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2-20 Parramatta Road, Columbia Precinct

SEPP 65

Natural Ventilation Assessment

Report Number 610.10150-R5

23 June 2011

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60 Strathallen Ave
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2-20 Parramatta Road, Columbia Precinct

SEPP 65

Natural Ventilation Assessment

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EXECUTIVE SUMMARY

SLR Consulting Australia Pty Ltd (SLR) has been engaged by PD Mayoh to prepare a preliminary Natural Ventilation Assessment of the residential apartments of the proposed new development at 2-20 Parramatta Road, Columbia Precinct, Homebush.

The Proposed Columbia Precinct development consists of a number of residential towers (some connected) on a series of 3-storey podiums). The concept design proposes a range of building heights, from the 3-storey podiums to 21-storey residential buildings. There is an increase in building height from the north (facing Parramatta Road) towards the south. It is proposed to extend George Street towards the south so that it runs through the proposed development and to create public parks with pedestrian and bicycle links throughout the development site.

SEPP 65 specifies the following rules of thumb:

- Building depth, which support natural ventilation typically range from 10 to 18 meters.
- Sixty percent (60%) of residential units should be naturally cross ventilated.
- Twenty five percent (25%) of kitchens within the development should have access to natural ventilation.
- Developments, which seek to vary from the minimum standards, must demonstrate how natural ventilation can be satisfactorily achieved, particularly in relation to habitable rooms.

Natural Ventilation Potential

The proposed development should be provided with numerous façade openings (eg windows and balcony doors) to make use of wind-induced natural ventilation throughout the year and thereby minimising energy costs.

Based in SLR Consulting qualitative natural ventilation study the following conclusions have been reached:

- 66.5% of residential units should be naturally cross ventilated

SLR recommends that the kitchens are to be located close to an opening to maximise the natural ventilations of these spaces to help compliance with SEPP 65.

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1 INTRODUCTION

SLR Consulting Australia Pty Ltd (SLR) has been engaged by PD Mayoh to prepare a preliminary Natural Ventilation Assessment of the residential apartments of the proposed new development at 2-20 Parramatta Road, Columbia Precinct, Homebush.

1.1 Site location

The proposed development site is bounded by Parramatta Road to the north and the railway line on the east through to the south of the site. The area surrounding the development site comprises:

- The Bakehouse Quarter heritage precinct along George Street to the north of Parramatta Road.
- Proposed Part 3A Major Project Application for a 13 storey hotel/function development between the Bakehouse Quarter and the Parramatta road (north to the site)
- A group of 6-storey to 12-storey residential flat buildings to the immediate west of the development site and east across the northern rail link.
- Low-rise residential flat premises through to the south and further west.

The Proposed Columbia Precinct development consists of a number of residential towers (some connected) on a series of 3-storey podiums. The concept design proposes a range of building heights, from the 3-storey podiums to 21-storey residential buildings. There is an increase in building height from the north (facing Parramatta Road) towards the south. It is proposed to extend George Street towards the south so that it runs through the proposed development and to create public parks with pedestrian and bicycle links throughout the development site.

Figure 1 Site Location



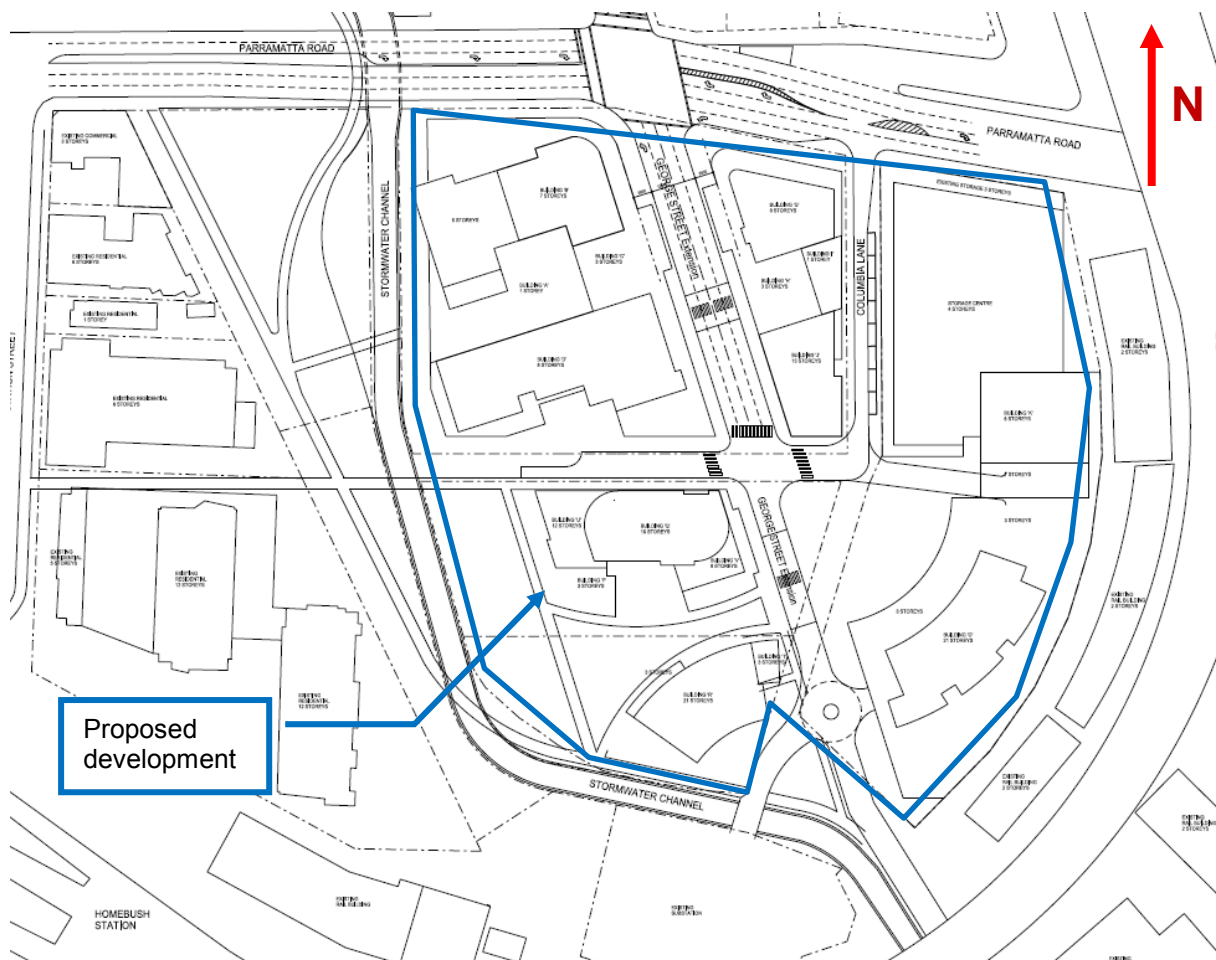
1.2 Proposed development description

The site consists of a number of residential towers ranging from four to 21 storeys with space for commercial, community and retail premises on the lower levels. It is proposed that there will be 600-700 residential dwellings on the site.

The following assessment is based on drawings (Dwg No. A.002, A.103 to A.108) provided by PD Mayoh, dated 20 May 2011. Whilst floor plan drawings A.103 to A.108 are noted as “indicative design” they provide the best available information for this assessment at this concept plane stage. The indicative design drawings show 629 residential dwellings. Future project applications will provide natural ventilation assessments based on complete floor plans and 3-D modelling inclusive of the units internal layout.

The proposed development site is surrounded by low and medium rise residential and commercial buildings.

Figure 2 Site Plan



2 SYDNEY'S WIND CLIMATE

The data of interest in this study are the annual mean hourly wind speeds throughout the year, how these winds vary with azimuth, and the seasonal break-up of winds into the primary Sydney wind seasons.

2.1 Seasonal Winds

In relation to key characteristics of the Sydney Region Wind Climate (refer wind roses provided in **Appendix A**) relevant to the wind impact assessment of the proposed development, we note that Sydney is affected by two primary wind seasons:

- Summer winds occur mainly from the northeast, south and southeast.
 - While northeast winds are the more common prevailing wind direction (occurring typically as offshore land-sea breezes), southeast and south winds generally provide the strongest gusts during summer.
- Winter/Early spring winds occur mainly from the west and the south.
 - West quadrant winds (southwest to northwest) provide the strongest winds during winter and in fact for the whole year.

2.2 Wind Exposure at the Site – the “Local” Wind Environment

Close to the ground, the “regional” wind patterns described above are affected by the local terrain, topography and built environment, which all influence the “local” wind environment.

- The development site currently receives reasonable shielding at lower levels from all directions.
- The development is more exposed to the winds at higher levels.

3 NATURAL VENTILATION

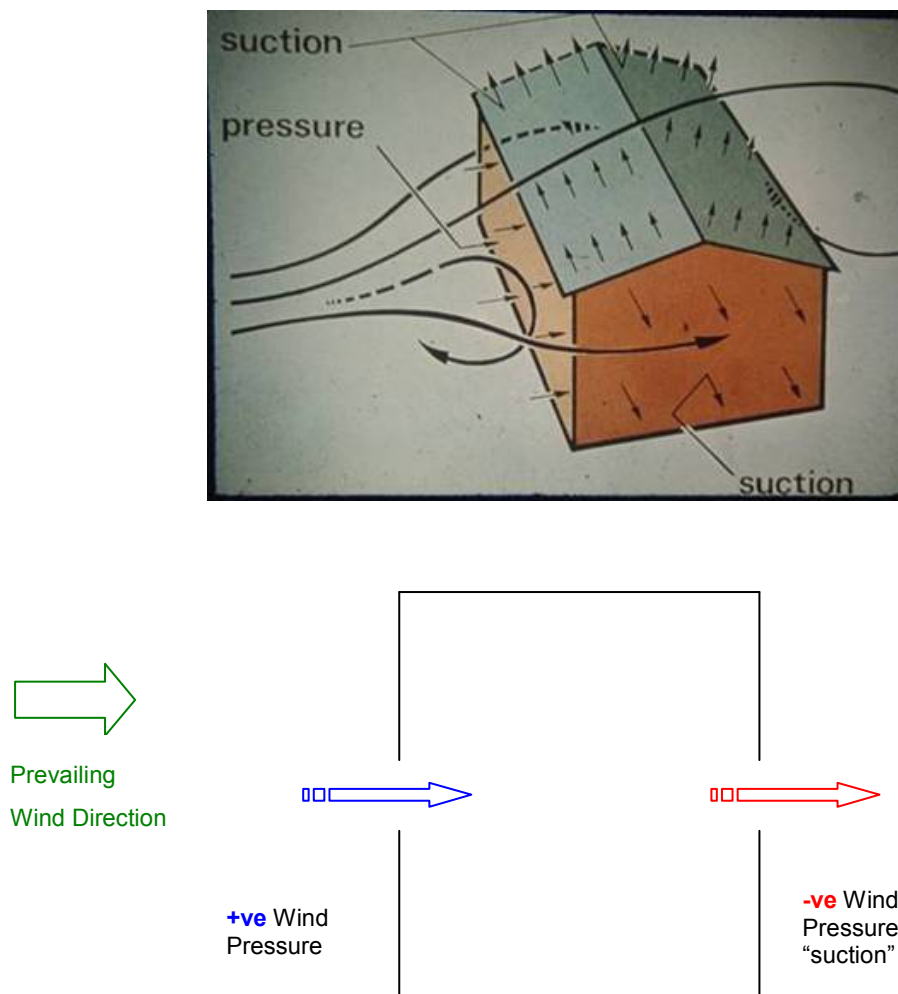
3.1 General Principles

A key feature of the proposed development is the incorporation of façade openings designed to enable various spaces within the development buildings to make use of wind-induced natural ventilation throughout the year thereby minimising energy costs.

Wind-induced natural ventilation works on the straightforward principle of differential pressure. If a building envelope has multiple openings and there exists a pressure difference between those openings, eg the wind pressure at one opening is greater than the pressure at the other opening, airflow will be pushed through the building in the direction positive to negative.

The resulting amount of airflow through the building envelope will be a function of the magnitude of the pressure differential, size of the various building openings and degree of “blockage” in between. These features are illustrated in **Figure 3**.

Figure 3 Wind-Induced Natural Ventilation via Differential Pressure



3.2 SEPP 65 - Residential Component

The most important role of natural ventilation in the context of the residential apartments is to remove accumulated heat gain during overheated periods. In this case, ventilation is intended to achieve predicted rates of volumetric air change. Also important during the summer months is the role of ventilation in directly improving the perception of thermal comfort by occupants of a space. This is achieved when moving air aids the evaporation of perspiration by passing over the skin. As long as there is some air movement, most people will tolerate somewhat higher temperatures.

Heat build-up within apartments through daytime summer temperatures can be quickly purged with the availability of suitable breezes at the site.

Building design should enable ventilation to be controlled, where comfort levels are maintained for the occupants during the summer and winter extremes. Locations of windows and openings within each apartment are to be suitably in line where possible with each other on opposite sides of the room. It is recommended that building openings be designed such that cross-ventilation is maximised, to minimise heat gain in summer.

Ventilation of building is achieved by permanent openings, windows, doors or other devices which have an aggregate opening or operable size of not less than 5% of the floor area of the ventilated room. The provision of ceiling fans for use in summer months is also encouraged.

In winter it is important to close off heated areas that need warming. The opportunity to open and close balcony doors will allow adequate control to moderate the impact of any higher than comfortable winds. It is recommended that the following initiatives also be incorporated to minimise heat leakage from the building:

- Design detailing of the glazing interface to the window framing system and the provision of adequate sealing in accordance with the Building Code of Australia (BCA).
- Doors leading to hallways, stairwells and non-common use areas provided with draught excluders to limit heat losses during winter months.
- Doors located throughout the development in general-use areas, such as access ways to/from the building, fitted with door closers where it is deemed that their opening will have an adverse effect on heat loss during winter.

SEPP 65 specifies the following rules of thumb:

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- Sixty percent (60%) of residential units should be naturally cross ventilated.
- Twenty five percent (25%) of kitchens within the development should have access to natural ventilation.
- Developments, which seek to vary from the minimum standards, must demonstrate how natural ventilation can be satisfactorily achieved, particularly in relation to habitable rooms.

3.3 Columbia Precinct Natural Ventilation Opportunities

The natural ventilation for the residential component of the proposed development has been assessed. Ventilation is achieved by the differential pressure between the different building facades. The drawings are still in working progress and the internal layout of each apartment has not been designed yet. For the purpose of the natural ventilation assessment, SLR assumed that windows can be installed to all external facades. The natural ventilation principles that apply for the proposed typical floor of Building "Q" is shown in **Figure 4**. In general westerly, northeast and southerly winds have a good potential to achieve natural ventilation, due to the building layout.

Figure 4 Natural Ventilation for Building Q Typical Floor

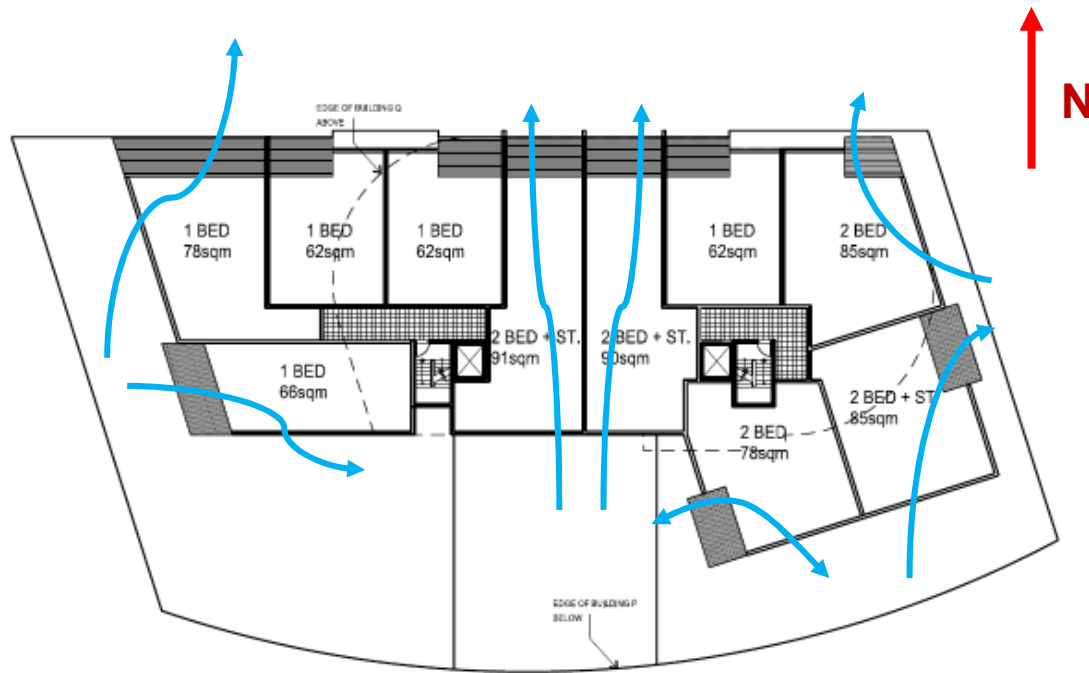


Table 1 Summary of Apartment with Natural Ventilation

Block	Representative Level	Number of Apartments per floor	Number of Similar floors	Apartments with natural ventilation	Total number of apartments	Number of complying apartments	% of complying apartments
ABCD	1	14	1	3	14	3	21.4%
ABCD	2	24	1	16	24	16	66.7%
B D	3	23	1	12	23	12	52.2%
B	4-5	11	2	6	22	12	54.5%
B	6	6	1	3	6	3	50.0%
D	4-7	12	4	7	48	28	58.3%
GHIJ	1	6	1	4	6	4	66.7%
GHIJ	2	14	1	9	14	9	64.3%
G	3	4	5	4	20	20	100.0%
J	3	4	12	4	48	48	100.0%
O	1	5	2	3	10	6	20.0%
O	3	8	18	5	144	90	62.5%
PQUV	1	14	2	10	28	20	71.4%
QUV	3	10	5	7	50	35	70.0%
QU	8-11	8	4	5	32	20	62.5%
Q	Top	5	4	3	20	12	60.0%
R	1	6	2	4	12	8	66.7%
R	3	6	18	4	108	72	66.7%
TOTAL					629	418	66.5%

Using the “Work in Progress” drawings dated 20/05/2011, SLR estimated the number of apartment per floors and the number of apartments that can be naturally ventilated. **Table 1** shows a summary of the SEPP 65 results.

The preliminary assessment estimates that 66.5% of the apartments of the whole development will comply with the cross ventilation requirements of SEPP 65 under the assumption that windows will be provided on all external façade.

3.3.1 Kitchen Natural Ventilation

SEPP 65 specifies that twenty five percent (25%) of kitchens within the development should have access to natural ventilation. As the apartment layouts have not been designed yet, SLR cannot assessment this requirement. So as to comply with this requirement SLR recommends that the kitchens are to be located close to an opening to maximise the natural ventilations of this space.

4 CONCLUSION

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5 CLOSURE

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

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