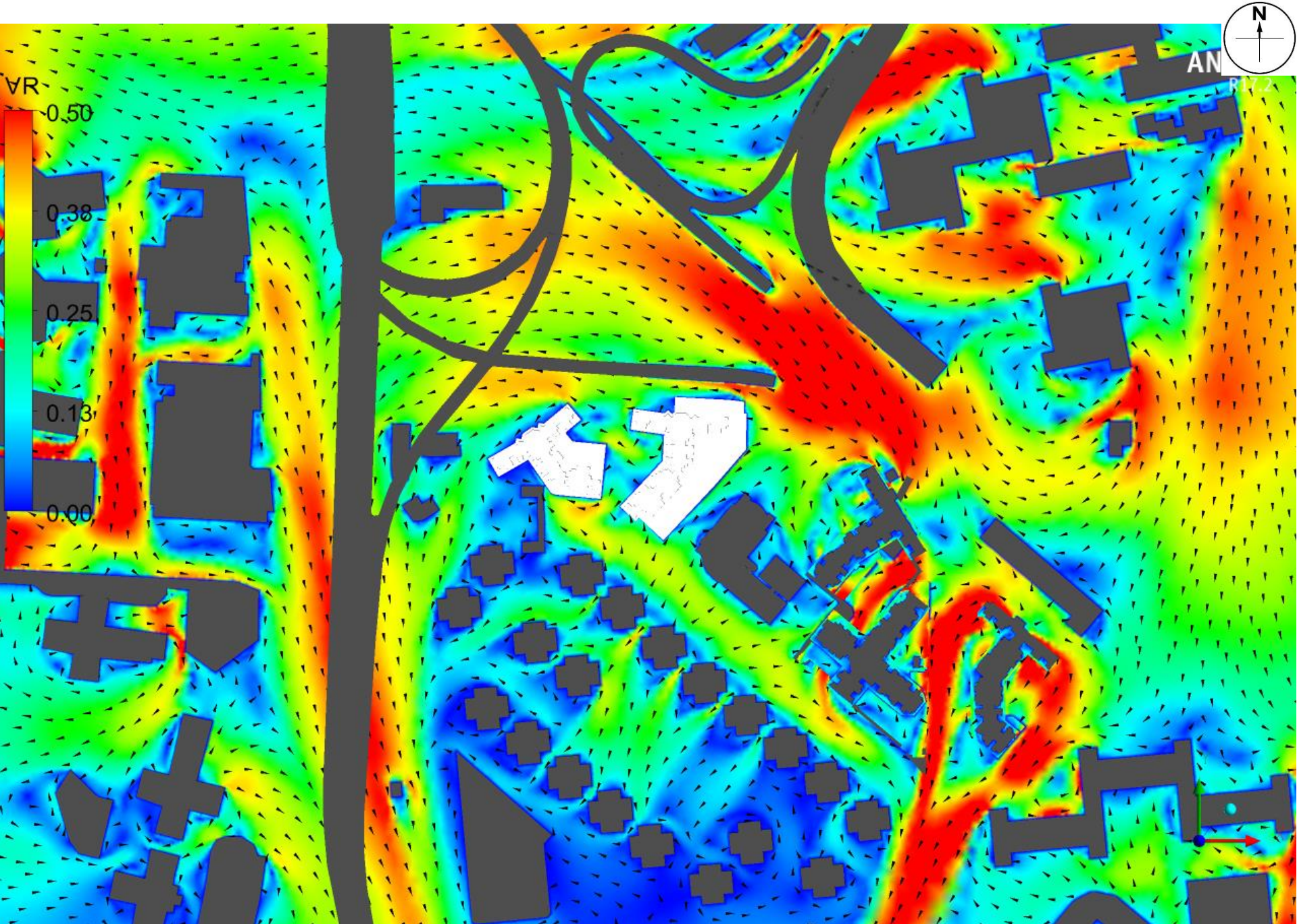
West View

Appendix 4

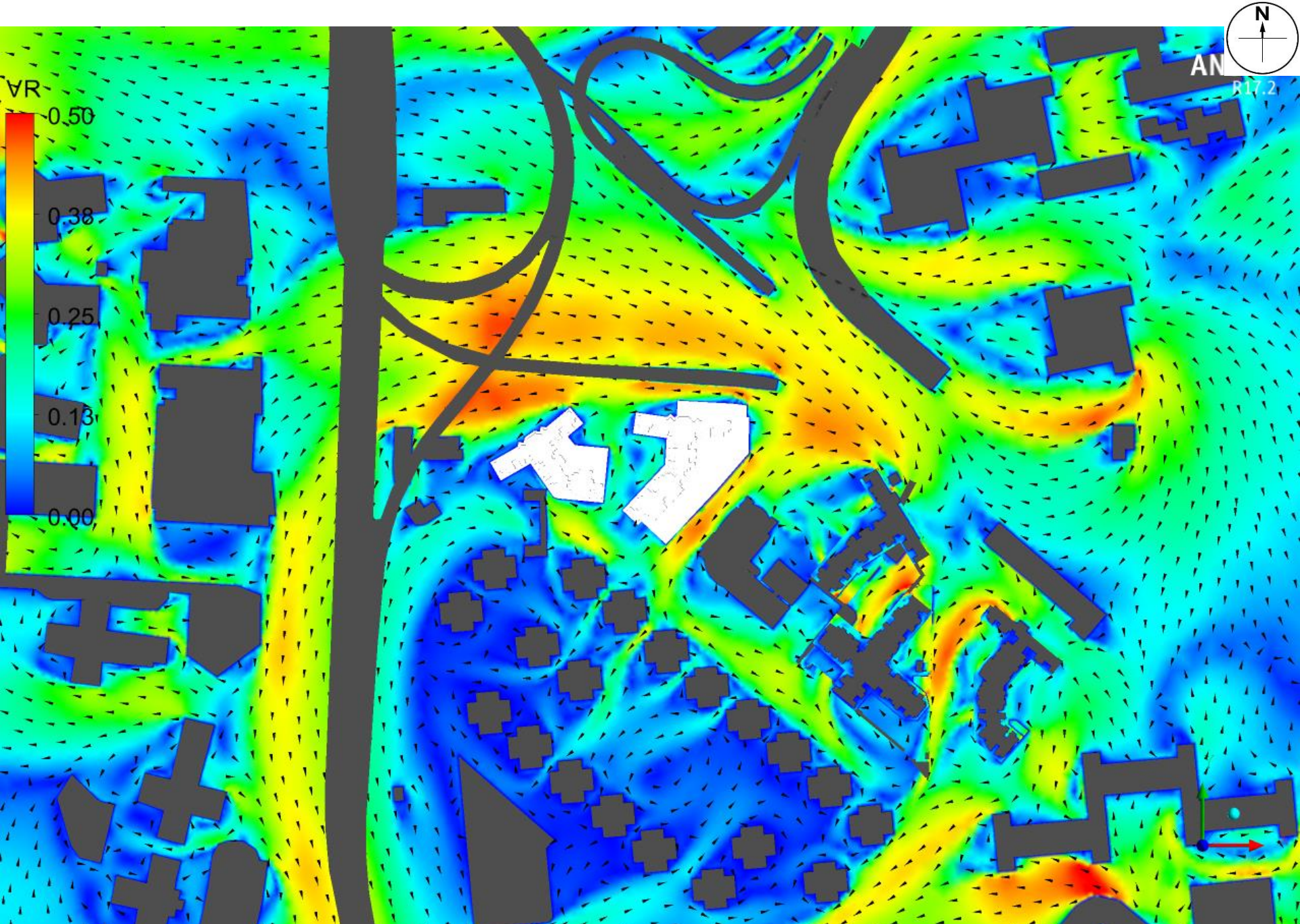
Contour and Vector Result of the CFD Simulation



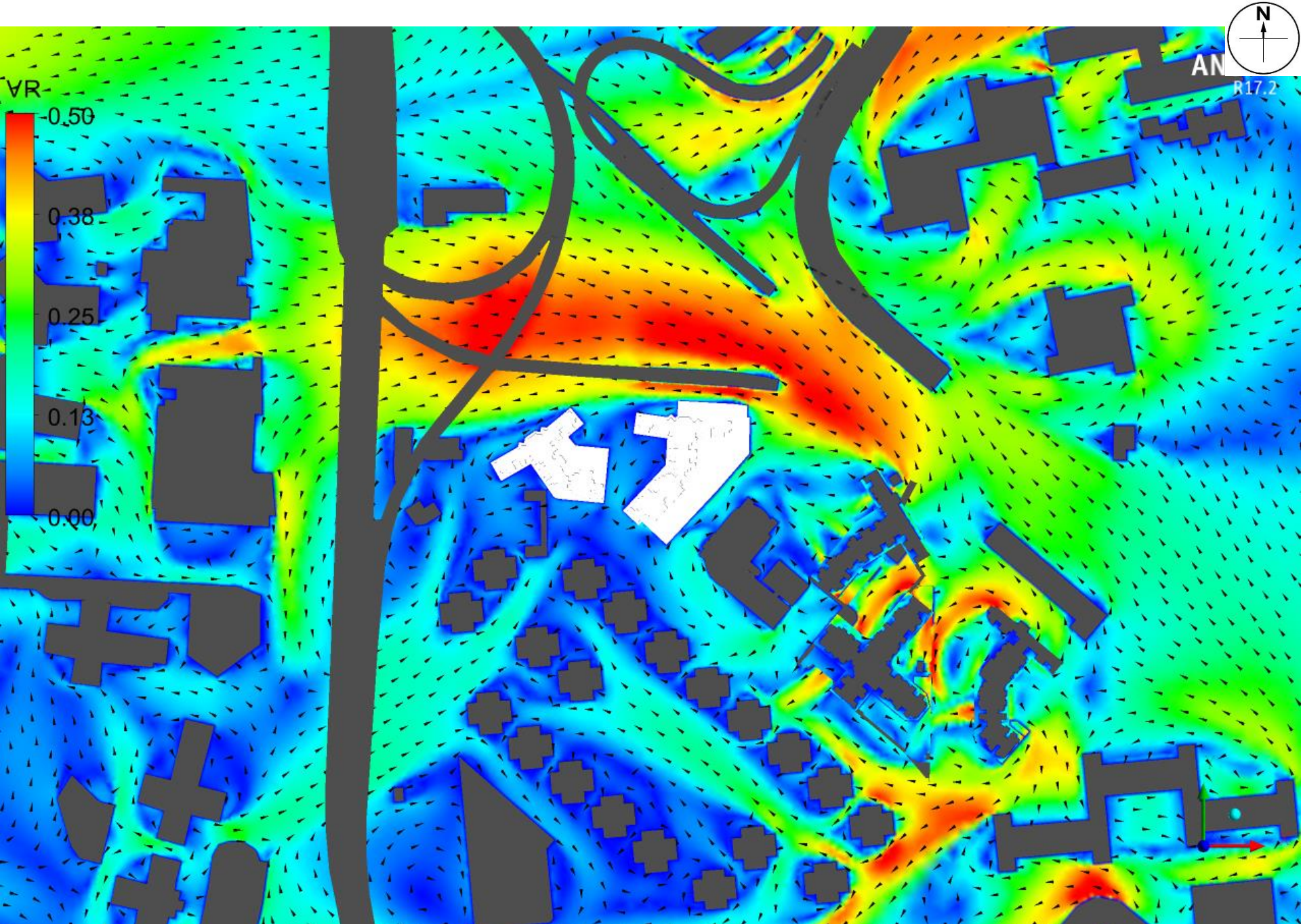
Baseline Scheme - Contour plot at pedestrian level under NNE Wind



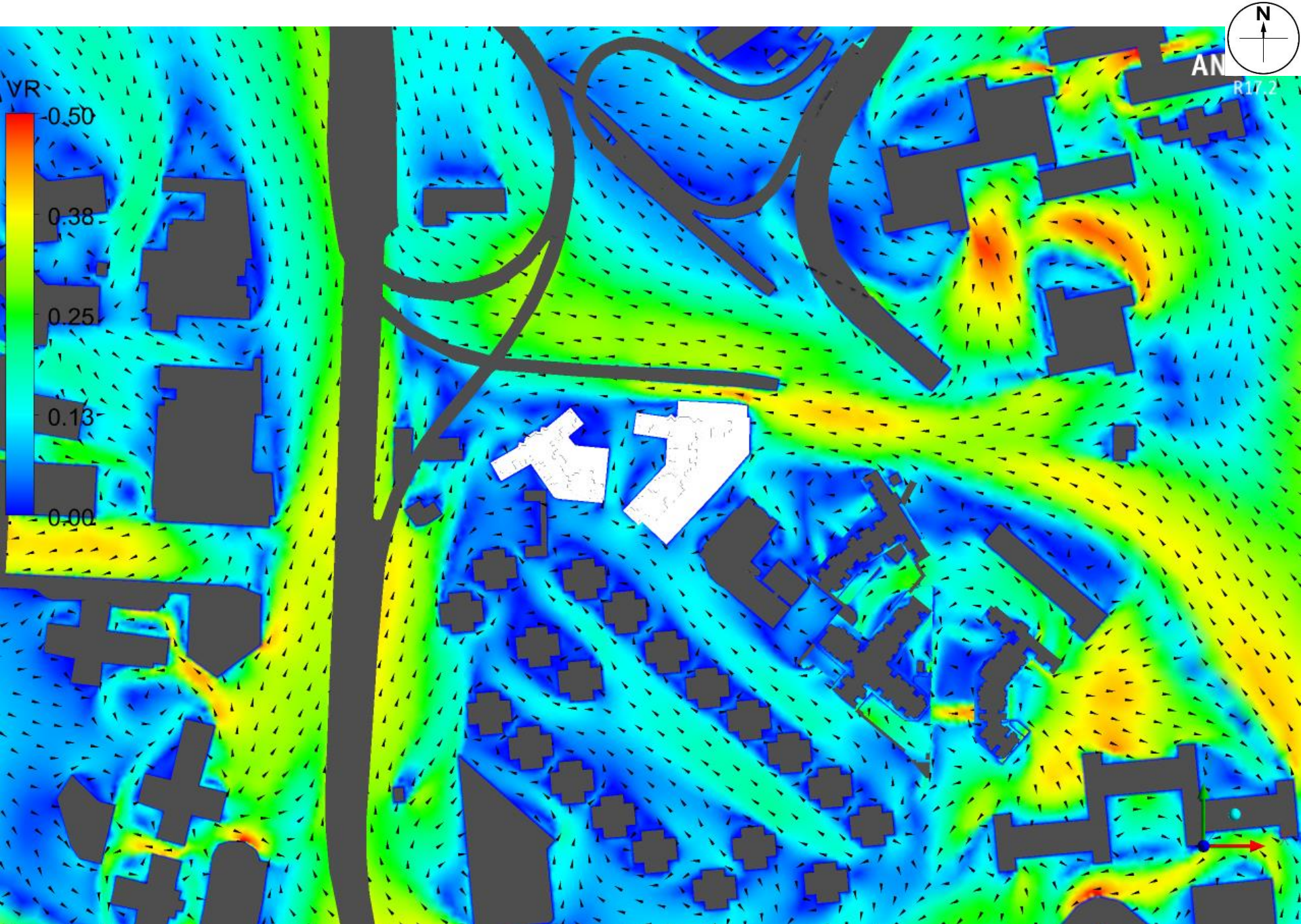
Baseline Scheme - Contour plot at pedestrian level under NE Wind



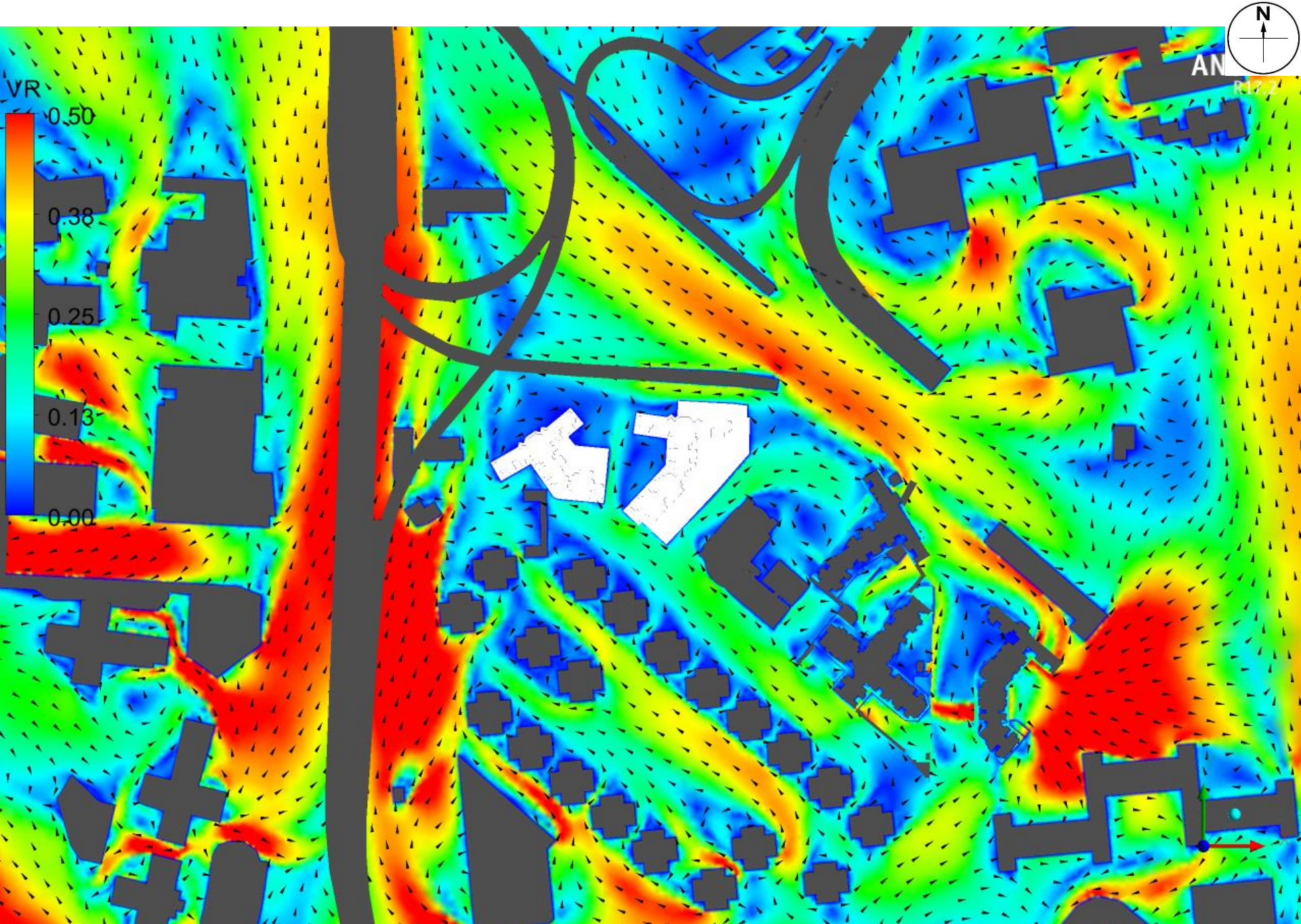
Baseline Scheme - Contour plot at pedestrian level under ENE Wind



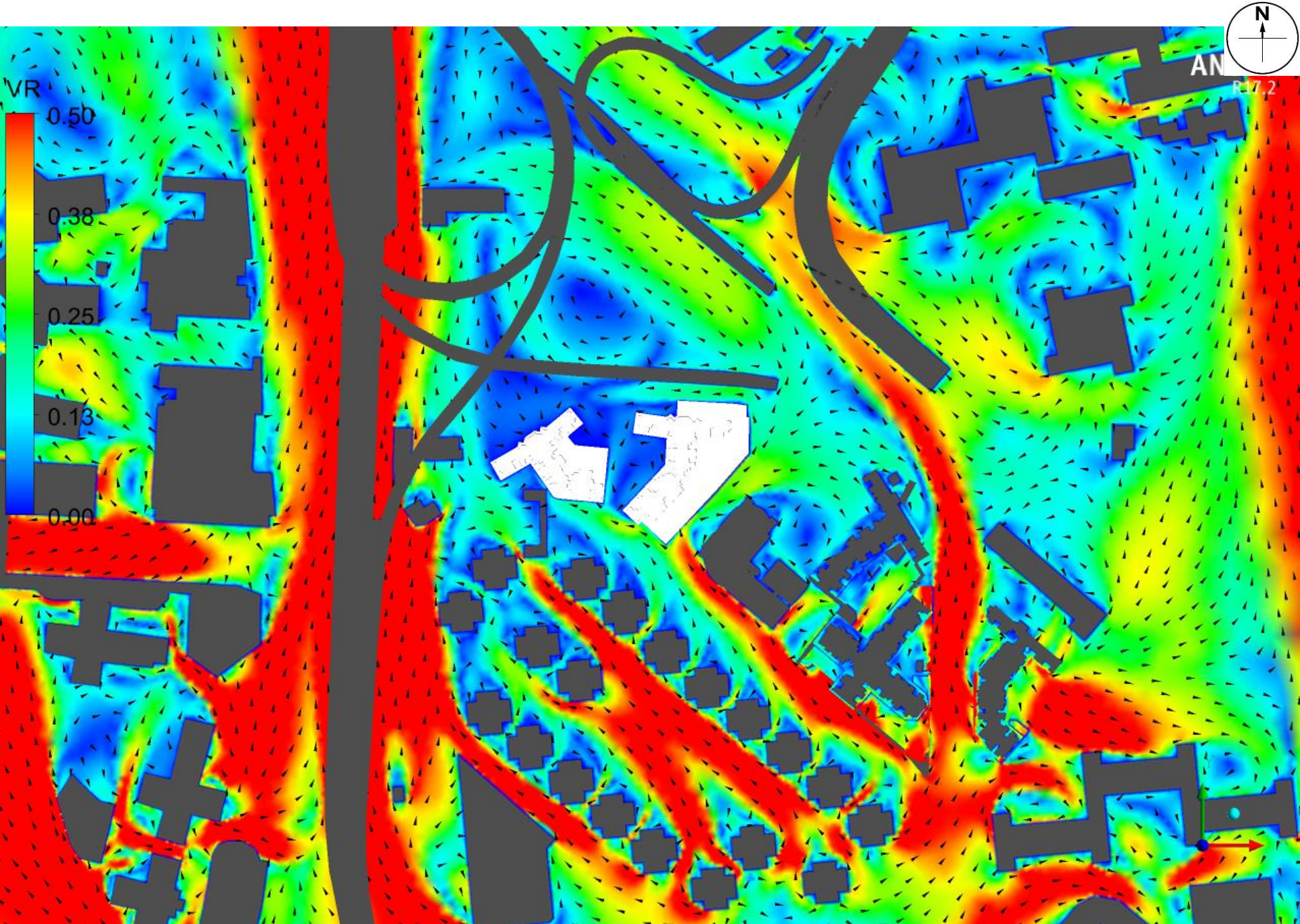
Baseline Scheme - Contour plot at pedestrian level under E Wind



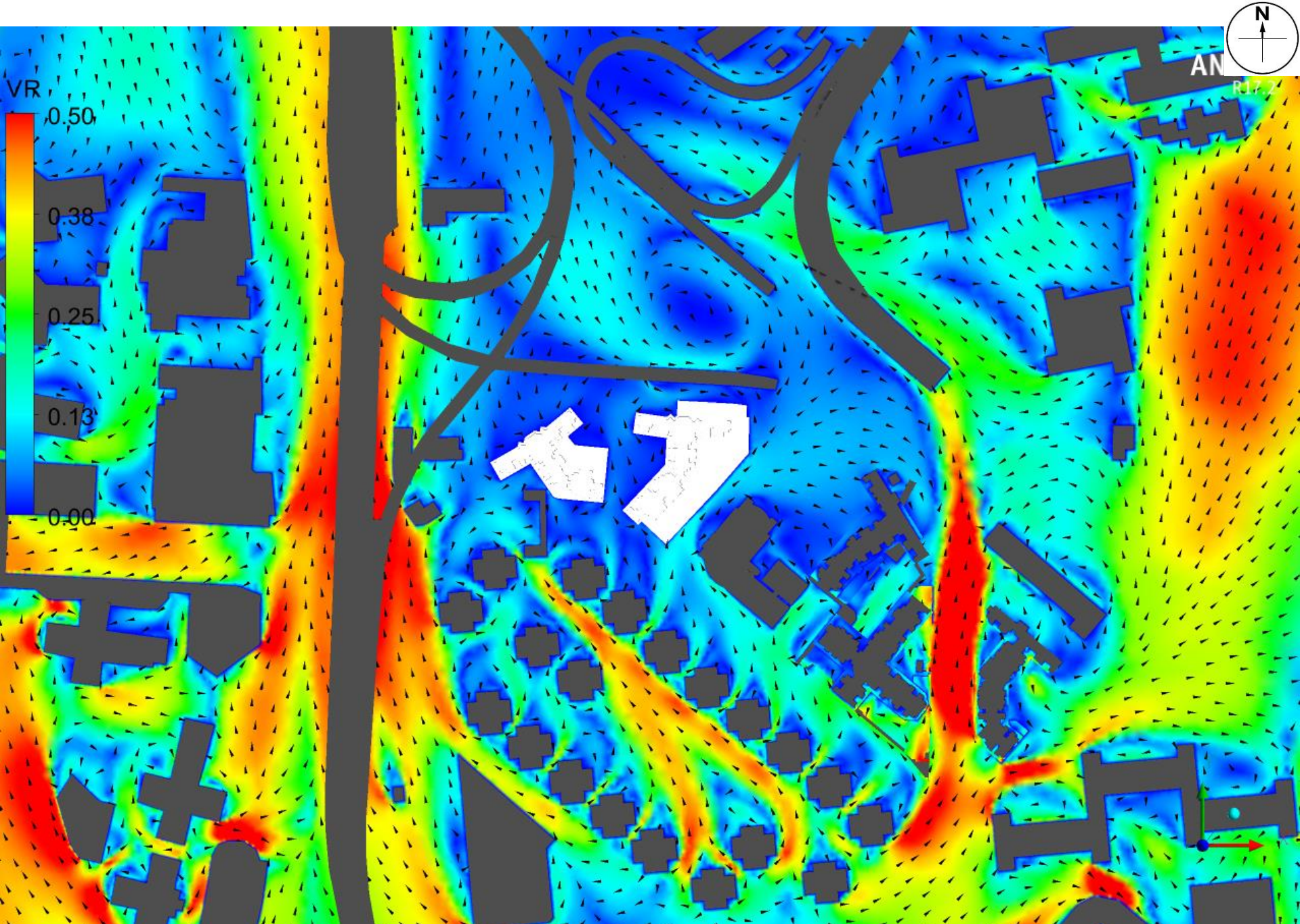
Baseline Scheme - Contour plot at pedestrian level under ESE Wind



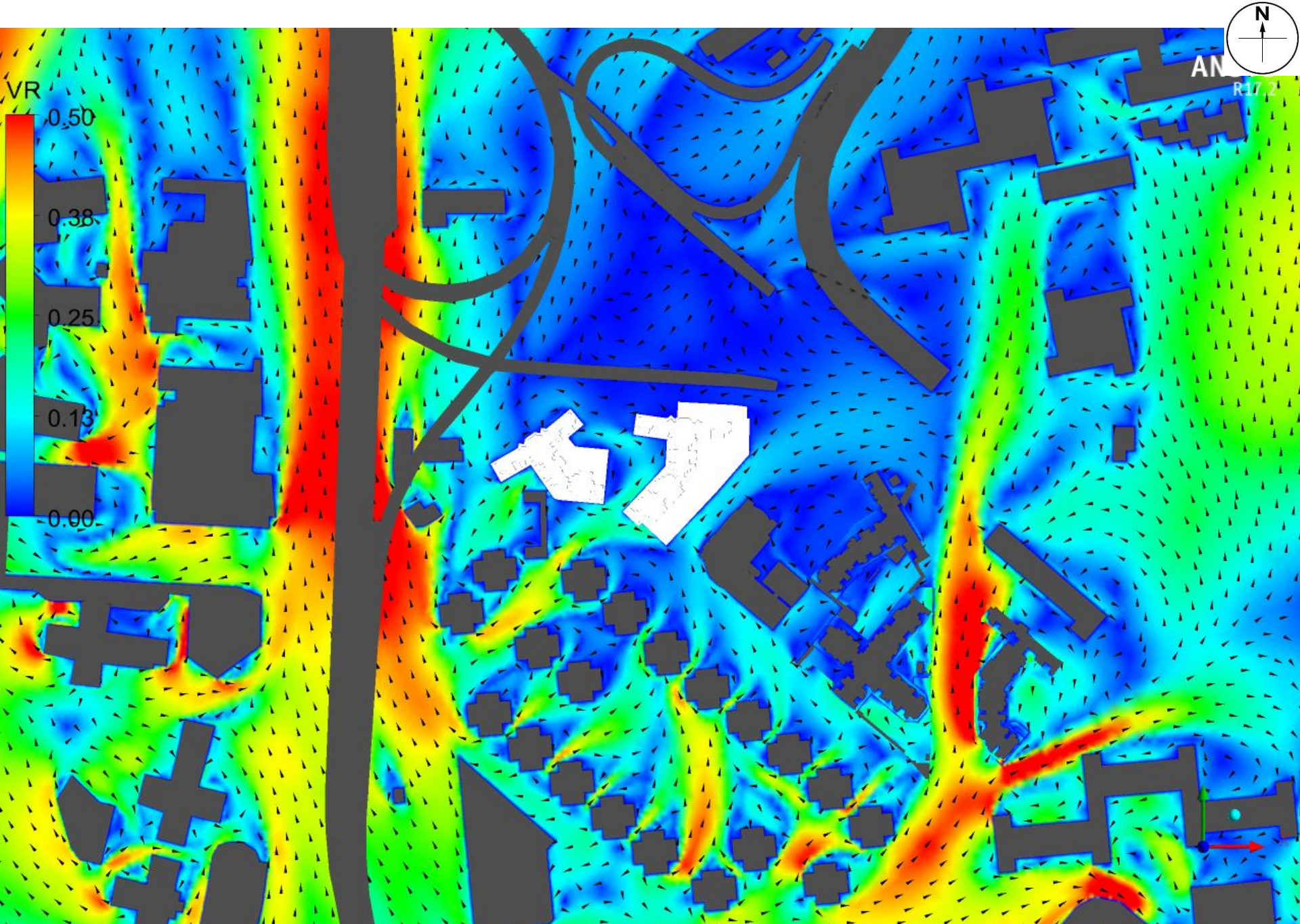
Baseline Scheme - Contour plot at pedestrian level under SE Wind



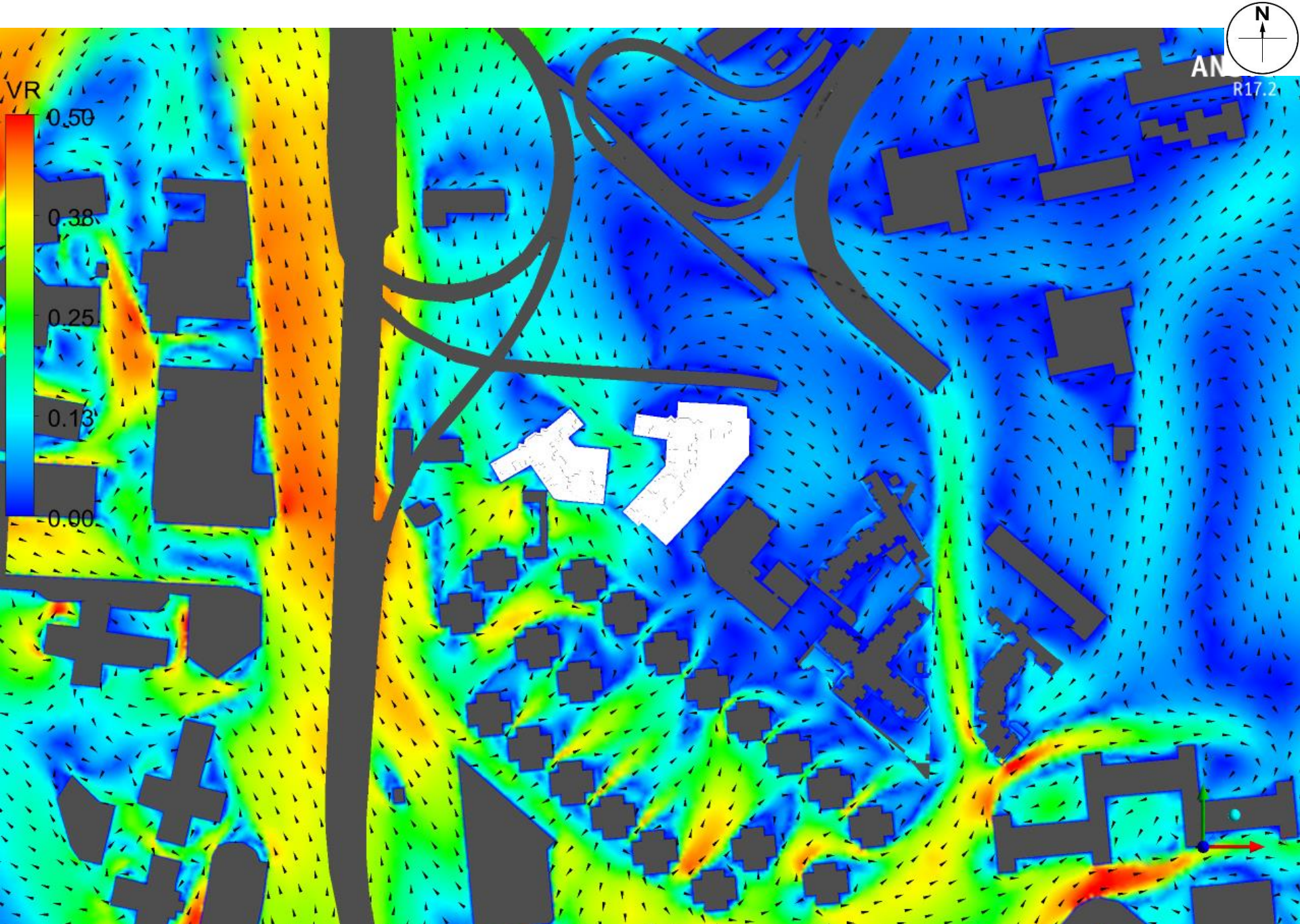
Baseline Scheme - Contour plot at pedestrian level under SSE Wind



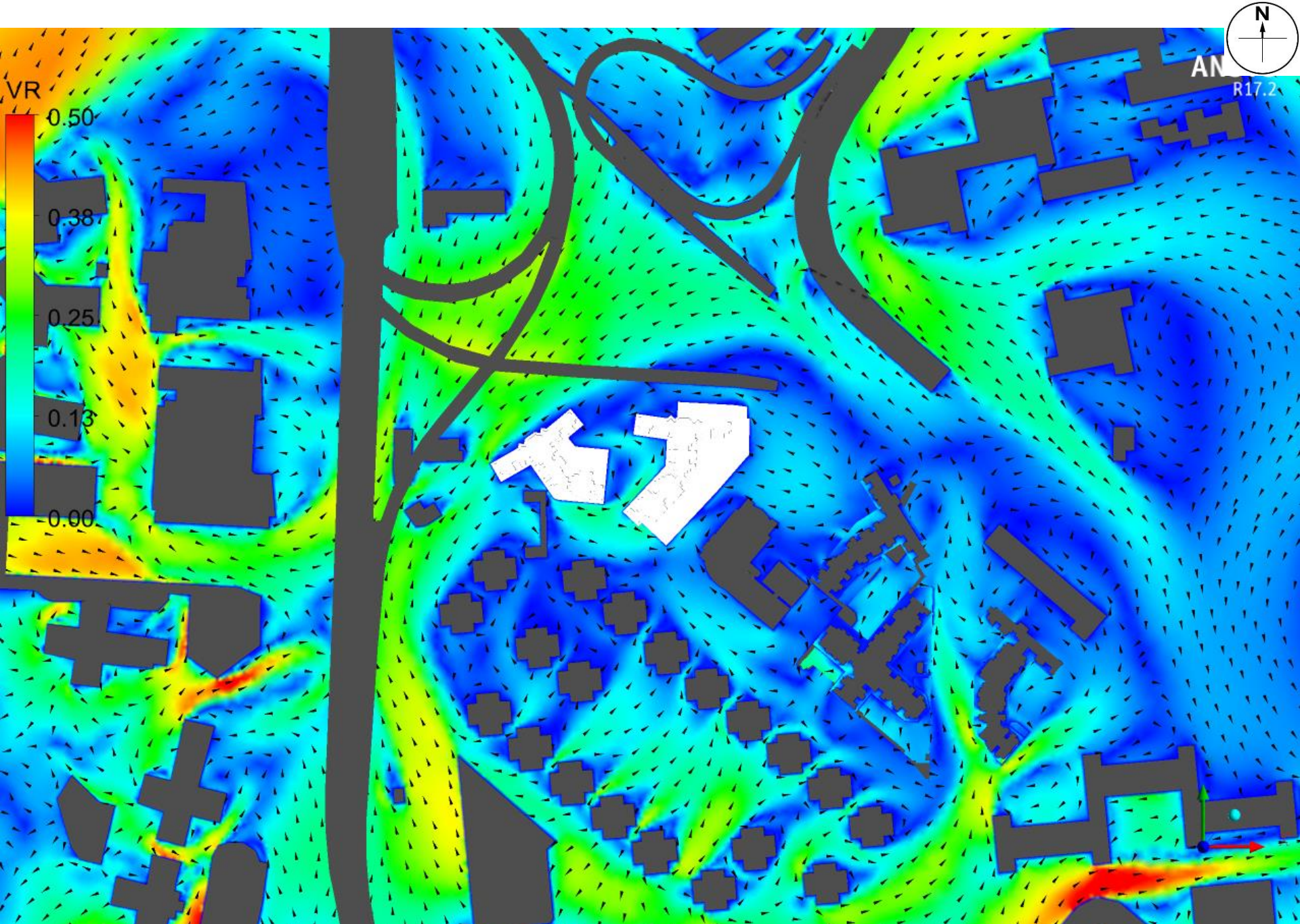
Baseline Scheme - Contour plot at pedestrian level under S Wind



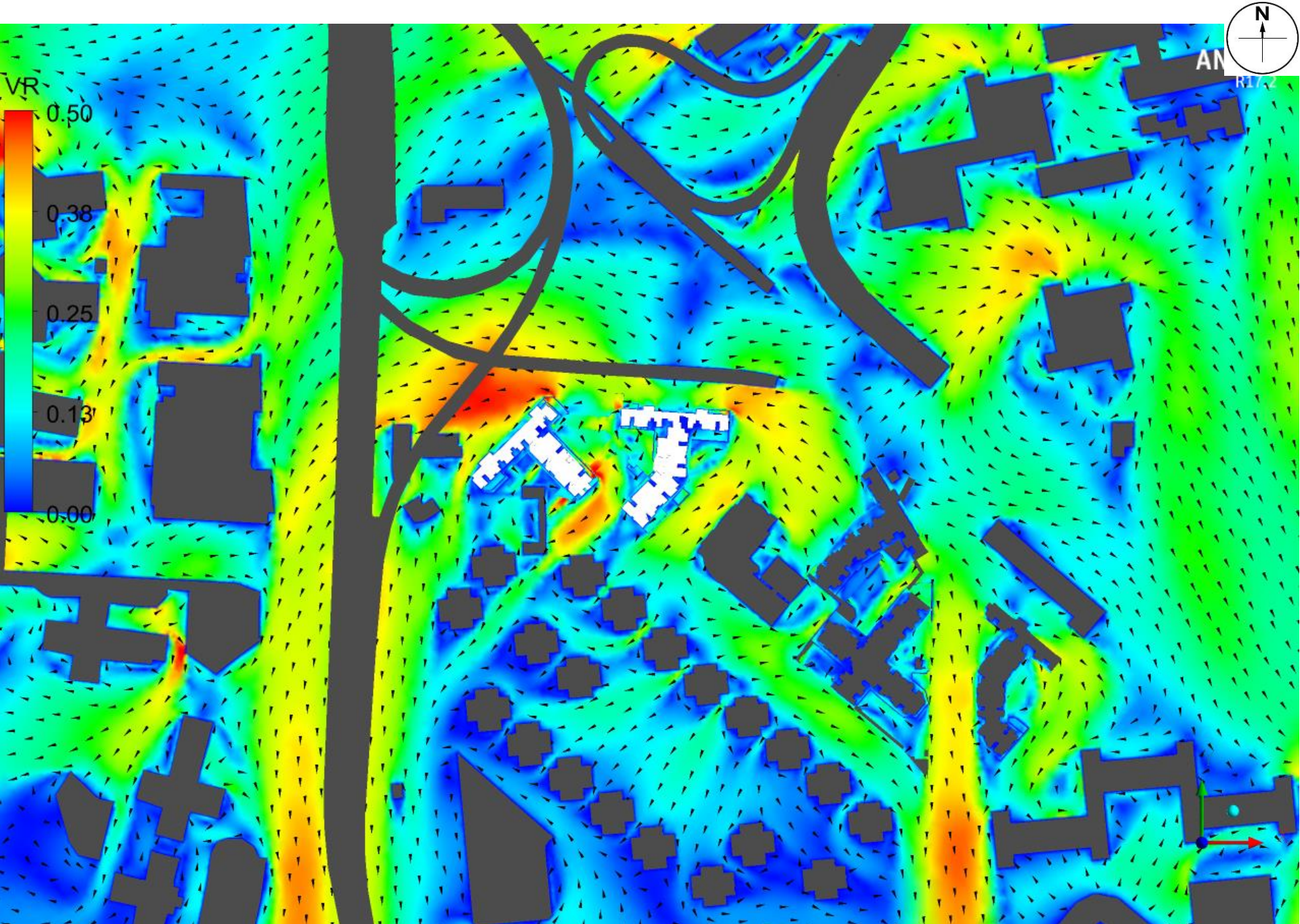
Baseline Scheme - Contour plot at pedestrian level under SSW Wind



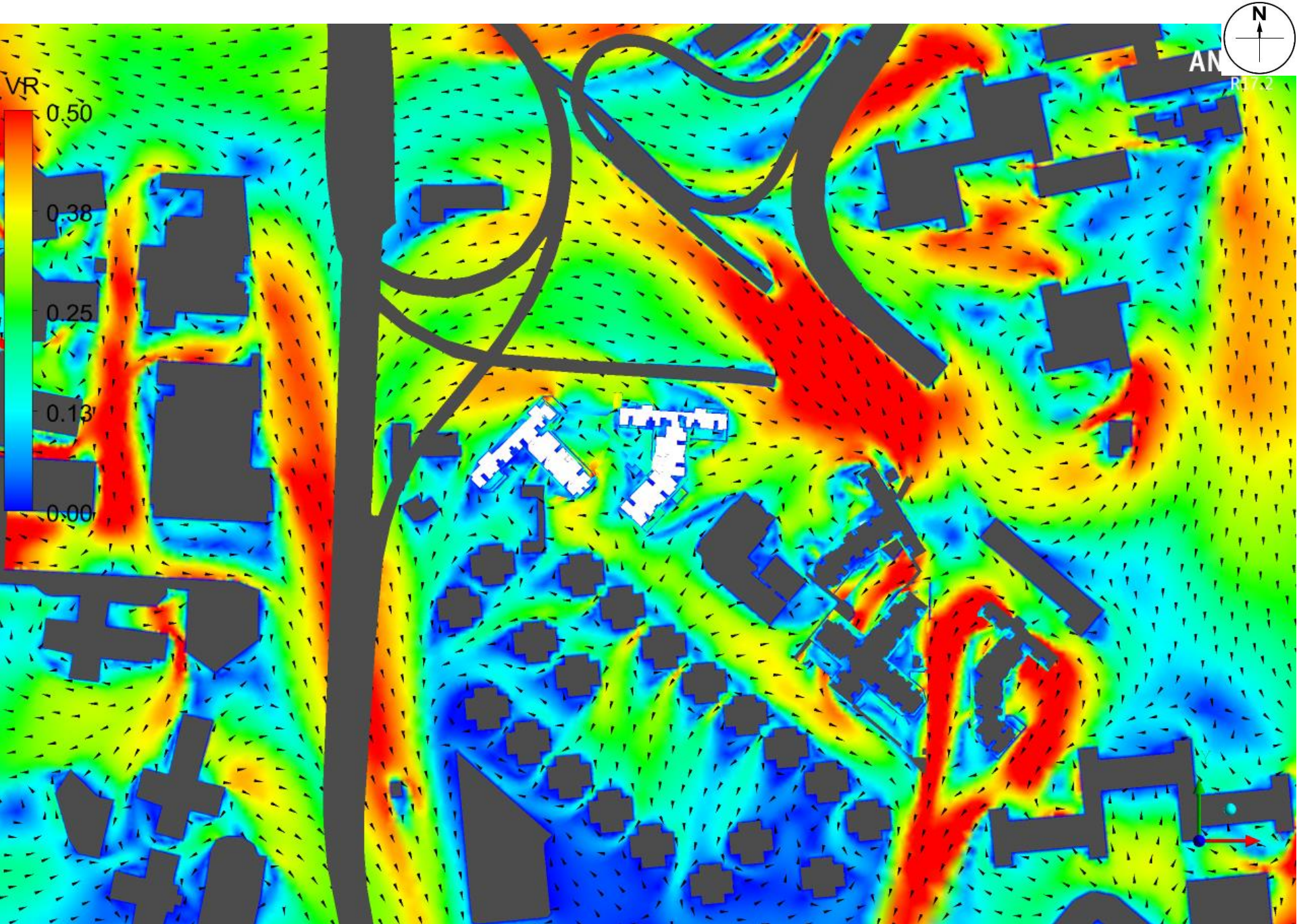
Baseline Scheme - Contour plot at pedestrian level under SW Wind



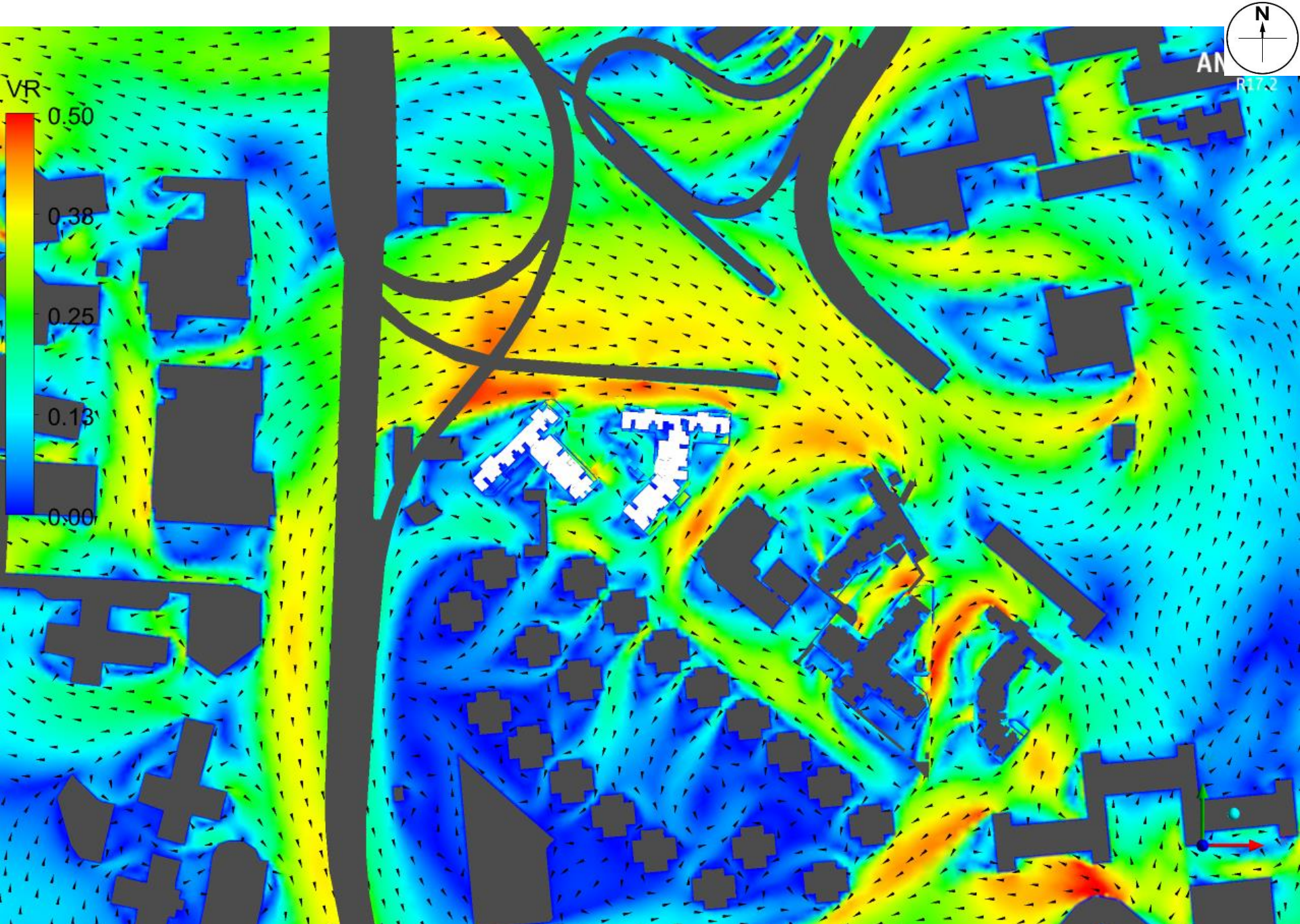
Baseline Scheme - Contour plot at pedestrian level under WSW Wind



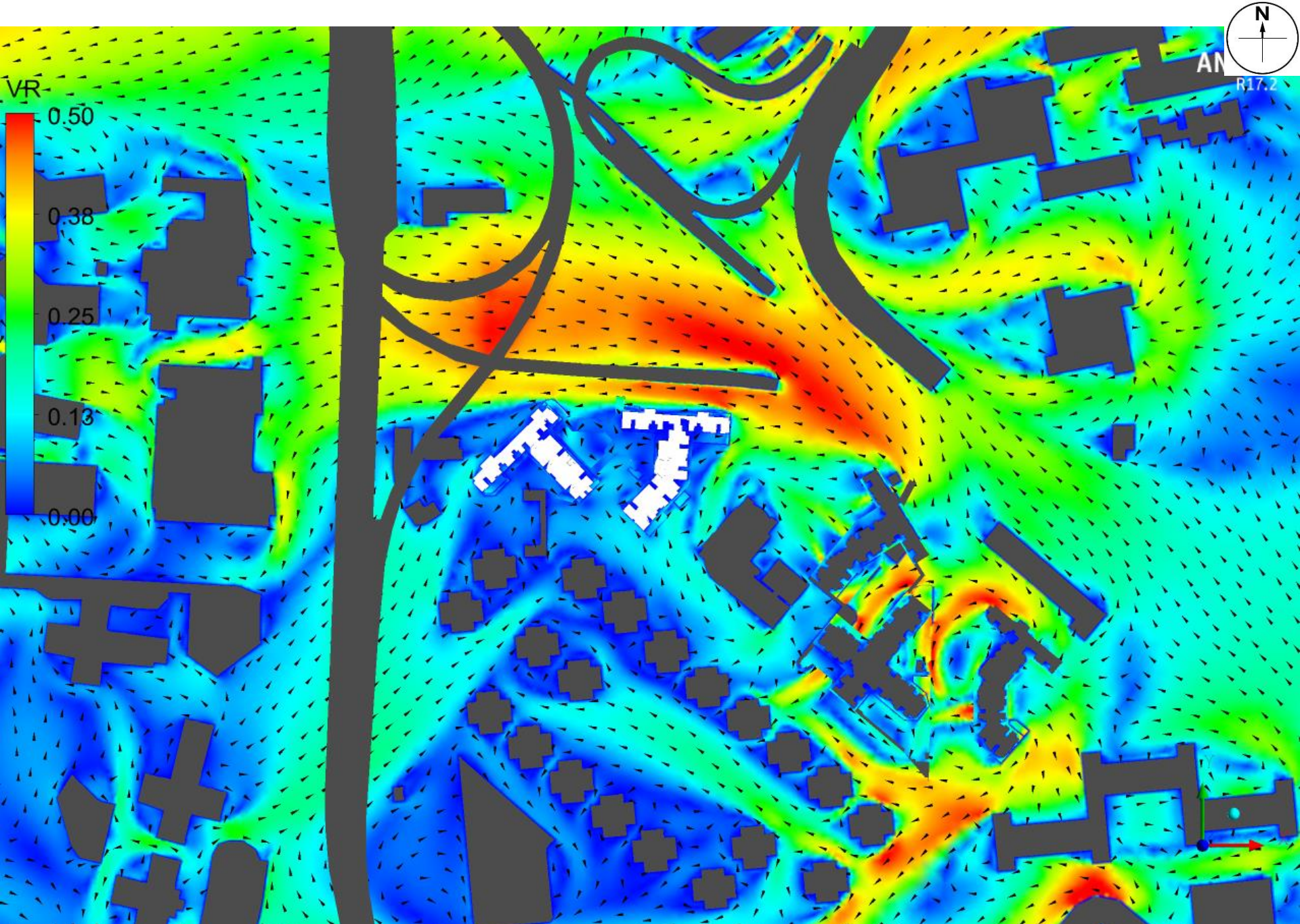
Proposed Scheme - Contour plot at pedestrian level under NNE Wind



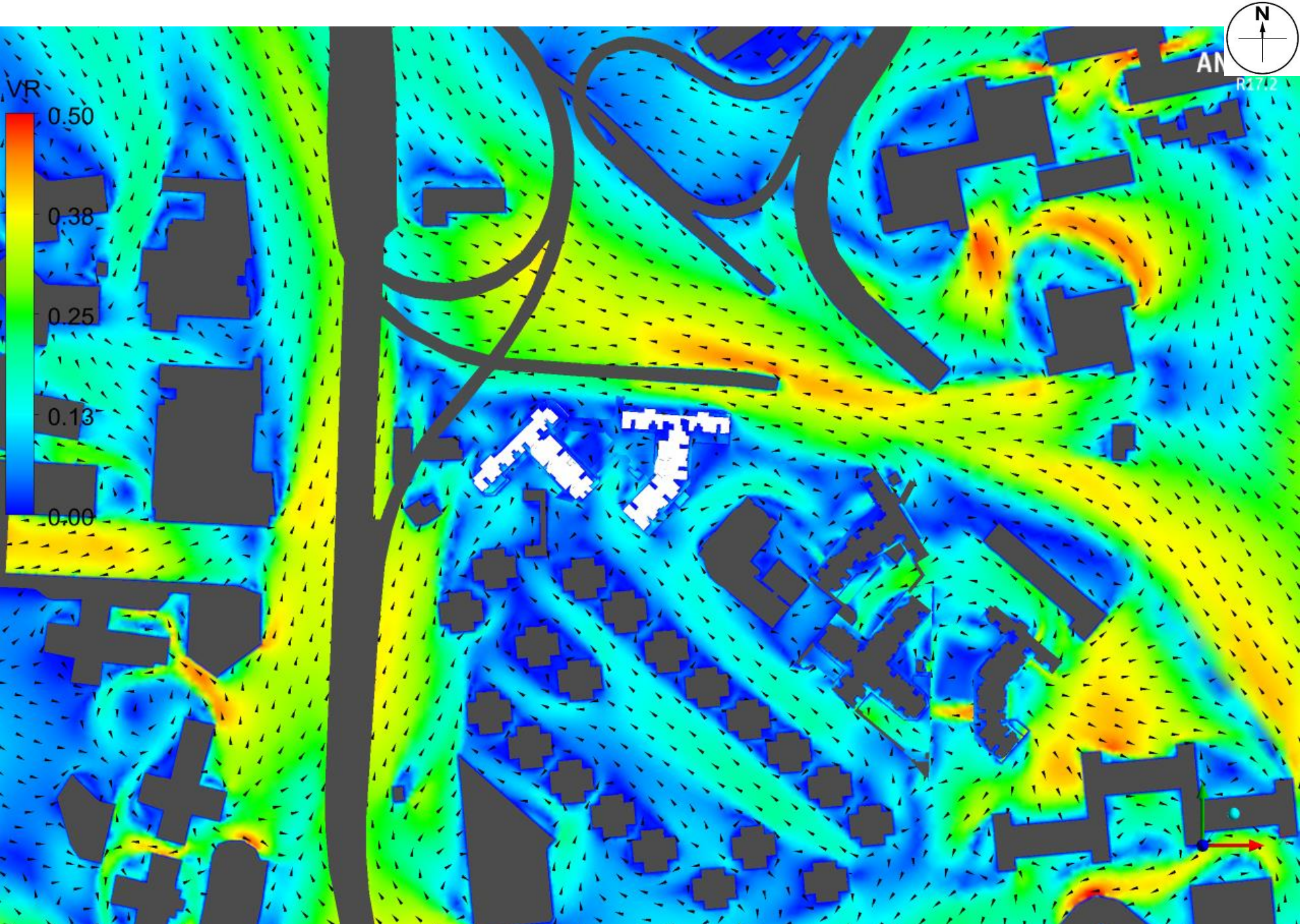
Proposed Scheme - Contour plot at pedestrian level under NE Wind



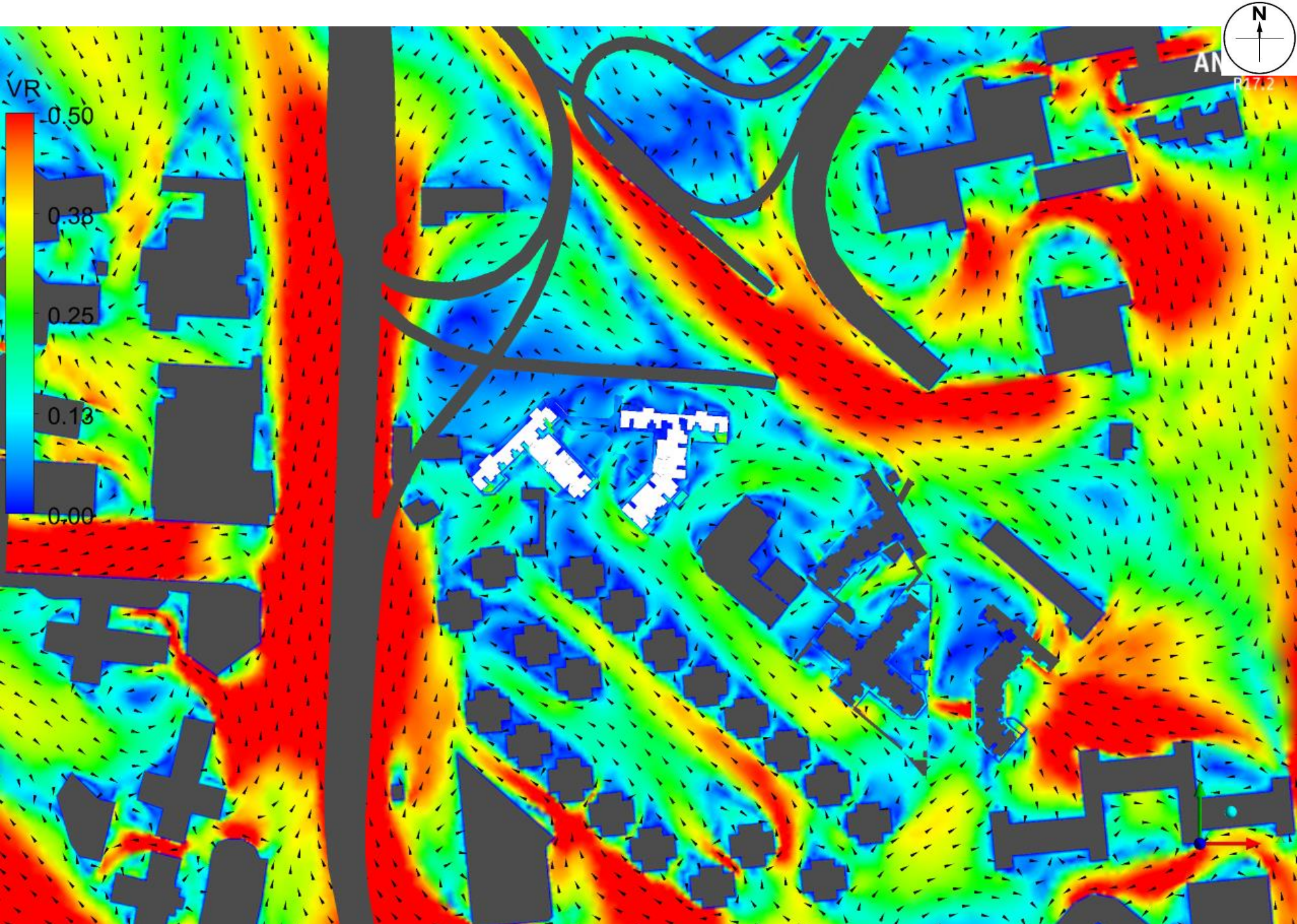
Proposed Scheme - Contour plot at pedestrian level under ENE Wind



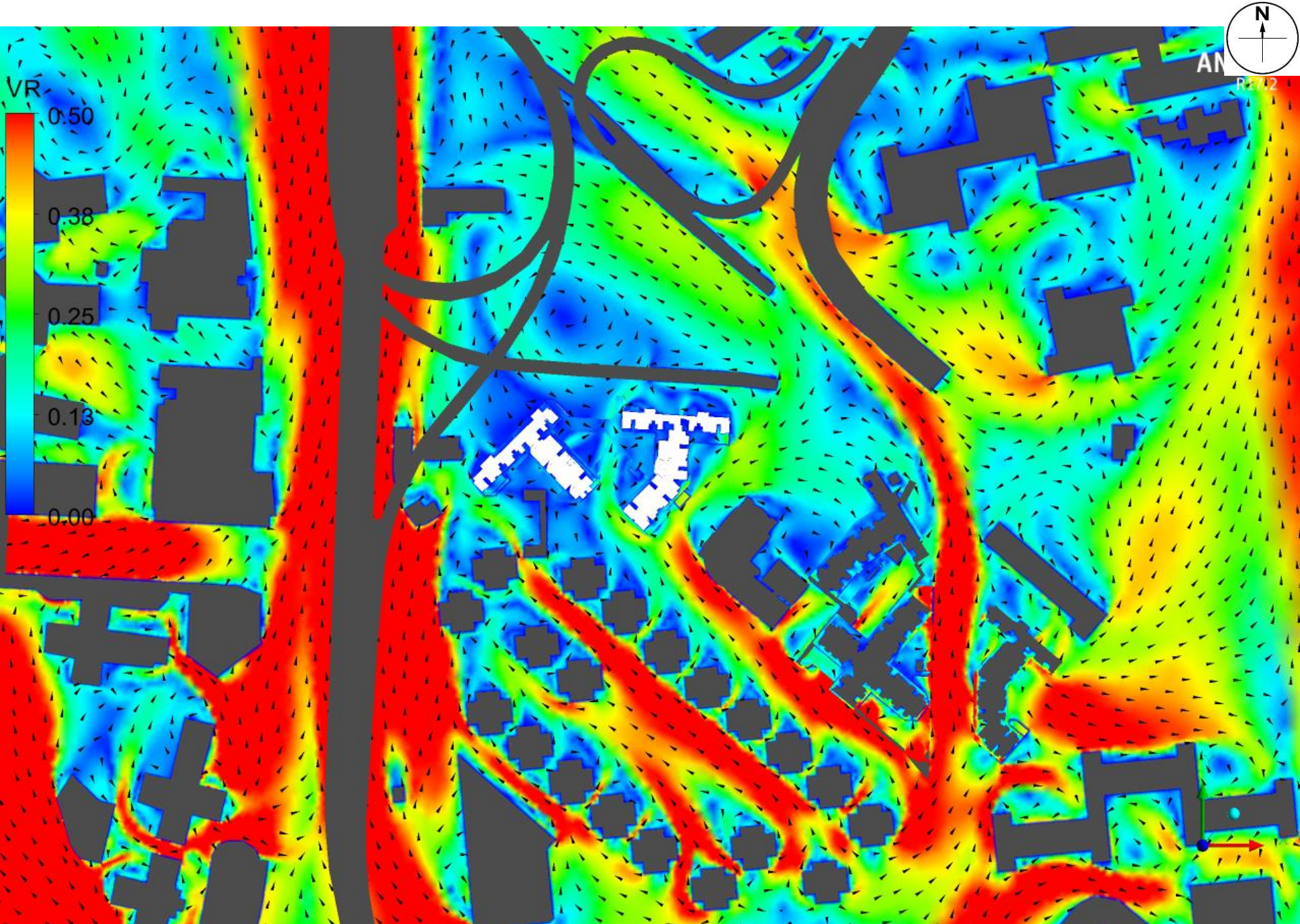
Proposed Scheme - Contour plot at pedestrian level under E Wind



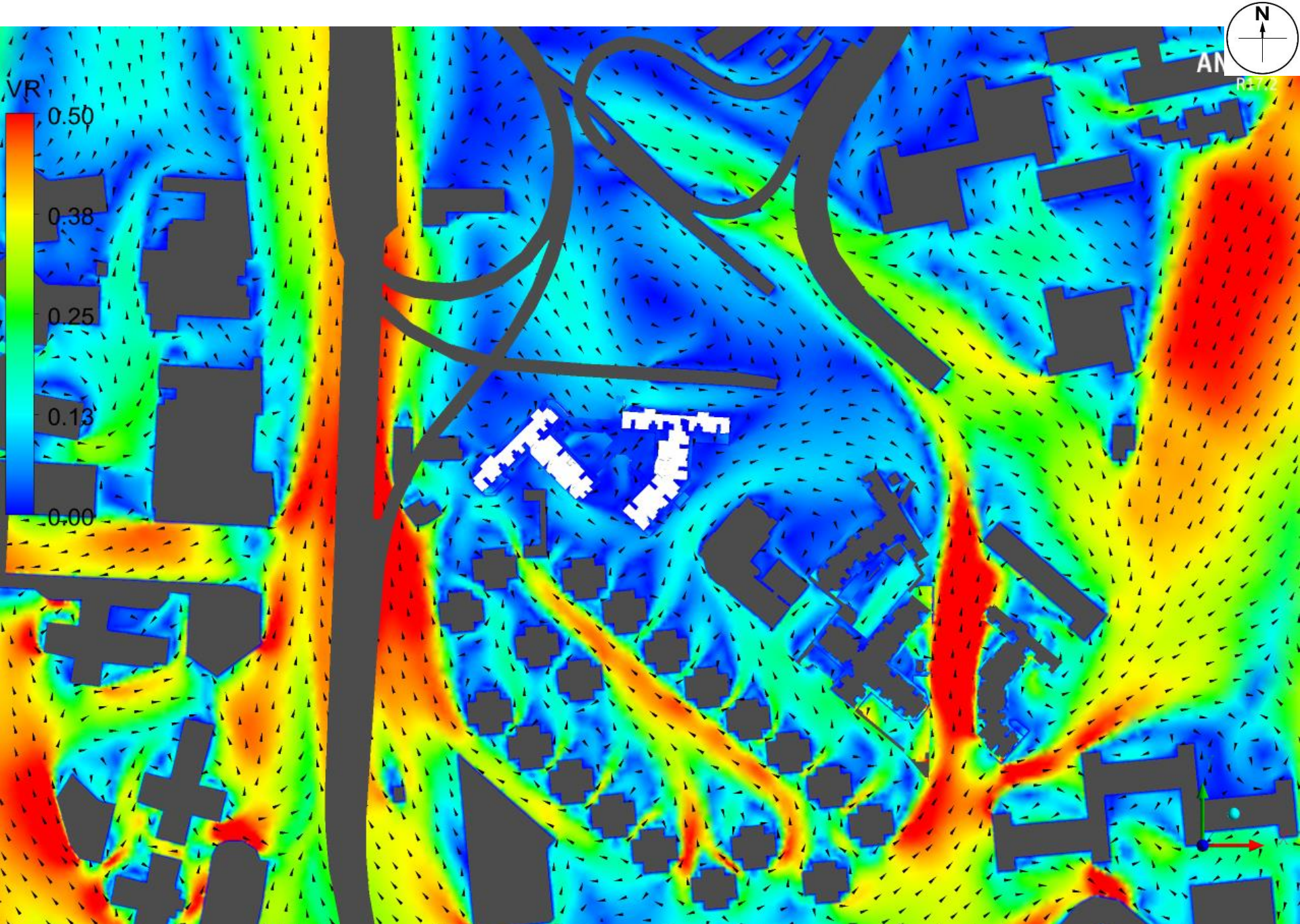
Proposed Scheme - Contour plot at pedestrian level under ESE Wind



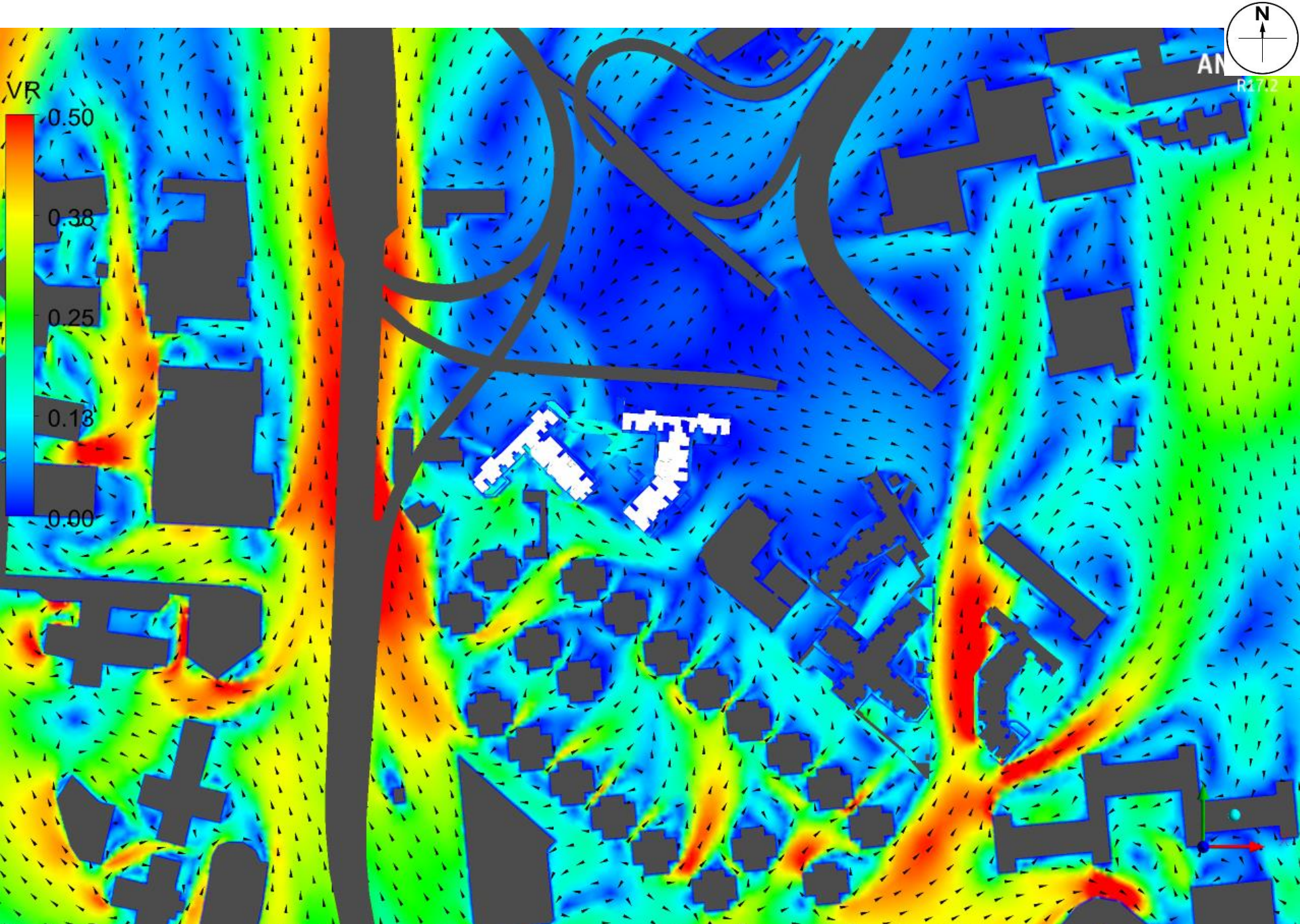
Proposed Scheme - Contour plot at pedestrian level under SE Wind



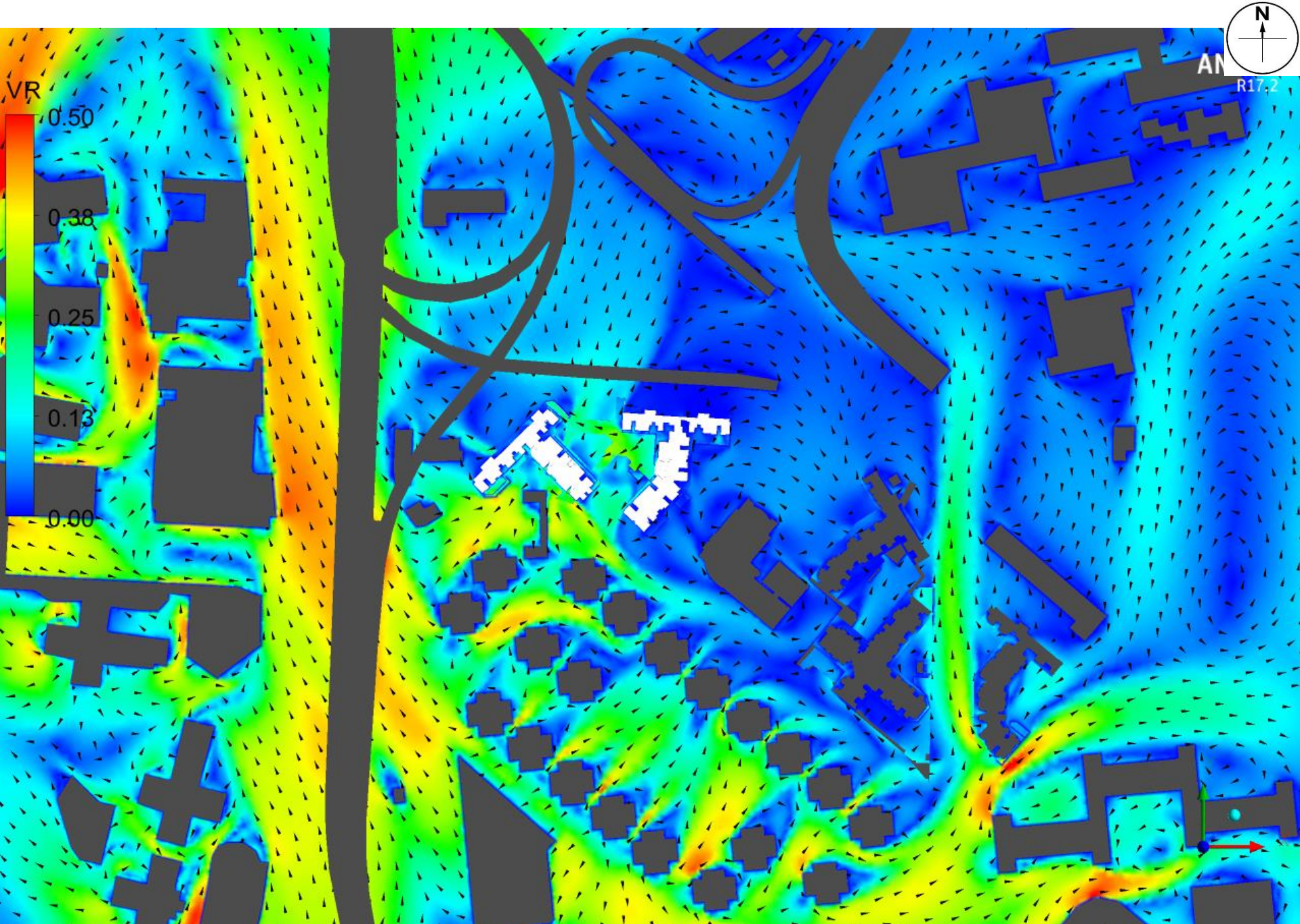
Proposed Scheme - Contour plot at pedestrian level under SSE Wind



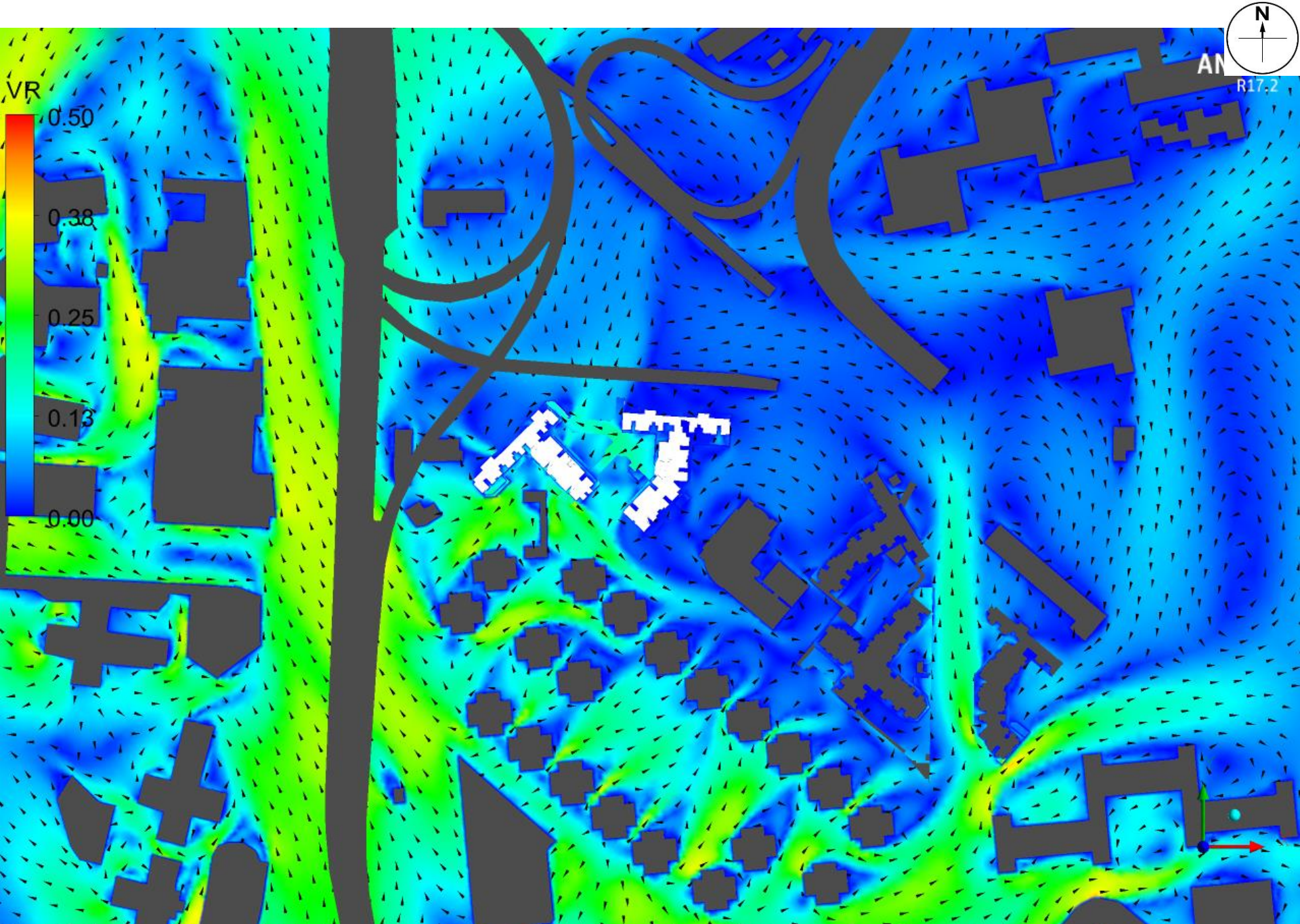
Proposed Scheme - Contour plot at pedestrian level under S Wind



Proposed Scheme - Contour plot at pedestrian level under SSW Wind



Proposed Scheme - Contour plot at pedestrian level under SW Wind



Proposed Scheme - Contour plot at pedestrian level under WSW Wind

Appendix 5

Detailed CFD Simulation Result for Selected Test Points

Baseline Scheme(VR)													
Test Point	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	Annual	Summer
P01	0.41	0.42	0.44	0.38	0.12	0.05	0.02	0.03	0.05	0.12	0.22	0.28	0.12
P02	0.36	0.38	0.39	0.37	0.15	0.06	0.03	0.03	0.04	0.18	0.17	0.27	0.13
P03	0.28	0.31	0.34	0.33	0.15	0.06	0.05	0.02	0.02	0.15	0.08	0.23	0.11
P04	0.28	0.28	0.36	0.31	0.19	0.16	0.12	0.03	0.01	0.10	0.04	0.24	0.11
P05	0.26	0.25	0.40	0.37	0.28	0.25	0.17	0.07	0.01	0.05	0.05	0.27	0.14
P06	0.07	0.23	0.34	0.30	0.27	0.26	0.20	0.07	0.01	0.01	0.04	0.23	0.12
P07	0.18	0.18	0.26	0.30	0.29	0.25	0.20	0.03	0.01	0.01	0.05	0.22	0.12
P08	0.33	0.16	0.18	0.33	0.33	0.22	0.17	0.01	0.02	0.01	0.04	0.23	0.12
P09	0.35	0.45	0.35	0.42	0.37	0.15	0.15	0.03	0.02	0.06	0.07	0.31	0.14
P10	0.28	0.55	0.41	0.48	0.39	0.27	0.18	0.07	0.05	0.07	0.05	0.36	0.17
P11	0.33	0.45	0.39	0.36	0.33	0.03	0.19	0.07	0.06	0.08	0.08	0.28	0.14
P12	0.25	0.32	0.33	0.25	0.19	0.09	0.21	0.08	0.08	0.07	0.09	0.21	0.12
P13	0.27	0.23	0.39	0.14	0.07	0.20	0.27	0.10	0.11	0.04	0.06	0.18	0.11
P14	0.24	0.27	0.42	0.20	0.16	0.19	0.28	0.10	0.10	0.05	0.06	0.21	0.13
P15	0.32	0.18	0.41	0.13	0.03	0.19	0.25	0.08	0.11	0.04	0.02	0.18	0.10
P16	0.30	0.09	0.44	0.05	0.09	0.16	0.24	0.13	0.12	0.05	0.10	0.16	0.11
P17	0.21	0.30	0.36	0.10	0.09	0.19	0.28	0.12	0.02	0.04	0.06	0.17	0.10
P18	0.06	0.25	0.13	0.02	0.08	0.19	0.24	0.03	0.15	0.11	0.15	0.11	0.12
P19	0.06	0.13	0.07	0.07	0.11	0.23	0.21	0.03	0.13	0.10	0.13	0.11	0.12
P20	0.48	0.35	0.21	0.04	0.08	0.19	0.21	0.05	0.18	0.16	0.20	0.18	0.14
P21	0.07	0.33	0.17	0.06	0.07	0.17	0.21	0.01	0.07	0.17	0.18	0.13	0.12
P22	0.12	0.29	0.27	0.05	0.05	0.13	0.14	0.06	0.06	0.29	0.11	0.14	0.12
P23	0.03	0.06	0.07	0.02	0.01	0.06	0.03	0.03	0.11	0.11	0.08	0.05	0.06
P24	0.12	0.07	0.07	0.06	0.05	0.12	0.13	0.07	0.24	0.36	0.10	0.11	0.16
P25	0.26	0.16	0.15	0.05	0.04	0.12	0.19	0.08	0.16	0.33	0.16	0.13	0.16
P26	0.35	0.27	0.13	0.08	0.15	0.26	0.09	0.07	0.05	0.24	0.22	0.17	0.15
P27	0.33	0.23	0.06	0.07	0.15	0.27	0.14	0.06	0.07	0.26	0.14	0.15	0.15
P28	0.28	0.19	0.08	0.08	0.13	0.18	0.12	0.07	0.13	0.21	0.23	0.14	0.15
P29	0.25	0.20	0.25	0.01	0.10	0.05	0.03	0.02	0.08	0.13	0.27	0.12	0.09
P30	0.32	0.29	0.39	0.26	0.03	0.04	0.04	0.03	0.03	0.05	0.25	0.19	0.09
Average SVR	0.25	0.26	0.28	0.19	0.15	0.16	0.16	0.06	0.08	0.12	0.12	0.19	0.12
T01	0.12	0.40	0.34	0.39	0.21	0.35	0.14	0.13	0.02	0.05	0.23	0.28	0.17
T02	0.26	0.30	0.42	0.48	0.29	0.14	0.06	0.09	0.02	0.12	0.26	0.31	0.17
T03	0.13	0.37	0.38	0.46	0.25	0.34	0.12	0.08	0.01	0.01	0.22	0.30	0.16
T04	0.20	0.28	0.40	0.47	0.29	0.18	0.05	0.12	0.01	0.08	0.22	0.30	0.16
T05	0.10	0.35	0.42	0.50	0.29	0.31	0.09	0.06	0.02	0.02	0.20	0.32	0.16
T06	0.10	0.38	0.29	0.19	0.02	0.12	0.45	0.24	0.06	0.08	0.26	0.17	0.16
T07	0.25	0.38	0.36	0.24	0.06	0.19	0.31	0.17	0.04	0.08	0.29	0.21	0.16
T08	0.30	0.31	0.27	0.22	0.13	0.32	0.27	0.21	0.00	0.07	0.27	0.21	0.17
T09	0.33	0.11	0.07	0.22	0.25	0.32	0.31	0.24	0.03	0.06	0.24	0.18	0.19
T10	0.23	0.23	0.07	0.20	0.22	0.14	0.37	0.25	0.21	0.04	0.21	0.17	0.19
T11	0.30	0.43	0.42	0.32	0.28	0.09	0.19	0.09	0.08	0.09	0.09	0.28	0.14
T12	0.23	0.39	0.38	0.22	0.18	0.14	0.19	0.09	0.06	0.08	0.08	0.23	0.12
T13	0.29	0.20	0.33	0.06	0.08	0.21	0.29	0.09	0.07	0.08	0.10	0.15	0.11
T14	0.27	0.25	0.21	0.04	0.04	0.14	0.17	0.08	0.01	0.08	0.11	0.12	0.08
T15	0.11	0.57	0.43	0.50	0.41	0.40	0.12	0.08	0.08	0.06	0.03	0.38	0.19
T16	0.14	0.52	0.43	0.49	0.39	0.43	0.13	0.08	0.08	0.05	0.00	0.37	0.18
T17	0.13	0.51	0.41	0.45	0.35	0.44	0.14	0.08	0.08	0.04	0.04	0.35	0.18
T18	0.10	0.50	0.33	0.39	0.22	0.38	0.18	0.08	0.06	0.05	0.03	0.29	0.15
T19	0.16	0.35	0.22	0.27	0.11	0.34	0.64	0.22	0.05	0.19	0.06	0.23	0.21
T20	0.16	0.31	0.13	0.23	0.03	0.07	0.31	0.06	0.16	0.44	0.11	0.18	0.19
T21	0.30	0.23	0.26	0.37	0.05	0.12	0.27	0.12	0.40	0.47	0.14	0.27	0.27
T22	0.35	0.27	0.35	0.34	0.22	0.30	0.40	0.35	0.39	0.37	0.30	0.32	0.34
T23	0.32	0.24	0.37	0.28	0.31	0.45	0.35	0.43	0.39	0.39	0.21	0.33	0.35
T24	0.33	0.48	0.32	0.14	0.35	0.53	0.62	0.47	0.45	0.43	0.20	0.34	0.40
T25	0.30	0.28	0.12	0.05	0.34	0.52	0.74	0.51	0.53	0.44	0.24	0.27	0.42
T26	0.36	0.37	0.18	0.05	0.38	0.59	0.76	0.49	0.50	0.38	0.28	0.29	0.42
T27	0.35	0.30	0.06	0.15	0.28	0.61	0.62	0.43	0.43	0.29	0.15	0.27	0.36
T28	0.37	0.36	0.12	0.17	0.33	0.62	0.71	0.44	0.45	0.34	0.28	0.30	0.41
T29	0.15	0.17	0.01	0.16	0.24	0.57	0.58	0.44	0.38	0.25	0.18	0.22	0.34
T30	0.38	0.29	0.15	0.11	0.26	0.54	0.42	0.16	0.32	0.04	0.22	0.23	0.24
T31	0.29	0.20	0.10	0.02	0.05	0.12	0.10	0.10	0.16	0.28	0.14	0.12	0.14
T32	0.17	0.11	0.08	0.05	0.06	0.17	0.27	0.11	0.15	0.29	0.01	0.11	0.15
T33	0.30	0.14	0.16	0.02	0.04	0.04	0.08	0.03	0.05	0.25	0.03	0.10	0.08
T34	0.32	0.33	0.37	0.00	0.05	0.08	0.05	0.01	0.12	0.21	0.11	0.16	0.09
T35	0.03	0.28	0.19	0.02	0.06	0.10	0.05	0.02	0.05	0.16	0.05	0.10	0.07
T36	0.11	0.27	0.23	0.07	0.08	0.14	0.22	0.08	0.04	0.08	0.05	0.12	0.09
T37	0.13	0.30	0.02	0.15	0.12	0.25	0.42	0.08	0.10	0.04	0.07	0.14	0.14
T38	0.14	0.26	0.32	0.11	0.11	0.15	0.17	0.12	0.15	0.08	0.11	0.16	0.12
T39	0.18	0.24	0.13	0.11	0.07	0.23	0.49	0.14	0.12	0.05	0.09	0.14	0.15
T40	0.18	0.25	0.25	0.15	0.12	0.17	0.14	0.04	0.02	0.01	0.13	0.15	0.09
T41	0.26	0.30	0.22	0.20	0.02	0.22	0.55	0.19	0.14	0.05	0.11	0.18	0.17
T42	0.20	0.27	0.29	0.03	0.15	0.25	0.24	0.12	0.08	0.11	0.09	0.16	0.13
T43	0.20	0.26	0.25	0.27	0.13	0.23	0.53	0.15	0.11	0.06	0.01	0.21	0.16

Baseline Scheme(VR)													
Test Point	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	Annual	Summer
T44	0.14	0.13	0.03	0.15	0.13	0.42	0.02	0.05	0.19	0.16	0.04	0.16	0.14
T45	0.12	0.14	0.01	0.14	0.05	0.03	0.13	0.15	0.30	0.32	0.06	0.12	0.17
T46	0.24	0.11	0.04	0.14	0.01	0.04	0.07	0.09	0.30	0.27	0.05	0.12	0.14
T47	0.10	0.21	0.04	0.05	0.11	0.30	0.45	0.26	0.22	0.29	0.02	0.14	0.21
T48	0.03	0.06	0.04	0.11	0.14	0.33	0.62	0.45	0.04	0.15	0.05	0.11	0.21
T49	0.07	0.28	0.23	0.12	0.13	0.32	0.55	0.41	0.05	0.04	0.05	0.16	0.18
T50	0.19	0.12	0.11	0.16	0.14	0.34	0.58	0.42	0.15	0.23	0.10	0.17	0.25
Average LVR	0.22	0.28	0.25	0.20	0.17	0.23	0.26	0.14	0.13	0.15	0.13	0.21	0.17

Proposed Scheme(VR)													
Test Point	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	Annual	Summer
P01	0.46	0.43	0.46	0.41	0.13	0.07	0.07	0.06	0.06	0.08	0.06	0.29	0.11
P02	0.29	0.29	0.38	0.39	0.16	0.03	0.08	0.09	0.07	0.09	0.06	0.25	0.11
P03	0.28	0.28	0.41	0.40	0.16	0.03	0.06	0.09	0.08	0.14	0.11	0.26	0.13
P04	0.31	0.32	0.43	0.41	0.19	0.10	0.16	0.09	0.01	0.11	0.08	0.28	0.13
P05	0.32	0.27	0.44	0.44	0.25	0.11	0.11	0.12	0.02	0.01	0.00	0.28	0.11
P06	0.23	0.09	0.40	0.45	0.27	0.03	0.03	0.10	0.01	0.00	0.01	0.25	0.10
P07	0.32	0.15	0.43	0.48	0.33	0.11	0.01	0.09	0.02	0.00	0.01	0.29	0.11
P08	0.41	0.36	0.37	0.45	0.34	0.20	0.17	0.07	0.03	0.01	0.02	0.31	0.14
P09	0.40	0.43	0.35	0.45	0.34	0.14	0.21	0.03	0.03	0.03	0.04	0.31	0.14
P10	0.35	0.54	0.37	0.46	0.34	0.36	0.20	0.05	0.04	0.04	0.04	0.35	0.17
P11	0.37	0.45	0.39	0.41	0.26	0.05	0.21	0.06	0.04	0.05	0.04	0.29	0.12
P12	0.36	0.38	0.38	0.32	0.14	0.15	0.26	0.07	0.03	0.05	0.05	0.25	0.12
P13	0.37	0.33	0.38	0.11	0.14	0.22	0.27	0.11	0.06	0.05	0.04	0.20	0.11
P14	0.32	0.34	0.37	0.18	0.07	0.23	0.29	0.09	0.03	0.05	0.05	0.20	0.11
P15	0.38	0.14	0.41	0.18	0.15	0.16	0.20	0.12	0.09	0.01	0.02	0.20	0.10
P16	0.35	0.09	0.43	0.06	0.11	0.15	0.18	0.15	0.11	0.02	0.01	0.16	0.09
P17	0.27	0.22	0.30	0.14	0.10	0.22	0.37	0.09	0.13	0.03	0.02	0.17	0.12
P18	0.06	0.20	0.05	0.09	0.11	0.29	0.37	0.07	0.16	0.03	0.02	0.12	0.13
P19	0.06	0.15	0.06	0.10	0.12	0.27	0.28	0.03	0.05	0.04	0.03	0.11	0.10
P20	0.41	0.24	0.18	0.09	0.11	0.24	0.23	0.04	0.07	0.21	0.14	0.17	0.14
P21	0.15	0.32	0.17	0.04	0.08	0.09	0.07	0.12	0.25	0.33	0.26	0.15	0.18
P22	0.09	0.22	0.16	0.03	0.07	0.09	0.04	0.09	0.20	0.33	0.25	0.12	0.16
P23	0.05	0.10	0.03	0.02	0.04	0.08	0.02	0.02	0.05	0.04	0.03	0.04	0.04
P24	0.05	0.14	0.02	0.06	0.12	0.23	0.06	0.05	0.25	0.34	0.26	0.13	0.19
P25	0.05	0.06	0.13	0.06	0.10	0.21	0.25	0.15	0.21	0.34	0.26	0.13	0.21
P26	0.28	0.16	0.15	0.12	0.12	0.14	0.13	0.05	0.14	0.27	0.20	0.16	0.16
P27	0.34	0.20	0.09	0.14	0.15	0.18	0.21	0.10	0.14	0.19	0.14	0.16	0.16
P28	0.32	0.21	0.14	0.07	0.03	0.03	0.02	0.03	0.01	0.01	0.01	0.09	0.02
P29	0.35	0.24	0.13	0.07	0.06	0.10	0.01	0.04	0.04	0.05	0.03	0.12	0.05
P30	0.42	0.33	0.03	0.05	0.04	0.11	0.02	0.04	0.06	0.04	0.03	0.11	0.05
Average SVR	0.28	0.26	0.27	0.22	0.15	0.15	0.15	0.08	0.08	0.10	0.08	0.20	0.12
T01	0.15	0.25	0.33	0.39	0.30	0.16	0.18	0.08	0.01	0.08	0.06	0.26	0.14
T02	0.30	0.23	0.40	0.44	0.33	0.10	0.02	0.14	0.06	0.08	0.06	0.29	0.14
T03	0.15	0.24	0.36	0.45	0.33	0.04	0.15	0.01	0.02	0.08	0.06	0.26	0.13
T04	0.22	0.21	0.38	0.43	0.35	0.20	0.07	0.09	0.02	0.10	0.08	0.29	0.15
T05	0.10	0.24	0.39	0.48	0.37	0.04	0.11	0.03	0.03	0.05	0.02	0.28	0.13
T06	0.11	0.34	0.28	0.16	0.03	0.19	0.45	0.27	0.07	0.08	0.05	0.17	0.15
T07	0.21	0.31	0.27	0.28	0.10	0.12	0.32	0.23	0.05	0.08	0.07	0.20	0.14
T08	0.28	0.28	0.17	0.36	0.18	0.25	0.27	0.29	0.00	0.07	0.06	0.23	0.17
T09	0.32	0.25	0.07	0.16	0.23	0.40	0.33	0.34	0.03	0.09	0.03	0.19	0.18
T10	0.30	0.27	0.05	0.21	0.12	0.16	0.41	0.37	0.18	0.10	0.01	0.17	0.18
T11	0.35	0.41	0.42	0.38	0.24	0.03	0.17	0.07	0.05	0.06	0.04	0.28	0.12
T12	0.31	0.39	0.37	0.25	0.15	0.07	0.16	0.09	0.06	0.06	0.04	0.22	0.10
T13	0.33	0.28	0.35	0.14	0.12	0.25	0.24	0.11	0.05	0.06	0.05	0.20	0.11
T14	0.34	0.26	0.23	0.21	0.13	0.22	0.17	0.08	0.05	0.07	0.05	0.19	0.11
T15	0.28	0.56	0.39	0.49	0.34	0.45	0.12	0.06	0.05	0.05	0.03	0.37	0.17
T16	0.13	0.53	0.39	0.48	0.31	0.47	0.11	0.07	0.07	0.04	0.02	0.35	0.17
T17	0.09	0.55	0.40	0.45	0.27	0.45	0.15	0.09	0.08	0.04	0.03	0.34	0.17
T18	0.07	0.49	0.32	0.39	0.16	0.35	0.08	0.09	0.08	0.05	0.06	0.28	0.14
T19	0.14	0.35	0.22	0.27	0.07	0.28	0.61	0.22	0.02	0.15	0.13	0.21	0.20
T20	0.20	0.38	0.16	0.25	0.03	0.42	0.18	0.07	0.03	0.44	0.33	0.23	0.23
T21	0.31	0.25	0.28	0.37	0.07	0.53	0.24	0.07	0.18	0.45	0.34	0.31	0.29
T22	0.33	0.22	0.36	0.33	0.29	0.53	0.40	0.38	0.33	0.36	0.27	0.34	0.36
T23	0.32	0.20	0.35	0.11	0.34	0.60	0.52	0.42	0.32	0.37	0.28	0.30	0.36
T24	0.34	0.49	0.33	0.07	0.36	0.69	0.67	0.46	0.45	0.43	0.32	0.34	0.43
T25	0.30	0.30	0.11	0.16	0.32	0.49	0.71	0.54	0.52	0.31	0.24	0.28	0.40
T26	0.34	0.39	0.15	0.17	0.36	0.53	0.72	0.52	0.50	0.38	0.30	0.31	0.43
T27	0.27	0.21	0.03	0.16	0.30	0.44	0.69	0.43	0.40	0.15	0.12	0.22	0.32
T28	0.30	0.38	0.01	0.16	0.35	0.54	0.69	0.47	0.45	0.33	0.25	0.27	0.40
T29	0.15	0.14	0.04	0.14	0.27	0.43	0.64	0.46	0.38	0.25	0.19	0.20	0.34
T30	0.26	0.20	0.11	0.15	0.28	0.28	0.55	0.22	0.20	0.19	0.14	0.20	0.24
T31	0.17	0.17	0.12	0.01	0.09	0.21	0.11	0.08	0.20	0.38	0.29	0.13	0.19
T32	0.24	0.22	0.19	0.03	0.09	0.17	0.26	0.08	0.18	0.28	0.22	0.15	0.17
T33	0.31	0.20	0.22	0.07	0.04	0.09	0.07	0.01	0.12	0.29	0.22	0.14	0.13
T34	0.27	0.35	0.36	0.07	0.03	0.06	0.04	0.05	0.24	0.26	0.20	0.18	0.14
T35	0.13	0.27	0.16	0.07	0.06	0.11	0.07	0.07	0.08	0.26	0.21	0.13	0.13
T36	0.13	0.25	0.18	0.07	0.09	0.12	0.21	0.05	0.09	0.18	0.14	0.13	0.12
T37	0.18	0.26	0.03	0.15	0.14	0.27	0.49	0.06	0.04	0.03	0.03	0.14	0.13
T38	0.14	0.26	0.32	0.07	0.12	0.14	0.18	0.12	0.01	0.01	0.01	0.14	0.07
T39	0.21	0.26	0.09	0.13	0.09	0.26	0.50	0.15	0.08	0.09	0.07	0.15	0.15
T40	0.19	0.29	0.27	0.11	0.13	0.16	0.20	0.02	0.07	0.03	0.02	0.16	0.08
T41	0.27	0.35	0.22	0.19	0.06	0.26	0.52	0.18	0.14	0.06	0.01	0.19	0.16
T42	0.20	0.30	0.29	0.05	0.16	0.25	0.30	0.14	0.08	0.12	0.02	0.17	0.13
T43	0.22	0.30	0.23	0.33	0.14	0.28	0.49	0.16	0.13	0.02	0.04	0.23	0.17

Proposed Scheme(VR)													
Test Point	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	Annual	Summer
T44	0.15	0.11	0.06	0.13	0.13	0.26	0.20	0.03	0.20	0.19	0.15	0.14	0.16
T45	0.11	0.08	0.08	0.13	0.02	0.02	0.11	0.17	0.27	0.32	0.24	0.12	0.18
T46	0.24	0.15	0.10	0.03	0.01	0.14	0.18	0.04	0.29	0.24	0.19	0.11	0.15
T47	0.11	0.24	0.04	0.03	0.10	0.29	0.55	0.39	0.19	0.33	0.26	0.13	0.27
T48	0.03	0.07	0.06	0.01	0.13	0.34	0.56	0.38	0.08	0.28	0.21	0.11	0.24
T49	0.07	0.29	0.19	0.06	0.13	0.32	0.56	0.43	0.09	0.02	0.02	0.14	0.18
T50	0.18	0.12	0.04	0.11	0.14	0.34	0.57	0.43	0.12	0.18	0.14	0.14	0.24
Average LVR	0.24	0.27	0.24	0.21	0.17	0.23	0.26	0.15	0.12	0.15	0.11	0.21	0.17

Appendix 6

Screen Capture of CFD Model Input Parameter

2. Boundary conditions: (take E wind as an example)

a (top surface of the bounding box)

Meshing

Mesh Generation

Solution Setup

General

Models

Materials

Phases

Cell Zone Conditions

Boundary Conditions

Mesh Interfaces

Dynamic Mesh

Reference Values

Solution

Solution Methods

Solution Controls

Monitors

Solution Initialization

Calculation Activities

Run Calculation

Results

Boundary Conditions

Zone

a

a_e

a_n

a_s

a_w

building

interior-66

interior-9

prism-cap-56-shadow

ps

topo

topo-60:ignore

Phase

mixture

Type

symmetry

a_e

Boundary Conditions

Zone

a

a_e

a_n

a_s

a_w

building

interior-66

interior-9

prism-cap-56-shadow

ps

topo

topo-60:ignore

Phase

mixture

Type

velocity-inlet

ID

44

Edit...

Copy...

Profiles...

Parameters...

Operating Conditions...

Display Mesh...

Periodic Conditions...

Highlight Zone

Help

Window 1

Velocity Inlet

Zone Name

a_e

Momentum

Thermal

Radiation

Species

DPM

Multiphase

UDS

Velocity Specification Method

Components

Reference Frame

Absolute

Supersonic/Initial Gauge Pressure (pascal)

0

constant

Coordinate System

Cartesian (X, Y, Z)

X-Velocity (m/s)

inlet_E x-velocity

Y-Velocity (m/s)

inlet_E y-velocity

Z-Velocity (m/s)

0

constant

Turbulence

Specification Method

Intensity and Viscosity Ratio

Turbulent Intensity (%)

5

Turbulent Viscosity Ratio

10

OK

Cancel

Help

a_n	Meshing - Mesh Generation Solution Setup - General - Models - Materials - Phases - Cell Zone Conditions Boundary Conditions - Mesh Interfaces - Dynamic Mesh - Reference Values Solution - Solution Methods - Solution Controls - Monitors - Solution Initialization - Calculation Activities - Run Calculation Results - Graphics and Animations - Plots - Reports	Boundary Conditions Zone - a - a_e a_n - a_s - a_w - building - interior-66 - interior-9 - prism-cap-56-shadow - ps - topo - topo-60:ignore Phase Type ID mixture symmetry 43 Edit... Copy... Profiles... Parameters... Operating Conditions...
a_s	Meshing - Mesh Generation Solution Setup - General - Models - Materials - Phases - Cell Zone Conditions Boundary Conditions - Mesh Interfaces - Dynamic Mesh - Reference Values Solution - Solution Methods - Solution Controls - Monitors - Solution Initialization - Calculation Activities - Run Calculation Results - Graphics and Animations - Plots - Reports	Boundary Conditions Zone - a - a_e - a_n a_s - a_w - building - interior-66 - interior-9 - prism-cap-56-shadow - ps - topo - topo-60:ignore Phase Type ID mixture symmetry 41 Edit... Copy... Profiles... Parameters... Operating Conditions...

a_w	Meshing Mesh Generation Solution Setup General Models Materials Phases Cell Zone Conditions Boundary Conditions Mesh Interfaces Dynamic Mesh Reference Values Solution Solution Methods Solution Controls Monitors Solution Initialization Calculation Activities Run Calculation Results Graphics and Animations Plots Reports	Boundary Conditions Zone a a_e a_n a_s a_w building interior-66 interior-9 prism-cap-56-shadow ps topo topo-60:ignore Phase mixture Type pressure-outlet ID 39 Edit... Copy... Profiles...
interior	Meshing Mesh Generation Solution Setup General Models Materials Phases Cell Zone Conditions Boundary Conditions Mesh Interfaces Dynamic Mesh Reference Values Solution Solution Methods Solution Controls Monitors Solution Initialization Calculation Activities Run Calculation Results Graphics and Animations Plots Reports	Boundary Conditions Zone a a_e a_n a_s a_w building interior-66 interior-9 prism-cap-56-shadow ps topo topo-60:ignore Phase mixture Type interior ID 2

3. Turbulence model setting:

