### 1.0 Introduction

This Shadow Assessment Paper is prepared by Conybeare Morrison (CM<sup>+</sup>) for the City of Canada Bay Council, and provides an assessment of the potential for shadow impact on the Rhodes Peninsula public domain with regard to the IProsperity Planning Proposal Amendment No.3.

### 2.0 Study Brief

This Paper provides an independent assessment of the potential shadowing impacts of the IProsperity Waterside Rhodes Pty Ltd Planning Proposal - Amendment No.3 of 26 May 2017 prepared by Stephen Bowers Architects, as amended by additional drawings provided by the proponent on 15 September 2017 (Elliptical Column Option), when compared with the Rhodes Station Precinct Masterplan (Rev04, Nov 2014) and Rhodes West Development Control Plan 2015 (RWDCP), and taking into consideration the approved Billbergia Pty Limited Development Application (DA2016 0005) for 6-14 Walker Street and 11-21 Marquet Street, Rhodes NSW. Refer to Figure 1.



### 3.0 The Proposal

The previous revised IProsperity Planning Proposal which was lodged in January 2017, was for a 35 storey building plus 4.2m plant room, comprised of a residential tower, commercial podium and communal facilities. The Planning Proposal was for 350 units, had a total GFA, including wintergardens, of 39,058m<sup>2</sup> and an FSR of 13.46:1. The podium was a curved streamline form, whilst the tower was a rounded trapezoidal plan.

The Planning Proposal Amendment No.3, lodged by IProsperity in May this year (the subject of this shadow assessment), has many of the same design features and the overall built form is very similar to the previous scheme, however, the proposal is 37 storeys in height, including plant room and two storey podium. This Planning Proposal Amendment No.3 is for 311 units with a total GFA, including wintergardens, of 37,944 m2 and an FSR of 13.08:1. The building is cut back from level 12 to level 23 to protect solar access to the Town Square.

Two options for the diagonal support column at the 'solar window' are being investigated by the proponent. This assessment is based on the Elliptical Column Option. If the Square Column Option is utilised, the results of the shadow assessment would be different.

### 4.0 Methodology

The methodology has three phases:

#### 4.1 Computer Modelling

Update the 3D computer model for the Rhodes Station Precinct based on the following information:

- IProsperity Planning Proposal Amendment No.3 (1-9 Marquet Street and 4 Mary Street), as amended by additional drawings provided by IProsperity on 15 September 2017.
- Approved DA for the adjoining Billbergia development (6-14 Walker Street and 11-21 Marquet Street).

For all other sites within the Precinct the building envelopes of the approved Rhodes Station Precinct Masterplan and RWDCP are illustrated.

#### 4.2 Shadow Study

Prepare shadow diagrams based on the updated 3D computer model for Summer Solstice, Equinox and Winter Solstice, at hourly intervals (for daylight hours), including the Town Square and immediate surrounding Rhodes Peninsula. An animation for Winter Solstice shadows between 12 noon and 2:00 pm was also produced.

#### 4.3 Shadow Assessment Paper

Prepare a factual statement assessing the potential shadow impacts of the IProsperity Planning Proposal Amendment No.3, when compared with the Rhodes Station Precinct Masterplan and considering the approved Billbergia DA.

### 5.0 Review Documents

This Shadow Assessment was undertaken based on the following documentation provided by proponents.

#### 5.1 IProsperity

- I-Prosperity Planning Proposal Amendment No.3 1 to 9 Marquet Street & 4 Mary Street, Rhodes, prepared by Stephen Bowers Architects (26 May 2017), including the following drawings:
  - IProsperity Planning Proposal Amendment No.3 Cover Sheet
  - Rhodes PP Calculation Table
  - Building Depth Analysis PP-00A, Rev P3
  - Setback & Building Seperation Analysis PP-00B, Rev P3
  - Lower Ground PP-002, Rev 11
  - Level 1 (Upper Ground) PP-003, Rev P11
  - Level 2 (First Floor) PP-004, Rev P11
  - Level 3 PP-005, Rev P11
  - Level 4 Level 11 PP-006, Rev P11
  - Level 12 PP-007, Rev P10
  - Level 13 PP-008, Rev P10

- Level 14 PP-009, Rev P10
- Level 15 PP-010, Rev P10
- Level 16 PP-011, Rev P10
- Level 17-Level 20 PP-012, Rev P10
- Level 21 PP-013, Rev P10
- Level 22 PP-014, Rev P10
- Level 23 PP-014A, Rev P10
- Level 24 Level 25 PP-015, Rev P10
- Level 26 PP-015, Rev P10
- Level 27 Level 36 PP-017, Rev P10
- Level 37 PP-018, Rev P10
- Roof PP-019, Rev P10
- North Elevation PP-031, Rev P2
- West Elevation PP-032, Rev P3
- South Elevation PP-033, Rev P3
- East Elevation PP-034, Rev P2
- Comparison of Amended IProsperity Planning Proposal to Station Precinct Masterplan SK-301, Rev P4
- Typical Unit Layout Studio PP-021, Rev P3
- Typical Unit Layout 1 Bed Unit PP-022, Rev P3
- Typical Unit Layout 2 Bed Unit PP-023, Rev P3
- Typical Unit Layout 3 Bed Unit PP-024, Rev P3
- Typical Unit Layout 3 Bed Unit PP-025, Rev P1
- Typical Carpark PP-019, Rev P9
- Carpark B1 PP-018, Rev P9
- I-Propserity Planning Proposal Amendment No.3 Shadow Study (Winter Solstice 9am-2pm)
- I Prosperity PP Amend 3.skp
- And additional drawings provided on 15 September 2017, including:
  - Rhode PP -V COLUMN\_ELLIPTICAL OPTION.skp
  - SHADOW DIAGRAM\_ELLIPTICAL COLUMN OPTION.pdf
  - East elevation-elliptical column.jpg
  - North elevation- elliptical column.jpg
  - West elevation-elliptical column.jpg

#### 5.2 Billbergia (Walker Street Developments Pty Ltd)

- Amended Plans DA2016 0005 10 Walker St Rhodes Walker Street Developments Pty Ltd Appendix A Elevation , including the following drawings:
  - Elevation East Walker Street DA-0501, Rev30
  - Elevation West Marquet Street DA-0502, Rev30
  - Elevation South DA-0503, Rev30
  - Elevation North DA-0504, Rev30
  - Internal Elevation Building A DA-0505, Rev30
  - Internal Elevation Building B DA-0506, Rev30
  - Detail Elevation Walker Street DA-0511, Rev30
  - Detail Elevation Marquet Street DA-0512, Rev30
  - Detail Elevation Through Site North DA-0513, Rev30
  - Detail Elevation Retail Shopfront DA-0514, Rev30

- Detail Elevation Tower A Facade DA-0515, Rev30
- Detail Elevation Balcony Conditions DA-0516, Rev30

### 6.0 Revised Parameters of IProsperity Concept Design

The proposed development has the following design parameters:

- 37 storeys (Incl. Plant Room and Podium)
- GFA of 37,944 m<sup>2</sup> (Incl. Winter Garden)
- FSR of 13.08:1 (Incl. Winter Garden)
- 311 units
- Retail 2,304m<sup>2</sup> GFA
- Commercial 3,706m<sup>2</sup> GFA
- 412 car spaces

### 7.0 Shadow Assessment

### 7.1 Introduction

The nature of the potentially complex Station Precinct built form requires a 'whole-of-precinct' approach to assess the effect of new development proposals. Existing apartment buildings in the precinct, approved DA buildings and the Masterplan building envelopes that apply for un-developed sites, must be considered in combination. To assess the potential for shadow impacts on the public domain of the Station Precinct and surrounding Peninsula, CM<sup>+</sup> prepared an updated 3D computer model of the Station Precinct. A Shadow Study was then prepared as a basis for the assessment of the IProsperity Planning Proposal - Amendment No.3. Refer to Figures 2 to 9 inclusive.

#### 7.2 RWDCP Solar Access and Daylight Controls

The development control that applies to the IProsperity site, is the RWDCP Section 3.3.11 'Solar Access and Daylight' which states the relevant Strategy and the Controls that apply to the public domain (C1-C3). The key technical parameters of the Controls are reproduced below:

Control 1 states that: ...new development should retain solar access to a minimum of 50% of the area of neighbourhood parks and green spaces during lunchtime hours (noon to 2:00pm) during mid-winter (22 June).

Control 2 states that: At the Winter solstice during the hours of noon, 1:00pm and 2:00pm, solar access is to be protected in Rhodes Town Square, and is to be maximised in the Mary Street Child Care Centre outdoor play area, and mid-block oval plaza and the laneways of the Station Precinct.

#### 7.3 Review of the IProsperity Proposal - Amendment No.3

#### 7.3.1 Winter Solstice

#### Solar Access to Peg Paterson Park

The consolidated shadow study indicates that in regard to solar access to Peg Paterson Park (Control 1), in mid-winter, at the prescribed lunchtime hours of 12noon, 1:00pm and 2:00pm, the proposal does not overshadow the park.

#### Assessment: Compliant

#### Solar Access to Rhodes Town Square

In regards to the 'protection' of solar access to Rhodes Town Square (Control 2) at Winter Solstice, at:

- 12noon and 1:00pm the proposal does not overshadow the square; and at
- 2:00pm the proposed tower overshadows the Town Square with a narrow shadow of approximate 1.5 2.0m width.

#### Assessment: Non-Compliant

#### Solar Access to Child Care Centre, Oval Plaza and Laneways

In regards to 'maximising' solar access to the Mary Street Child Care Centre outdoor play area, the mid-block oval plaza and the laneways of the Station Precinct at Winter Solstice:

- At 12noon the proposed tower does not overshadow the outdoor play area, oval plaza or laneways.
- At 1:00pm the proposed tower does not overshadow the outdoor play area or oval plaza. There is very minor overshadowing of the south tip of the Mary Street laneway.
- At 2:00pm the proposed tower does not overshadow the outdoor play area or oval plaza. Approximately 50% of the Mary Street Laneway is overshadowed at this time. The Masterplan established a similar level of laneway overshadowing.

#### Assessment: Compliant

#### 7.3.2 Summer Solstice

It should be noted that the RWDCP does not require the assessment of shadow impacts at this time of the year. None-the-less the study, refer to Appendix 1, established that at Summer Solstice (Daylight Saving), at:

- 12noon there is very minor shadowing of Peg Patterson Park and no notable impacts elsewhere;
- 1pm there are no significant shadows projected; and at
- 2pm there are significant shadows projected across the Mary Street laneway and minor shadowing of the Mary Street Child Care outdoor play area.

It should be noted that at the height of Summer it is the reverse case of Winter, in that shade is often sought after in the public domain.

#### 7.3.3 Equinox

It should be noted that the RWDCP does not require the assessment of shadow impacts at this time of the year. None-the-less the study, refer to Appendix 1, established that at Equinox, at:

- 12noon there are no significant shadows projected;
- 1pm there is minor overshadowing of the west edge of Rhodes Town Square and significant shadows projected across the Mary Street Laneway; and at
- 2pm there are significant shadows projected across the Mary Street laneway and Rhodes Town Square.



Figure 2: Masterplan Shadow, June 21 - 12 noon



Figure 3: IProsperity Shadow, June 21 - 12 noon



Figure 4: Masterplan Shadow, June 21 - 13:00



Figure 5: IProsperity Shadow, June 21 - 13:00



Figure 6: Masterplan Shadow, June 21 - 14:00



Figure 7: IProsperity Shadow, June 21 - 14:00



Figure 8: Masterplan Shadow, June 21 - 14:00 - Town Square View



Figure 9: IProsperity Shadow, June 21 - 14:00 - Town Square View



Additional Height by Billbergia DA Additional Height by IProsperity Proposal

Figure 10: IProsperity Proposal - View from South West



Figure 11: IProsperity Proposal - View from South East

Additional Height by Billbergia DA Additional Height by IProsperity Proposal



 Additional Height by Billbergia DA
Additional Height by IProsperity Proposal

Figure 12: IProsperity Proposal - View from North West



Figure 13: IProsperity Proposal - View from North East

 Additional Height by Billbergia DA
Additional Height by IProsperity Proposal



Additional Height by Billbergia DAAdditional Height by IProsperity Proposal

Figure 14: IProsperity Proposal - Overall View from West

### 8.0 Conclusion

This Shadow Assessment Paper is a factual statement assessing potential shadowing impacts of the IProsperity Planning Proposal Concept Design - Amendment No.3 when compared with the Rhodes Station Precinct Masterplan and incorporating the approved Billbergia DA design. The study addresses the shadow assessment criteria set down in the RWDCP.

This IProsperity Proposal is compliant with a number of shadow criteria, however, does have a small noncompliance with the Control that: "At the Winter solstice during the hours of noon, 1:00pm and 2:00pm, solar access is to be protected in Rhodes Town Square..." (Extract from RWDCP Section 3.3.11 Solar Access and Daylight, Control 1).

This IProsperity Planning Proposal is compliant at Winter Solstice at 12 noon and 1:00pm, however there is a small amount of overshadowing at 2.00pm (a narrow shadow cast from a proposed support column, which has been designed with an elliptical cross section in order to minimise the shadow cast.

An animation has been prepared which illustrates the overshadowing that results during this time period.







Rhodes Station Precinct IProsperity Planning Proposal - Amendment No.3 Shadow Assessment Paper

Appendix 1 | Equinox and Summer Solstice Shadow Studies





Equinox September 21 - 12noon



Equinox September 21 - 13:00



Equinox September 21 - 14:00



Summer Solstice (Daylight Saving) December 21 - 12noon



Summer Solstice (Daylight Saving) December 21 - 13:00



Summer Solstice (Daylight Saving) December 21 - 14:00