NABERS INDEPENDENT DESIGN REVIEW REPORT

Sandstone
23-29 Bridge Street
Sydney

11 FEBRUARY 2022

FILE REF: 2000081241 / J50254

PREPARED FOR

Stantec Pty Ltd
Level 16, 207 Kent St,
Sydney, NSW, 2000

PREPARED BY

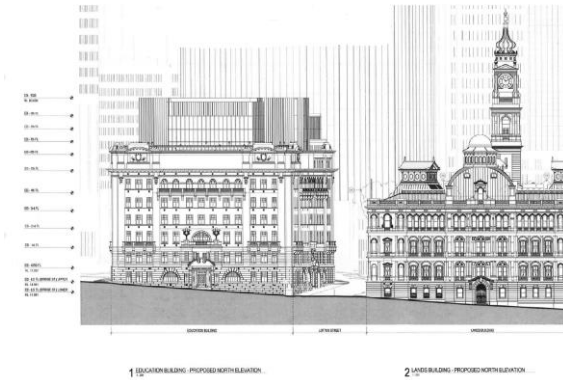
Napier & Blakeley Pty Ltd
ACN 006 386 278
ATF Napier & Blakeley Unit Trust
ABN 87 601 474 307
Level 5, 171 Collins Street
MELBOURNE VIC 3000
Tel 03 9915 6300

Napier & Blakeley
COST ▪ RISK ▪ RETURN

CONTENTS

REV	00
DATE	11 February 2022
PURPOSE OF ISSUE	Final
COPIES TO	Stantec
PREPARED BY	Ian Gardner
ISSUE AUTHORISED BY	Ian Gardner

EXECUTIVE SUMMARY



23-29 Bridge Street
Sydney

GENERAL

The proposed Sandstone Buildings Precinct development involves the refurbishment of two existing heritage buildings (namely, the Education Building and Lands Building) along 23-39 Bridge Street, Sydney NSW 2000. The precinct as a whole is to be refurbished as a 6-star luxury hotel development, with the Education Building housing all guestrooms (total 192 keys) and the Lands Building composed of hotel supporting functions and services (i.e. charge-to-room services).

Education Building consist of:

- 3 basement floors for plant room, services and BOH. Bottom-most floor has access to the Lands Building;
- Lower ground & Ground level composed of lobby, amenities and BOH;
- Nine-storeys of hotel guestrooms (From Level 1 up to Level 9, with Level 6 to Level 9 being new floors introduced above the existing heritage building); and
- Level 5 contains pool, spa and gym facilities;

Lands Building consist of:

- Lower-ground floor predominantly populated by food/beverage retail facilities, most of which provide charge-to-room services for guests within Education Building;
- Five-storeys of hotel amenities, functions and services (From Ground Level up to Level 4) such as bars, dining rooms, lounge rooms, meeting rooms, library, functions, wellness facilities, etc.

GFA – Approx. total 29,600m2 (Education Building – roughly 19,800m2; Lands Building – roughly 9,800m2)

The building design is progressing through design development, key systems are finalised and equipment is yet to be finalised.

STAR RATING

The building design and proposed system types align with those expected for a high energy performing building.

The energy model has been developed to a high level of detail and has been thoroughly scrutinised, improved and refined through the IDR and Stantec's internal process's. The modelling is generally conservative and appropriately so based on the energy consuming systems and their controls considered.

The outcome indicates a 2.3 Star outcome against the 5 Star Quality Hotel benchmarks and if extrapolated (unofficially) to an indicative 6 Star Quality Hotel benchmark, the outcome would theoretically be just above 3 Star performance.

It is the opinion of this reviewer that the development will perform at least as well as the modelled outcome and with operational advantages afforded by the thermal mass of the building and the high efficiency systems installed, there is significant scope for the building to perform well above the modelled outcome in practice.

The major residual risks to the project performance include:

- Correct implementation of comprehensive control and metering systems
- Commissioning and tuning
- Lighting design

1. INTRODUCTION

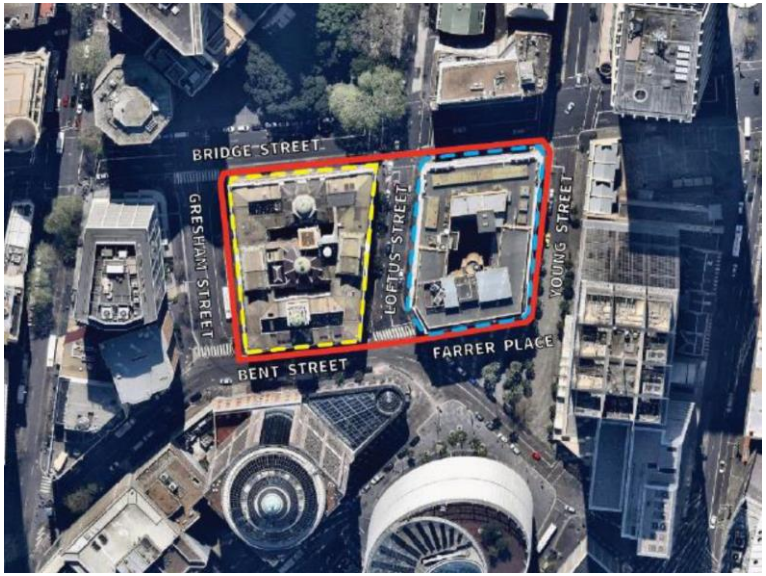
The purpose of this review is to provide an independent assessment of the energy efficiency design of the proposed building and its likelihood of achieving the proposed 2 Star Base Building NABERS rating. The review is not a verification, certification or guarantee that the building will achieve its rating. The final rating is entirely the responsibility of the project designers, constructors and operators.

1.1 SITE LOCATION

The property has a street address of 23-29 Bridge Street, Sydney.

For the ease of reporting, it is assumed that the subject property is oriented to the North, fronting Bridge Street.

The site is located at the northern end of the Sydney CBD with significantly taller building to the south, east and west and to the north of the Education Building (Proposed Hotel room building).



1.2 BUILDING DESCRIPTION

The proposed Sandstone Buildings Precinct development involves the refurbishment of two existing heritage buildings (namely, the Education Building and Lands Building) along 23-39 Bridge Street, Sydney NSW 2000. The precinct as a whole is to be refurbished as a 6-star luxury hotel development, with the Education Building housing all guestrooms (total 192 keys) and the Lands Building composed of hotel supporting functions and services (i.e. charge-to-room services).

Education Building consist of:

- 3 basement floors for plant room, services and BOH. Bottom-most floor has access to the Lands Building;
- Lower-ground & Ground level composed of lobby, amenities and BOH;
- Nine-storeys of hotel guestrooms (From Level 1 up to Level 9, with Level 6 to Level 9 being new floors introduced above the existing heritage building); and
- Level 5 contains pool, spa and gym facilities;

Lands Building consist of:

- Lower-ground floor predominantly populated by food/beverage retail facilities, most of which provide charge-to-room services for guests within Education Building;
- Five-storeys of hotel amenities, functions and services (From Ground Level up to Level 4) such as bars, dining rooms, lounge rooms, meeting rooms, library, functions, wellness facilities, etc.

GFA – Approx. total 29,600m2 (Education Building – roughly 19,800m2; Lands Building – roughly 9,800m2)

1.3 GENERAL DESCRIPTION

The system comprises the following:

- Central water-cooled chiller plant consisting of one 470kWr low load chiller with heat recovery function and three 1,460kWr high load chillers (2x duty & 1x standby). The chilled water is circulated in a primary-secondary pump arrangement, whereby:

- The primary chilled water loop arrangement includes circulation between the main chilled water return headers and supply headers through the chiller evaporators (4x primary chilled water pumps, 3x duty & 1x standby).
- The secondary chilled water pumps circulate chilled water to both the Education and Lands Building. Each building has its own duty-standby secondary chilled water pumps (i.e. 1x duty & 1x standby secondary chilled water pumps for each building). The low temperature chilled water is supplied to the air handling units and fan coil units distributed across the Education and Lands Building.

- Heat rejection is via four equal sized roof-mounted cooling towers (3x duty & 1x standby) which are sized to provide 28.5 degree condenser water to the chilled water plant for heat rejection via the condenser water pumps (4x condenser water pumps, 3x duty & 1x standby). In addition, the condenser water supply supplements the water-cooled kitchen refrigeration plants located at Lower Ground and Basement 3 of Education Building and is driven by a separate duty-standby condenser water pump set (1x duty & 1x standby).
- Central heating hot water generators consist of three 1,250kW gas-fired condensing boilers (2x duty & 1x standby). The heating hot water are circulated in a primary-secondary pump arrangement, whereby:
  - The primary heating hot water loop arrangement includes circulation between the main heating hot water return headers and supply headers through the condensing boilers (3x primary heating hot water pumps, 2x duty & 1x standby). The low-load heat recovery chiller contributes heating hot water to the heating hot water loop.
  - The secondary heating hot water pumps circulate heating hot water to both the Education and Lands Building. Each building has its own duty-standby secondary heating hot water pumps (i.e. 1x duty & 1x standby secondary heating hot water pumps for each building). The heating hot water is supplied to the air handling units and fan coil units distributed across the Education and Lands Buildings. In addition, the heating hot water passes through a set of dedicated heat exchangers to provide indirect heating to the pool circulation loop of the Lap Pool and Vitality Pool located at Level 5 of Education Building.
  - Separate secondary heating hot water pumps (1x duty & 1x standby) circulate heating hot water through a dedicated heat exchanger to provide pre-heating to the incoming potable cold water on the hydraulic side for domestic hot water provision.
- The air distribution system for each building are configured as follows:
  - Education Building:
    - Each hotel floor comprises a group of air handling units supplying pre-treated air to the floor. The corridor receives pre-treated air only, while guestrooms and ancillary spaces are served pre-treated air to a local fan coil unit, which handles hotel room loads.
    - The pool facilities located at Level 5 of Education Building has a dedicated air-to-air heat recovery air handling unit to pre-heat incoming outside air with the exhaust air via its internal plate heat exchangers. Other pool facility spaces such as the gym, spas, and treatment rooms are provided with local fan coil units to meet room loads.
    - All other conditioned ancillary spaces within the Education Building are provided with local fan coil unit(s).
  - Lands Building
    - Retail and commercial tenancies from Lower Ground up to Level 1 are provided with local fan coil units with direct outdoor air supply.
    - Dedicated groups of air handling units are provided to large function room spaces at Level 2 and 3 of Lands Building.
    - All conditioned ancillary & corridor spaces within the Lands Building are provided with local fan coil unit(s).
- The internal lighting loads are based on the maximum lighting power densities under the NCC 2016 Volume 1 Amendment 1 for the Education Building and NCC 2019 Volume 1 Amendment 1 for the Lands Building. Insufficient information was available at the time of assessment to conduct a thorough internal lighting calculation. The maximum allowable lighting power densities from the applicable NCC version for each building is considered to be a conservative estimate of internal lighting energy.
- Domestic hot water for the development is provided through a 2-step heating process, whereby:
  - Step 1 – Pre-heating by Mechanical Services: Incoming cold potable water at 17.7°C on the hydraulic services side interacts with the heating hot water loop on the mechanical services side via a heat exchanger. The incoming cold water passes through the heat exchangers and becomes pre-heated to 35°C.

- Step 2 – Additional heating by Hydraulic Services: Warm potable water exiting the heat exchanger on the hydraulic services side at 35°C then passes through another set of cross-flow heat exchangers with outgoing 65°C hot water. The warm potable water at elevated temperatures is stored in the primary hot water storage tanks (four 1,000L Rheem RT1000) designed to maintain hot water temperatures at 65°C by circulating heated hot water with the gas-fired hot water heaters (two RAYPAK B2634ID with thermal efficiencies of 82%)

- Centralized domestic hot water system is situated in the Education Building, domestic hot water is provided to both the Education Building and the Lands Building. The domestic hot water end-uses sources are identified to be:
  - Education Building Hotel Guestrooms – Taps & Showers
  - Education Building Level 5 Indoor Swimming Pool / Spa / Gym Amenities – Taps & Showers
  - Education Building BOH Amenities (e.g. housekeeping, public/staff amenities) – Taps & Showers
  - Lands Building BOH Amenities (e.g. public amenities) – Taps & Showers
  - Education Building Meal Preparation
- A central triplex pumpset is used to supply potable cold water to both the Education Building and Lands Building and comes with three equally sized 10kW pumps.
- The Sandstone Precinct development's vertical transportation system comprises of a total 12 lifts predominantly serving all floors of its respective buildings.
- Miscellaneous (but significant systems include:
  - Kitchen equipment
  - Pool systems
  - Distributed Hotel equipment
  - Hotel guest equipment

1.4 REVIEW PROCESS

The review process comprised the following:

Undertake a Peer Review of the consultant's Energy modelling and reporting generally following the principles of NABERS Commitment Agreements Handbook for estimating NABERS ratings Version 1.2 – July 2019

- Undertake an initial appraisal of the energy model and design documentation.
- Hold an initial meeting with Estimator to interrogate the model and assumptions.
- Undertake a detailed peer review of the energy model and associated documentation.
- Liaise and seek responses and/or clarification from the estimator to any queries
- Generate an Peer Review covering (as a minimum):
  - Risk assessment for each of the following categories, as detailed in the Estimator report and following review of the model

Input data and assumptions for base case model:

- Confirm all major systems and equipment have been modelled in the simulation software where possible (and not calculated manually)
- Where minor systems are calculated manually, review calculations and confirm assumptions used appear reasonable and are used appropriately in the building simulation.
- Confirm assumptions and default values used appear reasonable and are used appropriately in the building simulation.
- Review type of data used and weather station locations.
- Review the energy uses and fuel types covered.
- Confirm any exclusions are appropriate
- Confirm any items outside the scope of the Model have been considered.
- Confirm what has been modelled generally matches design documents.
- Review representation of building in the model.
- Review external shade representation and confirm any assumptions appear reasonable
- Confirm that glazing and glazing thermal performance have been appropriately represented in the model.
- Confirm that insulation has been appropriately represented in the model for walls, roofs and floors.

- Review the modelled floor area to ensure coverage
- Lighting Power Density: Confirm that lighting power densities have been appropriately represented in the model.
- Confirm there are no unconsidered impacts on heat loads or energy estimation.
- Lighting hours: Review schedule and assumptions about operation after-hours.
- Lighting Controls: Review modelled controls and assumptions. Confirm assumptions match control brief.
- Equipment Density: Confirm that equipment densities have been appropriately represented in the model. Confirm density assumptions have been appropriately documented (equipment type, power consumption per unit and number of units) and do not have further impacts on energy estimation.
- Review assumptions made for equipment load per person or per space (if used).
- Equipment Hours: Review assumed pattern of equipment use and the consequent effective equipment operating hours.
- Occupant density: Review the figure used.
- Occupancy hours: Review the hours assumed for each space and confirm they appear reasonable for the proposed use and space type.
- Review the hours of operation of the HVAC Plant.
- Review the representation of after-hours operation used and confirm it appears reasonable.
- Confirm that all components of HVAC plant have been appropriately represented in the model.
- Review all parameters that could impact the predicted energy consumption (efficiencies, plant size, capacity of the system to operate at part load/low load).
- Review all included miscellaneous plant (e.g. toilet exhaust systems) and confirm completeness.
- Review how infiltration is modelled in internal and external zones.
- Review proposed/designed control methodologies, their appropriateness for the systems and that they are modelled accurately.
- Confirm assumptions and modelled inputs appear reasonable.
- Review system type and end-use fitting selections (e.g. shower heads and taps).
- Review assumptions regarding use of hot water (e.g. per occupant) and modelled hot water distribution losses.

Metering Requirements

- Review the coverage descriptions of meters.
- Confirm arrangement of proposed meters and submeters results in appropriately metered end uses for energy management purposes.
- Confirm any required apportioning to external services.

Simulation Results

- Review the modelled outputs against known industry benchmarks to validate the level of performance offered is meeting minimum or better performance required for each of the usage areas (Administration, amenities, Hotel, retail, function spaces, meeting facilities etc).
- Confirm a base case model and review the high risk items with the design team to ensure suitable mitigation measures have been considered. Consider off-axis modelling of high risk items.
- Confirm estimates or assumptions for items are reasonable
- Review information provided for the base case model and any off-axis model.
- Confirm total included energy use figures are in accordance with the model and calculation outputs.
- Confirm a suitable modelling margin has been used.
- Highlight any identified risks with selected modelling margin.
- Review estimated performance in MJ / [rating unit], kg CO2-e and

Design and Equipment Review

- Review design features and confirm they are addressing intended outcomes and good environmental performance.

Risk Assessment

- Review described risk factors, level of risk and mitigation strategies and confirm that actions taken to mitigate risks so far are appropriate.
- Highlight any risks that have not been mitigated or have been inappropriately mitigated.
- Review Estimator comments on system and plant performance.

- Confirm inputs and assumptions are appropriate.
- Review additional information provided and confirm percentage/hours where temperature or load demands aren't met are reasonable and as expected.

Other Items

- If required, request any missing information before the Peer Review is finalised
- Review commissioning and tuning plans.

Final Assessment

- Provide a summary of the results of the review comparing the modelled performance against known benchmarks identifying the level of performance compared to current data where available.

Final Report

- Provide a Peer Review Report detailing the findings of the above review process, and:
- A completed checklist covering the above reviewed items (and additional items as identified during the review).
- A summary statement covering:
  - The reviewers opinion of the level of performance likely to be achieved based on the review.
  - Key and/or all identified risks and how they are being addressed
  - Key suggestions to be actioned
  - Any other conditions that are reasonable that should be met

2. RISK ASSESSMENT

The following table reviews and identifies risks associated with each component of the model.

ITEM	DESCRIPTION	REVIEWER COMMENTS	ACCEPTABLE
INPUT DATA AND ASSUMPTIONS			
MANUAL CALCULATIONS	Confirm all major systems and equipment have been modelled in simulation software as opposed to manual calculations being used (e.g. spreadsheets). Confirm assumptions used appear reasonable and are used appropriately in the building simulation. Review manual calculations, such as those calculated in spreadsheets, where used.	HVAC systems modelled within the software covering the thermal envelope and all HVAC systems. Model Assumptions include lighting to NCC max allowable W/sqm limits Required NABERS modelling defaults used for lighting, lighting controls, HVAC operation, occupancy and guest room equipment. Details included in Table 14 of the EMR are considered appropriate. Manual calculations include: Lighting (Internal and external) – generally conservative DHW usage – generally conservative Hydraulic system pumping - conservative Lifts – using Green Star Energy use and emissions calculation guide Ancillary ventilation systems – generally conservative Miscellaneous systems – 1.5kWh/sqm across GFA Common area equipment – 11kWh/sqm across lobbies, foyers, corridors, dining areas, BoH, conference areas. Kitchen equipment – based on data from similar properties/facilities Pool heating – based on surface area etc Pool pumps – per supplier equipment and operation advice	Yes
DEFAULT VALUES	Confirm assumptions and default values used appear reasonable and are used appropriately in the building simulation.	Default schedules confirmed to use NABERS defaults where required. A flat 70% diversity has been applied to TV and general loads for rooms in the base case. Off axis scenario 1 shows this will not unduly effect the result (0.7%).	Yes
SIMULATION PACKAGE	Confirm assumptions and default values used appear reasonable and are used appropriately in the building simulation.	Building simulation defaults reviewed and are generally conservative. The final model is very detailed and includes equipment and controls as designed.	Yes

CLIMATE DATA	Confirm assumptions and default values used appear reasonable and are used appropriately in the building simulation.	Sydney Observatory Hill Test Reference Year (NSW_Sydney_RO_81_TRY.fwt)	Yes
ENERGY COVERAGE	Review the energy uses and fuel types covered. Confirm meters and energy uses covered by each simulated meter are correct according to specification documents. Confirm any exclusions or any items outside the scope of the NABERS Energy rating that are not appropriately metered have been included in energy consumption calculations.	Gas and electricity, no diesel. Appears correct. It is assumed that metering will be installed to cover all exclusions. The metering strategy covers this broadly but a specific metering response/design arrangement has not been fully developed at this stage. Special attention should be paid to ensure metering installed measures the excluded uses per the NABERS rules.	Yes
DOCUMENT REFERENCING	Review all drawing and specification versions and dates used to source information (for each input). Confirm what has been modelled matches appropriate specification documents.	Modelling has used the current equipment schedules. It is noted that the selections are not final. Modelling has generally taken a conservative approach.	Yes
BUILDING FORM	Review representation of building.	The building form is modelled to a high degree of accuracy.	Yes
EXTERNAL SHADE	Review external shade representation and confirm any assumptions appear reasonable.	Building shading modelled conservatively. Surrounding building shading is included.	Yes
GLAZING	Confirm that glazing and glazing thermal performance have been appropriately represented in the model.	Glazing performance is accurately captured in the model.	Yes
INSULATION	Confirm that insulation has been appropriately represented in the model for walls, roofs and floors.	Calculations and drawings included. Part J minimums modelled.	Yes
CAR PARKS	Review what has been modelled for car parks.	No carparking.	Yes
FLOOR AREA	Review the modelled floor area, which may not be the same as the rated floor area. When appropriate for the rating type considered, confirm that Rated Area assumptions are reasonable and in line with the NABERS Rules.	Generally acceptable to the NABERS rules.	Yes
LIGHTING	**Lighting Power Density**: Confirm that lighting power densities have been appropriately represented in the model. Confirm density used is	Per NCC maximums	Yes

	appropriate and does not have unconsidered impacts on heat loads or energy estimation. **Lighting hours:** Review schedule and assumptions about the operation of cleaners or after-hours workers on site. Confirm it has been appropriately modelled. **Lighting Controls**: Review modelled controls and assumptions. Confirm assumptions match control brief.	Default schedules used for rooms, appropriate hours used elsewhere. Occupancy control modelled and included in specifications	
EQUIPMENT	**Equipment Density:** Confirm that equipment densities have been appropriately represented in the model. Confirm density assumptions have been appropriately documented (equipment type, power consumption per unit and number of units) and do not have further impacts on energy estimation. Review assumptions made for equipment load per person or per space (if applicable). **Equipment Hours:** Review assumed pattern of equipment use and the consequent effective equipment operating hours.	Defaults used and would appear appropriately conservative based on the expectation of normal use. Reviewed and appropriate. Per default schedules. Diversity applied to TV and general power usage in rooms.	Yes
OCCUPANCY	**Occupant density:** Review the figure used. **Occupancy hours:** Review the hours assumed for each space and confirm they appear reasonable.	Detailed in model Default occupancy assumed	Yes
HVAC SYSTEM TYPE	Review the system that has been modelled. Confirm there are no unacceptable differences between modelled system and specified and/or designed system.	Variable speed (Hi/Med/Low) FCU unit systems throughout Central water cooled chiller plant, primary / secondary pumping currently proposed. Central gas fired condensing boiler plant	Yes
HVAC HOURS	Review the hours of operation of the HVAC Plant.	Based on default occupancy	Yes

HVAC AFTER HOURS	Review the representation of after-hours operation used and confirm it appears reasonable.	After hours included per defaults	Yes
HVAC PLANT	Confirm that all components of HVAC plant have been appropriately represented in the model. Specifically, review assumptions for any areas where the simulation was allowed to default rather than use data from the design. Review all parameters that could impact the predicted energy consumption (efficiencies, plant size, capacity of the system to operate at part load/low load). Review all included miscellaneous plant (e.g. toilet exhaust systems) and confirm completeness.	All plant modelled per design data High efficiency central plant equipment. (Condenser water reset. Suitable part load systems and staging provided. Primary/secondary pumping provided. VSD control on most fans Plant schedules are comprehensive and complete.	Yes
HVAC ZONING	Review the zoning of HVAC. Confirm this has been taken into consideration when estimating the AHAC hours for a NABERS rating.	Appropriate dedicated airhandling plant for each area of operation. NA	Yes
HVAC CONTROL	Review the differences between the known or likely control methodologies of the actual system and those modelled. Confirm assumptions and modelled inputs appear reasonable. Confirm that modelled HVAC control is based on control briefs. Review how infiltration is modelled in internal and external zones. Confirm assumptions and modelled inputs appear reasonable.	Modelling conservative. Detailed control routines are appropriate. Dedicated control system for chiller plant. Confirmed, within the limitations of modelling software. Infiltration modelled appropriately differentiating between intern/external, new/old construction. Assumptions appear reasonable	Yes
DOMESTIC HOT WATER	Review system type and end-use fitting selections (e.g. shower heads and taps). Review assumptions regarding use of hot water (e.g. per occupant) and modelled hot water distribution losses.	Gas fired heating system from high efficiency boilers, central storage and distribution Per NABERS Handbook for estimating energy usage. Distribution losses modelled appropriately	Yes
METERING REQUIREMENTS			

METER DESCRIPTIONS AND LOCATIONS	Review the locations and coverage descriptions of all meters. Confirm what has been modelled is specified in design documents. Confirm arrangement of proposed meters and submeters results in appropriately metered end uses for the relevant NABERS rating scope. Confirm any required apportioning can be calculated in line with NABERS Rules for any shared services or facilities.	The metering strategy covers this broadly and details a suitable submetering strategy. A specific metering response/design arrangement has not been fully developed at this stage Special attention should be paid to non-hotel use areas, specifically that no included uses are captured by these meters. Apportioning of central energy/thermal systems will require a detailed review of the mechanical sub-metering strategy yet to be developed.	Yes
SIMULATION RESULTS			
OFF-AXIS SCENARIOS	Confirm a minimum of two models, including the **base case model** and one **off-axis mode**l including four **off-axis scenarios**, have been modelled. Review description of off-axis scenarios and confirm inputs and purpose are reasonable.	Off axis scenarios modelled: 100% occupancy Predicted 2030 weather data file (Climate change) Increased kitchen usage No C02 control to function areas. All considered concurrently = 6.6% emissions increase	Yes
NABERS RATING INPUTS	Review NABERS inputs for the base case model and off-axis model. Confirm they are in accordance with **the Rules**, and match the design documentation, model inputs and the assumptions used. Confirm Estimates or assumptions for these items are reasonable.	Inputs correct. Usage estimates acceptable	Yes
NABERS RATING ENERGY CONSUMPTION	Review information provided for the base case model and off-axis model. Confirm total included energy use figures are in accordance with the model and calculation outputs. Confirm a suitable modelling margin has been used for the base case model. Highlight any identified risks with selected modelling margin.	All input figures are correct. No modelling margin included (or required) due to the nature of this project whereby a best outcomes approach within the physical constraints of the project and the unique nature of this development compared to the NABERS Hotel rating tool.	Yes
NABERS RATING RESULTS SUMMARY	Review estimated performance in MJ / [rating unit], kg CO2-e and NABERS Energy Stars.	Maximum Normalised GHG Emissions (kgCO2e per room/year) Scope 1, 2 & 3 21,080kg C02/sqm, 2.3 Star	Yes

	Review scenarios and caveats and confirm reasonable.		
DESIGN AND EQUIPMENT REVIEW			
DESIGN REVIEW	Review design features and confirm they are capable of achieving project-specific requirements. Review design features and confirm they are capable of achieving intended outcomes and good environmental performance.	In general the design incorporates all of the aspects expected for a high performing building. The project provides a significantly higher level of service and facilities than are found in the Hotels considered a spart of the NABERS rating system. With a 6 Star Hotel rating proposed, there is no specific NABERS benchmark for this Hotel type so the Hotel has been compared on the 5 Star Hotel benchmark. If we extrapolate the NABERS bands to give an indicative 6 Star Hotel rating bands, the model would indicate a 3 Star outcome.	Yes
EQUIPMENT REVIEW	Review equipment selection and confirm selections are capable of achieving project-specific requirements. Review equipment selection and confirm selections are capable of achieving intended outcomes and good environmental performance.	Equipment selections are all based on current selections. Equipment appears appropriate for the design outcomes.	Yes
RISK ASSESSMENT			
RISK ASSESSMENT	Review described risk factors, level of risk and mitigation strategies and confirm that actions taken to mitigate risks so far are appropriate. Highlight any risks that have not been mitigated or have been inappropriately mitigated. Confirm stated risks are unlikely to prevent the building achieving its targeted star rating if managed as described. Review Estimator comments on system and plant performance. Confirm inputs and assumptions are appropriate. Review additional information provided and confirm percentage hours where temperature or load demands aren't met are reasonable and as expected.	Risks identified by this review: The model developed over the course of this review is very comprehensive and well considered by the team at Stantec. Refinements and corrections over the course of this review have improved the accuracy to a level considered to be very high but still conservative for this property. The main risk perceived is the limitation of the model to fully account for the thermal mass of the historic building structures. The deficiency would however make the model more conservative and full incorporation of the thermal mass would most likely result in an improved outcome. Demands are expected to ne met 99.9% of the time with plant well sized and appropriately arranged for low load operation.	
OTHER ITEMS			

DISCLAIMER	Review disclaimer in Estimator report and confirm it meets minimum requirements and is reasonable for the simulation.	Reasonable	Yes
COMPLIANCE CHECKLIST	Review the compliance checklist prepared by the Estimator and confirm all items have been covered in the report. If required, request any missing information before the Independent Design Review is finalised.	All items covered.	
COMMISSIONING PLANS	Review commissioning plans and confirm they appear to be good practice. If no commissioning plans are available, assess risk for the project and recommend future commissioning if required.	Commissioning in accordance with CIBSE/AIRAH requirements is specified, with 12 months tuning.	
NOTES			

3. FINAL RISK CHECKLIST

The following table reviews and identifies risks associated with each component of the model.

RISK	COMMENT	POTENTIAL MITIGATION	
DESIGN DEVELOPMENT	Design is well advanced and details appear to be appropriate. In the process of the modelling ad review, improvements have been implemented to improve efficiency and energy use.	None required	
DESIGN CHANGES	Design changes have the potential to impact energy consumption and risk the NABERS result	Any building envelope and any equipment changes should be modelled to assess their impact on the energy outcome for the building, prior to being implemented.	
KITCHEN EQUIPMENT	The kitchen is an area of high energy consumption. Equipment efficiency and operation can have a significant impact.	The model is considered conservative in its estimation.	
CONFERENCE AREAS	The use of these areas can have a significant impact on energy consumption.	The model is considered conservative.	
DIESEL	Diesel usage (if any) is anticipated to be small, none has been included in the model. The impact of ad-hoc diesel usage is not normally of any consequence	None required	
INTERNAL LIGHTING	Usage has been estimated very conservatively using the maximum NCC allowances	A need to concentrate on lighting and controls should be impressed on the electrical/lighting designers.	
AHUS AND FANS	Fan energy use is significant.	Commissioning and monitoring of fan usage during the tuning period should be closely monitored. Occupancy control should be considered, while this cannot eb easily modelled, it will reduce fan usage in operation and assist in achieving and improved rating.	
METERING	Metering is not detailed and there is a small risk that energy that could be excluded from the rating will not be able to be because of poor meter detailing. Metering is also fundamental to energy monitoring in operation to allow early identification of errant usage.	Include a detailed list of meters required for NABERS rating in the modelling report Develop a detailed list of submeters for energy monitoring and performance analysis with detailed reporting and dashboards for operator use.	

CONTROLS	Controls commissioning and tuning is critical to the operational performance of all systems	Ensure a detailed commissioning and tuning program is in place for the controls systems. Ensure the combined BMCS, Metering and energy monitoring system provides immediate feedback on unusual energy usage	
PV ARRAY	This is a relatively simple way to improve or mitigate energy usage	Consider installation where possible to improve the modelling margin, noting there is very limited space for solar on this site and overshadowing is significant.	
COMMISSIONING & TUNING	Commissioning and Tuning is often undertaken poorly and is by far the largest risk to building performance of well designed buildings	Ensure a fully comprehensive and detailed commissioning process validated by an independent commissioning agent is undertaken. Ensure Tuning reviews are undertaken diligently at least 2-monthly, and that as above suitable systems are in place to enable meaningful tuning to be undertaken.	

4. SUMMARY STATEMENT

4.1 STAR RATING

The building design and proposed system types align with those expected for a high energy performing building.

The energy model has been developed to a high level of detail and has been thoroughly scrutinised, improved and refined through the IDR and Stantec's internal process's. The modelling is generally conservative and appropriately so based on the energy consuming systems and their controls considered.

The outcome indicates a 2.3 Star outcome against the 5 Star Quality Hotel benchmarks and if extrapolated (unofficially) to an indicative 6 Star Quality Hotel benchmark, the outcome would theoretically be just above 3 Star performance.

It is the opinion of this reviewer that the development will perform at least as well as the modelled outcome and with operational advantages afforded by the thermal mass of the building and the high efficiency systems installed, there is significant scope for the building to perform well above the modelled outcome in practice.

The major residual risks to the project performance include:

- Correct implementation of comprehensive control and metering systems
- Commissioning and tuning
- Lighting design

APPENDIX A -
NABERS MODELLING REPORT

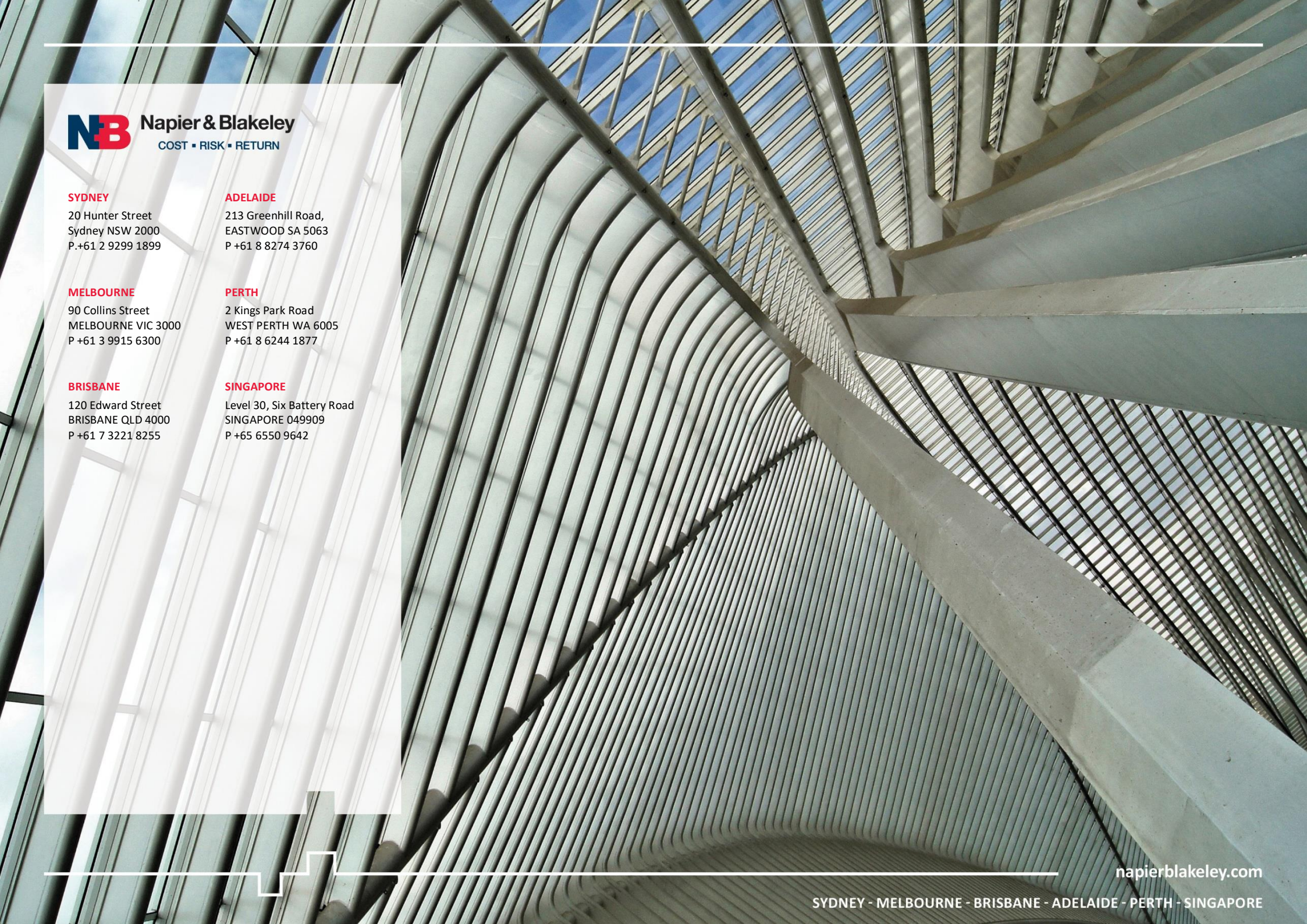
Stantec

Dated: 11 February 2020

Rev. 03

Ref 301350567

(Not attached due to size)



Napier & Blakeley
COST ▪ RISK ▪ RETURN

SYDNEY
20 Hunter Street
Sydney NSW 2000
P.+61 2 9299 1899

ADELAIDE
213 Greenhill Road,
EASTWOOD SA 5063
P +61 8 8274 3760

MELBOURNE
90 Collins Street
MELBOURNE VIC 3000
P +61 3 9915 6300

PERTH
2 Kings Park Road
WEST PERTH WA 6005
P +61 8 6244 1877

BRISBANE
120 Edward Street
BRISBANE QLD 4000
P +61 7 3221 8255

SINGAPORE
Level 30, Six Battery Road
SINGAPORE 049909
P +65 6550 9642