



**Vipac Engineers and Scientists Limited**

279 Normanby Rd, Port Melbourne, VIC 3207, Australia

Private Bag 16, Port Melbourne, VIC 3207, Australia

t. +61 3 9647 9700 | f. +61 3 9646 4370 | e. melbourne@vipac.com.au

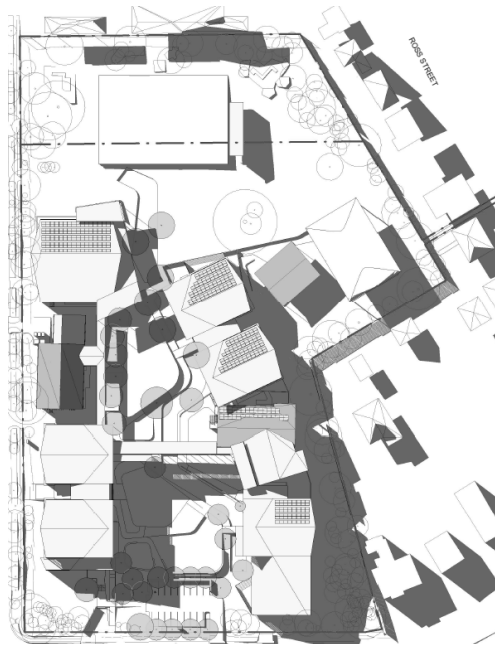
w. www.vipac.com.au | A.B.N. 33 005 453 627 | A.C.N. 005 453 627

## **Vipac Engineers & Scientists**

Tanner Kibble Denton Architects Pty Ltd

### **Curl Curl North Public School**

### **Wind Impact Statement**



30N-17-0055-TNT-617577-1

23 April 2018

| <b>Report Title: Wind Impact Statement</b><br><b>Job Title: Curl Curl North Public School</b>                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                          |                   |                |             |                 |   |             |               |   |                     |                   |   |  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------|-------------|-----------------|---|-------------|---------------|---|---------------------|-------------------|---|--|--|
| <b>DOCUMENT NO:</b> 30N-17-0055-TNT-617577-1<br><b>PREPARED FOR:</b><br>Tanner Kibble Denton Architects Pty Ltd<br>Level 1<br>19 Foster Street<br>Surry Hills, New South Wales, 2010, Australia<br><b>CONTACT:</b> Chloe Rayfield<br><b>Tel:</b><br><b>Fax:</b>                                                                                      | <b>REPORT CODE:</b> TNT<br><b>PREPARED BY:</b><br>Vipac Engineers and Scientists Limited<br>279 Normanby Rd,<br>Port Melbourne, VIC 3207,<br>Australia<br><br><b>Tel:</b> +61 3 9647 9700<br><b>Fax:</b> +61 3 9646 4370 |                   |                |             |                 |   |             |               |   |                     |                   |   |  |  |
| <b>PREPARED BY:</b><br>Author: _____ Date: 23 April 2018<br><br>Eric Yuen<br>Wind Engineer                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                          |                   |                |             |                 |   |             |               |   |                     |                   |   |  |  |
| <b>REVIEWED BY:</b><br>Reviewer: _____ Date: 23 April 2018<br><br>Zhuyun Xu<br>Senior Wind Consultant                                                                                                                                                                                                                                                |                                                                                                                                                                                                                          |                   |                |             |                 |   |             |               |   |                     |                   |   |  |  |
| <b>AUTHORISED BY:</b><br><br>Date: 23 April 2018<br><br>Sophie Lamande<br>Wind Group Leader                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                          |                   |                |             |                 |   |             |               |   |                     |                   |   |  |  |
| <b>REVISION HISTORY</b> <table border="1"> <thead> <tr> <th>Revision No.</th> <th>Date Issued</th> <th>Reason/Comments</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>16 May 2017</td> <td>Initial Issue</td> </tr> <tr> <td>1</td> <td>23 April 2018</td> <td>Plans Updated</td> </tr> <tr> <td>2</td> <td></td> <td></td> </tr> </tbody> </table> |                                                                                                                                                                                                                          |                   | Revision No.   | Date Issued | Reason/Comments | 0 | 16 May 2017 | Initial Issue | 1 | 23 April 2018       | Plans Updated     | 2 |  |  |
| Revision No.                                                                                                                                                                                                                                                                                                                                         | Date Issued                                                                                                                                                                                                              | Reason/Comments   |                |             |                 |   |             |               |   |                     |                   |   |  |  |
| 0                                                                                                                                                                                                                                                                                                                                                    | 16 May 2017                                                                                                                                                                                                              | Initial Issue     |                |             |                 |   |             |               |   |                     |                   |   |  |  |
| 1                                                                                                                                                                                                                                                                                                                                                    | 23 April 2018                                                                                                                                                                                                            | Plans Updated     |                |             |                 |   |             |               |   |                     |                   |   |  |  |
| 2                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                          |                   |                |             |                 |   |             |               |   |                     |                   |   |  |  |
| <b>DISTRIBUTION</b> <table border="1"> <thead> <tr> <th>Copy No. _____</th> <th>Location</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Project</td> <td></td> </tr> <tr> <td>2</td> <td>Client (PDF Format)</td> <td>Uncontrolled Copy</td> </tr> <tr> <td>3</td> <td></td> <td></td> </tr> </tbody> </table>                            |                                                                                                                                                                                                                          |                   | Copy No. _____ | Location    |                 | 1 | Project     |               | 2 | Client (PDF Format) | Uncontrolled Copy | 3 |  |  |
| Copy No. _____                                                                                                                                                                                                                                                                                                                                       | Location                                                                                                                                                                                                                 |                   |                |             |                 |   |             |               |   |                     |                   |   |  |  |
| 1                                                                                                                                                                                                                                                                                                                                                    | Project                                                                                                                                                                                                                  |                   |                |             |                 |   |             |               |   |                     |                   |   |  |  |
| 2                                                                                                                                                                                                                                                                                                                                                    | Client (PDF Format)                                                                                                                                                                                                      | Uncontrolled Copy |                |             |                 |   |             |               |   |                     |                   |   |  |  |
| 3                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                          |                   |                |             |                 |   |             |               |   |                     |                   |   |  |  |
| <b>KEYWORDS:</b>                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                          |                   |                |             |                 |   |             |               |   |                     |                   |   |  |  |

*NOTE: This is a controlled document within the document control system. If revised, it must be marked SUPERSEDED and returned to the Vipac QA Representative. This document contains commercial, conceptual and engineering information that is proprietary to Vipac Engineers & Scientists Ltd. We specifically state that inclusion of this information does not grant the Client any license to use the information without Vipac's written permission. We further require that the information not be divulged to a third party without our written consent*

## EXECUTIVE SUMMARY

**Tanner Kibble Denton Architects Pty Ltd** commissioned Vipac Engineers and Scientists Pty Ltd to prepare a statement of wind effects for the proposed development at **Curl Curl North Public School, at Playfair Road, North Curl Curl, NSW**. This appraisal is based on Vipac's experience as a wind-engineering consultancy.

Drawings of the proposed development were supplied by **Tanner Kibble Denton Architects Pty Ltd** in May 2017 with updated drawings in April 2018, as described in Appendix C of this report.

The findings of this study can be summarised as follows:

**The Proposed development would be expected to generate wind conditions:**

- In the ground level footpath areas within the walking comfort criterion.
- In the building entrance areas within the standing comfort criterion.
- In the outdoor seating areas within the recommended sitting comfort criterion.
- In the ground level student walkway areas within the recommended standing comfort criterion
- In the Level 1 student walkway areas within the recommended standing comfort criterion.
- In the various ground level outdoor amenity areas within the recommended standing comfort criterion.

The assessments provided in this report have been made based on experience of similar situations in Sydney and around the world. As with any opinion, it is possible that an assessment of wind effects based on experience and without wind tunnel model testing may not account for complex flow interactions in the vicinity.

## TABLE OF CONTENTS

|                    |                                                                               |           |
|--------------------|-------------------------------------------------------------------------------|-----------|
| <b>1</b>           | <b>INTRODUCTION .....</b>                                                     | <b>5</b>  |
| <b>2</b>           | <b>ANALYSIS APPROACH .....</b>                                                | <b>7</b>  |
| 2.1                | Site Exposure.....                                                            | 8         |
| 2.2                | Regional Wind Climate .....                                                   | 9         |
| 2.3                | Building Geometry and Orientation.....                                        | 10        |
| 2.4                | Flow Interactions with Adjacent Developments .....                            | 11        |
| 2.5                | Assessment Criteria.....                                                      | 12        |
| 2.5.1              | Use of Adjacent Pedestrian Occupied Areas & Recommended Comfort Criteria..... | 14        |
| <b>3</b>           | <b>PEDESTRIAN LEVEL WIND EFFECTS .....</b>                                    | <b>18</b> |
| 3.1                | Discussion.....                                                               | 18        |
| 3.2                | Recommendations .....                                                         | 18        |
| <b>4.</b>          | <b>CONCLUSIONS .....</b>                                                      | <b>19</b> |
| <b>APPENDIX A:</b> | <b>ENVIRONMENTAL WIND EFFECTS .....</b>                                       | <b>20</b> |
| <b>APPENDIX B:</b> | <b>REFERENCES .....</b>                                                       | <b>21</b> |
| <b>APPENDIX C:</b> | <b>DRAWING LIST.....</b>                                                      | <b>22</b> |

## 1 INTRODUCTION

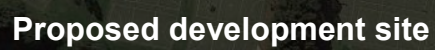
Vipac Engineers and Scientists has been commissioned by **Tanner Kibble Denton Architects Pty Ltd** to carry out an appraisal of the pedestrian wind effects at the ground level and open spaces of the proposed development at **Curl Curl North Public School at Playfair Road, North Curl Curl, NSW**.

Strong winds in pedestrian areas are frequently encountered in central business districts of cities around the world; including Sydney, Melbourne and Brisbane. Wind characteristics such as the mean speed, turbulence and ambient temperature determine the extent of disturbance to users of pedestrian areas. These disturbances can cause both comfort and safety problems and require careful consideration to mitigate successfully.

The proposed development is a set of school buildings ranging from 1-2 stories. The site is bounded by Playfair Road to the West, Abbott Road to the South, and existing buildings in the North and the East. A satellite image of the proposed development site and the west elevation of the building are shown in Figure 1 and Figure 2.

This report details the opinion of Vipac as an experienced wind engineering consultancy regarding the wind effects in ground level footpath areas adjacent to the development as proposed. No wind tunnel testing has been carried out for this development at this stage. Vipac has carried out wind tunnel studies on a large number of developments of similar shape and having similar exposure to that of the proposed development. These serve as a valid reference for the prediction of wind effects. Empirical data for typical buildings in boundary layer flows has also been used to estimate the likely wind conditions on the ground level areas of the proposed development [2] & [3].

Drawings of the proposed development were supplied to Vipac by **Tanner Kibble Denton Architects Pty Ltd** in **May 2017** with updated drawings in **April 2018**. A list of drawings supplied is provided in Appendix C of this report.



Page 6 of 22



## 2 ANALYSIS APPROACH

In assessing whether a proposed development is likely to generate adverse wind conditions in ground level footpath areas, Vipac has considered five main points:

- The exposure of the proposed development to wind
- The regional wind climate
- The geometry and orientation of the proposed development
- The interaction of flows with adjacent developments
- The assessment criteria, determined by the intended use of the areas affected by wind flows generated or augmented by the proposed development.

The pedestrian wind comfort at specific locations of ground level footpath areas may be assessed by predicting the worst annual 3-second wind gust expected at that location. The location may be deemed generally acceptable for its intended use if the annual 3-second gust is within the threshold values noted in Section 2.5. Where Vipac predicts that a location would not meet its appropriate comfort criterion, the use of wind control devices and/or local building geometry modifications to achieve the desired comfort rating may be recommended. For complex flow scenarios or where predicted flow conditions are well in excess of the recommended criteria, Vipac recommends scale model wind tunnel testing to determine the type and scope of the wind control measures required to achieve acceptable wind conditions.

## 2.1 SITE EXPOSURE

The proposed development is located on a relatively low lying terrain, surrounded within a 1 km radius by low rise suburban housing. However, adjacent to the site of the proposed development is Greendale Creek, Curl Curl Lagoon, and other sports grounds which lie in the South Westerly, Southerly and South Easterly directions. A satellite image showing these site surroundings is shown in Figure 3.

Considering the immediate surroundings and terrain, the site of the proposed development is assumed to be within Terrain Category 2 between the azimuth degrees of 90°-150° and 250°-290°, and Terrain Category 3 for all other directions (Figure 3).

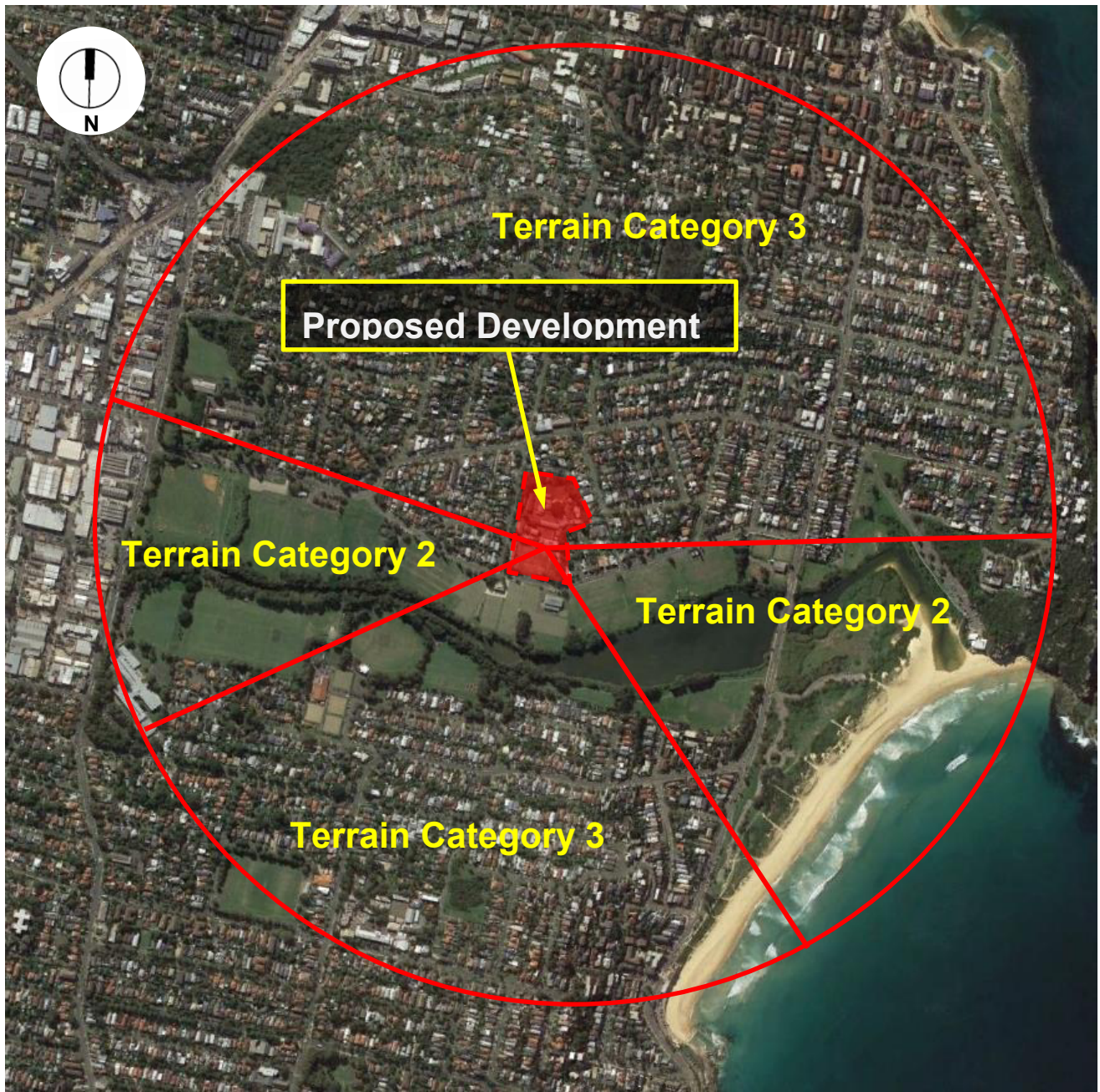


Figure 3: Assumed terrain roughness for wind speed estimation.



## 2.2 REGIONAL WIND CLIMATE

The mean and gust wind speeds have been recorded in the Sydney area for over 30 years. These data have been analysed and the directional probability distribution of wind speeds has been determined. The directional distribution of hourly mean wind speed at the reference height, with a probability of occurring once per year (i.e. 1 year return period) is shown in Figure 4. The wind data at this free stream height is common to all Sydney city sites and may be used as a reference to assess ground level wind conditions at the site.

### Yearly Mean Wind Speeds (m/s), at 500 m height, Cat 2, Sydney

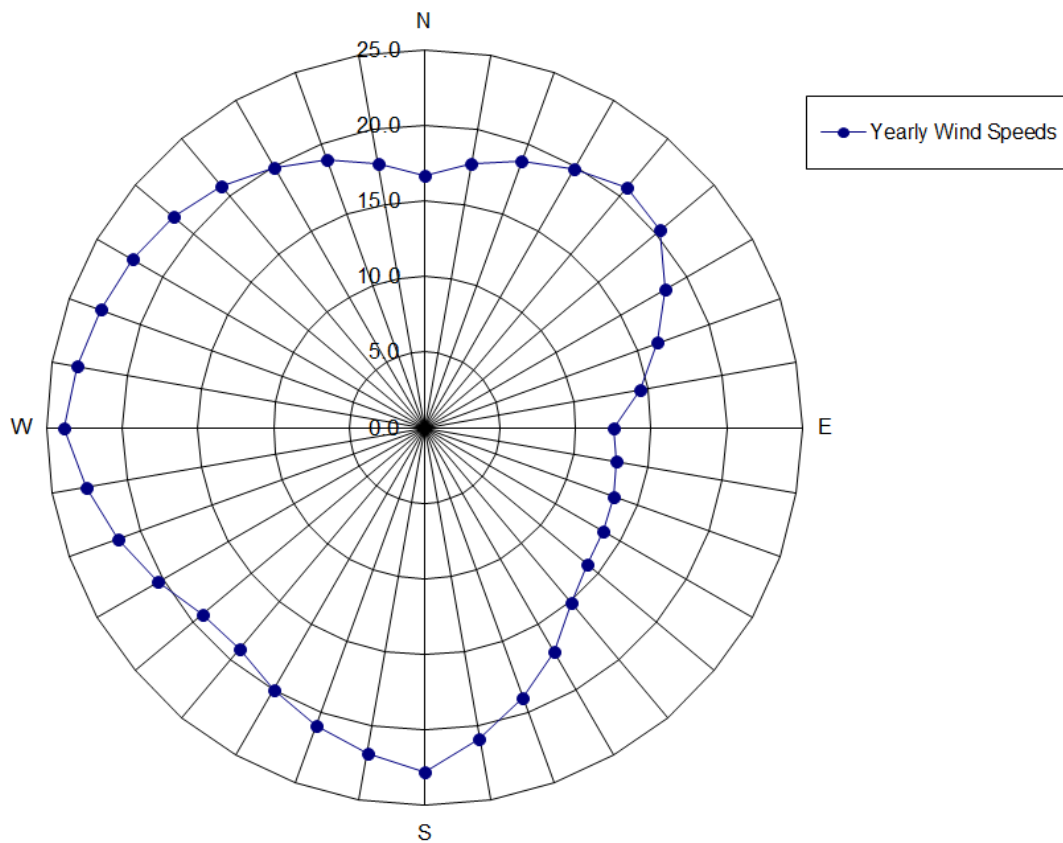


Figure 4: Directional Distribution of Annual Return Period Mean Hourly Wind Velocities (m/s) at the Gradient Height for Sydney.

### 2.3 BUILDING GEOMETRY AND ORIENTATION

The proposed development site has an approximate dimension of 160 m x 221 m shown in Figure 5. The long side runs north to south. The building has a maximum height of approximately 10m from street level (Figure 2).

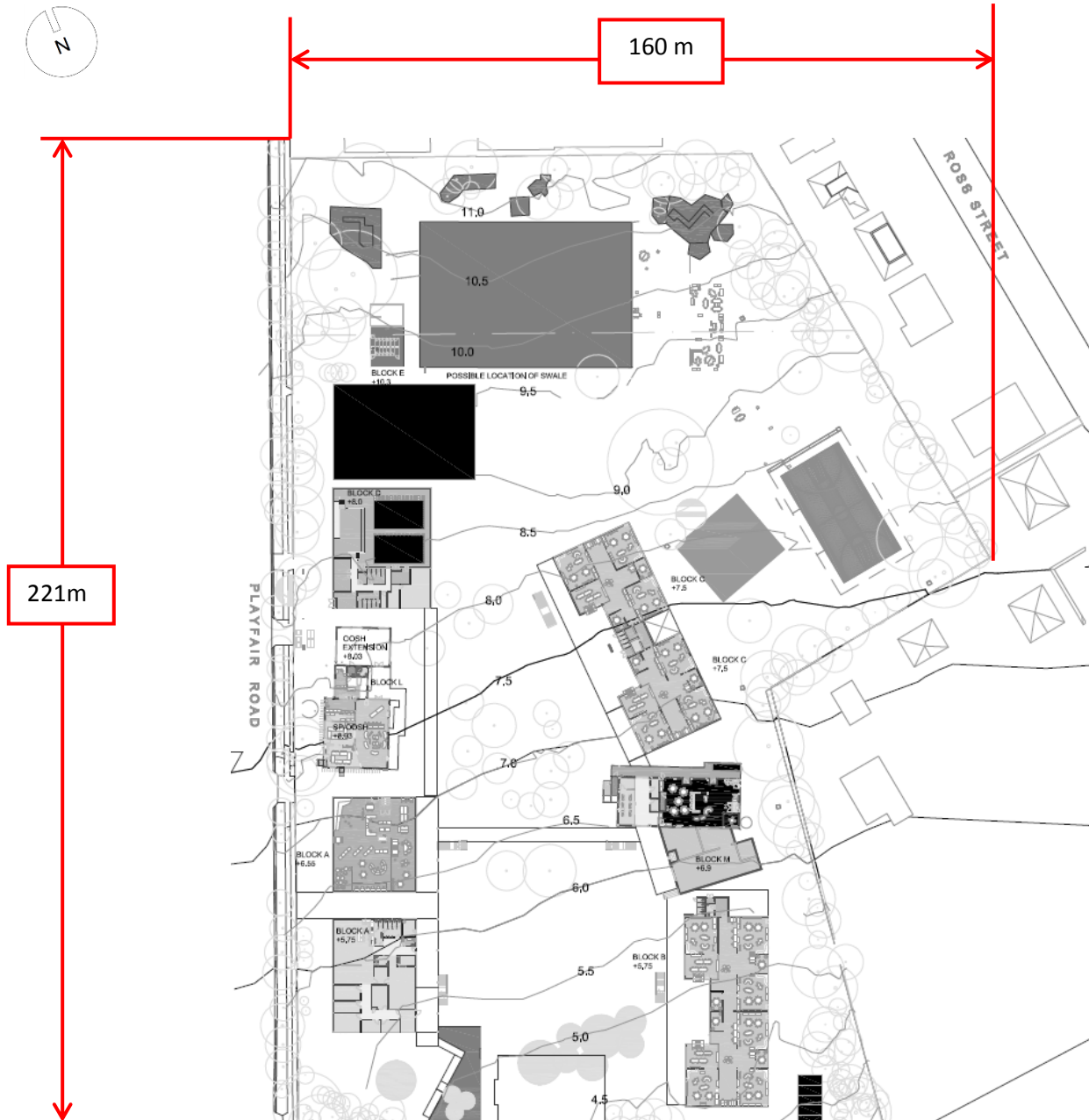


Figure 5: Ground level plan of the proposed development.

## 2.4 FLOW INTERACTIONS WITH ADJACENT DEVELOPMENTS

The immediately adjacent developments are shown in Figure 6. The majority of the residential dwellings surrounding the proposed development are 1-2 floors.

The development is particularly exposed to South Westerly, Southerly and Southerly Easterly winds due to the large open areas of the Curl Curl Youth and Community Centre, Curl Curl Sports Centre, Abbott Road Ground, Greendale Creek, Weldon Oval, Stirgess Reserve and other sporting grounds in the vicinity. The winds from the all other directions will be partially blocked by the surrounding buildings for the ground level.



Figure 6: Immediately adjacent surroundings and their approximate number of floors (F).

## 2.5 ASSESSMENT CRITERIA

With some consensus of international opinion, pedestrian wind comfort is rated according to the suitability of certain activities at a site in relation to the expected annual peak 3-second gust velocity at that location for each wind direction. Each of the major areas around the site are characterised by the annual maximum gust wind speeds. Most patrons may consider a site generally unacceptable for its intended use if it were probable that during one annual wind event, a peak 3-second gust occurs which exceeds the established comfort threshold velocity. If that threshold is exceeded once per year then it is also likely that during moderate winds, noticeably unpleasant wind conditions may result, and the windiness of the location may be voted as unacceptable.

The threshold gust velocity criteria are:

*Table 1: Gust Velocity Criteria - Recommended Wind Speeds for Comfort and Safety*

| Annual Maximum Gust Speed | Result on Perceived Pedestrian Comfort                                      |
|---------------------------|-----------------------------------------------------------------------------|
| >23m/s                    | Unsafe (frail pedestrians knocked over)                                     |
| <20m/s                    | Acceptable for <b>fast walking</b> (waterfront or particular walking areas) |
| <16m/s                    | Acceptable for <b>walking</b> (steady steps for most pedestrians)           |
| <13m/s                    | Acceptable for <b>standing</b> (window shopping, vehicle drop off, queuing) |
| <11m/s                    | Acceptable for <b>sitting</b> (outdoor cafés, gardens, park benches)        |

In a similar manner, a set of hourly mean velocity criteria with a 0.1% probability of occurrence are also applicable to ground level areas in and adjacent to the proposed Development. An area should be within both the relevant mean and gust limits in order to satisfy the particular human comfort and safety criteria in question.

The threshold mean velocity criteria are:

*Table 2: Mean Velocity Criteria - Recommended Wind Speeds for Comfort and Safety*

| Mean wind speed exceeded 0.1% of the time | Result on Perceived Pedestrian Comfort                                      |
|-------------------------------------------|-----------------------------------------------------------------------------|
| >15m/s                                    | Unsafe (frail pedestrians knocked over)                                     |
| <13m/s                                    | Acceptable for <b>fast walking</b> (waterfront or particular walking areas) |
| <10m/s                                    | Acceptable for <b>walking</b> (steady steps for most pedestrians)           |
| <7m/s                                     | Acceptable for <b>standing</b> (window shopping, vehicle drop off, queuing) |
| <5m/s                                     | Acceptable for <b>sitting</b> (outdoor cafés, gardens, park benches)        |

The Beaufort Scale is an empirical measure that related the wind speed to observed conditions on the land and sea. Table 3 describes the categories of the Beaufort Scale. The comparison between these observed conditions and the comfort criteria described above can be found in Table 4.



*Table 3: Beaufort Scale - empirical measure relating wind speed to observed conditions on land*

| Beaufort Number | Descriptive Term | Wind Speed at 1.75 m height (m/s) | Specification for Estimating Speed                                                                                                                                     |
|-----------------|------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0               | Calm             | 0-0.1                             |                                                                                                                                                                        |
| 1               | Light Air        | 0.1-1.0                           | No noticeable wind                                                                                                                                                     |
| 2               | Light Breeze     | 1.1-2.3                           | Wind felt on face                                                                                                                                                      |
| 3               | Gentle Breeze    | 2.4-3.8                           | Hair disturbed, clothing flaps, newspapers difficult to read                                                                                                           |
| 4               | Moderate Breeze  | 3.9-5.5                           | Raises dust and loose paper; hair disarranged                                                                                                                          |
| 5               | Fresh Breeze     | 5.6-7.5                           | Force of wind felt on body, danger of stumbling when entering a windy zone                                                                                             |
| 6               | Strong Breeze    | 7.6-9.7                           | Umbrellas used with difficulty, hair blown straight, difficult to walk steadily, sideways wind force about equal to forwards wind force, wind noise on ears unpleasant |
| 7               | Near Gale        | 9.8-12.0                          | Inconvenience felt when walking                                                                                                                                        |
| 8               | Gale             | 12.1-14.5                         | Generally impedes progress, great difficulty with balance in gusts                                                                                                     |
| 9               | Strong Gale      | 14.6-17.1                         | People blown over                                                                                                                                                      |

*Table 4: Comparison between Mean comfort criteria and the observed conditions*

| Comfort Criteria | Beaufort Scale Equivalent      |
|------------------|--------------------------------|
| Safety           | 9 – Strong Gale                |
| Walking          | 5 – Fresh Breeze               |
| Standing         | 4-5 – Moderate to Fresh Breeze |
| Sitting          | <4 – Moderate Breeze           |

### 2.5.1 USE OF ADJACENT PEDESTRIAN OCCUPIED AREAS & RECOMMENDED COMFORT CRITERIA

The following table lists the specific areas adjacent to the proposed development and the corresponding recommended criteria.

*Table 5: Recommended application of criteria*

| Area                                               | Specific location                                                                                                                               | Recommended Criteria |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Public Footpaths,<br>Access ways and<br>Courtyards | Around the proposed development on Playfair Road, Abbott Road and the main entrances into the School grounds, as well as outdoor sports grounds | Walking              |
| Building entrances<br>and Student<br>pathways      | Several locations (Figure 7 and Figure 8)                                                                                                       | Standing             |

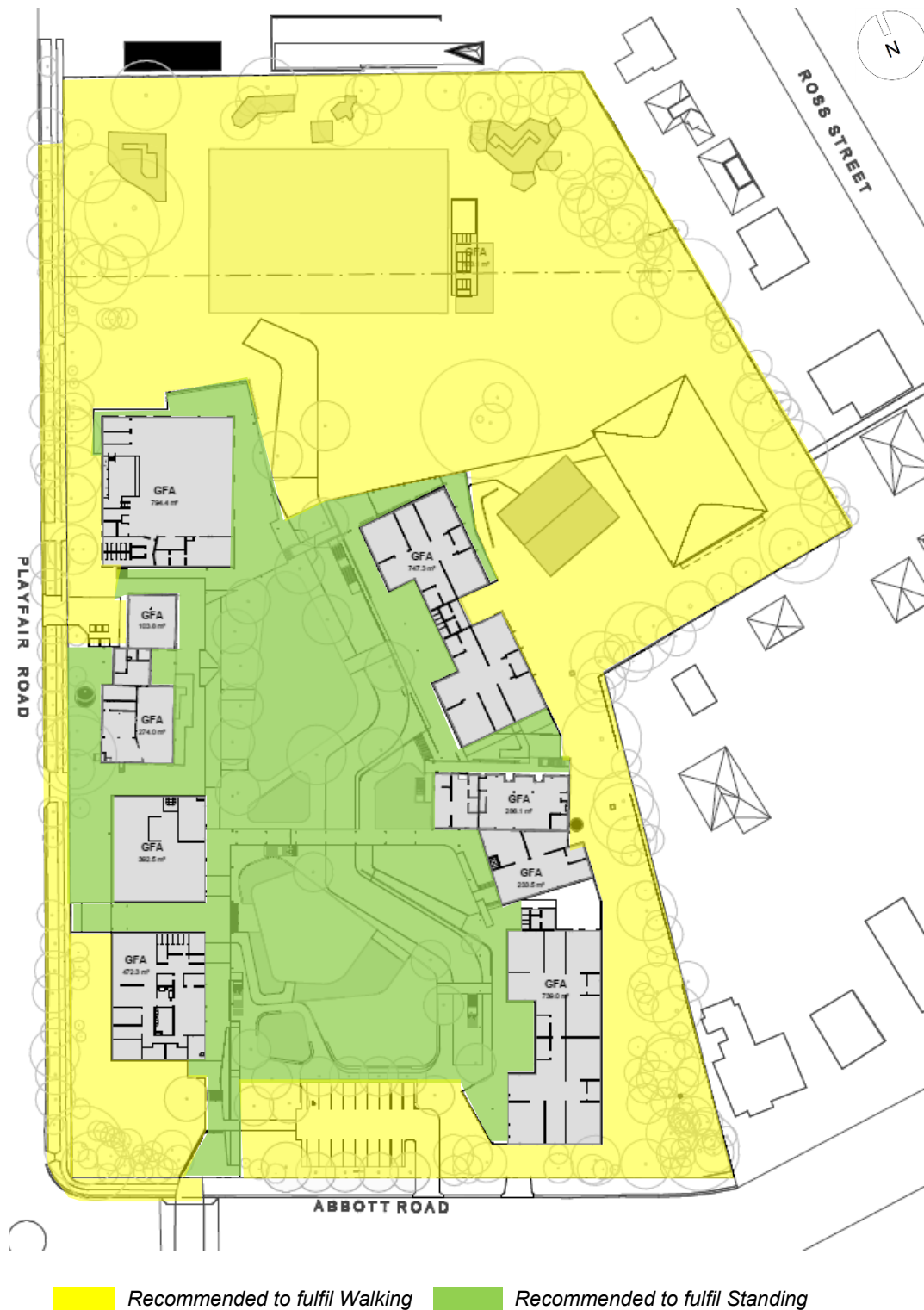


Figure 7: Schematic plan view of the ground floor with recommended wind criteria overlaid

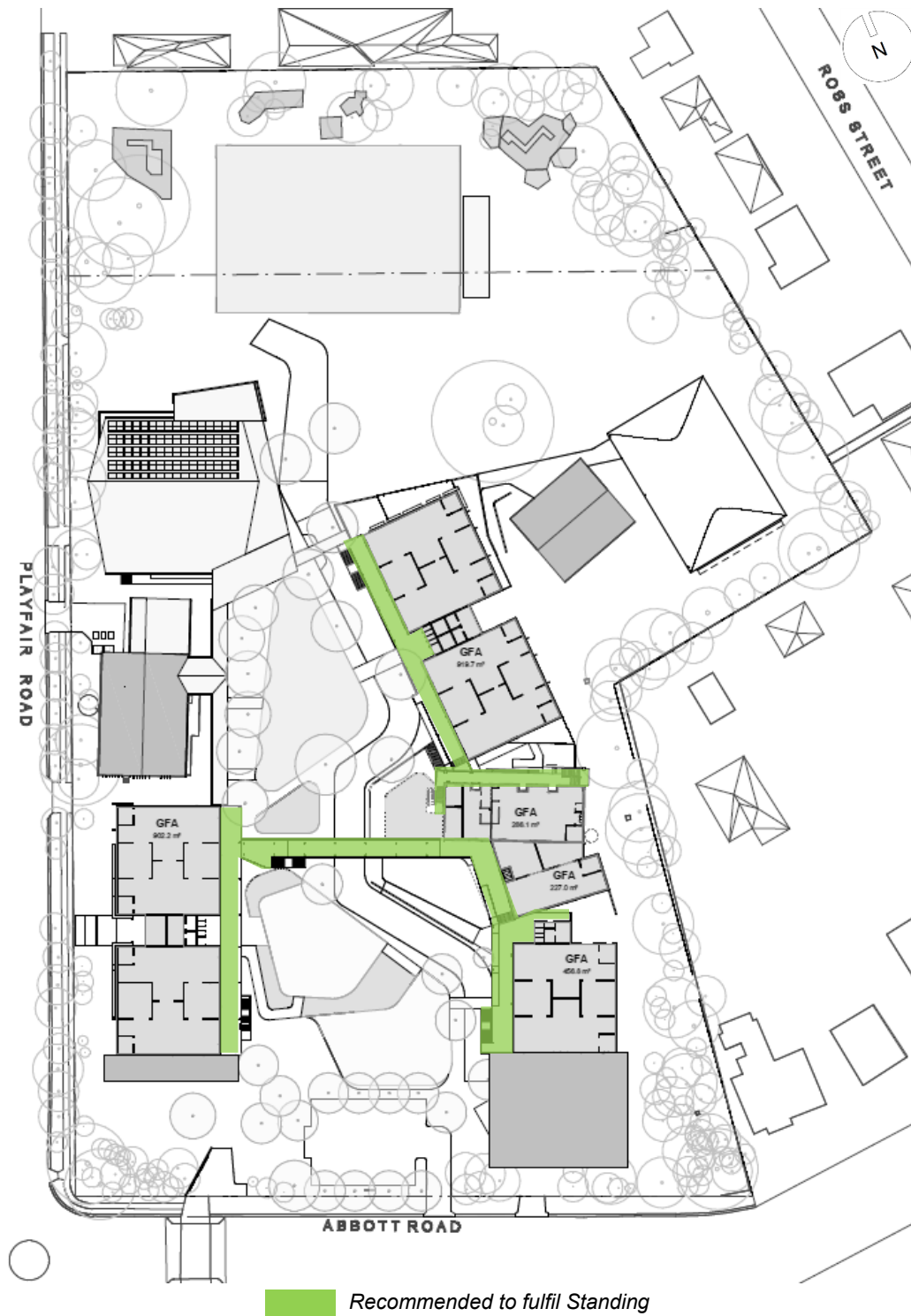


Figure 8: Schematic plan view of Level 1 with recommended wind criteria overlaid



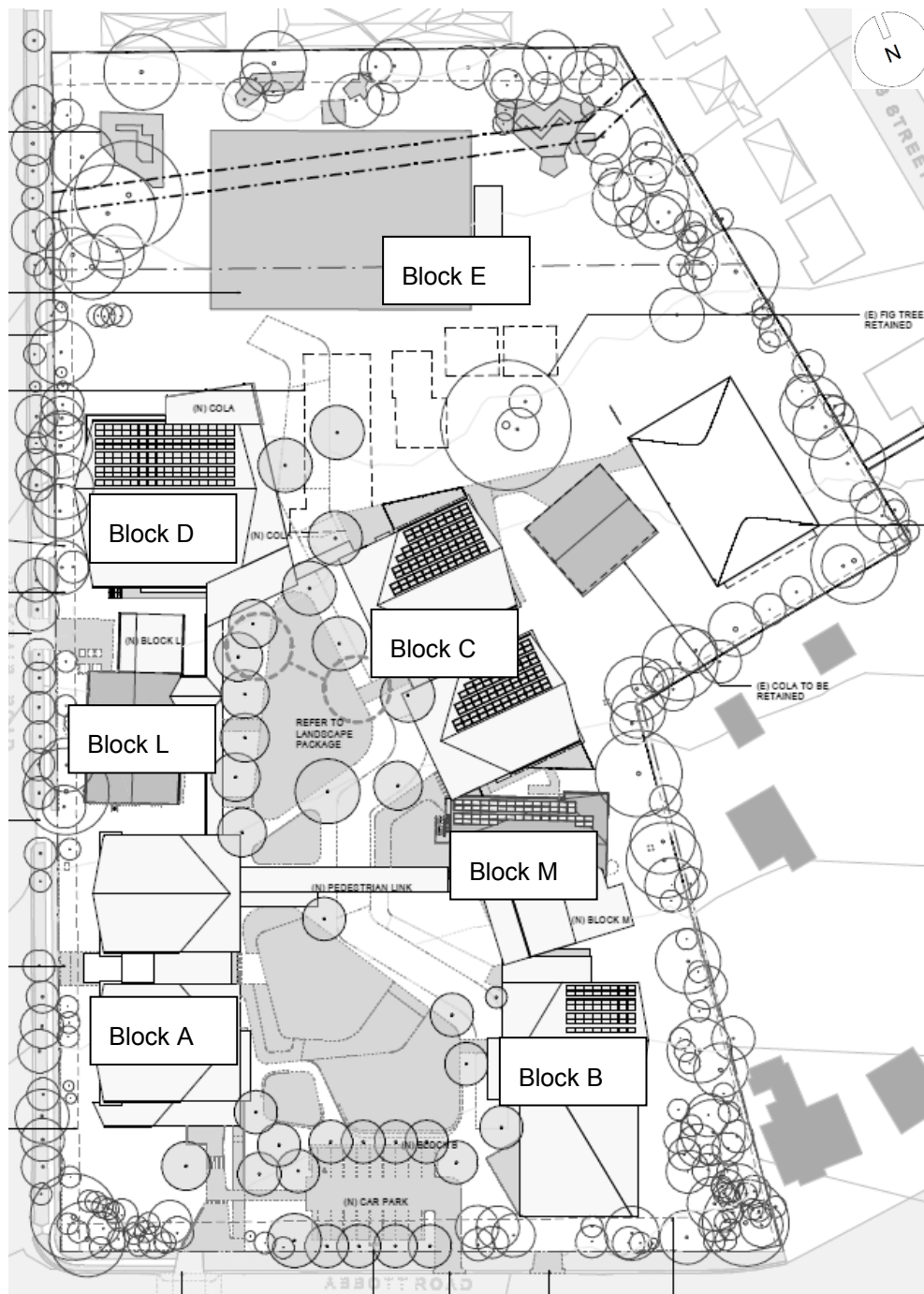


Figure 9: Schematic plan view of the ground floor with the building designations overlaid

### 3 PEDESTRIAN LEVEL WIND EFFECTS

#### 3.1 DISCUSSION

The proposed development incorporates a number of wind mitigating features, including

- Canopies above outdoor use areas;
- Extensive landscaping at the ground level;

##### Ground Floor

The development is shielded by the adjacent buildings from the eastern direction; however it is relatively exposed to north and south westerly winds, due to the location of the open outdoor recreational areas.

As there are no buildings north of Block E and Block D (refer to Figure 9 for building designations); the sporting grounds and play equipment are expected to have wind conditions within the recommended criteria for walking.

The proposed development has two main entrance ways into the school area. The main entrance way to the school is located near the south western corner along Abbotts Road; there is also a Secondary School Entrance along Playfair Road. These areas are expected to experience wind speeds within the recommended criterion of walking due to the extensive use of landscaping on the south western corner, and along the eastern border. It is expected that the adjacent existing developments along Playfair Road and the landscaping on the south western corner will provide adequate shielding from predominate westerly winds, and therefore no recommendations are made for the public entranceways and footpaths around the proposed development.

The majority of the entrances into the school blocks are facing the inwards, towards each other, and therefore providing shielding to each other. They are also under extensive canopies which help reduce the effects of downwash. Therefore no recommendations are made.

There are many outdoor amenity areas in the school grounds such as the Gathering Lawn, and Active Play Areas. As these areas are located in between the western blocks (Blocks A, L D) and eastern blocks (Block B, M, C) channelling winds are expected, however due to the surrounding landscaping, these areas are expected to be within the recommended standing criterion (Figure 9).

##### Level 1 Student Walkways

The student walkways on Level 1 are under cover, and assumed to have a balustrade height around the perimeter of 1100mm. No adverse wind speeds exceeding the recommended criterion for standing is expected for these areas, so therefore no recommendations have been made.

#### 3.2 RECOMMENDATIONS

After careful consideration of the areas at the base of the proposed development, Vipac predicts that the proposed development will present some changes to existing wind conditions in adjacent ground level areas. However, Vipac predicts that most of the areas would not exceed the various recommended criterion for the pedestrian level winds at the ground level or in the Level 1 walkways. As such, Vipac makes no wind mitigation recommendations for wind control treatments for the proposed design

It should be noted that this study is based on experience only and has not utilised any experimental data for the analysis.

#### 4. CONCLUSIONS

An appraisal of the likely wind conditions at the pedestrian ground level, and open learning areas of the proposed development at **Curl Curl North Public School, at Playfair Road, North Curl Curl, NSW** has been made.

Vipac has carefully considered the form and exposure of the proposed development, nominated criteria for various public areas according to their function and referred to past experience to produce our opinion of likely wind conditions.

The findings of this study can be summarised as follows:

**The Proposed development would be expected to generate wind conditions:**

- In the ground level footpath areas within the walking comfort criterion.
- In the building entrance areas within the standing comfort criterion.
- In the outdoor seating areas within the recommended sitting comfort criterion.
- In the ground level student walkway areas within the recommended standing comfort criterion
- In the Level 1 student walkway areas within the recommended standing comfort criterion.
- In the various ground level outdoor amenity areas within the recommended standing comfort criterion.

The assessments provided in this report have been made based on experience of similar situations in Sydney and around the world. As with any opinion, it is possible that an assessment of wind effects based on experience and without wind tunnel model testing may not account for all complex flow interactions in the vicinity.

*This Report has been Prepared  
For  
Tanner Kibble Denton Architects Pty Ltd  
By  
VIPAC ENGINEERS & SCIENTISTS LTD.*

## Appendix A: ENVIRONMENTAL WIND EFFECTS

### Atmospheric Boundary Layer

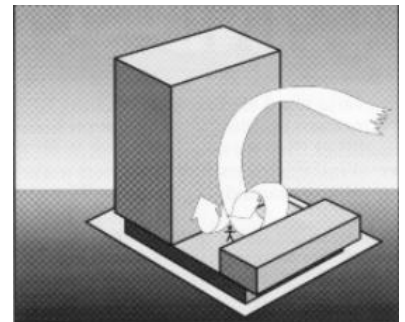
As wind flows over the earth it encounters various roughness elements and terrain such as water, forests, houses and buildings. To varying degrees, these elements reduce the mean wind speed at low elevations and increase air turbulence. The wind above these obstructions travels with unattenuated velocity, driven by atmospheric pressure gradients. The resultant increase in wind speed with height above ground is known as a wind velocity profile. When this wind profile encounters a tall building, some of the fast moving wind at upper elevations is diverted down to ground level resulting in local adverse wind effects.

The terminology used to describe the wind flow patterns around the proposed Development is based on the aerodynamic mechanism, direction and nature of the wind flow.

**Downwash** – refers to a flow of air down the exposed face of a tower. A tall tower can deflect a fast moving wind at higher elevations downwards.

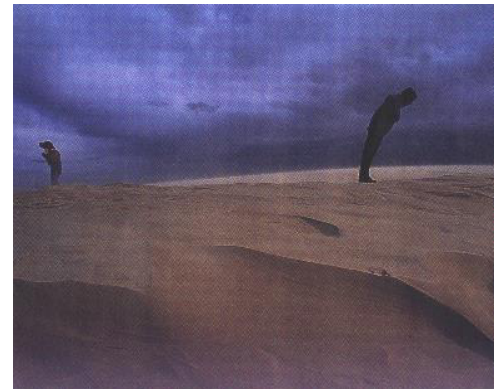
**Corner Accelerations** – when wind flows around the corner of a building it tends to accelerate in a similar manner to airflow over the top of an aeroplane wing.

**Flow separation** – when wind flowing along a surface suddenly detaches from that surface and the resultant energy dissipation produces increased turbulence in the flow. Flow separation at a building corner or at a solid screen can result in gusty conditions.



**Flow channelling** – the well-known “street canyon” effect occurs when a large volume of air is funnelled through a constricted pathway. To maintain flow continuity the wind must speed up as it passes through the constriction. Examples of this might occur between two towers, in a narrowing street or under a bridge.

**Direct Exposure** – a location with little upstream shielding for a wind direction of interest. The location will be exposed to the unabated mean wind and gust velocity. Piers and open water frontage may have such exposure.



## Appendix B: REFERENCES

- [1] *Structural Design Actions, Part 2: Wind Actions*, Australian/New Zealand Standard 1170.2:2011
- [2] *Wind Effects on Structures* E. Simiu, R Scanlan, Publisher: Wiley-Interscience
- [3] *Architectural Aerodynamics* R. Aynsley, W. Melbourne, B. Vickery, Publisher: Applied Science Publishers



**Appendix C: DRAWING LIST**Drawings Received 19<sup>th</sup> April 2018

| Title                      | Dwg. No.    |
|----------------------------|-------------|
| Site Plan                  | AR.DA2.1101 |
| (N) Ground Plan South      | AR.DA2.2001 |
| (N) Ground Plan North      | AR.DA2.2002 |
| (N) First Floor Plan South | AR.DA2.2003 |
| (N) First Floor Plan North | AR.DA2.2004 |
| (N) Roof Plan South        | AR.DA2.2005 |
| (N) Roof Plan North        | AR.DA2.2006 |
| GFA Plans                  | AR.DA2.2501 |
| Elevations                 | AR.DA2.3001 |
| Sections                   | AR.DA2.3101 |