# THE **SANDSTONE** PRECINCT

**FINAL BINDING OFFER**
JULY 2015

**VOLUME 4**
Scheme Report

CENTURION REC RAFFLES HOTELS & RESORTS
GRIMSHAW aurecon

# THE **SANDSTONE** PRECINCT

**VOLUME 4**
Scheme Report

# A7 Schemes

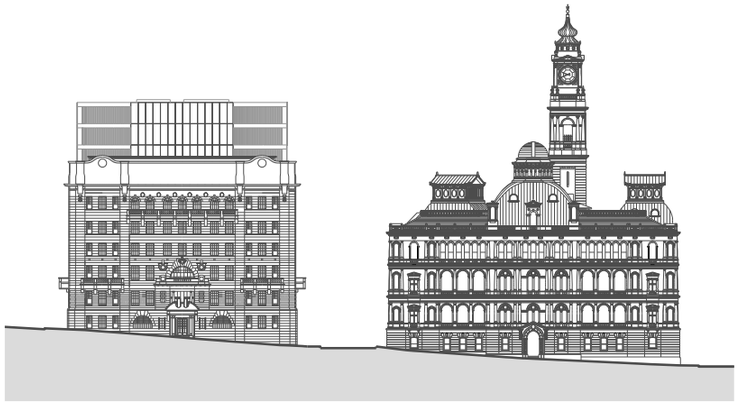
# Progressive Offer:
## Base Scheme

This submission details a Progressive Offer which includes a **Base Scheme** that fully aligns and complies with the objectives outlined in the SEARS and EIS documentation, and an **Scheme Option** that includes a carefully considered proposition for a tower above the Department of Education Building.

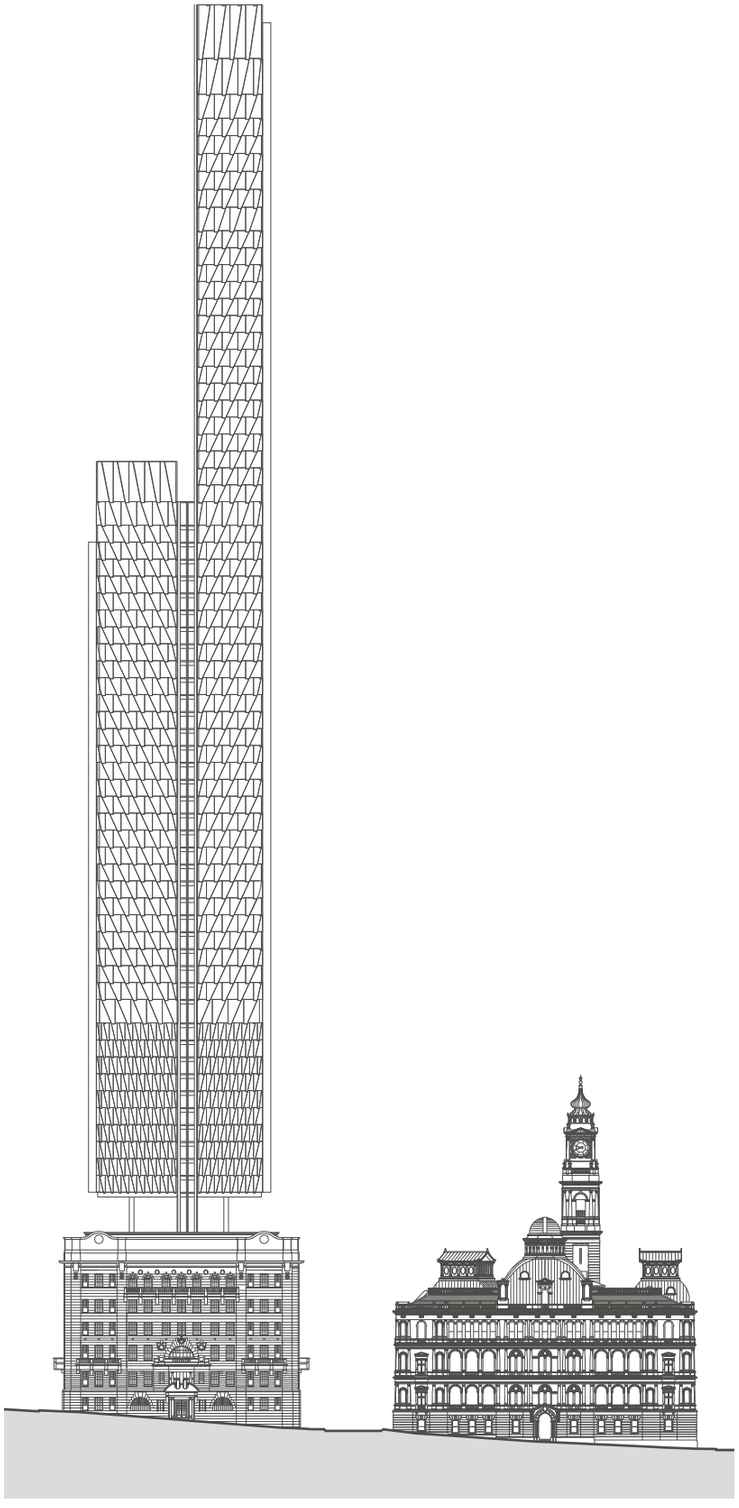
The proposals and concepts for the designs of the two heritage assets are essentially identical, with the option to include a tower above the Department of Education building structured within a Progressive Offer. The heritage and architectural principles established within the Base Scheme's approach to the Department of Education courtyard remains consistent between the two schemes.

As such, this document will firstly outline the fundamental concepts which underpin both the Base Scheme and the potential for a tower within the Scheme Option.

For clarity, the Scheme Option tower will be presented first, followed by an overview of the Base Scheme.



# Progressive Offer:
## Option Scheme

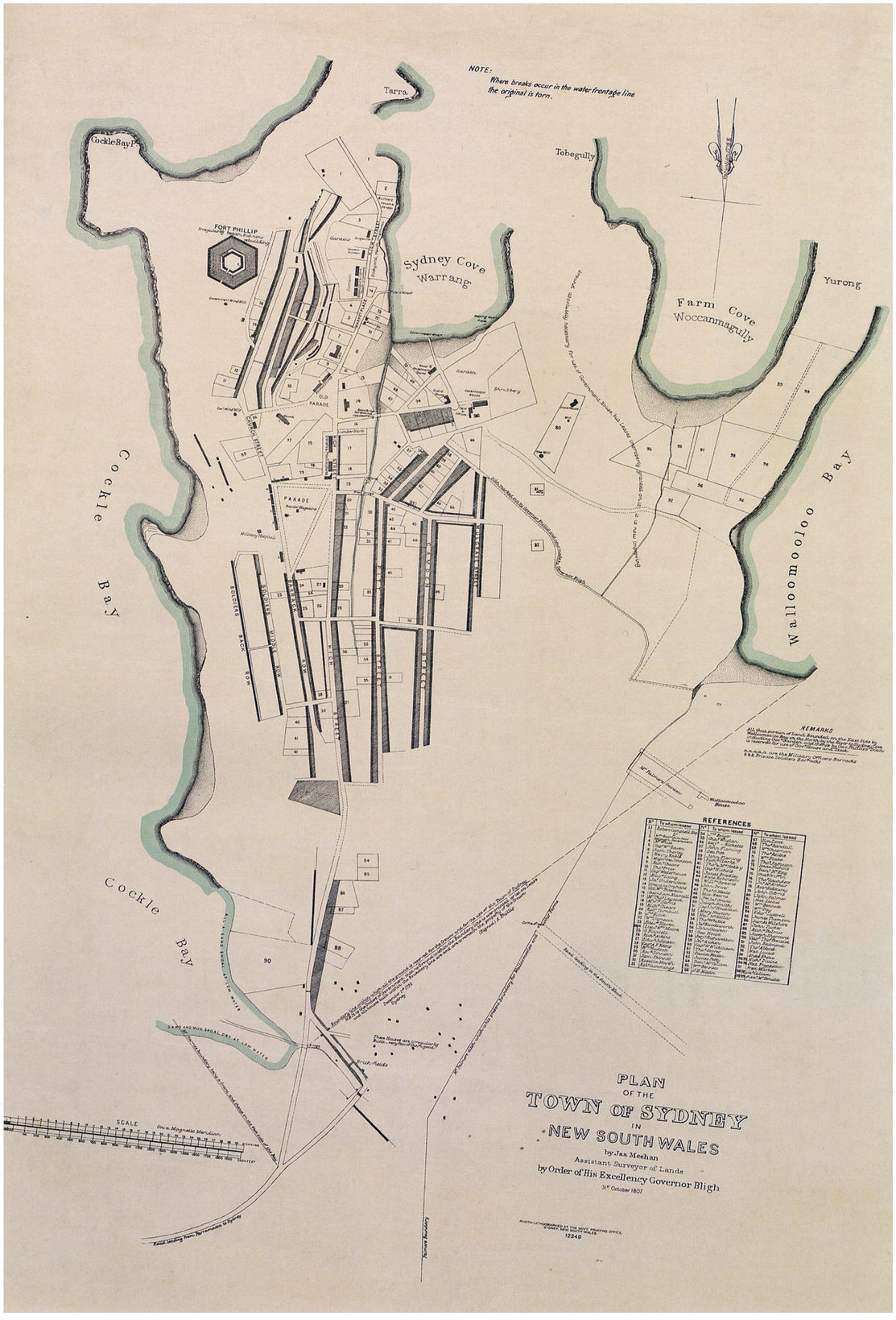


Within the Progressive Offer, an option to include a tower above the Department of Education Building has been proposed. The underlying principles, spatial organisation, and approach to heritage established in the Base Scheme remain the genesis of the Scheme Option.

A slender and elegant tower proposal has been conceived through an extensive and rigorous design process which has considered the impacts to the existing heritage building, surrounding precinct, overshadowing to surrounding key public spaces, view sharing from adjacent neighbours, allocation of Floor Space Ratio, and its contribution to Sydney's growing skyline.

Key benefits to the State include:

- an increases to the number of hotel rooms by sixty (60) keys;
- meeting the objectives of SEARS;
- increasing employment opportunities;
- a greater financial return to the State;
- enhancement of the NSW economy in the long term;
- an increase in capacity to contribute to improving the public realm;
- promotion of residential activity within the Sydney CBD, and
- raising Sydney's status as global city through an elegant and iconic tower.




**Plan of the town of Sydney in New South Wales**
James Meehan, 31 October 1807

# Response to Annexure D of 23 December, 2014 Correspondence
## Compatibility with SEARS

**Secretary's Requirements**

The Secretary's Environmental Assessment Requirements list the necessary items for the submission of an EIS for the Stage 1 SSD 6751. Should the Proponent be successful in securing the project, the Proponent will endeavour to comprehensively address the Secretary's Environmental Assessment Requirements.

The sections below highlight those areas requiring consideration in the EIS and how this Final Binding Offer submission has addressed, or intends to address through the preparation of an EIS, in any further planning applications.

**1. Relevant EPIs, Policies, and Guidelines**

The Proponent has engaged a Planning Consultant with vast experience in City and State planning law to advise on the Statutory Planning Framework and which planning pathways may be considered most appropriate for the complexities of this project. In addition to the relevant planning policies, the Proponent is also extremely conscious of the relationship between this proposed tourism development and the various other documents and strategies listed in the SEARS under this section, including the NSW 2021 vision and the Draft Metropolitan Strategy for Sydney to 2031.

**2. Built Form and Design**

The proposed building envelope of the Base Scheme lies within the proposed Stage 1 SSD 6751 maximum allowable envelope with additional setbacks considered to improve the reading between the original and new building components. For the purposes of this submission, a full view impact study of the Base Scheme has not been undertaken on the basis that the design is within the proposed SSD 6751 envelope.

As part of the Progressive Offer, the Scheme Option tower is not proposed to comply with the proposed building envelope. However, a rigorous and thorough design analysis has formed the basis for the development of the design proposals of the tower form and its setting within the city context. This process and analysis is evidenced fully within this A7 Schemes document. (Please refer to the 'Scheme Principles' within the Facilities Overview Programme.)

**3. Amenity**

Whilst this submission for the Base Scheme has not produced any further amenity (shadow and view) studies beyond those already completed for the SSD 6751 application, the potential amenity impacts to key public spaces were given thorough consideration and examination in the development of the Scheme Option. (Please refer to 'Scheme Principles' within the Facilities Overview Programme for a comprehensive overview of the amenity analysis that informed the design proposal's development.)

**4. Heritage**

The Proponent has engaged a heritage consultant to advise on the design proposals, the existing Conservation Management Plans, and related heritage policies and documents. The Proponent recognises the extreme significance of the two buildings and potential archaeology within the sites and would fully comply with any further heritage submission requirements including a Heritage Impact Statement and Conservation Management Plan as set out in the SEARS requirements. Refer to the heritage consultant's assessment of the Scheme's proposals located within the Consultant Assessments chapter of this document.

**5. Subterranean Works**

This document details the design proposals for establishing a subterranean pedestrian connection under Loftus Street to connect the two heritage assets, including areas for back-of-house facilities, loading, and parking. The connection is a fundamental requirement to sustain the operation and success of the hotel precinct. (Please refer to the relevant material throughout this document for further detail.)

For clarity, both the Base Scheme and Scheme Option propose the same subterranean solutions, with only a difference in parking levels required to accommodate the demand generated by the tower.

**6. Traffic and Access**

The proposed access and traffic solutions are consistent for both Schemes presented within the Progressive Offer. The Proponent has engaged a Traffic Consultant to provide advice during the design process leading to this submission, on site access options for the underground levels of the complex, and on potential measures to allow the pedestrianisation of Loftus Street with an acceptable level of bus traffic remaining on Gresham Street. Should the Proponent be successful, a Traffic Consultant would prepare the required Traffic Impact Assessment. (Please refer to the Consultant Assessment later within this document for further detail).


**Plan of the town of Sydney in New South Wales**
John Carmichael, Sydney 1837

# Response to Annexure D of 23 December, 2014 Correspondence

## Compatibility with SEARS

**7. Infrastructure Impacts - Interim Rail Corridor**

Whilst the announcement has been publicly made about the intended Sydney Metro rail alignment, the Proponent understands that the provisions of the Interim Rail Corridor which placed a railway station within Macquarie Park may still be maintained to protect against any unforeseen future changes. Both Schemes within this Progressive Offer have acknowledged the location of the Interim Rail Corridor and prepared viable solutions that do not impact upon this protected corridor. (Please refer to the relevant section within the Services Outline of this document for further detail.)

**8. Ecologically Sustainable Development**

For this submission, the Proponent has engaged an ESD Consultant to advise on how the design proposals, construction, and operation of the development could address sustainable principles, measures, and outcomes. A dedicated review has been prepared and is contained within the Consultant Assessments chapter of this document outlining the key strategies that the Proponent and Operator would look to achieve. Raffles has its own internal sustainability policies which set aspirational targets for all of their developments, considering both material and construction aspects, as well as ongoing operational matters.

**9. Consultation**

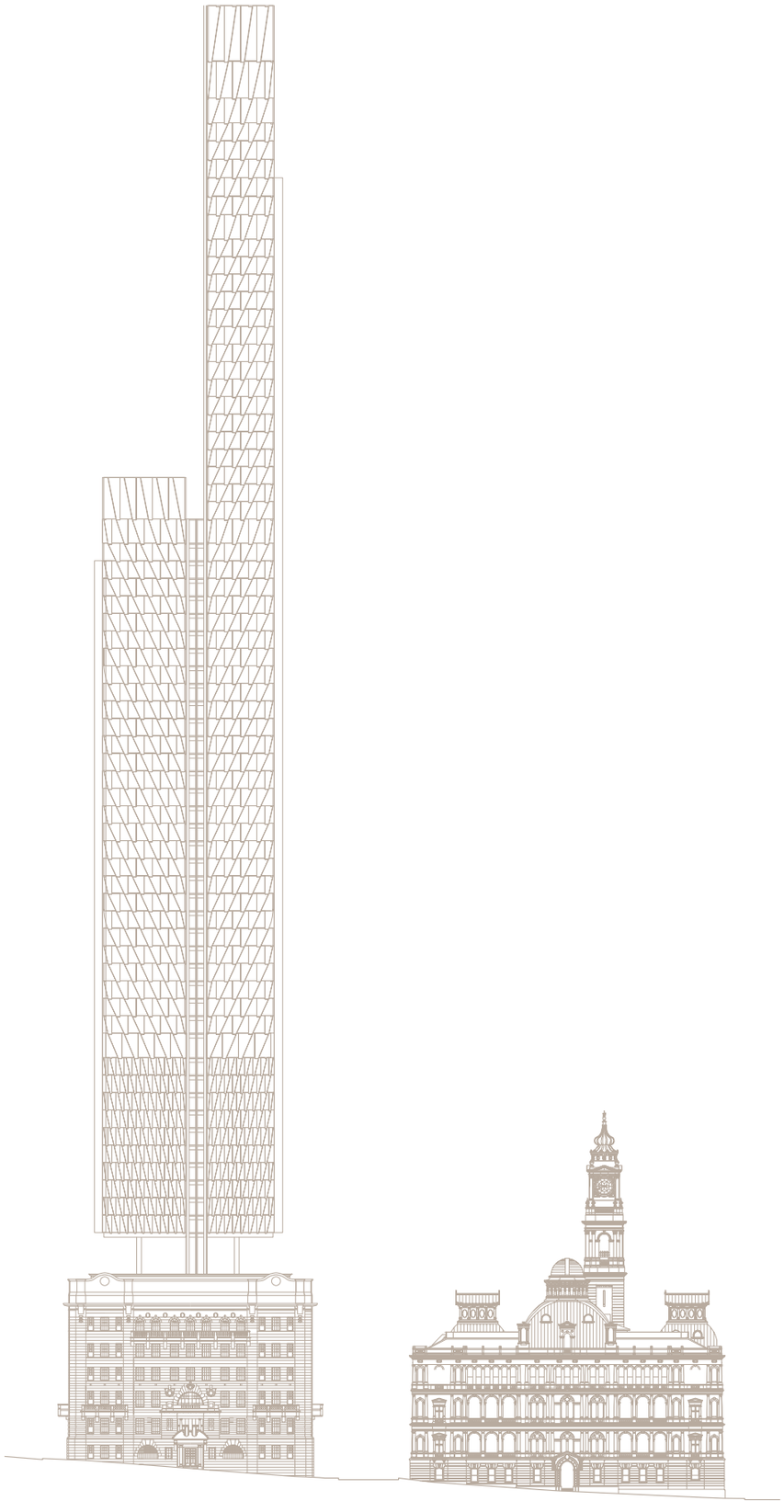
Regardless of what level of building form is later pursued within the Progressive Offer structure, the Proponent acknowledges and understands the complex consultation process require with all local, State or Commonwealth authorities, service providers, community groups, and affected landowners, and will consider a suitable consultation process within any future design development and submission to ensure that a detailed and genuine consultation process is established and followed.

## Achieving Heritage Requirements Compatibility with CMP's

**Heritage Principles and Response**

The Proponent has engaged a Heritage Consultant from the outset of the EOI Phase 1 during the last quarter of 2014. To respond to the requests for further information on heritage issues, as outlined in Annexure D of correspondence received on 23 December 2014, the Heritage Consultant has assessed both the Base and Scheme Options continuously throughout their development to offer their professional assessment and direction on all heritage related issues.

(Please refer to the Heritage Assessment which outlines in detail the heritage responses and heritage approaches outlined within this Scheme document that evidence the consideration given to the restoration and reinterpretation given to these two significant heritage assets.)



# A7 Contents

For clarity, this submission has been restructured from the sequence suggested within the 23 December 2014 correspondence to allow the presentation of the various requisite components to be read in what we believe is a more coherent and progressive format. An Executive Summary has been included as an overview to the following sections.

The key concepts, principles, and approaches which bind both the Base Scheme and the Scheme Option will be presented within the Executive Summary before outlining in full detail the Scheme Option, followed by the Base Scheme.



Refer to Volume 5 for the Detailed Schematic Drawings provided separately for both the Base Scheme and Scheme Option.

# Executive Summary


**Sketch of Sydney Cove - 1788**

# Overview

Governor Philip chose a remarkable place for the first European settlement in Australia, and renamed it 'Sydney Cove'. A small, deep and north facing cove, Warrang to the local Aboriginals, nestled between two gently sloping headlands. Tarra to the west and Tobegully to the east. A freshwater stream ran down the sheltered valley into the cove; and as described in the history of 'Public Sydney by Phillip Thalis and Peter John Cantrill, 'it was the ideal place to settle'. The colony's first Governor, Philip, laid out the initial and interim government official's buildings at the time of settlement, on the eastern shores of the freshwater stream – the tankstream – parallel to the shoreline and fronting a small and narrow street – Bridge Street. At an oblique angle to the south of these buildings O'Connell Street was established as a first principal street of the new town, which at its north eastern end opened into a triangular square behind the official's houses. From there this street bent northward adjacent to the Governors House and ran down to a wharf on the south eastern shore of the cove.

This somewhat peculiar intersection marks the first place of European settlement – the first planned principal street and a corresponding square and connection to the harbour. The government buildings at this location, later including the Chief Justices House and Surveyor Generals Office, and the Colonial Secretary's House, would in the late 19th and early 20th century become the sites for the establishment of a grand array of sandstone public buildings, including the Department of Lands, the Department of Education and Agriculture and the small triangular space, known today as Farrer Place. Bridge Street became the first street of public buildings in the colony and the eminent sandstone compositions provided a chiaroscuro effect of golden light and shadow against the immutable character of the indigenous landscape, gnarling angophora's and shading figs.

James Barnet's Lands Building constructed in 1876 from immense rectangular sandstone blocks, with deeply modelled facades shading the harsh northern light, was a building of unprecedented grandeur, scale, and elegance and proclaimed to Sydney a civic character intonating the confidence and culture of the new city. The later 1912 Education Building by the Government Architect George McRae, constructed in more frugal times, was less distinguished but its monolithic presence was sufficiently counterpoising, and its interiors modest and utilitarian in the provision of an administrative workspace.

This recounting of the history of the site is necessary. The site of the Sandstone Precinct evolved through the interplay of geography, urban layout, public significance, climate and landscape. These themes provide the foundation tenets for considering the transformation of these buildings within their circumstance and situation. The most important consideration though is for a possible and authentic ongoing public role in City while understanding the 'postcapital' imperative for renewal through re-purposing and self-sufficiency.

The City orientated towards the 21st century preferences the re-instatement of the social over the public. The City as the place for interaction and interchange, where the occasions for those activities seek both a variety experiential characters and amenities, within a granularity of places and situations that speaks of its unique locale, histories and environment.

The role of a hotel intended in this context is to give forth the opportunity for the experience of what the French sociologist Pierre Bourdieu ascribes as 'habitus'; that which is created through the interplay social processes over time that are shaped by both by past events and structures and that shape current practices and behaviours. It becomes the experience possible within a place that is derived from its social context and physical structures and which subsequently becomes distinctively cultural and symbolic.

Raffles Sydney therefore seeks to make a place and circumstance to constitute a new realm for social encounters and by re-constituting the significance of the sandstone buildings and allowing the history and experience of the building to contribute to the day to day rituals of its citizens and to enamour those of its residents. Raffles Sydney then becomes of Sydney, describes part of it, and make placeor others to participate in it.

The buildings historic situation has always placed it at one of intersection and visual significance. Currently it describes that of the legal/financial/governance precinct of the CBD, to the transit hub and tourist services of the Quay, bisected by the great north to east corridor of Bridge Street that connects the Harbour to the Gardens, despite this it's built form while substantial at street level, is absent with the cityscape.

The very core intention of the proposal for Raffles Sydney, is in its responsibility towards transcribing a new public realm. Typically, the private occasion of hotel and their entries subtract the life of the street in service to their associative ground level retailing. With the Sandstone Buildings, the distinguished rooms of the three ground floor levels that fall from Farrer Place to the corner of Bridge and Gresham Streets, become enlivened with a coterie of restaurants and food provedores that open out onto extended pavements and a new public space created with the closure of Loftus Street. Surrounded by the muted enclosures the commercial office buildings, the new hotel will give to the City both public space and the day and night activities of a vital restaurant and hospitality precinct.

Raffles Sydney is considered not as single entity but one of four related entities. Hotels and Serviced Residences within a Hotel. The heritage significance of the Lands Building is retained by its translation into a Grand Hotel. The pre-eminent composition of the diverse interior rooms and spaces are retained. The individual offices or set there-of becomes smaller suites, the rooms off the balcony loggias and terraces are combined to form grand suites suitable for entertaining as well as residing, while the larger office spaces off its upper level principal 'wings' have very few new sub-divisions and when such do occur are inserted in relation to the structural form of the walls and ceilings. It becomes a hotel of 51 suites set around the former 'Strong Room', the Lands Department former plan archives. These climatically isolated spaces are used in combination with the roof level observatories for an arrangement of unique functions while being available in interim to experience the building as a gallery or an interpretation facility for the heritage of the buildings fabric and former use.

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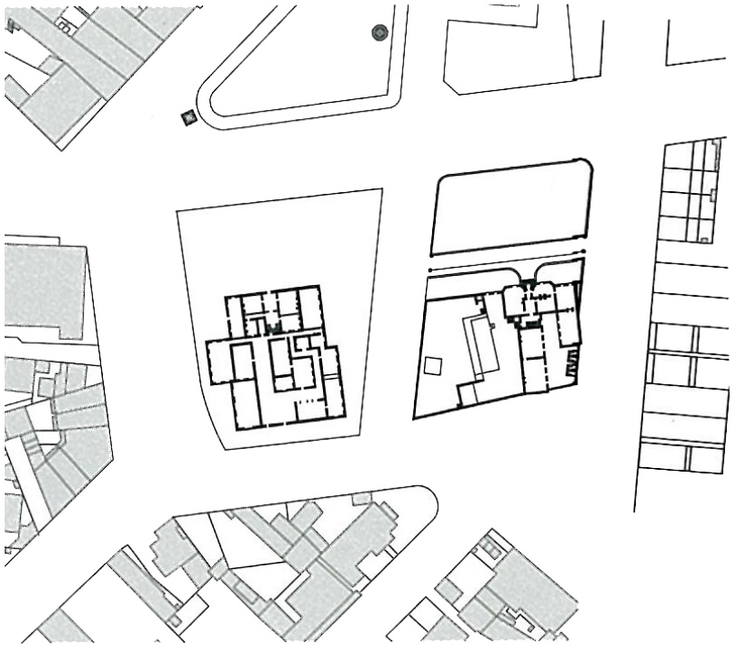

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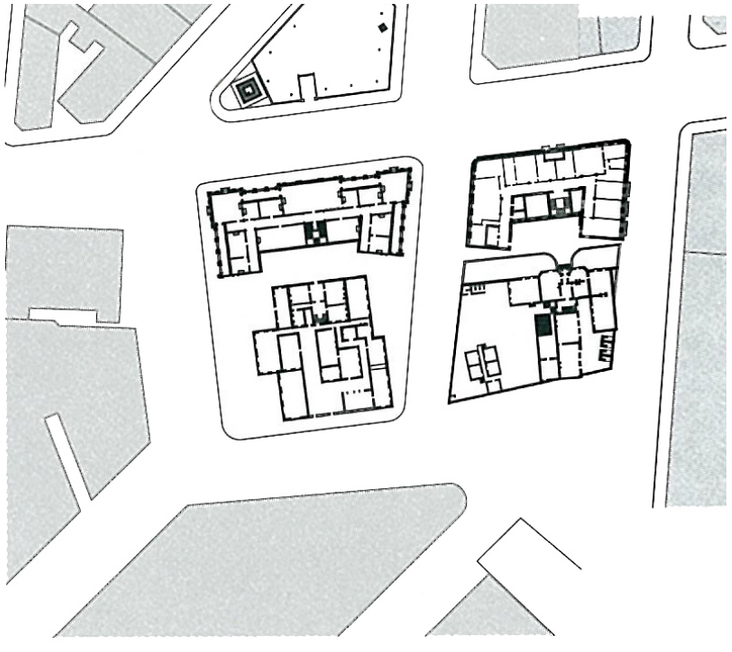

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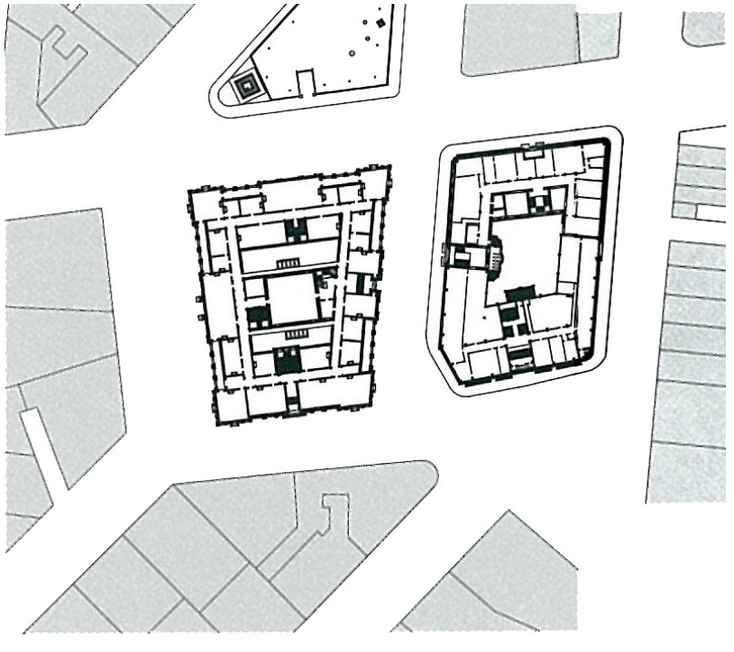


1893

The Education Building, being the lesser of the two buildings and for which was built in two components, is considered more suitable for greater intervention in its transition to the Heritage Hotel. The former open light wells of the twin buildings that formed a courtyard has re constructed as a grand public room. Incorporating the large rectangular sandstone construction of the Lands Building, the internal walls of the courtyard recall the striation of the Education Building's Façade while interpreting the composition of the opening of the former brick light wells. The Building therefore finds both its further evolution and perhaps completion and gives to the precinct a very distinguished place for the principal public activities of the overall hotel. Beneath this new courtyard is situated a new 540m2 Ballroom with a pre-function space beneath the new Loftus Street Square, for which provides a lower ground level connection between both buildings. The Heritage Hotel is aligned to have greater accessibility with 104 hotel suites circumscribing the Atria Courtyard culminating at the top with a new Wellness and Spa Facility in the former gallery, and with a roof top pool deck and bar.

The hotel considers the re-use of the four symmetrical entries of each of the existing buildings which occur on their bisecting axis. The hotel has three principal lobbies, each accessed discretely through the small but honorific entries, and each one responding to its urban context of streets and squares. The Lands Building's principal hotel entry is off Gresham Street, through the former 'Official's Entrance' or the former entry of the Director General of Secretary General. The reception occurs in a newly furbished central room beneath the 'Strong Room' and is experienced in ensemble with the light wells formerly used as carriageways for the transiting of officials by horse.

Gresham Street becomes the principal taxi drop-off, the public entry of Bridge Street is retained, and the formal entry from Loftus Street enjoys its new public square. The Heritage Hotel with the Education Building is not dissimilar with its public entry off Bridge Street, and its formal entrance into the Atria Courtyard from the Loftus Street Square and the main lobby for the serviced residences occurs from Farrer Place. The hotel place activities on five of its six frontages.

It is intended that Raffles Sydney works with an inverted programme. Activated public domain with outward facing restaurants and bars – including the new Raffles Long Room, interspersed with discrete entries access a rich and spectacular sequence of internal atria and courtyards which can corral the common and social activities of its residents with the more public functions of the ballrooms and function rooms. It is the very diversity of functions and the choreography of activities between the interior to that of its place that supports the financial performance of the hotel and its contribution to the City.

Rising out of the bounding structure of the courtyard walls is a proposal for elegantly proportioned and slender tower accommodating 216 serviced residences and apartments operated by Raffles. The tower rises 66 levels above the Education Building and includes a function at Level 20, overlooking Sydney Harbour, which operates in ancillary to the Ballroom and other hotel functions. The residences include their own roof top pool facilities and the uppermost column of the tower, just one apartment room width in dimension achieves the height of 283m AHD with a semi-enclosed function space.

The challenge to consider a tower is one not seen as opportunity but one of immense responsibility. For a tower to be considered above the Education Building, it must acknowledge the manner in which it relates to all the constituent parts of its urban context and immediacy to the Sandstone Buildings. The proposition for the tower acknowledges the ambiguity in intention of how to both conserve and renew. The tower begins by evacuating an envelope beneath the solar planes that shadow Chifley Square and the domain. It retains a setback to Bridge Street that situates itself modestly only in the foreground of Government Phillip Tower. It is setback to Young and Loftus Streets to maintain the slenderest of profiles and to allow the retention of views and sunlight to 1 Bligh Street. The base of the tower aligns to the base of the Governor Philp Tower. It achieves consistency in streetscape and the setback tower base gives sufficient separation so that the tower is read separately to the existing heritage fabric. The tower's slender form of vertically offsetting rectilinear columns gives an elegant profile to the floor plan of four apartments, while the buildings reach to 66 storey is provides a unique profile and silhouette that acknowledges the historical evolution o the skyline.

The building structure is based on a cruciform of sheer walls clad in sandstone which reveal themselves as the vertical columns terminate. The cantilevered floor slabs are also clad in sandstone and form a unified composition to the sandstone Courtyard and Ballroom beneath. The form of the tower really begins at the ballroom and extrudes vertically while be enveloped by the existing dimension of the courtyard. The residential apartments of the tower are enclosed within a ventilating sheath of clear glazing. The panels are cut on the diagonal and set ajar to allow the capturing of the breeze. The light of the sun and surface and edge together with an interplay of shadow produces a fractural sheen that recalls that of the glimmering surface of the harbour. It is a relationship of material and effect to place and climate that intends a unique contribution to the City's visual form.

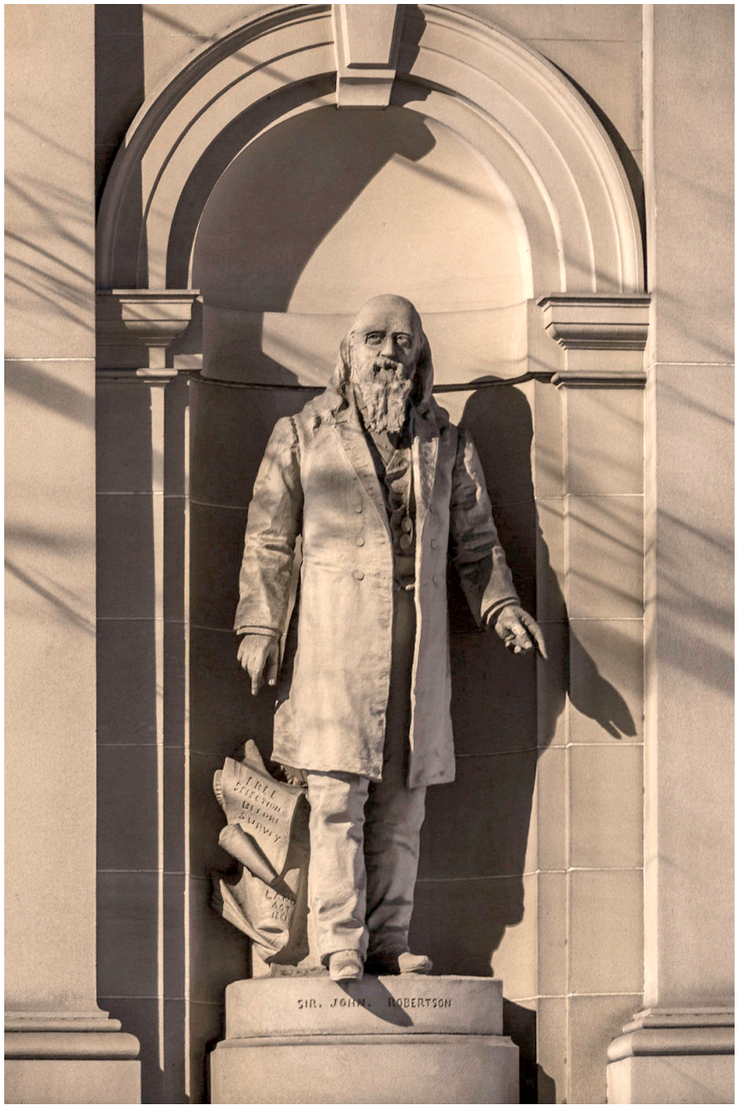
In considering the re-constitution of the Sandstone Buildings as the new Raffles Hotel Sydney, the proposal seeks to re-establish the historical significance of the site beyond its heritage fabric, by ensuring that this place of the first European settlement in Australian becomes once again its heart of interaction and encounter, and with buildings of distinguished presence. The public utility of the administrative offices is translated by the social activities of its spaces, enlivened new public spaces and courtyards, and rehabilitated historical streets and places. The Grand and Heritage Hotels provides Sydney the highest quality of hospitality which integrates an experience of history unprecedented within Australia. The proposition for the tower and its residences within, seeks to place itself within an evolving cityscape, where its proportion gives elegance, its sandstone structure substance, and the layering material effect of its glazed ventilating enclosure evocating the quality and play of light between harbour and sky.

# Heritage and Cultural Significance

The site of the Lands and Education Buildings has enormous cultural and heritage significance to not only Sydney and New South Wales, but also to the rest of the country. From the earliest days when the first settlers arrived the site was been selected and occupied by the colony's first surveyor and has subsequently been associated with the Government of NSW.

Today the buildings stand as some of the finest examples of Australian colonial architecture designed by the famous Government Architects James Barnet (Lands) and George McRae (Education). In their contemporary context, the buildings maintain their landmark status within the Sydney CBD. Their importance as public assets of the highest significance cannot be overestimated – they must be understood, appreciated, and celebrated. The opportunity for their adaptive reuse as luxury hotels should seek to embrace this history and allow the buildings to be experienced and enjoyed by the public in ways that may not have been possible in their previous incarnations as government departments.

This Scheme document will outline in detail the considered approaches the Proponent has developed to ensure that these assets will not only be protected as significant public heritage items, but also to celebrate and project them into their next evolution as two of Sydney's finest buildings.



# Raffles and Heritage

**Raffles Brand: Synonymous with Heritage**

For nearly 130 years Raffles has provided the warmest welcome, the richest experiences, and the fondest of memories. Today its legend continues internationally, from its first hotel in Singapore, to Dubai, Seychelles, Phnom Penh, Seam Reap, Beijing, Hainan, Manila, and Paris.

Raffles Hotel opened in 1887 with one hundred rooms in a bungalow overlooking the beach and South China Sea in Singapore. Soon its reputation for hospitality and quality of both product and service made it "the place" to stay. Over the years this 'Raffles Difference' surpassed that of its venue and destination, making it an iconic international symbol of what is a Grand Historic Hotel.

For a period of two and a half years Raffles Singapore shuttered its windows and doors for a complete restoration and re-development of this National Monument and its surrounds. During this time not only were the venerable structures restored and the facilities updated for the twenty-first century traveller, but further care and effort was expended to ensure that though such a process the unique heritage that had made Raffles Hotel a Grand Historic Hotel was not lost.

This learning from the past to take such a property into the future, became the credo of Raffles Hotels & Resorts for the g restorations and redevelopments of Grand Historic Hotels in Phnom Penh, Seam Reap, Monteux, London, Hamburg, Beijing, Paris, and soon… Sydney.

The restoration of Raffles Hotel, its surrounding facilities and amenities has become the gold standard for such undertakings in Greater Asia and internationally. The effort required to create or re-develop a Grand Historic Hotel is not a simple task. Most such properties did not start out as grand and historic, or even as hotels. Discovering the 'heritage' from which to build from requires an understanding of the community in which the property exists, as well as its past and current role in such a community. From here evolves the creation of the next chapter of its life, as a Grand Historic Hotel.

The Sandstone Precinct Assets with their long and illustrious heritage are a perfect fit to become a Grand Historic Hotel. Over the years these significant structures have housed some of Sydney's most creative and industrious minds as they conceptualised, planned, and often constructed much of the built heritage of greater Sydney and NSW, as well as guiding the education of its future leaders.

As the Raffles Sydney, not only will this heritage be respected, it is the foundation stone upon which our Consortium will build.

As an integral part of this process the story of the Lands and Education buildings will be expanded upon, with these historic venues being sensitively restored and made available more extensively for the enjoyment of a far greater spectrum of in-hotel, local residents, and visitors to the City of Sydney.

# Raffles Sydney

**A Grand Hotel unlike any other in the world**

The Raffles brand is proven to be well suited to heritage redevelopments. It is nevertheless paramount that the response to the adaptive re-use of the Sandstone Precinct assets not only carefully considers the specific heritage, fabric, and history of the two buildings, but that the new interventions acknowledge Sydney's unique history, culture, climate, and setting.

The Proponent will, upon the successful completion of its submission, and with the guidance / direction of the veteran Hotelier and Founding Chairman of the Raffles Group, work collaboratively with Sydney's premier architectural firm, as well as engage an Interior Designer of international reputation, along with its aforementioned iconic operator, to bring this exciting project to a most successful fruition.

It will be the Proponent and project team's focus to formulate a tailored and considered design response to the required new interventions into the existing building's fabric, retaining the heritage that is inherent to the buildings. A new paradigm in both service and product will be created which will establish a higher standard of luxury and hospitality for visitors to, and residents of, Sydney.

Coupled with the Raffles 'Total Lifestyle Environment' concept, Sydney's benign climate along with the open verandahs of the Grand Hotel and the pedestrianised areas surrounding the Raffles Sydney, provide for a number of opportunities to activate the buildings and surrounding precinct in a contemporary manner that embodies the lifestyle enjoyed daily by Sydneysiders.

The great sandstone façades of these buildings reflect a heritage evidenced throughout Sydney and represented in many other significant buildings such as the GPO, Town Hall, and the Chief Secretary's building among others. The experience of staying within a part of this sandstone heritage will be palpably felt and become part of the allure of the Raffles Sydney.

On a warm summer night, if you are sitting on its open-air verandahs / terraces, strolling along pedestrianised Loftus street, or enjoying a varied choice of culinary excellence, it will soon be apparent that you are in Sydney and at Raffles. .

RAFFLES
HOTELS & RESORTS

# Destination Precinct

### Site Location

In their current context, the buildings are ideally positioned for reuse as tourist accommodation. The Sandstone Precinct offers proximity to key tourist destinations such as Circular Quay, the Opera House, the Rocks, the Botanic Gardens, and the Sydney CBD. The site benefits from an integrated surrounding network of public transportation, including buses, rail and, in the near future, Sydney's new light rail system. All serve to further enable the successful operation of a new luxury hotel accommodation.

The buildings' imminent redevelopment into luxury hotels should also be seen within the greater context of redevelopment occurring around the northern edges of the CBD including the AMP redevelopment, 1 Alfred Street, and 182 George Street. This area of Sydney will be undergoing significant transformation in the coming years and therefore it is important to consider how the Sandstone Precinct revitalisation will positively contribute to this evolution of the City.

### The Concept

Given the Sandstone Precinct's ideal location and an understanding of the future surrounding developments, this offer seeks to establish the precinct as a pre-eminent tourist destination within the City attracting not only those who will stay within the hotels, but also drawing other visitors and residents to the hotel for its amenities and offerings.

To allow the two buildings to be understood as being part of a single Raffles precinct, the public realm surrounding the buildings becomes a vital contributor to the success of their adaptive reuse and interpretation as a precinct. This offer proposes a high quality and unifying hard and soft landscape that will support the establishment of a distinct identity to the precinct which prioritises pedestrian movement, outdoor dining opportunities, and public benefit and amenity.

These initiatives will greatly improve the character of the public realm which will benefit the City of Sydney, its residents, and its visitors alike. The drawing overleaf illustrates the intent to unify the precinct through its public realm approach.

The formation of this precinct also represents a vital heritage approach that this proposal has established which seeks to utilise the food and beverage and other amenities within the ground floors of each building to outwardly engage and activate both the surrounding public realm and, importantly, the perimeter and interior spaces of the Lands and Education buildings. This heritage activation approach will ensure that the buildings' character and history are available for a greater degree of exposure to the public and their guests.

# Public Realm and Landscape:
## Defining the Sandstone Precinct

**Loftus Street Public Realm**

This offer welcomes the opportunity to partner with the City of Sydney to create a new pedestrianised public realm between the Department of Lands and the Department of Education buildings along Loftus Street. The Proponent recognises the current transport plans for the bus network situated immediately around the buildings and understands the enormous complexities in resolving the bus network as it passes through and terminates near this area of the CBD. However, the Proponent believes there would be great benefit to the City if a solution could be found that allows for the pedestrianisation and activation of Loftus Street within the Sandstone Precinct. Such a solution would provide a tremendous opportunity for all to enjoy the well-proportioned space between these two great buildings, giving greater exposure and understanding of the historical setting of the Sandstone Precinct.

To sufficiently activate this new proposed public realm for the City, food and beverage outlets have been located on the terraces of the Department of Lands building accessed from the Loftus street entry. Within the Department of Education Building, the existing carriageway entry is proposed to become a small outlet catering for both activities within the internal atrium and the proposed outdoor public space.

**Farrer Place**

The proposal's intent seeks to concentrate the activation of the public realm within Loftus Street allowing the character of Farrer Place to remain much as it is today. A discrete porte cochère entry to the Department of Education building is located on the Farrer Place entrance and will have little impact on the existing pedestrian movements through Farrer Place.

Consideration has also been given to improve and activate Farrer Place which greatly benefits from being well situated between the Governor Philip and Macquarie Towers, 1 Bligh Street, and the new luxury hotels.

The Proponent is mindful of the status of the listed palm trees within Farrer Place and does not propose their removal, but would look to partner with the City of Sydney to consider ways of improving the small kiosks and surrounding area beneath the listed palm trees to improve the character and quality of this protected outdoor public space.

### High Quality Public Realm and Landscape

Critical to the success of any public realm is the quality of hard and soft landscaping elements that form the palette upon which we predominantly experience our urban open spaces. Keeping in mind the public nature of the surrounding areas of the Sandstone Precinct, the Proponent would welcome the opportunity to develop the surrounding landscape proposals to both improve the quality of the existing public realm and to help instigate the reading and definition of the Sandstone Precinct.

The Proponent would like to explore the potential of using sandstone paving within the Loftus Street public realm to give further context and connection through the use of appropriate materials. Such a use of sandstone would assist in the establishment of the precinct identity and create a recognisable and distinct new public realm for the City of Sydney, benefiting from the setting between these two great buildings.

**Macquarie Place Park**

**Phoenix Canariensis**

# Public Buildings Made Publicly Accessible

### The Department of Lands

Whilst the two buildings have always been publicly owned assets, the ability for the general public to experience the grandeur of their interiors has been limited. The opportunity now exists through their adaptive re-use to open up a far greater proportion of their interiors throughout the buildings and to offer an increased understanding and appreciation of these historically significant spaces that were previously limited in public access.

As discussed previously under the 'Destination Precinct' heading, the proposals for both heritage assets seeks to greatly increase the public engagement these buildings offer through an outward reaching activation that attracts people to the buildings and brings them into their interior. This external activation forms a crucial principle of the heritage approach which promotes the public awareness of the buildings, their reincarnation as a Grand Hotel, and invites their storied history to be made more evident.

Importantly for the Department of Lands Building, the old carriageway entry and pathway will be re-established allowing the public to experience and understand the original building function and spatial configuration. At ground floor, the original extent of the carriageway will be read by visitors as they freely pass through the lobby level which is proposed to be restored to its original, open arrangement of spaces.

Significant historical fabric such as the surveyor's tape base in the ground floor corridor will be evident and celebrated, whilst the terraces to Loftus Street will be activated by cafés and restaurants.

The two grand central staircases will provide public access to the proposed Interpretation Centre within the central strong room on Level one. This dedicated space will present a well-crafted narrative of the building's rich heritage, contributing to the public's awareness of these great buildings.

Through exposure to the restored heritage building fabric and significant moveable heritage items, the story of the building and its significance dating back to the days of the first settlers will be publicly told and become an integral part of the hotel experience for all to enjoy.

Also key to the public accessibility of the heritage buildings is the intention to offer regular curated tours of the two buildings, with special and additional events to coincide with Open Day Festivals.


**Department of Lands -** Bridge Street Entrance (top)
**Department of Lands -** NSW Contour Map (bottom)


**Department of Lands -** External Terrace (top)
**Department of Lands -** Surveyor's Tape Base (bottom)

**Department of Lands -** Central Stair (top)
**Department of Lands -** Observatory (middle)
**Department of Lands -** Mapping Room (bottom)

# Public Buildings made Publicly Accessible

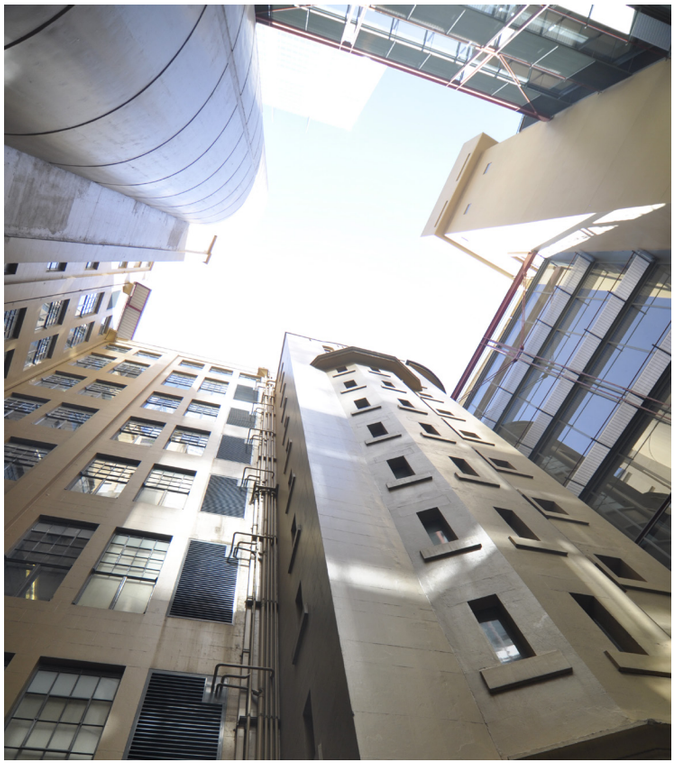
### The Department of Education

The Department of Education Building also benefits from having multiple entries on three frontages which will encourage circulation through the building that currently only affords public access into the entry foyers. The elaborate marble interiors of the Bridge Street and Farrer Place entries will no longer represent the extent of a typical visitor's experience of the building, but rather be the first step into the many great spaces the building contains within.

Similar to the carriageway within the Department of Lands, the existing carriageway entry within the Department of Education will provide activation to the adjacent spaces of the exterior public realm within Loftus Street and the interior lobby atrium.

The opportunity to utilise the current gallery spaces on Level 7 as a Wellness Centre and Spa, open for public use and memberships, will further increase public accessibility to one of great heritage spaces at the top of Education building.

The greatest potential for public accessibility will be within the grand lobby set within the re-established central courtyard. This space will be open for the general public to enjoy and will be activated by a number of food and beverage outlets over multiple levels. It also will provide the main access from Loftus Street into the ballroom located directly below the courtyard lobby, thus allowing all function guests to experience the newly formed courtyard space. The existing scale of the Education courtyard provides an excellently proportioned space, filled with daylight and will, through a well-considered design resolution, establish one of the great interior public spaces Sydney has to enjoy.



**Department of Education -** Loftus Street Entrance (top)
**Department of Education -** Existing Courtyard (bottom)

**Department of Education -** Central Stair (top)
**Department of Education -** Level 7 Gallery (bottom)

# Facilities Overview Programme
## Principles and Vision

# Hotels within a Hotel

## Hotels within a Hotel

The Raffles Sydney is a +6 star international standard hotel that has been conceptually segmented into three differentiated entities with their own targeted end–users, as well as intuitively paired facilities and amenities.

The 'Hotels within a Hotel' concept allows for the maximisation of focused usage of accommodation areas, by fine-tuning operations and creating a viable massing of facilities and amenities. Furthermore, each hotel is detailed to meet and exceed the expectations of its client base, focused on providing the facilities and amenities that the end-user expects, and where appropriate will be willing to pay for.

The Sandstone Precinct naturally fits with the 'Hotels within a Hotel' concept through the existing relationship and distinction between the Department of Lands and the Department of Education buildings. The third proposed component outlined within the Option Scheme provides further balance to the successful operation of the concept by introducing a complimentary offering from those contained within the heritage assets.

Importantly, each component of the concept benefits from the other through their natural differentiation in offering, market and amenity. The design proposal has considered an approximate total 235 hotel rooms across the three components.

## The Grand Hotel

Located in the Department of Lands Building, The Grand Hotel consists of approximately 50 individually rentable and connected suites. This grand historic hotel offers accommodation ranging in sizes from 55 to 180 square meters with an average suite size of approximately 78 square meters. The Grand Hotel will be predominately an 'all suite' hotel with the accommodation categories including Landmark, Personality and Sandstone Suites.

## The Heritage Art Hotel

The Heritage Art Hotel located in the Department of Education Building, will consist of approximately 120 individually rentable accommodation modules with an average size of approximately 48 -50 sq meters. Having accommodation modules of a more traditional size, the Heritage Art Hotel will be comprised of Heritage Suites, Artist Suites, and State Rooms.

## The Raffles Residences

### Option Scheme

The Raffles Residences will be hotel centric apartments with complete pantries, located in the new tower above the Department of Education and consist of 80 individually rentable 1 bedroom apartments measuring approximately 80 square meters each. This modern accommodation offering provides a unique component within the 'Hotels within a Hotel' concept catering for guests that which to experience the great view the precinct has to offer in a more modern offering.












**Grand Hotel - Landmark Suite Lounge Room Visualisation**

# The Grand Hotel

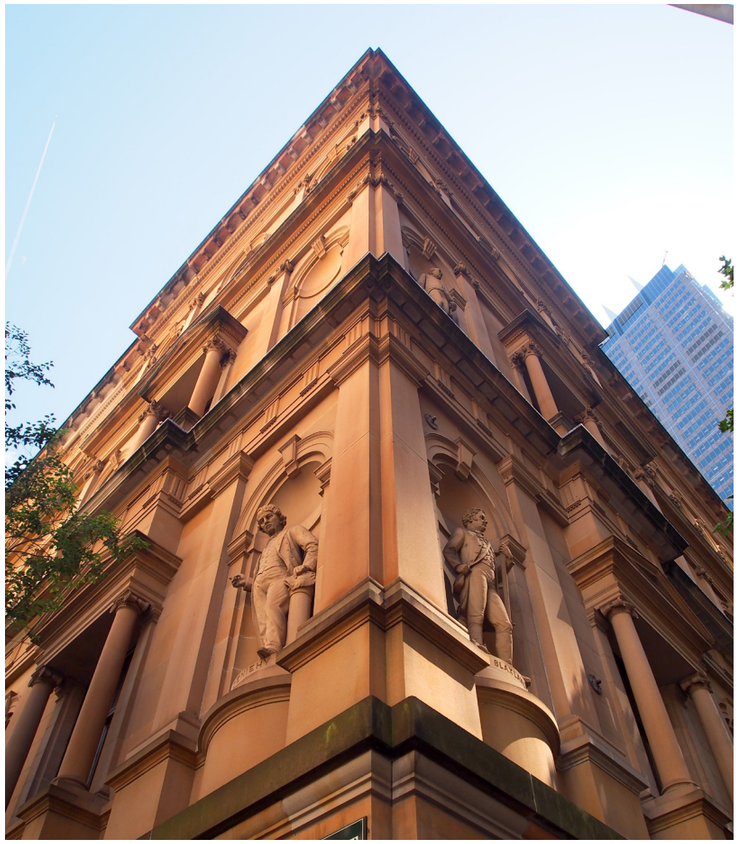
## Heritage Principles and Approach

Great care has been taken in the design of this proposal for the Department of Land's building to restore the two atria to their original extents including, the ability to read and interpret the original carriageway through the ground floor spaces. The newly reinstated atria will flank a central reception area providing an accessible, open configuration of space that both offers guests the grand hotel experience expected of Raffles and contributes positively to understanding the building's unique heritage.

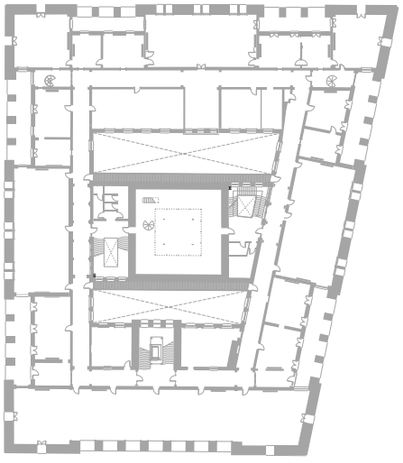
Areas of historical importance within the Lands Building, will where ever possible, be accessible to the public and if is not possible, due to security or other reasons of this nature, such access can be made available through the Hotel's Lifestyle Concierge.

The unique architectural roof scape of the Lands Building will be formally preserved and restored. The wonderful spaces that fall within the vaulted domes of the Observatory and East and West Wings have conceptually been considered to allow for expanded access to patrons from the public, as well as in-hotel residents.

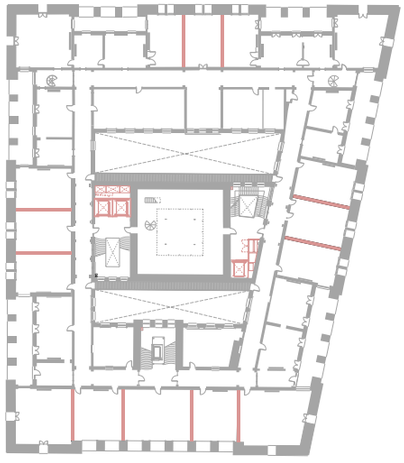
Within a typical floor of hotel suite accommodation, the proposals have sought to predominantly utilise existing walls and door locations to create the room arrangement on each floor. In existing larger open areas, sensitively located new walls will be placed to align with structural elements and window locations to allow the existing spaces to be better configured for hotel use and to preserve original proportions and detailing. These new walls also offer great opportunity to discretely service the rooms with a minimal impact to the existing fabric.



**Department of Lands - External Façade Detail**



**Existing Heritage Fabric -** Plan Diagram



**Proposed New Fabric (black) -** Plan Diagram

# The Heritage Hotel

### Heritage Principles and Approach

The more modern Department of Education building represents the more economic approach taken to public buildings of the era in which it was designed and constructed, with the external sandstone façade installed as a cladding rather than a loading bearing structure like its predecessor across Loftus Street. Similarly, the design internal courtyard took on more of a utilitarian approach, even receiving criticism from the Public Works Committee at the time claiming 'the back view of the building was far from appealing.'

Principally, the concept proposal for this submission suggests the façades of the internal courtyard be given the same value, importance and experience as the beautiful external façades received as we look establish a grand new space for Sydney whilst ensuring the Department of Education remains a significant heritage asset and landmark.

Both the Base Scheme and the Option Scheme within the Progressive Offer structure consider the interior materiality, scale and significance through the introduction of sandstone clad walls which bring the texture and charm of the building's exterior into the interior of the courtyard. This proposal elevates the current secondary interpretation and experience of the internal courtyard fabric to an equal status with its respected exterior.

To acknowledge the building's history and current display of art throughout its interior, the Consortium will be focusing on the heritage use of the building and developing a lifestyle / arts / culture approach which is compatible with both its historic and present uses.

Over the years, there have been several extensive renovations of the Education Building to update its suitability for the needs of that time. These renovations have considerably altered many areas of the original internal fabric, leaving fewer areas of great internal character to draw upon.

Unlike the Department of Lands, the configuration of rooms within the typical floor plate of the Department of Education will benefit from a largely unconstrained interior. As a result, the rooms within the Heritage Hotel will be both more uniformly arranged and smaller in size to provide a different type of offering from that of the Grand Hotel.

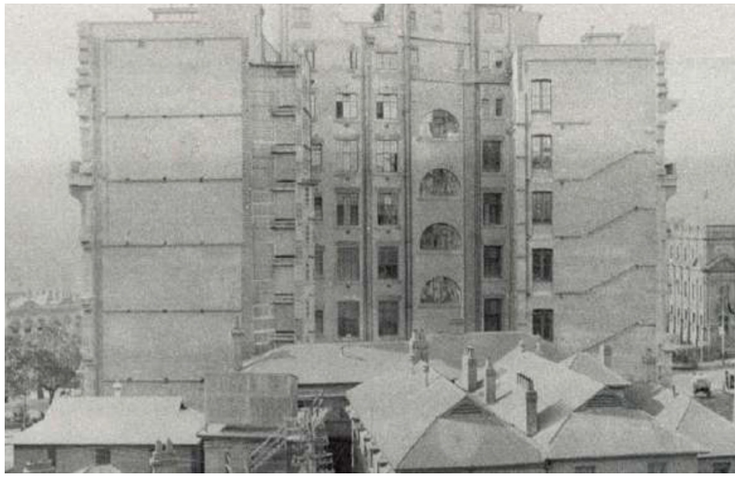
Like the Department of Lands, areas of high or extreme heritage significance are proposed to remain with sensitive adaptations to bring the spaces up to modern code compliance and to the level of finish expected of a luxury hotel.

**Department of Education -** External Façade Detail (above)
**Department of Education -** Proposed Courtyard Lobby Visualisation (opposite)

# The Heritage Hotel

## 'Elevating' the Courtyard Experience

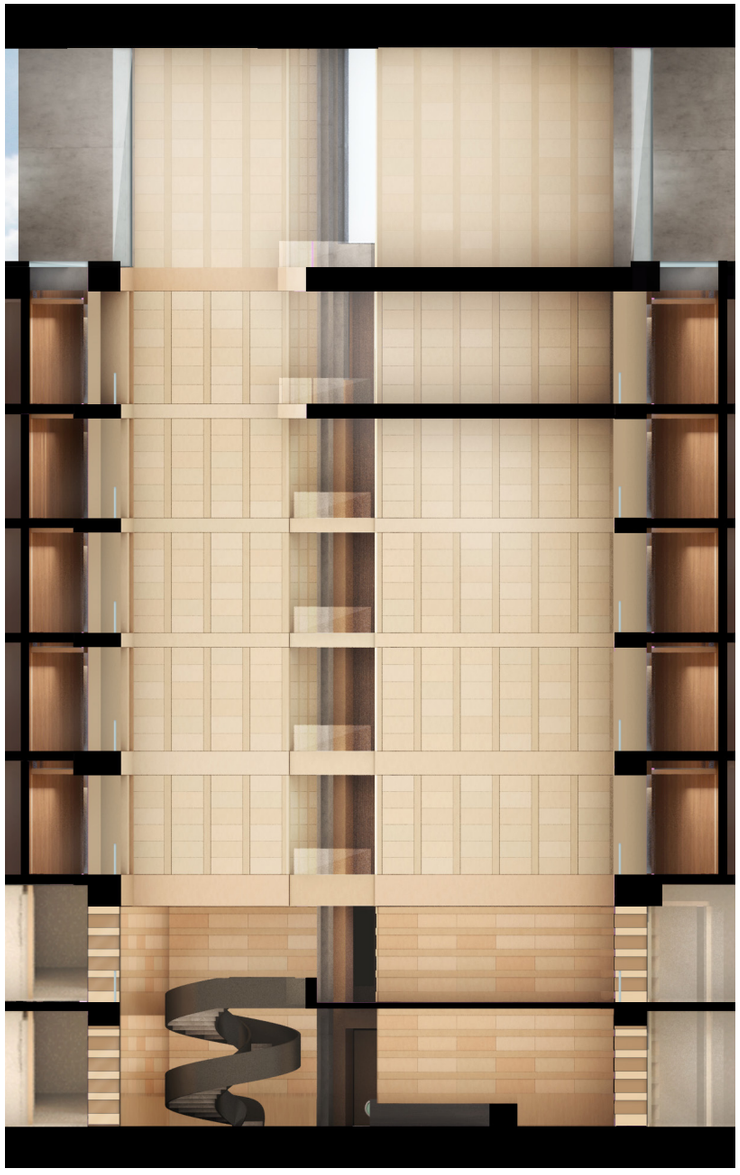
The below illustrations represent the intention to bring the internal reading of the courtyard walls to the same level of quality and materiality given to the existing external façades. To reflect the building's exterior, the courtyard walls suggest a more textured use of sandstone at its base and transitioning into a more smooth textured application at the upper levels. The introduction and reinstatement of archways denotes their use in both the existing external façades and originally within the courtyard.



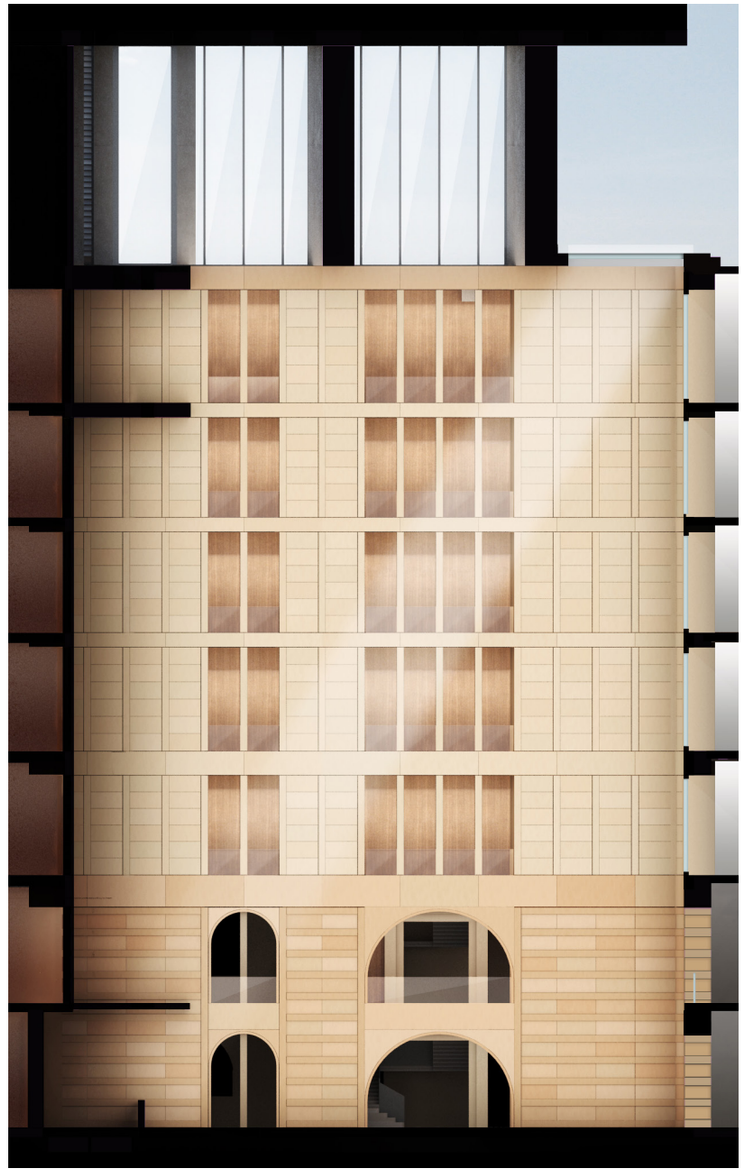
**East Internal Elevation**

**North Internal Elevation**

South Internal Elevation



West Internal Elevation




CIRCULAR QUAY RAILWAY STATION
Marriott

# The Raffles Residences

## Option Scheme

The consideration to place a tower above the existing Department of Education building has been rigorously conceived to ensure the proposals address the many issues that impact upon its proposition.

As outlined in the introduction, the inclusion of a tower has several benefits to the State, the City of Sydney, and the hotel operator.

- Increases number of hotel rooms by 60 keys
- Meets objectives of SEARS
- Increases employment opportunities
- Greater financial return to the State
- Benefits NSW economy in long-term
- Increases capacity to contribute to improving public realm
- Promotes residential activity within CBD
- Raises Sydney's status as global city through elegant and iconic tower

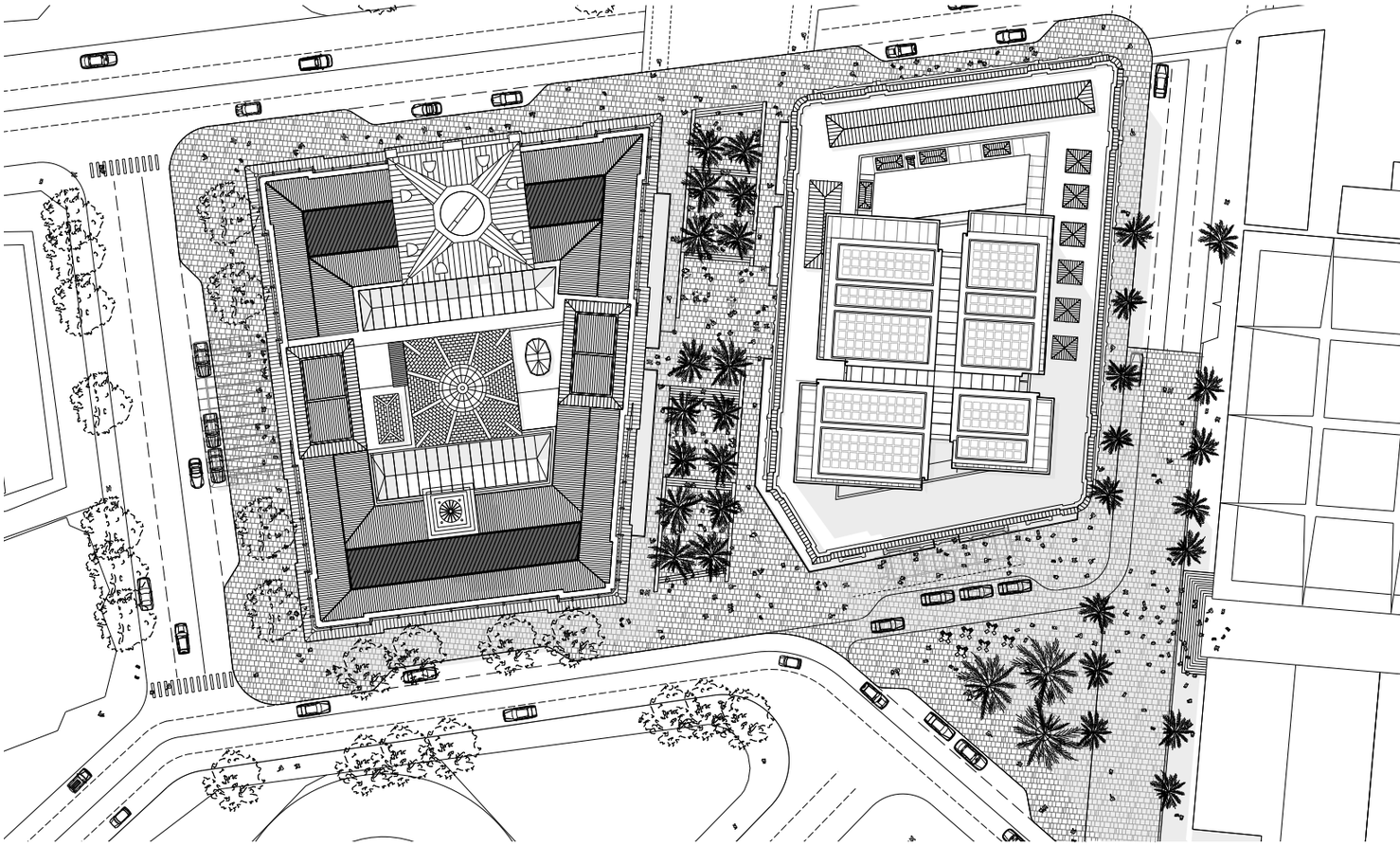
The following section details the formation of the tower design as a thorough response to context and heritage.

# Strategic Considerations

The proposal of any tall building in a dense urban context in necessarily a complex exercise in understanding and balancing the many factors that impact upon an urban form response. In this situation, the additional consideration of heritage impact upon the Department of Education building is also fundamental in formulating a design proposal.

The following sections outline in detail the methodology and considerations given to the design development of the proposed tower including:

- Buliding Envelope and Solar Access (Overshadowing)
- Floor Plate Configuration
- Bridge Street and Precinct Setbacks
- Contribution to the Skyline
- Building Setbacks (Heritage Reading)
- View Sharing
- Street and City Integration
- Floor Space Ratio



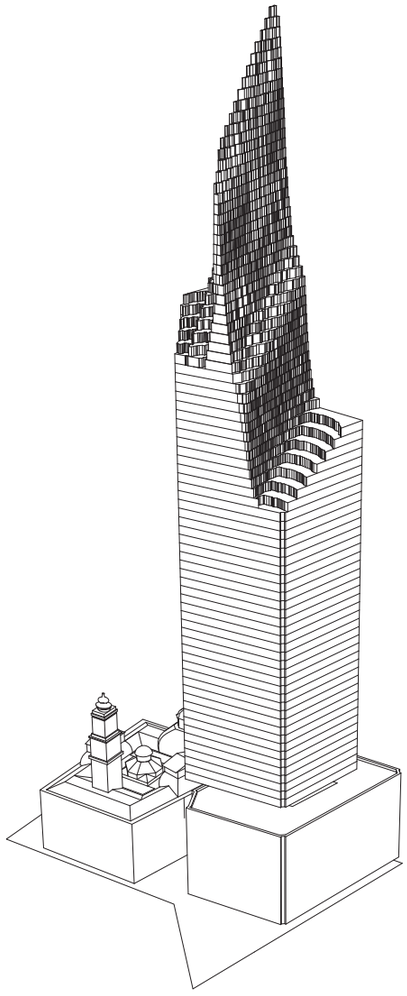
# Planning Principles:
## Building Envelope and Solar Access

**Chilfley Square Overshadowing - Sydney LEP 2012 Clause 6.19**

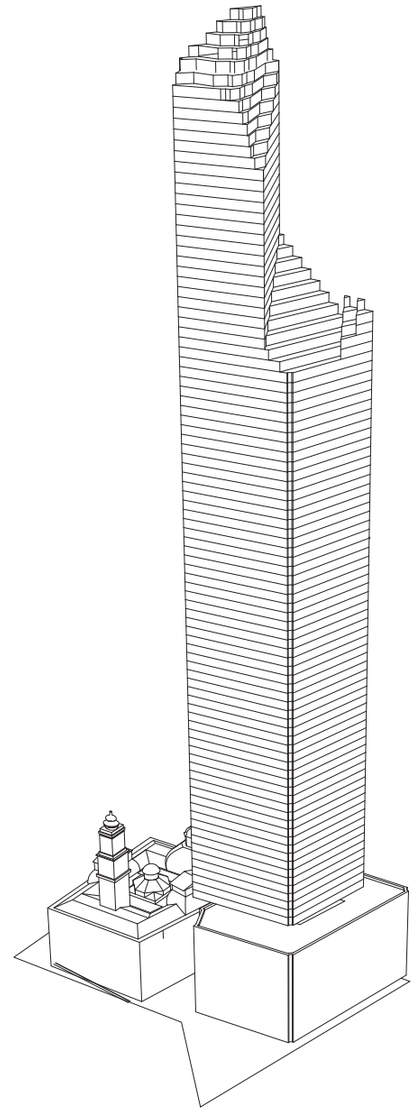
Extensive modelling has been undertaken to construct a 'Solar Envelope' based on the LEP Clause 6.19 protecting Chifley Square and other significant public spaces within the CBD. Using the same methodology to generate the Solar Envelope for 333 George St., the analysis considered each half-hour increment between 12:00 and 2:00 PM from the 14th of April to the 31st of August. This set of 700 different instances produced an maximum building envelope that ensures no further overshadowing to Chifley Square.

**Domain Sun Access Plane - Sydney LEP 2012 Clause 6.17**

The below diagram represents the potential building envelope established through the provision of Clause 6.17 in the Sydney LEP protecting sun access to the Domain. The envelope is far greater than that established through the application of the Clause 6.19 protecting Chifley Square shown adjacent.



**Chifley Square Shadow Envelope**



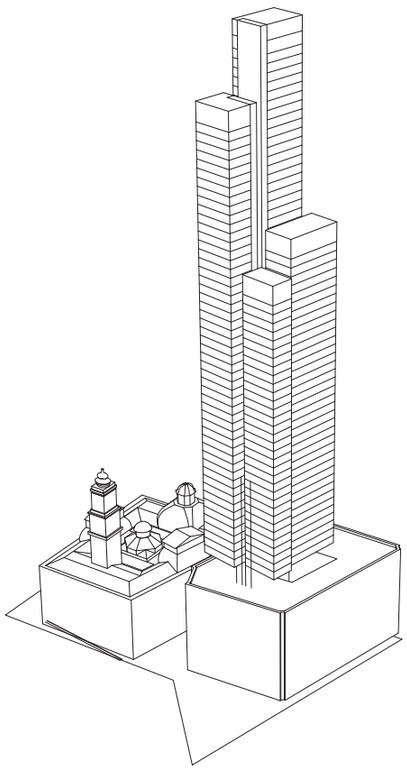
**The Domain Shadow Envelope**

**Tower Massing 01 - Max RL 252  AHD (67**

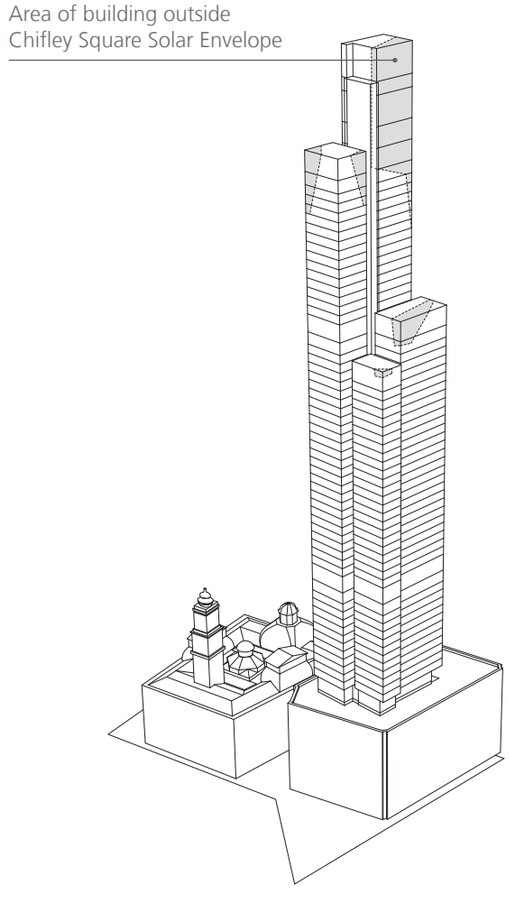
Measuring 67 storeys including the existing Department of Education at its base, the form of the tower sits wholly within the Solar Envelope created for Chifley Square and therefore causes no areas of additional overshadowing.

**Tower Massing 02 - Max RL 283 AHD (74 Storeys)**

The proposed form of Tower Massing 02, extends the Tower Massing 01 quadrants maintaining their proportional relationships to the point at which the tallest quadrant touches the Domain Solar Envelope.  Standing at a height of 283 metres above AHD, this slender and elegant tower form extends 74 storeys (including the existing Education building) and contains some areas of proposed built form that would project outside of the calculated Solar Envelope governing Chifley Square.  However, when evaluated in detail, the proposed tower height created an area of additional shadow over Chifley Square in only 15% of the 700 instances examined.



**Tower Massing Proposal 1**




**Tower Massing Proposal 2**

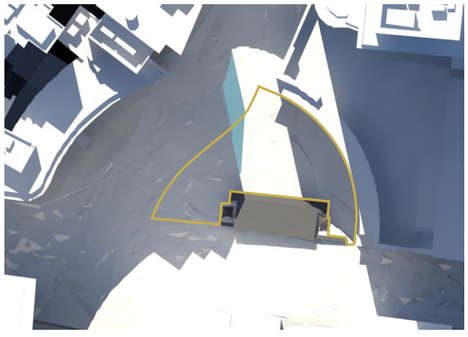
# Planning Principles:
## Building Envelope and Solar Access

### Chiefly Square

The following shadow diagrams illustrate in summary the 15% additional impact the taller tower option presents over Chifley Square. Due to the sun azimuth at 12:00 and 2:00 PM through these months, there are no instances where overshadowing occurs at these times. Therefore, those times have not been illustrated below as there is no additional impact.

In many instances the shadows from the proposed tower fall on top of existing buildings or within a small area of Chifley Square. The below shadow diagrams illustrate the impacts on Chifley Square from the proposed Tower Massing 02, taken from the 14th of April and monthly until the 31st of August, covering the nominated period outlined in Clause 6.19 of the Sydney LEP 2012.

**April 15th**



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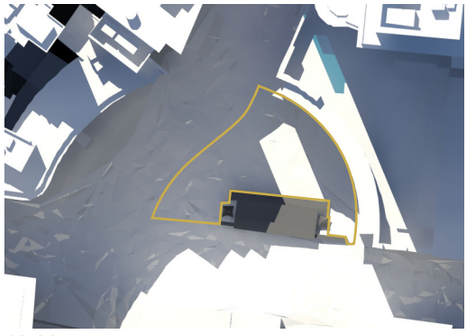

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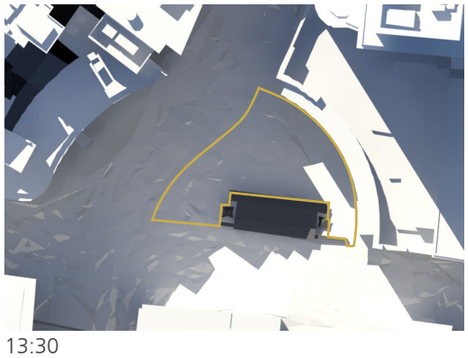

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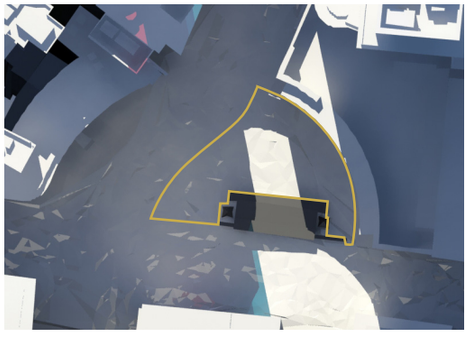
**May 15th**



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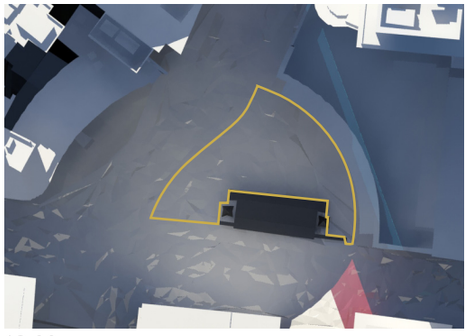

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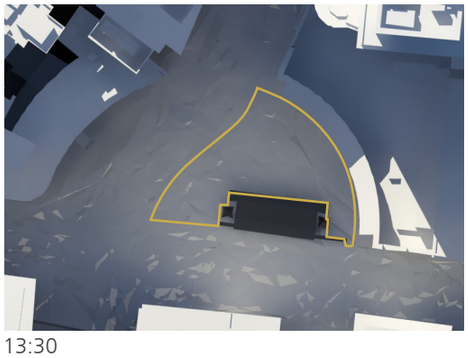

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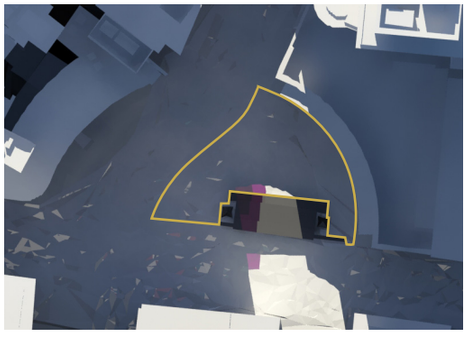

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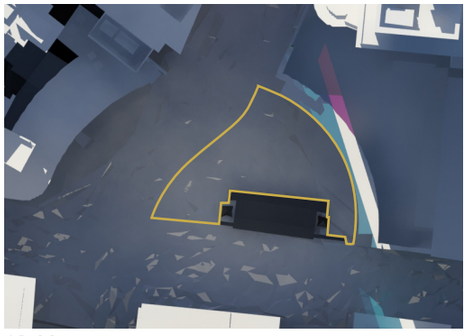

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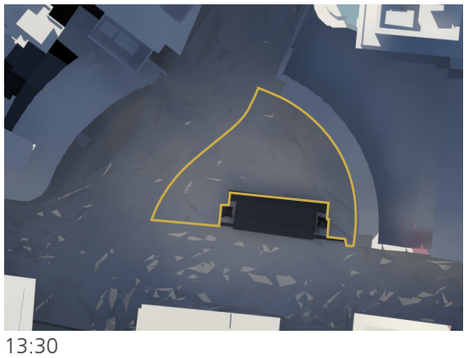

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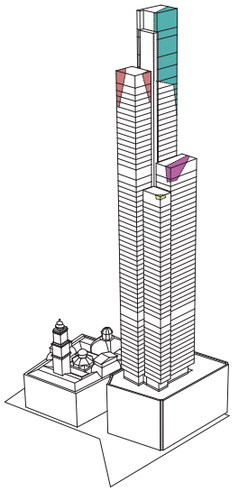
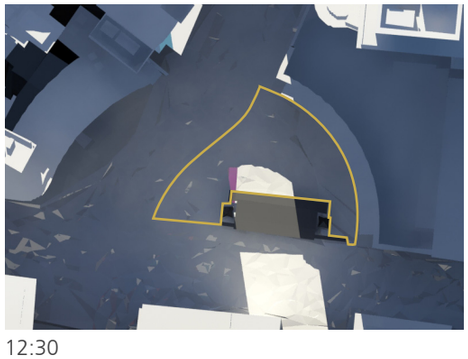


**Areas of Tower Massing Outside Solar Envelope**
Colours Correspond Shadow Diagrams Below

- No additional overshadowing between 12:00 and 2:00 PM from 14th April to 31st august.
- Only 15% additional impact overall from 14th April to 31st august.

**July 15th**



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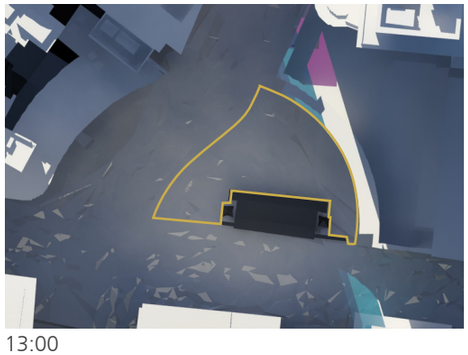

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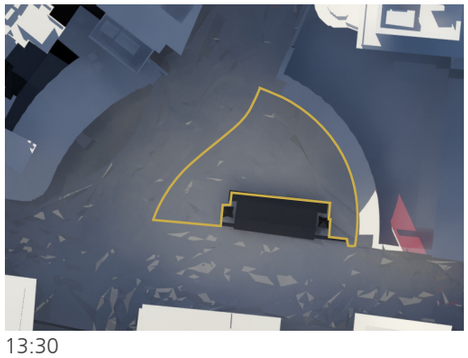

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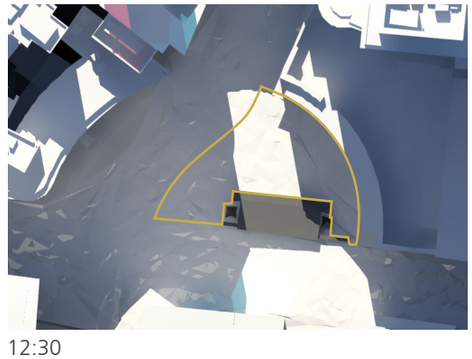
**August 15th**



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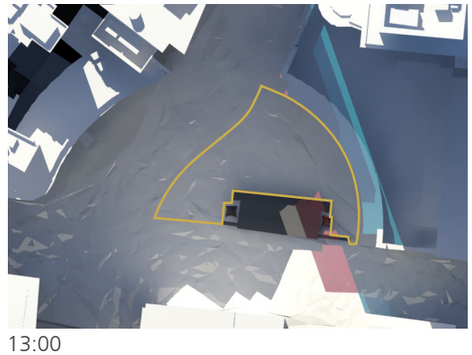

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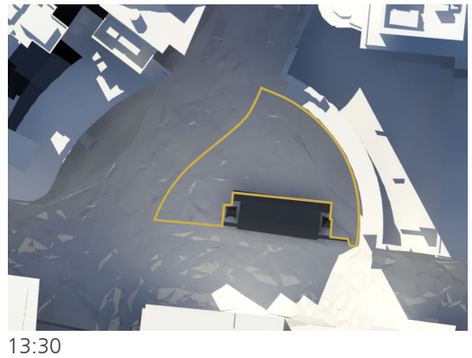

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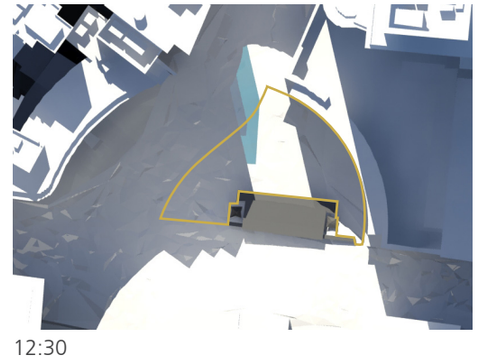
**August 31st**



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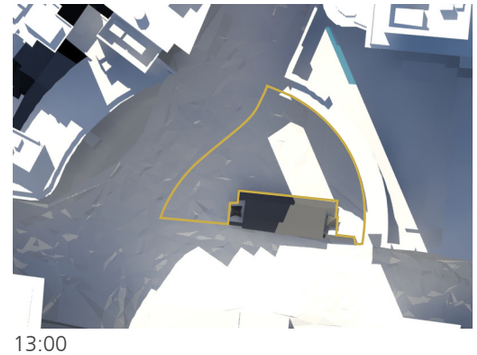

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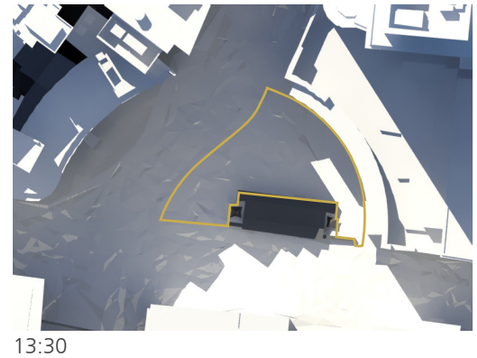

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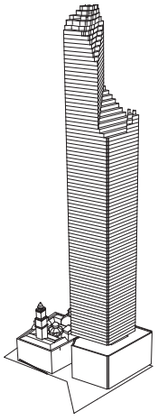
# Planning Principles:
## Building Envelope and Solar Access

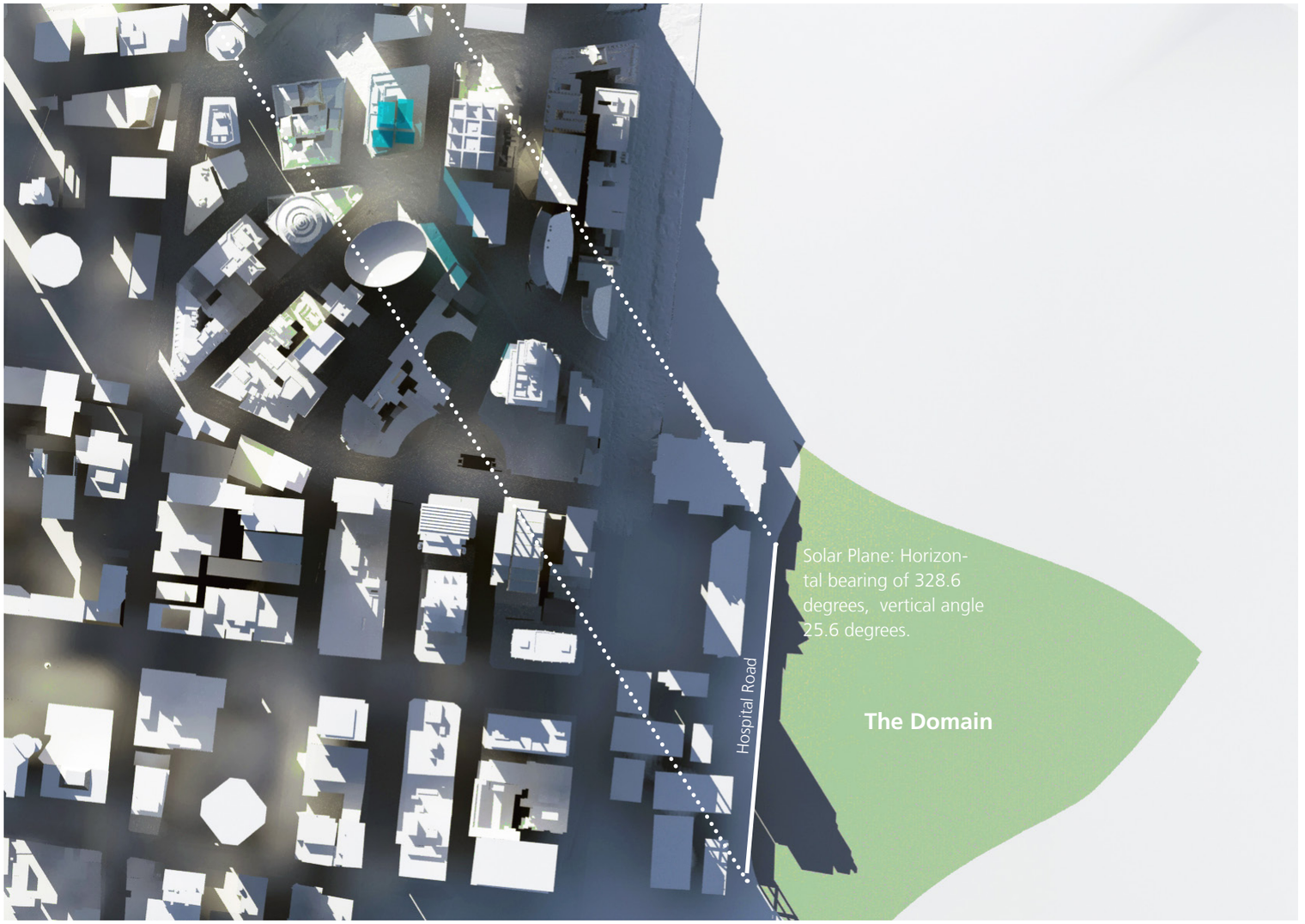


### The Domain Sun Access Plane

Clause 6.17 of the Sydney LEP 2012 establishes a Sun Access Plane and sets out the restrictions of overshadowing to the Domain. The clause nominates a plane based on the sun angle at 2 pm on the winter solstice. The proposed form of the tower reaches up to this limit but keeps below the plane so that no overshadowing occurs across the Domain at this time.

- There is no impact on The Domain at 2pm on the Winter Solstice

**Additional Overshadowing**

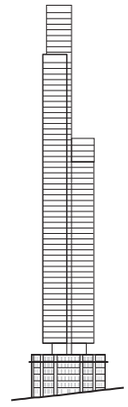


# Planning Principles:
## Building Envelope and Solar Access

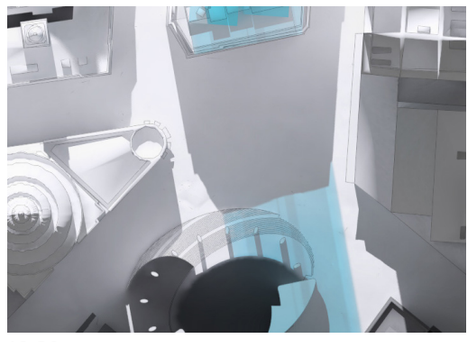
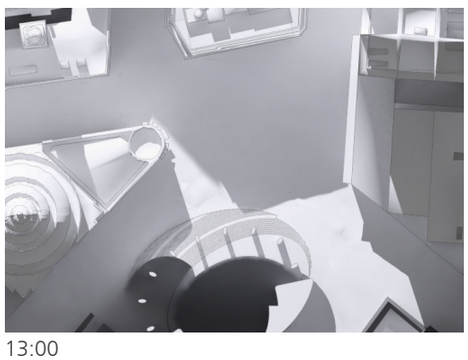
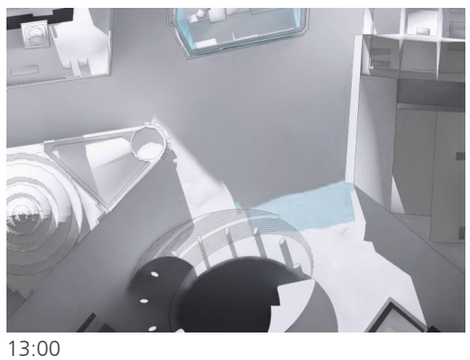
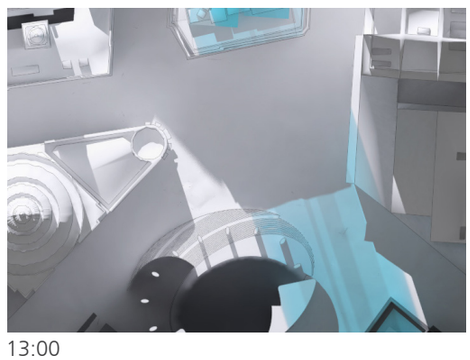
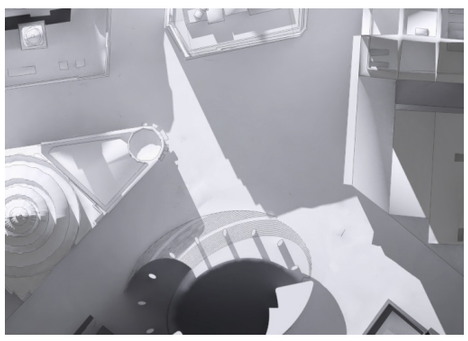
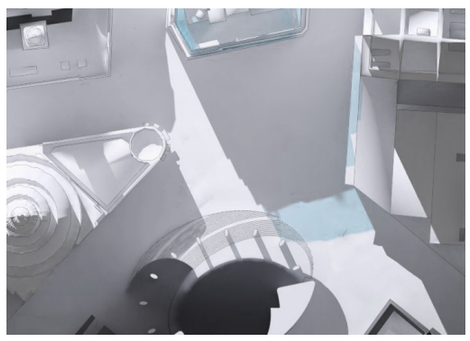
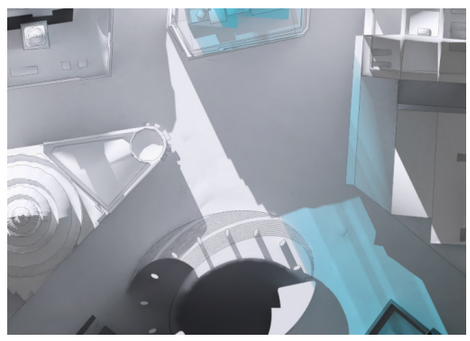
**1 Bligh Street**

As a key public space, the area under 1 Bligh Street has been evaluated to determine the difference in impact between the existing situation, the proposed Base Scheme envelope and the proposed tower envelope of the Option Scheme.

- Impact of the tower overshadowing has very little additional impact than that of the base option massing envelope to the overshadowing of the Bligh Street steps at this time



**Additional Overshadowing**

| Existing Education Building | Base option | Tower option |
|---|---|---|
|  |  | |
|  12:30 |  12:30 |  12:30 |
|  13:00 |  13:00 |  13:00 |
|  13:30 |  13:30 |  13:30 |

# Planning Principles:
## Floor Plate Configuration

**Key Moves**

The response to configure a hotel and residential floor plate over the Department of Education building initially sought to provide all units with a north facing aspect benefiting from both sunlight and uninterrupted views to the harbour.

Whilst this satisfied the intent to maximise the northern façade extents from an apartment amenity perspective, it also generated impacts to the surrounding context which could be addressed and mitigated in an alternate response while retaining the desire for views and amenity.

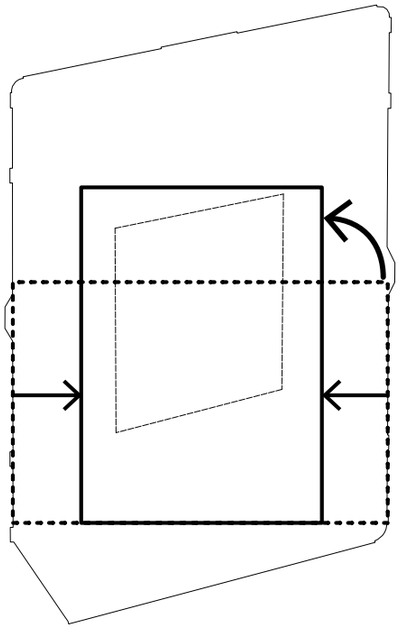
The first key move rotates the floor plate orientation from an east / west alignment to a north / south alignment. This rotation provides greater setbacks to the existing building below on the east and west elevations and assists with view sharing concerns from buildings to the south of the site.

**Central Structural Cruciform**

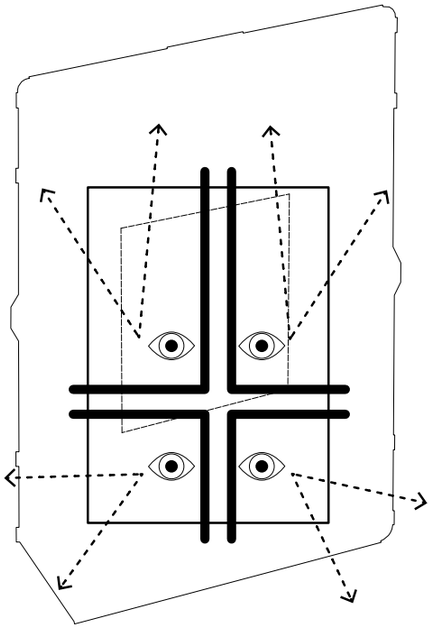
To capitalise on the fantastic views from the building, a structural system for the building was conceived that placed a rigid cruciform structure within the centre of the floor plate allowing the perimeter of the buliding to be less encumbered with structure.

The central cruciform structure naturally creates 4 distinct areas for hotel rooms and apartments to be configured within.

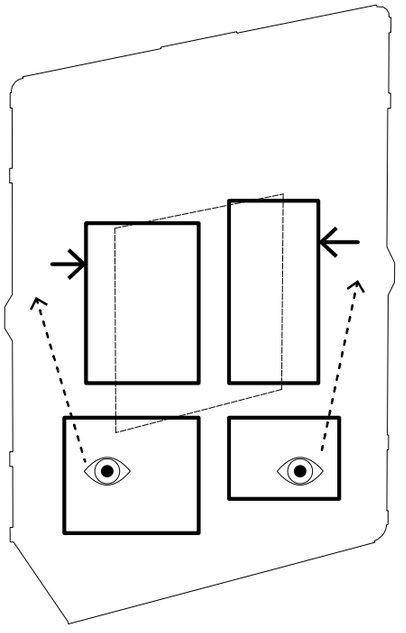
The next strategy sought to adapt the regular modules through setting back the two northern modules to allow the two southern modules to be afforded oblique views to the harbour from the perimeter loggias. This strategy allowed all modules to gain benefit of harbour views whilst minimising the width of the tower form.



**Floor Plate Rotation**



**Central Structural Cruciform**

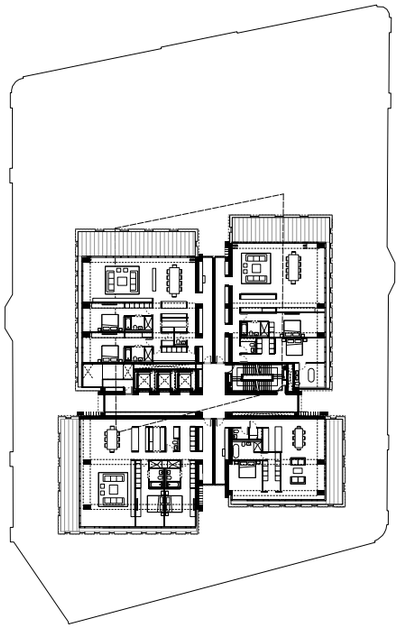


**Fine Tune Apartments**

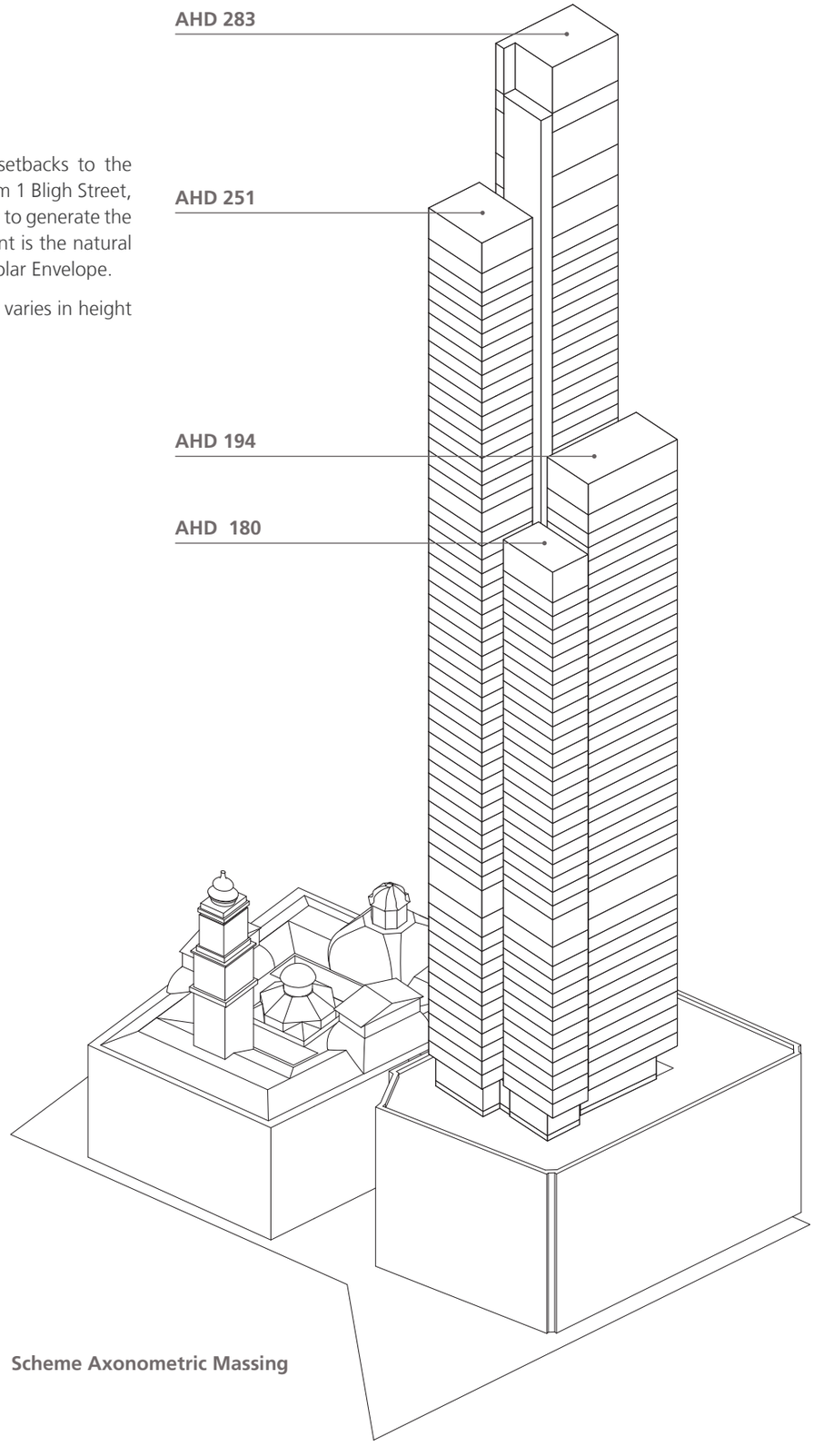
**From Floor Plate to Tower Form**

Having configured the base floor plate to primarily address setbacks to the Department of Education building and view sharing analysis from 1 Bligh Street, the tower quadrants are extruded upwards to the Solar Envelope to generate the building's formal response. The varying height of each quadrant is the natural outcome of the intersection of the tower floor plate with the Solar Envelope.

The outcome produces an elegant and slender tower form that varies in height as a direct response to the overshadowing analysis.



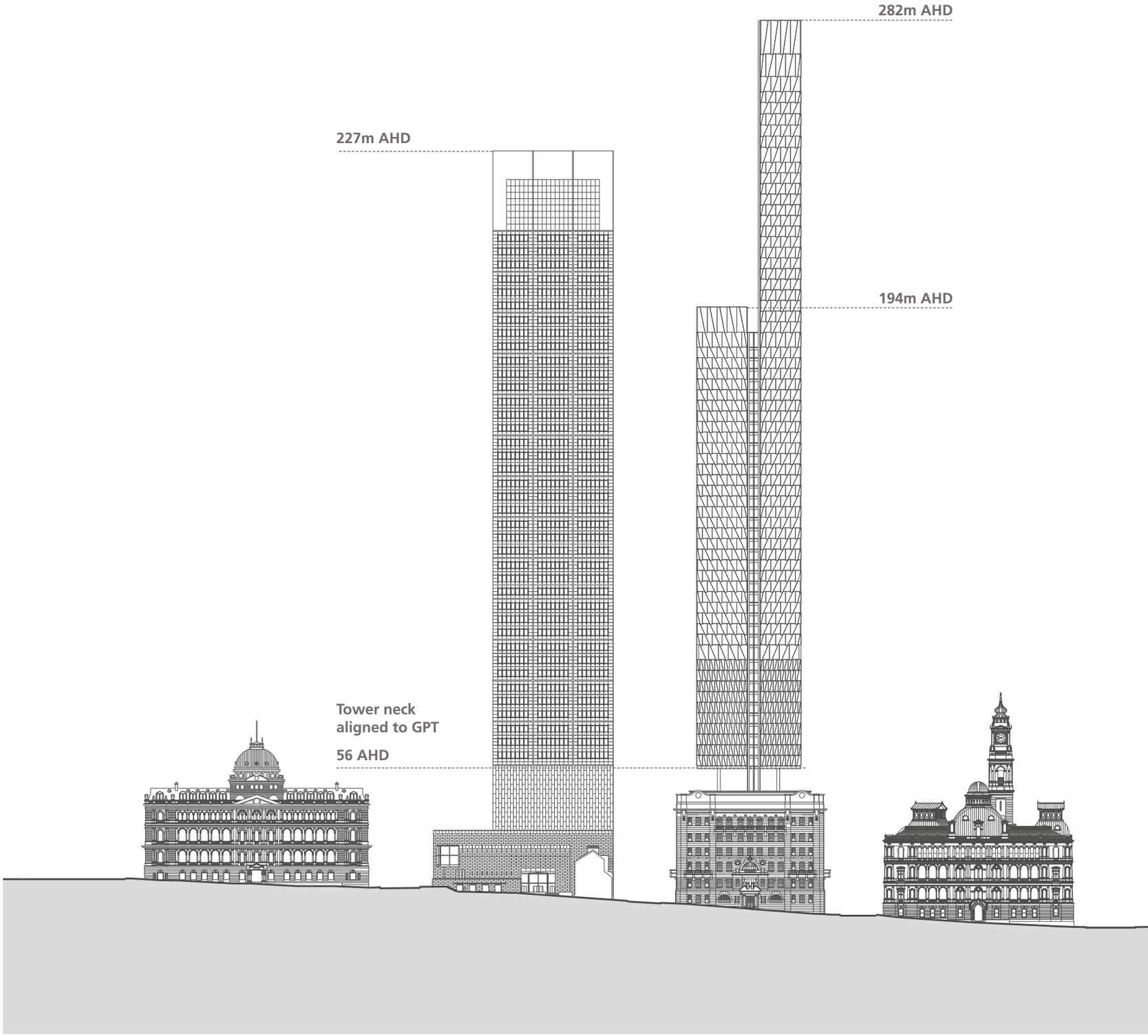
Typical Tower Floor Plate



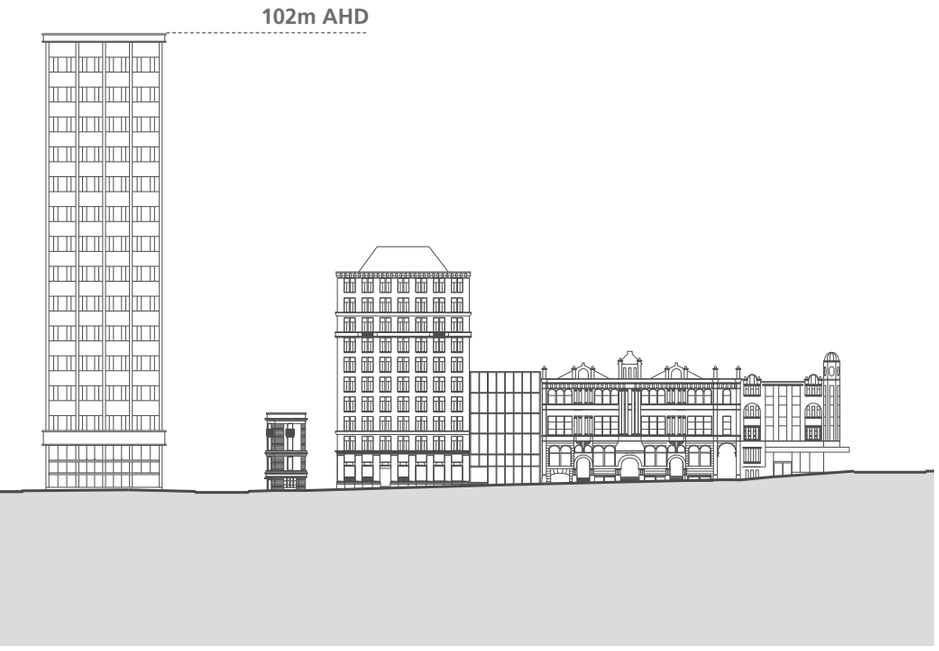

Scheme Axonometric Massing

# Planning Principles:

## Setbacks to Education Building + Relationship to GPT



In response to its existing urban context, the tower has a number of proposed relationships that help situate the tower formally. Maintaining the distinction between the proposed tower form and the heritage base of the Department of Education building is a critical formal gesture to achieve. The design proposal elevates the bottom of the tower to align with the adjacent soffit of the Governor Phillip Macquarie tower, striking a datum that picks up this strong contextual reference.



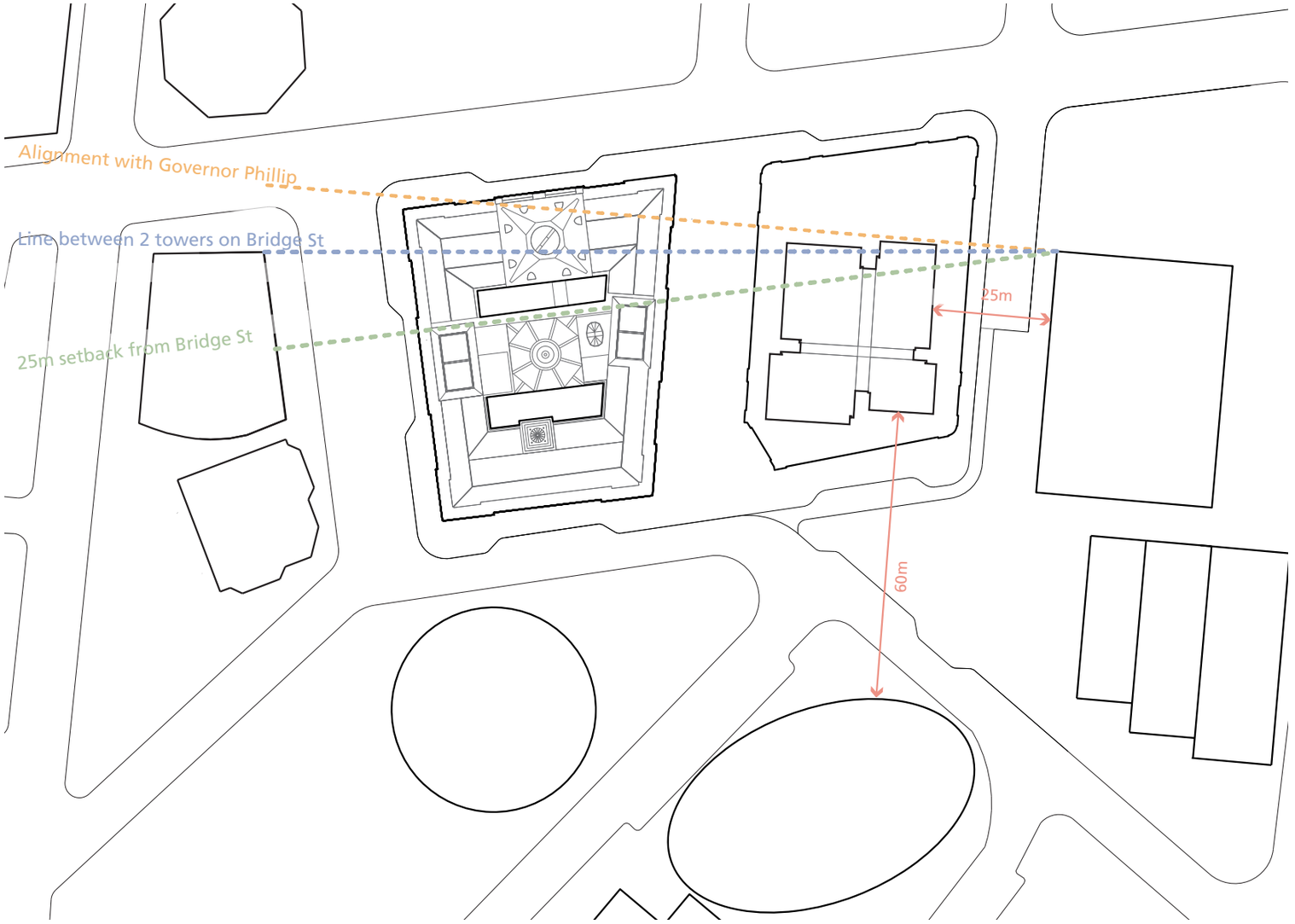
# Planning Principles:
## Precinct Setbacks

**Setbacks to Bridge Street**

The City of Sydney DCP establishes a 25m setback to tower forms, along Bridge St generally - noting no provision for additional form over either the Department of Lands or the Department of Education.

Whilst the design proposal does not fully respect the intended 25m setback along Bridge Street, it recognises the visual line established between the northern elevations of the Governor Phillip Macquarie tower and 56 Pitt Street and situates the tower within this perceived alignment as demonstrated by the diagram below.

The adjacent image demonstrates the minimal impact of the proposed building location on the street-scape of Bridge Street as the tower form is visually situated between the two existing dominant built forms along the southern side of the street.




**Setbacks to Bridge Street**
Visualisation looking east toward site

# Planning Principles:
## Contribution to Skyline

**Configuring Sydney's Skyline**

In 1971, the City of Sydney released its Strategic Plan for the city which included Policy 14, a specific section addressing Sydney's emerging urban form and how it might 'improve the appearance of the City from afar and from within in harmony with the City's unique topography and character'.

This vision document included the below diagram that illustrated the intent to 'emphasise the City's natural topography, and protect and enhance the drama of the City's skylines by encouraging the erection of the tallest buildings along ridges.'

The site of the proposed tower above the Department of Education falls within this strategic intent and would not only add further emphasis to the cluster of tall buildings including the Governor Phillip Macquarie and AMP towers, but its extremely slender proportions would serve as an elegant contrast to the bulkier forms the its neighbours.

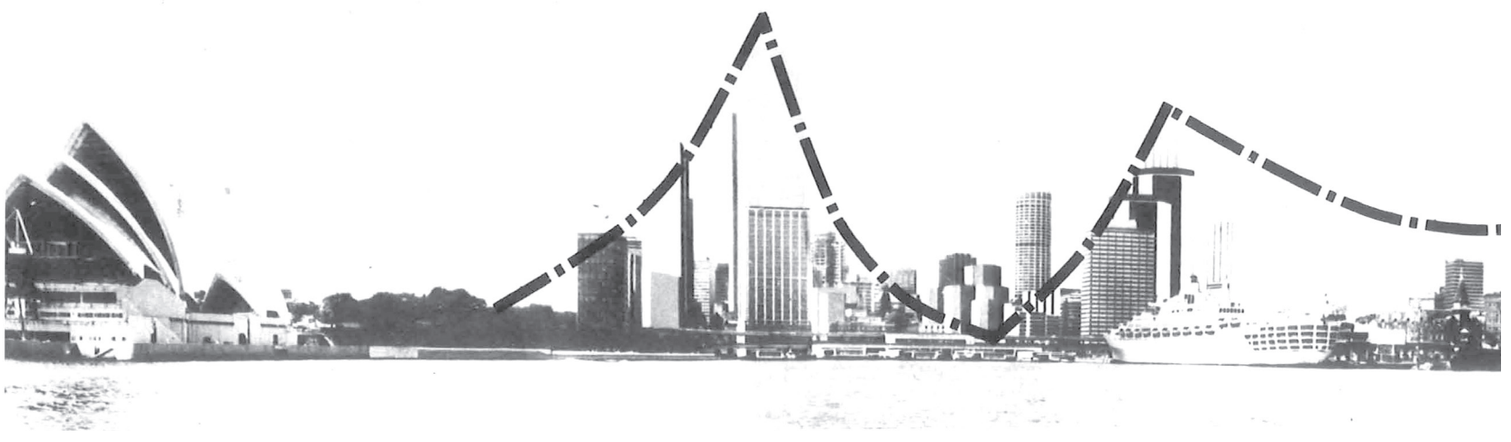
**The Sandstone Precinct Cluster**

Our perception and awareness of the built form of Sydney reveals the realisation of these strategies outlined decades ago and evidences the natural ridges and valley that formed Sydney Cove

The below diagrams illustrate the cluster of buildings running along the ridge of Macquarie Street, effectively creating a cluster of buliding height very near the peak illustrated in the previous diagram taken on approach to Circular Quay.

The adjacent painting by F. F. delineavit depicts the low lying base at the centre of City cove and flanked by the natural topographic ridges to the east and west.

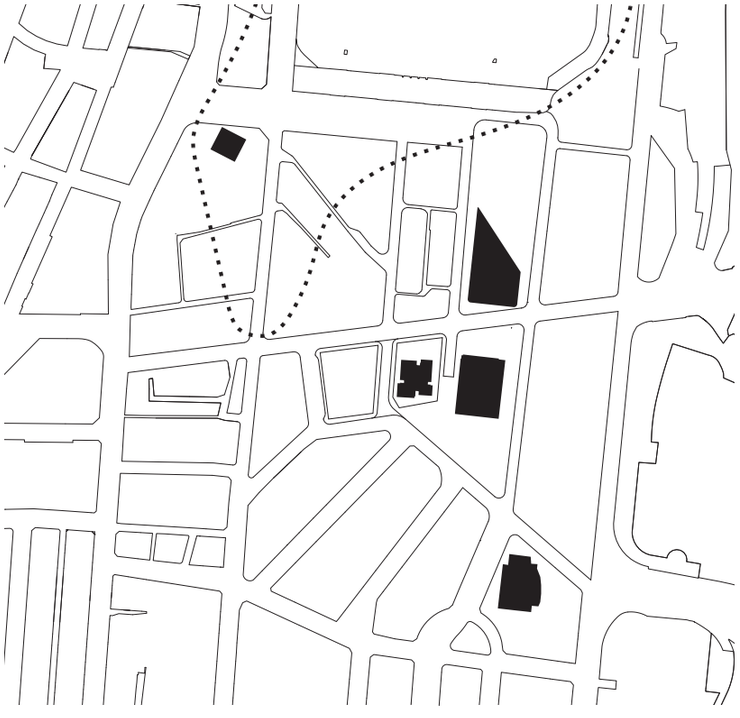
**City of Sydney Strategic Plan 1971 - Urban Form**



**Building heights to step back from Circular Quay**
City of Sydney Strategic Plan 1971


**Sydney Cove, Port Jackson in the County of Cumberland**
F. F. delineavit, 1769

**Plan of City at RL 90m**



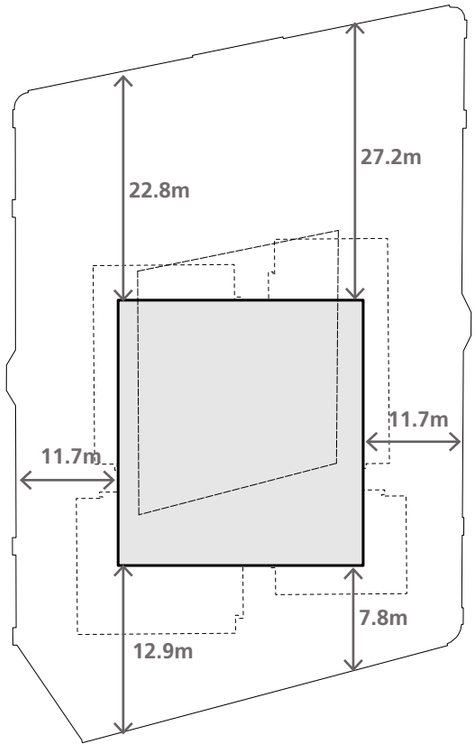
**Plan of City at RL 190m**

# Planning Principles:
## Setbacks to Education Building

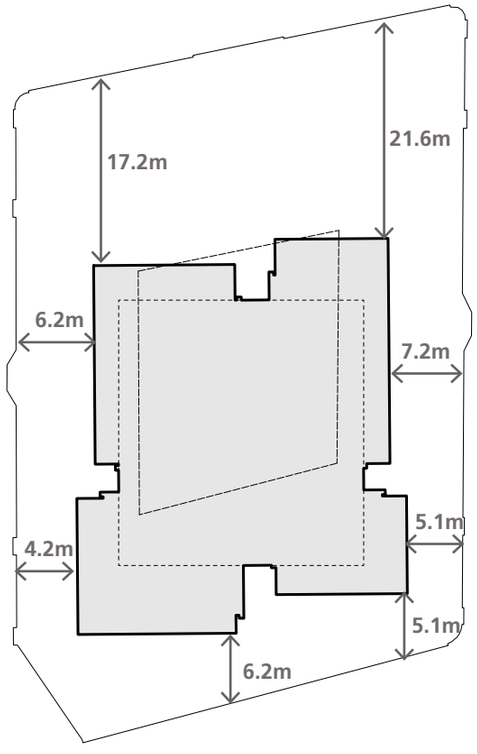
To further accentuate the distinction between the tower and heritage building, generous setbacks both to the tower above and to neck of the tower below are provided to create a clear reading of the two building components. The inset neck of the tower reduces the tower's footprint as it lands on the existing structure.

As demonstrated in more detail later within this section the structural transfer zone of the tower lands on the perimeter of the internal courtyard walls, transferring the tower's loads through the courtyard and into the ballroom below.

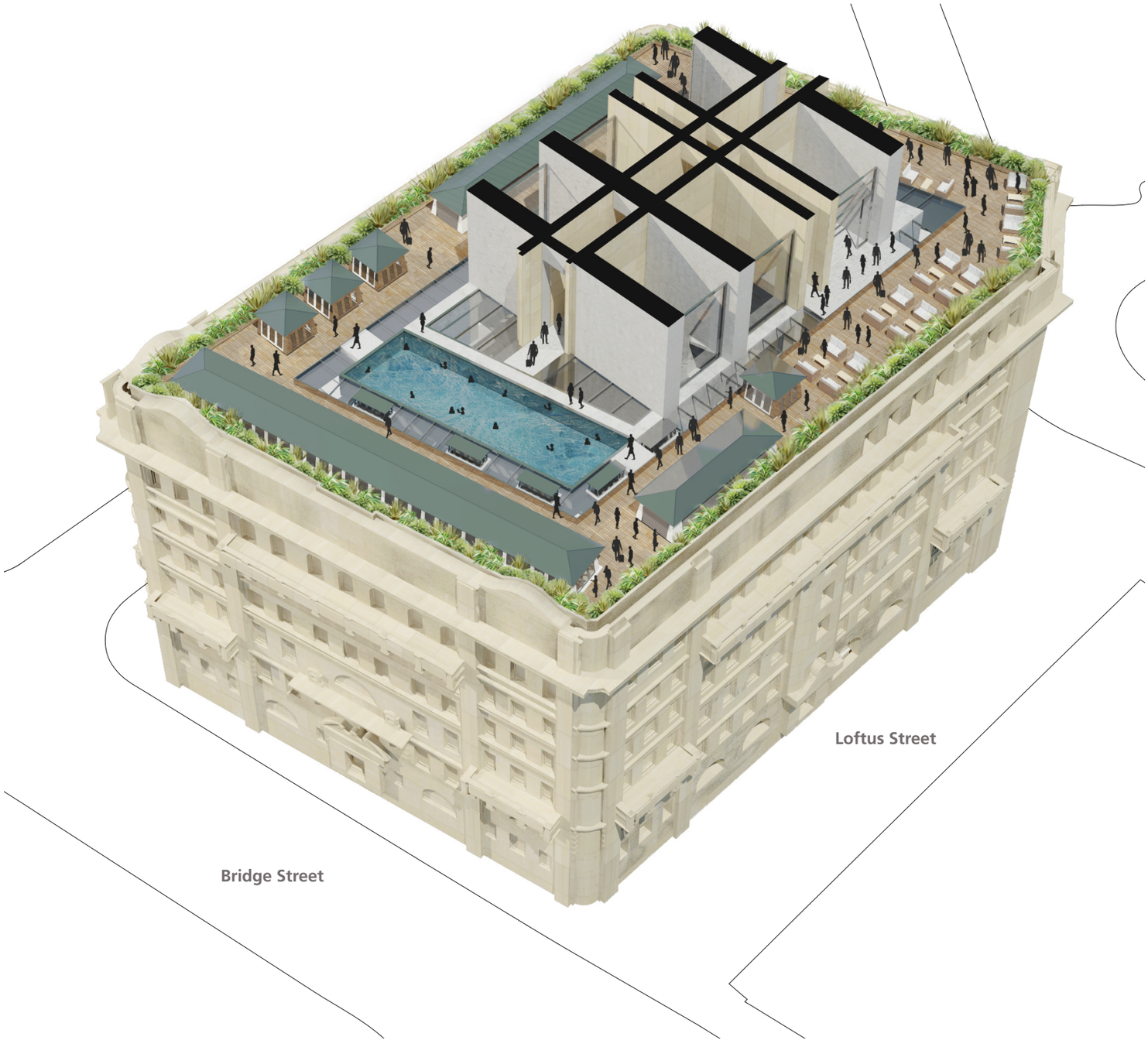
Also of note are the generous setbacks provided to Bridge Street on the northern face of the building. The generous setbacks not only respond to the greater context of urban form along Bridge Street, but they also situate the tower asymmetrically to the southern portion of the existing courtyard allowing a greater proportion of northern light to fill the interior.




**Setbacks to Tower Neck**




**Setbacks to Tower**


Loftus Street
Bridge Street

# Planning Principles:
## View Sharing

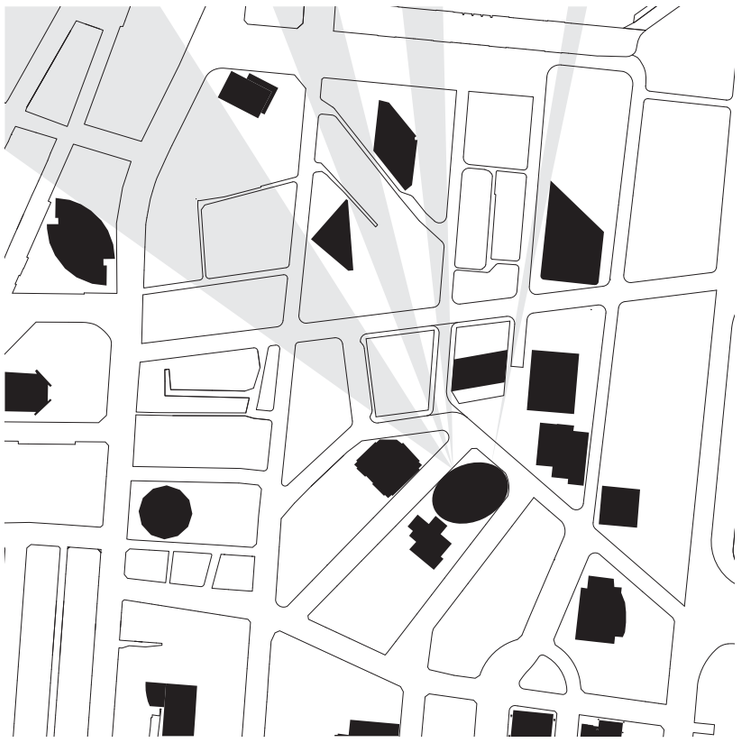
**Impact of Initial Tower Floor plate**

As previously outlined, the initial floor plate configurations considered maximising the northern exposure to capitalise on the harbour views afforded from the tower. However, this initial floorplate was determined have to great of an impact on loss of view from 1 Bligh Street.

**Impact of Current Tower Floorplate**

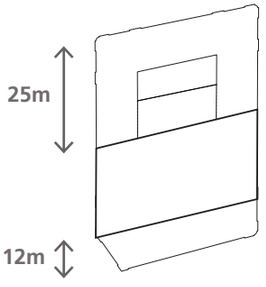
The proposed tower floor plate minimises the building width in the east / west axis and results in an increased proportion of view from 1 Bligh Street when compared with the option to maximise harbour views.

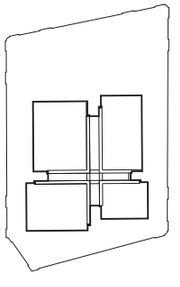
It is important to acknowledge that the potential loss of view amenity from 1 Bligh Street would also be balanced by the increased public activation of the Sandstone Precinct, offering additional amenity to those working within the vicinity.



**Initial Tower Floorplate Concept**

**Current Tower Floorplate Concept**

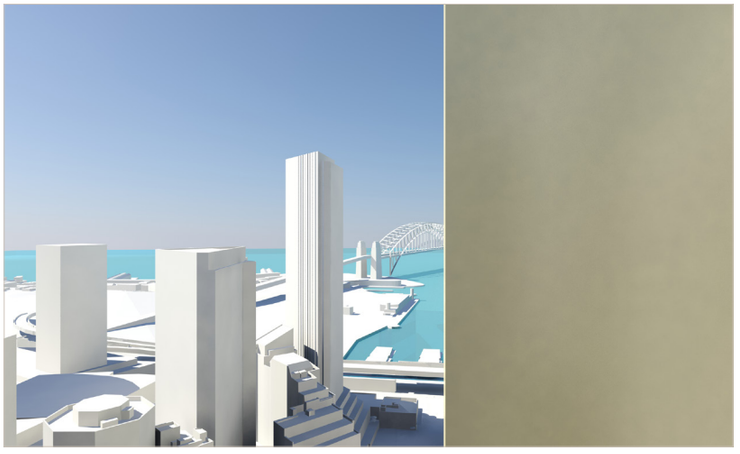


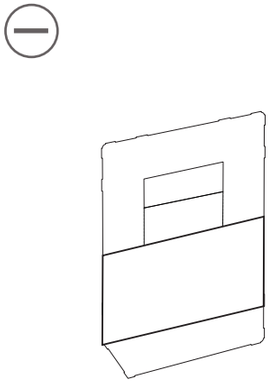



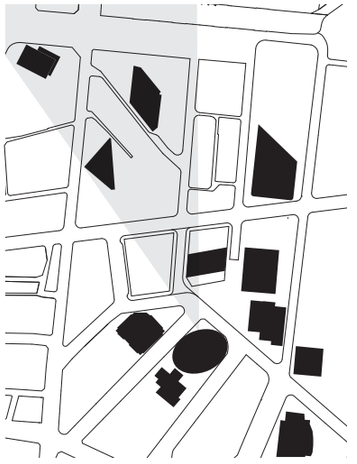
**Visualisation Overlooking Macquarie Park**
Demonstrating exposure to 1 Bligh Street

# Planning Principles:
## View Sharing

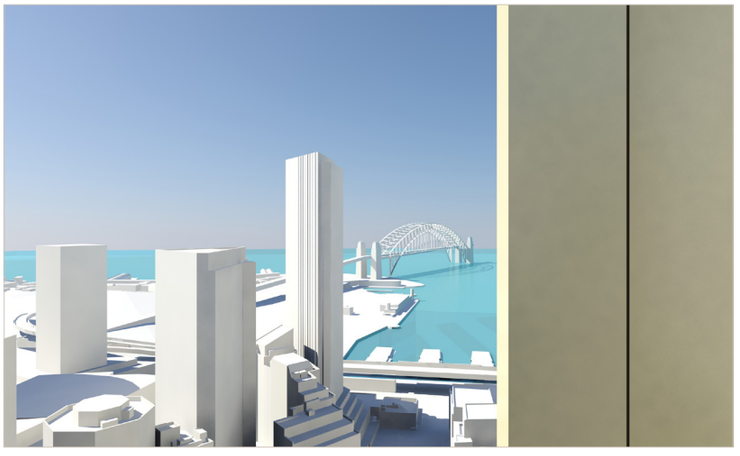
The below images represent the improved views afforded from 1 Bligh Street through the proposed building form compared to that of the initial tower floor plate. As demonstrated, the reduced width of the floor plate permits full Harbour Bridge views from the central axis of the elliptical tower plan.

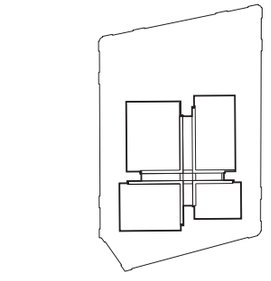


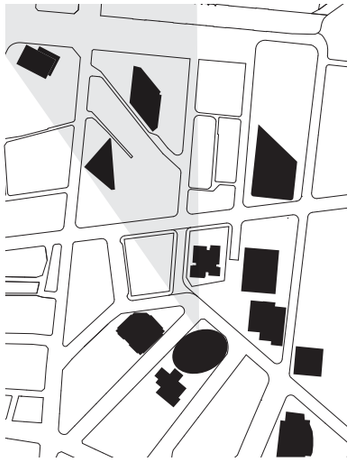




**Initial Tower Floor Plate Concept**

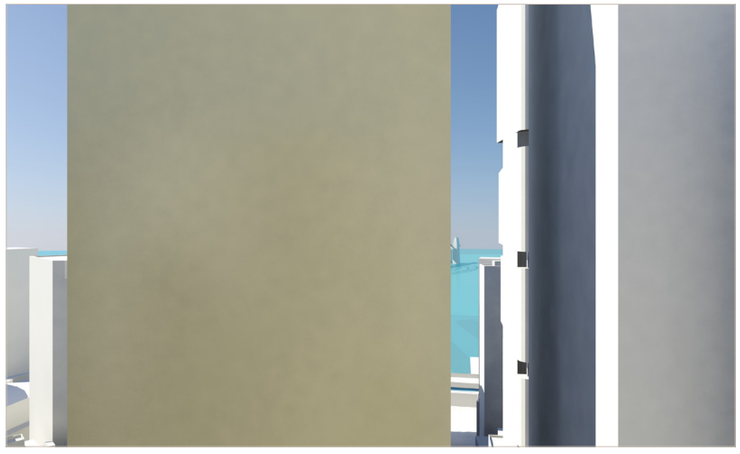




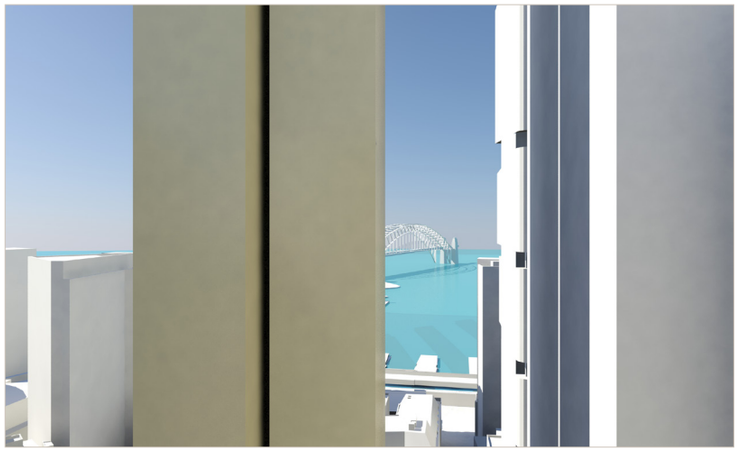


**Current Tower Floor Plate Concept**

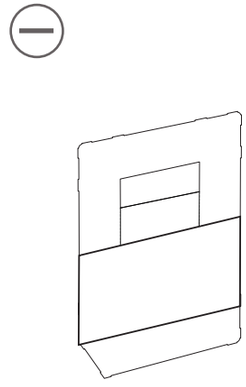
The below images demonstrate the increased view along Young Street when viewed from the eastern portions of the 1 Bligh Street floor plate. The more narrow proposed tower floor plate enables a large proportion of the Harbour Bridge to remain in view compared to the broader tower form which only reveals the north pylon of the bridge.

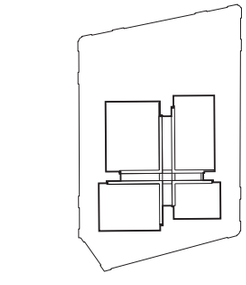


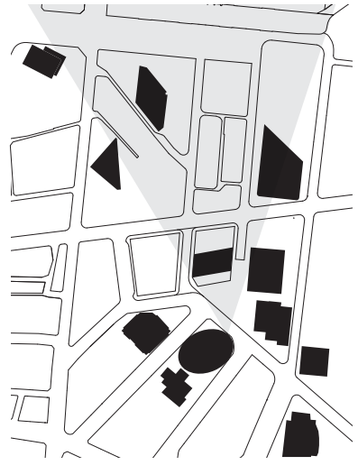
Initial Tower Floor Plate Concept

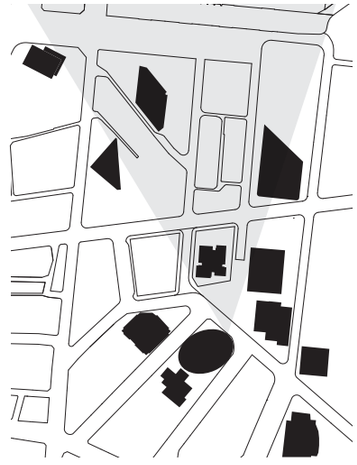


Current Tower Floor Plate Concept









# Street and City Integration

The following images demonstrate the view impact, or lack or impact, the proposed tower will have in the city's setting when viewed from different vantage points.

The tower has little to no visibility when viewed from inner-city and eastern suburbs do to the prominence and adjacency of the Governor Phillip Tower. Glimpses of the proposed scheme are possible on approach from ferries entering Circular Quay from the east, as parts of the building are revealed between the space located between the Governor Phillip Tower and the AMP Tower.

When viewed from the many parts of the west, the tower appears nestled into the middle of the CBD urban forms with the proposed height just allowing it to be distinguished from the general skyline backdrop.

The most prominent distant views of the proposal are afforded from Circular Quay to Kirribili where the front of the CBD presents itself. The slender form of the tower counters many of the larger, bulkier forms providing a natural balance to the composition of the skyline.

Oblique views from the east and west extremities of Bridge Street demonstrate that the tower setback provides sufficient distance to ensure the tower does not encroach upon the existing view corridor. The line between the northwest corner of the Governor Phillip Tower and the northeast corner of 56 Pitt Street establish an existing view setback within which the tower comfortably sits without negatively impacting upon Bridge Street.

Closer views of the Education building demonstrate that the tower has sufficient setbacks that in some instances seem to detach the building from its setting over the Education building.

The views which give the greatest clarity to the relationship between the tower and the Education building below are those taken from the corner of Bligh and Bent Streets. Views here have sufficient elevation to read the tower neck tucking back to reach the extents of the courtyard perimeter. The setback between the tower and the tower neck are critical to the visual separation and 'landing' of the tower on the heritage form at its base.

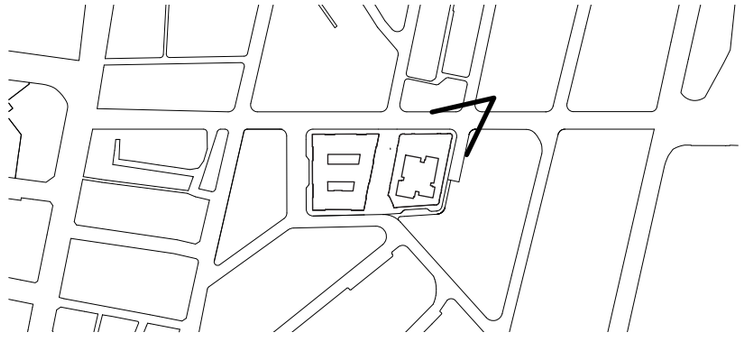
# Street and City Integration

## View corner of Bridge and Young Streets

Existing View

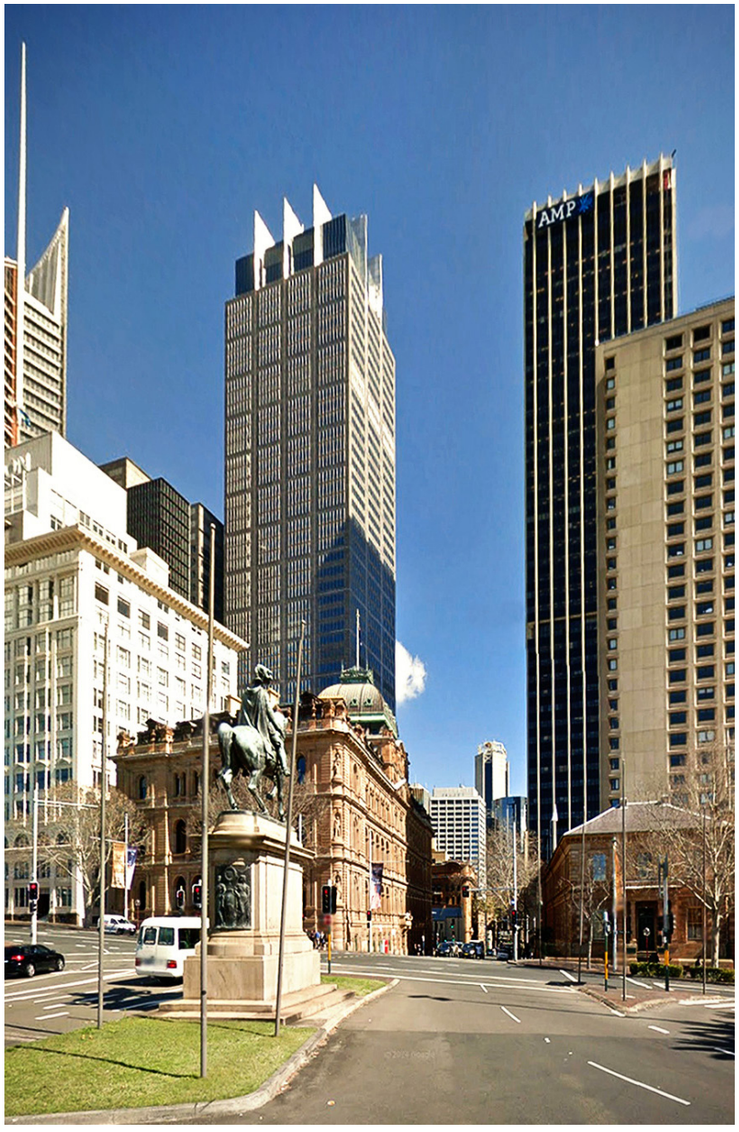
Proposed View

The above vignette demonstrates the effectiveness of the proposed building setbacks to the Department of Education, visually separating the tower component from the heritage base.



# Street and City Integration

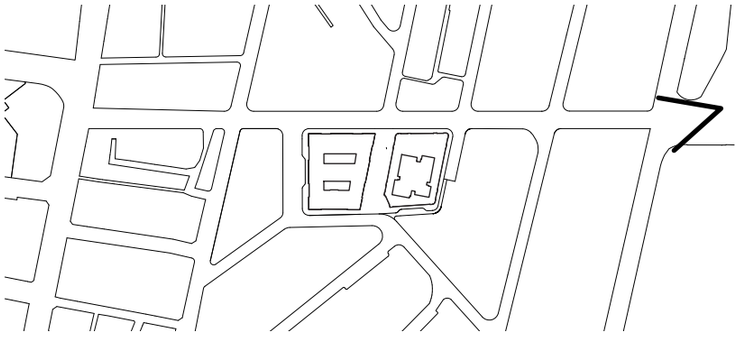
## View Looking West on Bridge Street




**Existing View**


**Proposed View**

The proposed tower form sits comfortably within the existing city scale context at the eastern entrance of Bridge Street near the Conservatorium.



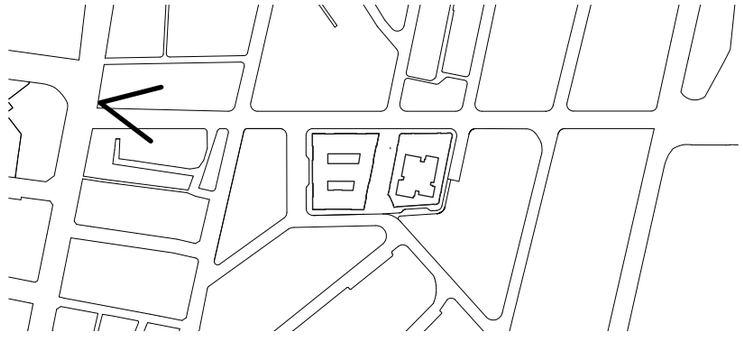
# Street and City Integration

## View Looking East on Bridge Street


**Existing View**

As demonstrated previously within the section relating to Bridge Street setbacks, the proposed tower form remain behind the visual line of site established between the Governor Phillip Macquarie tower and 56 Pitt Street.


**Proposed View**

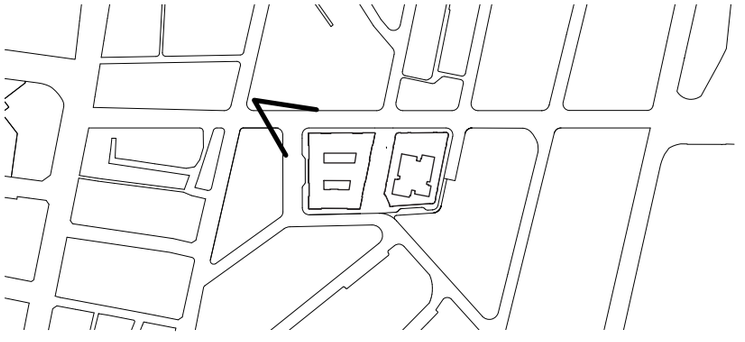


# Street and City Integration

## View Looking East on Bridge Street

Existing View

Proposed View



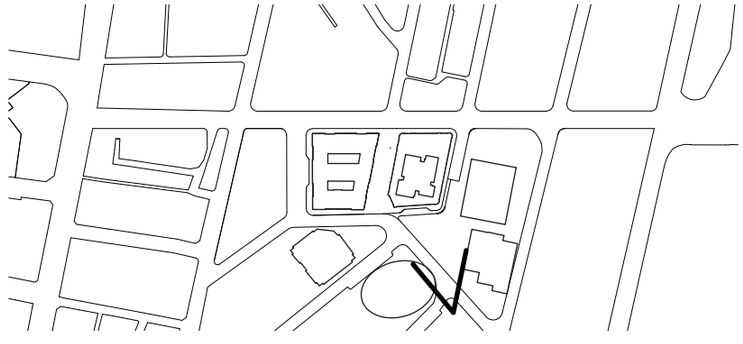
When viewed along Bridge Street in closer proximity to the Department of Lands building, the proposed tower form is situated with the backdrop of the Governor Phillip Macquarie tower.

# Street and City Integration

## View from corner of Bent and Bligh Streets

Existing View

Proposed View



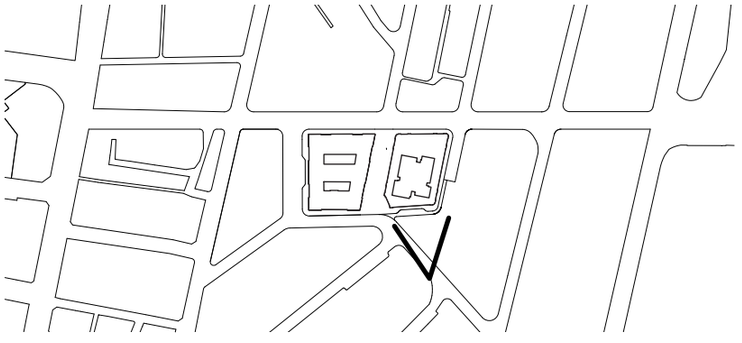
On of the more prominent views of the proposed tower and its relationship to the Department of Lands below is taken from the corner of Bligh and Bent Streets. Whilst the tower to have a view impact on the existing heritage building, the raising of the tower base and setting further back its 'neck' allow the two building component, old and new, to be read as a whole whilst retaining their individual reading.

# Street and City Integration

## View from 1 Blight Street

Existing View

Proposed View

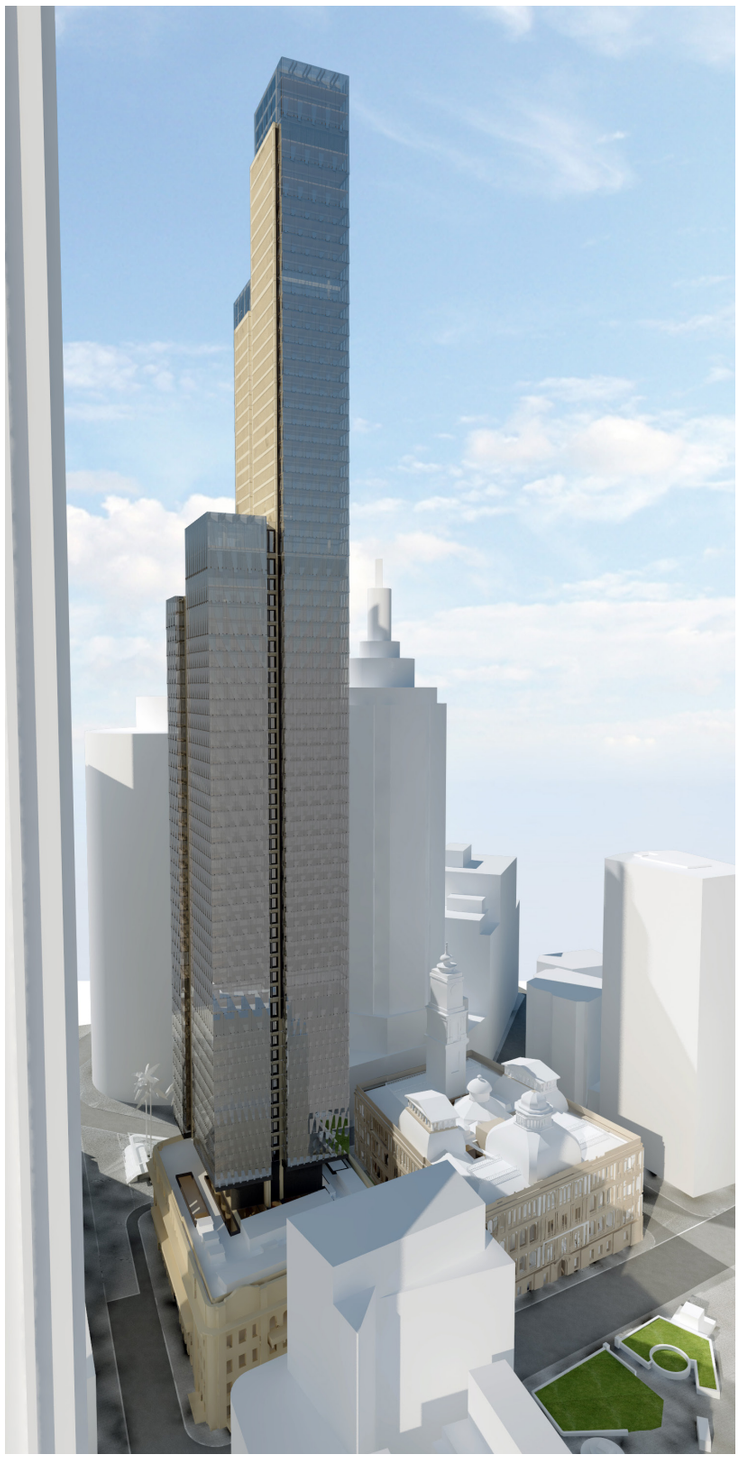


# City Scale Context

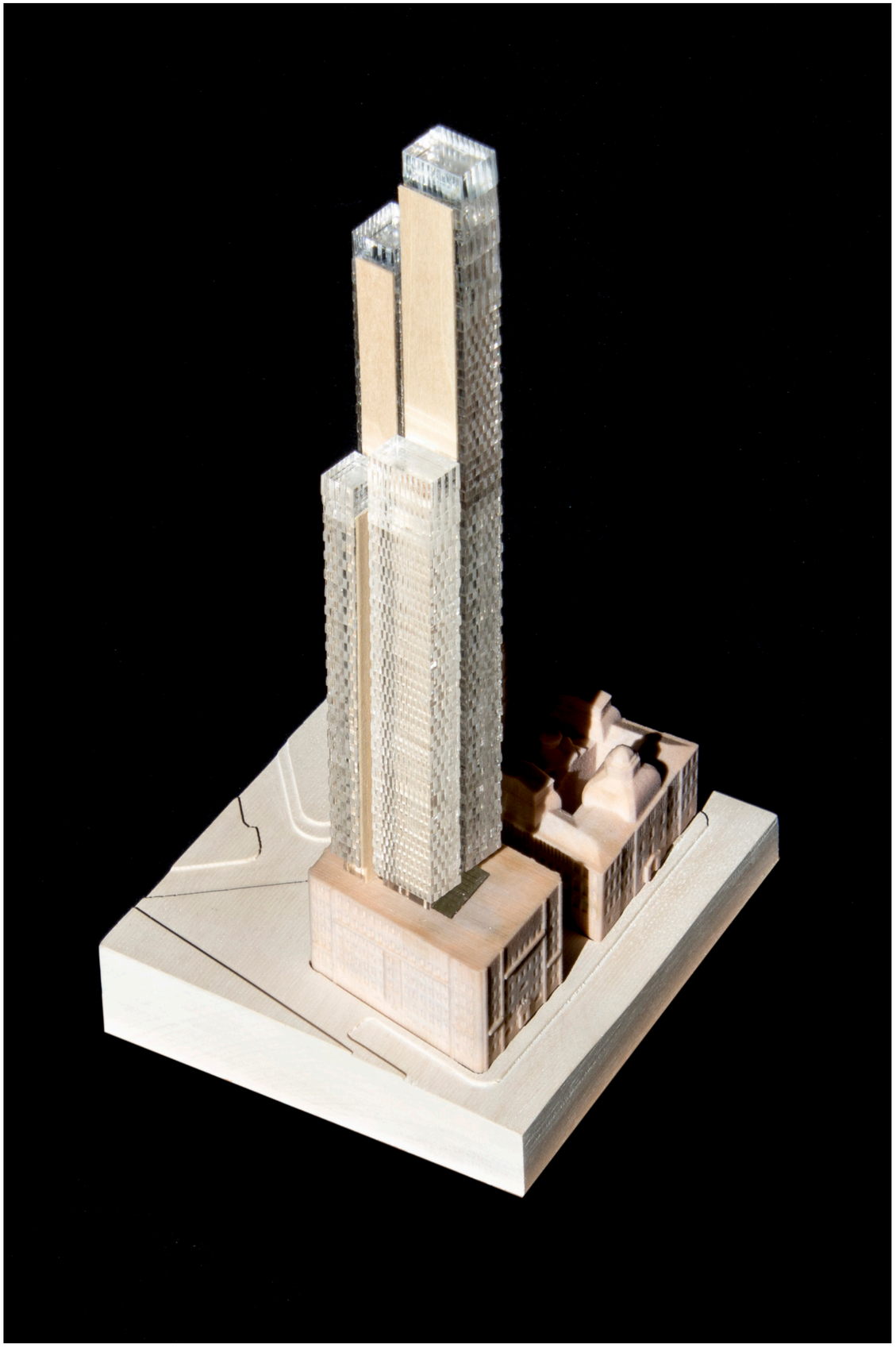
**View Looking Northeast**

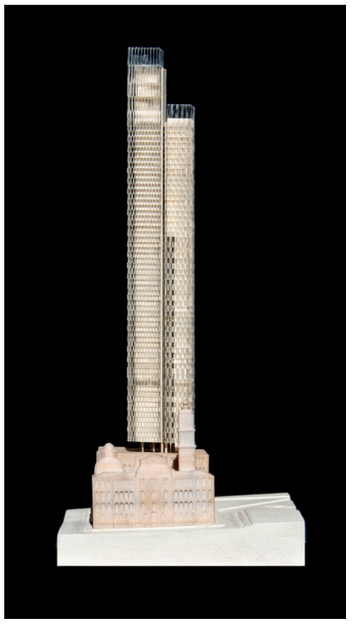
**View Looking North**

View Looking South



View Looking Southeast





# Planning Principles:

## Floor Space Ratio

The below tables outline the floor space ratio calculated for both the Base Scheme and the Option Scheme within the Progressive Offer. Whilst the proposed areas for the Base Scheme are well within the allowable ratio, the GFA of the proposed tower exceeds the maximum allowable area permitted for the singular site of the Department of Education building. Achieving this FSR outcome would require the negotiation and transfer of unassigned floor space from the Department of Lands site which is not intended to have any further built form placed above it.

**Base scheme**

| Site | Site area (m2) | Current GFA (m2) | Proposed GFA (m2) | Exisitng FSR | Proposed FSR | Maximum FSR |
|---|---|---|---|---|---|---|
| Lands | 3,320 | 10,076 | 11,245 | 3.03 | 3.39 | 14 |
| Education | 2,762 | 13,410 | 19,480 | 4.85 | 7.05 | 14 |
| Total | 6,082 | 23,486 | 30,725 | 3.86 | 5.05 | 14.63* |

**Residual FSR for Base Option = 9.58**

**Tower scheme**

| Site | Site area (m2) | Current GFA (m2) | Proposed GFA (m2) | Exisitng FSR | Proposed FSR | Maximum FSR |
|---|---|---|---|---|---|---|
| Lands | 3,320 | 10,076 | 11,245 | 3.03 | 3.39 | 14 |
| Education | 2,762 | 13,410 | 55,564 | 4.85 | 20.12 | 14 |
| Total | 6,082 | 23,486 | 66,809 | 3.86 | 10.98 | 14.63* |

**Residual FSR for Tower Option = 3.65**

*Maximum FSR for the sites (combined) to be 13.3:1. With the additional FSR for a design excellence bonus, the maximum FSR is 14:63:1. This is based on the sites being combined. Individually the sites have a base FSR of 8:1, with up to 6:1 for hotel/ motel accommodation and 4.5:1 for serviced apartments/retail/office.

Note: The basement areas below loftus street are included in the education building areas

# Tower Proposition:

## A Holistic Approach

**Holistic Conceptual Approach**

The proposition to locate a tower above the Department of Education building represents the outcome of a rigorous process that situates the key programmatic elements of the Ballroom, the courtyard and the tower in a holistically conceived composition - allowing the tower to both transfer its loads to the foundations whilst respecting the spatial order and geometries of the existing building.

**Establishing the Ballroom**

The proposal locates a new ballroom below the existing Department of Education courtyard. The perimeter of the ballroom bears a direct relationship to the extents of the existing courtyard above and establishes the structural base onto which the tower's structure lands.

**Supporting the Courtyard**

The level of the existing car park will become the new internal floor of the hotel atrium. A deep structural zone will provide the clear spans required for the ballroom below and will also serve to underpin portions of the existing structure as required.

**Tower Transfer Structure**

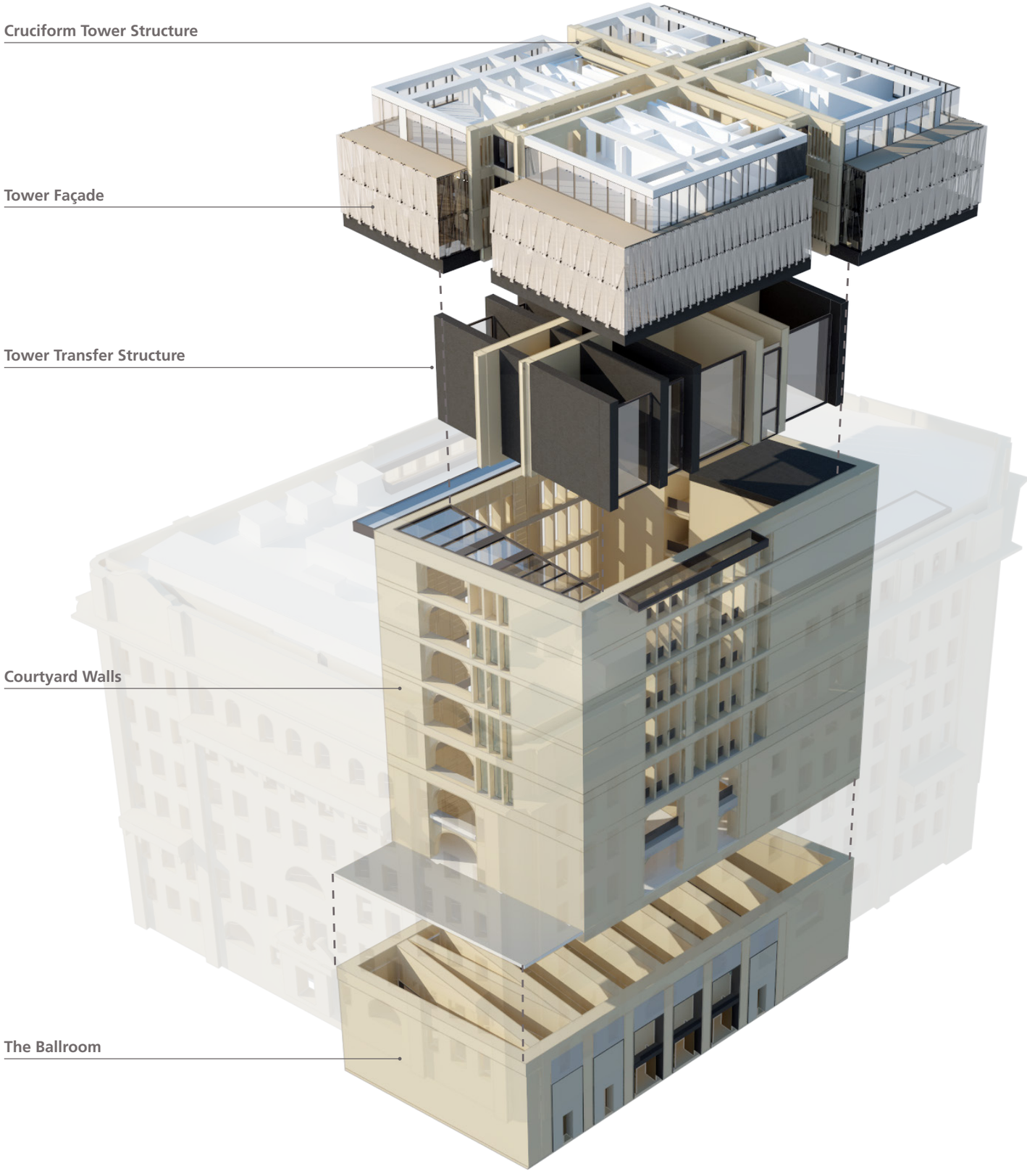
Situated at the top of the newly instated atrium order, the tower transfer structure redirects the building's loads from their tower positions to the perimeter load bearing walls of the atrium. Spanning nearly 10 metres, the height of the transfer structure permits ample daylight to the interior and allows the tower floor plate to be sensitively positioned above the existing building.

**Re-establish Courtyard Walls**

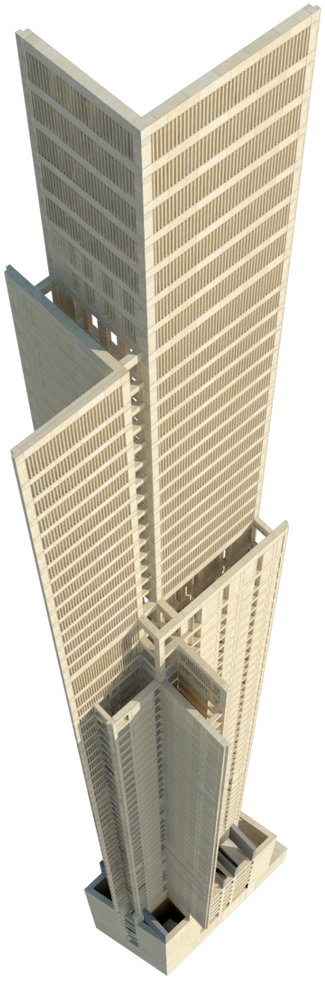
As established in the base scheme, the design intent proposes a new order and reading of the atrium that respects the existing extents of the original courtyard but instates a new building fabric that elevates the quality of the architectural experience and sets the trajectory for the Department of Education as it continues its evolution.

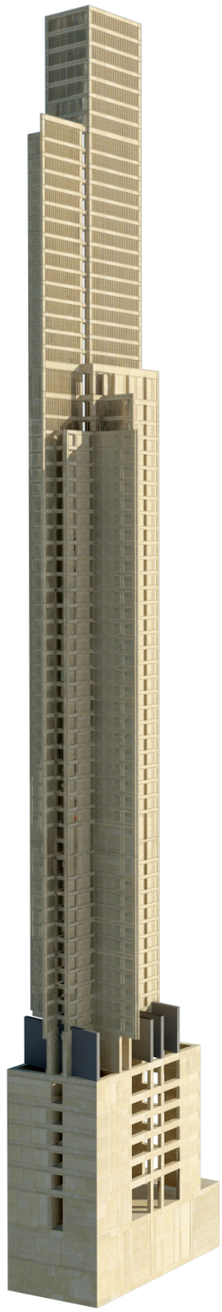
**Typical Tower Floor Plate**

The typical tower floor plate is configured in a cruciform arrangement that provides the required rigidity to the slender structure and allows views to be minimally impacted by perimeter columns within the apartments.

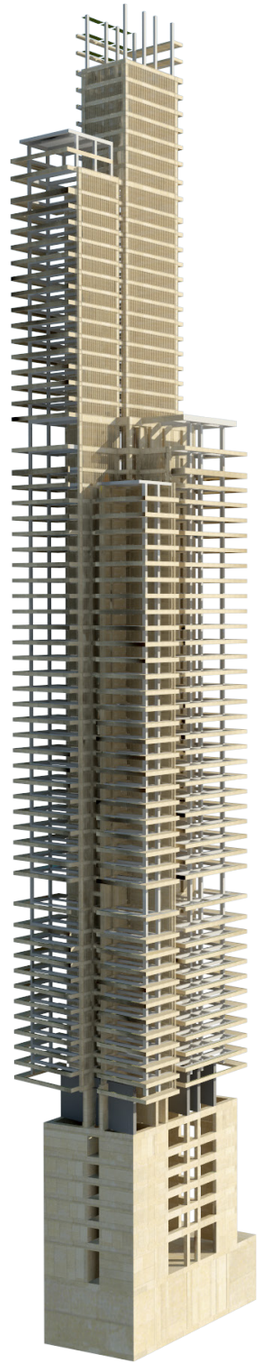

Cruciform Tower Structure
Tower Façade
Tower Transfer Structure
Courtyard Walls
The Ballroom

# Structural Strategy

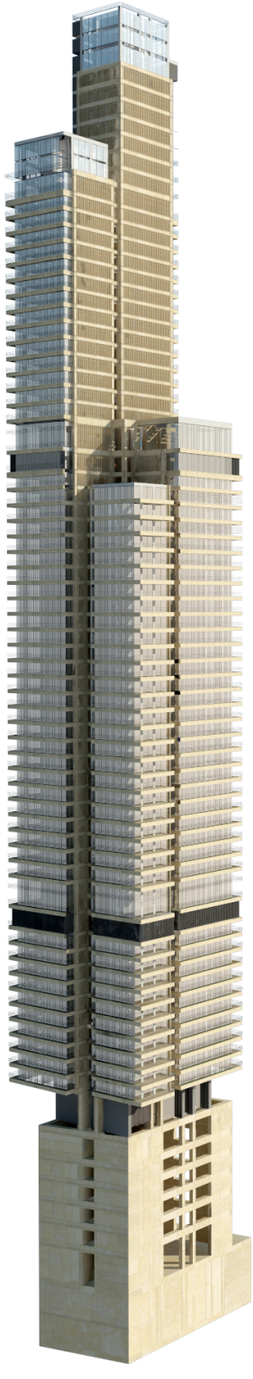




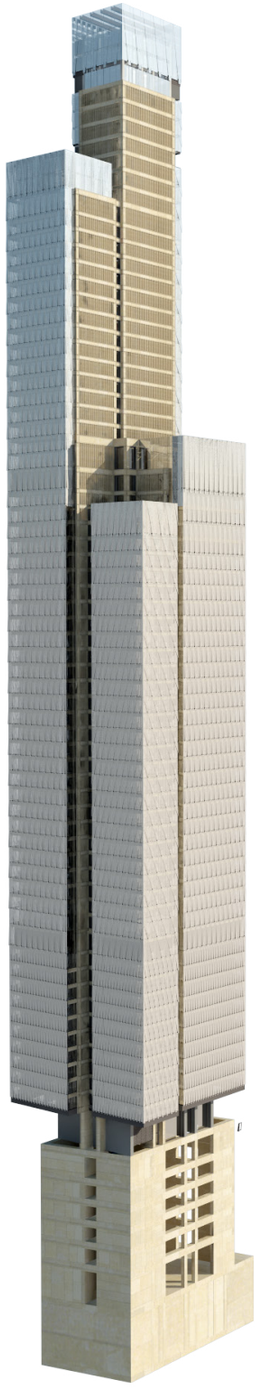
Cruciform Primary Structure



Secondary Structure



Internal Glazing

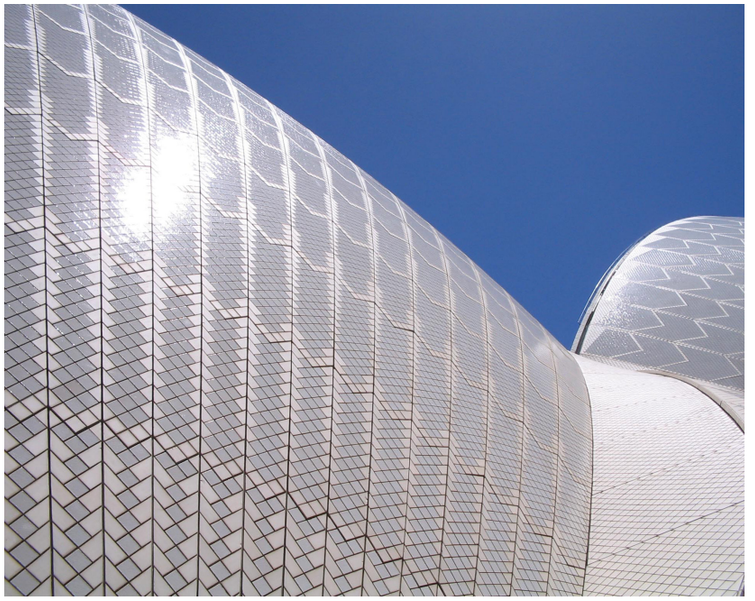


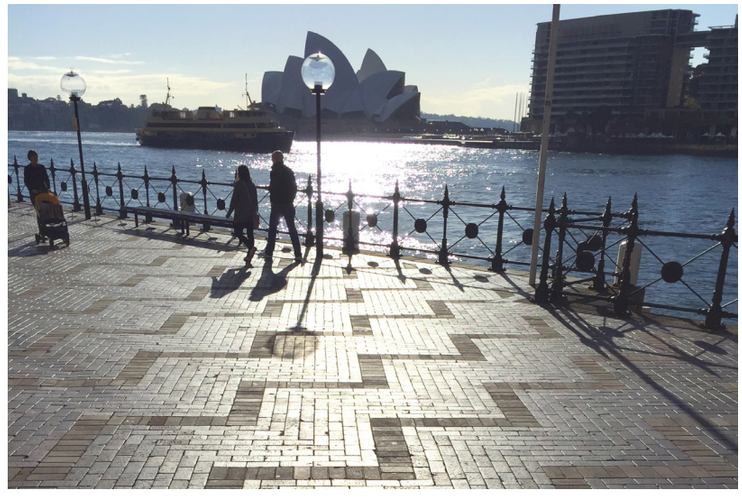
External ventilated glazed screen

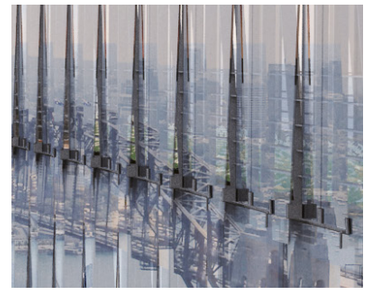
# Materiality , Craftsmanship, Façade and Effect

The tower façade is intended to reflect the unique environment of the setting of Sydney Harbour from the iridescent ceramic scales of the Opera house to the sparkle of the water's surface reflecting the sun's rays. The materials and ambience around circular quay have a radiant nature which the façade of the tower captures through its texture, expression and materiality.

Recognising the building's placement within the Sandstone Precinct, the design of the tower has considered the use of Sandstone to be a crucial link setting of the tower in relation to its heritage base.







# Elevations

**North Elevation**

East Elevation

# Elevations

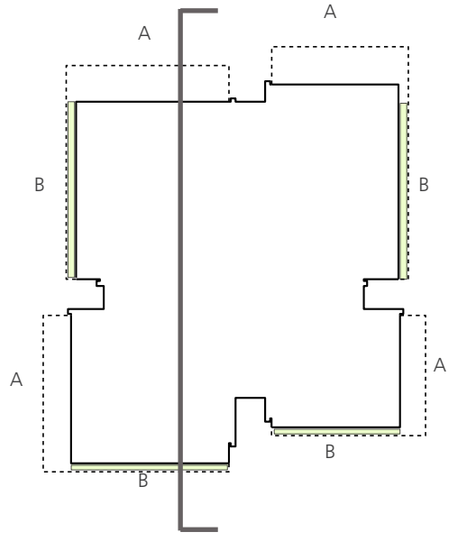
**South Elevation**

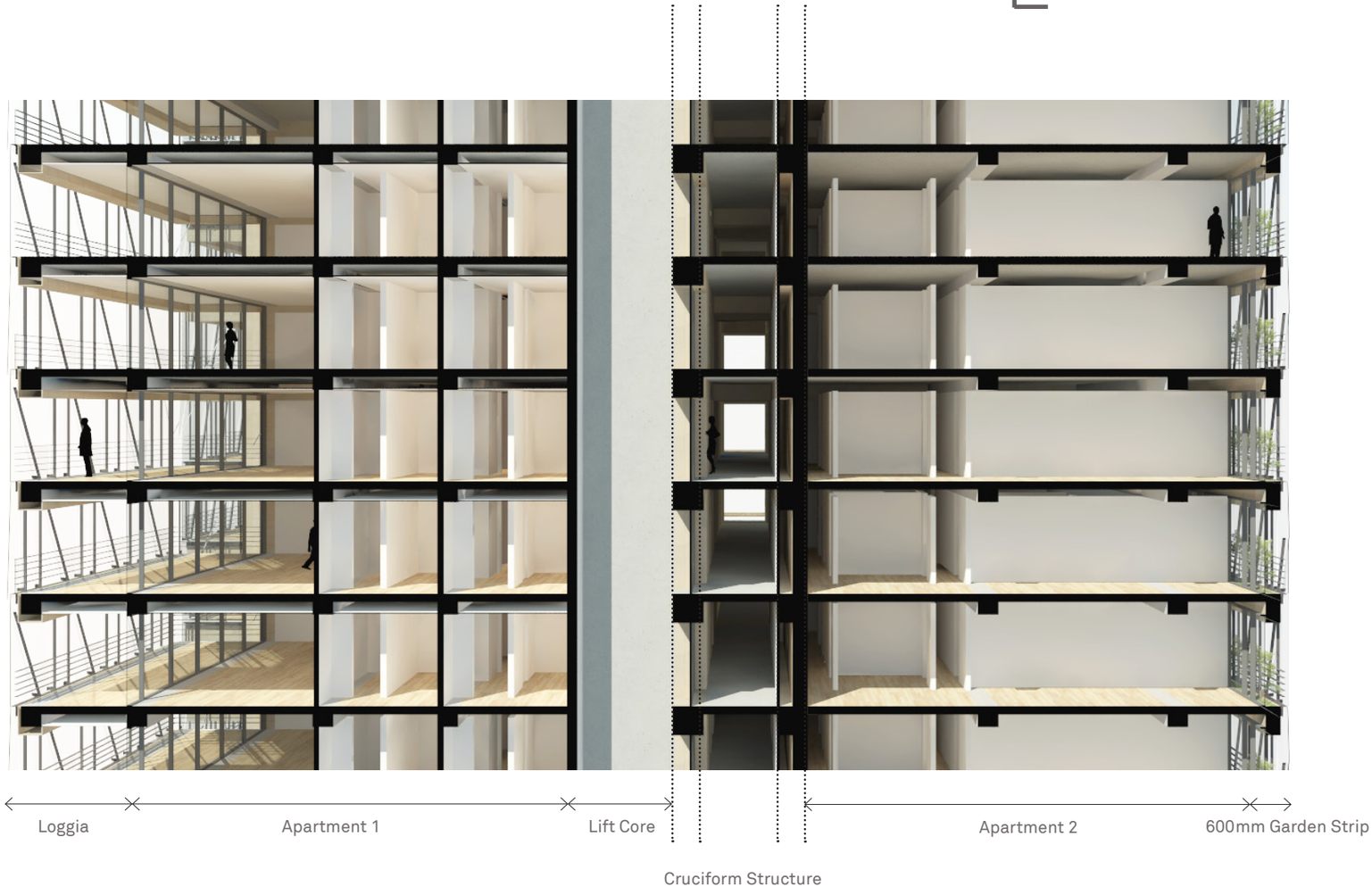
West Elevation

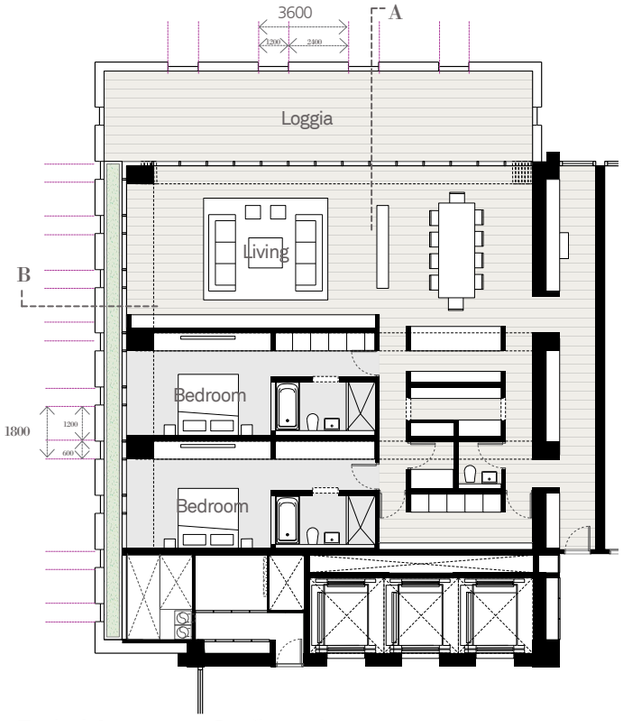
# Tower Façade

Each apartment typically sits within one quadrant of the cruciform structure. The façades to the apartments are based on a double skin system which provides a naturally ventilated outer zone and a fully thermally sealed layer to the apartment interiors.

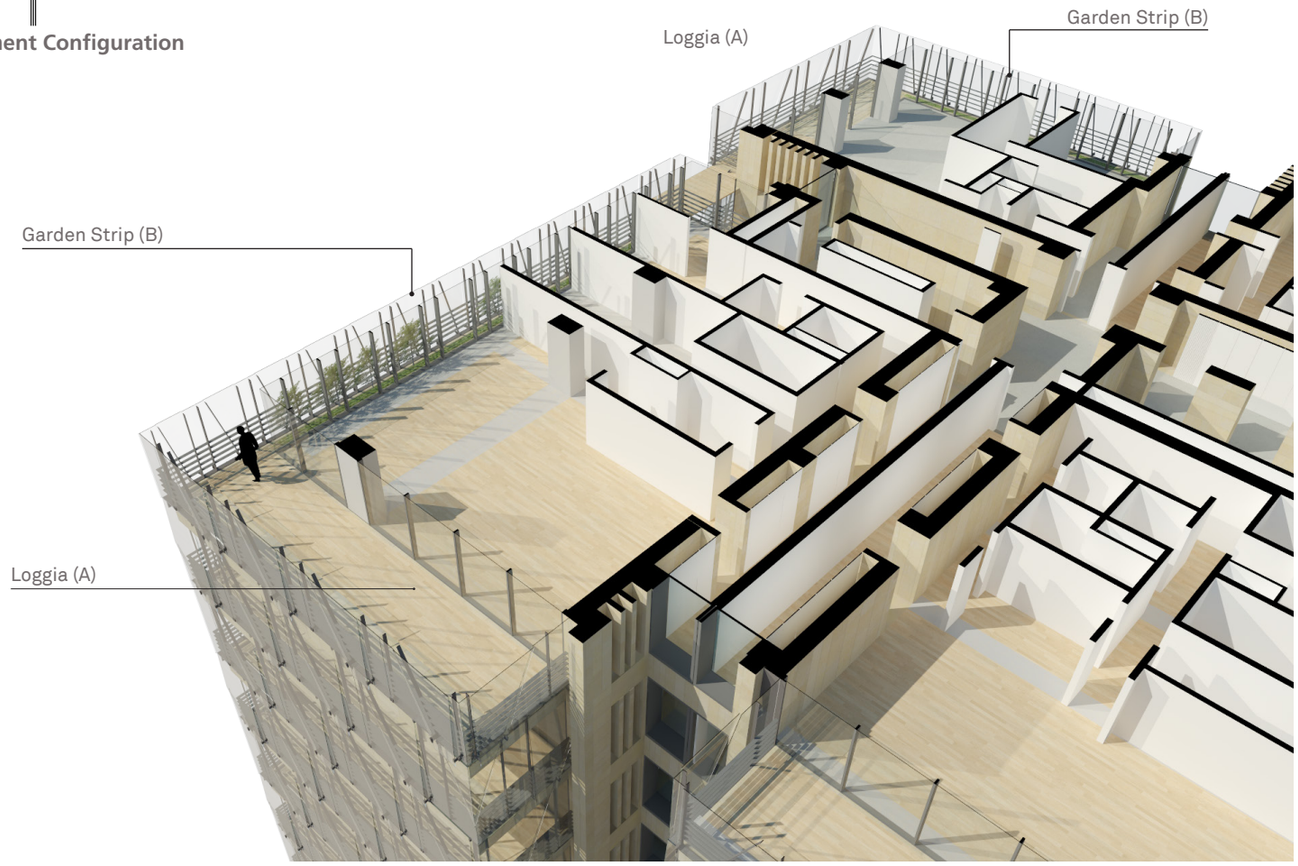
A single glazed shingled outer skin  is fixed in position to allow natural ventilation to the outer areas of the residences. These spaces comprise of a generous Loggia space which extends out from the main living areas (A) and a planting/ garden zone adjacent to the bedrooms (B). The façade module also changes in amplification on each aspect of the apartments. The Loggia which afford the views out across the city have a large generous glazing panels whist the bedrooms façades have a tighter grain to give additional shading and privacy.






**Typical Apartment Configuration**



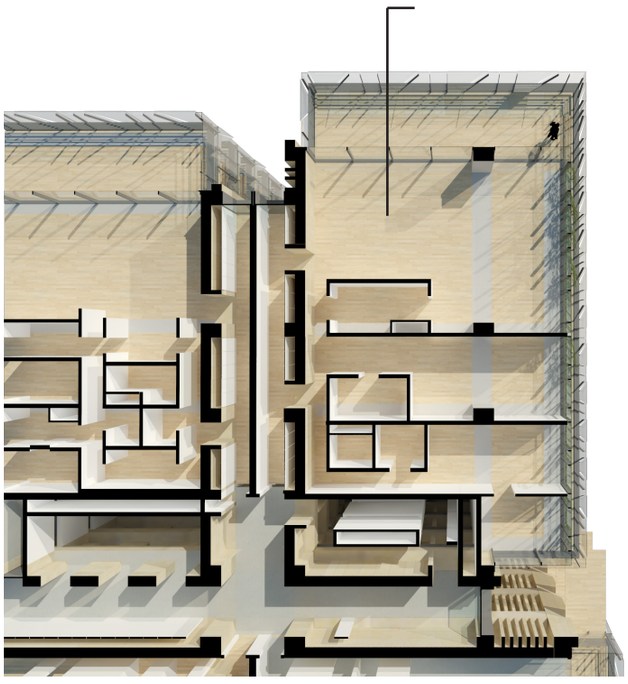
# Tower Façade

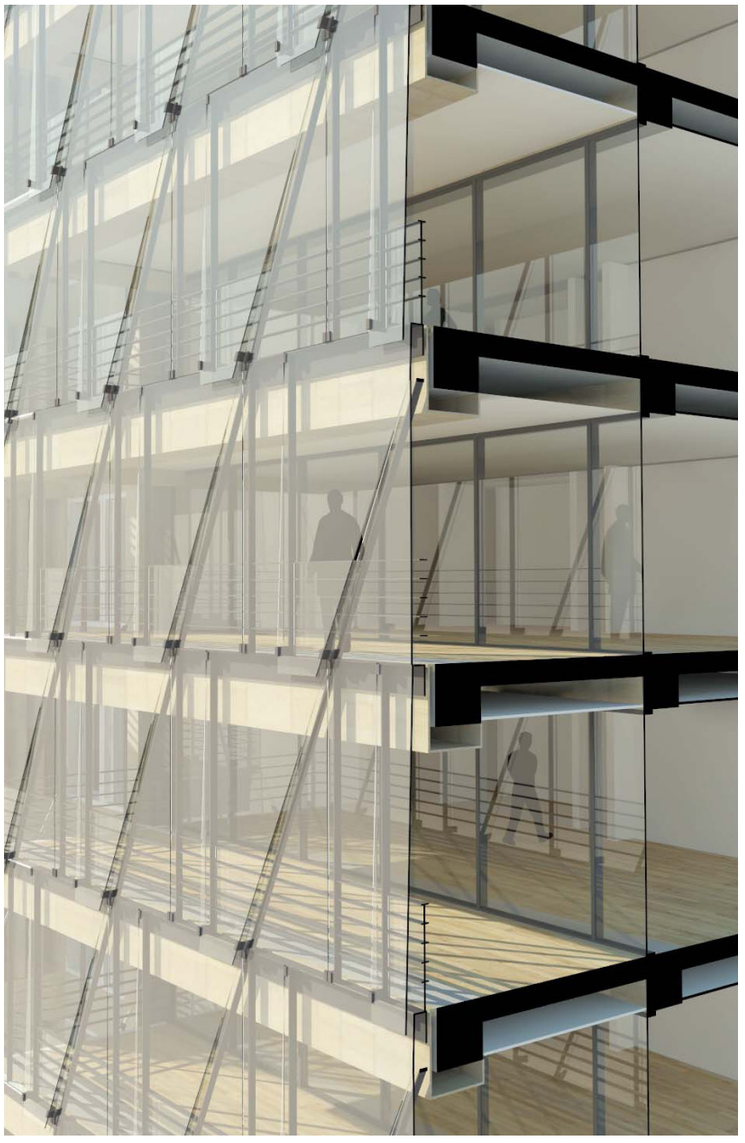
**A - Deep ventilated apartment loggia**

Extending out beyond the living spaces from each apartment are ventilated loggia spaces. All are afforded panoramic views out across the harbour and city. The single glazed outer façade with minimal fixings maximises these views.

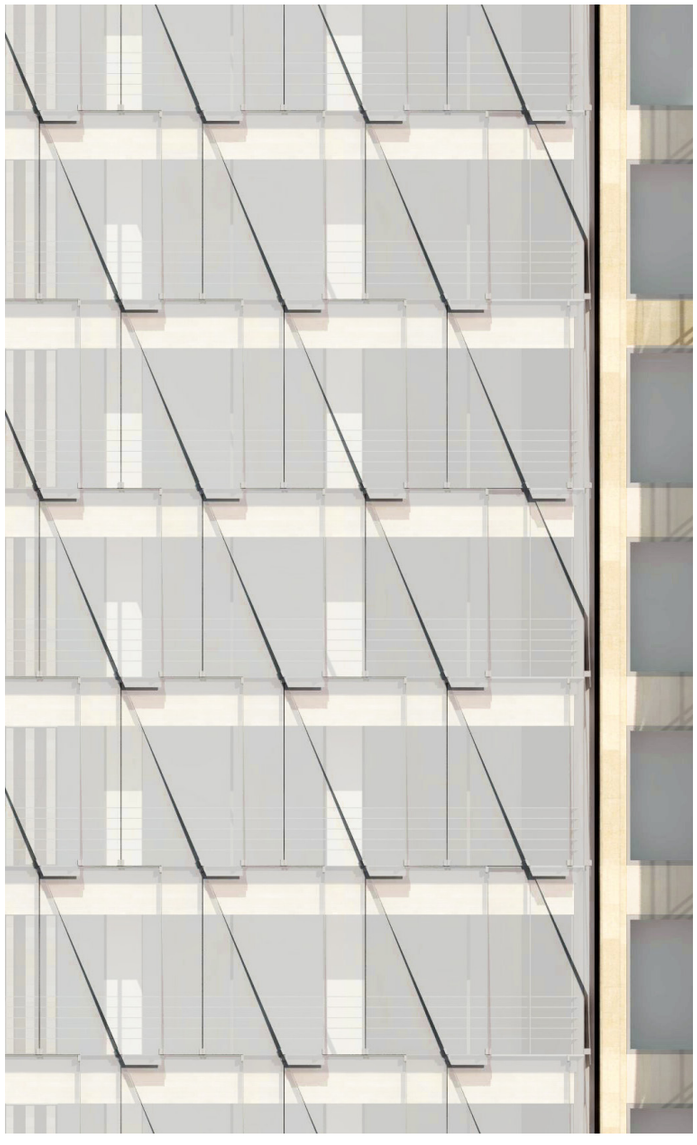
These spaces are typically 3000-3600mm deep and naturally ventilated. The fixed open shingled outer glazed skin provides protection from the wind and elements whilst still allowing a truly ventilated space that gives the feeling of being in an external environment. Double glazed sliding doors to the apartment living spaces provide the thermal protection to the main apartment living spaces.

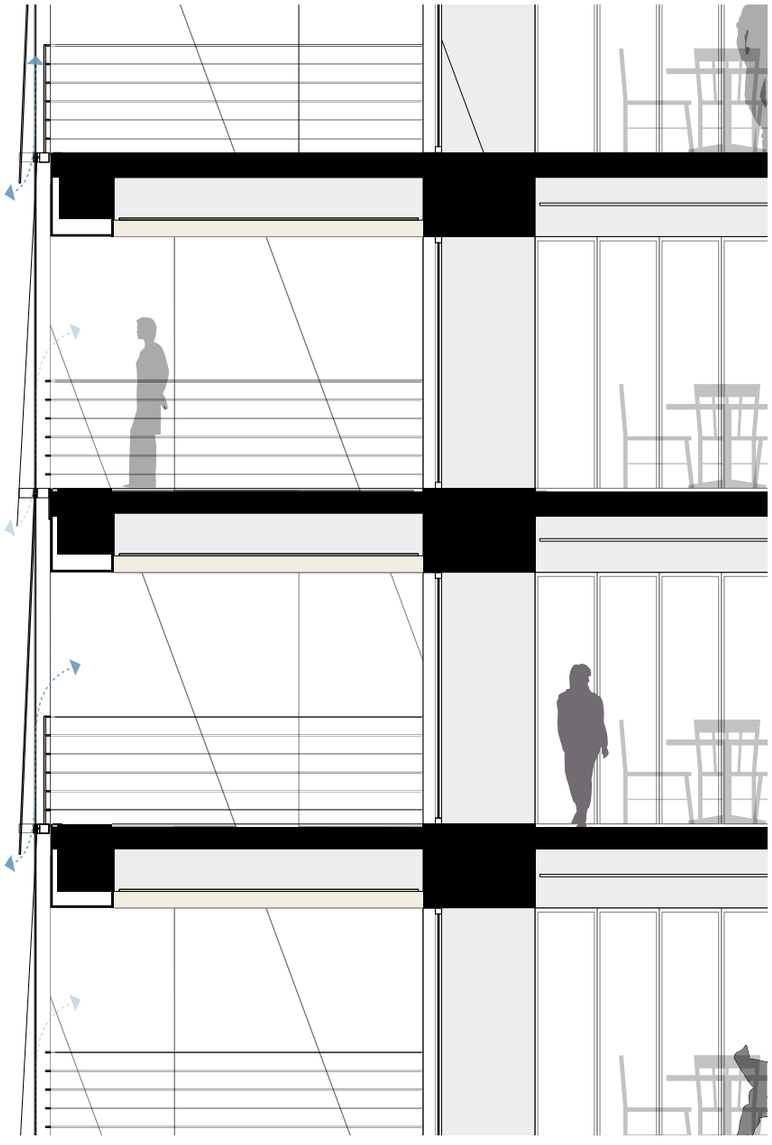
The depth to the balcony and the deep edge beam behind the outer skin give protection from the sun.





## Detail Section and Elevation





3000-3600mm Ventilated Loggia

Living Rooms

# Tower Façade

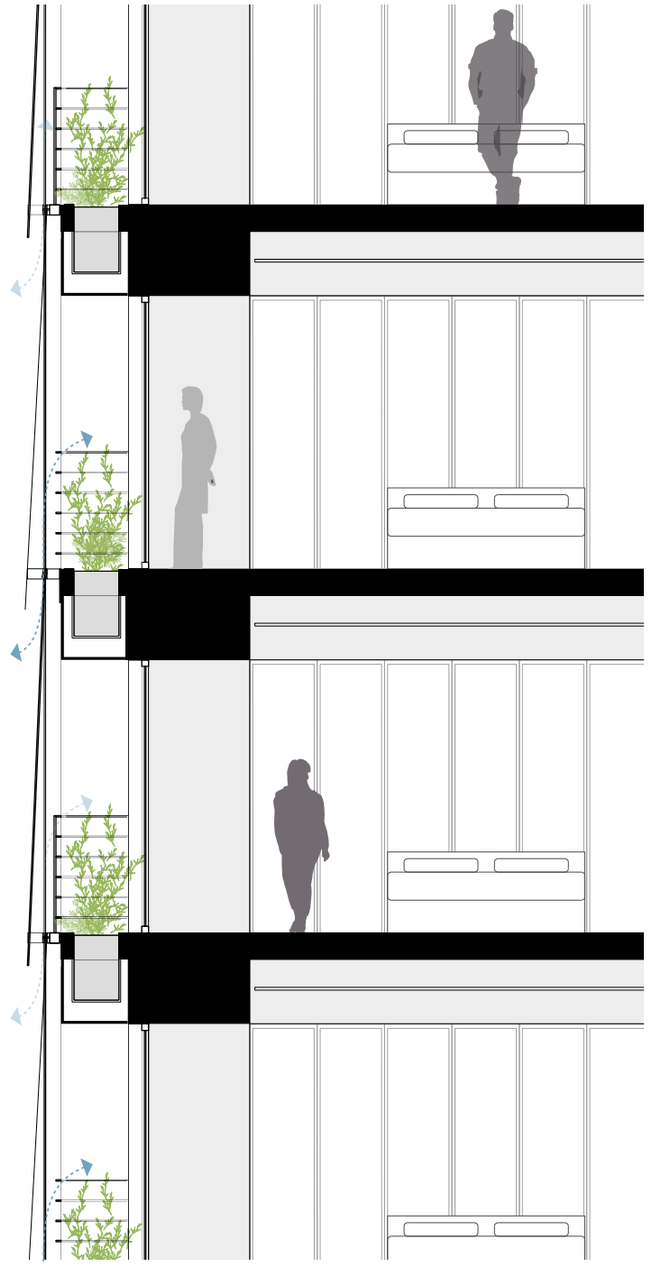
**B - Ventilated Façade with Garden Planters**

The shallower façade zones to each apartment have a tighter façade rhythm which provides additional shading and privacy to the bedroom areas.

This 600mm façade zone provides the opportunity for a planted border to be utilised by the apartments. The cavity is naturally ventilated as part of the double skin façade system and provides the thermal buffer to the interior spaces. Planting in this zone will provide an additional layer of shading and privacy to the bedrooms as well as improving the quality of the air to the apartments

This planters can be accessed through operable doors from the bedrooms for easy maintenance.

## Detail Section and Elevation

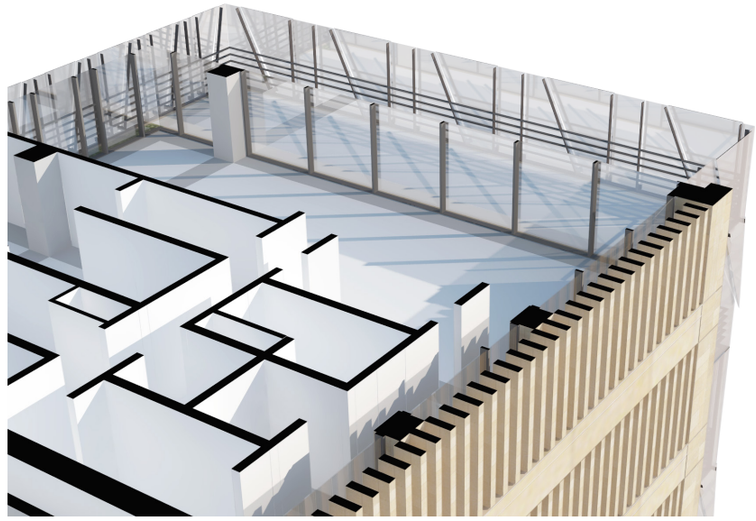


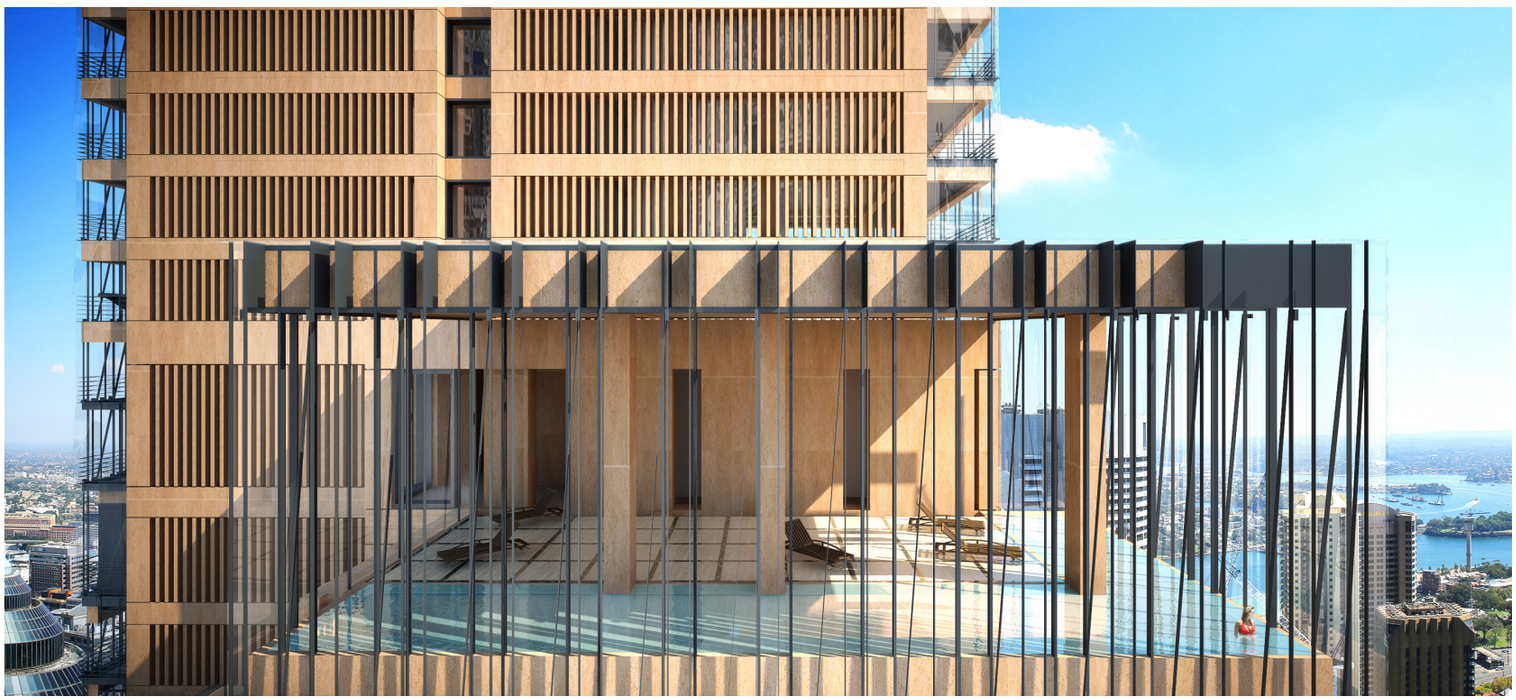
# Tower Façade

**C - Sandstone Louvred Exposed Cruciform Façade**

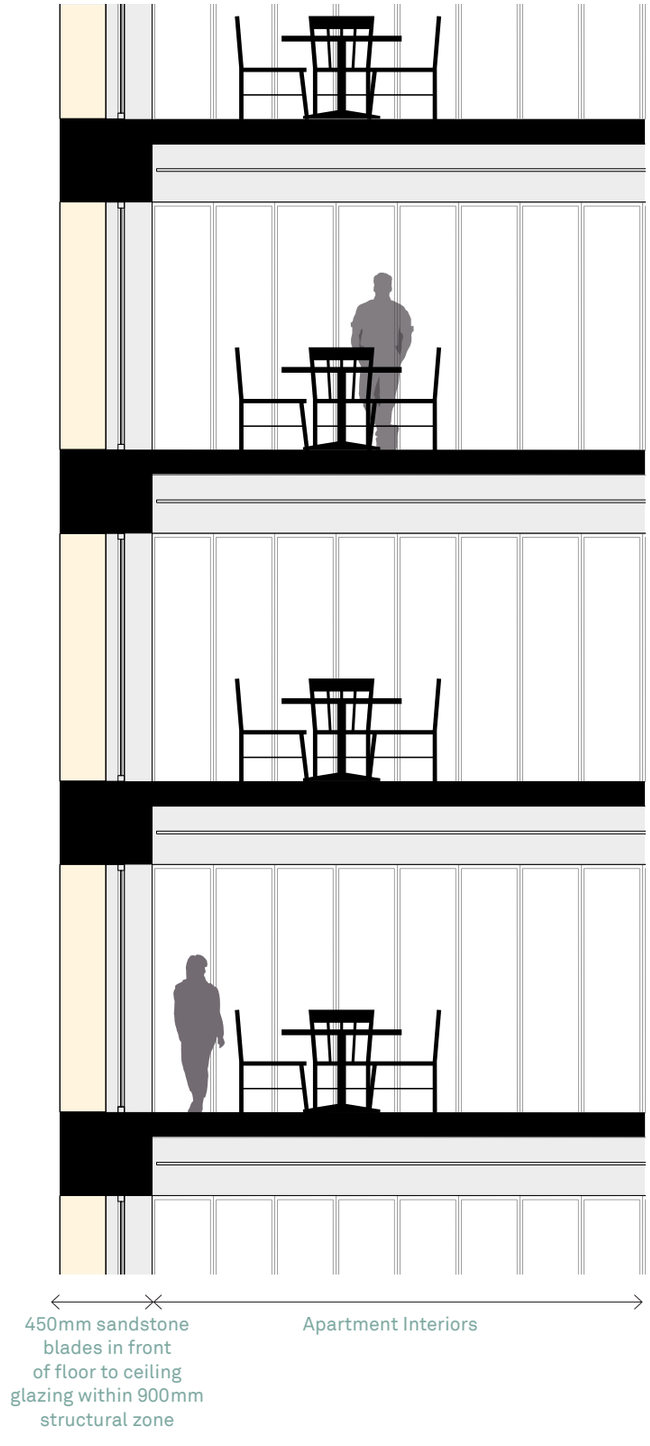
The principle cruciform structure which runs up the tower is expressed in sandstone cladding. As the tower quadrants drop off towards the top of the building these sandstone walls become exposed and become part of the façade expression.

The sandstone beams and columns are expressed on the exposed façades with vertical blades as the infill in front of glazing to allow views out The sandstone walls stop short of the penthouses to each quadrants which are given a glass lantern wrapping over the tops of the towers.



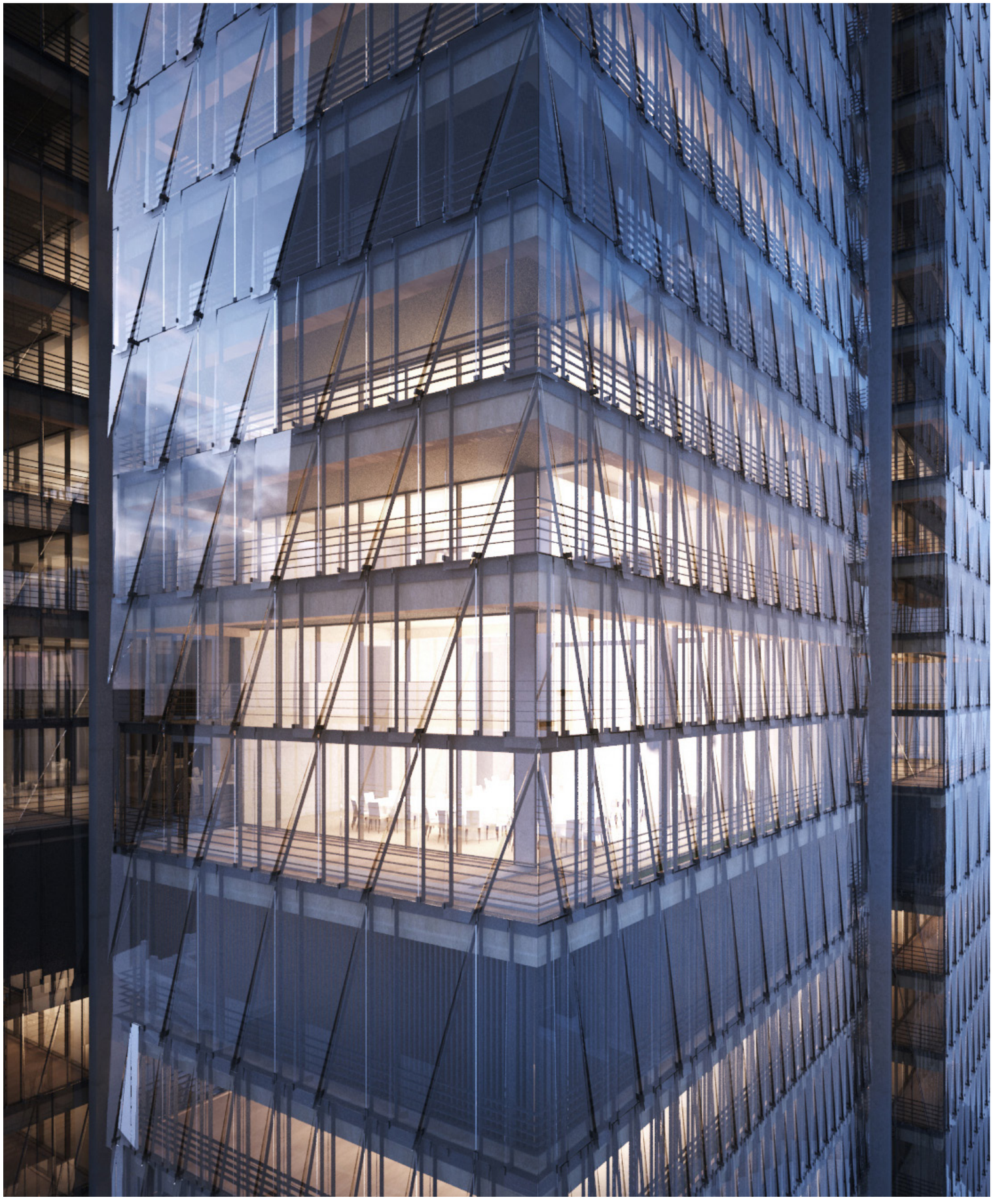


## Detail Section and Elevation



# Tower Structure and Façade

Top of Towers



# Plans and Supporting Schedule

Raffles Sydney

# Hotel Arrivals Overview

Among the most important components of any hotel and paramount to the enduring success of a Grand Historic Hotel, is its sense of arrival. The spontaneous moment of welcome on arrival and warm well wishes on departure, are the bookends of any perfect stay.

The Sydney Raffles Sandstone Precinct benefits from the setting of these two distinguished heritage assets offering multiple entry and arrival points for a number of different guests and visitors. To give hierarchy and order to the various entry points, the proposal has carefully considered the location of the porte cochère's and their relation to the different hotel components.

Bridge Street is a busy east / west artery within Sydney's CBD. Its grand scale and importance to the city structure is somewhat diminished by the impact of the volume of vehicular traffic. Similarly, whilst the original public entries remain on Bridge Street, the environment of Bridge Street is not fully conducive for situating the main hotel arrival point.

However, the potential exists to consider the existing width of Bridge Street and to utilise portions of the existing road reserve which are not designated as through traffic lanes as opportunities for additional taxi lay-by or public drop-off points. The inclusion of these drop lanes would help further activate the original public entries, rather than relegate them to a lesser position, whilst helping to relieve the potential traffic load during peak times.

The primary vehicular access to the areas beneath Farrer Place and Loftus Street is proposed as a shared entry using the existing Governor Phillip Macquarie Tower access located along Young Street. This location provides the best outcome for the precinct and public realm by utilising an existing vehicular entry point and therefore minimises the potential impact to either Gresham, Loftus or Bent Streets. Should for any reasons this shared access become untenable in the future, the intent would be to pursue a new vehicular drop within Gresham Street extending below Bent Street to service the shared spaces beneath the two heritage buildings. Please refer to the Traffic and Access assessment located within the Consultant Assessments chapter of this document for further information.

The adjacent diagram outlines the scheme's principal arrival points.

The following pages further detail each Welcome and Arrival experience for each of our 'Hotels within a Hotel'.

## Legend

**1.** Grand Hotel Porte Cochère and Entry

**2.** Loftus Street Entry

**3.** Farrer Place Port Cochere and Entry (Tower Entrance)

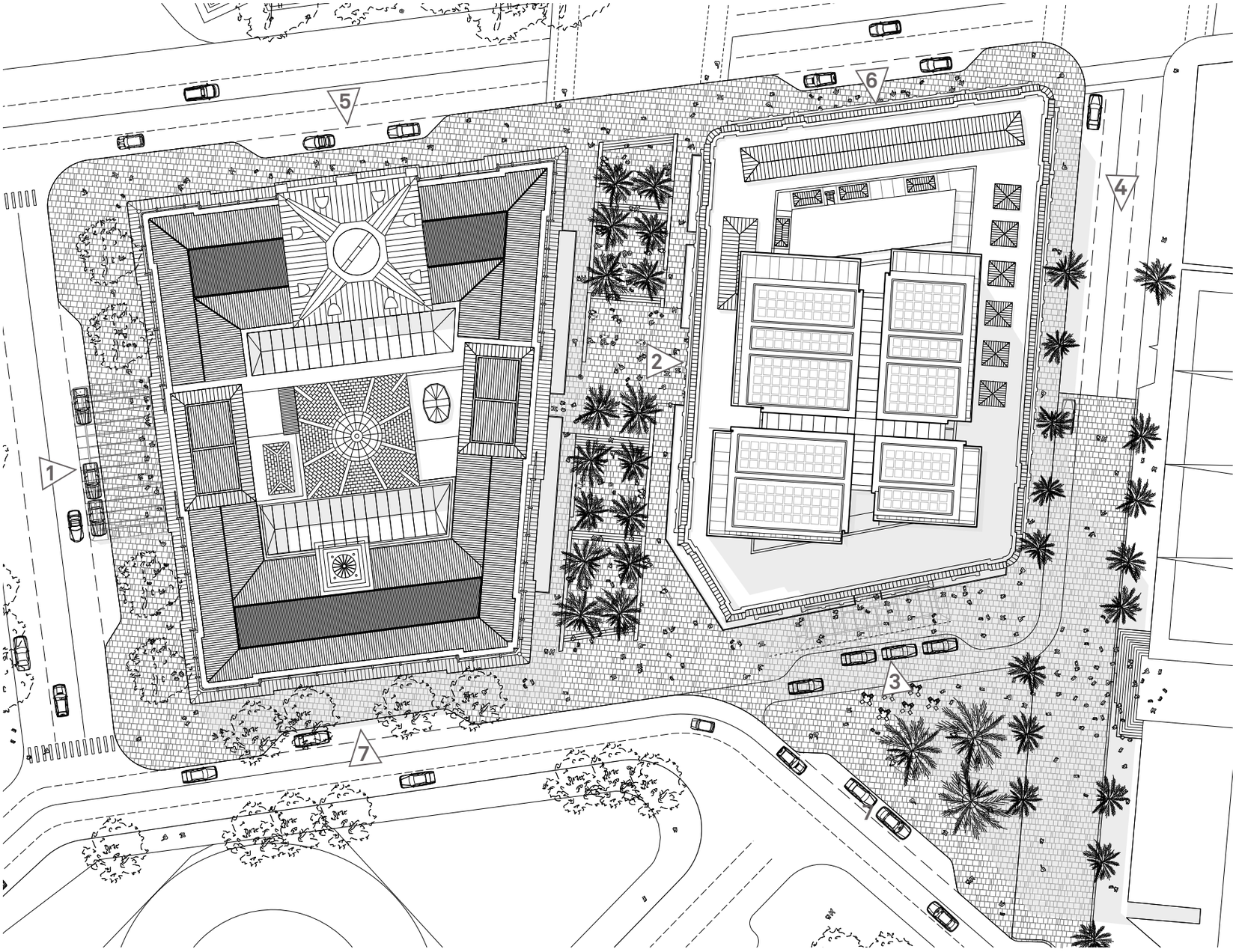
**4.** Car Parking and Services Entry via GPT Car Park

**5.** Bridge Street Taxi Drop and Entry into Grand Hotel

**6.** Bridge Street Taxi Drop and Entry into Heritage Art Hotel

**7.** Existing Taxi Ranks

**Arrival and Drop-Off Diagram**


1
2
3
4
5
6
7

# Gresham Street Arrival

## The Grand Hotel

Arriving at the Gresham Street entrance of the Raffles Sydney begins the powerful story of what is a Grand Historic Hotel.

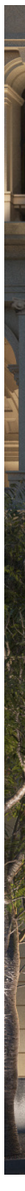
Anytime of day or night the experience is magical, but on an early winter evening, when there is a slight drizzle, is the perfect time to feel embraced by the inner warmth of this special place.

Walking under the glass canopies and peering into to the windows of the shops on Ground Level and experiencing the golden light emanating from the open air verandas and suites on the floors above, one at once understands the sense of welcome and well-being that a Grand Historic Hotel imbues to those that come within its presence.

The play of light across the timeless sandstone walls, the sounds of laughter emerging from the former carriage entrance, proposed to become the famous Long Bar, and the light music coming from the verandah overhead, are all indications that one has arrived at the Raffles Sydney.

A lightly framed and transparent porte cochère is formally centred on the façade's symmetrical order creating a stunning sense of arrival allowing the grandeur of the sandstone façade to be continuously observed and appreciated.

To help situate the building within the Sandstone Precinct the proposal has considered the potential to widen existing footpaths, particularly between the drop off lane and the building edge to allow sufficient space between the two. The drop lane also provides the opportunity to extend the paving at the northern and southern corners, allowing landscape and activation to spill out from the building's interior.



**Gresham Street Porte Cochère** Grand Hotel

# Grand Hotel Lobby

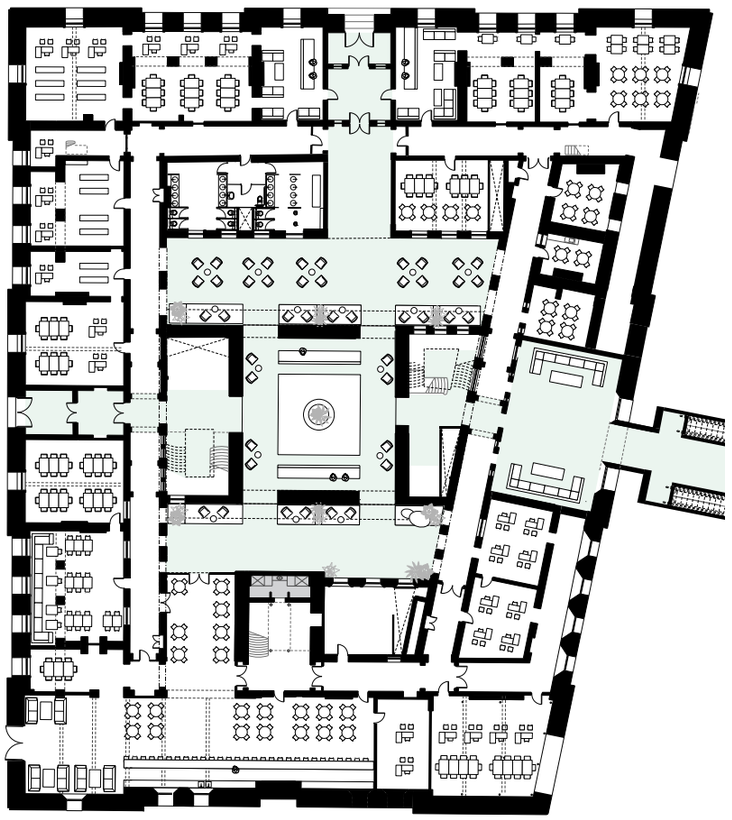
The Grand Hotel's dramatic entrance off Gresham Street, through the original Minister's entrance to the Lands Building, instils a moment of grandeur and sense of having arrived at one's destination. The immediate opening of the main door by the doorman, his warm smile and greeting, visibly conveys the "Raffles Difference'.

A select collection of specialty retail shops, offering fine jewellery, watches, fashion and lifestyle accessories are located along one side of the main entrance, with the main reception lobby and elevators to the accommodation levels straight ahead. In the centre of it all is the trademark Raffles oversized stunning arrangement of fresh / seasonal flowers.

The reception area sits beneath the walls of the Central Record Strong Room located at the heart of the building. The thick walls denote the original purpose and function of the rooms above and provide order to the flowing spaces of the hotel lobby. Significantly, the reception area sits within the middle of the original carriageway that wound through the building's two atria leading to the carriage entrance on Gresham Street. The proposal seeks to clearly reinstate the reading of the old carriageway, thus allowing guests and public to once again interpret the heritage of this grand building.

Importantly, the Grand Hotel lobby will provide the check-in services for both the Grand Hotel and the Heritage Hotel. All arriving guests staying at Raffles Sydney will be afforded the same welcome experience no matter which part of the Sandstone Precinct they will be staying. Operationally, this makes an easy link between the two buildings necessary. The design proposal utilises the existing formal order and spatial arrangements of the ground floor lobby to naturally guide guests staying in the Heritage Hotel through and under Loftus Street.

Surrounding the lobby on the Ground Floor of the Grand Hotel are a number of retail outlets, the Raffles Long Bar and Steakhouse, and the Raffles Main Dining Room. The components will be covered in more detail in the 'Total Lifestyle Environment' section of this report which outlines the retail, dining and other supporting programs within the hotel facilities.



**Grand Hotel Lobby** Key Plan


RAFFLES


RAFFLES
RAFFLES

# Heritage Art Hotel Courtyard

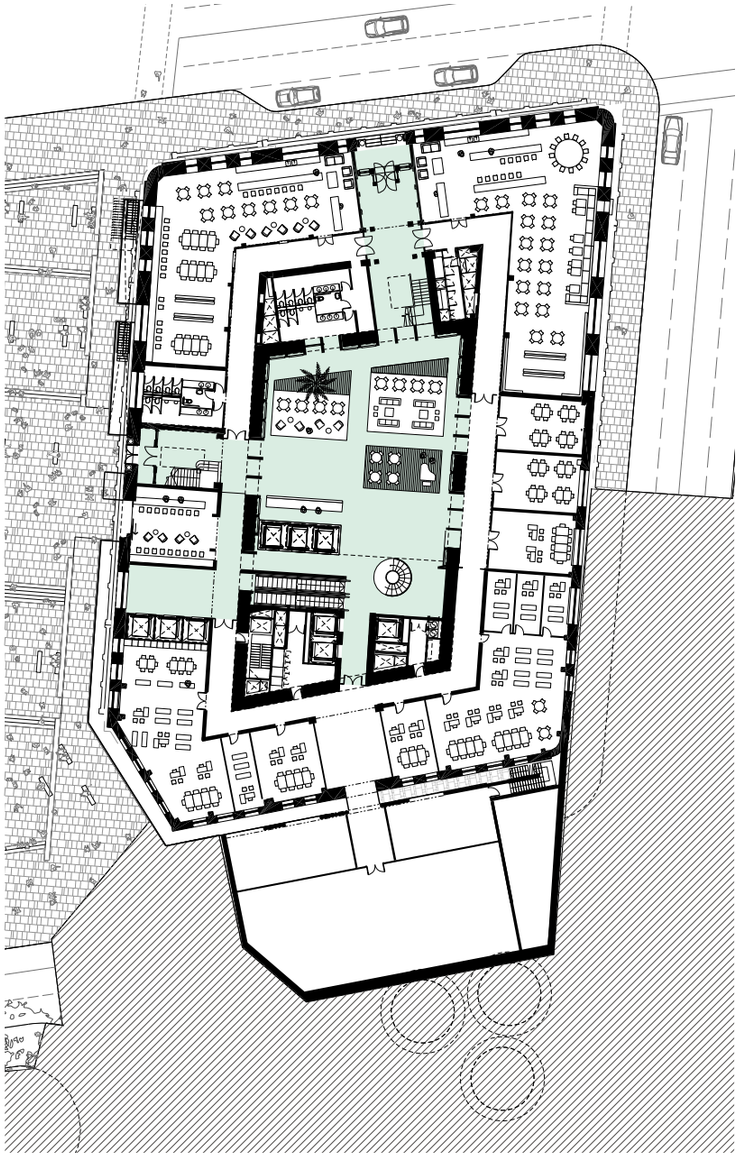
If staying in The Heritage Art Hotel, in-house residents will arrive at the Gresham Street Main entrance and be welcomed and checked into the hotel, in the same personalized manner as those staying in the Grand Hotel.

Following registration the newly arrived hotel residents will be escorted across the short distance of the reception lobby to the elevators that will take them directly to their accommodations in the Heritage Art Hotel.

The ground floor of the Heritage Art Hotel Courtyard will remain at the existing level of the current courtyard car park, but is proposed to be transformed into one of the great public spaces in Sydney. At 7 storeys in height, this grand public space has been configured to allow ample daylight to its interior casting light and shadow upon the finely detailed and crafted sandstone walls.

A sophisticated schedule of live music playing throughout the day and evenings will compliment the rich character of the interior established through the fine use of sandstone.

With multiple entries from Bridge Street and the Loftus Street public realm, the courtyard interior will be activated through a number of points, allowing people to meander through the connect spaces and experience the newly instated interior from a variety of vantage points.



**Heritage Art Hotel Lobby** Key Plan

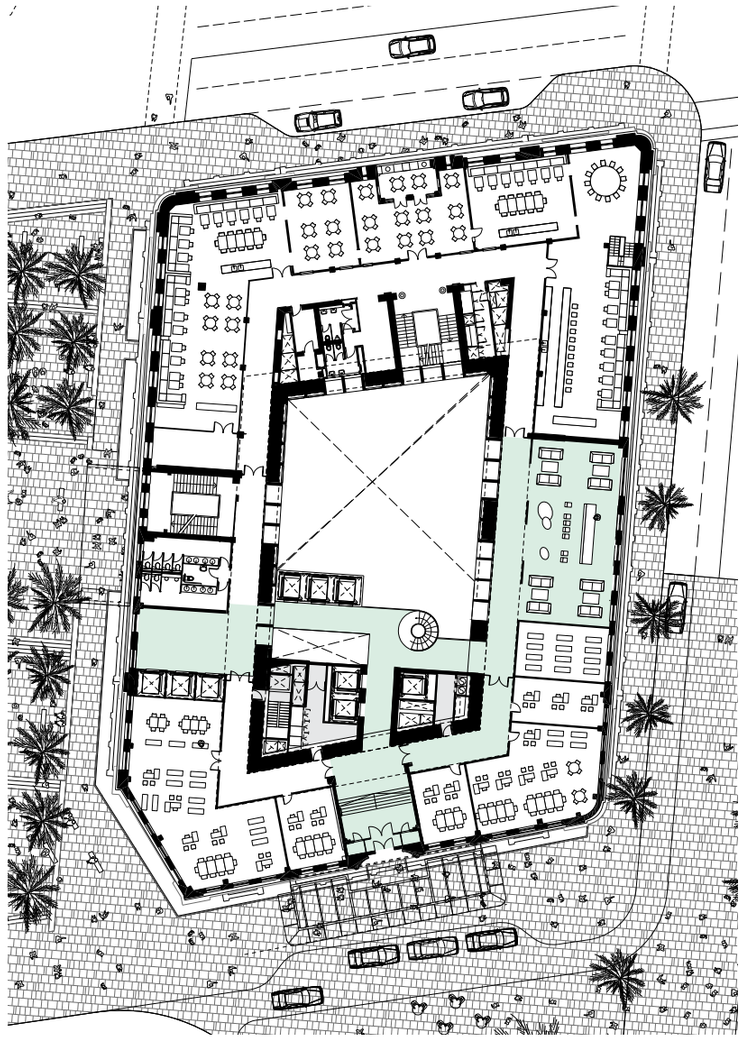
# Farrer Place Porte Cochère

## The Raffles Residences Lobby

Separated from the Grand Hotel Gresham Street entrance, the Raffles Residences porte cochère and lobby is accessed from Farrer Place.

For convenience, in-house residents of the Raffles Residences are welcome to register in the arrival lobby of the Raffles Sydney in the Lands Building by entering through the main Gresham Street entrance, however the intention is to designate a separate entry and arrival experience for both the Raffles Residences and the Tower Apartments.

The location of the porte cochère within Farrer Place has been design to allow the existing pedestrian flows through the space to remain largely as they currently exist.  The nature of Farrer Place as a public space for Sydney will also remain as part of the scheme proposals.



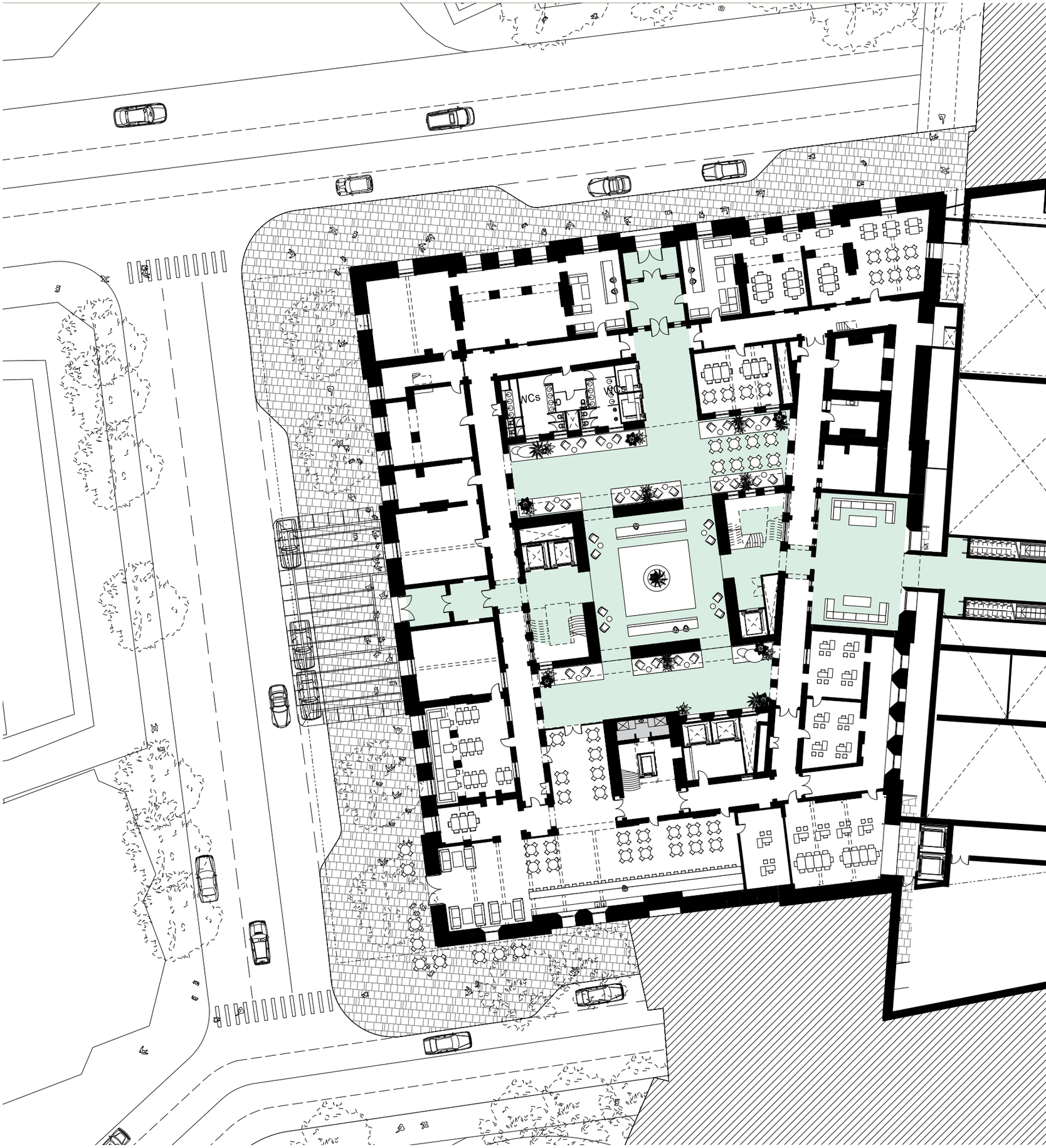
**Raffles Residences** Porte Cochère and **Lobby** Key Plan

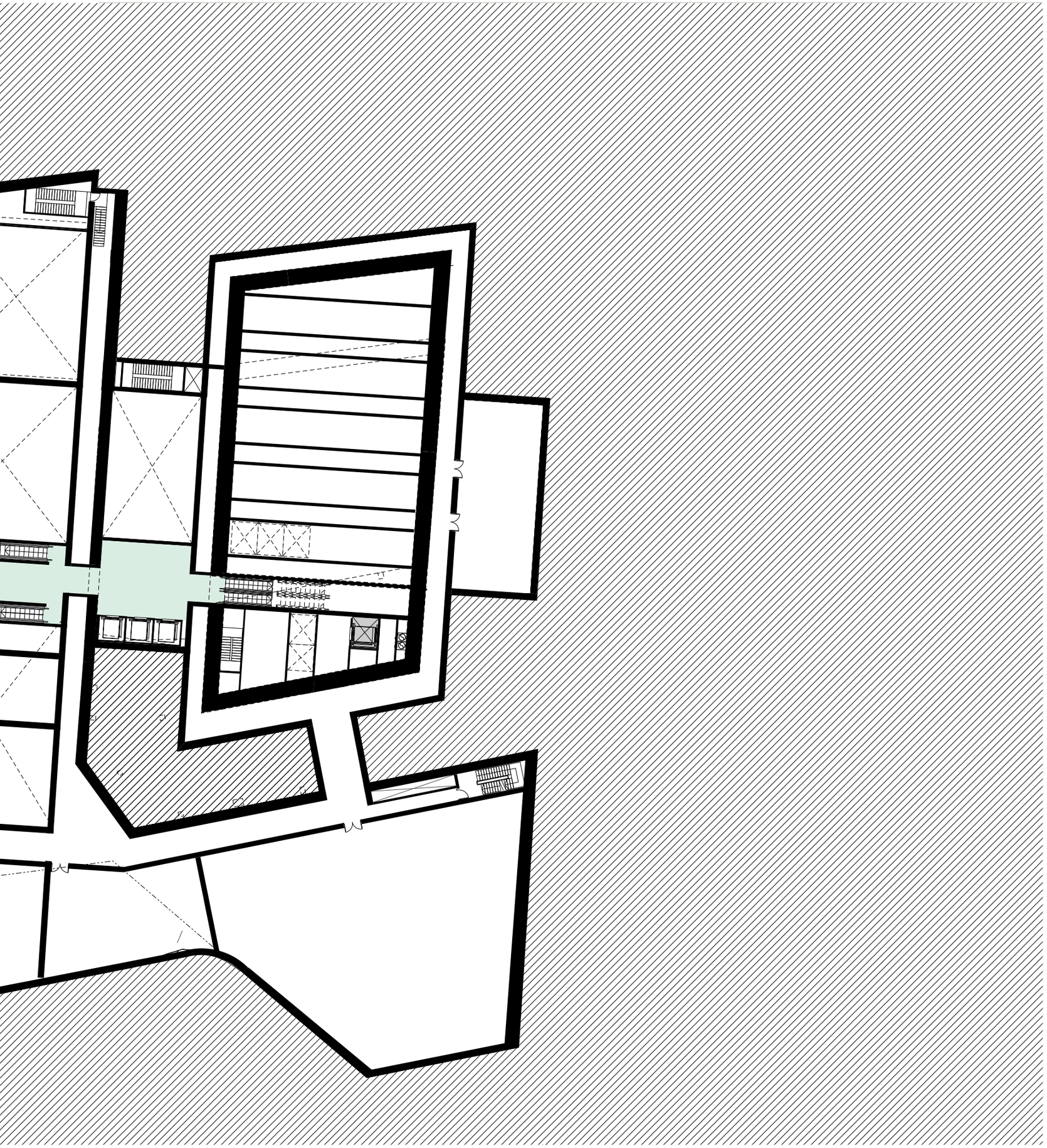

ONE
WAY

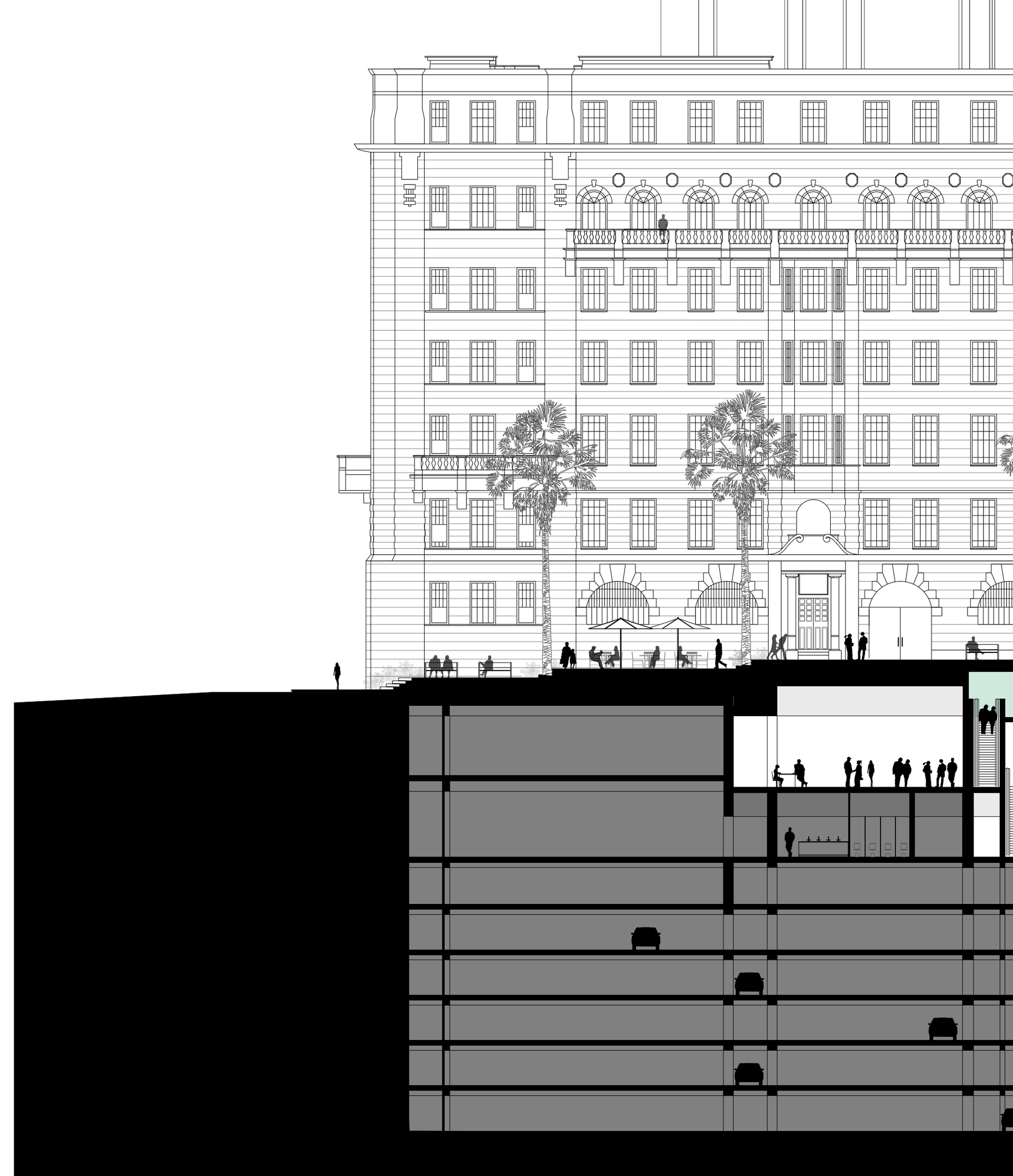
# Raffles Residences Lobby

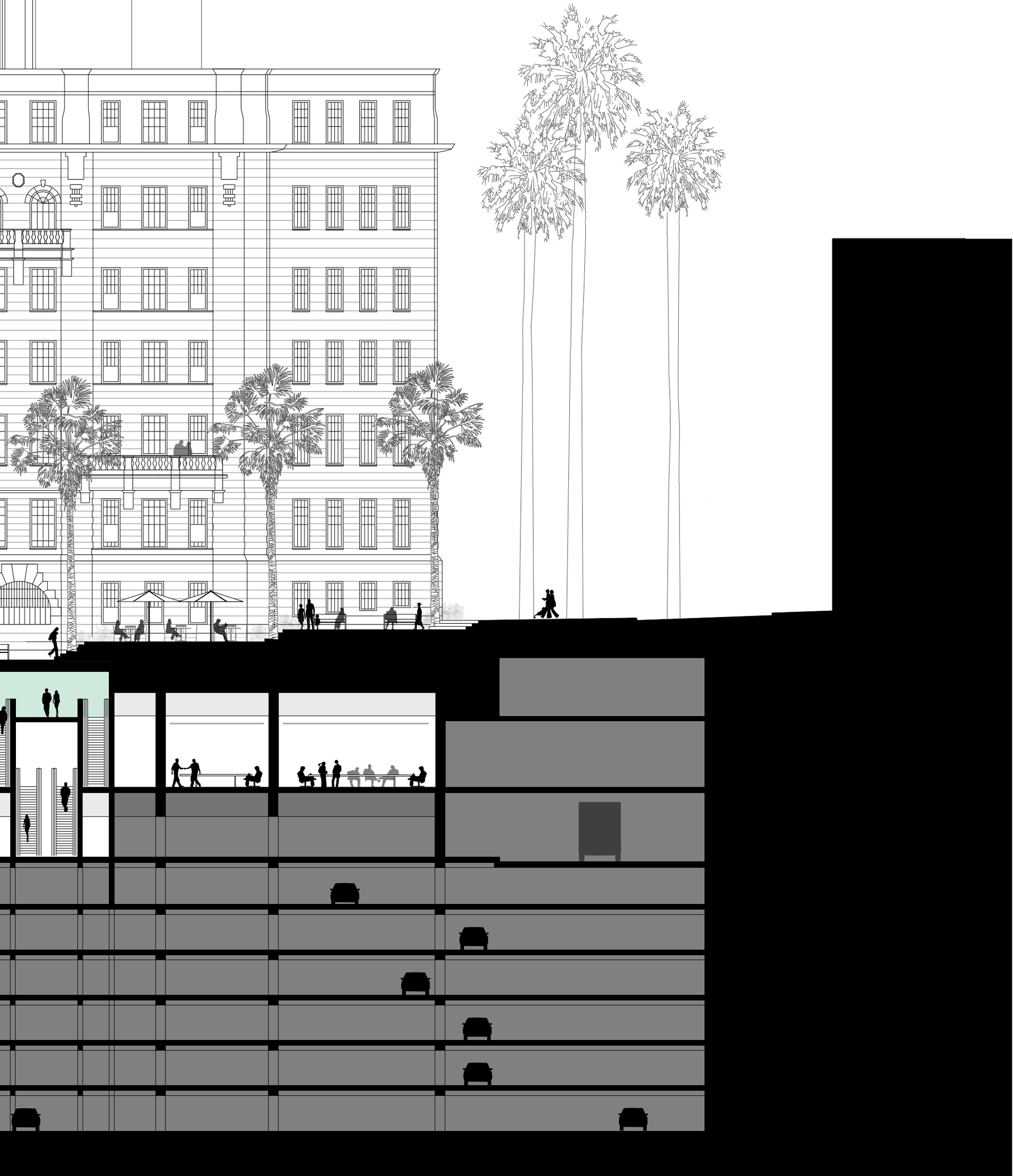
**Raffles Residences** Lobby

## Pedestrian Subterranean Link









# Total Lifestyle Environment
## Heritage Activation

# Total Lifestyle Environment

## By Centurion and Raffles

Within the Raffles Sydney campus a 'Total Lifestyle Environment' has been created, where the whole of the offerings is worth much more then the sum of its parts, considering both product and service.

Intensive logistical visioning and conceptualisation has allowed for the optimal use of spaces for the presentation and showcasing of moveable heritage items associated with the historic buildings,  the Consortium's permanent collection of Australian and Greater Asia contemporary art, as well as the integration of public facilities and the efficient movement of end-users between spaces. In order to best serve our varied business models, at times innovative space planning further provides for the required separation of facilities, patrons and uses.

The 'Total Lifestyle Environment' provides all end users with the necessary amenities to meet and exceed their expectations and bring them and those they influence back for repeat visits and patronage of the hotel and its facilities.

When conceptualising an iconic hotel in today's fast paced and competitive environment, the expectations of all stakeholders / end-users has never been higher.

To meet and exceed these expectations, we have developed the "Total Lifestyle Environment' which encompasses all of the affecting components that factor into creating successful hospitality, culinary and other lifestyle experiences. Only when these factors are in sync can there be assurance of an acceptable overall experience.

The Raffles Sydney as a Grand Historic Hotel has a very generous amount of components making up its unique 'Total Lifestyle Environment'


### Public Areas

The **Centurion Art Collection,** an over 500 piece permanent collection of Australian (60%) and Greater Asia original art forms focused on the contemporary art works of established and emerging artists.

Original art of the collection to be featured in all public and accommodation areas of the Raffles Sydney.  Art Collection and Heritage tours to be scheduled daily.

The **Sandstone Precinct Interactive Heritage Centre**, a comprehensive interactive facility conveying the story from inception of The Sandstone Precinct through the restoration and redevelopment which has resulted in the Raffles Sydney.

Exhibits to include historic documents, artefacts, photographs and other memorabilia with a small retail shop to offer related items for purchase.

## Food and Beverage Outlets

Facilities to be operated by Raffles

- Hotel Main Dining Room
- Long Bar
- Long Bar Steakhouse
- Executive Lounge for in-house residents
- Pool Side restaurant

Facilities to be operated by others

- Fine Dining Restaurant
- Informal Dining
- Australia's Bounty
- The Music Courtyard
- Carriage Bar
- Loftus Street Kiosk
- Farrer Place Kiosk

## Conference & Meeting Facilities

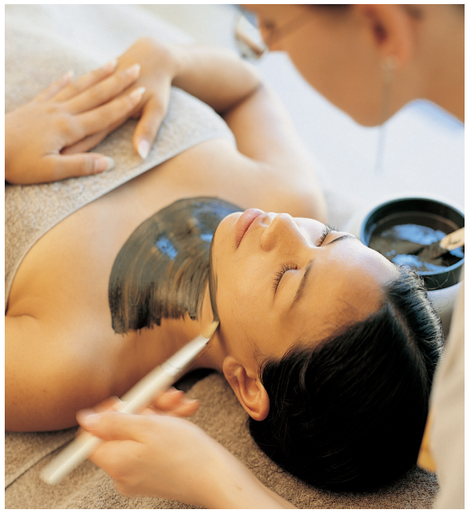
- Grand Ballroom for up to 500 persons banquet and 700 persons reception / meeting
- Breakout and Meeting Rooms

## Special Functions

- Wine Vault
- Japanese Restaurant
- Dessert Restaurant
- Jazz Bar
- Clock Tower Private Dining


## Specialty Retail Outlets

- Fine jewellery
- Watches
- Hotel (news stand and sundries)
- Fashion Women
- Fashion Men



## Leisure Facilities

- Spa Treatment Facilities
- 24 / 7 Fitness Centre and Gym
- Pedicure and Manicure Salon
- Roof deck swimming pool

# The Grand Hotel Overview

## Ground Floor - Lobby, Food and Beverage, and Retail

The Ground Floor Lobby and Reception areas are supported by a number or retail and dining venues. The Raffles operated Main Dining Room is located at the north-eastern corner of the building with seating spilling out into the covered courtyard. In the opposite corner, the old carriageway entrance is proposed to be transformed into the famous Raffles Long Bar. Activating the corner of Bridge and Gresham Streets, and flanking the main entry are a series of small, fine retail outlets catering for both hotel and outside guests. The arrangement of amenities is configured to ensure a vibrantly activated ground floor, bringing the grandeur and heritage of the Departments of Lands building to the fore.

## Central Strong Room

The central strong room at the heart of the Lands Building offers a unique opportunity to create a variety of experiences and offerings. At Level 1, the space is proposed to become a Heritage Interpretation Centre allowing the public to better understand the storied history of the building. On the levels above, the concept considers Level 2 as a private Executive Lounge area for hotel guests, and a 'Wine Vault' at the uppermost level of the strong room.

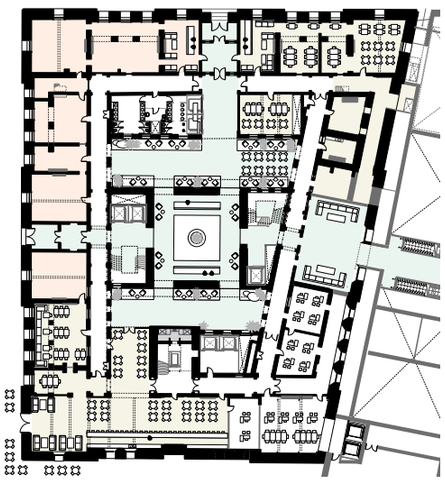
## Observatory and East / West Wings

The roof scape of the Department of Lands buildings contains some of the most dramatic and unique throughout the building. The proposal has considered the potential to relate this group of spaces as a suite of special functions, each which offer an attraction that compliments the other spaces.

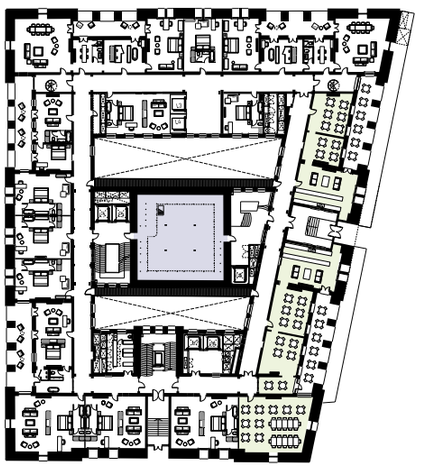
## Clock Tower

Located above the original lift location, a newly installed lift will provide access to one of the levels within the Clock Tower where private dinners may be organised for groups ranging in size between 2 - 12 people.

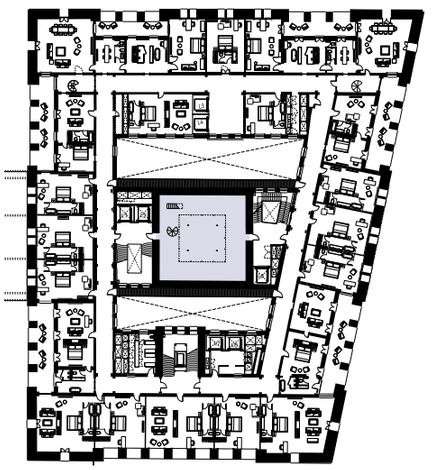
**Ground Floor - Lobby**



**Level 1 - Strong Room and Loftus St Terraces**



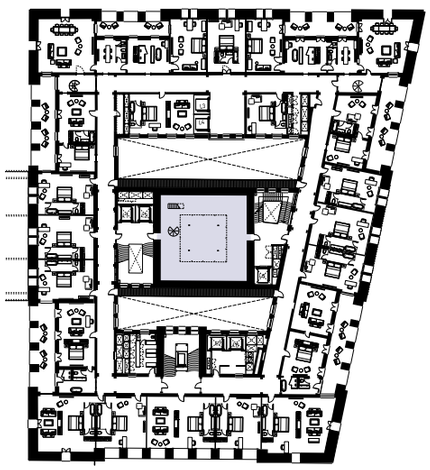
**Level 2 Strong Room**



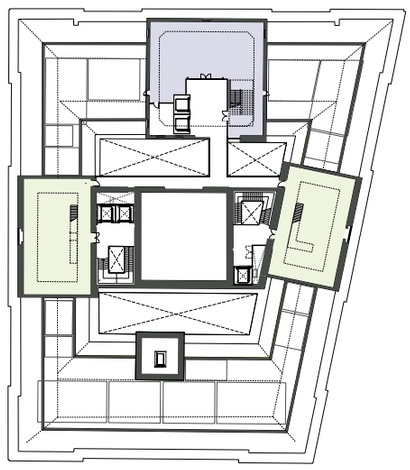
## Facilities Overview Schedule

| | Lobby + Public Areas | Food and Beverage | Retail | Unique Heritage Areas | TOTAL |
|---|---|---|---|---|---|
| Ground Floor | 832 sqm | 765 sqm | 408 sqm | | 2005 sqm |
| Level 1 | | 400 sqm | | 150 sqm | 550 sqm |
| Level 2 | | | | 150 sqm | 150 sqm |
| Level 3 | | | | 150 sqm | 150 sqm |
| Level 4 | | 335 sqm | | 200 sqm | 535 sqm |
| Level 5 | | 135 sqm | | 170 sqm | 305 sqm |
| Level 6 | | | | 45 sqm | 45 sqm |
| Level 7 | | 25 sqm | | | 25 sqm |
| | | | | | |
| Subtotals | 832 sqm | 1660 sqm | 408 sqm | 865 sqm | |
| TOTAL | | | | | 3765 sqm |

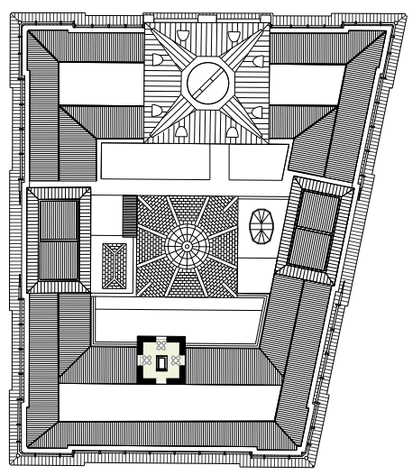
### Level 3 Strong Room



### Level 4, 5, 6 - Observatory and Wings



### Level 7 - Clock Tower Restaurant



# Raffles Long Bar & Main Dining Room

## Raffles Long Bar

Raffles Hotel Singapore became famous for its Long Bar, a drinking facility that actually started out as the front porch of the hotel, not as a bar. Similarly the Long Bar in The Grand Hotel (Lands Building) started out as a carriage entrance.

Patrons can enter the Long Bar either directly from the lobby of the hotel or through the former carriage entrance off of Gresham Street. As with any such establishment, the distance from the bar to its patrons is kept short and there is plenty of seating, just off the lobby for overflow, as well as a row of tall tables on Bent Street.

From about mid-day until early the next morning the Long Bar is the place to be, to enjoy your favourite spirited beverage. Perhaps overtime the Sydney Sling will become as popular as its Singapore cousin, which often sells over 5,000 glasses a day.

If you see peanut shells on the floor, this is not poor housekeeping, but part of the tradition of Raffles Long Bar.

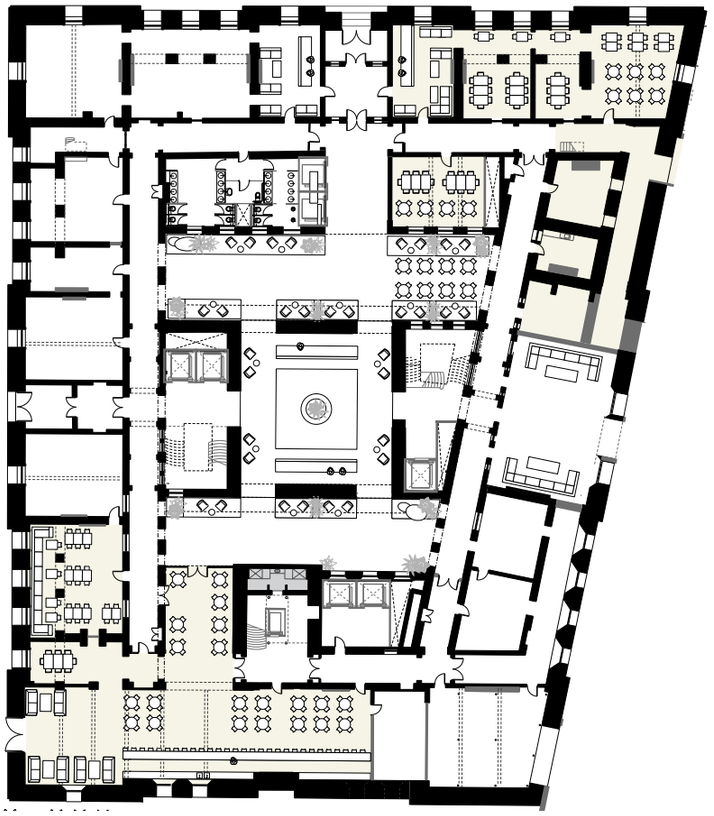
## Long Bar Steakhouse

A much more recent concept then the famous Long Bar is the Long Bar Steakhouse. This oozy restaurant is just off of Gresham Street, connecting to the Long Bar and is an ideal place to frequent for the best of aged Australian grass fed beef as well as its other home-style offerings. Many of its lighter items can also be enjoyed in the Long Bar itself, along with your beverage of choice.

## Raffles Main Dining Room

For three meals a day as well Supper, in-house as well as Sydney residents and visitors come from far & wide to the hotel's main dining room to enjoy its international fare. Access is either from the hotel's main lobby or directly through its entrance off of Bridge Street. Seating is available in the dining room itself or along the original carriageway in the lobby.

The kitchen is located along the semi-sunken areas fronting Loftus Street, connected to a back-of-house dumb waiter to allow deliveries and waste to pass without disrupting the front-of-house areas.



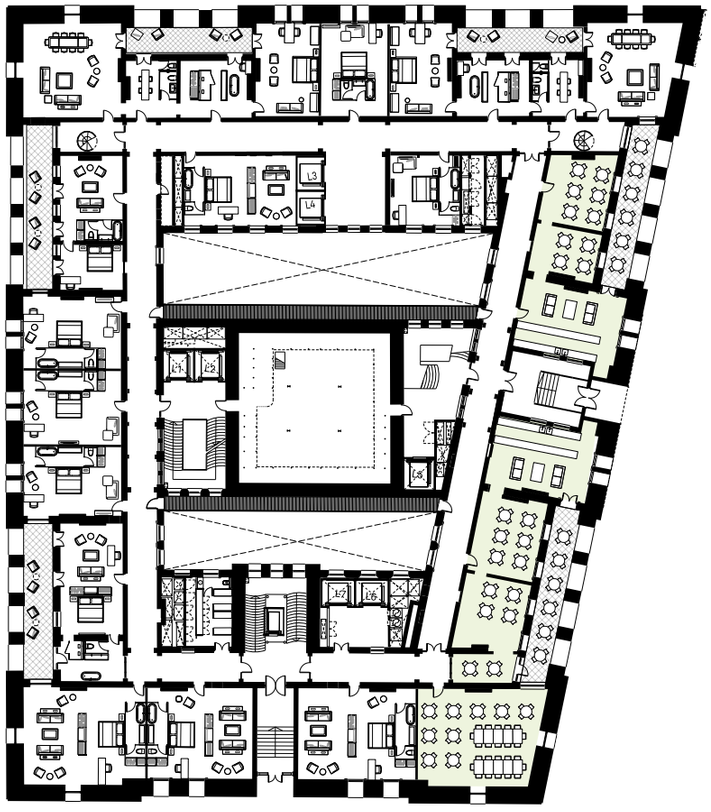
**Raffles Bar and Dining** Key Plan

# Loftus Street Restaurants

## Loftus Street Restaurants

In the spaces and open terraces over looking the newly pedestrianised Loftus Street will be located two well known Sydney restaurants - one restaurant catering for a fine dining experience, and the other for more casual dining. In addition to the seating inside and on the terraces, lighter fare can also be enjoyed in the seating areas created in the pedestrianised areas Loftus Street.

Whilst these spaces could have been allocated for guest accommodation, the location of these offerings aids the heritage activation principles envisaged for the precinct through their public street engagement.



**Loftus Street Restaurants** Key Plan

**Loftus Street** Terrace Restaurant

# Unique Heritage Areas

## Interpretative Heritage Centre - Level 1

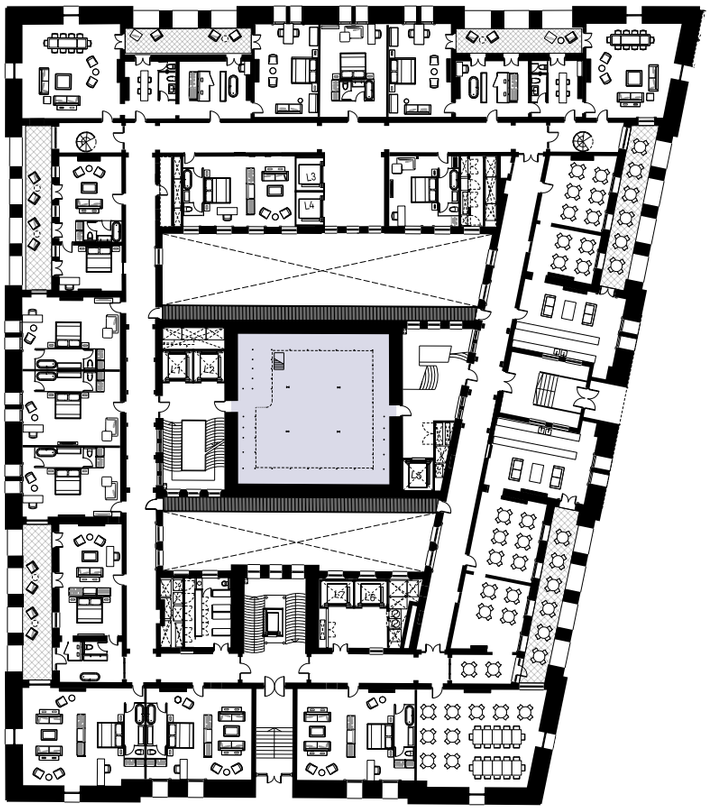
On Level 1 of The Lands Building, in the first level of the original strongrooms, will be the Sandstone Precinct Interpretative Heritage Centre providing materials showcasing the history of the Sandstone Precinct Assets, as well as to related matters of interest, including the restoration and re-development of the structures and their impact over time on the Sydney community and farther afield. Where appropriate and possible, this centre will also house original furnishings and memorabilia displays linked to the history of the buildings, Sydney and NSW.

Access will be open to in-hotel residents, Sydney residents and visitors to the Hotel.

## Executive Lounge - Level 2

In the 2nd level of the strong room will be developed an Executive Lounge for in-house residents of the Grand Hotel and Heritage Art Hotel.  This facility will serve breakfast and light meals during the day, as well as cocktails in the evening as well as provide other executive lounge facilities.

Access to The Executive Lounge is via internal hotel resident elevators and is restricted to hotel guests.



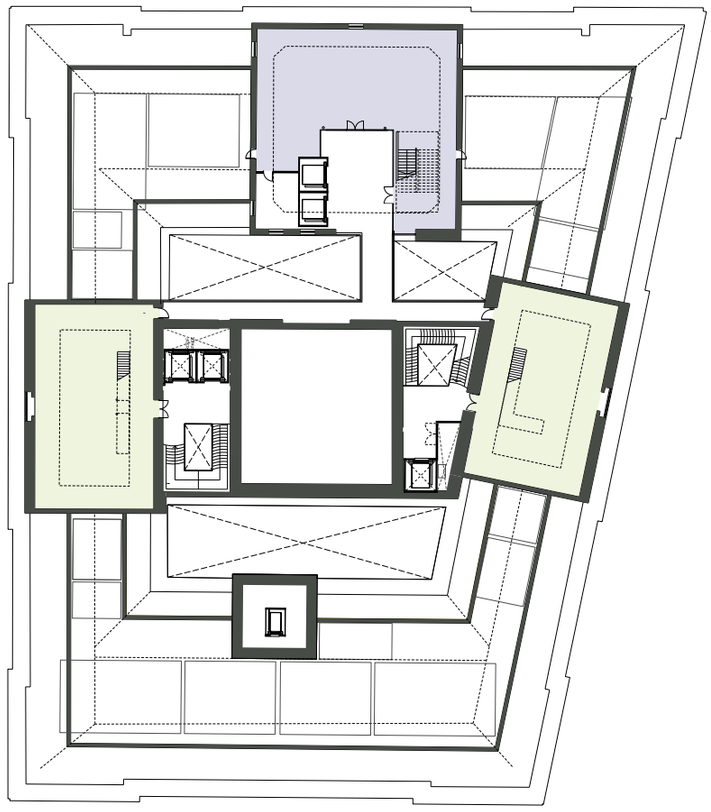
**Unique Heritage Area** Key Plan

## The Observatory and East and West Wings

The roof scape of the Department of Lands building provides a rich spatial variety of vaults, pavilions, galleries and an observatory offering a rare perspective of the Sandstone Precinct and surrounds.

These most interesting structures were constructed beginning in the early 1900's and utilized by the Lands Department to accomplish the task of drying architectural plans, the sighting of land parcels and storage of documents.

The Consortium strategically visualises the east and west wings as being a fine Japanese restaurant and a purveyor of decadent desserts. The Observatory levels are conceived to house a sophisticated jazz bar and the top floor of the venerable strong room as a wine cellar of note.



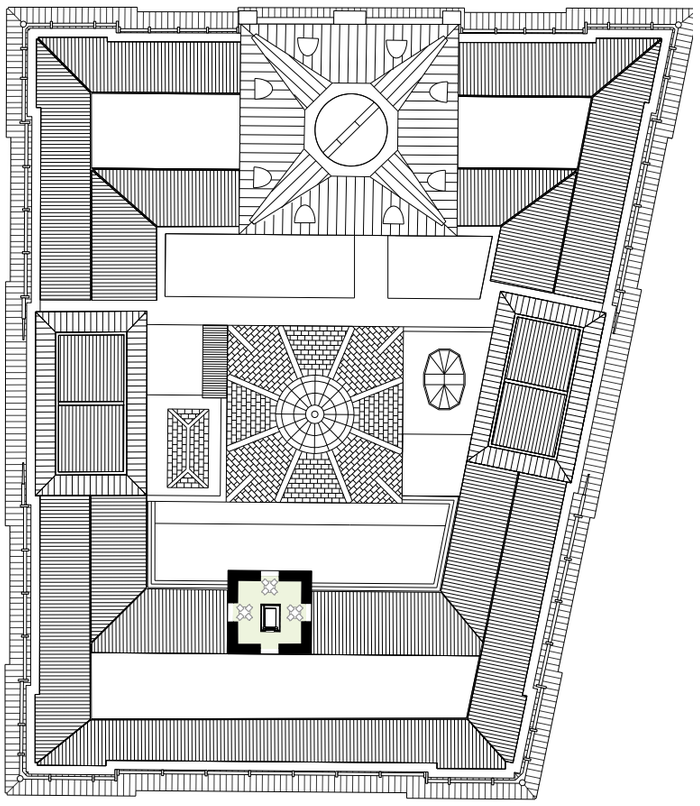
**Unique Heritage Area** Key Plan

# Unique Heritage Areas

## The Clock Tower

Within the clock tower, an intimate private dining room will be available for groups between 2 - 12 people offer an truly bespoke dining experience with views of the precinct and harbour beyond.

Located above the building's original lift, this small and exclusive space will provide access to areas previously inaccessible to the public, facilitating the activation of heritage spaces previously unavailable to the public.



**Unique Heritage Area** Key Plan


CHRISTIE
CORPORATE

# The Heritage Hotel Overview

The Heritage Hotel and spaces beneath the existing building and Loftus Street provide a full programme of amenity and special functions that support the 'Total Lifestyle Environment' concept.

The Heritage Hotel and its associated public spaces, food and beverage outlets, and amenities all benefit from the multiple entries afforded from 3 of the building's 4 elevations, and spread across 2 levels.

Situated at the base of the Heritage Hotel Courtyard is the Raffles Grand Ballroom and associated Pre-Function space, drawing its guests through the courtyard lobby above and the subterranean link beneath Loftus Street. A separate Conference Facility sits one level above the Ballroom serving events both associated with the Ballroom or operating independently.

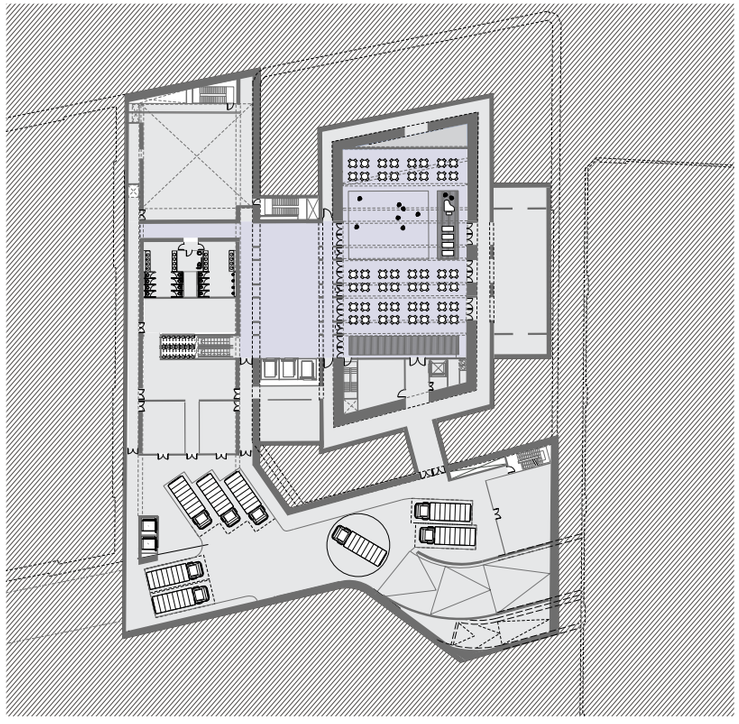
The ground floors accessed from Bridge and Loftus Streets, and Farrer Place provide a diverse mix of retail, food and beverage and lounge spaces that interact with one another and compliment each others' experience.

At the top of the building, a Wellness Centre and Spa occupy the spaces of the existing gallery and the roof is proposed to be used as an outdoor pool deck.

**Facilities Overview Schedule**

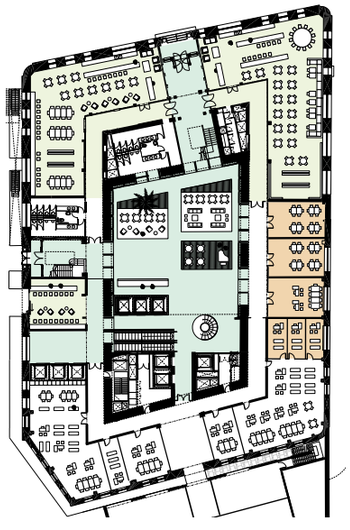
| | Lobby + Public Areas | Food and Beverage | Retail | Special Functions | TOTAL |
|---|---|---|---|---|---|
| Basement Level 1 - Ballroom | | | | 865 sqm | 865 sqm |
| Ground Level (Lands) - Conference | | | | 790 sqm | 790 sqm |
| Level 1 - Heritage Hotel Lobby | 730 sqm | 685 sqm | 180 sqm | | 1595 sqm |
| Level 2 - Raffles Residences Lobby | 425 sqm | 555 sqm | 155 sqm | | 1135 sqm |
| Level 7 - Spa and Wellness | | | | 735 sqm | 735 sqm |
| Level 8 - Roof Deck Pool | | 30 sqm | | 1750 sqm | 1780 sqm |
| | | | | | |
| Subtotals | 1155 sqm | 1270 sqm | 335 sqm | 4140 sqm | |
| TOTAL | | | | | 6900 sqm |

Basement 1 - Ballroom

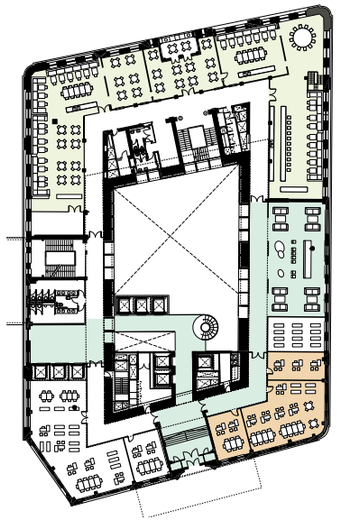


Ground Level - Conference Centre

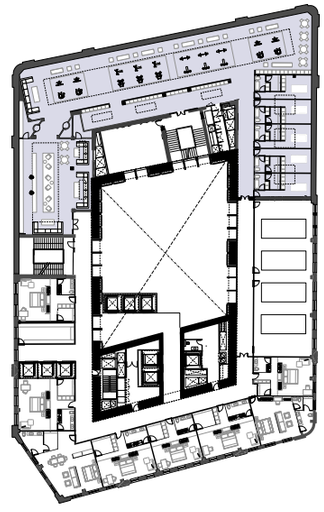
Level 1 - Heritage Lobby Level



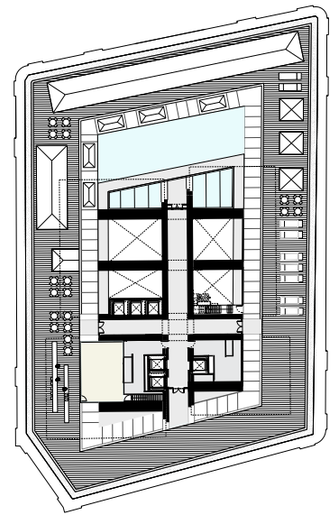
Level 2 - Raffles Residences Lobby



Level 7 - Spa and Wellness



Level 8 - Pool Deck and Bar



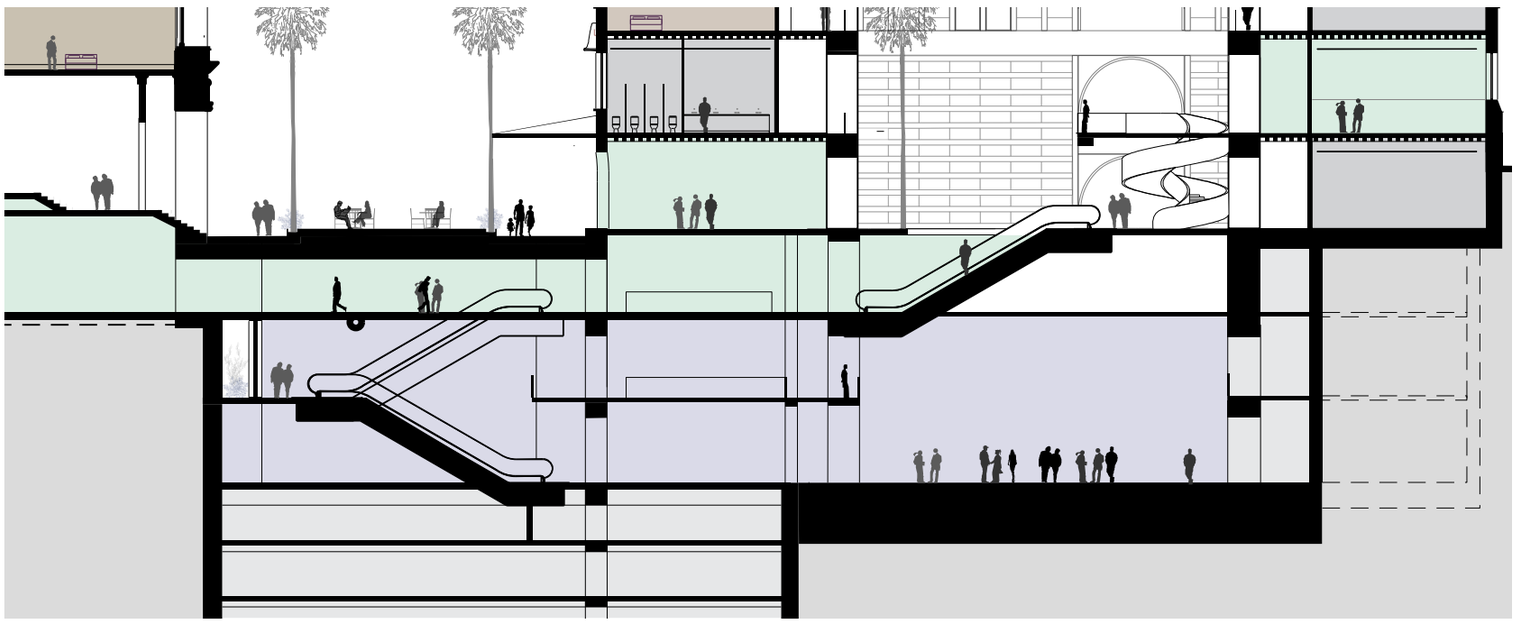
# The Raffles Grand Ballroom

## Meeting Rooms / Conference Facilities

Located below the existing courtyard of the Education Building, the Raffles Grand Ballroom will cater for a capacity of 450 persons for a sit down banquet and up to 960 persons for a reception function. The ballroom is divisible into a 60-40 configuration to provide flexibility. There are also four, state of the art meeting rooms within the conference centre area which is serviced by its own separate pref-unction / breakout space. Primary entry to the Grand Ballroom and Conference Centre is via the Loftus Street entrance, with accessibility through all other entrances including Farrer Place, Bridge Street and Gresham made possible by the subterranean pedestrian link.

| | |
|---|---|
| **Ballroom Area** | **540 sqm** |
| **Clear Height** | **8 m** |
| **Subdivision** | **2 bays - 60/40** |
| **Capacity Chart** | |

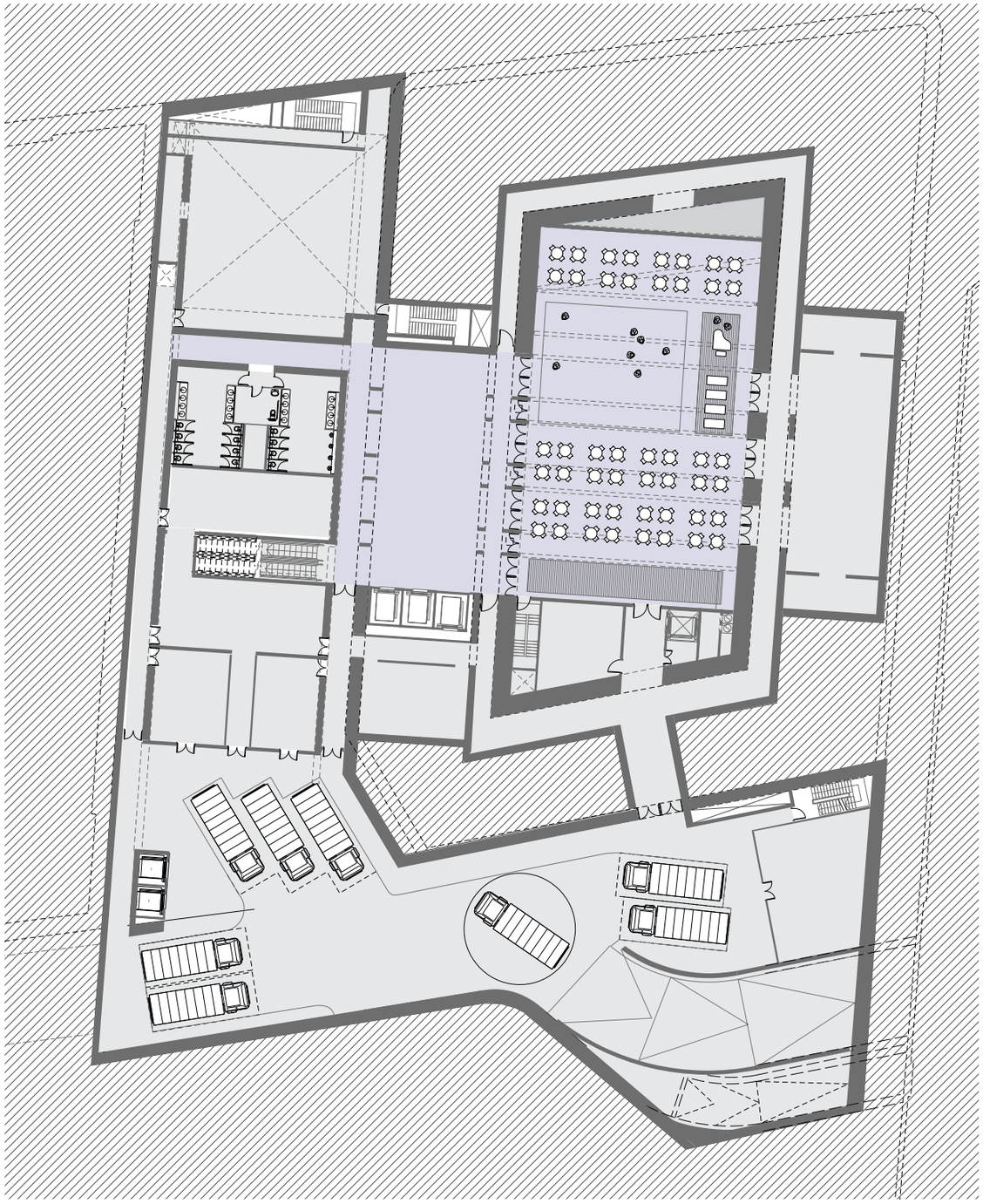
| Banquet | Theatre | Classroom | Reception | Cabaret | Buffet | Dinner Dance |
|---|---|---|---|---|---|---|
| 450 | 600 | 360 | 960 | 320 | 360 | 270 |



**Raffles** Grand Ballroom

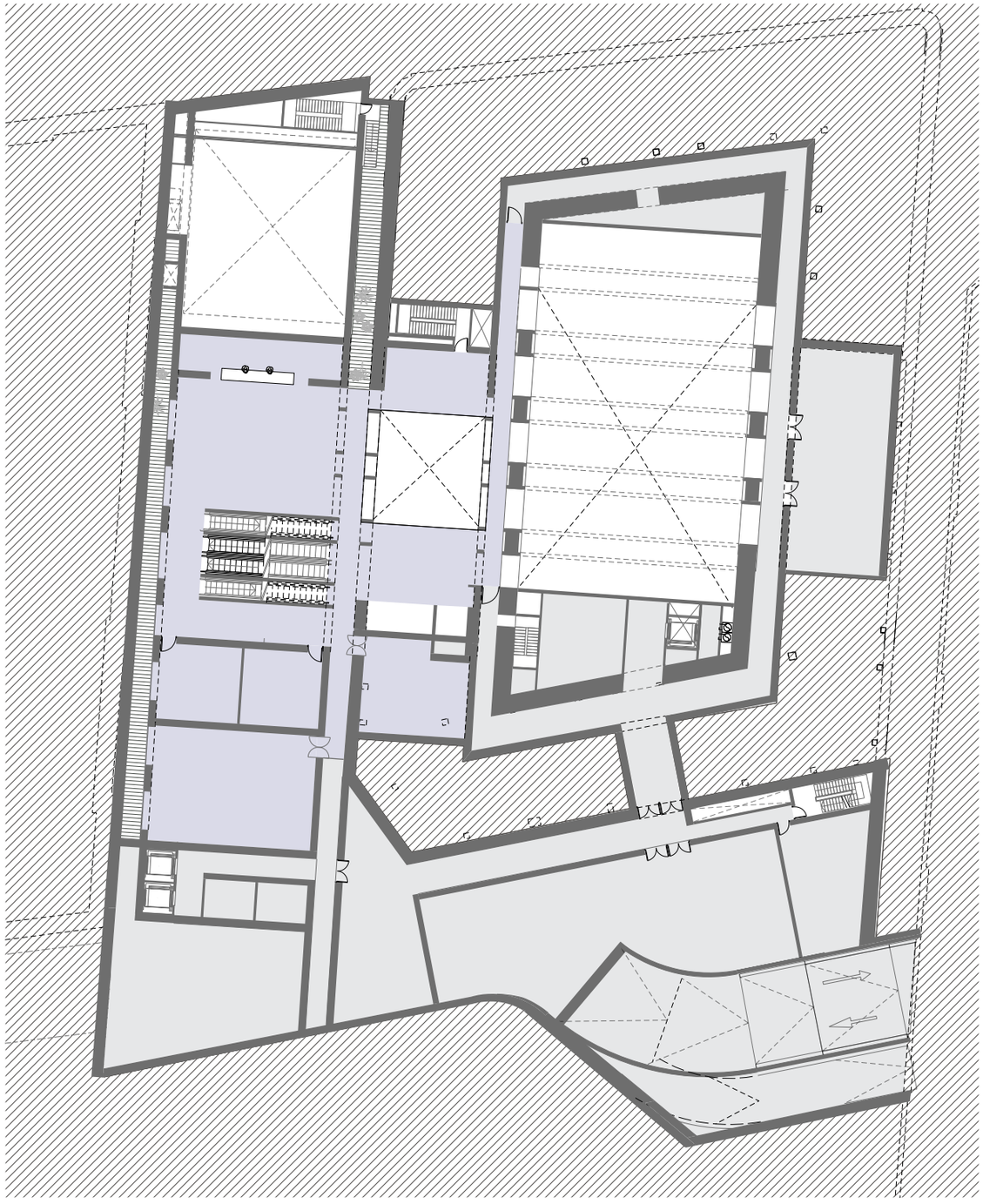
## Ballroom and Pre-Function Area

| | |
|---|---|
| **Ballroom Area** | **540 sqm** |
| **Pre-Function Areas** | **325 sqm** |



## Conference Centre Facilities

| | |
|---|---|
| Conference Rooms | 490 sqm |
| Pre-Function Areas | 300 sqm |



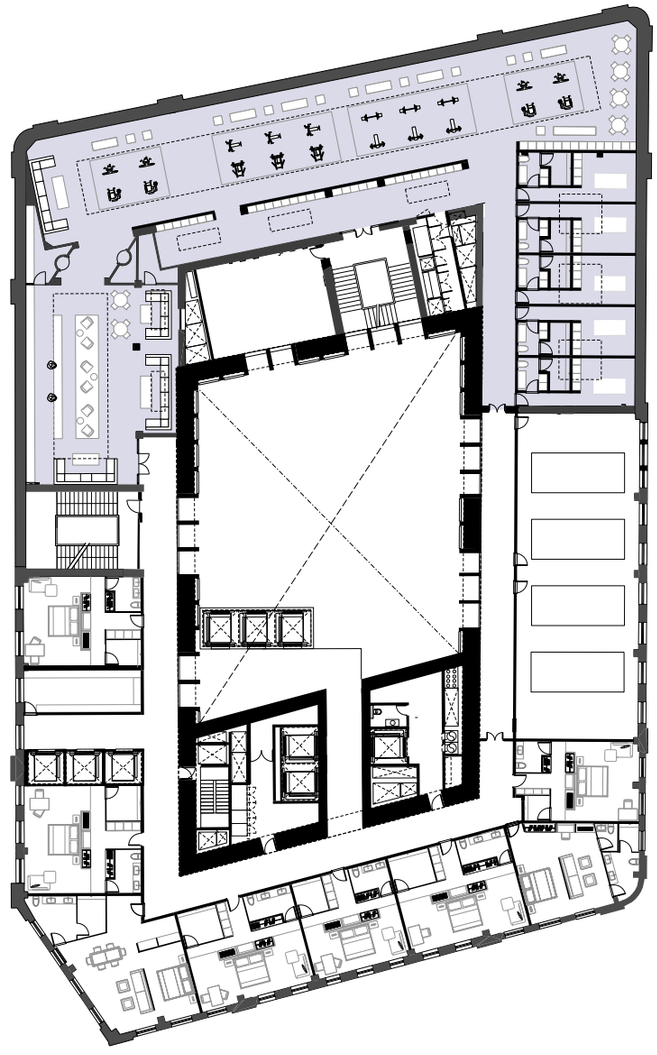
Pedestrian Subterranean Link

# Spa and Wellness Centre

## Health and Wellness Centre / Spa

Level 7 of The Heritage Art Hotel (Education Building) contains the Spa and Wellness Centre within the top lit gallery spaces at the northern end of the building. Whilst these areas have no perimeter windows the exterior, the natural light afforded from the listed skylights provides the perfect environment for the Wellness Centre.

Its offerings include traditional and holistic treatment regiments pampering the mind and body, as well as a full régime of healthy lifestyle exercises, complimented by complete gym and fitness facilities.

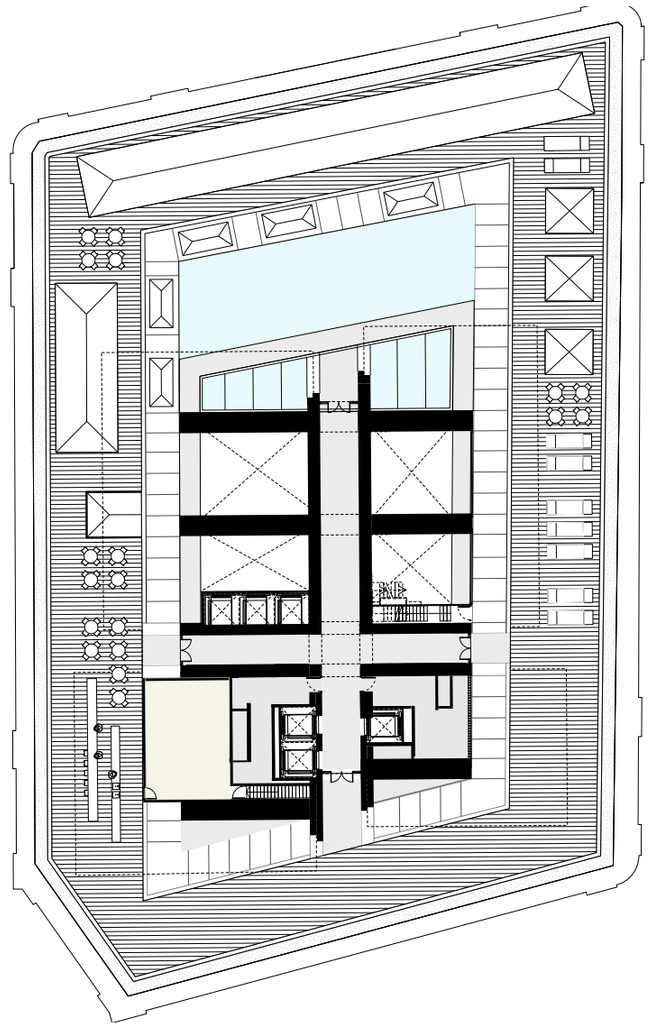


**Spa and Wellness** Key Plan

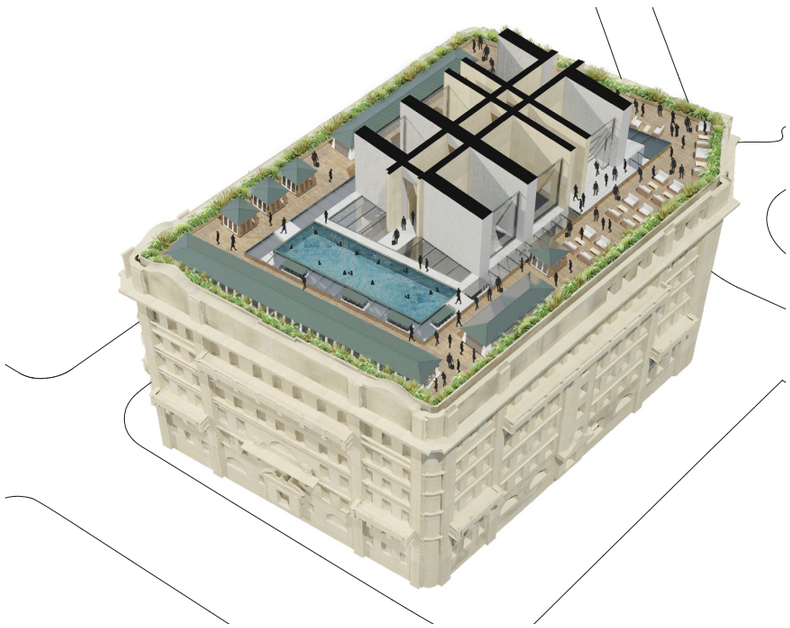
# Spa and Wellness Centre

## Roof Deck Pool and Bar

An outdoor swimming pool is located on the roof of the Education Building, serviced by a pool side bar and enjoying the northern and western sunlight.



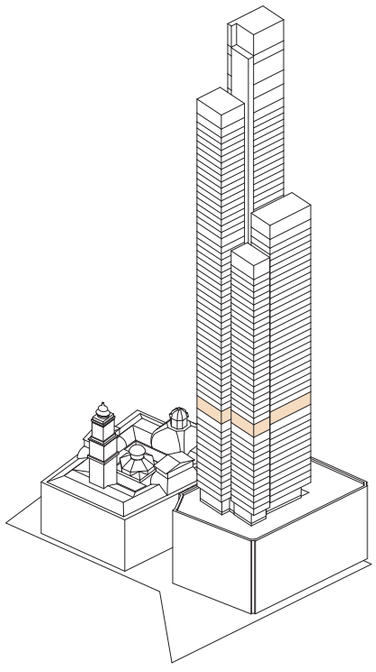
**Roof Pool Deck** Key Plan

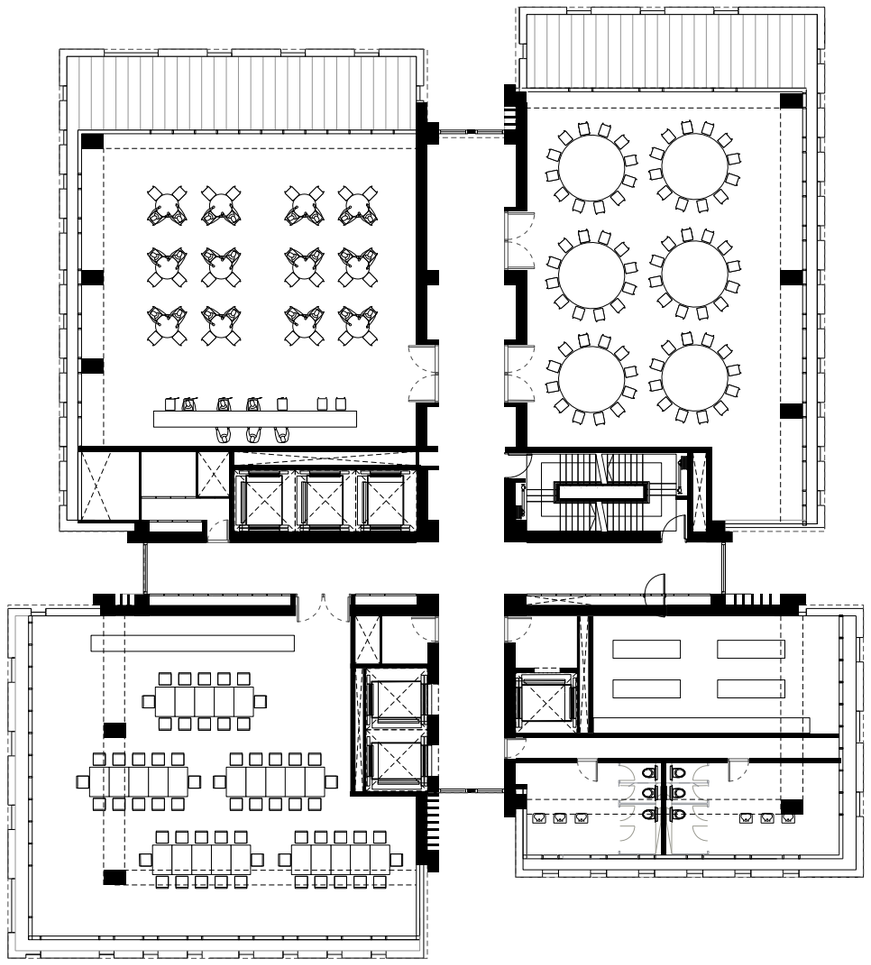


# Harbour View Function Centre

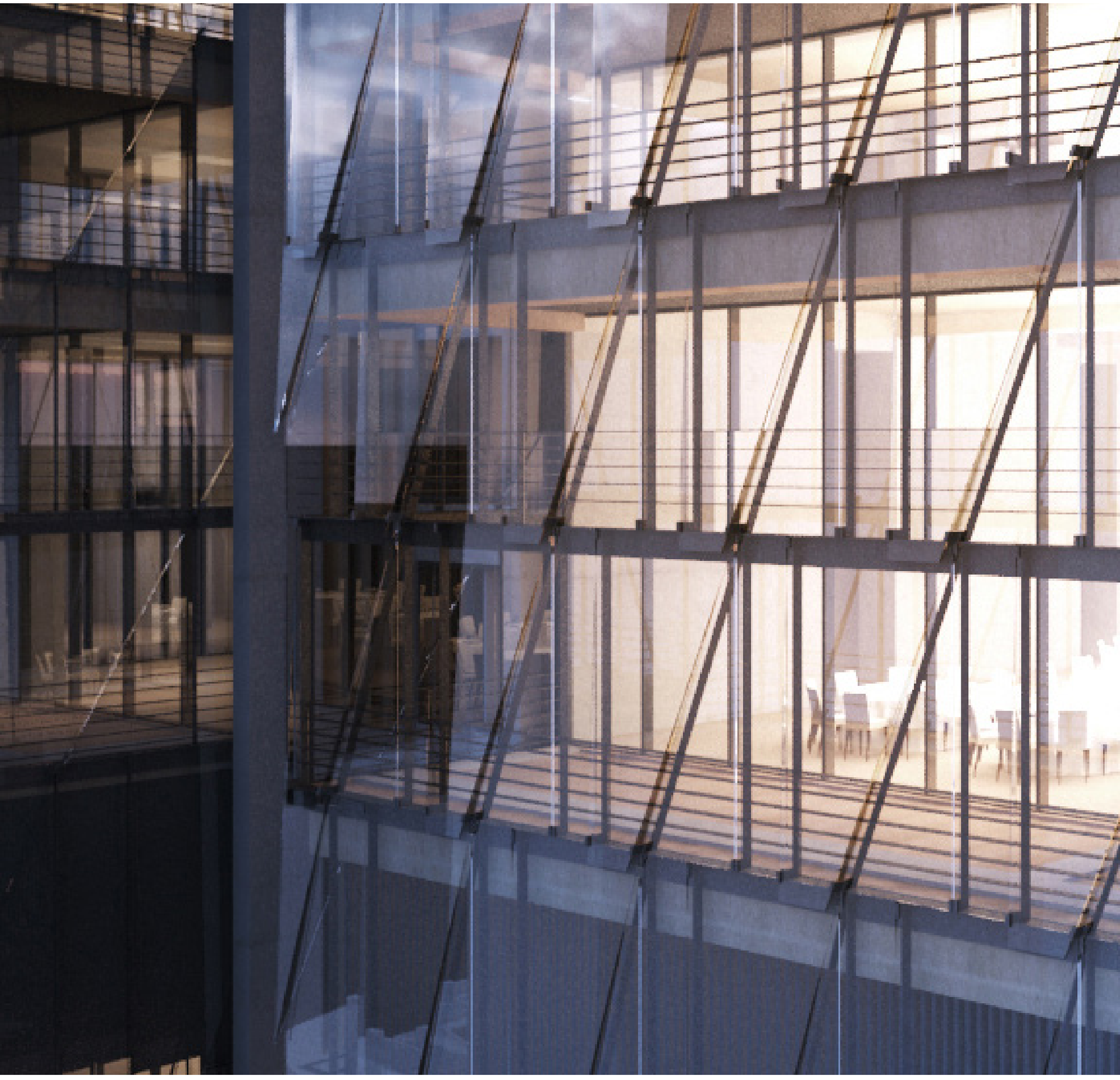
The Harbour View Function Centre is located on Level 20 of the tower and provides over 700 square meters of function space with uninterrupted views of the Harbour Bridge and Circular Quay. This double height function space can cater for a variety of different function types and sizes and is perfect for both daytime and evening events.

This facility works in tandem with the hotel's Grand Ballroom and Meeting Room facilities within the Education Building. Facilities are perfect for lectures, meetings and social lunches / dinners.





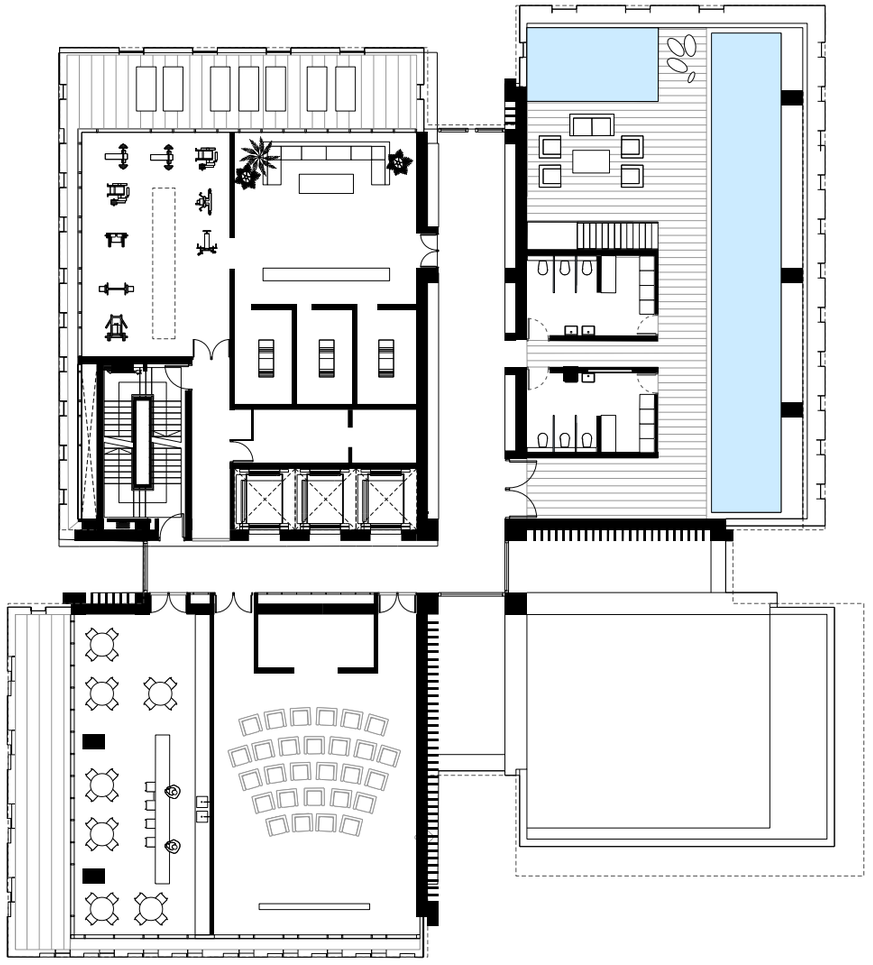
Harbour View Function Centre

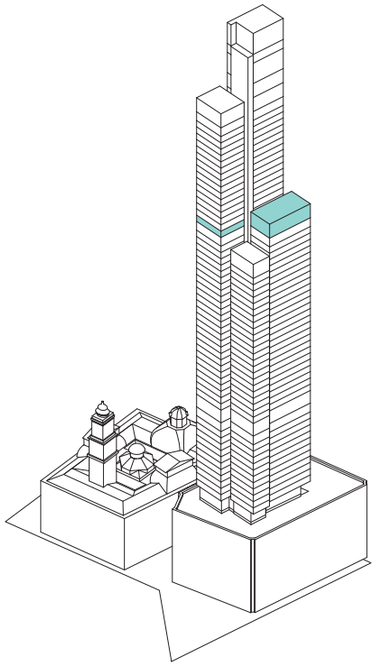


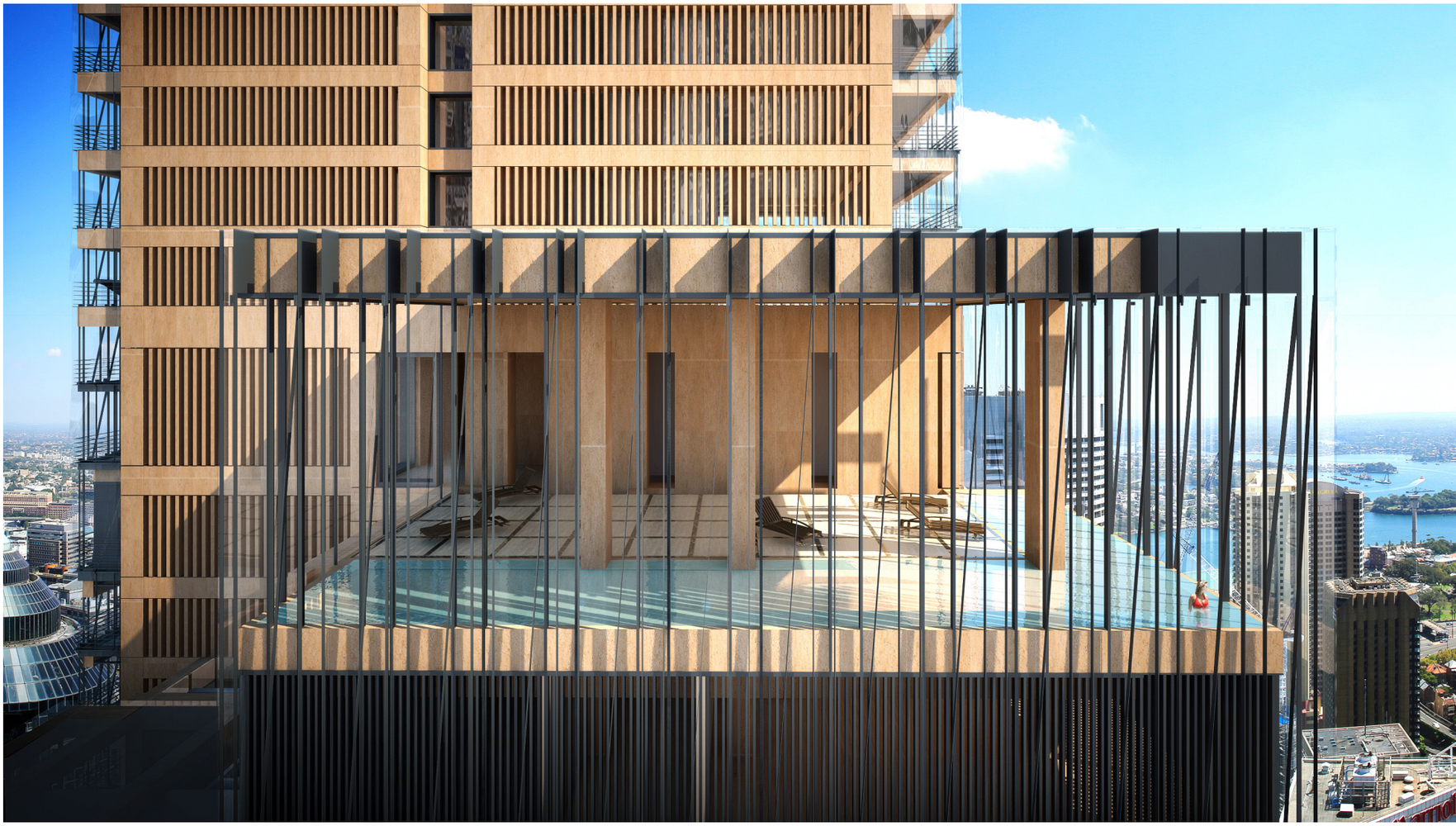
Harbour View Function Centre

# Tower Apartments Club Facilities

Level 48 of the Tower Apartments offers private facilities for Tower Apartment Residents including complete gym and fitness facilities, lap swimming pool, male and female lockers / sauna / steam rooms.  A media screening room and small bar area offer additional amenity for the residents and their guests.







**Tower Facilities** Pool

# Grand Hotel Accommodation

# Accommodation Overview

Throughout Raffles Sydney's three "Hotels within a Hotel' all accommodations modules provide the following base amenities:

- 55-65 inch smart televisions
- "Sleep Well' beds
- Frette Linens
- "Perfect View' vanity mirrors
- Fogless in-shower shaving mirrors
- ECO Washers
- Selected branded furnishings and antiques
- Spa Bath Amenities
- Pillow Menu
- Weighing Scale
- Coffee and Tea making facilities
- Complementary Mini Bar
- Complementary Wi-Fi
- Lighting mood settings (3) and individual temperature control
- Original art

The Raffles Sydney makes every effort to ensure that its in-hotel resident's stay is so enjoyable that they will come back again and again. To further ensure this, the hotels accommodations are segmented into Sleep, Bath, Relaxation and Work / Dining areas. Each of the above areas is intuitive conceptualized and designed to meet and regularly exceed the in-hotel resident's expectations.'

As part of the Facilities Overview Programme, the following section will address the accommodation across the three hotel components. Typical Suite and Room plans will illustrate the intent for the different room categories, with visualisations of the two larger suites from each of the heritage assets provided to give an indication of approach, finish and quality of the interiors.

The requirement to address an Indicative Materials Schedule is covered in the following pages through the many detailed visualisations of the two primary suites within the both the Grand Hotel and Heritage Art Hotel. Should the proponent be successful, the intention would be to appoint an Interior Designer / Design of international reputation to work alongside the Consortium's design team to consider and develop in detail the finer material selections and strategies to sensitively address the conservation of and intervention within the existing heritage fabric.

For all front-of house areas, the intention will be to select and confirm appropriate materials after a thorough and rigorous design process in consultation with the many stakeholders, including importantly the heritage advisers, to respect both the building's existing fabric and the requirement for a high end level of material quality and finish expected of a luxury hotel.

In all back-of-house areas, the material selections will be considered both for their suitability in the heritage context and for their durability as required by the particular area.

# The Grand Hotel

### Accommodation Overview

As outlined in the preceding section of 'Hotels within an Hotel', the Department of Lands building's grand scale and character leads naturally into the proposition of an 'all suite' hotel offering in contrast to the offering provided by within the Department of Education building.

The overriding intention in the room development of the Department of Lands Building seeks to maintain any existing fabric if at all possible. The proposals have configured the division of suites within the existing interior fabric to utilise that existing fabric to its fullest extent, including the use of existing doors and openings. The proposals permit the retention and conservation of all existing walls and where necessary only, additional new partition walls have been sensitively inserted to allow the division of a larger space into smaller suites.

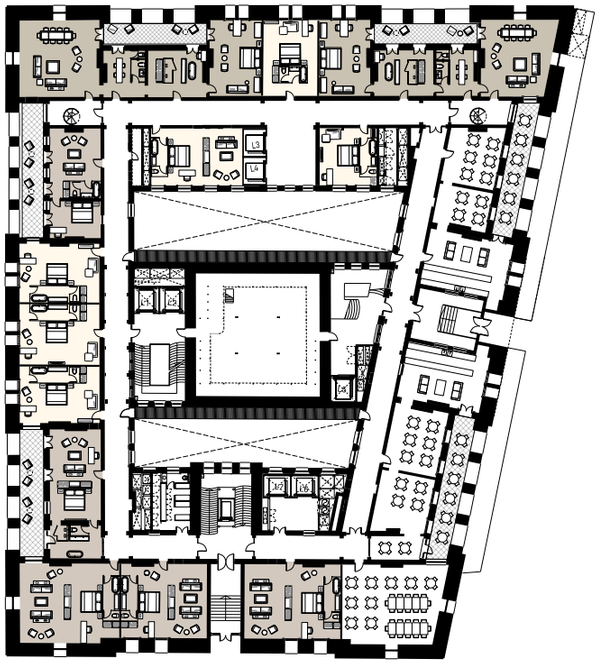
Three room categories exist within the Grand Hotel including the largest Landmark Suites, Personality Suites and the smaller Sandstone Suites.

The room layouts are largely similar across the three floors of accommodation reflecting the consistent existing interior wall arrangement guiding the division of room.

Where possible all fireplaces in the Lands Building will be restored and equipped with Bio-ethanol operational units.

### Level 1

Due to the minimal level differences between Level 1 and the outdoor public areas of Loftus Street, the proposal has located two Food and Beverage outlets to the terraces and surrounding interior spaces facing Loftus Street to avoid any potential privacy issues impacting upon the accommodation and to assist in the activation of the Loftus Street pedestrianised public realm. Landmark Suites benefit from the northerly aspect facing Bridge Street, whilst the Personality and Sandstone Suites establish their natural pattern around the other frontages.



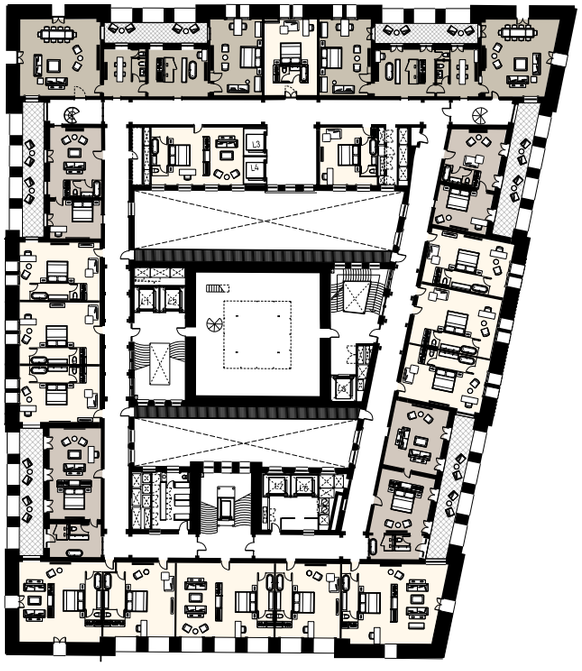
### Accommodation Schedule

The design proposal for the Department of Lands building includes 51 suites across 3 levels of accommodation as represented by the table below.

| | Landmark Suites | Personality Suites | Sandstone Suites | |
|---|---|---|---|---|
| **Avg. Size** | 160 sqm | 86 sqm | 49 sqm | |
| **Level 1** | 2 | 5 | 6 | 13 |
| **Level 2** | 2 | 8 | 10 | 20 |
| **Level 3** | 2 | 9 | 7 | 18 |
| | | | | |
| **Subtotal** | 6 | 22 | 23 | |
| **TOTAL** | | | | 51 |

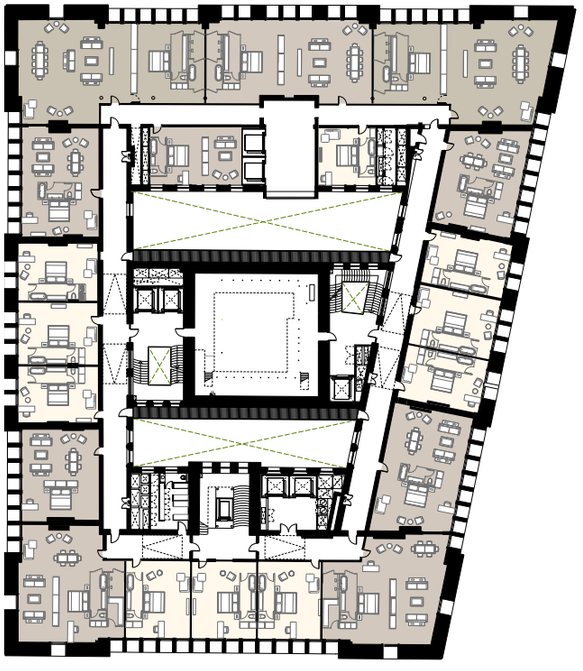
### Level 2

The order established on the floor below is largely continued within Level 2. Landmark Suites enjoy the benefit of the private northern terraces and natural division of rooms within the suites. Personality Suites facing east and west also benefit from the existing terraces whilst the Sandstone Suites are configured in larger existing spaces through the sensitive addition of new fabric.



### Level 3

Like the levels below, Level 3 is afforded with great height to the interior, with the primary differences being fewer existing interior walls and the lack of terraces. As a result, a higher degree of new fabric is required to attain the room division. Also of note, many of the existing fireplaces on the levels below do not continue to this floor, particularly in the large, open plan areas to the northern and southern wings of the building.

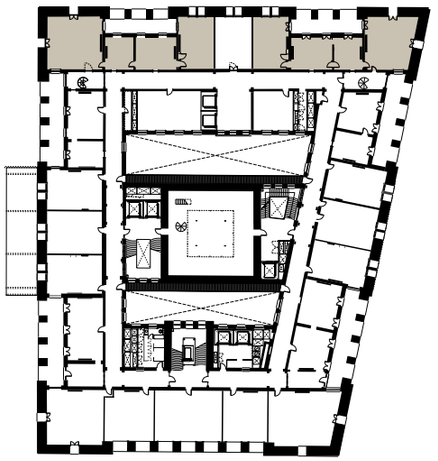


# Landmark Suites

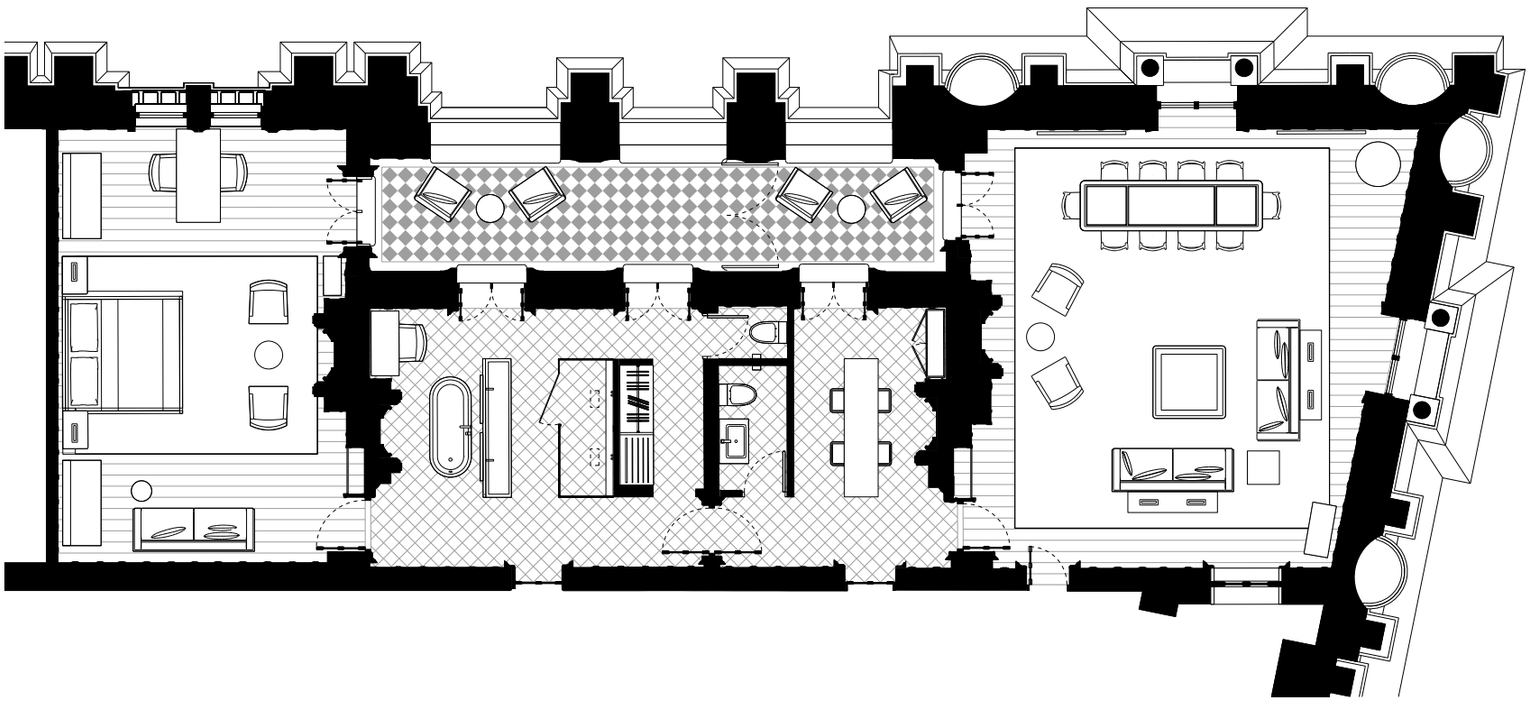
**Typical Landmark Suite**

These suites are the top accommodation category in the Grand Hotel segment and located in the Lands Building. The typical Landmark suite covers an area of 160 square meters and is located on the Bridge Street elevation.

The suites on Levels 1 and 2 include as part of its layout a private, triple bay open-air verandah, separate living / dining, bedroom, bathrooms / powder room / dressing room with closet and full pantry areas, all with restored Bio-ethanol fireplaces. Furnishings are traditional in design and include selected antiques. All artwork is original and is part of The Centurion permanent collection of Australian and Greater Asian modern / contemporary art. Certain items from the historical asset registry of the Lands Building will also be featured. Floors are exposed timber or tile / stone and in the bedroom and living room feature oriental carpets.



**Landmark Suites** Key Plan



**Landmark Suite** Bedroom

**Landmark Suite** Bedroom

**Landmark Suite** Terrace

**Landmark Suite** Lounge Room

**Landmark Suite** Bar

**Landmark Suite** Bathroom

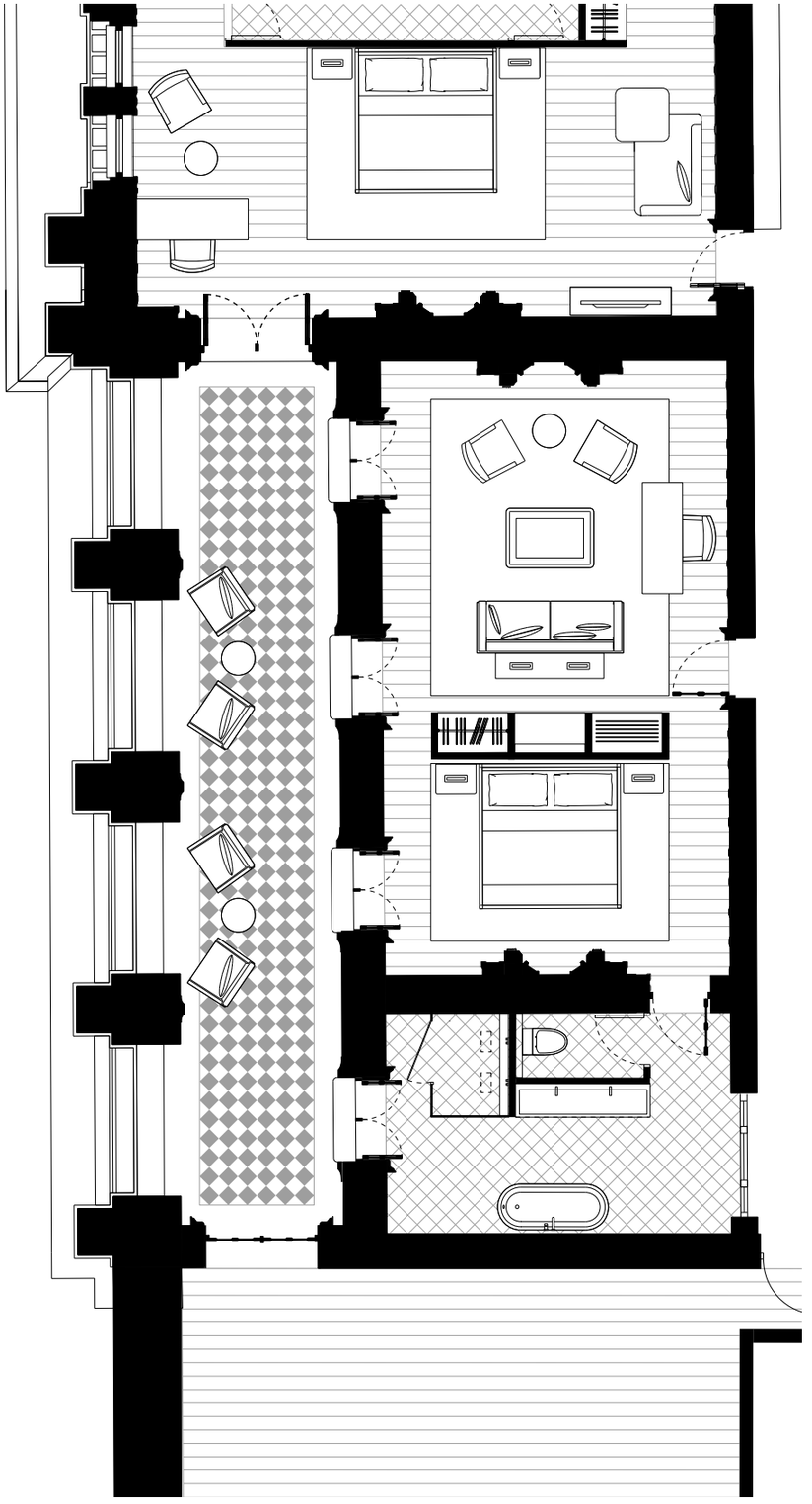
**Landmark Suite** Bathroom

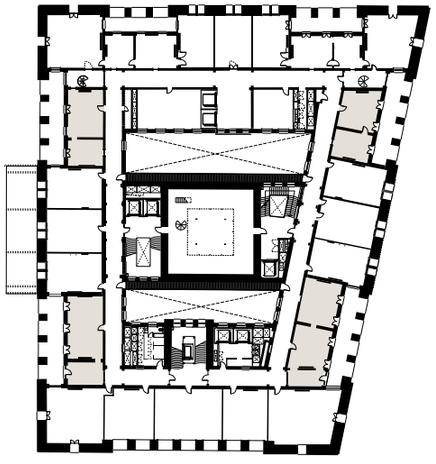
# Personality Suites

### Typical Personality Suite

Personality Suites are specifically identified by name to personalities that have been closely associated with the 'Sandstone Precinct Assets', Sydney, NSW, or Australia and have passed on.

The typical Personality Suite measures 86 square meters in area, and is located on the Gresham or Loftus Street elevation of the Lands Building. They include as part of their layout private, triple bay open-air verandahs, separate living and dining, bedrooms, bathrooms, a powder room, and a dressing area with closet. Living and sleeping areas feature restored Bio-ethanol fireplaces. Furnishings are traditional and include selected antiques and memorabilia associated with the personality for whom the suite is named. All art is original and is part of The Centurion permanent collection of Australian and Greater Asia modern /contemporary art. Certain items from the historical asset registry of the Lands Building will also be featured. Floors are exposed timber or tile / stone and in the bedroom and living room feature oriental carpets.



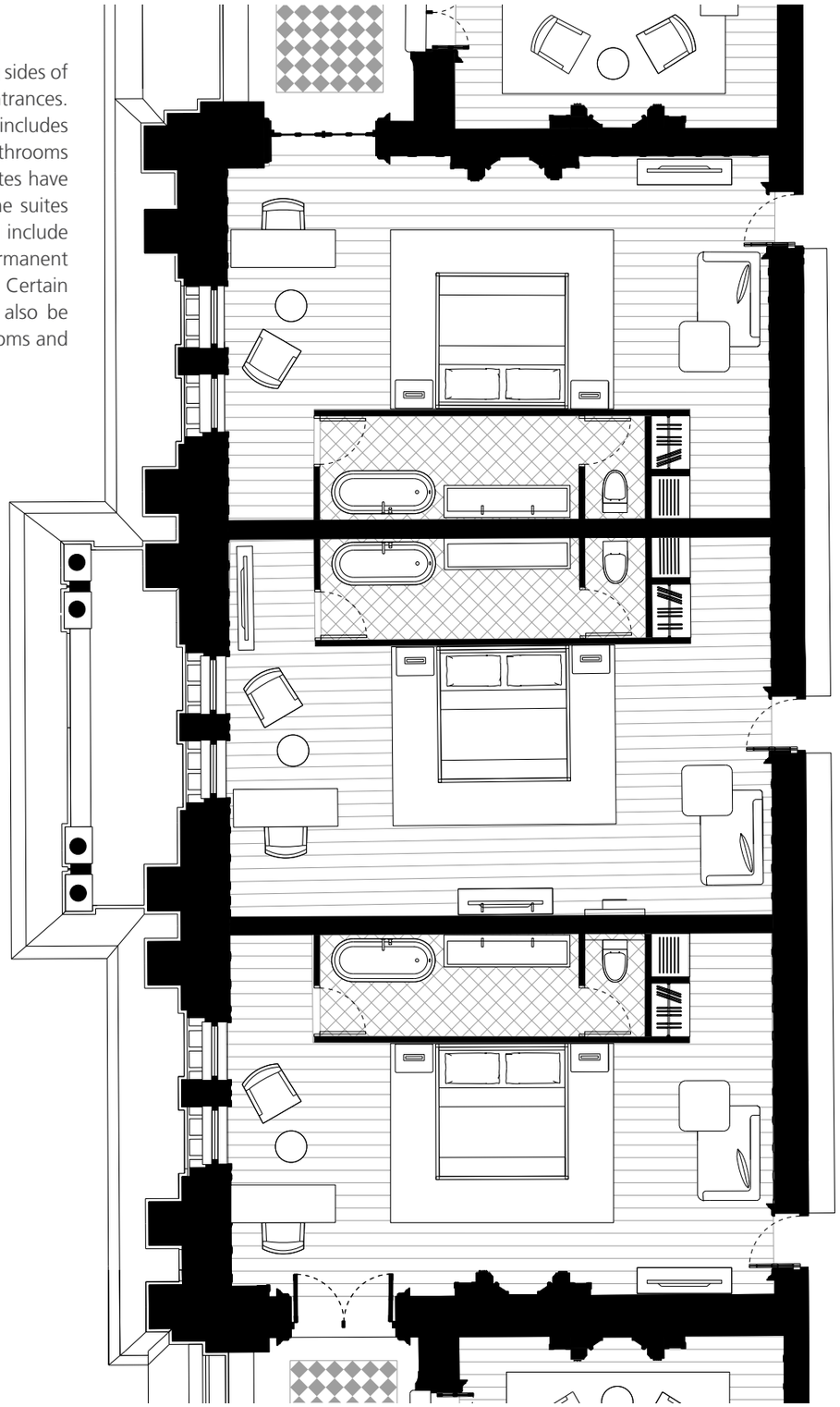


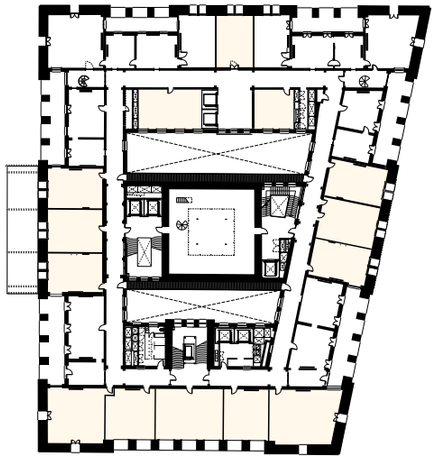
**Personality Suites** Key Plan

# Sandstone Suites

### Typical Sandstone Suite

Sandstone Suites are located on the Gresham, Bent and Loftus facing sides of the Lands Building and in most situations over and above the main entrances. The typical Sandstone Suite covers an area of 49 square meters and includes as part of its layout a generous bedroom area with individual full bathrooms and in some cases separate living / dining areas. The Sandstone Suites have large operable windows, but no open-air verandahs. Many of the suites have restored Bio-ethanol fireplaces. Furnishings are traditional and include selected antiques. All art is original and is part of The Centurion permanent collection of Australian and Greater Asia modern/ contemporary art. Certain items from the historical asset registry of the Lands building will also be featured. Floors are exposed timber or tile / stone and in the bedrooms and living room feature oriental carpets.





**Sandstone Suites** Key Plans

# Heritage Hotel Accommodation

# The Heritage Hotel

**Typical Accommodation Floors and Schedule**

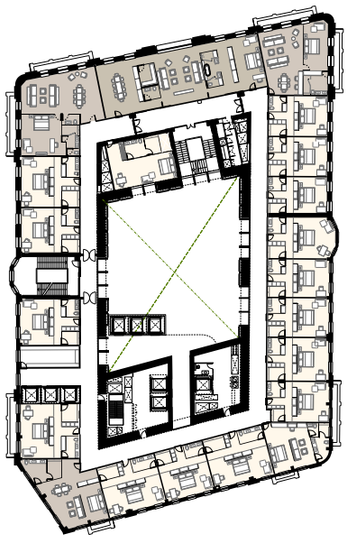
In contrast to the all suite offering within the Department of Lands building, the accommodation within the Education building compromises a much higher proportion of the hotel's typical offering. State Rooms average approximately 45 sqm in area and benefit from a more regular room layout and arrangement around the building's internal circulation.

The north facing corner rooms have been identified as Personality Suite, the second room Category within the Heritage Hotel.

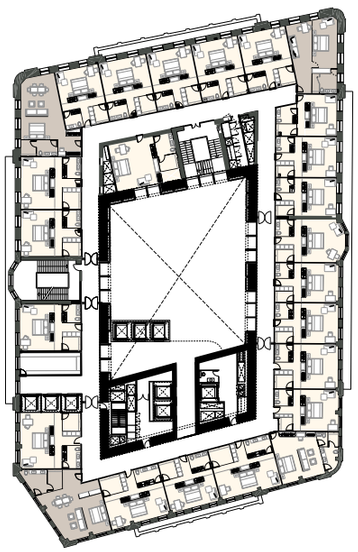
Unlike the Grand Hotel, only 1 large suite exists on level 3 facing Bridge Street , with two smaller suites typically located at the northern corners.

The design proposal for the Department of Education building includes 104 suites and rooms over 5 levels of accommodation as represented by the below table and diagrams.

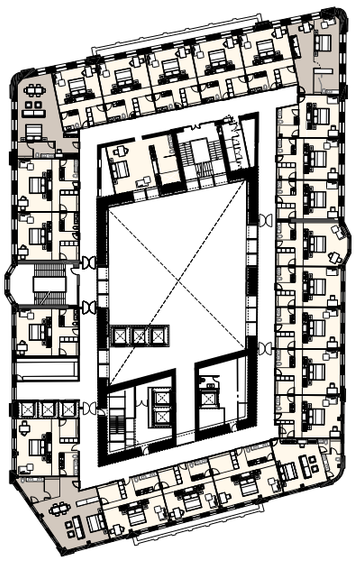
## Level 3



## Level 4



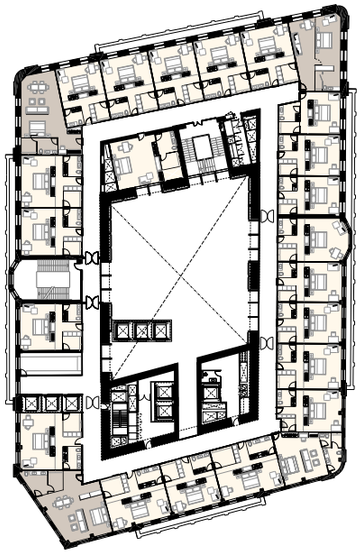
## Level 5



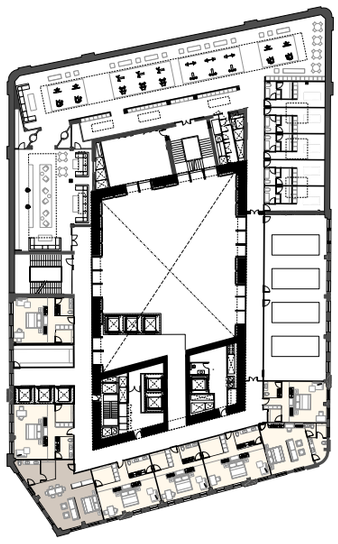
## Facilities Overview Schedule

| | Heritage Suite | Artist Suites | State Rooms | |
|---|---|---|---|---|
| **Average Size** | 160 sqm | 86 sqm | 49 sqm | |
| **Level 3** | 1 | 3 | 17 | 21 |
| **Level 4** | | 3 | 22 | 25 |
| **Level 5** | | 3 | 22 | 25 |
| **Level 6** | | 3 | 22 | 25 |
| **Level 7** | | 1 | 7 | 8 |
| | | | | |
| **Subtotal** | 1 | 13 | 90 | |
| **TOTAL** | | | | 104 |

## Level 6



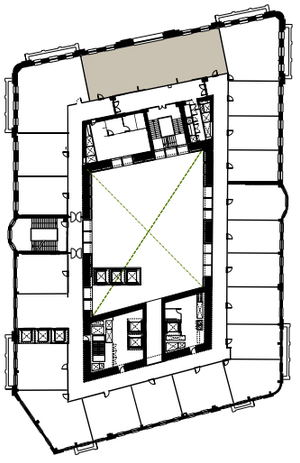
## Level 7



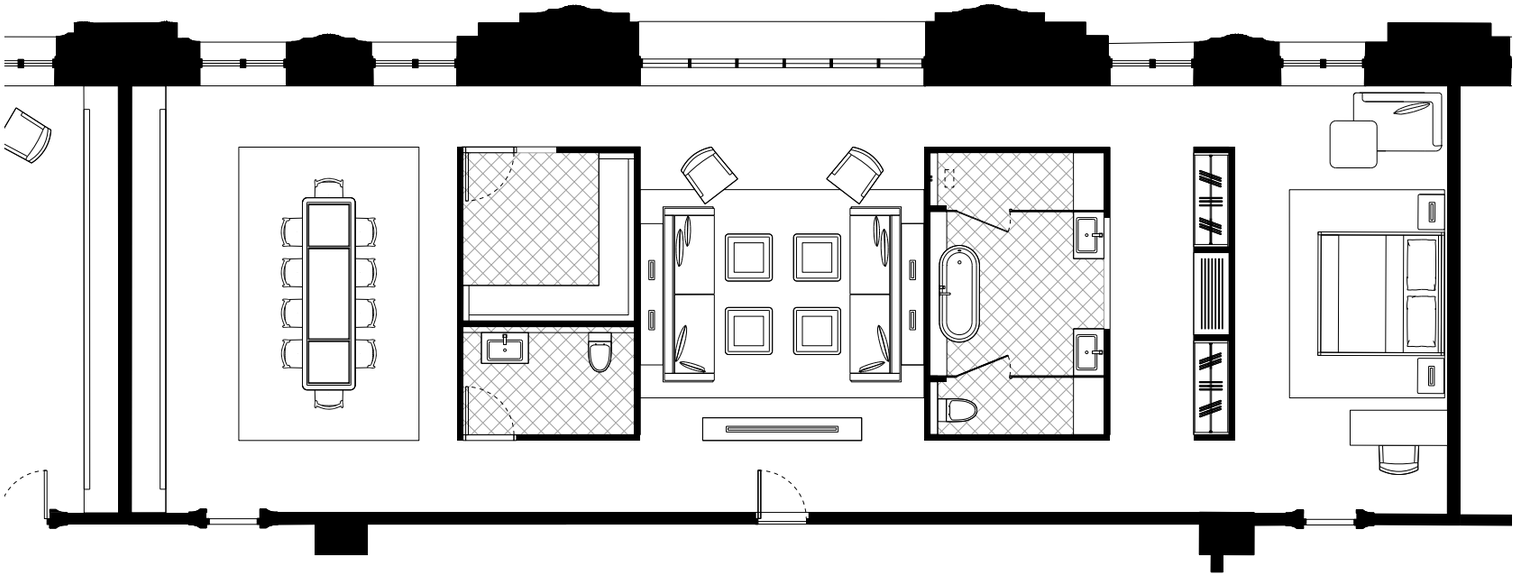
# Heritage Suite

### Typical Heritage Site

The Heritage suite is located on the Bridge Street side of the Education Building Level 3. The Heritage Suite covers an area of 163 square meters and includes large open format living and dining spaces with powder room and two connecting bedrooms with individual full bathrooms as well as dressing areas. The central living area is focused on the large arched window fronting Bridge Street and providing great character to the interior space. Furnishings are contemporary and include selected iconic designer pieces. All art is original and is part of The Centurion permanent collection of Australian and Greater Asia modern / contemporary art. Floors in the bedrooms are fully carpeted with timber and tile / stone used in designated areas.



**Heritage Suite** Key Plan



**Heritage Suite** Bedroom – Interior studies

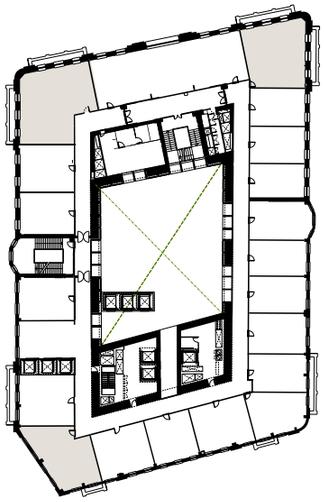
**Heritage Suite** Lounge Room – Interior studies

**Heritage Suite** Dining Room – Interior studies

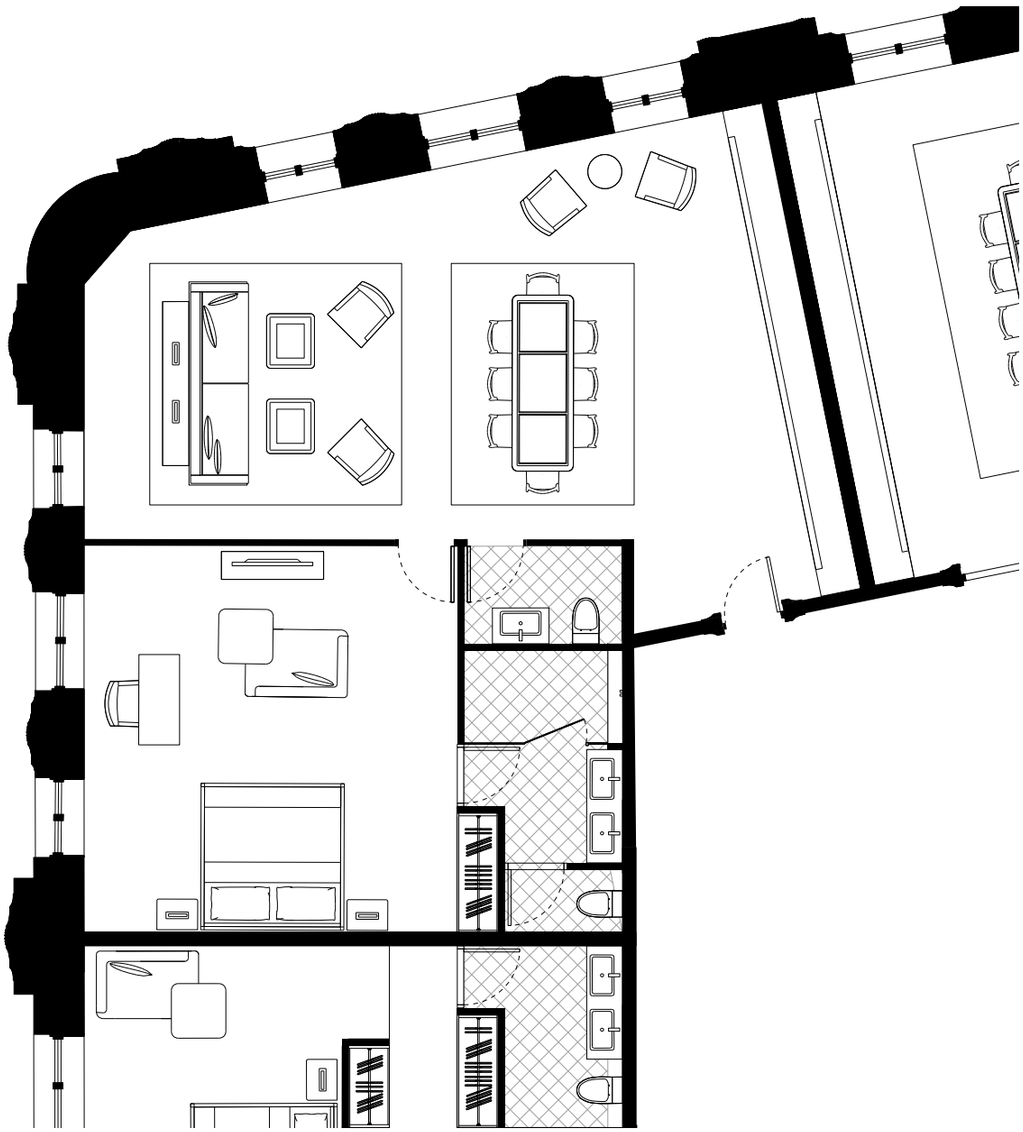
# Artist Suites

### Typical Artist Suite

The typical Artist Suites are located in the corner sections facing Bridge Street of The Education Building. The Artist Suites get their names and inspiration from artistic and other creative personalities that have been associated with the 'Sandstone Precinct Assets, Sydney / NSW and or Australia past and present. The typical Artist Suite covers an area of 65 square meters and includes an integrated living / dining format with powder room, separate bedroom including bathroom and dressing area. Furnishings are contemporary and include selected memorabilia associated with the artist / creative personality for whom the suite is named. All art is original and is part of The Centurion permanent collection of Australian and Greater Asia modern /contemporary art. Floors are fully carpeted with timber and tile / stone used in designated areas.



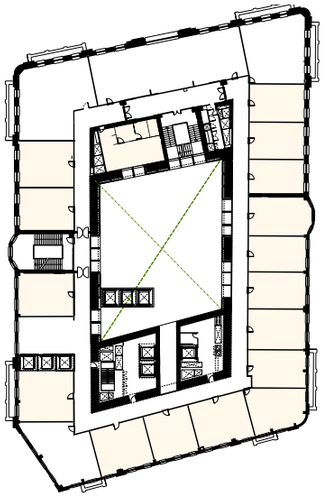
**Artist Suites** Key Plan



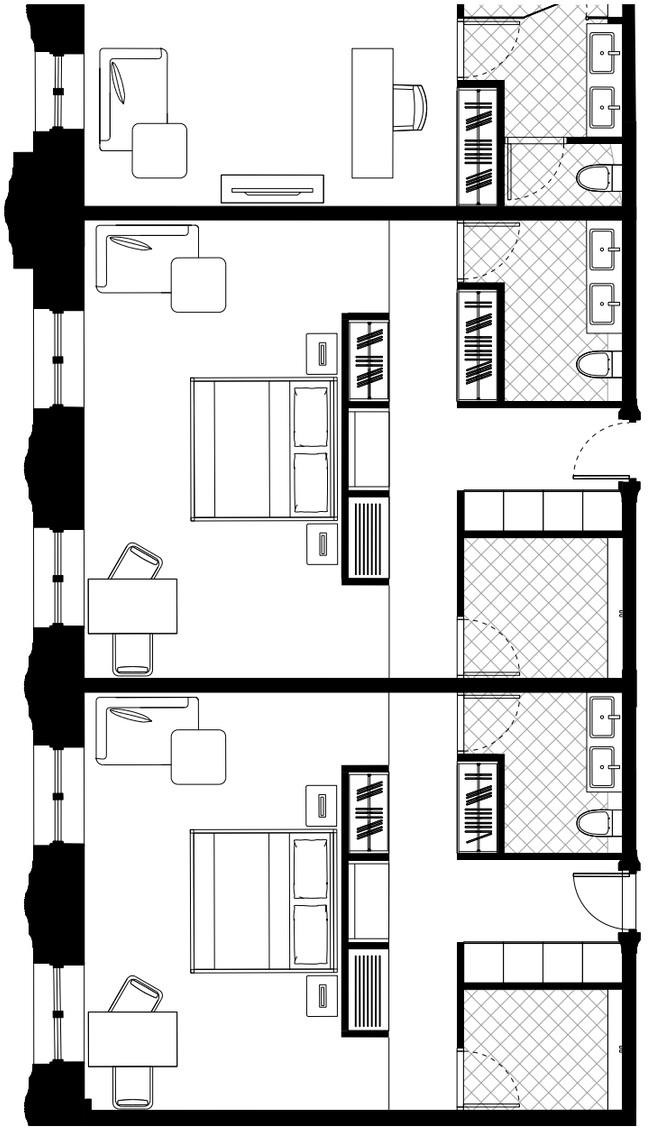
# State Rooms

### Typical State Room

The majority of the accommodations in The Heritage Art hotel are State Rooms. The typical State Room covers an area of 40 square meters and encompasses integrated sleeping, dining / work, relaxation areas with a separate bathroom featuring an oversized rain shower. Furnishings are contemporary. All art is original and is part of The Centurion permanent collection of Australian and Greater Asia modern /contemporary art. Floors are fully carpeted with timber and tile / stone used in designated areas.



**State Rooms** Key Plan



# Raffles Residences and Tower Apartments

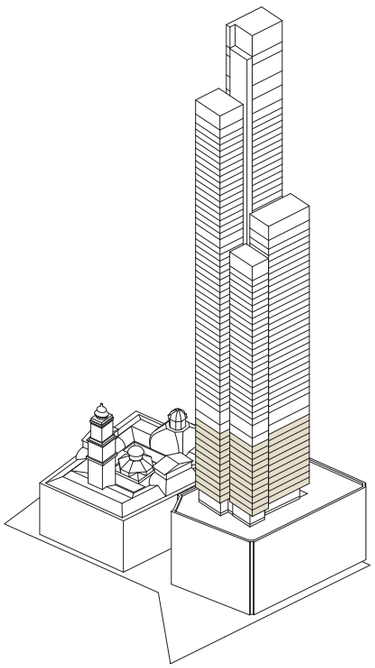
# Raffles Residences

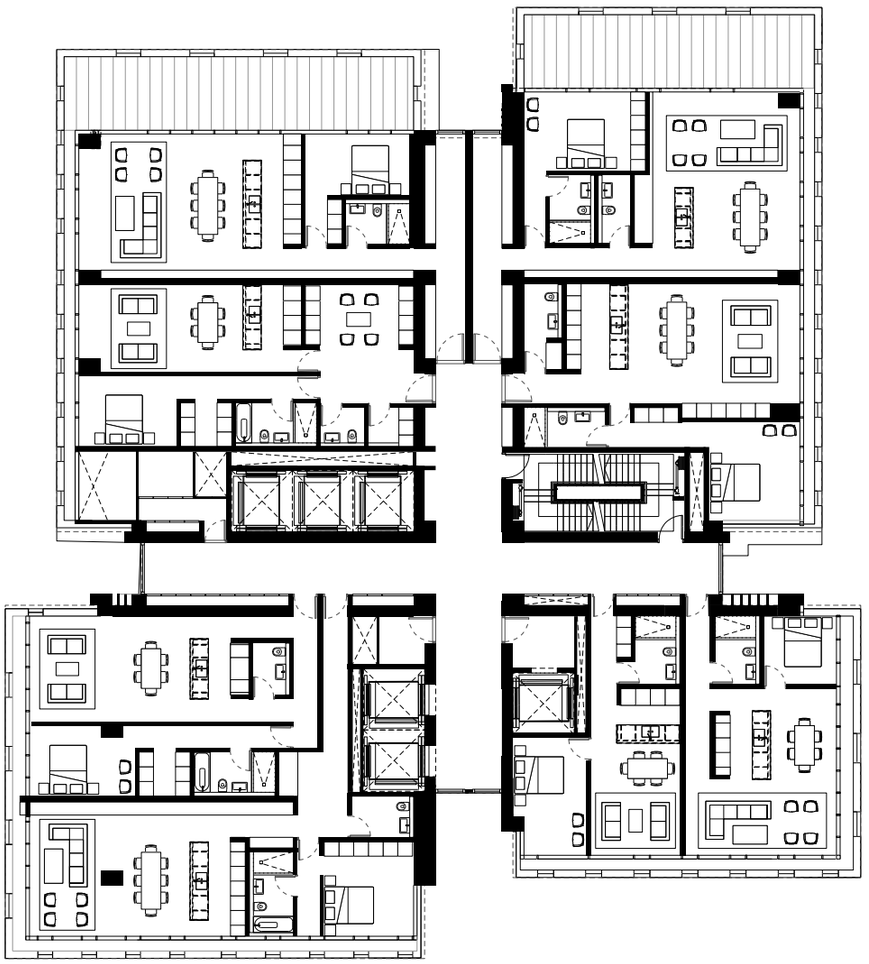
### Raffles Residences

Located on the lower 10 floors of Raffles Residences tower, the typical Residence covers approximately 80 square meters. At this height they have wonderful views in all four directions, including spectacular views over Circular Quay. The rooms have been configured to allow each room to capture at least partial views of the harbour. The format of the residences is with separate living and dining areas inclusive of powder room, complete kitchen and large bedroom with en-suite bathrooms. The Raffles Residences form an integral part of the hotel and are fully integrated with and serviced by it. Many of the residences have extensive open-air terraces and due to their expansive layouts and lifestyle features are ideal for in-hotel residents who are on extended stays in Sydney. All art is original and is part of The Centurion permanent collection of Australian and Greater Asia modern /contemporary art.

**Raffles Residences** Dining and Lounge Room

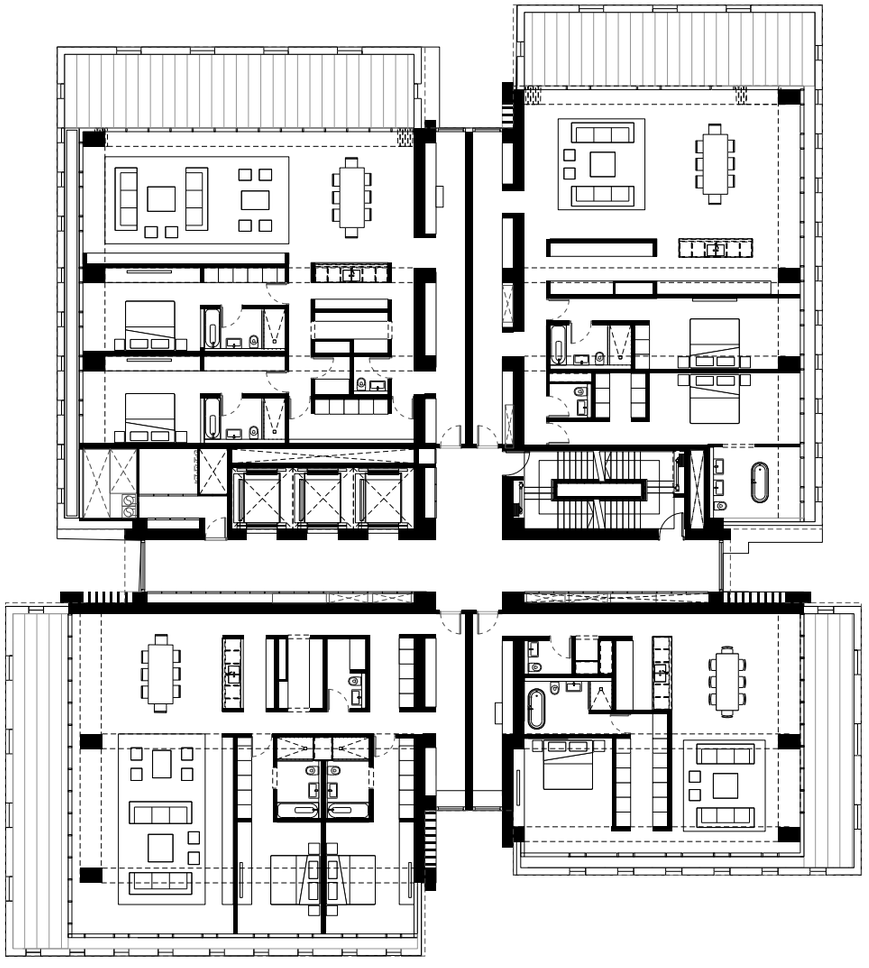
## Typical Plan Levels 9-18

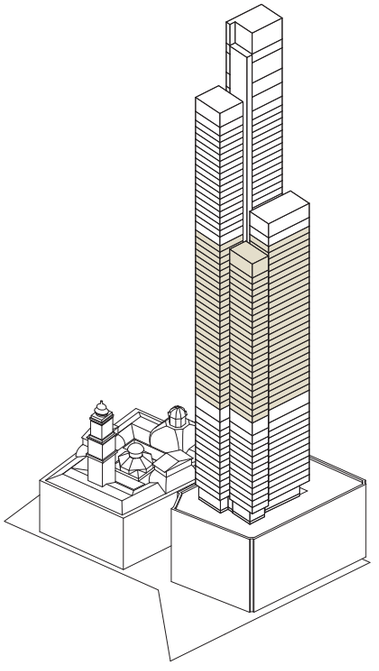




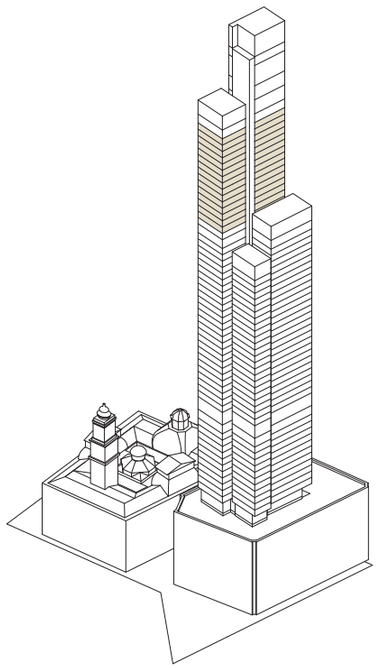
# Tower Apartments

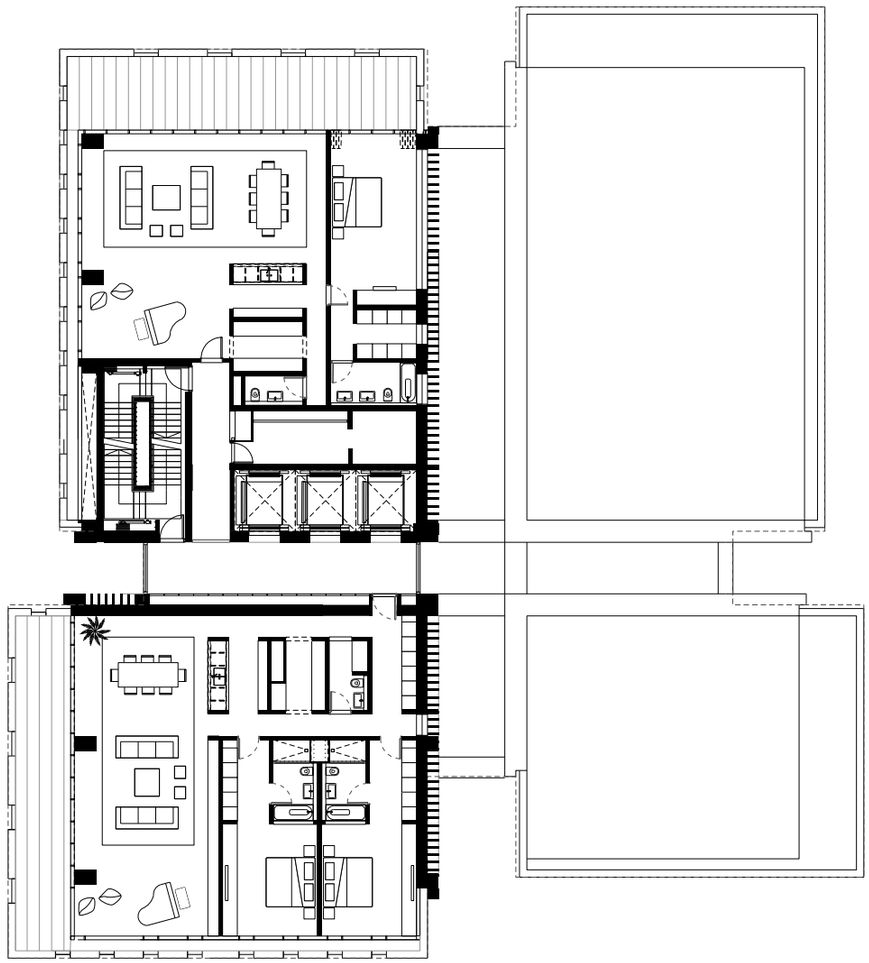
**Typical Plan Levels 21-45**





## Typical Plan Levels 49-62

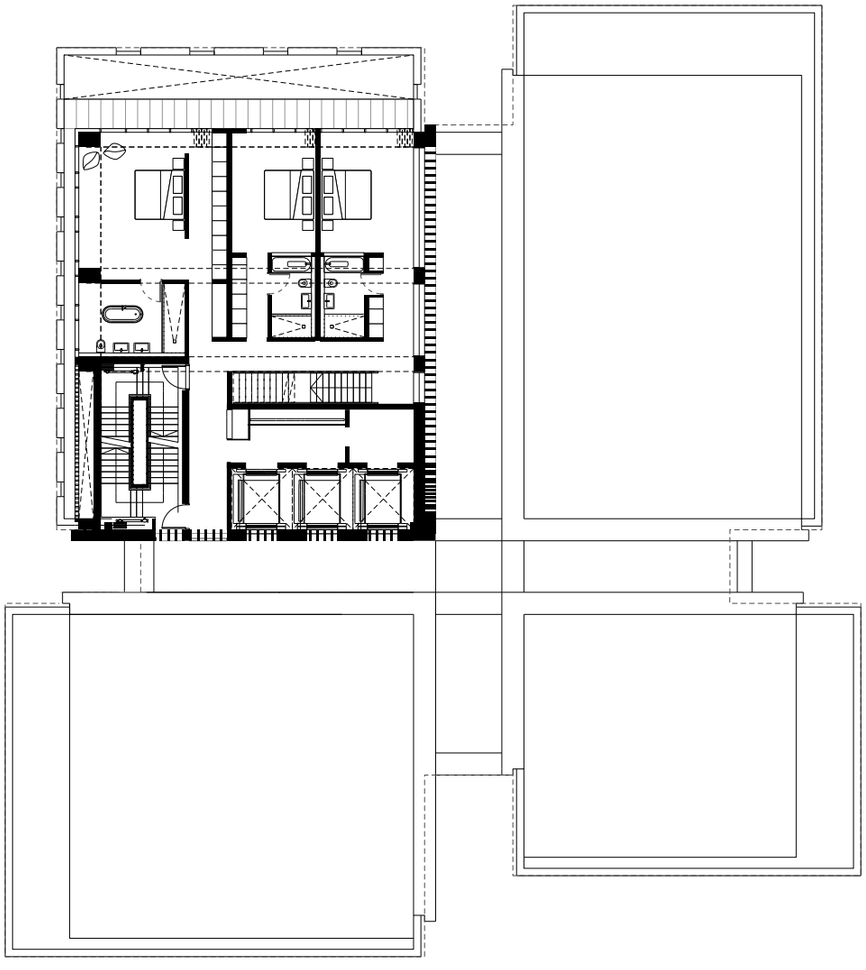


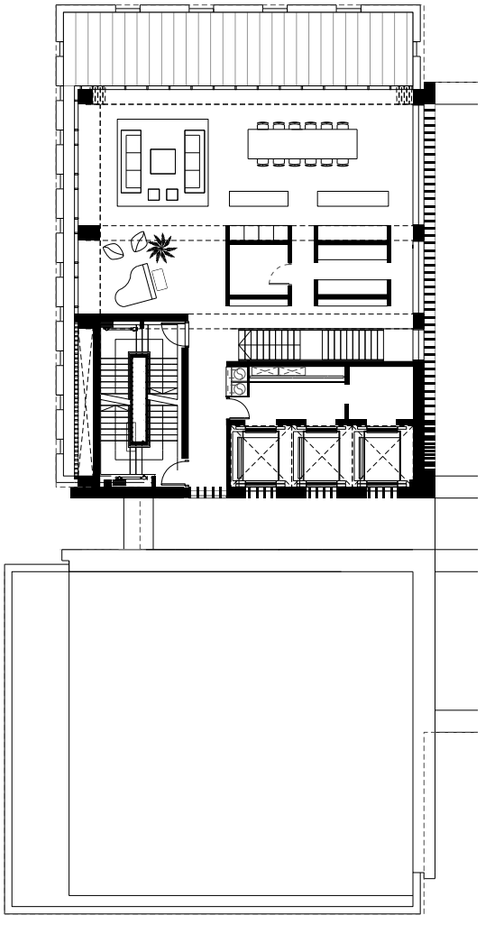


**Raffles Residences** Dining and Lounge Room

# Tower Apartments

## Penthouse Levels

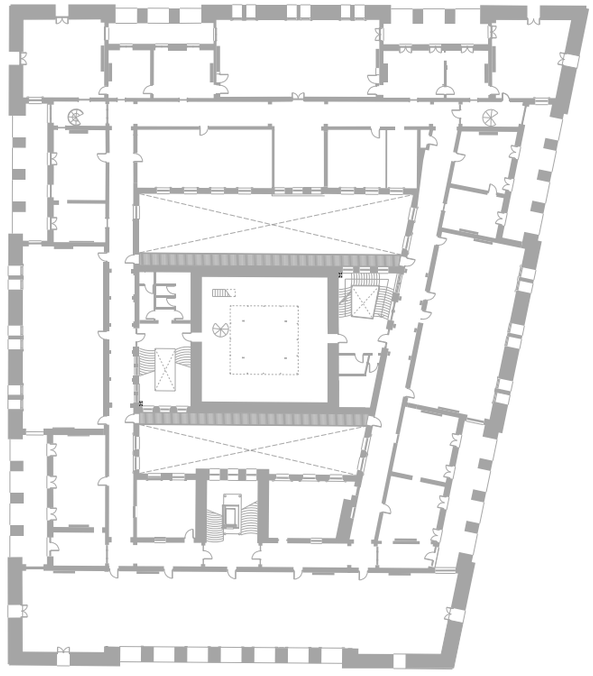




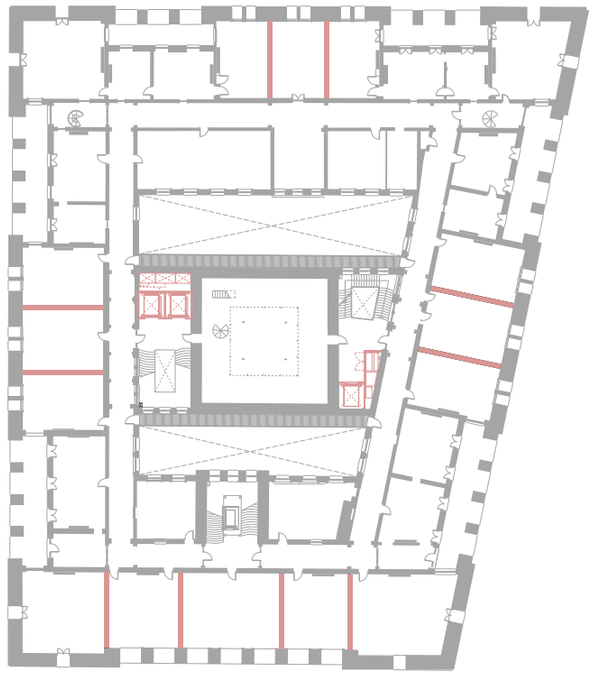
# Grand Hotel Servicing Strategy

Within a typical floor of hotel suite accommodation, the proposals have sought to predominantly utilise existing walls and door locations to create the room arrangement on each floor. In existing larger open areas, sensitively located new walls will be placed to align with structural elements and window locations to allow the existing spaces to be better configured for hotel use and to preserve original proportions and detailing. These new walls also offer great opportunity to discretely service the rooms with a minimal impact to the existing fabric, particularly in areas where the ceilings exhibit a great degree ornamentation and detail.

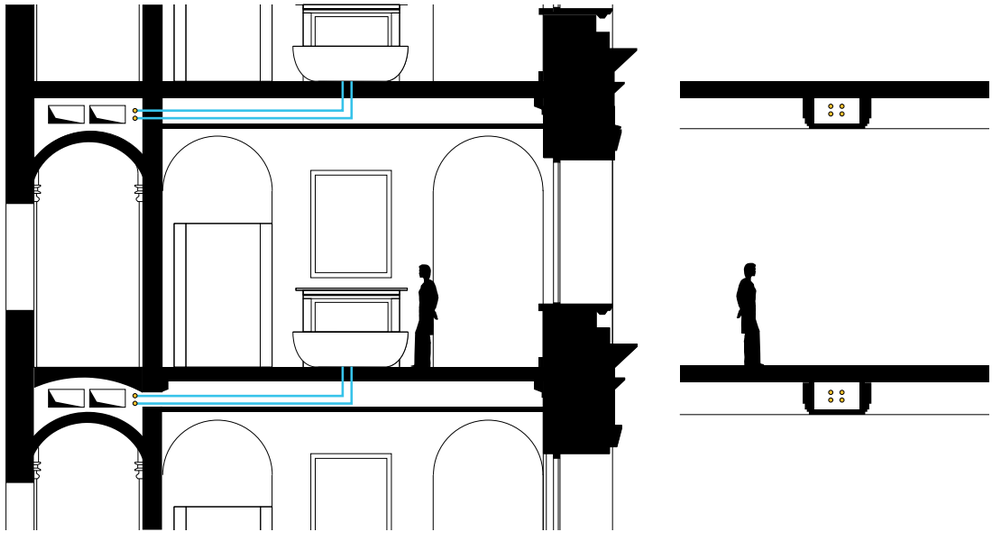
The wet areas within the Landmark Suites have been located in the spaces behind the terraces which currently do not have the same level of interior detailing as the adjacent bedroom and lounge spaces. Given this, the opportunity exists to locate the required services discretely within a false beam element that allows the services to run horizontally into the existing raised floor services zone around the internal corridors.



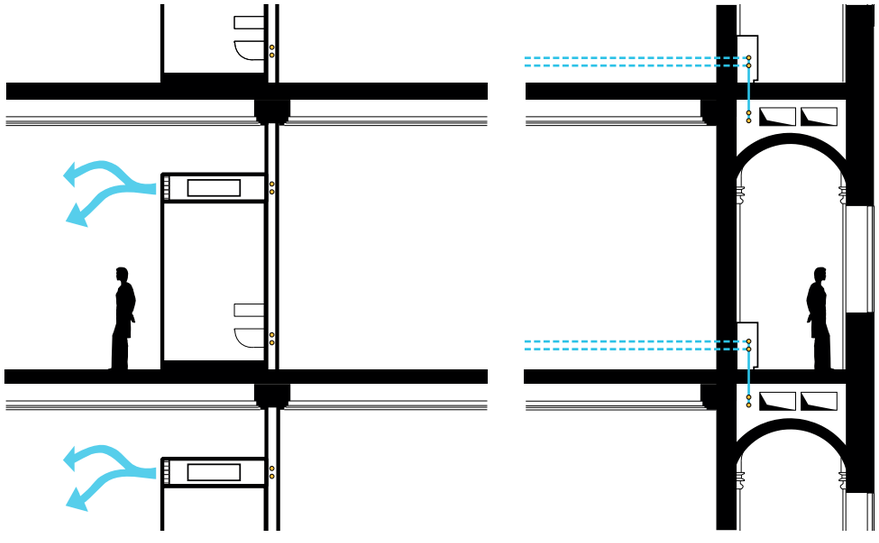
**Department of Lands** Existing Walls



**Department of Lands** Proposed Walls



**Landmark Suite** Wet Areas Servicing Strategy - Utilising Service Beams in Appropriate Areas

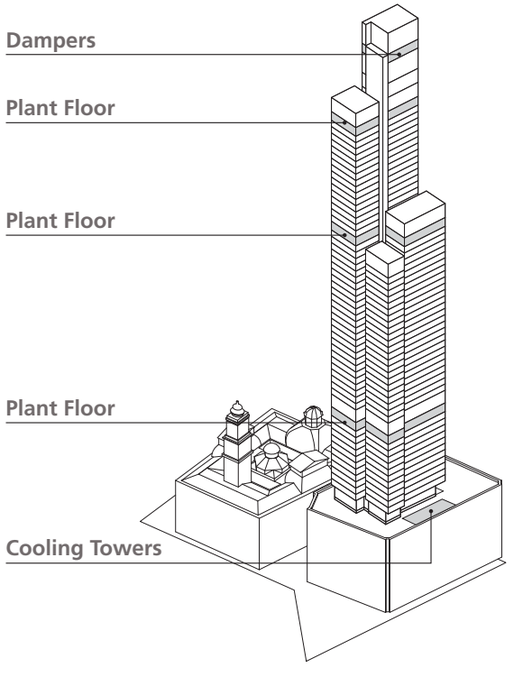


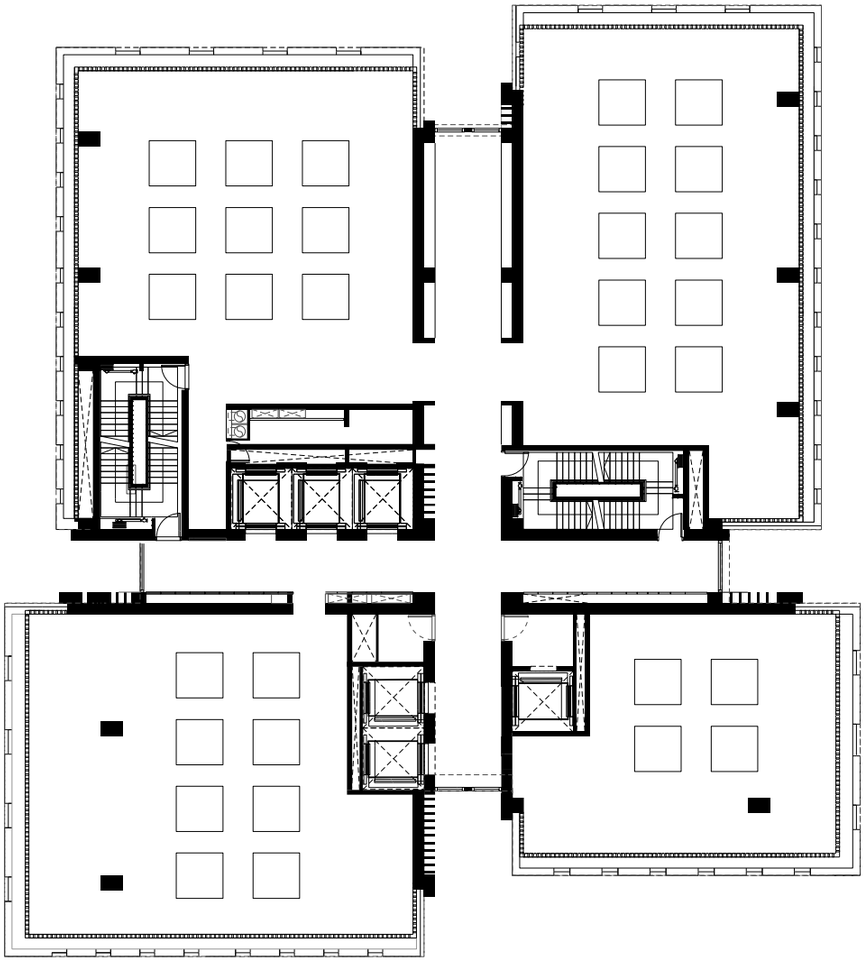
**Sandstone Suite** Wet Areas Servicing Strategy - Utilising New Interior Walls

# Typical Plant Floor

**Plant**

Plant floors have been allocated throughout the tower to ensure the scheme's working services. These floors have been located and coordinated with the engineering consultants. Refer to the Services Outline within this report for further information

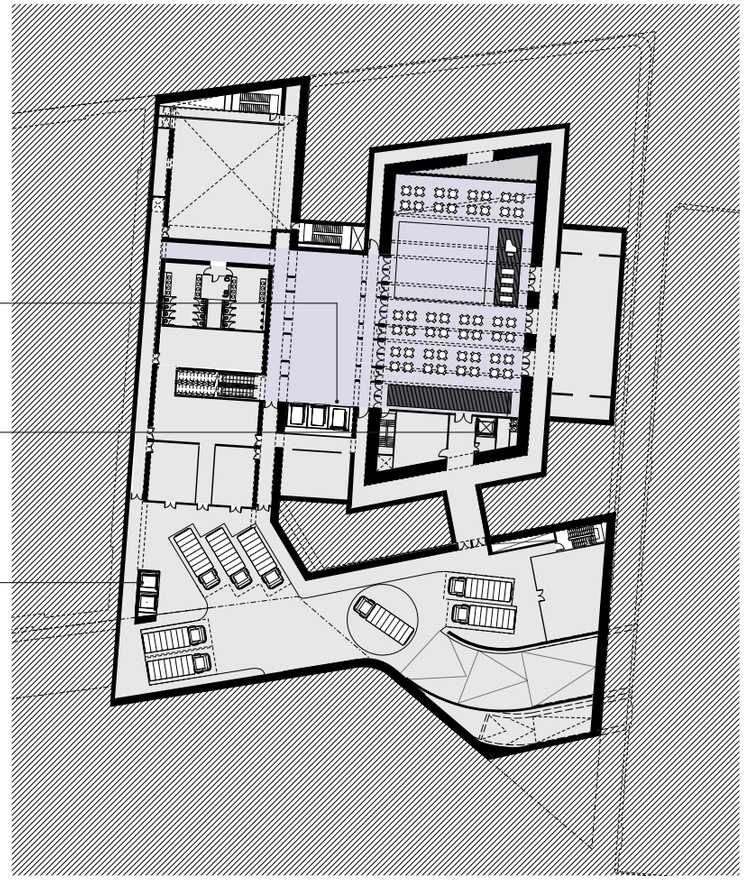


# Shared BOH Facilities

**BOH / Loading / Servicing**

Operationally, a hotel spread across two different buildings in this context requires a common loading or back-of-house area to efficiently facilitate the deliveries, waste and the many other daily operations of a hotel. The design proposal suggests a common loading area and level on Basement Level 2 that is centrally located beneath Farrer Place and Loftus Street. This central location allows the loading bay to service both buildings in a single area, offering efficiencies in planning and logistics. Additionally, the Ballroom is also located on Basement Level 2 thus allowing deliveries and setup for various Ballroom function on the same level.



# Intended Staffing

**'The Raffles Difference'**

The Raffles Difference is based on building an integrated team of welcoming, well-trained hospitality professionals

In order to provide the highest standards of service to its in- house residents and other end-users of its facilities, it is imperative to have a welcoming and well-trained team.

The Consortium envisions the ratio of employees to guest rooms to be between 1.2 to 1.5 FTE at the opening of the hotel and to maintain such staffing levels going forward.

The Consortium will be considering a flexi benefit HR system to be able to better meet the needs of all employees, by tailoring their benefits to their lifestyle and age. Such a system has been shown to have very good results as to reducing turnover, as well as developing a strong service related mentality within the operational, administrative and marketing teams.

The Consortium is further supportive of employees undertaking professional upgrading and training courses. These including grant programs, self study courses and industry development programs.

Please refer to Section 8 of the Final Binding Offer (Volume 1) for further details.

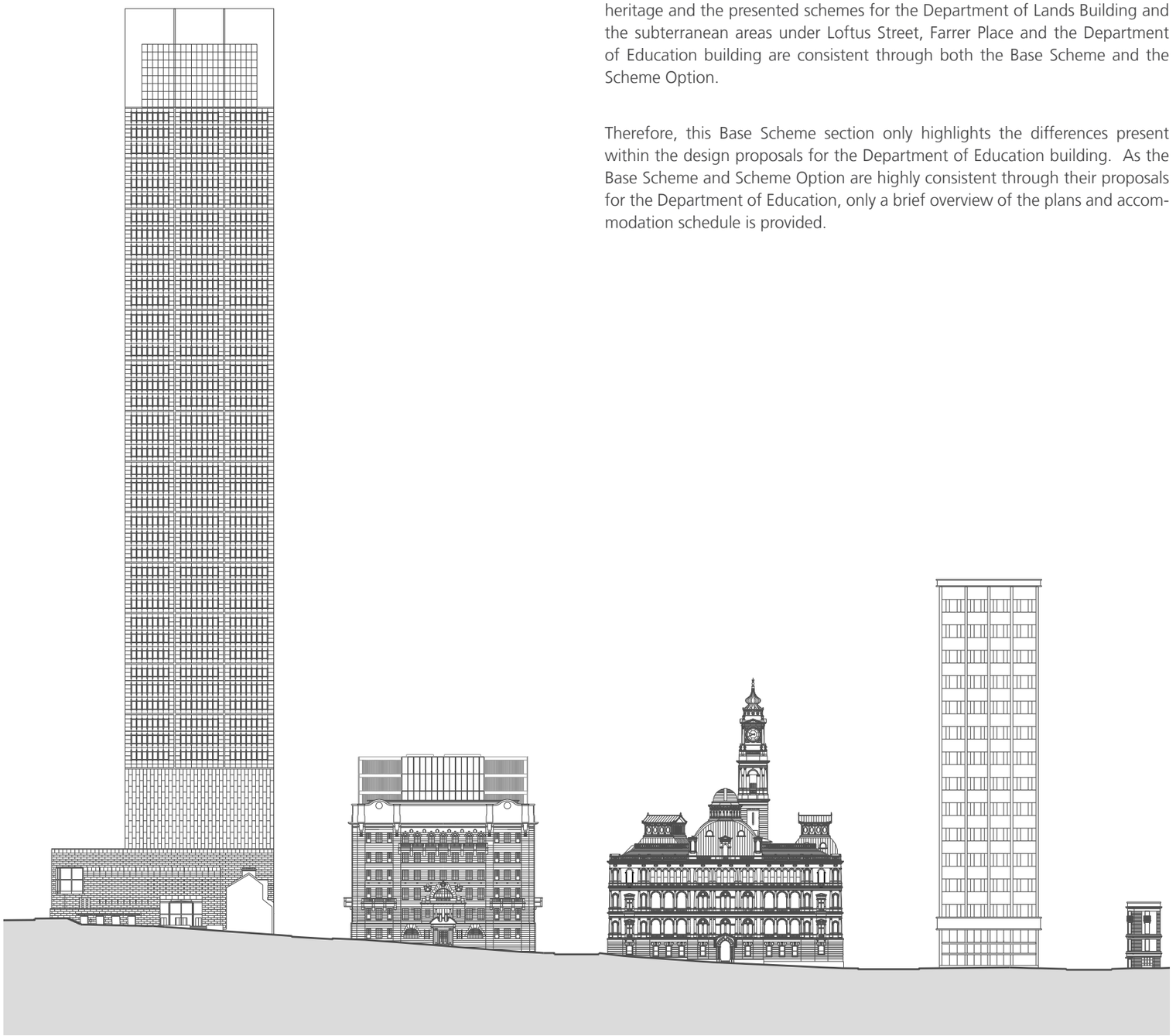
# Base Scheme

# Base Scheme

Within the Progressive Offer, the Base Scheme addresses the requirements of A7 in Annexure A of the Final Binding Offer Letter with particular regard for the allowable built envelope above the Department of Education building.

As previously outlined in the Introduction, the principles and approaches to heritage and the presented schemes for the Department of Lands Building and the subterranean areas under Loftus Street, Farrer Place and the Department of Education building are consistent through both the Base Scheme and the Scheme Option.

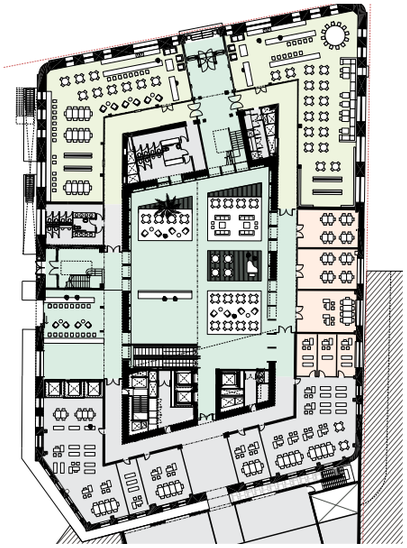
Therefore, this Base Scheme section only highlights the differences present within the design proposals for the Department of Education building. As the Base Scheme and Scheme Option are highly consistent through their proposals for the Department of Education, only a brief overview of the plans and accommodation schedule is provided.



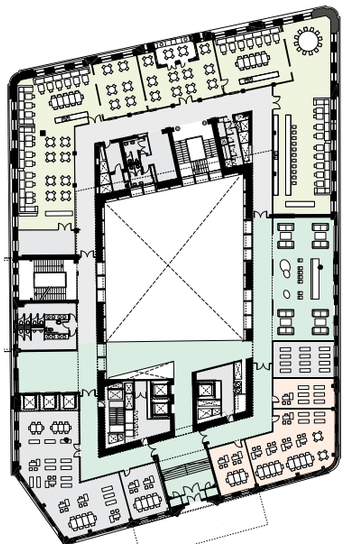

ONE
WAY

# The Base Scheme Hotel Overview

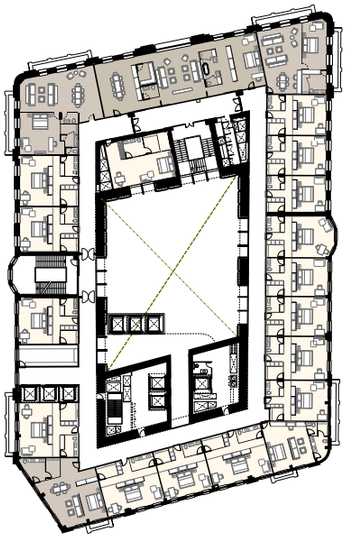
## Level 1



## Level 2

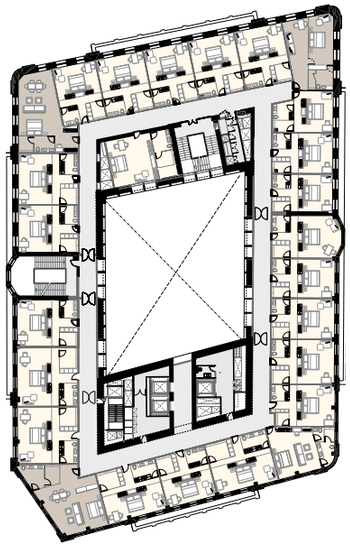


## Level 3

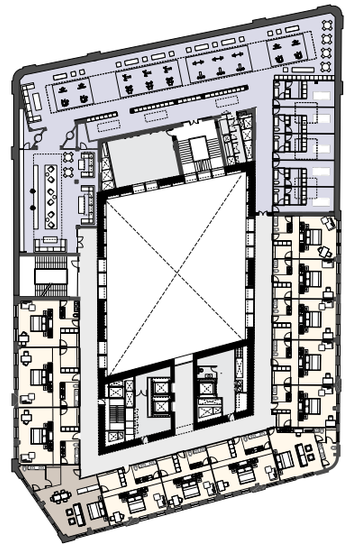


| | Lobby + Public Areas | Food + Beverage | Retail | Special Functions | Plant |
|---|---|---|---|---|---|
| Level 1 | 730 sqm | 685 sqm | 180 sqm | | |
| Level 2 | 425 sqm | 555 sqm | 155 sqm | | |
| Level 3 | | | | | |
| Level 4 | | | | | |
| Level 5 | | | | | |
| Level 6 | | | | | |
| Level 7 | | | | 735 sqm | |
| Level 8 | | | | | |
| Level 9 | | | | | |
| Level 10 | | | | | 850 sqm |
| Subtotals | 1155 sqm | 1240 sqm | 335 sqm | 735 sqm | 850 sqm |
| TOTAL | | | | | |

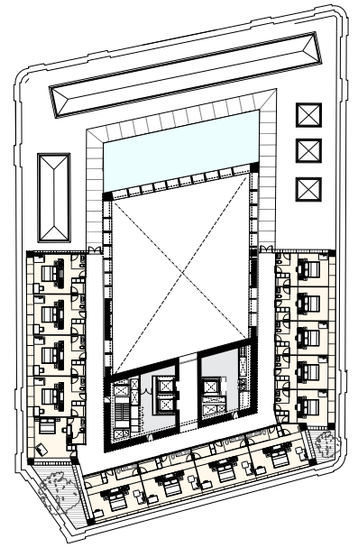
## Level 4-6



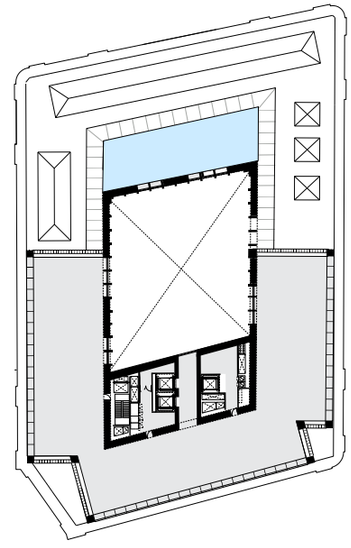
## Level 7



## Level 8-9



## Level 10

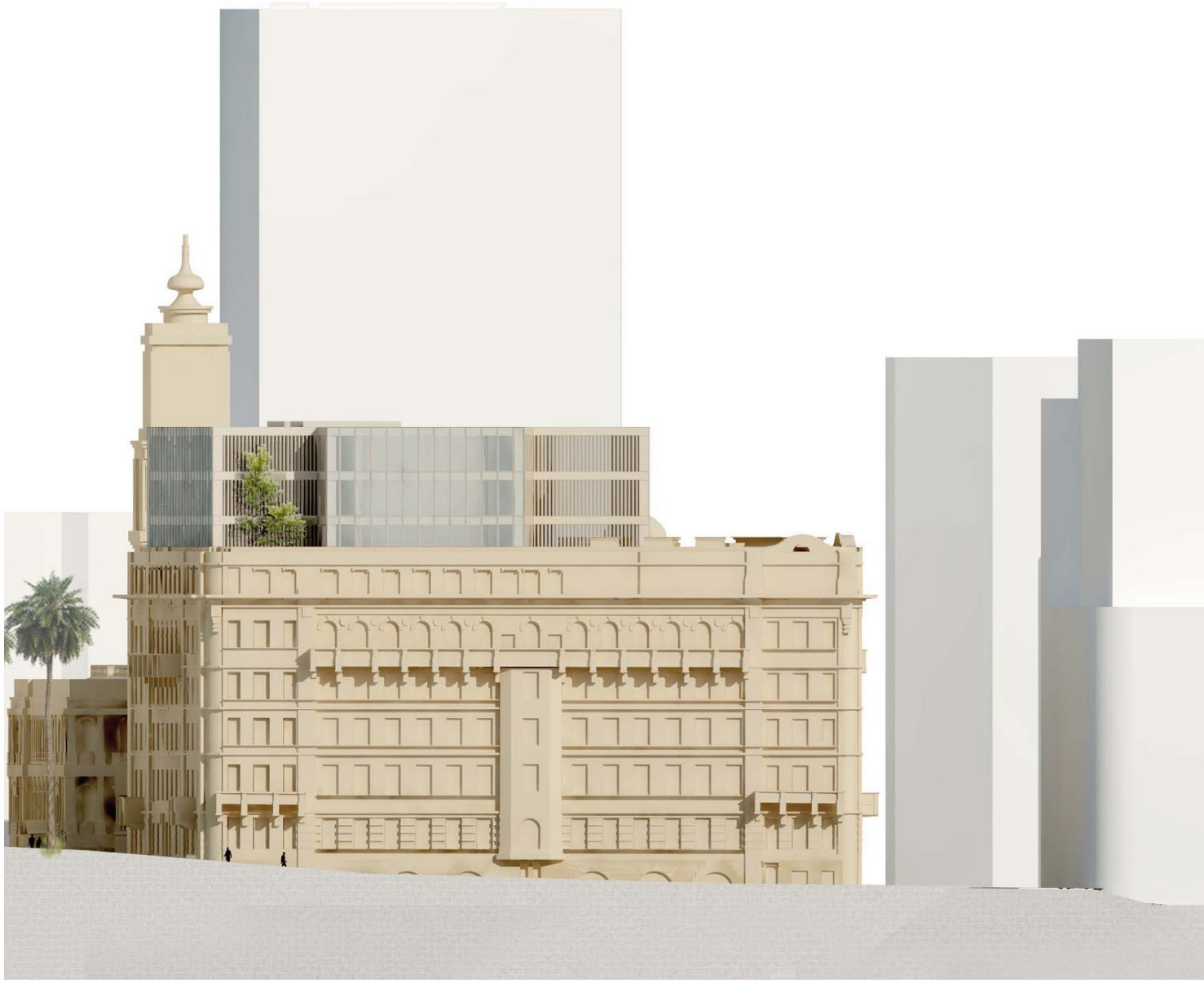


| | Heritage Suite | Artist Suites | State Rooms | TOTAL |
|---|---|---|---|---|
| Average Size | 160 sqm | 86 sqm | 49 sqm | |
| Level 1 | | | | |
| Level 2 | | | | |
| Level 3 | 1 | 3 | 17 | 21 |
| Level 4 | | 3 | 22 | 25 |
| Level 5 | | 3 | 22 | 25 |
| Level 6 | | 3 | 22 | 25 |
| Level 7 | | 1 | 12 | 13 |
| Level 8 | | | 14 | 14 |
| Level 9 | | | 14 | 14 |
| Level 10 | | | | |
| Subtotals | 1 | 13 | 123 | |
| TOTAL | | | | 137 |

# Elevations

## North Elevation

East Elevation

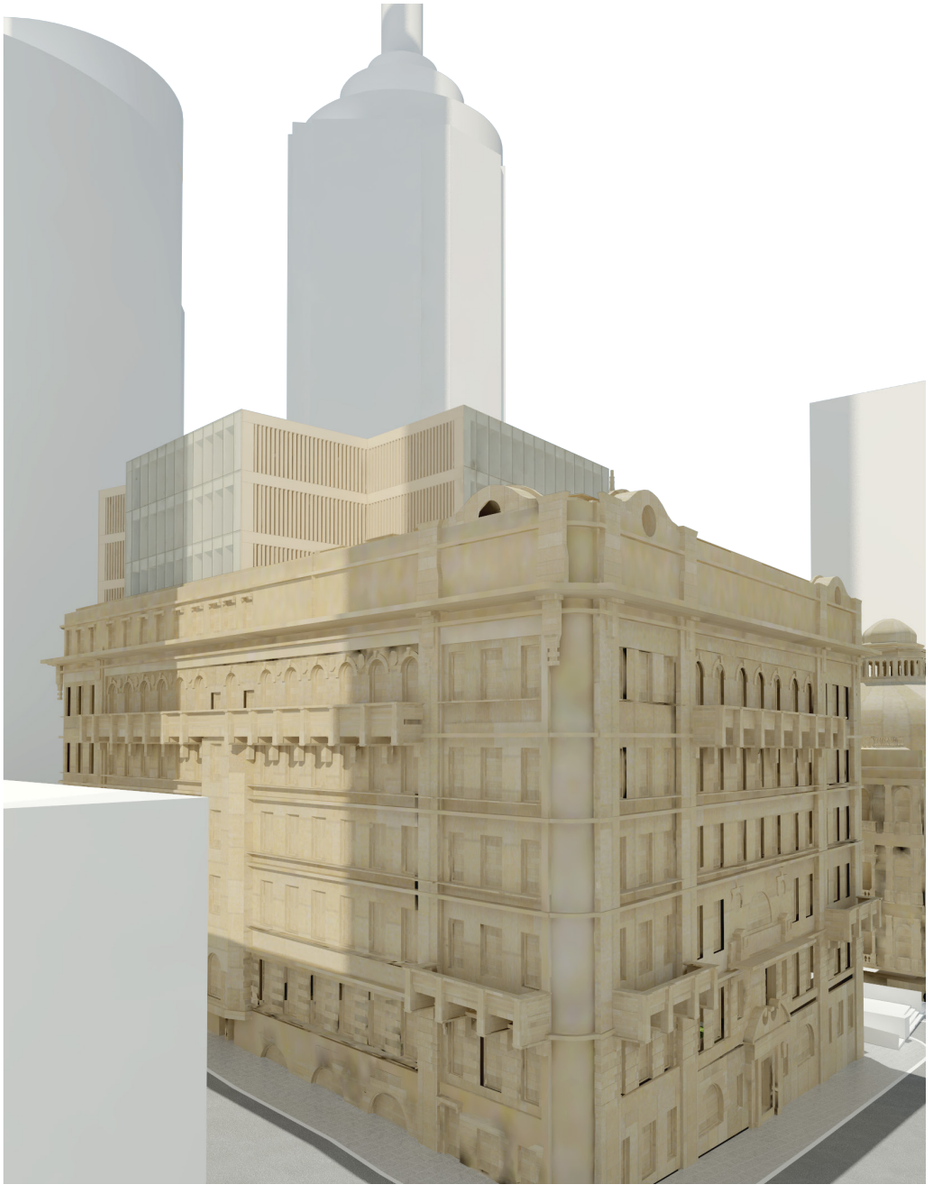


# Elevations

## South Elevation

## West Elevation

View from Bridge Street East



View from Bent Street West

View from Farrer Place

View from Farrer Place

# Services Outline

# 1. Engineering and Building Services Overview

## 1.1 Introduction

This preliminary assessment of the engineering and building services requirements for scheme has been provided to provide an understanding of the consultants design and the engineering and servicing strategy that will be required to enable a luxury hotel to operate in the Sandstone Precinct. It also informs the consortia bidding for the precinct on the nature of the requirements to adaptively reuse of the existing heritage buildings on this site.

The purpose of the preliminary concept development is to:

- Inform development of the architectural planning.
- Set the context and strategy for the building services, acoustic, fire engineering, vertical transport structural and structural and civil engineering requirements.
- Respond to the preliminary brief requirements of Raffles as set out in the Raffles Design and Construction Standards V.3.1 October 2010 and identify areas where clarification or deviation from these standards are likely to be required due to the nature of the heritage buildings and Australian context.
- Identify key infrastructure requirements including diversion of services within the project footprint.
- Assist the consortia and the cost planner, in developing a capital project cost estimate.
- Set the design services framework for the development of the design should the project consortia be successful in securing the precinct.

The concept design is intended to be preliminary and to a level of design whereby primary project scope elements and risks are identified.

The scope of services covered within this concept design report includes:

- Mechanical services
- Electrical services and specialist lighting
- Hydraulic services
- Fire Services
- Fire Engineering
- ICT/ AV and Security
- Vertical Transport
- Structural and Civil Engineering
- Acoustics

## 1.2 Limitations

It is important that the limitations of this document, pertaining to the current project design phase, are clearly understood. The limitations and accuracy of information contained within the documentation at this time have been assessed with respect to the development of the scheme to support the requirements of the Final Binding Offer and where necessary, contingency/ risk allowances should be assessed against the current level of design by the Cost Manager.

The engineering and building services assessment including sketches in the supporting appendices (as listed in Appendix A) are representative of the intended design approach and the sketches do not reflect a fully coordinated design at this time; rather preliminary developing concepts at a point in time of the current design process. Further design development will be necessary to translate design requirements into a fully coordinated design. The information presented in the following sections is representative of preliminary concepts with commensurate commentary and explanatory information to inform preliminary architectural planning and which has led to the current development of the architectural scheme which supports this Final Binding Offer.

In completing the preliminary assessment and concept development, the following items are noted in relation to risks and opportunities:

- **Heritage**. The heritage nature of the building's façade, structure and internal elements. This assessment has attempted to integrate design concept responses to documented information regarding the heritage elements including advisory input from the heritage consultant. However it is noted that many aspects of the heritage impacts will be unknown until design development is undertaken, for example the exact restraints for penetrations for new services through existing walls and floors. The designs responds to the advice received from the heritage consultant and it is expected that further development will fine tune services reticulation pathways in response to specific heritage restraints that may become evident. The strategies themselves, as presented, are adaptable to such design development.
- **Acoustic performance**. The current concept design identifies the need for an additional internal glazing skin to meet the noise requirements based upon the Raffles Design and Construction Standards V.3.1 October 2010. The exact design and extent of additional internal glazing will be determined at a later stage as the overall scheme is developed in consultation with the consortia and hotel operational partner Raffles.
- **Builders' works.** Builders' works associated with new plant spaces within the roof void of the Department of Lands (Lands) building. The strategy involves strategic reuse of the roof void space within the Lands Building, such as to minimise alteration and modification to the existing heritage roof. This is likely to require additional building structure being introduced into the roof void to support and isolate building services plant.

- **Services tunnels.** The design strategy identifies that connection between the Lands Building and new basements and will be a key to ensure discrete and appropriate servicing pathways. As such allowance is made for a an in-ground services tunnel underneath the Lands building The preliminary concept design also proposes reuse of the existing subterranean void space at the perimeter of the Lands Building to be utilised for the reticulation of services (predominantly drainage from the proposed new kitchens), however an alternative solution would be required should council approval not be granted.

- **Remediation to existing structure**. Subject to latent conditions, the extent of which cannot be fully understood until exploratory works are undertaken. These will be identified through further investigation following completion of the transaction should the consortia be successful.

Further specifics risks and opportunities identified with the assessment and preliminary concept development are defined within the relevant section relating to each engineering, technical and building services discipline.

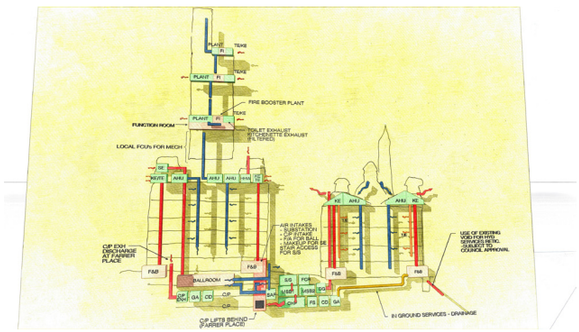



**Figure 1-1 Building services block planning-overall**

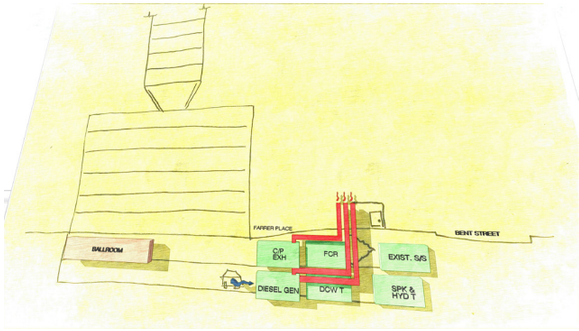



**Figure 1-2 Farrer Place services block planning**

## 1.3 Project overview

The precinct has two existing buildings on the site, namely the Departments of Lands ('Lands Building') and Department of Education ('Education Building'). The requirements for the Lands Building and Education Buildings are outlined in this report.

The façade and internal spaces of the Lands Building are heritage listed and the façade of the Education Building is also heritage listed. It is noted however that not all the internal spaces of the Education Building are heritage listed.

The scheme as it is currently developed comprises the following:

- **Lands Building**
  - Ground Floor Plan: The lobby/ reception, retail spaces, kitchen areas and food and beverage areas
  - Level 1 – 3: Hotel rooms, food and beverage areas (level 1 only) and function spaces
  - Level 4, 5 & 6: Exclusive food and beverage, and function spaces, plant areas within roof cavity

- **Education Building and tower**
  - Levels B8 to B4: Car parking
  - Level B3: Car park, back of house
  - Level B2: Loading dock, back of house and plant areas, and the Ballroom.
  - Level B1: Back of house, plant areas and Mezzanine function area for Ballroom
  - Ground Floor: Back of house, plant areas and guest subterranean link between buildings
  - Level 1: Food and beverage areas, reception/ lobby area (Education building hotel)
  - Level 2: Food and beverage areas, reception/ lobby (tower hotel and apartments), specialist suites/ function areas and offices, atrium
  - Levels 3 – 6: Hotel accommodation
  - Level 7: Hotel accommodation, health club/ spa facility
  - Level 8 Pool area, plant area (referred to as "rooftop plant" or "level 8 plant area")
  - Levels 9 to 18: Dual key (one-bed) apartments (hotel accommodation)
  - Level 19: Plant areas (referred to in the report as "lower level plant floor")

- Level 20: Function Space
- Levels 21 to 46: Serviced apartments
- Level 47: Plant areas (referred to in the report as "mid-level plant floor")
- Level 48: Function area (health club and other amenities)
- Levels 49 to 62: Residential apartments
- Level 63: Plant areas (referred to in the report as "upper level plant floor")
- Levels 64 to 70: Penthouse apartments (multi-level)
- Level 71: Damper for structural system
- Levels 72 to 74: Penthouse apartment
- Rooftop helipad

The aspirations for the scheme are to establish a Raffles luxury hotel and Raffles residences in a proportion of the tower above the Education Building. It is understood there may be different grades of hotel suite within the development however for the purposes of the preliminary engineering and building services design all hotel spaces will be considered to have equivalent systems and equipment unless otherwise stated.

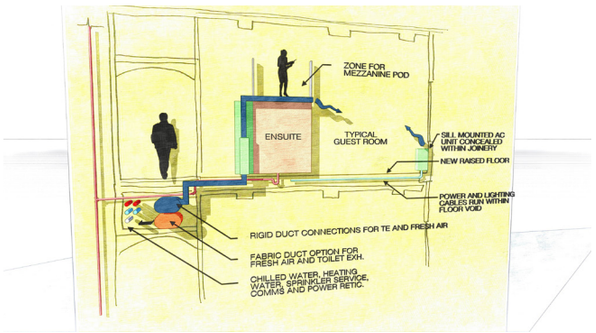



**Figure 1-3 Typical Guest room services concept-Lands Building**

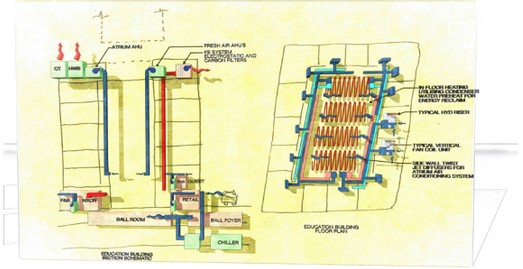



**Figure 1-4 Services block planning- Education Building section schematic & floor plan**

## 1.4 Multidisciplinary design drivers

The proposed scheme is unique in terms of the proposed offering and the building constraints and opportunities. The following items have influenced the development of the preliminary concept:

- The proposed changes to the building's internal configuration and use (in conjunction with the age and condition of the existing plant and equipment) lend to a complete update of all the building services systems in both type and configuration. All building services systems will be new, high efficiency, reliable, and designed with appropriate maintenance access to ensure long term reliability and functionality of the entire building. Refer to Figure 1-1 for a holistic view of the block planning undertaken that informed the building services strategy.
- The majority of mechanical systems for fresh air and exhaust are proposed to be centralised and located at roof level, with concealed air inlets and discharges. In doing so this negates the need to introduce openings into the heritage façade, leaving the façade largely unaffected by the introduction of modern high quality engineering systems.
- The architectural scheme includes for the provision of new roofs to the atriums voids for a significant amenity improvement of the courtyard/ atrium spaces below. This enclosing of the existing voids further supports a centralisation of primary air systems from the roof level.
- Where required to suit plant functionality requirements for basement plant items, new discharge and intake vents are proposed to be seamlessly integrated into the ground plane at Loftus Street and at Farrer Place. This mitigates the need for further disruption to the existing heritage building fabric (refer Figure 1-2).
- The luxury hotel offering will be provided with reliable and robust services and systems with high levels of control. The mechanical services system will respond to this with conventional chilled water fan coil unit system with gas fired heating hot water system. The primary plant systems will be centralised and serve both buildings as well as the tower. There will be opportunity to decentralise the proposed heating hot water system to serve each of the three building components individually. This will be subject to further design development of the precinct.
- The proposed scheme will require a significant addition to building energy demand due to the expanded footprint and enhanced servicing requirements. As such three new substations will be required. The current design concept has considered the benefit of collocating basement substations, main switchboards and central chiller plant together in basement plant areas to match load sources to load centres and minimise distribution runs. Chiller plant is also to be located centrally within the development minimising chilled water piping distribution, and thus reducing energy requirements.

- The integration of new services within the Lands Building aims to be sympathetic to the requirement to retain heritage ceilings, walls and floors to as great an extent as possible. To this end, the existing corridor floor voids are will be utilised for primary services reticulation. Secondary reticulation will be via either existing floor void or new floor voids (retaining the existing floor in situ, with minor removal to allow new services installation). Air conditioning services will be integrated within new en-suite bathroom services pods within each guest room. Existing cabling and lighting power reticulation pathways are proposed to be maintained wherever practicable. Refer Figure 1-3 for a typical guest room services concept for the Lands Building.
- The Lands Building rooftop is of significant heritage value and there is limited opportunity to introduce new plant spaces on top of the existing roof. The design response therefore will consider a significant extent of services plant being embedded within the existing roof void, including provision of new structural and acoustically rated fabric to separate new roof void plant from guest spaces below.
- Similarly to the Lands Building the Education Building is proposed to be provided with all new building services. The heritage façade is retained however internal alterations to the building allow the provision of new services risers. To maintain the heritage façade, plant areas are generally located at roof or basement levels, drawing intakes and discharges from beyond the heritage fabric.
- The atrium floor is proposed to be treated with a combination of air supply and underfloor heating to provide excellent amenity to this large open void. Services concepts are illustrated in Figure 1-4.
- The Fire Engineering strategy will respond to the constraints offered within the existing buildings. The existing fire egress stairs do not escape direct to outside and there exists a further constraint in relation to the extent of openings able to be introduced into the existing building fabric. Solutions will be considered on the basis of performance objectives giving consideration to the enhanced floor to floor heights available, the respective fire loads in various areas, and the integration of the holistic form of the building to provide a safe, reliable, considered fire engineering solution cognisant of the heritage value of the Lands and Education Buildings. Figure 1-5 shows consideration of the planning strategy for smoke control in the Education Building by way of example.
- The proposed design will commit to sustainable design solutions including low energy usage design solutions and leveraging off the inherent opportunities for sustainable design solutions within the development of the scheme. Strategies identified for further consideration at this stage will include:
  - Modern, high efficiency centralised chiller plant.
  - Consideration of energy efficient water cooled Variable Refrigerant Volume (VRV) for the tower above the Education Building.
  - Solar boosted hot water, subject to space availability and heritage constraints.
  - Variable speed circulation systems for pumping.
  - Coordinated integrated design solutions matching load centres to load sources where practical to minimise services runs and associated energy losses.
  - Utilisation of existing building thermal mass to integrate with the thermal system response.
  - The use of high efficiency gas fired hot water systems for heating.
  - Provision of additional building insulation where not constrained by heritage componentry, noting preliminary advice from the BCA consultant has confirmed that it will not be required to upgrade existing façades. In many cases it will likely not be possible to introduce additional insulation without damage to existing heritage fabric.
  - Consideration of innovative technologies such as waste heat rejection/ reclamation from site wide sewer systems.
  - Adoption to Raffles 'Green' sustainability targets as outlined in the Raffles Design and Construction Standards V3.1 2010 where applicable and practical taking into account the Australian context. Refer to services discipline sections for specific sustainability initiatives identified.

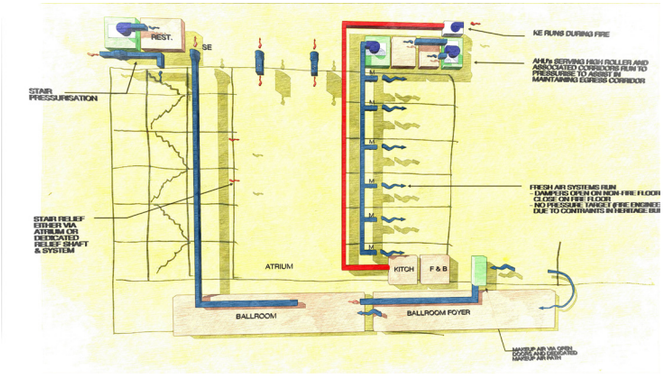



**Figure 1-5 Education Building-Smoke Control strategy**

# 2. Security Services

## 2.1 Introduction

The implementation of this security strategy has been considered to address the requirements of security that cover the Hotel's operation as well of the public and clientele who will be in attendance. The design will cover those requirements of Raffles and additional methods to assist in the maintenance of appropriate levels of safety.

## 2.2 Design criteria

### 2.2.1 Design inputs

Inputs to the security concept design are listed as follows:

- Raffles Hotels and Resorts' Design and Construction Standards V3.1 2010; and
- AS 4806-2008 Closed Circuit Television (CCTV), Parts 1 to 4.

### 2.2.2 General security

There will be high levels of security generally within the Sandstone Precinct; security will be discrete and not imposing. The atmosphere of the hotel needs to be welcoming so as to invite further guests to the location; yet current guests need to feel safe and secure within the hotel.

The functions of the following security measures are outlined in Raffles Hotels and Resorts' Design and Construction Standards:

- CCTV
- Electronic Access Control
- Alarms
- Physical Security Measures

Raffles Hotels and Resorts' Design and Construction Standards V3.1 2010 outline different risk environments and specific security standards for each environment. The security services will initially be designed to a 'Low Risk' environment pending a further security risk assessment. The outcome of this assessment, as well as other possible requirements for the hotel component of the scheme, may increase the levels of security needed to address certain security risks. A preliminary schematic outlining the security services solution is provided in Appendix B.

### 2.2.3 Closed Circuit Television (CCTV)

CCTV will be located at strategic points throughout the hotel, both public and operational. The functions of this system are to monitor activity outside the surrounding area of the hotel, identify people entering into the building, and to monitor all main public areas and sensitive areas within. CCTV coverage will include:

- All perimeter entrances/exits (including fire exit doors) and roof top
- Hotel Lobby including the Reception area
- Lifts and Lift Lobbies
- All publicly accessible circulation routes/corridors (including corridor's throughout each level)
- Communal areas
- Operational circulation spaces
- Loading Bay
- Licensed areas (i.e. the bar)
- Cash exchange areas (including recreational facilities, the bar, and ATMs)
- Baggage storage areas
- Any area deemed as being a sensitive area
- The surrounding area of the buildings

All CCTV will be monitored within the Security Control Room and at a secondary point in the main reception area. There will be an area within the Security Control Room where CCTV images can be reviewed in privacy by guests or civil authorities if required.

### 2.2.4 Hotel access control

The Hotel access control system will include all access into each guest rooms as well as access into other guest areas such as the gym, pool and spa locations. This system will also extend to certain store rooms and other areas where access is needed by cleaning and maintenance staff.

### 2.2.5 Commercial access control

The commercial access control system will be used for the building perimeter, the parking lots, and some back-of-house areas. These include, but are not limited to:

- Reception
- Security Control Room
- Communications Rooms
- Plant Rooms
- All access points between staff and public area

### 2.2.6 Duress alarms

Duress alarms will be installed in areas where people may require security assistance.

These areas may include:

- Reception
- Security Control Room
- Function rooms (including the Ballroom)
- Any other area deemed as being a sensitive area that may require duress alarms

### 2.2.7 Other alarm systems

All perimeter doors will be fitted with Reed Switches so that they can be monitored in the Security Control Room and the position of the door (open or closed, locked or unlocked) can be seen. Other doors, for example fire exit doors, will also be alarmed with Reed Switches.

### 2.2.8 Physical security

All doors within the hotel will be solid, robust and fitted with locking devices appropriate to their location and functions. All windows in public areas, in any service areas applicable, on the ground floor or levels below will be fitted with standard locking devices.

The main entrance doors shall be lockable.

All opening windows within the hotel guest rooms will have locking mechanisms.

## 2.3 Optional Security Measures

The current design has been progressed with consideration of possible optional security measures that may be applicable, subject to further design development. The design facilitates the potential for these items to be applied, without significant alteration to the planning. Adjustments to detailing of elements would be undertaken during design development.

### 2.3.1 Access from adjacent building

In the event of an emergency where government officials need to be evacuated from the adjacent buildings at the Governor Phillip Tower and at 1 Bligh Street, Sydney, there is the potential for an underground movement route between these locations and the Sandstone Precinct site to be constructed. This could allow officials to travel safely underground into secure areas within the Sandstone Precinct site.

### 2.3.2 Education Building – Ballroom

The Ballroom could potentially be the first secure area for officials evacuating the adjacent buildings through the underground movement route or for people in close proximity to the Ballroom. The walls of the Ballroom would have low level fortification and there would be controlled access into, and out of, the room.

### 2.3.3 Lands Building - Incident Management Room

Within the function room on Level 1 there could be false walls to disguise an Incident Management Room, including the equipment and services within. During emergencies, this Incident Management Room could be operated by State and Federal Agencies as an incident management centre. When the Incident Management Room is not in use, the Function Room itself would be used as normal.

This room would be access controlled.

### 2.3.4 Lands Building - Panic Room

A Panic Room could potentially be guised as a function room and would be used for this when the Panic Room is not in use. This room could be the primary secure destination for visiting officials in the event of an emergency; for this reason the walls of this room would be heavily fortified. Officials evacuated to the Ballroom in the event of an emergency could be manoeuvred to this location through the fire stairs when it is deemed reasonable to do so. The fire stairs could also be utilised by officials staying within the hotel, including the Presidential Suites if they are located on a different floor.

This room will be access controlled.

### 2.3.5 Lands Building - Presidential Suites

At this time it has been indicated that the hotel will have at least one Presidential Suite, with the potential for three; one built to United States of America's security standards, one built to the United Kingdom's security standards, and one similarly built to these standards for other foreign officials.

These rooms will be access controlled and suitably fortified in accordance with both the hotel standards and other relevant security standards.

### 2.3.6 Education Building – elevator shaft

The elevator shaft within the Education Building could be a fortified shaft built to withstand high levels of deliberate or accidental attack, or natural disaster. In emergencies, this particular elevator shaft could be programmed to travel directly to its highest level in the tower to enable ready access via stair to the helideck.

This will be considered further as part of detailed design.

### 2.3.7 Key management system

A key management system will be used if there is deemed to be a requirement for the management of physical keys. Where this measure is adopted, the key management system would be located in the Security Control Room.

## 2.4 System configuration

### 2.4.1 CCTV system

All IP cameras will be connected to a main system server located within the main communications room. Where the distance between the camera and the main system server is too large, then the camera will be connected to a secondary server located in another location, which will itself connect back to the main system server.

All cameras shall be selectable for display on monitors within the control area through a keyboard or a PC touch-screen. The control system shall have the capacity to display multiple camera views on the display screens. The level of high definition will be sufficient as to be able to provide facial recognition.

In general, all cameras will be monitored through the Security Control Room, with a secondary monitoring location being the main reception area.

There will be capability for recording of each camera for a duration of 30 days an allowance for an extra 20% spare capacity. There should be facilities where recordings can be exported to other media, such as DVD or USB.

### 2.4.2 Hotel access control system

The hotel access control system will be adopted on all hotel rooms and all other areas requiring access to guests, general hotel staff, cleaning staff or maintenance staff (indicated above in section 2.2.4). This will connect to a gateway which is then connected to servers which will be located in the reception area and in the administration area.

Hotel access control system cards (magnetic strip or radio-frequency identification [RFID]) will be encoded by encoders located in the reception area and in the administration area. The hotel and residential apartments will use an Open Protocol system.

### 2.4.3 Commercial access control system

The Commercial Access Control System will include card readers, electronic locking devices, push-to-exit buttons, break glass buttons, automatic door interfaces, lift controllers and fire controllers. All of the security hardware within this system will connect to a security control panel located in the main communications room.

Where the distance between the security hardware and the main security control panel is too large, then the hardware will be connected to a secondary security control panel in another location, which will itself connect back to the main security control panel.

### 2.4.4 Alarm systems

All alarm systems (including Reed Switches and duress alarms) will be connected to a main security control panel located within the main communications room. Where the distance between the alarm hardware and the main security control panel is too large, then the hardware will be connected to a secondary security control panel in another location, which will itself connect back to the main security control panel.

## 2.5 Design considerations for the tower

### 2.5.1 General

Appropriate levels of security will be adopted for the proposed use of the tower atop the Education Building. The mixture of both residential apartments and hotel room accommodation warrants additional and separate combinations of security measures servicing the tower.

### 2.5.2 Residential apartments

In the residential apartment's components of the tower, then security measures will be minimal. CCTV cameras are intended to be placed in the lift lobbies to monitor anyone approaching the lifts from each floor. There will also be CCTV inside the lifts.

There is a potential for CCTV cameras also to be used for other areas such as penthouses or other sensitive areas as deemed appropriate.

Other security hardware may be used such as Reed Switches, electronic locks, card readers, break-glass buttons, push-to-exit buttons, duress buttons or automatic door interfaces where the requirement is deemed necessary.

### 2.5.3 Hotel room accommodation

Where hotel room accommodation is adopted within the tower (level 9 to 18), similar security measures to other hotel room accommodation levels throughout the Lands and Education Building will be adopted. This includes CCTV throughout the level covering all corridors, lift lobbies, and other areas deemed as requiring CCTV surveillance.

The Hotel Access Control System will also be adopted throughout these levels. This system will connect to the same system used throughout the Lands and Education Buildings.

Other security hardware may be used such as Reed Switches, electronic locks, card readers, break-glass buttons, push-to-exit buttons, duress buttons or automatic door interfaces where the requirement is deemed necessary.

# 3. Structural

## 3.1 Introduction

The structural solutions proposed for the current scheme will be concentrated mainly around the Education Building due to the:

- Tower structure above;
- Enclosure of the atrium space;
- Excavation under the building; and
- A significant amount of ground retention around the perimeter of the excavation, which is dependent on the depth to good quality rock sufficient to undertake vertical face excavation without retention.

To provide a commentary to the indicative and preliminary structural sketches produced as part of the preliminary concept at this time in Appendix C, a comprehensive description of the structural works for each level or area has been given in the following sections of the report which aligns with the development of the current architectural scheme.

Structural engineering will also be undertaken within the Lands building in order to facilitate the respectful integration of building services elements and alterations to the roof that are proposed as part of the concept. This section outlines the principles for such works.

## 3.2 Excavation requirements

The current scheme has new excavation works under the centre of the Education Building in order create the Ballroom, approximately 12m below the existing level 1 floor. A deeper excavation is required to the western side of the Education Building, as well as areas under Loftus street and Farrer Place. These areas extend down to level B8, an additional 6 levels deeper than the Ballroom floor.

Substantial underpinning as shown on structural drawing SK-06 (Appendix C) will be required to achieve the architectural requirements of the Ballroom and surrounding areas. There are some large transfer beams which will also be designed in the permanent state spanning around 25m and supporting existing stone walls 9 storeys high and up to 1m thick. The underpinning and transfer structure will be subject to very stringent deflection criteria due to the brittle nature of the sandstone structure. The design will give consideration to this however it is noted that considering the nature and age of the existing structure some remediation works may be required.

## 3.3 Areas of structure within the Education Building

### 3.3.1 Level 8 Pool, Spa & Plant

The existing roof structures over level 7 will be demolished in some areas to make way for a pool and spa area and rooftop plant on level 8. This will mean an additional concrete level and a roof over the plant room. The location of the pool and plant on level 8 is expected to be located primarily on the 1920's half of the building (southern half). Further design development will be undertaken to detail impacts on the existing and new structure however it is noted that the scheme fundamentally supports the provision of a pool in the vicinity.

A post tensioned band and slab system will support the proposed pool and spa off the existing columns which will require strengthening. The depth of the pool on level 8 and any impacts on the level 7 hotel rooms below is yet to be determined.

The intention would be to make the new structure for the plant rooms and general areas as light as possible to minimise the extent of strengthening to the existing columns and footings. This could be achieved through a steel beam and steel deck solution, which would also aid in constructibility.

The development of such an approach will need to incorporate sufficient acoustic controls to be developed in order to minimise the slab thickness, which is usually required as 200mm in residential applications, and is much thicker than the structurally adequate thickness of 120mm with steel beams spaced at every 2.5-3m.

The location of plant above the existing structure will be minimised wherever possible to reduce the load on the existing structure and potential strengthening of columns.

The plant room area on the rooftop (level 8), is also proposed to comprise lightweight structure, rather than a concrete slab.

Earthquake and wind loading assessments will continue to be undertaken during design development in order to finalise structural requirements. Preliminary analysis determines that the additional vertical load would result in all columns supporting the new level needing to be strengthened with additional steel plates or members welded to the existing. This is expected to be required over at least the top few levels of the building.

### 3.3.2 Services risers from Level 1 to Level 7

There will be services riser requirements to penetrate the existing floor structure. Based on the current understanding of the structural framing of the Education Building, the intent would be to locate the penetrations away from the main steel beams and introduce additional steel beams to trim the openings as required.

### 3.3.3 Level 1 - new Ballroom roof and surrounding

The level 1 structure provides a column free space to the ballroom below, as well as new slabs and beams in the areas that excavation has extended down and a new floor is now required to replace the existing slab on ground. However, there will be a large portion of the existing level 1 structure that remains unchanged.

The structural system over the ballroom is proposed comprise deep PT beams and PT slabs spanning 20m clear to new columns built under the underpinned structure.

The 4 sets of podium and tower lifts require co-ordination with the structural beam layout.

The majority of the underpinning structure will become part of the permanent structure for the Level 1 floor. An infill PT slab has been documented in the concept drawings in Appendix C.

### 3.3.4 Loftus Street and Farrer Place Port Cochere

All external works have been documented at level 2.

Loftus St is to be closed and will become a new landscaped pedestrian thoroughfare. The extent of landscaping will be developed during design development and the floor structure designed to withstand substantial landscaping and live loading. Therefore the floor structure is substantial in size and reinforcement.

The external road/port cochere slab structure has been schemed as PT slabs and bands being supported on columns running down to rock. The reliance of vertical support from the ground at this RL so that the structure can be benched on the adjacent ground has been avoided, as the ground may be low quality at this level and permanent retention may be required for the ground to support the load from the new concrete structure. The roof to the vehicle entrance has also been documented that this level.

The port cochere canopy will be an architecturally designed structure with column free space potentially supporting glass roof and high quality finishes.

### 3.3.5 Level B1

Under the current concept this level will consist of suspended slabs and reinforced concrete beams for the ballroom reception area, back of house and service corridors.

### 3.3.6 Level B2

This level consists of a slab on ground to the ballroom floor and surrounding services corridors under the Education Building footprint. It also supports the loading dock, substation, storage and kitchen facilities. This has resulted in a live load allowance on this floor of 15kPa. There will be double slabs around the loading dock as well as substation which will require a large clearance height.

### 3.3.7 Levels B3 to B7

These levels are similar in loading and layout. The car park layout will need further development to include the column locations, but the proposed column spacing has been increased to 4 car bays to minimise impact. The current concept includes PT banded slabs supported on columns to B8. The floors will be loaded by switch rooms and chiller plant, as well as the general car park layout, so the live load allowance of up to 7.5 kPa has been determined generally, with a greater allowance to be made for the fire sprinkler storage area. Lateral stability will be provided to these floors by keying into and pouring up against the excavated rock face under the Lands and Education building.

### 3.3.8 Level B8

This current concept for L8 floor includes a 150mm thick slab on ground, sitting on a 100mm layer of crushed rock drainage layer.

Column foundations will also exist below this level, and although they have not been documented, the quality of rock as this level is assumed to be high. Consequently, the pad footing sizes will be minimised in size. The site geology is discussed in 3.6.

## 3.4 Areas within the Lands Building

### 3.4.1 Plant within the existing roof void

New air handling units have been planned to be located within the existing roof void. Currently, this structure would not be sufficient to withstand the additional loadings and additional structure is required to support the new equipment. The floor structure is proposed to take the form of steel beams and pre-cast concrete planks to aid constructibility. Alternatively steel beams and profiled steel formwork sheet could also be used. Steel beams, joists and a chequer plate system could also achieve the same outcome, however there is a strict acoustic requirement to isolate the plant noise from the hotel rooms below, so the solution would need to be tailored to suit the acoustic requirements.

The roof is currently supported by roof trusses spaced at approximately 4m and occupy the full depth of the roof space. It is likely that these trusses would need to be modified to make room for the AHU's, so the roof trusses would need to be transformed into roof rafters, allowing the structure to be contained to a 500-600mm zone directly below the roof.

## 3.5 Tower structural system

The proposed tower structural system will consist of a double shear wall system running along lobby in a cruciform shape plus lift and stair cores. Link walls/beams will be provided between the double shear wall system and the lift and stair cores where possible to form box-shaped structures to increase torsional stiffness and hence the overall structural performance of the tower stability system. The optimal tower wall thickness based on preliminary assessment will be in the range of 200 to 500mm which is considered reasonable for the height and slenderness of the proposed tower.

The tower structure will be supported by a mega box of 1200-1500mm thick perimeter walls which runs through a newly created atrium within the existing Education Building to the footing via three-storey deep transfer system below Level 9. The intention based on early collaboration with the architect is that transfer and atrium structural system will be blended with the architectural design intent for the atrium while achieving all structural requirements for the tower. The tower will be founded on four mega columns which will extend to the rock below.

In order to effectively maintain occupant comfort in the top levels of the tower, a damper system has been proposed to be located on an upper level floor of the tower. The damper mass based on current preliminary assessment will be 315 tonnes and provided in the form of 20 water tank cells. This system would add another 2% damping into the overall structural system for the tower and assist to minimise complaints of wind-induced discomfort from the residents and hotel guests.

The structural system design for the tower will continue to evolve in collaboration with the architectural intent for the tower element of the redevelopment as the design develops.

The outline design parameters for the tower structural system are outlined below:

### 3.5.1 Load criteria

- Residential live load 1.5kPa
- Wind speed 46m/s (Sydney)
- Terrain category 3

### 3.5.2 Structural requirement

- Wall thickness below transfer (Atrium) 1,500mm
- Wall thickness at transfer (Level 9) 1,000mm
- Wall thickness above transfer (Tower) 200-500mm
- Link wall/beams required to form box-shaped structures to increase over torsional stiffness of tower stability structure.
- Three-storey deep transfer system required below Level 9

### 3.5.3 Dynamic performance

- Tip deflection approx. 300mm or H/850
- First translational mode frequency approx. 0.21Hz
- First torsional mode frequency approx. 0.34Hz
- Wind-induced peak acceleration approx. 10.7mg (ISO criteria is 11.5mg)
- Targeted critical damping ratio 3%

A two-way liquid damper in form of water tanks of 315 tonnes total required to achieve the above damping criteria will be required for an upper level of the tower (currently allocated to level 71 in the current scheme). The proposed system would include 20 tank cells in four (4) stacks of five (5) cells each with dimensions of 5.8m (length) x 4.4m (width) x 1.2m (height).

## 3.6 Site geology

### 3.6.1 Geological setting

The Sydney CBD region is underlain by man-made fill, and variable extents of peaty quartz sands, silts, and clay. Soils are underlain by Hawkesbury Sandstone which is described as being a medium to coarse-grained quartz sandstone with very minor shale and laminate lenses. The sandstone is generally well-cemented by quartz/ siderite overgrowth and clay. The Hawkesbury Sandstone is generally massive or cross-bedded, near horizontally bedded.

### 3.6.2 Structural Geology

Aurecon have assessed the geology in the immediate vicinity of the Sandstone Precinct. There are several well documented geological structures which traverse the Sydney CBD Area based on available information, however no testing has been undertaken at this stage.

The presence of geologic structures could impact the design and engineering of the Sandstones Development. The presence of fractures and defects, including major structures such as faults and dykes, may reduce allowable bearing capacities for foundations, increase groundwater inflow, and present unstable conditions for vertical excavation faces. Furthermore, the release of high in-situ horizontal stresses during excavation can result in ground movement that may affect adjacent properties. It is noted that the adjacent excavations in the Governor Phillip Tower (GPT) development would most likely have relieved these stresses and therefore reduced the risk for the Sandstones Precinct redevelopment.

Below is shown selected details of near vertical structural features in the Sydney CBD (Figure 3-1) which indicates that the GPO Fault Zone is likely to transverse the Sandstones Precinct south to north, and the east-west trending Pittman LIV dyke (Great Wynyard Dyke GWD) is just north of the Sandstones Precinct at Bridge Street.


Figure 3-1:Sydney CBD Structural Geology

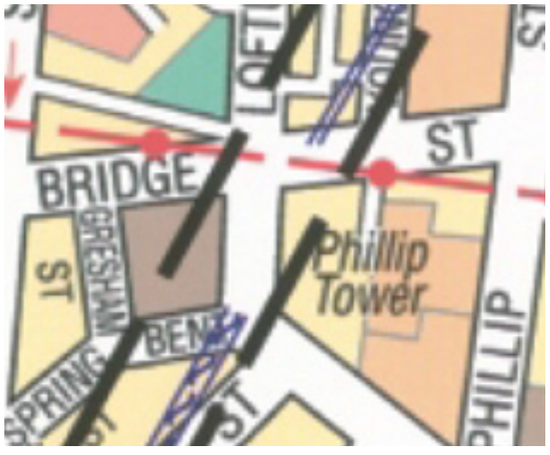



Figure 3-2: Sydney CBD Structural Geology – Sandstone Precinct Close-up

**GPO Fault**

The GPO Fault is widely spaced, includes vertical and sub-vertical joint sets with joint spacing of up to 3m are is common in the Hawkesbury Sandstone. The angle of joint surfaces may vary in the range of 30° on either side of vertical. Joints are usually open, with surfaces mostly rough and iron stained. Major jointing orientations in the Sydney region are NNE-SSW and ESE-WNW. Other common defects include weathered seams, bedding partings, shale/sandstone interfaces and shear zones.

The GPO Fault trends in a NNE direction across the Sydney CBD, and is shown in Figure 3-2 to cross both Young and Loftus Block and Bridge and Alfred Block. The GPO Fault has been observed further south at O'Connell Street, and was encountered in geotechnical drilling for 33 Bligh Street, both generally in agreement with the orientation indicated.

The GPO Fault comprises multiple crush zones and closely spaced jointing and faulting with normal and reverse fault offsets. The width of the principle shear zones of the fault likely vary from under 10m to over 20m width, with a greater frequency of fracturing possible for some distance from the interface.

**Dykes**

The Pittman LIV dyke runs east-west across the Sydney CBD, and is shown in Figure 3-1 to be at Bridge Street near Young and Loftus Block, and trending south of Bridge Street at Bridge and Alfred Block.

The Pittman LIV dyke is known to comprise a sub-vertical intrusion of dolerite that ranges from weathered residual clay near surface to mostly fresh rock from depths of approximately 30m. Dolerite is likely weaker and more weathered near boundaries, whilst sandstone at the interface may be partially metamorphosed and closely jointed for several metres.

The Dyke is located in Bridge Street and we will need further investigation to determine the possible effects on temporary and permanent shoring.

**In-situ Stress of Hawkesbury Sandstone**

The Hawkesbury Sandstone of the Sydney Basin is known to have relatively high magnitudes of in-situ horizontal stress that may be several times greater than the vertical overburden. In-situ stresses tend to be greatest in one direction, and the orientation of the principle horizontal stress in the Sydney CBD is generally north-south to slightly northeast.

Given the orientation of the site and the fact that the site is near the intersection of two main features, the GPO fault and the Pittman LIV dyke it is a reasonable working assumption that any stresses in the immediate vicinity of the excavation in Loftus Street would have dissipated against the GPO fault and the expected movements related to excavation induced ground movements would be minimal and will not adversely impact the Lands Building.

### 3.6.3 Future rail tunnel

It is unlikely that the redevelopment of the Sandstones Precinct will impose any significant engineering challenge to development of the future rail corridor. However it is anticipated that review and approval by the relevant authorities will be necessary for any proposed works in the immediate vicinity. A more defined corridor would need to be defined to facilitate future development and further planning would continue to be developed through the planning and development phase of any redevelopment.

### 3.6.4 Foundations

A suitable basis for the preliminary proportioning of foundations can be found in the classification system for foundations on sandstone in the Sydney region recommended by Pells. The system is based on the primary criteria of rock strength, fracture frequency, and the extent of weathered seams; competence of rock increases with decreasing 'class' (e.g. Class V is represents the poorest quality rock).

Recommended parameters for preliminary design are provided below in Table 3-1.

**Table 3-1: Typical Presumptive Bearing Capacities for the Sandstone Precinct**

| Class of Sandstone | Ultimate End Bearing [1] (MPa) | Serviceability End Bearing [1] (MPa) | Ultimate shaft adhesions [3] (kPa) |
|---|---|---|---|
| Class V | >3 | 1 | 150 |
| Class IV | 8 | 2 | 300 |
| Class III | 20 | 4 | 1000 |
| Class II | 60 | 8 | 1500 |
| Class I | >120 | 12 | 3000 |

Notes:

1. Ultimate values occur at large settlements (>5% of minimum footing dimensions).

2. End-bearing pressure to cause settlement of <1% of minimum footing dimension.

3. Clean socket of roughness category R2 of better.

It is anticipated that CL III Sandstone will be encountered within the GPO Fault Zone at the proposed existing basement level. However, it is possible that CL II or better Sandstone may be encountered in areas adjacent and optimisation of the foundation design will be based on the results of future geotechnical investigations at the specific locations of the main heavily loaded columns.

### 3.6.5 Underpinning and Retention

The main areas for consideration in relation to excavation and underpinning related to the geology are outlined below:

- The nature and extent of existing shallow retention support along the boundaries requires investigation and coordination during construction such that adequate support is provided.
- The presence and extents of proximate geologic structures, most notably the Pittman LIV dyke and GPO Fault, will undergo further assessment and investigation to ascertain possible impacts on design and construction.
- Noise and vibration assessments will be required to determine impact of construction works on adjacent areas. It is expected that saw cutting of sandstone at property boundaries would be necessary to avoid over-breaking and to de-couple vibrations caused by mechanical excavation from nearby buildings.
- The design will weigh up the costs and benefits of adopting either a drained or tanked basement. Further investigation of groundwater levels will occur to inform such a decision.

### 3.6.6 Ground investigations

Further investigations will be required during subsequent phases of design with such work seeking to address the following:

- Identify design stratigraphy, including extent of surface material requiring retention.
- Identify key defects in rock mass that may affect stability of the excavation face. Specifically, clarify the presence of any geologic structures such as the GPO Fault and Pittman LIV dyke within influence of the proposed works.
- Determine the founding conditions and design bearing capacities at locations and depths of key foundations.
- Determine groundwater levels and fluctuations/variability.

The above is likely to be achieved by drilling vertical and inclined boreholes in suitable locations, utilising an acoustic televiewer for down-hole visualisation, installation of piezometers for ongoing groundwater measurement, and conducting laboratory testing on rock and soil samples. Any investigation works would be consolidated with other testing requirements for the redevelopment.

Investigation drilling could be undertaken at Bent Street, Loftus Street, Bridge Street and Gresham Street. In addition, drilling from the courtyard within the Education Building diagonally to identify the GPO structure will be required.

## 3.7 Design development clarifications

The following items have been listed as those that will require closer assessment during design development.

- The underpinning and transfer systems will be developed, interrogated and detailed to mitigate risk to the existing structure or heritage façade. Our team includes industry leading specialists whom have successfully undertaken equivalent recent projects with similar risks.
- The underpinning works will compromise the lateral stability system of the Education Building, mainly in the temporary condition. The extent of this bracing/stability system that will be required in the temporary state will be developed during a later design stage.
- Further works would need to be undertaken to determine the extent of strengthening required to existing columns due to pool, spa area and rooftop plant area on the Education Building.
- The additional loading would also require the existing building to be reassessed for earthquake and wind loading. This assessment could result in strengthening being required to the existing building and further assessment will be undertaken as part of design development.
- The level of weathered rock sufficient to not require retention is not yet known. Due to the relatively large excavated extent under the precinct, temporary and permanent shoring will be required. The full extent would be determined in conjunction with detailed geotechnical investigations in subsequent planning and design phases.
- A geotechnical engineer will be engaged to assess in detail the adequacy of the remaining rock under the Education Building to provide stability under the forces that will be likely be imposed. A substantial amount of support is proposed to be removed from the western façade wall of the Education building, resulting in the adjacent remaining rock being subject to much higher loads. Should it be determined through exploratory investigation that these forces are too high for the rock to withstand, strengthening in the form of permanent rock bolting or the like will be provided
- The extent of the future rail tunnels are not yet defined, however based on recent announcements related to the new Sydney metro alignment it is considered unlikely that the future rail tunnels will be located under the Education Building/ Tower. This will continue to be monitored throughout the planning and design process.

# 4. Civil Services

## 4.1 Introduction

This section identifies the existing and proposed external services within and surrounding the Sandstones Precinct and provides preliminary design advice in relation to the underground entrance ramps to and from the proposed basement carparks.

The extent of functions required in the design requires, by necessity extensive and deep excavation involved with constructing basement carparks, Ballroom and "back of house" functions. In addition the development will impact on the location of the existing services within the roadway corridors surrounding the buildings. These services will require relocation in due course.

The development will require the diversion/abandonment/protection of numerous services within the precinct and as such the detail provided in the following sections represents an outlines of the current sources of information, design standards and the parameters and assumptions used in the investigation to date.

## 4.2 Design criteria

The ensuing commentary and preliminary sketch in Appendix D, which identified the range of existing known services for the precinct, are based on the following sources of information and design standards:

- AS2890.1-2004 – Off-street Car Parking
- AS2890.2-2002 – Off-Street Commercial Vehicle Facilities
- Discussions with Sydney water.

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- Dial before you dig data capture.
- GIS Contours and boundaries.
- Available reports and drawings.

## 4.3 Design assumptions

Design assumptions from AS 2890.2-2002 used in the assessment of ramp entries/ exits for the proposed basement:

- Service entrance designed to accommodate a Medium Rigid Vehicle (MRV) with the dimensions 8.8m long x 2.5 wide and 4.5m clearance height.
- 7.2m wide entrance way to accommodate 2 vehicles entering/exiting at the same time. 8.7m min width required on bends.
- Maximum roadway entrance grades 15.4% (1 in 6.5 ) with maximum rate of change over 7m of travel being 6.25% (1in 16)
- Current grade of Gresham Street assumed 6% (from GIS data)
- Other design assumptions:
- 0.5m floor slab thickness above entrance ramp.
- 2 lanes (8.0m wide) bus carriageway required through Gresham Street.
- Vehicle control methodology, e.g. barrier/ traffic island required to separate the access ramp to the hotel and bus traffic.

## 4.4 Precinct background information

### The State Heritage Register

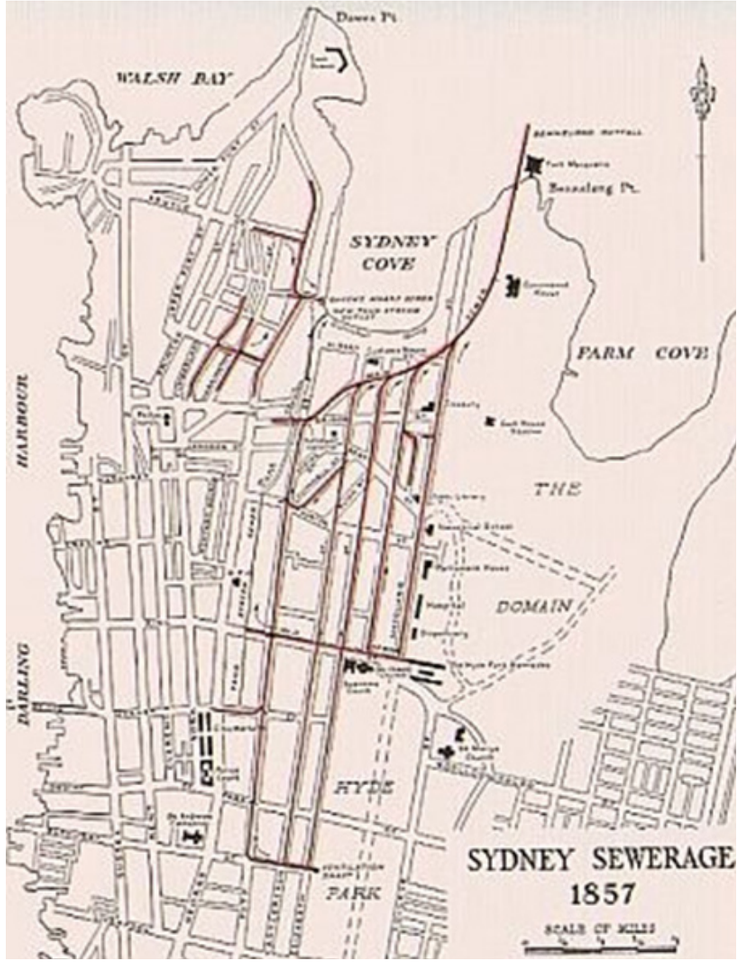
The State Heritage Register (SHR) was established under Section 22 of the Heritage Act and is a list of places and objects of particular importance to the people of NSW, including archaeological sites. The SHR is administered by the Heritage Branch of the OEH and includes a diverse range of over 1500 items, in both private and public ownership. To be listed, an item must be deemed to be of heritage significance for the whole of NSW.

The presence of archaeological sites listed on the SHR needs to be confirmed, it is however understood the Bennelong Stormwater Channel (BSC) runs through the middle of the site. This has been confirmed in a review of the Sydney Water **Section 170 Register and noted right.**

The Heritage Act requires all government agencies to identify and manage heritage assets in their ownership and control. Under Section 170 of the Heritage Act, government instrumentalities must establish and keep a register which includes all items of environmental heritage of State or local significance that are owned, occupied or managed by that government body. All government agencies must also ensure that all items entered on its register are maintained with due diligence in accordance with State Owned Heritage Management Principles approved by the Minister on advice of the NSW Heritage Council. These principles serve to protect and conserve the heritage significance of identified sites, items and objects and are based on relevant NSW heritage legislation and statutory guidelines.

**The Bennelong Storm Water Channel [SWC] No. 29 is listed on the Sydney Water s170 Register (Figure 3). This is one of five original combined sewers built in Sydney c. 1857, by the City Council. It is a combined sewer/ stormwater drain, made of brick and oviform in shape. The item includes a network of drains running throughout the CBD** (as indicated in Figure 4-1). **The Bennelong SWC runs roughly E-W through the approximate middle of the subject site** (Sandstone Precinct)**, with branches also diverging to run south along Phillip, Young and Loftus streets.**

Figure 4-1 Bennelong Stormwater Channel




**Geology**

The subject site was located on the southern foreshore and slopes bordering a flooded river valley within the Sydney Basin, a large depositional geological feature that spanned from Batemans Bay to the south, Newcastle to the north, and Lithgow to the west. The underlying geology of the lower portions of the subject site bordering the estuarine flat and Sydney Cove foreshore comprised Quaternary sediments consisting of quartz sand, silt and clay. The underlying geology of the remainder of the subject site consisted of Hawkesbury Sandstone, which comprised medium to coarse-grained sandstone, very minor shale and laminate lenses. Hawkesbury Sandstone was one of the most extensive geological layers of the Sydney Basin, and was used by both Aboriginal and European people for a variety of shelter and subsistence requirements.

**Soils**

Circular Quay was formed from land reclamation works that began in the 1830s and involved filling the tidally influenced estuarine flat that extended around the southern shore of Sydney Cove. The original southern foreshore of Sydney Cove would have predominantly comprised tidal mud banks associated with the mouth of Tank Stream, the main watercourse through inner Sydney. Although it was likely that sections of the original southern shoreline of Sydney Cove were preserved intact beneath the reclamation fill, the contemporary ground surface across the northern boundary of the subject site is considered to be disturbed terrain.

Generally shallow soils existed across the Hawkesbury Sandstone slope south of the shoreline, with soil developed in situ from the underlying sandstone geology. This soil context, called the Gymea soil Landscape, consisted generally of sandy soils with high erosion hazard in cleared areas. The upper lens of Hawkesbury Sandstone beneath the Gymea soil Landscape was likely to be weathered and fractured, resulting in 'floating' bedrock at the soil/bedrock transition.

**Landform and Hydrology**

Exploratory investigations have not been permissible at this stage in the project however a significant amount of historical data exists to provide information to the designers upon which have made educated decisions for the project.

The subject site is located across the moderate to gradual slopes on the western side of a sandstone ridgeline. The orientation of the main crest of the ridgeline, approximately 250 metres east of the Sandstone Precinct site, is north towards the Opera House, and is aligned with the eastern side of Macquarie Street. The high point of the subject site is at the intersection of Bridge Street and Phillip Street, with the terrain from that point dropping north to Circular Quay and west towards Pitt Street.

## 4.5 Authority and in-ground services

The natural drainage catchment within the inner Sydney area was a watercourse called the Tank Stream that flowed north from a swampy area stretching between Market Street and Park Street. The watercourse flowed between the current alignments of Pitt Street and George Street, with the mouth of the creek originally a tidally influenced estuarine flat covering the area north from Bridge Street, east from Pitt Street and west from Loftus Street. The tidal flat area stretched east across the northern end of Loftus Street (refer Figure 4-2).

The northern boundary of the site formed the southern shore of Sydney Cove at the time of first European settlement in 1788. The Tank Stream was officially abandoned as a source of water in 1826, and the stream gradually closed over from 1852 with sections used for sewage.

The estuarine tidal flat at the mouth of the Tank Stream was gradually in-filled with introduced dredged sand and mud, demolition rubble, industrial and household waste. The in-fill of the estuarine flat extended the southern foreshore of Sydney Cove northwards by approximately 70 metres from the original alignment along the northern boundary of the subject site. The site is outside of the in-fill area and excavations for the precinct and relocation of services is expected to require normal measures to avoid collapse during construction.

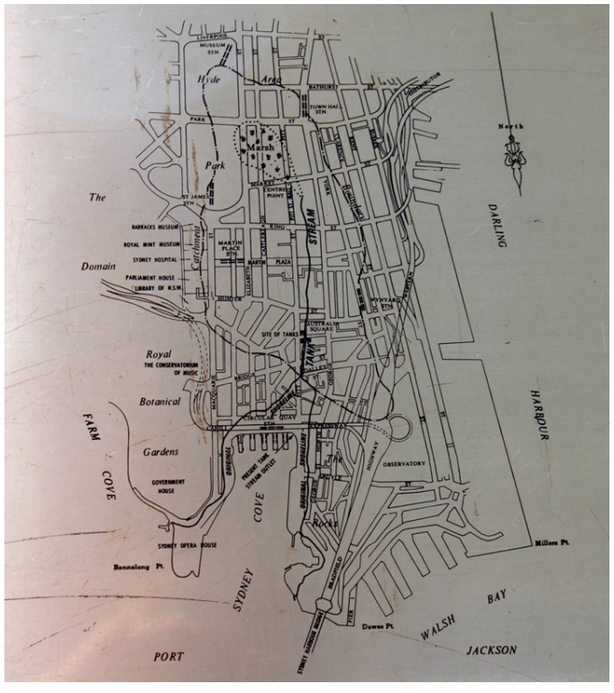



**Figure 4-2 Tank Stream Location and Historic Shoreline**

### Bent Street and Farrer Place

Numerous services within Farrer Place and Bent Street will need to be relocated to allow for the construction of the basement levels and underground access and egress ramps. An indicative list of services affected is indicated below:

- Potable water (Sydney Water):
  - 150Ø Cast iron cement lined pipe to be relocated from the intersection of Farrer Place and Bent Street.
  - 250Ø Ductile iron cement lined pipe to be relocated from the north of Bent Street.
  - 100Ø Cast iron cement lined pipe to be relocated from the centre of Farrer Place.
  - 225Ø Cast iron cement lined pipe to be relocated from the south of Bent Street.
- Stormwater:
  - 300Ø concrete pipe and catchpits to be removed and reinstated after works through the north of Bent Street.
  - Historic Bennelong Stormwater Channel to be protected at the intersection of Farrer Place and Young Street.
- Sewer:
  - 660 by 990 Concrete sewer carrier main through Farrer Place, Young and O'Connell Street to be relocated.
  - - 300Ø vitrified clay pipe to be relocated from the intersection of Farrer Place and Bent Street.
- Electricity ducts and structures:
  - - Low voltage electrical supply and infrastructure within Farrer Place and Bent Street to be relocated.
- Gas:
  - 110mm Nylon main 1050kpa high pressure secondary main through the centre of Bent Street to be relocated.
  - Various 7kpa network mains throughout Bent Street to be relocated.
- Fibre optic:
  - Fibre optic perpendicular to the east of Farrer Place to be relocated.
- Communication ducts and structures:
  - Communications ducts to the north of Bent Street to be relocated.
  - Location of telecommunication to the south of Bent Street to be confirmed and either relocated or protected during construction.

## Loftus Street

Numerous services within the Loftus Street will need to be either protected and/or relocated to allow for the construction of the underground ballroom and the link between the two buildings (Lands and Education). An indicative list of services affected is indicated below:

- Potable water:
  - 200Ø Cast Iron Cement Lined pipe on the western side of Loftus Street to be relocated.
  - 450Ø Cast Iron Cement Lined pipe on the eastern side of Loftus Street to be relocated.
- Stormwater:
  - Unknown stormwater pipe type and diameter to be removed. New drainage to be installed through Loftus Street.
  - Historic Bennelong Stormwater Channel through the centre of Loftus Street to be protected. Refer to Figure 4-3 for a sketch of an option for protecting the channel.
- Sewer:
  - - 300Ø Vitrified clay pipe through the centre of Loftus Street to be relocated.
- Communication ducts and structures:
  - Two separate communication ducts on the east and west of Loftus Street to be relocated
- Gas:
  - 150Ø 1050kpa high pressure secondary gas main to the east of Loftus Street to be relocated.
  - Secondary pipe main regulator located in the southeast section of Loftus Street to be relocated outside of works area.
  - 110Ø 7kpa main in the western side of Loftus Street to be relocated.
- Electricity ducts and structures:
  - Low voltage electrical supply and infrastructure that are contained in Loftus Street to be relocated.

## Gresham Street

Numerous services within the Gresham Street will need to be relocated to allow for the construction of the access ramp. The access ramp will connect the underground carpark and service area to the roadway in Gresham Street. An indicative list of services affected is indicated below:

- Potable water:
  - 250Ø Cast Iron cement lined pipe to the east of Gresham Street to be relocated.
  - 150Ø and 200Ø Cast Iron cement lined pipe to the west of Gresham street to be protected
- Sewer:
  - 300Ø vitrified clay pipe to through the centre and east of Gresham Street to be relocated.
  - Communication ducts and structures
  - Communication ducts perpendicular to Gresham street through the centre of the road to be relocated
  - Communication ducts on the western boundary of Gresham Street to be protected.
- Gas:
  - 75Ø Nylon main on the western boundary of Gresham Street to be relocated or protected.
  - Unknown diameter gas line through the centre of Gresham Street to be protected or relocated.
- Electricity ducts and structures:
  - Consultation with the utility owners needs to be undertaken to ensure proposed relocations and protection works are satisfactory with the owner and do not greatly affect the service they currently provide.

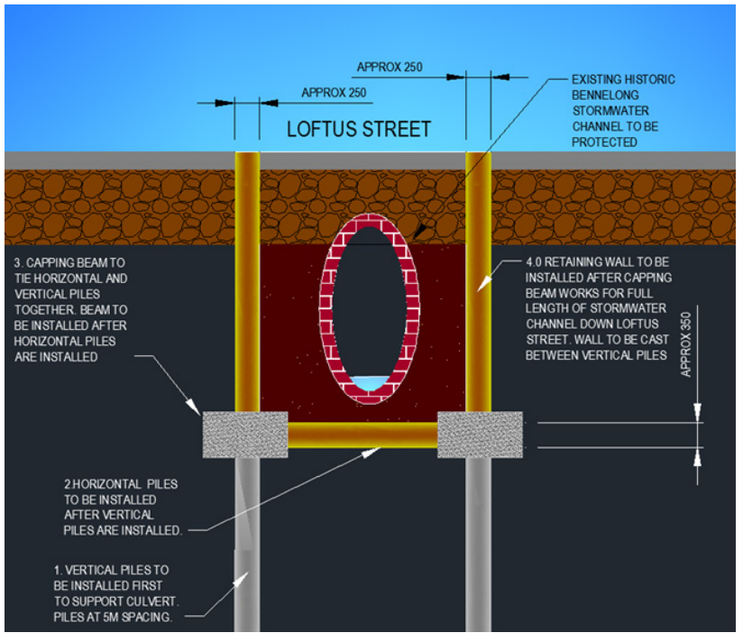
## 4.6 Heritage structure implications

The existing Bennelong Stormwater channel (SWC) No. 29 is located in Loftus Street and Young Street and is of high historical and technical significance as it was one of the five original combined sewers built in Sydney around 1957 (refer section 4.4). The channel is an oval brick formed channel with dimensions of 1.1m by 0.7m for the Loftus branch and Young Street Branch. It is noted that in 1992 the Young Street branch had a section of the historic sewer diverted and replaced with a 1.8m by 0.9m box culvert as part of the development of the Governor Phillip Tower building.

The current design incorporates the Bennelong sewer above the Ballroom foyer. The Sewer would either be protected during construction works and remain in place or will be replaced with a box culvert similar to the Young Street Diversion.

Further liaison with Sydney Water will need to be undertaken to determine the most appropriate method of accommodating the Bennelong Sewer.

**Figure 4-3 bennelong stormwater channel protection detail**




## 4.7 Basement vehicular access

A review of the access arrangement to the basement loading dock has been carried out based on Grimshaw Architect's drawing A03_2003. The following design criteria has been considered for the preliminary design of the loading dock and carpark access:

- Maximum gradients to be less 15.4%.
- Separation between loading dock service area and carpark traffic.
- Changes of grade for the access ramps not to be greater than 6.25% over 7m.
- Entrance tunnel length at least 40m long to provide sufficient cover to the existing surface
- The design vehicle is able to manoeuvre into position for unloading with only one reverse movement. This is achieved by the inclusion of a turn table
- The service bay lengths are sufficient for the length of the design vehicle.

The review is based on providing a one way bus only section (2 lanes) within Gresham Street. A median strip (kerbed traffic island) will be required between the bus lane and the loading access to ensure separation.

# 5. Mechanical

## 5.1 Introduction

The mechanical services for the proposed development will be designed to be sympathetic to the heritage and high grade finishes expected of this hotel. This section outlines the background behind the design intent of the mechanical services. This does not aim to represent every single system; rather represent a concept for further design development. It describes the primary systems to inform the scheme, and has been developed in consultation with the architect to inform spatial planning.

## 5.2 Design criteria

The air conditioning and ventilation systems for the project will be designed based on the ambient weather conditions at the site located in the Sydney CBD. The hotel will be occupied 24 hours a day 365 days a year and as such the design will allow for this mode of operation.

The design will also consider the life cycle costs of operating the building, and in particular the continuous operation of services. Highly efficient systems will be designed and equipment will be selected to enable reduced energy consumption and operating costs.

### 5.2.1 External Design Conditions

| Function | Cooling | Heating |
|---|---|---|
| Temperatures | 31.1 ° C DB/22.7 ° C WB max. | 4.5 ° C DB min |
| Solar gain | Maximum | Zero |
| Wind Velocity | 12 kmh | 25 kmh |

### 5.2.2 Internal Design Conditions

| General areas | Summer | 23 ° C DB. 55% RH max. |
|---|---|---|
| | Winter | 21C DB min. |

### 5.2.3 Ventilation

To AS 1668:2:

- Supply air: >4.5 L/s m ²
- Infiltration: 0.5 air changes per hour.

### 5.2.4 Internal gains

| Office areas | Lighting | Office equipment |
|---|---|---|
| | 15W/m including ballast | 15W/m |

## 5.3 Authority and in-ground services

The site will require new electrical substations with associated ventilation. Two new substations are proposed to be located below ground under Loftus St and as such will require mechanical supply and exhaust to comply with Ausgrid ventilation requirements.

In addition a third new substation is currently proposed for the lower level plant floor of the tower. This substation will be naturally ventilated.

## 5.4 System configuration

The mechanical services concept for the scheme will be to provide separate systems for hotel and residential areas. Systems are chosen in accordance to the appropriate fit for application giving consideration to energy, reticulation impacts, metering and the like.

### 5.4.1 Chilled water plant

The proposed development will incorporate a chilled water plant that reticulates chilled water to the Lands and Education Buildings and levels 9 to 18 of the tower to service the dual key apartments, and plant serving the function area on level 20 from the tower's lower level plant floor (currently proposed for level 19). The chilled water will be utilised within central air handling units (AHUs) serving larger areas and spaces, as well and smaller fan coil units (FCUs) generally located in individual bedroom suites and rooms.

The scheme will nominally include three to four (subject to design development) water cooled high efficiency chillers located in basement plant rooms under Loftus St. Chiller plant sizing will be calculated based on the expected diversified cooling load of the hotel. Utilisation of multiple chillers will provide the ability for low load turn down for periods when the building load is reduced and also allow for a level of cooling to be provided (nominally 65%) in the event of a component of the plant being out of service for maintenance.

The chiller may incorporate water side economisers where the cooling towers may be available to provide sufficient cooling capacity for low load periods. The ability to utilise water side economy mode will be analysed as part of detailed design.

Access to the chiller plant room will be via the basement loading dock.

Chilled water and condenser water pumps associated with the plant will also be located within the Chiller Plant Room. All chilled and condenser water pumps will incorporate Variable Speed Drives (VSDs). Chilled water will enter both the Lands and Education Buildings on their lowest floors. Within the Lands Building, insulated chilled water pipework will reticulate around each level via a void space under the corridor floors.

Condenser water from the chilled water plant will be pumped to the level 8 rooftop plant area of the Education Building.

Heat reclaim from the Low Load Chiller may be used for underfloor heating in the atrium utilising a heat exchanger and pump.

### 5.4.2 Cooling tower plant

Cooling tower plant will be located on level 8 of the Education Building in two groups for hotel and residential accommodation and spaces accordingly. Cooling towers will be sized to accommodate the chillers for the hotel areas, with a separate group for the heat pumps serving the residential accommodation and spaces.

No additional condenser water reticulation loop is proposed for individual tenants or users at this time.

Closed circuit cooling towers will be considered during detailed design.

### 5.4.3 Heating water plant

Dual key apartments located on levels 9 to 18 of the tower will be air conditioned utilising fan coil units with chilled water and heating water coils connected to the hotel central cooling and heating plants.

Toilet exhaust and outside air plant will be located in the lower level plant floor of the tower which will also houses AHU's serving Function Areas on level 20.

### 5.4.4 Tower

Residential apartments proposed for levels 21 to 74 in the tower will be air conditioned utilising a variable refrigerant volume (VRV) system with water cooled outdoor condensing units located in common plant areas on each level being served.

Two bed apartments will be provided with two VRV indoor units serving the living and bedroom areas respectively.

Single bed apartments will be provided with one VRV indoor unit incorporating change over damper from living to bedroom areas.

Two (and/or three) level penthouse style apartments will be provided with two (or three) VRV indoor units on each level zoned accordingly for living and bedroom areas.

Cooling towers will be located on the level 8 rooftop plant area of the Education Building with associated pumps. Heat exchangers and pumps will be located on the mid-level plant floor (level 47 as currently shown for the scheme) and on the lower level plant floor (level 19) to provide reduced head pressure on lower levels of the tower.

Heating will be introduced into the condenser water system for the residential levels of the tower from the hotel heating plant via heat exchanger and metered water supply.

Toilet exhaust, odour exhaust from kitchenettes and outside air plant (with VRV cooling/heating) will be located on each of the lower, mid and upper plant floors of the tower (currently levels 19, 47 and 63 respectively of the architectural scheme).

The Health Club currently proposed on level 48 of the scheme will utilise a VRV cooling and heating system, or packaged water cooled units.

### 5.4.5 Heating water plant

The current design concept proposes a common heating hot water system that reticulates heating water around the Lands and Education Buildings with metered supply for residential accommodation in the tower. The heating hot water will be utilised within the AHUs and FCUs. Where required, in duct heating coils may be utilised on common air systems.

The scheme will nominally include two to three (subject to detailed design) natural gas fired heating water heaters located in the level 8 rooftop plant areas of the Education Building.

### 5.4.6 Critical systems

All business critical areas such as computer rooms and kitchen cool rooms will be provided with separate air cooled refrigeration plant and have generator power back-up. Condensers will be located within the carpark. Where capacity requirements dictate, water cooled DX systems may be utilised and connected to the hotel condenser water system.

### 5.4.7 Lands Building central tempered air system

The Lands Building will be provided with a central air handling plant located within the roof cavity space that provides outside air down riser shafts to the levels below. The air handling systems will utilise chilled and heating water from the central plant and will partly condition and dehumidify the air to within a range of 20° to 24° (nominally). The ability to utilise heat recovery from nearby exhaust systems will be investigated and analysed as part of detailed design.

The tempered air supply will provide air filtration to reduce the quantity of particulates distributed to the fan coil units. The filtered air will extend the life of the fan coil unit air filters and therefore require less frequent maintenance.

### 5.4.8 Education Building central tempered air system

The Education Building will be provided with a central air handling plant located within the level 8 rooftop plant area and provide outside air down riser shafts to the levels below. The air handling system will utilise chilled and heating water from the central plant and will partly condition and dehumidify the air to within a range of 20° to 24° (nominally). The ability to utilise heat recovery from nearby exhaust systems will be investigated and analysed as part of detailed design.

### 5.4.9 Lands Building Food and Beverage

The food and beverage outlets proposed for the ground level of the Lands Building will be provided with individual air conditioning fan coil units, discreetly located within cupboards or mezzanine areas above the kitchens. Fan coil units will be provided with chilled and heating water from the central plants. Supply air will be distributed to the public areas with ductwork either concealed within the ceiling void spaces or exposed within the areas served.

Outside air will be provided from the tempered outside air supply system to the FCU where additional cooling or heating will be provided to satisfy the actual load of the space. Outside air flow will be sized for the actual population of the food and beverage area with the ability to modulate as required based on carbon dioxide monitoring and control.

The kitchen areas associated with the food and beverage areas in the Lands Building will be provided with kitchen exhaust. Nominally kitchen exhaust systems have been sized for an allowance of between 4000l/s and 7000l/s at each corner of the building. The actual flow may be rationalised as part of the detail design stage and limited by the availability of plant space within the roof void.

Kitchen exhaust hoods will incorporate grease filters and will require odour reduction filtration or treatment. All discharges will be provided with carbon and electrostatic filtration to 99% effectiveness.

Kitchen exhaust ductwork will be connected to the kitchen exhaust hoods and dishwasher hoods in each kitchen and rise within the allocated riser space to the roof level plant rooms within the roof cavity where kitchen exhaust fans will be located. The kitchen exhaust will discharge vertically through the roof sheeting in a manner that respects the appearance of the Lands Building roof area. This may include vent openings in the roof sheeting.

Kitchen exhaust make up air supply will be provided from the roof level plant down riser shafts to the ground level below. The kitchen make up air will be filtered unconditioned and sized to approximately 90% of the exhaust rate. Make up air will be provided either directly to the exhaust hoods or as close as possible. Individual makeup air systems per retail tenancy are considered in the concept design at this stage.

### 5.4.10 Education Building Food and Beverage

The food and beverage outlets proposed for the ground level of the Education Building will be provided with individual air conditioning fan coil units located within cupboards or mezzanine areas above the kitchens. Fan coil units will be provided with chilled and heating water from the central plants. Supply air will be distributed to the public areas with ductwork either concealed within the ceiling void spaces or exposed within the areas served.

Outside air will be provided from the tempered outside air supply system to the FCU where additional cooling or heating will be provided to satisfy the actual load of the space. Outside air flow will be sized for the actual population of the food and beverage area with the ability to modulate as required based on carbon dioxide monitoring and control.

The kitchen areas associated with the food and beverage areas in the Education Building will be provided with kitchen exhaust. Nominally kitchen exhaust systems have been sized for an allowance of between 4000l/s and 9000l/s at each of the two North corners of the building. The actual flow may be rationalised as part of detailed design.

Kitchen exhaust hoods will incorporate grease filters and will include odour reduction filtration or treatment. All discharges will be provided with carbon & electrostatic filtration to 99% effectiveness.

Kitchen exhaust ductwork will be connected to the kitchen exhaust hoods and dishwasher hoods in each kitchen and riser within the allocated riser space to the roof level plant rooms where kitchen exhaust fans will be located. The kitchen exhaust will discharge vertically through the roof sheeting.

Kitchen exhaust make up air supply will be provided from the roof level plant down riser shafts to the ground level below. The kitchen make up air will be filtered unconditioned and sized to approximately 90% of the exhaust rate. Make up air will be provided either directly to the exhaust hoods or as close as possible. Individual makeup air systems per retail tenancy have been included as part of the concept design.

### 5.4.11 Education Building Ballroom

The proposed Ballroom will be provided with air conditioning from an air handling unit located adjacent to the space. The air handling unit will be provided with chilled and heating water from the central plants.

Outside air will be provided from intake riser located in the VIP drop off zone. The air handling systems will incorporate carbon dioxide monitoring and control of outside air. The systems will also include the ability to operate in economy mode where the system may supply full fresh air when ambient conditions allow. Relief air from the ballroom will be discharged into the carpark or into a smoke exhaust riser to be resolved in detail design.

The Ballroom foyer on ground level will also be provided with conditioned air from the Ballroom plant.

The Ballroom kitchen located on level B1 under Loftus Street will be provided with kitchen exhaust. Nominally the kitchen exhaust system has been sized for an allowance of 9000l/s. The actual flow may be rationalised as part of detailed design.

Kitchen exhaust hoods will incorporate grease filters and may include additional odour reduction filtration or treatment as required depending on the analysis to be conducted as part of the detail design.

Kitchen exhaust ductwork will be connected to the kitchen exhaust hoods and dishwasher hoods in each kitchen and rise within the Education Buildings allocated riser space to the rooftop (level 8) plant room where the kitchen exhaust fan will be located. The kitchen exhaust will discharge horizontally through the roof.

Kitchen exhaust make up air supply will be provided from the rooftop plant area down riser shafts to the ground level. The kitchen make up air will be filtered unconditioned and sized to approximately 90% of the exhaust rate. Make up air will be provided either directly to the exhaust hoods or as close as possible.

The Ballroom will be provided with dedicated smoke exhaust system with makeup air from the foyer and outside air supply system.

### 5.4.12 Lands Building ground floor retail spaces

The retail spaced located within the Lands Building will be provided with FCUs served from the central chilled and heating water systems. Outside air will be provided from the tempered air system.

### 5.4.13 Lands Building reception and atrium areas

The reception area within the Lands Building will be provided with FCUs served from the central chilled and heating water systems. Outside air will be provided from the tempered air system.

Supply air to the North and South atria will be provided to the ground level from the tempered supply system.

The atrium will be provided with smoke exhaust fans located at the top of the atrium. Make up air for the smoke exhaust will be provided from the tempered outside air system to the non-fire affected floors. The smoke control system will be fire engineered as it is not expected that a deemed to satisfy pressure differentials will be achievable due to the atrium.

### 5.4.14 Lands Building accommodation suites

The accommodation suites located within the Lands Building will be provided with local fan coil units located within cupboard space. The cupboard will likely be integrated within a bathroom pod. Supply air from the FCU will be provided to supply air grilles also integrated into the bathroom pods. Within larger suites additional FCUs will be provided within vertical units concealed within joinery.

The FCUs will be provided with chilled and heating water from the central systems with pipework run within the corridor ceiling space of the level below. The pipework will then rise into a sub-floor space within each suite to the FCU cupboard. Access to the ceiling void is limited and generally only available via floor access panels from the level above. Ceilings, floors and walls of the Lands Building are generally all heritage listed and therefore access for installation is restricted. To enable installation smaller than usual component pieces will need to be utilised and installation within confined spaces will be required. This will add to the complexity of the scheme.

Outside air will be provided to the FCUs from the central tempered air system. Airflow rates will be sized to offset the bathroom pod exhaust rate. The tempered air will be ducted within the ceiling void space of the level below then rise into the sub-floor space of the suite. Fire dampers will be provided in ductwork where passing through the fire compartment layer. Similarly the installation of the ductwork will require smaller component pieces and will add to the complexity of the scheme.

Exhaust from the bathroom pods will be ducted down into the sub-floor space of the suite and then down into the ceiling void of the level below in a similar route to the outside air supply. Exhaust flows will be sized to exceed the minimum requirements of AS1668.2 by approximately 50%. Fire dampers will be provided in ductwork where passing through fire compartments.

### 5.4.15 Lands Building corridor spaces

Tempered air will be provided to the corridor spaces to maintain a positive pressure differential to the accommodation suites.

Under fire mode operation, supply air will be provided to the non-fire affected floors only.

### 5.4.16 Lands Building function rooms

The function rooms located on levels 1, 2 and 3 of the Lands Building will be provided with FCUs served from the central chilled and heating water systems. Outside air will be provided from the tempered air system.

### 5.4.17 Lands Building Cigar, High Roller, and Clubhouse rooms

The Cigar, High Roller, and Clubhouse Rooms located on the roof level of the Lands Building will be provided with FCUs located within the roof cavity space and served from the central chilled and heating water systems.

In the event of fire system activation the three spaces will all operate in full outside air mode to provide pressurisation for egress to the fire stairs.

### 5.4.18 Education Building ground floor retail spaces

The retail spaced located within the Education Building will be provided with FCUs served from the central chilled and heating water systems. Outside air will be provided from the tempered air system.

### 5.4.19 Education Building lobby and atrium areas

The reception area within the Education Building will be provided with FCUs served from the central chilled and heating water systems. Outside air will be provided from the tempered air system.

Supply air to the atrium will be provided to the ground level from bulkhead supply registers.

The atrium will be provided with smoke exhaust fans located at the top of the atrium. Make up air for the smoke exhaust will be provided from the tempered outside air system to the non-fire affected floors. The smoke control system will be fire engineered as it is not expected that a deemed to satisfy pressure differentials will be achievable due to the atrium.

In slab heating will be provided within the atrium area from the central heating water plant. This is proposed to utilise some waste heat from the central chiller systems, where practical. This option yields operational energy benefits due to the reuse of heat that is otherwise wasted. It is also a sustainability initiative.

### 5.4.20 Education Building accommodation suites

The accommodation suites located within the Education Building will be provided with local fan coil units located above the bathroom area. Supply air from the FCU will be provided to supply air grilles at the bathroom bulkhead. Within larger suites additional FCUs will be provided within vertical units concealed within joinery.

The FCUs will be provided with chilled and heating water from the central systems with pipework run within the corridor ceiling space. Outside air will be provided to the FCUs from the central tempered air system. Airflow rates will be sized to offset the bathroom pod exhaust rate. The tempered air will be ducted within the ceiling void space. Fire dampers will be provided in ductwork where passing through the fire compartment layer.

Exhaust from the bathrooms will be ducted within the ceiling void space.

Exhaust flows will be sized to exceed the minimum requirements of AS1668.2 by approximately 50%. Fire dampers will be provided in ductwork where passing through the fire compartment layer.

### 5.4.21 Education Building corridor spaces

Tempered air will be provided to the corridor spaces to maintain a positive pressure differential to the accommodation suites.

Under fire mode operation, supply air will be provided to the non-fire affected floors only.

### 5.4.22 Education Building conference and exhibition space

The conference and exhibition space will be provided with chilled and heating water air handling units located in the rooftop plant area. The air handling systems will incorporate carbon dioxide monitoring and control of outside air. The systems will also include the ability to operate in economy mode where the system may supply full fresh air when ambient conditions allow.

### 5.4.23 Smoke control

The following outlines the key elements of the smoke control strategy. It is noted that the strategy is based on a fire engineered, performance based approach. The system will comprise:

- Exhaust to each atrium void. Nominally up to 30 m3/s each.
- Makeup air for atrium extract will come from opening doors at the ground floor plane. The smoke exhaust rate may be influenced and restrained by the extent of makeup air available due to the heritage façade in the Lands Building. The smoke exhaust rates in the Education Building may be similarly restrained.
- The centralised fresh air fans will run and operate in a semi-zone smoke control fashion, with motorised dampers included at each floor take off to allow closing on fire floors and opening on non-fire floors. No pressure requirement is targeted.
- Lands Building roof top habitable spaces will have air pressurisation systems to run and pressurise the rooms and the access corridors up to the point of the fire stairs.
- The Ballroom will be provided with dedicated smoke exhaust. Makeup air will be via a combination of natural makeup via the entryways and mechanical makeup via the air handling and dedicated makeup air systems.
- The tower will be provided with deemed to satisfy stair pressurisation and mechanical, fan driven, relief systems.
- Kitchen exhaust systems may continue to run during fire and will be selected and configured for this purpose.
- Air conditioning units within guest rooms and retail will shut down.

- Fire dampers will be provided at all fire rated boundaries. It is noted that the existing condition of the fire rating is largely unknown. The mechanical systems are to be designed to assume that all floors and guest room walls, retail, food and beverage tenancies are fire compartment boundaries and require fire dampers or fire rated ductwork in compliance with code requirements.
- Exhaust systems with air flow downwards will continue in operation during fire mode.

### 5.4.24 Stair pressurisation

All fire stairs are expected to be provided with essential stair pressurisation supply from the roof plant areas of both buildings. Generally air will be proved into the top of the stairs in lieu of dedicated stair pressurisation shafts.

Relief air will be via a dedicated relief air system within the lands building. Within the Education Building, relief will be via the atrium smoke exhaust fans or alternatively via a dedicated relief air system.

### 5.4.25 Carpark

The car park will be provided with mechanical supply and exhaust systems for each level. The systems will be provided with carbon monoxide monitoring and control to minimise energy consumption of the system.

### 5.4.26 Pool

The enclosed Pool/ Spa area will be provided with a mechanical ventilation system providing heating for comfort and minimisation of evaporation losses. The plant will be located adjacent to the pool on level 8 of the Education Building.

The change rooms associated with the Pool/ Spa will be provided with exhaust will be discharged from the level 8 rooftop plant area.

### 5.4.27 Substation

The two basement Substations will be mechanically ventilated and the substation on level 8 will be naturally ventilated. Substations will be in accordance with Energy Authority requirements and ventilation will be part of the substation works. Refer to Section 6 of this report.

### 5.4.28 Back of house service areas

Back of house service areas including service corridors, store areas, amenity areas, laundry, UPS, MSB, grease arrestor, sewer pump rooms, lift motor rooms, plant rooms/ areas, etc. will be provided with outside air and exhaust air systems as required.

## 5.5 Design considerations for the tower

The inclusion of a mixed use hotel and residential apartments in the tower above the Education Building will require some additional mechanical services and some alternate design solutions. This will include meeting Section J requirements for the design with respect to the façade glazing specification.

The dual key apartments/ hotel suites are expected to be owned and operated as part of the hotel complex. As such these apartments will be provided with chilled and heating water from the central plant also serving the lower hotel floors.

The residential apartments will be provided with a water cooled VRV system with local on floor plant reticulating refrigerant pipework to in ceiling fan coil units.

Due to the location of the location of the apartment tower on top of the Education Building, the central cooling towers and heating water plant would need to be located on the level 8 rooftop. This frees up best value premium apartment space at the top of the building, whilst minimising piping requirements. All dual key rooms are to be provided with sealed façade to suit the functionality requirements plus also ensure plant discharges do not affect the building internal environment.

FCUs located within the rooms would be located above bathroom areas with chilled and heating water supply.

Residential Apartment ventilation may either be delivered by centralised air handling systems or from naturally ventilated façades. Resolution will be via detailed design stages. Allowances should be made for centralised outside air systems to account for fresh air requirements and makeup air to kitchenettes and toilet exhausts.

The current concept will allow for a centralised or local kitchenette and toilet exhaust. Centralised systems will be incorporated into the plant room floors. Centralised odour (kitchenettes) exhausts will be provided with carbon and electrostatic filtration to efficiency of 99%.

## 5.6 Detailed design clarifications

The proposed mechanical systems generally comply with the design intent of the Raffles Design and Construction Standards V.3.1 2010, noting the complexity of modifying an existing heritage listed building will result in locally and contextual departures from the Raffles Design and Construction Standard, which will be considered in consultation with Raffles and the design team during detailed design. Examples will include:

- It is noted that the guidelines identify the need for a high pressure steam plant for the laundry, whereas alternative solutions may be considered due limited space and potential for further energy savings.
- The guidelines identify heating and cooling be provided in the kitchen areas, however the current concept does not include this as a means to reduce energy consumption, but noting heating and cooling could be made available via the use of the chilled and heating water systems if required during detailed design development.

## 5.7 Heritage structure design considerations

The heritage constraints of the ceilings, walls, floors and façade in particular will impose a degree of complexity to the mechanical services design. Within the Lands Building in particular the ductwork reticulation to the accommodation suites will require installation within the ceiling voids of the level below. It is noted however that the ceilings are heritage listed and it will not be possible to demolish for ductwork installation. A proposed alternative solution is to require duct and pipework sections to be lowered through access panels in the floors of the levels above in smaller sections, noting in some instances it may be possible to gain access to the ends of the corridors for materials to be inserted from one end.

Within the accommodation suites and corridors of the Lands Building, it is proposed to install a raised floor above the existing floor. This will enable ductwork and pipework to transfer from the corridor space into the suites without exposing the services.

The roof of the Lands Building will also site numerous fan and air handling systems. These will be housed in dedicated acoustically treated spaces and will require augmentation to the ceiling structure to accommodate plant floors and plant walls. The existing roof trusses will be removed /reconfigured in a number of locations to accommodate the installation of new plant. The full extent of the requirement will be identified during design development however making appropriate allowances for builders work to the roof void at this time would be prudent. Refer to the mechanical (Appendix E) information which provides indicative proof of concepts at a point in time to demonstrate the design intent with respect to mechanical services.

## 5.8 Plant replacement and maintenance strategies

Plant located within the basement levels will be accessible from the back of house areas.

Plant located on roof areas including roof cavity spaces will require access off the adjoining occupied spaces. It is proposed that sections of the roof sheeting would be removable in the event large items required replacement during operations.

Chiller plant will be accessed via the carpark lifts and/or Loading Dock.

The current lifting strategy has been considered in order to facilitate plant removal from the Education Building and tower plant rooms, areas and plant floors via a dedicated goods lift in the tower (at least) up to the lower level plant floor, and above this level via a shared goods/passenger lift servicing the floors above.

# 6. Electrical

## 6.1 Introduction

This section outlines the intent of the design with respect to electrical services for the scheme, and provides a preliminary concept level of design with respect to the electrical infrastructure that will be required for the Lands and Education Buildings, and the proposed tower above the Education Building. It forms the basis for developing a detailed design. It is supported by preliminary drawings in Appendix F, which are intended to be indicative only at this stage of design. The following commentary where relevant may supersede the detail shown on the drawings to reflect the latest architectural scheme presented as part of this Final Binding Offer.

The concept design has been undertaken to be sympathetic with the restraints and opportunities associated with the heritage buildings.

Fundamental and sound engineering principles have been applied to the scheme. Infrastructure for large power systems (substations and generators) have been located centrally to the load sources and within either basement or tower plant areas/ floors to minimise impact on the ground plane or heritage fabric. Ventilation discharges and authority access requirements are proposed to be discreetly integrated into new ground plane elements in lieu of works which could impact on the heritage buildings. Electrical risers will reuse as much as possible the existing pathways although to enable optimum distribution, some new risers and reticulation pathways within the existing buildings are proposed.

The lighting design proposes to retain and reuse any light fittings that area appropriate however it is noted that much of the lighting is not heritage listed and therefore can be replaced to suite the required décor.

## 6.2 Design criteria

### 6.2.1 Power Supply Determination

The concept design of the power supply and its configuration has been based upon the "Occupancy Requirements & Lighting/Equipment Load Estimates" within the Raffles Design and Construction Standards V3.1 2010, and extensive experience in hotel, high rise and mixed use facilities design to determine the size and configuration of the power supplies to the site.

The current power supply size and configuration are developed to a robust concept design level, using an average approximate rate of 45-50VA/m2 based on the mix of load densities and areas throughout the development. The design will be further developed, in conjunction and responding too, the architectural form and function of the facility. The current scheme is also compliant with Ausgrid requirements.

### 6.2.2 Internal illuminance design levels

Internal lighting will be designed in accordance with the requirements of AS1680, generally referred to in the table below, which are considered typical based on the current level of design detail:

| Internal Area | Average Maintained Design Illuminance (Lux) |
|---|---|
| Security Control | 320 |
| Fire Control | 400 |
| Hospitality | 160 |
| Entrances | 160 |
| Change Room | 80 |
| Circulation | 80 |
| Cleaners' Room | 80 |
| Communications Room | 320 |
| Food & Beverage<br>General<br>Counters | <br>160<br>120 |
| Indoor Car park<br>General<br>Entrances | <br>40<br>To AS/NZS 1680 |

| | |
|---|---|
| **Kitchen**<br>**General**<br>**Food Preparation, cooking, wash-up** | <br><br>160<br>240 |
| **Loading Bay** | 80 |
| **Meeting Room** | 320 |
| **Office** | 320 |
| **Library**<br>**Book stacks**<br>**Remainder** | <br>240<br>320 |
| **Plant Room**<br>**General**<br>**Control Panel, Switch room** | <br>80<br>60 |
| **Reception** | 240 |
| **Stair** | 80 |
| **Storage** | 160 |
| **Toilet** | 80 |
| **Utility** | 160 |
| **Hotel rooms and suites** | Designed to meet the architectural an comfort requirements, observing requirements under AS/NZS1428 for people with disabilities |

**Table 6-1: AS1680 Typical illuminance design levels**

### 6.2.3 Noise levels

Noise from building services and equipment shall be no less than 40 dB(A) LAeq and no greater than 50 dB(A) LAeq in any public areas (such as public foyers, corridors, lobbies, waiting areas and the like). Noise levels assumed for typical areas of the scheme are as follows:

| | |
|---|---|
| Conference rooms and associated break-out rooms | 35 dB(A) |
| Private offices | 35 dB(A) |
| Meeting rooms | 35 dB(A) |
| Open office areas | 40 dB(A) |

### 6.2.4 Design life/ durability

Equipment will be selected to obtain a maintenance service life of at least 25 years. Further requirements beyond this period will be considered as part of the detailed development of the scheme.

### 6.2.5 Spare capacity

Electrical systems will generally be designed for the calculated requirements with an additional 20% spare capacity as the starting design principle.

## 6.3 Authority and in ground services

### 6.3.1 Electricity supply

Ausgrid will reticulate HV cabling to three new indoor substations which will be required based on preliminary calculations of the electrical load requirement for the scheme. Current proposals for the substations include, one at basement level serving the Lands Building, one at basement level serving the Education Building and lower hotel portion of the tower, and an elevated substation serving the higher portion of the tower above the Education Building at level 20. The project will provide underground conduits between the site boundary and the basement substations along with a suitable path for 11kV cabling within the tower for the elevated substation.

### 6.3.2 Substations

Ausgrid will provide three new triplex substations to supply the redeveloped facility. The third Ausgrid owned substation is planned for the tower's lower level plant floor and shall be located for optimal distribution of power. Further negotiation with the Authority during design development will finalise ownership and capital contribution requirements for the substations. Based on calculations of the current scheme, the redeveloped precinct would contain nine new transformers throughout the redevelopment noting that the standard configuration of triplex sub stations with Ausgrid contain 3 x 1,500kVA transformers where 2 are utilised and the third is spare providing a level of redundancy for maintenance and failure. Noting all transformers are non-firm rated and can service and actual load between 1.1-1.3MVA per transformer.

- 3 X 1,500kVA transformers supplying the Lands Building at basement level;
- 3 X 1,500kVA transformers supplying the Education Building at basement level; and

- 3 x 1,500kVA transformers supplying the tower in the lower level plant floor substation. All redundant transformers are proposed to be removed.

The works by Ausgrid will include the following:

- Decommissioning of the existing substations in accordance with the project sequencing requirements.
- Temporary power supplies during the relevant stages, as required.
- Installation of new incoming feeders to the Southern and Eastern Sub Stations and elevated Sub Station in the education tower.
- Installation and commissioning of the new utility switching cubicles.

Depending on final authority negotiations, the building owner would provide the following:

- New HV substation rooms. These substations will accommodate the supply authority HV metering equipment and the Points of Supply (POS) for both incoming 11kV feeders. For the purposes of electric power supply and reticulation, the Lands and Education Buildings will be divided into two separate power supply zones, with each zone supplied by one of the substations.
- Cable trenching including cable ladder.
- Equipotential bonding.
- Sleeves for Earth stakes.
- Bonding of reinforcement.
- Steel supports for equipment as required.

### 6.3.3 Existing electrical supplies and diversions

As part of the current concept design it is assumed that existing electrical supply to the Education and Lands Buildings provided from the sub stations in Farrer Place/ Bent Street area will be decommissioned. During later stages of planning and development the leaseholder will be required to liaise with Ausgrid to investigate the possibility of decommissioning the existing substation located beneath the plaza at the rear of the Education Building.

There may be minor supplies from these substations that will require diversion as part of this project which will be determined by further investigations during later stages of planning and design.

## 6.4 System configuration

### 6.4.1 Description of electrical systems

The following electrical system functionality has been identified as part of the concept at this stage:

| Area/Room | Description of Electrical Systems |
|---|---|
| Guest Room - Standard | - Local load centre<br>- Lighting<br>- Small Power<br>- Some dimming control to lighting<br>- DDA compliant lighting control and power outlets |
| Guest Rooms - Premium | - Local load centre<br>- Premium lighting<br>- Small Power<br>- Dimming control to lighting<br>- High quality electrical fixtures<br>- DDA compliant lighting control and power outlets |
| Front of House areas | - Architectural lighting<br>- Feature and branding lighting<br>- Small power |
| Retail | - Local distribution board<br>- Warm shell lighting<br>- Limited small power |
| Food and Beverage, and Kitchens | - Local distribution board<br>- Warm shell lighting<br>- Kitchens to have sealed light fittings suitable for food preparation areas<br>- Limited small power |
| Bars and Dining Areas | - Premium lighting<br>- Automated lighting controls<br>- Small power<br>- High quality electrical fixtures |

| Area/Room | Description of Electrical Systems |
|---|---|
| **Meeting rooms** | - Premium lighting<br>- Automated lighting controls<br>- Small power<br>- Floor boxes for flexible use of space and provision for communications and AV<br>- High quality electrical fixtures |
| **Function Areas** | - Premium lighting<br>- Stage lighting and rigging power as required<br>- Automated lighting controls<br>- Small power<br>- Floor boxes for flexible use of space and provision for communications and AV<br>- High quality electrical fixtures |
| **Pool/ Spa Facility** | - High quality lighting, IP rated where required<br>- Automated lighting controls<br>- Small power<br>- Robust electrical fixtures |
| **Workout studios (Gym) (Aerobics and Yoga)** | - Flexible lighting.<br>- Automated lighting controls<br>- Small power<br>- Fitness equipment power<br>- Power for hair-dryers and the like in adjacent toilet areas<br>- Robust electrical fixtures |
| **Back of house areas** | - Utilitarian lighting<br>- Basic lighting control<br>- Small power<br>- IP rated electrical fixtures |

### 6.4.2 Demolition works

The current concept assumed that the disconnection, removal and making good of the following items will be required:

- Existing MSB(s)
- Existing sub mains
- Existing distribution boards
- Existing luminaries, switches, GPOs and wiring
- Existing communications back-bone including FDPs, IDFs, outlets and wiring.

### 6.4.3 Staging of work

The design has given consideration to the potential staging of building works if and as required. Power supplies for both Lands and Education Buildings can be energised early should it be desirable to operate the hotel whilst continuing with construction works for the tower. This will be subject to detailed program and staging design which will be undertaken at design development stages.

### 6.4.4 Enabling works

Opportunities for early works packages as part of the delivery of the scheme will likely be possible to enable the diversion of all in ground services in the affected areas as part of the redevelopment scope. These early works would remove or divert all services that are within the precinct (or boundary) of the redevelopment site. This early works will also ensure that required supplies to Lands and Education Buildings can be maintained and that all required supplies to surrounding buildings and areas of public or private infrastructure are not affected during the delivery of main works for the redevelopment. All required services will be required to be kept active in accordance with developed staging plan.

Site investigations will be undertaken during later phases of planning and development to determine the extent of enabling works and the required staging of those works to be undertaken. The requirement to address latent site conditions should be considered as part of the project cost estimate for the current scheme.

### 6.4.5 Consumer Mains

Provision of consumer mains electrical supply from the points of supply in the Ausgrid HV Switch rooms, to the associated Building LV main switchboards, inclusive of 11kV cable path to the elevated substation in the Education Building tower will be required.

The points of supply will be the 400V terminals on the Ausgrid switchgear. The design will provide for consumers mains supply from these terminals with fire rating as required to meet the NCC and relevant Australian Standards.

### 6.4.6 Transformers

New transformers will be supplied and installed by Ausgrid. It is assumed based on current concept that the leaseholder of the Sandstone Precinct will be a Low Voltage (LV) Customer and therefore transformers will remain as an Ausgrid asset. This will be subject of further negotiation with the authority during design development.

It will be a general requirement that transformers will be interchangeable with those typically used by Ausgrid in order to facilitate availability of replacement units in an emergency.

### 6.4.7 LV Main Switchboards

The initial proposal is that new main switchboards (MSBs) will be required to supply the site designed and constructed to AS/NZS 3439, AS/NZS 3000, National Construction Code of Australia and supply utility requirements. Main switchboards will be free standing, totally enclosed, metal clad, back-connected, type-tested fault rated at 63kA for 1.0 second. In addition they shall be modular and extendable and allow the future installation of one additional switchboard module if required, and comply with the Internal Arching Fault Tests specified in Appendix F of AS/NZS 3439 (Form 3b minimum).

Main busbars and main switches sized to the transformer capacity plus spare spaces for 20% additional submains will be required.

The following will be provisioned on each of the main switchboards with automatic sensing for all 3 phases:

- Automatic power factor correction equipment
- Surge suppression equipment
- Power failure sensing

Further requirements for the LV Mains Switchboards will include:

- Discrimination coordination for all protective devices will be provided.
- MSBs will be provided with digital power analysers. In principle every MSB will be equipped with a digital power analyser connected at the main incomer, and further units on major loads.
- Power factor correction will be installed to maintain a minimum power factor of 0.95 for the main switchboards.
- Surge suppression equipment: shunt-connected surge suppression will be installed at each of the main switchboards.

### 6.4.8 Metering facilities

For the current concept design the following metering facilities requirements have been assumed:

- LV revenue metering equipment for the base building supplied and installed by the Distribution Company.
- A separate tenant meter for the carpark.
- Separate tenant meters on each floor of the building.
- Metering panels, isolation facilities and connections will be in accordance with the Ausgrid Service and Installation Rules and the requirements of Ausgrid and the retailer.
- Customer sub-meters using digital power analysers (multi-function panel meters) will be installed on the main incoming LV mains and all out-going sub-mains (sub-meters located in 'field' switchboards instead the main switchboard could also perform this role). Incoming standby power will also be sub-metered.
- All meters will be pattern approved and suitable under current legislation to on-sell power if required.

### 6.4.9 Generator and Liquid Fuel System

Two 500kVA diesel generators will be required, with one each serving the Lands Building and Education Building respectively. The generator will be connected to the Life Safety and essential rising mains and connected loads.

The generators are proposed to be installed within the basement, in proximity to the main electrical primary distribution and utilising strategically located air intake and discharge points at the ground plane of Loftus Street and Farrer Place.

### 6.4.10 Submains

Sub-mains reticulation will be provided from the main switchboards to switchboards/ distribution boards for, but not limited to:

- Electrical distribution boards
- Passenger and Goods Lifts
- Escalators
- Essential mechanical switchboards
- Non-essential mechanical switchboards
- Hydraulics switchboards
- FIP
- UPS installations

Sub-mains will utilise copper stranded conductors and the insulation type will be 90 deg. C rated except for the fire-rated sub-mains which may require a higher temperature rating in accordance with the Building Code of Australia, AS 1668 and AS/NZS 3000. Additionally, the bus-duct may be considered for high-current loads.

All sub-mains will be supported on a cable ladder, in dedicated risers separate from communication and other services, and harmonics and electromagnetic interference will be carefully addressed to ensure minimum interference at all points in the building.

### 6.4.11 Distribution Boards

Based on the current concept, Distribution Boards will be supplied separately for the following areas:

- Typically, four general Distribution Boards (DB) per floor in both the Lands and Education Buildings.
- Food and Beverage (F&B) outlets.
- Retail outlets.
- Kitchens.
- Hotel rooms will have load centres.
- Areas of high load concentration.

Switchboards will be sized to allow 20% spare capacity and will include controls, PCMS interfaces and load-shed facilities as required.

### 6.4.12 UPS

UPS will be supplied to each building and based on preliminary assessment 2 x 250kVA static (or rotary) UPS will be required for each building. These UPS will be connected to the essential rising mains and connected loads. The connected loads will be reconciled against the Raffles Design and Construction Standards V.3.1 October 2011, or such departures that may be determined in consultation during detailed design .Batteries will be sized to maintain full load power continuity for 30 minutes at end of life.

### 6.4.13 Cable reticulation

A floor void is present in both the Lands and Education Buildings. This floor void has varying depths throughout both buildings. Typically the corridor has a greater depth that the surrounding rooms. Presently cables are reticulated in this corridor floor void then distributed to a single point in each room where cabling enters a suspended light fitting. Cabling from the first fitting is typically then linked using secondary steel support to the remainder of light fittings in each space.

It is proposed to use the corridor for main cable reticulation and rely upon pendant light fittings where required and additional ceilings in other areas to conceal cabling. Primary cable reticulation will be underfloor such as to minimise impacts on the heritage fabric of existing walls and surfaces.

### 6.4.14 Power Control and Monitoring System (PCMS)

The PCMS will control and monitor the low voltage electrical reticulation system and interface with the BMS system in the building.

### 6.4.15 Lightning protection options

A lighting protection risk assessment will be conducted in accordance with AS 1768 during detailed design and will likely require both electrically continuous structure (stair cores) and down conductors to all other areas.

The existing Lands Building will be reviewed although it is expected that lighting protection systems should be allowed to be upgraded.

The tower building will be provided with new lightning protection.

### 6.4.16 Earthing

New earthing systems will be provided for both buildings and will largely involve new earthing electrodes within the new excavated foot print.

Systems will be design in accordance with AS/NZS 3000 Section 5.

Systems will involve separate power, communications, and lighting earthing as follows:

- Power system earth:
  - HV substation earthing.
  - Power system earth.
  - MEN earth at building main switchboard.
  - Earthing conductors
  - Earth electrodes
- Communications earth:
  - A separate communications earth in the Communications Room.
  - Earth conductors connecting communications earth from each communications cupboard to the main earth in the Communications Room.
- Lightning earth
  - A separate lightning earth system.

## 6.5 Project wide lighting

The objective of the lighting concept for the scheme will be to create a visually enticing environment enhancing the aesthetic nature of the architecture and harmonising with the historical ambience of the building. The lighting shall serve a different function from one space to the next however the predominant atmosphere will be warm, elegant, welcoming and relaxing.

An emphasis will be placed on providing an overall sense of consistency throughout the buildings by minimising the variety of lighting elements and selecting high quality luminaries from a broad and versatile family range. Exceptions will be made for spaces of high visual importance such as lobbies and ballrooms, where unique luminaries and lighting effects will provide a sense of elegance and sophistication.

All of the architectural luminaires used throughout this project should be of a very high quality to reflect the standard of the hotel. As such the lighting cost estimate should be based on market prices of authentic, designer, European light fittings.

The lighting concept as outlined in the following sub-sections provides a preliminary vision for a very high-end lighting design that will reflect the luxury status of the hotel. These concepts should be used as a basis for ongoing collaboration with the Architects, Designers and Clients through the design development process.

Although the concepts below only cover some portions of the hotels facilities and zones, they are indicative of what would be expected across the entire redevelopment.

### 6.5.1 Architecture and amenity

Key elements of the scheme considered as part of the lighting concept at this stage include:

- Classic style pendent lighting as a central feature for most rooms. The pendants should be of high artisan quality and detail, such as cut in crystal, Murano glass or fashioned alabaster and will act to provide the majority of lighting for each room as well as enhance the visual interest of the space.
- Classic style wall lights will serve as soft, ambient auxiliary lighting. The style of the wall lights should retain the theme of the pendants to strengthen the lighting theme and overall character of the building.
- Downlights shall serve a dual purpose of providing accent lighting to paintings or sculptures, as well as providing indirect, general area lighting.
- Concealed LED strip lighting will be provided as a highlight to illuminate façades, demarcate spaces, provide background ambient light, and in some cases provide functional light.

- Table lamps and floor lamps shall be considered, subject to the design criteria, to decorate lounge and relaxation areas as furnishings. Free-standing lamps shall also provide functional lighting throughout the hotel suites.
- Discreet accent lighting will be provided in exterior window alcoves and recesses to provide depth and drama to the building façade.
- Recessed in-ground uplights will be used to highlight strong architectural elements of the building façade, and where possible, to highlight internal columns and ceilings.
- Post-top lanterns will be used to illuminate the pedestrian thoroughfares around the perimeter of the buildings.
- Bollards for open, external landscaped areas to provide security for path lighting, as well as general amenity lighting.
- In-ground up-lights for beautification of existing and planned foliage as well as possible exterior infrastructure.
- Underwater lights to highlight any potential exterior or interior water features.
- Additional landscape lighting to provide a high level of exterior feature lighting for the Loftus Street and VIP entrance areas.

### 6.5.2 Function

Key elements of the scheme considered as part of the lighting concept related to functionality will consider the following:

- Ingress protected food-safe luminaires will throughout all clean areas such as kitchen and food preparation areas and laundry facilities.
- Impact resistant batten type luminaires used throughout the carparks, workshop areas and service equipment areas such as generator rooms and communications rooms.
- Street lighting where applicable to ensure all surrounding or impacted streets meet the requirements of AS1158.

### 6.5.3 Emergency

All exit and emergency luminaires will be of a centrally monitored RF type. All exits signs will be of an edge-lit LED style and all emergency luminaires will be of a discreet, single-point emergency type.

## 6.6 Typical lighting applications

### 6.6.1 Hotel Suites

A rudimentary lighting concept and layout has been undertaken as a guide to demonstrate the various lighting elements that should be incorporated into a typical hotel suite (see figure 1). This lighting layout acts as a concept for further development in discussion with the design team and Raffles. It also serves a purpose of providing a preliminary template for lighting cost per square metre for the current scheme.

The lighting design will allow for a number of various lighting elements which each serve their own specific function(s). The diversity of light sources will enable guests to ascribe a specific mood or scene to each space which suits their level of

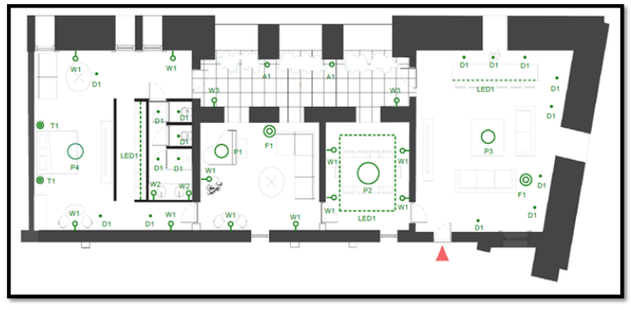



**Figure 6-1 Typical Hotel Suite Lighting Layout**

In this example, ornate pendants and wall lights will be supplemented with soft isolated pools of light from the free-standing lamps and accent downlights for artwork (see Figure 6-2 and Figure 6-3). Led cove lighting will provide intimate ambient light and help define the geometry of architectural features (see Figure 6-4).

**Figure 6-6 Pendants and wall lights in corridor**

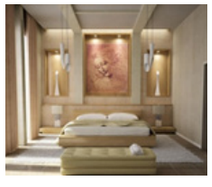


**Figure 6-3 Artwork highlights**

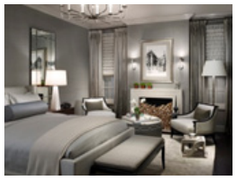


**Figure 6-4 Intimate cove lighting**

### 6.6.2 Corridors

The treatment of the hallways will be to open the space up by reducing the number of pendent luminaires and incorporating a number of flush wall lights to compensate (see Figure 6-5). This approach will accentuate the dimensions of the space and provide an element of intimacy with the guests due to the spatial relationship (see Figure 6-6). The pendants which are used should be of large volume to enhance the impact statement of these feature lights.

Discreet LED cove lighting will be considered where possible to softly demarcate guest room entry doors and to highlight threshold spaces such as lift and stairwell areas (see Figure 6-7).

There may be scope for providing accent lighting of art pieces, sculptures or architectural detail, depending on the results of the interior design concept.

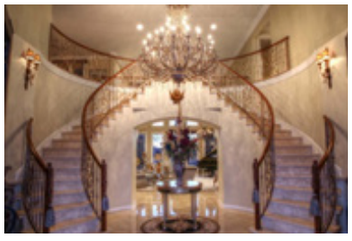


**Figure 6-9 Central feature pendants**

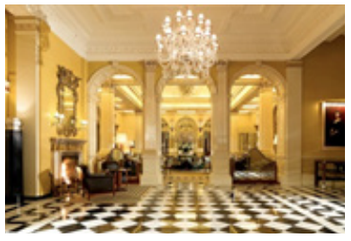


**Figure 6-10 Visual hierarchy to direct**

### 6.6.3 Lobby areas

As the lobby and ground floor acts as the main representation of the buildings as a whole, special treatment needs to be given to these areas to create a luxurious atmosphere. A degree of psychology and theatrical lighting practices will be undertaken to enhance the volume and architecture of the space by using indirect up-lighting, for example, to highlight the ceiling and columns (see Figure 6 8).

In Large, open Lounge and Foyer spaces, very large, ornate pendants will be used as central features (see Figure 6 9). Essentially the entry feature lighting shall set the foundations on a large scale for which the corridors and suites shall be a more modest extension of. LED strip lighting systems, wall-washers and pin-spot lights will be used to set a visual hierarchy on chosen vertical surfaces and objects to help guide the guests through the space to points of particular interest (see Figure 6 10).

Adjacent feature spaces such as Atria, Function rooms, Pool area and Ballrooms shall be treated with equal detail and luxury; however the approach shall be quite different so as to provide a higher contrast and character or atmosphere for the various leisure areas to the rest of the building.

### 6.6.4 Façade

As the façade lighting is not solely an adornment for the hotel guests but a representation of the buildings, special consideration needs to be given to how that will be correctly displayed.

The impression of façade lighting can be subjective to each person however general parameters still apply; if too much highlighting is employed it can flatten the surface and wash out the detail of the façade. Conversely, applying a small amount of alcove lighting and limited wall-washing will enhance the depth of the façade and give strong definition to the architecture however it can cause prominent shadowing and be interpreted as 'moody'. Striking the right balance is very important (see figure 11).

Similarly it is very important not to use luminaires of a high intensity as this can cause glaring hot-spots and create a visual distraction as opposed to an invitation.

For the Sandstone buildings the approach would be to create a dynamic lighting system which can be adjusted at the owner's discretion. By using a dynamic system, various scenes could be set to give the building a number of different appearances. Similarly, dimming functions would be applied so that various highlight elements transition into brilliance at staggered time slots, and fade out again toward curfew hours.

Various façade sequences could also be programmed upon future request for special events such as an evening ball, or festivals such as Vivid.

**Figure 6-11 Striking the right balance**

## 6.7 Design considerations for the tower

The tower building will be provided with a new substation in the lower level plant floor (currently level 19 in the architectural scheme). This will serve a new main switch board, feeding up to on-floor distribution boards for house power and apartment tenant boards. Power feeds will be segregated between hotel (lower floors) and apartment/ serviced apartments.

## 6.8 Detailed design considerations

Due to the Raffles Design and Construction Standards V3.1 2010 being written for the Northern American market several aspects of this brief will require localisation for the Australian market and to comply with AS/NSZS3000.
Items such as, but not limited to the following will be consulted upon through detailed design:

- System loads
- System voltages
- Lighting control vendor
- Lighting technology – noting that LED is required and will form part of the design
- Lighting power density conversion from the California Savings by Design Lighting Guidelines to the National Construction Code Section J.
- Lighting levels to be converted from lumens to square metre to horizontal and vertical illuminance as required by AS/NZS1680 and AS/NZS1158.
- The use of photovoltaic technology will be evaluated during detailed design and form part of the project should it be found viable.

## 6.9 Heritage structure design considerations

Due to the heritage of the Lands Building the lightning protection solution for the Lands Building will not rely upon the existing structure being electrically continuous. A separate network of dedicated down conductors will be required. This new system will comply with AS/NZS1768.

Some existing light fittings in the Lands and Education Buildings will be considered for refurbishment and potential re-use. Although not heritage listed some light fittings are of historical value that may complement areas of the refurbishment.

All light fittings will aim to re-use existing cable penetrations in ceiling areas to minimise disruption to the existing surfaces. Furthermore, all general cable reticulation in areas of heritage significance, as covered in the 2014 Conservation Management Plan, will be grouped together and utilise existing cable access penetrations to minimise disruption to the building fabric.

## 6.10 Plant replacement and maintenance strategy

All electrical plant rooms will be planned with sufficient access for removal, replacement and maintenance of the applicable equipment. With this in mind the Ausgrid substations will be constructed in accordance with the Ausgrid requirements which consider these items. The MSB, UPS and Generator rooms will be designed to provide access for equipment, sufficient area for maintenance and to comply with relevant Australian Standards.

# 7. Information Communications and Technology

## 7.1 Introduction

This section details the concept design approach in order to provide a high quality functional solution for the provision of ICT services for the proposed scheme.

The communications strategy has been formed around consideration of the need for robust, modern technology communications infrastructure interwoven with the existing heritage building fabric.

Similarly, and consistently with the other engineering disciplines it has involved review of the restraints and opportunities within the existing building and seeking out pathways for services reticulation.

A star backbone configuration is proposed throughout, distributing from a data centre room to communications spaces across the hotel. Communication spaces range from floor communications rooms to cupboards, centrally located to provide 100% coverage for any systems that require connectivity. Communications spaces will be provided riser pathways located around the core to enable transitioning of critical communications cabling. The existing floor void within the Lands Building will serve as the reticulation pathway for services through the floor plate into the rooms. The Education building offers additional pathways through new ceilings. The concept design provides diversity and redundancy for critical communications in key areas such as the data centre room.

A structured cabling system solution on a converged network will provide consistency of cabling, support from single and multi-vendors, flexibility to allow changes in configuration, simplify troubleshooting across the product life and support for future applications.

Wireless and radio systems are proposed throughout the hotel providing 100% coverage in order to provide staff and guests with ubiquitous access to the Intranet, internet, mobile phone communication and staff 2-way communication.

## 7.2 Design criteria

The preliminary scope for ICT services for the development of the scheme considers the following requirements:

- A structured cabling system – including horizontal and backbone cabling.
- Communications rooms/ spatial requirements – including a data centre room, communications building distributor room, floor communications rooms, floor communications cupboards and communications risers with preliminary dimensions commensurate with the current scheme forming part of the initial planning for the scheme.
- Communications cable containment pathway system e.g. pits, ducts, conduits, trays and baskets.
- Local area network (LAN) system.
- Wireless LAN (WLAN) system.
- VoIP telephony system.
- Satellite master antenna television (SMATV) system.
- Internal distributed antenna system (DAS).
- Real Time Location Services.
- Interfaces to:
    - Security: access control, intruder alarms, CCTV and intercom.
    - Building and facility management systems.
    - Electrical monitoring.
    - Lighting control.
    - Car park systems.

### 7.2.1 Standards

The standards and guidelines considered in developing the current concept include:

- Raffles Design and Construction Standards V3.1 2010
- AS/NZS 3000, Wiring Rules
- AS/NZS 3080, Telecommunications installations – Generic cabling for commercial premises.
- AS/NZS 3080 Amendment 1
- AS/NZS 3080 Amendment 2
- AS/NZS 3084, Telecommunications installations – Telecommunications pathways and spaces for commercial buildings
- AS/NZS 3085, Telecommunications installations – Administration of Communications cabling systems

- AS/NZS IEC 61935.1 – Testing of balanced communication cabling in accordance with ISO/IEC 11801, Part.1: Installed cabling
- AS/NZS IEC 61935.2– Testing of balanced communication cabling in accordance with ISO/IEC 11801, Part.2: Patch cords and work area cords
- ISO/IEC 14763-3, Information Technology – Implementation and operation of customer premise cabling – Part 3: Testing of optical fibre cabling
- ISO/IEC 24702, Information Technology – Generic cabling – Industrial premises
- AS/NZS ISO/IEC 15018, Information Technology – Generic cabling for homes
- AS/ACIF S008, Australian Standard – Requirements for Authorised Cabling Products
- AS/ACIF S009, Australian Standard – Installation requirements for customer cabling (Wiring Rules)
- ISO/IEC 24764, Information Technology – Generic Cabling for Data Centres
- NSW Electrical Service and Installation Rules
- Building Code of Australia/National Construction Code
- ISO/IEC 11801, Telecommunications installations – Generic cabling for commercial premises
- IEEE 802.3at Power over Ethernet Enhancement
- TIA/EIA 568A, Commercial Building Telecommunication Standard
- BICSI TDMM, Telecommunications Distribution Methods Manual
- BICSI COOSP, Customer-Owned Outside Plan Design Manual
- TIA/EIA 568B, Commercial Building Telecommunication Standard.
- ANSI/TIA 942, Telecommunications Infrastructure Standard for Data

## 7.3 Authority and in-ground services

Based upon a review of documentation following Dial Before You Dig (DBYD) investigation of the precinct, the following services may be impacted and require to be, rerouted and/or replace:

- AAPT (PowerTel) – underground fibre optic/telecommunications cables
- AARNet – underground fibre optic cable assets
- Amcom – underground fibre optic services
- NextGen – underground cable services
- Optus – underground fibre optic/telecommunications cables
- PIPE Networks – underground telecommunications services
- Primus Telecom – underground assets
- Uecomm – underground cable services
- Vocus – underground fibre optic/telecommunications cables

Based on a preliminary desktop review, the redeveloped precinct will require a main incoming service carrier to provide internet and WAN capabilities – preferably through incoming fibre cables. There will also be a requirement for a distributed antenna system.

## 7.4 System configuration

### 7.4.1 ICT spaces

Dedicated building spaces will be required to support the ICT systems for the site, including:

- Data centre room
- Communications building distributor rooms
- Floor communications rooms
- Floor communications cupboards
- Communications risers
- AV Equipment Room

The sizing of the communications rooms will need to consider the following factors:

- The equipment that is to be serviced in that area e.g. data outlets, wireless, access points, phones etc.
- The active equipment that is to be housed within each of the rooms e.g. network and server equipment.
- The passive equipment that is to be housed within each of the rooms e.g. patch panels.
- Access requirements to equipment within the room.
- Space availability for work areas, tools and test equipment.

Preliminary sizing of the spatial requirements based on the proposed scheme requirements have been provided to the architect as part of the planning process, and will be further reviewed and refined as part of detailed design.

#### 7.4.1.1 Data Centre Room

- The main communications room containing server and network head-end equipment to service the hotel.
- Located within Basement L1.
- Interfaces to all other communications spaces within the building via OM3 optical fibre cabling to provide network connectivity.
- Interfaces to IDFs on each floor for analogue services via Category 3 cabling.
- Provides network connectivity to the field via Category 6A cabling within the area with which it is located.
- Size: 10000 (W) x 6000 (D) mm in and divided into two separate spaces of 7000 (W) x 6000 (D) mm and 3000 (W) x 6000 (D) mm.

#### 7.4.1.2 Communications Building Distributor Room

- The communications space for incoming carrier services for external hotel communications to the internet, PSTN, hotel WAN and mobile phone DAS equipment.
- Interfaces to the Data Centre Room via OM3 optical fibre cabling and Category 3 cabling for network connectivity.
- Located on Ground Level within the Lands Building: Size: 5400 (W) x 5200 (D) mm.

#### 7.4.1.3 Floor Communications Room

- The communications space for providing network connectivity to the field via Category 6A cabling for the floor with which it is located.
- It is envisaged to contain 2no. racks – one passive and one active.
- Interfaces to the Data Centre Room via OM3 optical fibre cabling for network connectivity.
- Located on each floor of both the Lands and Educations buildings including – Basement L2, Ground Level (Education), Level 1 (Land), Level 2 (Land and Education), Level 3 (Land and Education), Level 4 (Education), Level 5 (Education), Level 6 (Education), Level 7 (Education) and Level 8 (Education).
- Sizes: 2600 (W) x 1600 (D) mm with access from both 2600mm sides or 2800 (W) x 3000 (D) mm.
- Floor Communications Rooms are supplemented by Floor Communications Cupboards due to distance limitations and expected cable routes.

#### 7.4.1.4 Floor Communications Cupboard

- The communications space for providing network connectivity to the field via Category 6A cabling for the area with which it is located.
- It is envisaged to contain 1no. rack – combined passive/active.
- Interfaces to the Data Centre Room via OM3 optical fibre cabling for network connectivity.
- Located in areas where Floor Communications Rooms are unable to service due to distance limitations.
- Located on each floor of the Education Building tower.
- Sizes: 2000 (W) x 1000 (D) mm.

#### 7.4.1.5 Communications Junction Boxes

- Communications Junction Boxes (LV Junction boxes) will be installed in each hotel room or suite.
- Telecommunications outlets in each hotel room will interface to the Communications Junction Box.
- The Communications Junction Box will interface to the nearest Communications Room or Cupboard for IP connectivity.
- The Communications Junction Box will interface to the Intermediate Distribution Frame for analogue services.

#### 7.4.1.6 Network Termination Devices

- Network Termination Devices will be installed in each strata apartment.
- Telecommunications outlets in each strata apartment will interface to the Network Termination Device.
- The Network Termination Device will interface to the Communications Building Distributor Room via a local Floor Communications Cupboard.

#### 7.4.1.7 Communications Risers

- There will a requirement for at least 2 off communications risers per floor.
- Communications risers will contain cable pathways between floors and an Intermediate Distribution Frame for analogue services.
- Residential apartments will have their own separate and segregated riser for Network Termination Device connectivity to the Communications Building Distributor Room.

### 7.4.2 Structured cabling system

A single-vendor structured cabling system is proposed for all copper and fibre elements, including cable, patch cords, frames, connectors and accessories.

#### 7.4.2.1 Backbone fibre optic cable

- Multimode, 50/125-micrometer, OM4 optical riser rated fibre cable.
- Singlemode, 9/125-micrometer, OS2 optical riser rated fibre cable.
- Non-metallic (Non Conductive), Gel-free, LSZH
- Comply with OM4/OS2 standards ITU-T G.651 / 652, IEC 60793-2-10 (Type A1a.2), ISO 11801 OM3, ICEA S-83-596, AS/NZS 3080 and TIA-492-AAAC
- Patch Panels: shall be 24 ports LC duplex modular type.
- All fibre connectors shall be pigtails type factory terminated with minimum 1 meter fibre length.

#### 7.4.2.1 Multipair copper cable

- 100-ohm, Multipair voice cable with minimum of 0.55 mm conductor DIA formed into 20-pair bundle groups covered with a grey low smoke thermoplastic jacket.
- Comply with ICEA S-90-661, TIA/EIA-568-B.2 (Category 3)
- 110-style IDC for Category 3.
- Patch Panel: 50 ports RJ45 (19 in) Cat3 patch panel with “110 IDC” connectivity.

#### 7.4.2.2 Horizontal copper cable

- 23 AWG, 100-ohm, Plenum, 4-pair F/UTP Shielded copper cable
- IEEE 802.3an-2006 and ISO 11801 Class EA
- ANSI/TIA-568-C.2 Category 6A
- IEEE 802.3at Power over Ethernet Enhancement
- Low Smoke Zero Halogen rated cable
- Patch Panel: 24 ports 19” rack mounted patch panel
- Jacks and Jack Assemblies: Category 6A, RJ45, 10G shielded, colour-coded, eight-position jack

**Table 7 : Typical Communication Outlet Requirements**

| Standard Room | 7 outlets per room |
|---|---|
| Luxury Room | 7 outlets per room |
| Royal Suite | 10 outlets per room |
| Presidential Suite | 12 outlets per room |
| Strata Apartments | 6-8 outlets per apartment |
| Workstations | 2 outlets per workstation |
| Printers / Fax | 2 outlets per printer / fax |
| Wireless Access Point | 2 per access point |
| CCTV cameras | 1 per camera |
| Security panels | 1 per panel |
| Boardroom | 10 outlets per room |
| Meeting room | 8 outlets per room |
| Function room | 4 outlets per 10m2 |
| Spa | 4 outlets per 20m2 |
| Front of House | 4 outlets per 30m2 |
| Elevator | 2 outlets per car |
| Bar and dining | 4 outlets per 40m2 |
| Staff rooms | 4 outlets per room |

### 7.4.3 Local Area Network

It is proposed to have two physically separated Local Area Networks (LAN) provided for the development – an administrative LAN and a guest LAN. These LANs shall be converged networks for data, voice, video and multimedia traffic. The converged networks shall be based upon a standard hierarchical network design model comprising of core and access layers.

Core equipment shall be located in the Data Centre Room.

Access equipment shall be located in Floor Communications Rooms and Floor Communications Cupboards.

The Local Area Network will initially comprise of:

- Dual redundant 10Gbps backbone between core and access layers.
- Access layer connectivity of 1Gbps between end devices.
- Core switching capable of being upgraded to 40Gbps.
- VLAN capabilities.
- Quality of Service functionality.
- Firewall and security services.

The Local Area Networks shall be capable of interfacing with the greater Raffles WAN network.

### 7.4.4 Wireless LAN

A Wireless LAN (WLAN) shall be provided with 100% wireless coverage throughout the hotel. The wireless network must accommodate up to 10,000 simultaneous connections at any one time.

Access management, monitoring, usage measurement and limiting tools for visitors must be implemented on the wireless network to allow the operators staff to monitor and manage the network bandwidth and usage on the WLAN.

The WLAN system will comprise of:

- Core equipment consisting of WLAN controller, management and authentication systems.
- WLAN equipment compatible with IEEE 802.11a/b/g/n/ac and IEEE 802.3af PoE standards.
- WLAN equipment supporting latest security, encryption and management protocols such as IEEE 802.11i/x, WPA2, WPA, AES and TKIP.
- Real Time Location Based Services for location tracking purposes.
- Quality of Service functionality
- Dual band – 2.4GHz and 5.0GHz frequencies
- RF channel management features

### 7.4.5 Telephone

A telephone system based on Voice over IP (VoIP) technology is to be implemented utilising the converged LAN. The VoIP system shall have the capacity to support a minimum of 2000 extensions with the capability to expand through the use of software.

The VoIP system will comprise of:

- VoIP core equipment consisting of a Call Processing Server, Voice VLANs, Voicemail Server, SIP Voice Gateway, Analogue Voice Gateway and PSTN Gateways
- IP phone handsets including standard, enhanced, reception, executive, wireless, conference, switchboard and power-fail handsets
- Quality of Service functionality
- Video (H.320) calls
- Class of Service determining line restrictions
- The following functionality: automatic call back, call diversion, call hold, call park, call transfer, conference call, do not disturb, external call transfer, incoming call transfer, contact search, internal call, paging and voicemail.

### 7.4.6 DAS

A two-way radio system and mobile coverage system shall be implemented via a distributed antenna system (DAS) throughout the hotel.

The DAS shall:

- Provide coverage for a two-way radio system to be used by operation hotel staff.
- Provide connection and coverage for a minimum of three mobile carriers.
- Two-way radio system equipment shall be contained within the Data Centre Room.
- Mobile carrier equipment shall be contained within the Communications Building Distributor Room.
- Be capable of mobile coverage of simultaneous operation of GSM 900/1800, UMTS 850/900/2100 and LTE 700/1800/2100/2300/2600.

The system shall consist of:

- DAS head-end equipment
- Combiners, repeaters and splitters
- Coaxial cabling
- Antennas and leaky feeder
- Required RF licenses for two-way radio

### 7.4.7 Real Time Location Services

A Real Time Location Service (RTLS) system shall be implemented via use of the WLAN system. The system shall accurately track and locate devices within a three metre and eight metre radius in all areas.

The system shall consist of:

- RTLS server and controllers
- RTLS monitoring and management software
- RTLS tags

## 7.5 Design considerations for the tower

Some specific design considerations and allowances that will need to be considered for the tower design include:

- Floor Communications Cupboards will be required on each floor
- Backbone multi-mode fibre cabling linking the Floor Communications Cupboards with the Data Centre Room.
- Intermediate Distribution Frames to be located on each floor.
- Backbone copper cabling linking the Intermediate Distribution Frame with the Data Centre Room.
- FTA and Pay TV connectivity per floor for apartments
- Horizontal copper cabling linking end devices in apartments with the Floor Communications Cupboards
- Separate riser for residential apartments
- Separate passive communications network servicing the strata apartments from the Communications Building Distributor Room.

## 7.6 Detailed design considerations

The following assumptions have been made and will need further clarification during detailed design:

- A distributed antenna system is located throughout the hotel to provide 2-way and mobile phone coverage.
- A Wi-Fi tracking system will be required to provide tracking for linen carts, people or other objects.
- Design development will identify any preferred technology partners to provide systems such as LAN, Wi-Fi / WLAN and VoIP telephony equipment to the requirements of Raffles.

## 7.7 Heritage structure design considerations

Wi-Fi access points mounted on the ceiling. These are small discrete elements and are expected to be able to be integrated into the interior design as part of design development.

## 7.8 Plant replacement and maintenance strategy

Key design considerations which will be developed further during detailed design may include but not be limited to the following:

- New rooms will need to be created for communications spaces throughout the buildings.
- Communications spaces will contain enough spacing to provide access for maintenance.
- Communications spaces will be provided to ensure that horizontal copper runs do not exceed 90m.

# 8. Audio Visual Services

## 8.1 Introduction

The Raffles audio visual (AV) services should be designed such that they complement the grandeur of the hotel scheme. As such, the latest technologies and best design practises are proposed for the scheme. The AV systems will be designed in accordance with the design considerations in the sections that follow.

## 8.2 Scope of AV services

Based on the current scheme development, the AV services for the scheme will include the following facilities and systems:

- General audio visual services to event, function, and meeting rooms
- Public address
- Distribution of AVC signals around the precinct
- S/MATV and IPTV Systems (Central Hotel TV)
- Digital signage and way finding
- Specialist localised AV systems such as those serving the spa area
- Guest Entertainment services

## 8.3 Definitions

| | |
|---|---|
| AV | Audio Visual |
| AVC | Audio, Video, and Control |
| AVER | Audio Visual Equipment Room |
| BD | Building Distributor |
| DCR | Data Centre Room (Main Communications Room) |
| DRM | Digital Rights Management |
| EDID | Extended Display Identification Data |
| F/UTP | Foil overall/individual Unshielded Twisted Pair |
| FCR | Floor Communications Room |
| FD | Floor Distributor |
| FRHI | Fairmont Raffles Hotels International (or "Raffles") |
| HDCP | High-bandwidth Digital Content Protection |
| IPTV | Internet Protocol Television |
| LAN | Local Area Network |
| MMOF | Multimode Optical Fibre |
| PABX | Private Automated Branch exchange (telephony systems) |
| S/MATV | Satellite and Master Antenna Television system |
| SMOF | Single Mode Optical Fibre |
| TP | Twisted Pair cabling (typically category style 4 twisted pair) |
| U/FTP | Unshielded overall/individually Foil shield Twisted Pair |
| VLAN | Virtual LAN |
| WLAN | Wireless LAN (WiFi) |

## 8.4 Design criteria

### 8.4.1 Standards

The AV systems (including MATV) will need comply with the following relevant standards:

- Raffles Design and Construction Standards V3.1 2010
- Building Codes of Australia (National Construction Code)
- AS 1345: Identification of the contents of pipes, conduits and ducts
- AS/NZS 2053: Conduits and fittings for electrical installations
- AS 2211: Safety of Laser products
- AS 2834: Computer accommodation
- AS/NZS 3000: Wiring Rules
- AS/NZS 3080: Telecommunications installations — Generic cabling for commercial premises
- AS/NZS 3084: Telecommunications pathways and spaces for commercial buildings
- AS/NZS 3085.1: Administration of communications cabling systems
- AS/NZS 4117: Surge Protective Devices for Telecommunications Applications
- AS 4262.1: Telecommunication Overvoltages – Protection of Persons
- AS 4262.2: Telecommunication Overvoltages – Protection of Equipment
- ACIF S008: Requirements for customer cabling products
- ACIF S009: Installation Requirements for Customer Cabling (Wiring Rules)
- AS/NZS 1367: Coaxial cable and optical fibre systems for the RF distribution of analogue and digital television and sound signals in single and multiple dwelling installations
- AS 1417: Receiving antennas for radio and television in the frequency range 30MHz to 1 GHz – construction and installation
- AS 60118.4: Hearing aids – Magnetic field strength in audio-frequency induction loops for hearing aid purposes
- The following will also be used as a guide for the audio visual systems:
- ANSI/Infocomm 1M-2009: Audio Coverage Uniformity in Enclosed Listening Areas (ACU)
- ANSI/Infocomm 3M-2011: Projected Image System Contrast Ratio
- ANSI/Infocomm 4M-2012: Audio Visual Systems Energy Management

### 8.4.2 Network architecture

Typically the architecture for the AV systems serving each space will be localised to the room served, with the ability to connect to other areas within the building via AVNet.

Consideration will be given to alternate solutions such as networked based AV switching and cloud based control systems during detailed design.

Public Address, Digital Signage, and the Hotel Central TV systems will be network based.

Where not supported either by the FRHI Corporate, Guest Services LANs, or a dedicated proprietary network (e.g. AVNet), the required AV network connectivity will form part of the Hotel Services Converged LAN. All appropriate network configuration requirements such as supported protocols, CoS/QoS, enabled ports, etc. will be coordinated and applied as required.

### 8.4.3 General AV signal distribution

The design for the general in room AV systems will be based on digital signal distribution (e.g. HDMI, DVI-D) over Twisted Pair (TP) copper cabling rather than analogue signals (e.g. VGA, Composite, Component) over coaxial and/or proprietary cabling for extended cable lengths.

The use of digital signal distribution has been selected based on the following principles:

- The analogue sunset limits what digital content is able to be presented on analogue based systems (either lowered resolution or no output at all).
- Fewer analogue to digital and digital to analogue conversions for less signal loss and maintained content integrity.
- High-bandwidth Digital Content Protection (HDCP) compliant so as all equipment with digital audio and video outputs will be able to be interfaced, regardless if HDCP has been enabled or not. Note, that while the distribution system will be HDCP compliant and allow for playback of DRM protected content, all copyright and other applicable licensing agreements must be adhered to as required by the content producer, distributor, and all other relevant parties.

Analogue VGA computer video signals will still be accepted to cater for legacy equipment such as laptops and computers. These signals will be scaled to digital video to maintain consistency in the distribution system and limit the level of signal degradation.

TP will be used for extended audio and video signal cabling lengths to cater for future flexibility in upgrading the Audio Visual systems. Where equipment and wall plate inputs are located in or adjacent Audio Visual racks with easily accessible cable pathways, the proprietary signal cable type may be used, however additional twisted pair cabling should also be installed for future systems upgrades. Provide suitable line drivers and/or extenders for all video, audio and control signals as required.

All AV systems will include Extended Display Identification Data (EDID) management and inbuilt video scaling to minimise incompatibilities between external sources such as laptops and the display devices. EDID management will be used to force source devices to the native screen resolution before scaling should be implemented.

All infrastructure will be 4K/Ultra High Definition resolution ready. Matrix switches with swappable input/output cards will be capable of being upgraded to 4K/UHD without minimal reprogramming or reconfiguration required.
Where suitable, all-in-one presentation switches which combine audio and video matrix switching with system control processors will be used to reduce complexity in the system and minimise the rack space required.

### 8.4.4 Display systems and technology

All displays will use current technologies and be Energy Star compliant. They will use current technologies such as:

- Monitors and TVs – LED backlit LCD or OLED
- Projectors – Solid state lamps such as laser and/or hybrid laser-LED

All displays will accept digital video signals and will be HDCP compliant.

All displays will be commercial/hospitality grade and rated for use in the proposed environment (e.g. signage screens will be rated for minimum 24 hours/day continuous operation). Residential grade displays will not be accepted unless proof of warranty can be provided for installation in commercial environments (e.g. "Pro-sumer").

### 8.4.5 Accessibility considerations (DDA)

The AV systems for the hotel will be designed in accordance with the recommendations of the Accessibility report provided by the Disability and Discrimination Act (DDA) consultant during the detailed design phase of the project and take consideration of such things as control panel mounting and hearing augmentation

The final equipment type and selection will be coordinated with Raffles based on their preferred solution for each application during detailed design.

Consideration will also be given to app based hearing augmentation systems that use WLAN as the delivery platform, rather than proprietary transceiver systems.

### 8.4.6 Interfacing to hotel proprietary systems

Interfacing between the Raffles corporate LAN and applications and Hotel Services and Guest Services LANs will be managed appropriately though the use security appliances and routers as required. These may include, but are not limited to, the following applications:

- Guest account and billing services
- Guest access control systems (such as VingCard)
- Integrated Building Systems (IBS) such as mechanical services, power control and metering systems,
- Audio Visual Management programs
- Security systems such as access control, duress alarms, and CCTV
- Public address and music servers
- Digital signage servers

All required connectivity will be coordinated with the FRHI IT Manager and in accordance with the FRHI IT Management policy where applicable.

### 8.4.7 AV management facilities

The following AV management facilities will be provided in accordance with the Raffles Design and Construction Standards V3.1 2010.

#### 8.4.7.1 Audio Visual Equipment Room (AVER)

An Audio Visual Equipment Room will be provided either adjacent or next to the Data Centre Room for the development, and preferably on the same level as the AV Department Operations Office. The Audio Visual Equipment Room will act as the hub for all AV Services within the buildings, and will be finished to a similar level of services as the DCR. The following equipment housed in this space will include, but not limited to, the following:

- AVNet central switching and processing
- Public Address and background music servers
- AV System management and reporting
- Guest Entertainment System equipment
- S/MATV and IPTV processing equipment
- Digital signage
- AV switching equipment for the Ballroom (where located on the same level as the main ballroom floor)

#### 8.4.7.2 AV Department Operations Office

The AV Department Operations Office will be located on the same level as the main event space for the precinct, with access to the service corridor around the room. The office will be used by services and management personnel for the following tasks:

- Support and venue setup
- Testing of equipment
- Management of AV stock

The office space should be provided with a minimum of three (3) workstations and one service desk for testing and configuring equipment prior to deployment. It should also be located on the same level and adjacent to the AV Equipment Store for easy access to AV equipment.

#### 8.4.7.3 AV Equipment Store

The main AV Equipment Store should be located on the same level as the AV Department Operations office and the service corridor for the main event space. The AV Equipment Store will house the following equipment:

- Spare AV equipment such as Guest TVs and set top boxes
- Spare AV consumables such as projector filters and lamps (if required)
- Loose equipment for the main event space such as:
  - Mobile projector screens
  - Audio equipment
  - Theatre lighting equipment
  - Audio and lighting mixing consoles
  - Props and room dressings such as curtains and drapes

## 8.5 System configuration

The following system configuration is proposed for the precinct.

### 8.5.1 Audio Visual systems functionality

The following AV system functionality has been considered to inform the concept design:

| Area/Room | Functionality |
|---|---|
| Guest Room – Standard | - Guest Entertainment Services System<br>- Media Panel for connecting guest devices such as laptops and smart devices to the room TV<br>- Local control |
| Guest Rooms – Premium | - Guest Entertainment Services System<br>- Media Panel for connecting guest devices such as laptops and smart devices to the room TV<br>- In room Hi-Fi with dual zone configuration<br>- Local control |
| Guest Floors<br>Elevator cars | - Background music in lobby areas only<br>- Digital signage in lobby areas only<br>- Centralised control |
| Front of House areas<br>Retail and Logo | - Public Address system with background music<br>- Audio reinforcement systems suitable for reproducing music<br>- Ability for local audio to be input into the audio system for selected areas<br>- Digital signage with connectivity to the Central Hotel TV System<br>- Discrete localised and centralised control<br>- Centralised monitoring |
| Bars and Dining Areas | - Public Address system with background and foreground music<br>- Audio reinforcement systems suitable for reproducing music and program content as well as voice<br>- Ability for local live audio to be input into the audio system for selected areas<br>- Digital signage with connectivity to the Central Hotel TV System<br>- TVs in selected areas with connectivity into both the local audio system and audio visual input plates<br>- Discrete localised and centralised control<br>- Centralised monitoring |
| Meeting rooms | - Localised AV equipment with control<br>- Permanent display systems such as projectors with ceiling hideaways and wall mounted monitors with motorised reveals<br>- Input and output to the centralised AVNet distribution network<br>- Connectivity to the Central Hotel TV system<br>- Audio reinforcement systems suitable for reproducing music and program content as well as voice<br>- Hearing augmentation to support the audio system<br>- Executive quality tele and video conferencing systems<br>- Digital signage outside of rooms for event identification<br>- Centralised monitoring |

| Area/Room | Functionality |
|---|---|
| Function Areas | - Localised AV equipment with control<br>- Permanent display surfaces such as ceiling mounted projector screens with hideaways<br>- Input and output to the centralised AVNet distribution network<br>- Connectivity to the Central Hotel TV system<br>- Audio reinforcement systems suitable for reproducing music and program content as well as voice<br>- Hearing augmentation to support the audio system<br>- Projector drop down service poles for multiple mounting options<br>- Theatre rigging bars for lighting/audio/ staging<br>- Floor box network with interconnecting conduits both within the room and to the service corridor for flexible room configurations<br>- Digital signage outside of rooms for event identification<br>- Discrete localised and centralised control<br>- Centralised monitoring |
| Spa | - Background music from a locally controlled music server with interconnectivity to the main music server<br>- Discrete localised control<br>- Wall mounted TVs with connectivity to the Hotel Central TV system and associated personal headphones for selected areas<br>- Centralised control and monitoring |
| Workout studios (Aerobics and Yoga) | - Background and foreground music with connectivity to the:<br>  - Locally controlled music server;<br>  - Local audio inputs including body worn microphone(s)<br>  - Main music server<br>- Audio reinforcement systems suitable for reproducing music content as well as voice<br>- Discrete localised control<br>- Centralised control and monitoring |
| Back of house areas | - Public Address system with background and foreground music<br>- Wall mounted TV's connected to the Central Hotel TV Network and local inputs for staff areas<br>- Local and centralised control<br>- Centralised monitoring |

### 8.5.2 S/MATV and IPTV (Central Hotel TV)

#### 8.5.2.1 S/MATV

The S/MATV system will form the backbone of the Central Hotel TV system for the development, and will consist of the following components:

- Roof top mounted commercial satellite dish and Free To Air antenna
- Head end processing equipment
- PayTV standards compliant 5-Wire backbone infrastructure
- SMOF optical fibre back bone for connectivity between the plant head end processing equipment and the AVER
- Set top boxes and processing equipment as required in the AVER for connectivity to the Central Hotel TV IPTV system

For residential levels of the development (where provided), a fully compliant PayTV network compliant S/MATV system will be provided as required. This system shall operate in parallel to the Central Hotel TV system to allow for tenants to install their own PayTV service provider subscription should they require it.

#### 8.5.2.2 IPTV (Central Hotel TV)

For flexible distribution, scheduling, and control around the precinct, an IPTV solution will be used for distributing Central Hotel TV signals. The system will consist of the following equipment:

- Heading processing equipment in the AVER such as transcoders, modulators, encoders, and streaming management servers
- Encryption management servers where PayTV will be distributed
- Integration with Digital Signage system
- Connectivity to the Hotel Services LAN for distribution around the precinct

The network connectivity will be provided as part of the Hotel Services LAN as a VLAN. All network configuration requirements will be coordinated as required to support the IPTV system.

### 8.5.3 Control and monitoring

All AV enabled spaces will be able to be centrally controlled and monitored by a master head-end software platform. The software will be capable of the following:

- Remote control and diagnostics of rooms and enabled spaces including notification via email and report log
- Monitoring of consumables and equipment run times
- Ability to create scheduled and critical maintenance run sheets for service personnel
- Equipment usage and statistics for future fit out considerations
- Room scheduling including forced shutdown if no activity is present in the room

The software will be able to be access via any PC connected to the correct network. Login credentials will be required to access the system, with various user levels provided based on the support required.

Local room control will also be provided to selected areas through both fixed and wireless AV touchscreen controllers. Proprietary control systems such as Crestron, AMX, or equal will be used as the primary control platform these spaces. The use of smart devices such as iPad or Android tablets may be used as secondary wireless control surfaces.

Interfacing to billing and food and beverage software packages will be considered during the design phase to allow for Clients to order items such as coffees and cakes during meetings.

#### 8.5.3.1 Building services interfacing

**Lighting Control System**
The AV system will be interfaced to the building Lighting Control System. A LCS gateway will be provided for integration between the AV system and LCS. Meeting rooms with AV touchscreen controllers will interface into the LCS and be able to control the local luminaires in addition to the house LCS control system.

An interface will be provided in the main event space to allow for control of the house lighting LCS locally at a lighting control desk during events.

**HVAC**
HVAC boost will be provided in selected AV enabled spaces. This will be enabled both the AV control system in the room and via an HVAC control panel as required.

**Blinds**
Motorised sheer and block out blinds will be provided in selected rooms as part of the architectural package. The motorised blinds will be interfaced to the AV control system in each room.

**Fire Trip Signal**
A Fire Trip signal will be interfaced into the Audio Visual control system design to comply with the intent of AS1670.1 (warning signals must be minimum 10dB above ambient noise level).

Upon receiving of an alarm signal from the fire alarm system, the audio visual control system will mute all audio output channels to the local area speakers, in order to allow occupants to hear the fire alarms.

The fire trip may also be interfaced into the Digital Signage platform to trigger pre-stored content on the screens and assist with information patrons and potentially evacuating the hotel.

### 8.5.4 AVNet

An AV distribution network (AVNet) will be provided around the precinct for connectivity between function rooms, meeting rooms, and selected areas as required. The system will be broadcast quality based to provide the best signal quality with lowest latency.

The proposed active distribution system will be based around Riedel Mediornet or similar systems.

### 8.5.5 Public Address

The Public Address will be designed to distribute high fidelity audio throughout the precinct. The system will be network based using industry standard protocols such as CobraNet, Audio Video Bridging, or Dante. The following head end equipment will be located in the AVER:

- Main processing and management server(s)
- Background music server(s)
- Local input and output connectivity to AVNet

The network connectivity will be provided as part of the Hotel Services LAN as a VLAN. All network configuration requirements will be coordinated as required to support the PA system.

Detailed electroacoustic analysis will be completed during the detailed design phase of the project to minimise audio spill between adjacent spaces. The use of highly directive speakers with minimal spill and tailored acoustic treatments will be considered during this process.

Interfacing to other precinct entertainment platforms such as AVNet and the Central Hotel TV system will be provided are required to support the desired room functionality.

The background music server will be selected based on the preferred FRHI solution. This will connect back to a global content repository, which can push new content as required over an internet connection or be locally uploaded via memory device.

Interfacing to the AV Monitoring and Control system will be provided to allow for scheduling of content playback. Alternatively, this can be managed by back ground music server.

Consideration to providing a combined the emergency warning and public address systems will be reviewed during the concept design phase.

#### Spa

The Spa and associated areas be provided with additional local PA services specific to the Spa guest experience. This will include a local music server with tailored to the spa area. The Spa Manager will have direct access to this server for selecting content as required, as well as centralised control and access for general management.

The spa system will also be connected to the main precinct PA system, to allow for general music to be piped through the facility as required.

### 8.5.6 Guest Entertainment Services

A dedicated Guest Entertainment Services system will be provided as part of the redevelopment. This system will support the following services:

- Guest TV and Video on Demand
- Internet connectivity
- Voice services (subject to the final preferred PABX design for the development)

The system will be provided as a standalone network, with the active equipment and configuration supplied by a third party provider as preferred by FRHI. The network cabling, S/MATV, and infrastructure connectivity will be provided as part of the development works for the Guest Entertainment Services contractor leverage from.

All head end equipment will be located in the AVER in dedicated communications rack(s).

Interconnectivity between the Guest Services Network and FRHI Corporate network will be provided as required for billing purposes.

### 8.5.7 Digital Signage

A digital signage platform will be provided as part of the project works. This will be used by the hotel's Marketing and Communications department for displaying tailored content to various displays around the precinct, as well as providing information to guests such upcoming events and way finding.

The digital signage system will be capable of displaying both static and dynamic/ animated content.

All content is expected to be produced in house by the hotel operator in line with corporate guidelines. Specific content for special events such as major functions and product launches may also be able to be uploaded, however this will be at the discretion of the hotel operator.

The network connectivity will be provided as part of the hotel services LAN as a VLAN. All network configuration requirements will be coordinated as required to support the Digital Signage system.

The consideration to interfacing the Digital Signage and the fire alarm systems will be undertaken during detailed design to assist with informing and evacuating guests during an emergency.

### 8.5.8 Event Space Facilities

The larger event spaces will be provided with a mix of permanent and infrastructure to support temporary AV equipment.

The permanent equipment will be provided so that a base level of events can be held by guests and clients without the need to engage staging companies. These will include

- Projectors with associated screens
- Audio systems (both inbuilt and portable)
- Associated control systems

Cable pathways, rigging points, power, network and interfacing to the Hotel AV systems will also be provided for 3rd party staging companies to dress the event areas.

## 8.6 Design considerations for the tower

### 8.6.1 S/MATV design

The Current S/MATV design is based around the following two systems:

- Guest Services
- Central Hotel TV

Both of these services will be delivered as an IPTV solution. For the delivery of standard S/MATV services to the apartment levels, the S/MATV design will be amended to include a standard 5-wire PayTV services distribution system on the serviced apartment tower building where the apartments will be Strata titled.

### 8.6.2 Future expansion for the hotel

For flexibility in the future use of the apartment block section of the tower, backbone cabling will be provided to the FCRs/FDs on all levels to allow for future expansion of the hotel with minimal additional rework required should these floors become part of the hotel.

## 8.7 Detailed design considerations

### 8.7.1 AVNet

The Raffles Design and Construction Standards V3.1 2010 nominates the following cabling to be provided as part of each AVNet panel cabled back to either the AVER or a local communications cabinet.

- 3 x Audio ties (2 x sends, 1 x return)
- 2 x Composite Video
- MATV outlet for Central Hotel TV
- MMOF\

Aurecon propose the following deviations to this design:

- The AV Panels will include the following signals
  - 4 x Audio ties (configurable as required)
  - 2 x HDMI and/or SDI video signals
  - AVNet Communications LAN
  - SMOF
- All AVNet panels located on the same floor as the AVER will use proprietary cabling to the AVER room provided that the maximum signal distribution length is not exceeded.
- For all AVNet panels on all other levels:
  - Where required in a room with a local AV rack, all connection will be presented in this rack on a patch panel with the ability to be patched into or out of the in room AV system as required.
  - Where no local AV rack is installed, all connections will be presented on a wall plate in the room, and cabled back to the local floor distributor.
- To support broadcast grade audio and video distribution, a media convertor platform such as Riedel Mediornet will be used to maintain signal integrity and quality. This will be delivered over SMOF, and cabled back to the AVER room. The signal will then either be broken out and patched locally at the rack, or routed to another AVNet plate as required.

### 8.7.2 Central Hotel TV

The Raffles Design and Construction Standards nominates that the Central Hotel TV system is to be delivered over MATV cabling which Aurecon have assumed as modulated signals over coaxial cabling.

Aurecon propose that the Central Hotel TV system is IPTV based to allow for tailored control and content to be delivered to end points around the buildings, and also tie in with the Digital Signage platform. It will also allow for centralised management and streamlining of scheduling using de-centralised head end software that can be accessed from authorised computers with the appropriate credentials.

### 8.7.3 AV Equipment Stores on each floor

The Raffles Design and Construction Standards V3.1 2010 nominates that AV Equipment Stores should be provided on all levels that have function rooms.
Aurecon propose that one large AV Equipment Store room is provided on the same level as the main event space and will be sized to house equipment to support all function areas as required. Clear access from the AV Equipment Store to the service elevators for each building will be provided.

## 8.8 Plant removal, replacement and maintenance

### 8.8.1 Large format displays

Where Large Format Displays (LFDs) such as 80"+ screens are installed in lieu of projectors, the service pathway from the installed room to the associated service area will be designed accordingly. This includes items such as door heights, elevator sizing, and access corridors.

Specialist requirements to remove equipment such as operable glazing or carnage will be avoided where possible.

### 8.8.2 Audio Visual Equipment Room

The Audio Visual Equipment Room will be designed to a similar standard as the DCR – refer to the ICT section for further information.

### 8.8.3 Event space access

The following provisions will be allowed for access to the main event space:

- Clear pathway from the loading dock and the AV Equipment Store to the room, wide enough to fit two (2) pallets side by side with spare room. This pathway should not be used for storage under any circumstances.
- The pathways will have minimal bends and corners, and also have a suitable clear ceiling height to cater for tall objects such as exhibits and stage rigging.

### 8.8.4 AV Equipment Store Room

The following provisions will be allowed for access to the AV Equipment store:

- Access to the main event space as noted above.
- Access to the main loading dock similar to what will be provided for the main event space.
- Access to the main service elevators for each building to allow for stored AV equipment to be moved to function rooms on other levels as required.

# 9. Hydraulic

## 9.1 Introduction

The Hydraulic services for the Sandstone precinct development will be designed to be sympathetic to the heritage and high grade finishes expected of the hotel proposal. This section outlines the background behind the design intent of the hydraulic services and will include the following services:

- Potable water supplies
- Sanitary drainage
- Natural gas service
- Roof water drainage
- Domestic hot and warm water systems

## 9.2 Design criteria

The hydraulic services design criteria will be included for the water services (hot, warm, reuse and cold water), sanitary drainage systems, Gas services and Downpipe and gutter systems.

The design criteria that have been considered include the local requirements, heritage items, system requirements and Raffles Hotel operational guidelines. Other items considered include life cycle costs and maintenance requirements.

## 9.3 Codes and Standards

The demand calculations and designs for the Hydraulics Services System will comply with the National Plumbing Codes and relevant Building Codes and Standards including AS3500, AS5601, AS2419, AS2441, NPC, BCA, Sydney City Council, and Sydney Water.

## 9.4 Hydraulic Services

### 9.4.1 Water supply usage estimation

The estimation of potable water supply usage has been defined using best practice for hotels/ residential apartments. The water demand usage will be refined during detailed design in coordination with the design team and any relevant specialist consultants that will be appointed. The following items have been considered in estimating the water usage for the current concept design:

- Laundry
- Kitchen & Pantry
- Landscape
- Pools and Spa

| Water Supply System Design Criteria Allowances | Area Utilization |
|---|---|
| **Area** | **Net Internal Area** |
| Hotel Guest Rooms | 9,561 m2 |
| Private Residences | 33,136 m2 |
| Retail/F&B/function space | 6,547 m2 |
| **Water Supply System** | **Water Consumption Rates** |
| Hotel Guest Rooms | 9,561 m2 |
| Private Residences | 33,136 m2 |
| Retail | 6,547 m2 |
| **Potable water consumption** | **Water Consumption Rates** |
| Hotel Guest Rooms | 750~2200 l/hotel unit/day |
| Private Residences | 750~2200 l/hotel unit/day |
| Public Food & Beverage | 20 l/meal/person/day |
| Kitchen | 10 l/m2/day or 15% of PW consumptions |
| Laundry | 15% of potable water consumption |
| Pools & Spa water make-up | 750~1500 l/day/pool |
| Retail | 45 l/m2/day |
| Irrigation water system | TBA m3/day/ha (1.0 l/s/ha) |
| Water storage duration | 1 days storage |

**Table 10-1 | Water Supply System Design Criteria Allowances**

### 9.4.2 Water supply system description

The water supply system will entail a Sydney Water metred mains connection that will supply water to the development. The metred water supply will fill water storage tanks that will allow for reticulation to the developments different stratum. The water supply system will supply water to the different stratum via independent systems. The water supply will be pumped to the allocated storage tanks located within the redevelopment's building plant areas. From the tanks the water will be distributed as required. In order to minimise water usage to the development, rain water reuse will be incorporated.

### 9.4.3 Water metering arrangement strategy

The water metering strategy will be in accordance with Sydney Water requirements. The hotel portion of the development will have a dedicated water meter and all sub systems (kitchens, laundries, back of house) will have building monitored systems (BMS) water meters and be separately monitored (mechanical services, pool water top up, hot water generation and shared stratum etc.). This configuration will provide the separate stratums to manage usage and billing. The private residences in the tower are proposed to have a separate billing water meter.

### 9.4.4 Domestic hot water services

The concept design provides separate individual domestic hot water plant systems to match the building usage and also minimise distribution lengths and associated losses. The plant groupings are:

- Roof of Lands building: Serving the Lands building.
- Education building: Serving education building and ballroom and associated primary kitchen.
- Mid level of tower building, serving the lower tower zone.
- Upper level of tower building, serving the upper tower zone.

Systems are proposed to comprise separate gas fired hot water heaters (Raypak or equivalent) with separate insulated storage tanks. Integration with waste heat from mechanical systems for preheat of incoming domestic cold water will be considered during design development.

The estimation of hot water supply usage has been defined using best practice for hotels/residential apartments. The hot water demand usage will be refined during the detailed design with respective specialist consultants. The following items have also been considered in estimating the hot water usage for the Laundry and Kitchen and Pantry:

| Hot water demand (Estimates) | | |
|---|---|---|
| | 35~65 | l/person/day (Hotel Guest Rooms) |
| | 35~90 | l/person/day (Private Residence) |
| | 10 | l/person/day (Public F&B) |
| | 35~45 | l/person/day (Retail Area) |
| | 15 | % of total hot water consumptions - l/day (Kitchen & Pantry) |
| | 15 | % of total hot water consumptions - l/day (Laundry) |
| Storage duration | 2 | hours |
| Recovery time | 2 | hour |
| Incoming water temp | 12~15 | oC |
| Required hot water temp | 49 | oC (for guest bathrooms) |
| | 60 | oC (for kitchens) |
| | 82 | oC (for kitchen dishwasher's with a local booster heater |
| | 70 | oC (for laundry) |

**Table 10-2 | Domestic hot water system design criteria**

### 9.4.5 Thermal mixing valves for domestic hot water system

Thermal mixing valves will be provided to all baths, showers, bidets and wash hand basins to regulate the temperature as required by code and reduce the risk of scalding. Hot water to cleaners and kitchen sinks, washing machines and dishwashers would be provided at source temperature.

### 9.4.6 Gas services

The estimation of natural gas supply usage has been defined using best practice for hotels/residential apartments. The gas demand usage will be refined during the detailed coordination stages of design with respective specialist consultants. Allowances have been made for a Laundry, for kitchens and pantries and pools and spa facilities for the current concept design.

**Table 10-2 | Domestic Hot Water System Design Criteria**

| Gas demand items: | |
|---|---|
| Hot Water Heating Plant | Approximately 6000Mj/h |
| Mechanical Services Plant | Approximately 8000Mj/h |
| Commercial kitchen | Approximately 3000Mj/h |
| Apartment cook-top | Approximately 40Mj/h to each apartment |
| Retail (F&B) | Approximately 1000Mj/h to each retail area |
| Pool/Spa heating | Approximately 1000Mj/h |
| Hotel – back/front of house | Approximately 5000Mj/h (Allowance) |

**Table 10-2 Gas Demand Usage**

The hot water generation units will be separated into stratums. Generally the hot water generation plants will be gas fired and the hot water generation plants will be metered and monitored. The private residential apartments will be separately metred (billable).

### 9.4.7 Sanitary drainage

The sanitary drainage system will be designed to be sympathetic to the proposed architecture design. The current proposal is to incorporate a mixture of sanitary drainage systems. The lower levels (existing buildings) will incorporate conventional drainage principles, whilst the tower will incorporate a reduced velocity aerator system. The low rise will incorporate a fully vented modified sanitary drainage system. The system chosen will be such that it provides the most flexibility and is well suited with the buildings.

### 9.4.8 Grease waste plumbing and drainage

The grease and trade waste drainage systems will be incorporated into the building to collect and treat all grease wastes and hot discharges for all food areas. These systems will be in accordance with Australian Standards and meet the requirements set by Sydney Water.

All food and kitchen preparation areas shall be connected to a grease arrestor.

Due to restraints in the existing Lands building grease arrestors serving kitchen preparation spaces serving this building are proposed to be located within the footprint of the newly excavated basements, with minor local building work to introduce new drainage lines. The arrestors will be located as close as possible to the served space.

Grease arrestors serving the Education Building will be provided in the newly excavated basement plant areas. All arrestors will be located with suitable access via the loading dock for drain down.

### 9.4.9 Stormwater downpipes and gutter systems

The Stormwater downpipes and gutter systems have will be designed in accordance with AS3500, Sydney Water guidelines and Sydney City Councils requirements. The design rainfall intensity will be:

| 1 in 100 – 5min rain event = 270mm/h |
|---|
| 1 in 20 – 5 min rain event = 210mm/h |

## 9.5 Authority and in ground services

The main authority coordination will be completed by the civil engineer, with this section of the report dealing with hydraulic connections to and from the mains supply. The Hydraulic sections will include connections to and from the mains. The main connections described below will include water mains connections, fire mains connections and sanitary drainage mains connection.

During the detailed design phase a Section 73 application with Sydney Water will be lodged and any requirements managed. It is anticipated that on site detention, water mains diversions/upgrades and possible sewer mains upgrades will be required based on the current design.

### 9.5.1 Sanitary drainage, water and fire services connections

Currently the proposal for the Lands Building sanitary drainage will be to reuse the existing sewer mains connection located in Gresham Street. The proposed design for the Education Building and new tower would be for a new sewer connection located in Loftus Street.

A new water mains connection will be provided with capacity for one day of water storage; meanwhile a new water mains connection will be required to meet the requirements of the current code.

The final approved locations will be determined during detailed design by the aforementioned Section 73 application with Sydney Water.

## 9.6 Detailed design clarifications

The hydraulics system current design intent complies with local authority requirements and the Raffles Design and Construction Standards with the exception of the allowance for two days of hot water storage. We have currently allowed for two peak hours of hot water, this is in line with other major hotels located in the Sydney District and is consistent with other current project and is in line with good design practice. The site is located within the heart of Sydney's CBD and amongst significant infrastructure. Sydney water has on similar projects confirmed that maximum time outage due to an unforeseen failure in an authority piped system is 5 hours. The proposed design therefore uses the anticipated outage duration and reliability of the system to inform the on-site storage requirements.

Any departures from the standards will be discussed and resolved as part of the detailed design process in collaboration with Raffles and the design team.

## 9.7 Heritage structure design considerations

The heritage constraints of the ceilings, walls, floors and façade limit the extent of penetrations (core holing within the ceiling) through existing building fabric within the Lands Building. Hence it is intended that pipework will be reticulated to the accommodation suites via the floor voids.

## 9.8 Plant replacement and maintenance

There are no major impacts relating to the replacement of the hydraulic equipment identified at this stage of design. The design intent is to remove all existing hydraulic items within the buildings and have them replaced with equipment suitable and fit for purpose for the proposed scheme.

The concept has evolved in consideration to access and lifting requirements. Lifts rated for goods and plant removals will be required to serve the plant floors. Components will be designed in modular form to allow replacement with minimal intrusion to building function or form.

# 10. Fire Protection

## 10.1 Introduction

The Fire Protection services for the redevelopment of the Sandstone Precinct will be sympathetic to the heritage fabric of the building, while ensuring it is developed in according with relevant policies, codes and standards. This section outlines the design intent based on the current development of the scheme and will be further developed during detailed design in collaboration with the architectural and other building services solutions.

### 10.1.1 Systems

Fire Protection services include all materials, fittings and equipment as required for the complete fire protection installation and will include:

- Grade 1 Water supply including Fire water storage tanks and pumps
- Fire hydrant and hose reel system including stortz hermaphrodite hose couplings
- Automatic fire sprinkler systems
- Fire detection systems
- Sound system and intercommunication system for emergency purposes
- Fire Extinguishers
- Smoke management system interface
- Helideck fire protection system

## 10.2 Design criteria

### 10.2.1 Standards

The fire protection services will be designed in accordance with the requirements from a Fire Engineering perspective, Building Code of Australia, the relevant Australian Standards and the requirements of FRNSW.

Specifically, the relevant acts, codes, standards and guidelines will include, but not be limited to, the following:

- Building Code of Australia 2015
- AS 1345 Identification of the contents of pipes, conduits and ducts
- AS 1603 Automatic Fire and Detection Alarm Systems
- AS 1670 Automatic fire detection and alarm systems
- AS 1851 Maintenance of Fire Protection Equipment
- AS 2118 Automatic Sprinkler Systems
- AS 2419 Installation of Fire Hydrants
- AS 2441 Installation of Fire hose reels
- AS 2444 Portable Fire Extinguishers - Selection and Location
- AS 2700 Colour standards for general purposes
- AS 2845 Water Supply - Mechanical Back flow prevention devices
- AS 3000 Electrical Installations (SAA Wiring Rules)
- AS 4118 Fire Sprinkler systems
- SAA HB20 Graphical symbols for Fire Protection Drawings
- Water Authority Conditions of connection
- NSWFR Conditions of connection
- CAP 437 Offshore helicopter landing areas – Guidance on standards

### 10.2.2 Fire hydrant system

Based on the current concept, the fire hydrant design criteria will consist of:

- 300 litres/min at 700 kPa at each of the 2 most hydraulically disadvantaged hydrant outlets.
- 600 litres/min at 700 kPa at each of the 2 most hydraulically disadvantaged hydrant outlets under FRNSW boost or brigade pump controlled conditions.
- each fire stair door, within 4m. Cabinet can be recessed into wall.
- Fire hydrant storage tank – rooftop.

### 10.2.3 Automatic fire sprinkler system

The fire sprinkler hazard classification rating will consist of:

- Building Services Plant rooms — Ordinary Hazard 1
- Car parking — Ordinary Hazard 2
- Retail — Ordinary Hazard 3
- Restaurants and Café — Ordinary Hazard 1
- Hotel — Ordinary Hazard 1
- Hotel Laundry — Ordinary Hazard 3
- Serviced Apartments — Light Hazard
- Residential Apartments — Light Hazard

### 10.2.4 Helideck fire fighting system

The preliminary design requirements for the fire protection of the tower rooftop helipad will include a helideck fire system design criteria are outlined below. These will be further developed as part of detailed design:

- Deck integrated fire-fighting system (DIFFS). The DIFFS will generally consist of a water based DIFFS system used in conjunction with a helideck passive fire retarding system equal to Aluminium Offshore – Astech Enhanced Safety Aluminium Helideck.
- The helideck DIFFS pop up water sprinkler nozzles shall be integrated into the helideck and be supplied as a complete system by the helideck supplier.
- Minimum water supply duration of 5 minutes or as recommended by the selected helideck and DIFFS system supplier.

### 10.2.5 Spatial considerations

Preliminary room and plant size spaces were developed in the early phases of design to inform the architectural planning and spatial allowances for back-of-house/ services and plant areas reflected in the current scheme as part of the submission. Areas that will be required and have been identified against the current scheme include:

- Fire hydrant and sprinkler booster assembly – must be located 10m from building, or fixed to external wall of building and be protected per regulations.
- Sprinkler control valve room – sprinkler alarm valves must be located in a secure room or enclosure which has direct egress to a road or open space.
- Mimic Panel (within entry lobby of each building).
- Fire control room – located such that egress from any part of its floor, to a public road or open space, which does not involve changes in level which in aggregate exceed 300mm.
- Fire sprinkler storage tank (roof or basement).
- Sprinkler pump room – electric pump location adjacent to the Sprinkler Control Valve Room; diesel pump to be located adjacent to the sprinkler storage tank.
- Fire services riser (one per building) – clear access into riser required to main floor area.
- Dry fire riser cables (one per building).
- Hydrant riser/ landing valve – in every fire stair; corner of landing.
- Fire hose reel cupboard – on every level, up to 30m coverage and adjacent to each fire stair door, within 4m. Cabinet can be recessed into wall.
- Fire hydrant storage tank – rooftop.
- Fire hydrant pump room – with a door opening to road or open space; or a door opening to a fire isolated passage or stair which leads to a road or open space.
- Fire services relay pump room – mid-level plant room in tower with access via fire stairs.

## 10.3 Authority and in-ground services

The water supply to the combined automatic sprinkler and fire hydrant/fire hose reel system will be via the water main infrastructure located in Young Street.

A new 150mm water main connection will be taken from the existing water main to the building. This main in turn will feed the fire booster assembly, dedicated water storage tanks and the fire pump sets consisting of a one-off electric driven pump and a backup diesel pump which will supply the required flows and pressures to the combined automatic fire sprinkler and fire hydrant systems within both buildings.

## 10.4 System configuration

### 10.4.1 Water supply

The pumps will be connected into a 150mm fire services ring main infrastructure feeding all floors of both buildings and be connected to the fire booster isolating valves, hydrant landing valves and sprinkler control valves. To service the full height of the proposed tower above the Education Building, the fire system will be divided into eight pressure zones in accordance with AS2118.6.

The fire booster will be located within sight of the main entrance of the building and be directly accessible from Young Street while the primary fire pumps and water storage tanks are proposed to be located at the basement of the building on level B2. In addition, a secondary set of fire pumps complete with a small break tank will be required in the rooftop plant area on level 8 of the Education Building to reduce system operating pressures to within acceptable limits of the fire pumps, pipe couplings and various other system components. Given the proposed height of the tower, fire booster relay pumps located on level 8 will be required to assist NSWFR when boosting the upper pressure zones located above 50m in height in accordance with AS2118.6 and NSWFR operational requirements.

Separate dedicated fire pumps and tanks will also be provisioned to supply the fire-fighting system for the helideck, proposed on the upper level plant floor of the tower (level 63 of the current architectural scheme).

A series of meetings will be required between fire engineering and the Fire and Rescue NSWS, to discuss the overall building strategy throughout the development of the design, as discussed in section12, which may have a bearing on the final siting of main plant and equipment. The final location of fire protection equipment will also be fully coordinated with the architectural design as part of the detailed design phase.

### 10.4.2 Combined automatic sprinkler systems and hydrant systems

The combined automatic sprinkler/ hydrant system is proposed to be fed by an infrastructure of 150mm pipe and isolating valves connected to the dedicated fire services infrastructure and fed by the dedicated fire pumps.
150mm pipe risers will be installed in the fire rated stairs within the Education Building as part of the fire service main infrastructure in a ring main with hydrant landing valves located on each stairs floor landing in accordance with AS2419. All points on a floor will be within reach of a 10m hose stream issuing from a 30 m hose laid flat on the floor.

Sprinkler control valves will be located in one fire rated stair on each floor landing. The fire stair will be directly accessible from or adjacent to the fire control centre with direct egress to a road or open space.

The automatic sprinkler systems will be installed on all floors of the buildings in accordance with AS2118.1.

While the common water supply and associated pumps will serve both buildings, the Lands Building will have separate risers for sprinkler protection and separate risers for the fire hydrant system. This is to overcome the fact that there are no DTS compliant dedicated fire isolated stairs in the Lands Building and further to protect its existing heritage nature. The risers will be incorporated in services riser cupboard

### 10.4.3 Fire hose reels

Fire hose reels will be installed on all floors of the building, and will be within 4 m of each fire stair door in accordance with AS2444. All points on a floor will be within reach of a 4 m hose stream issuing from a 36 m hose laid flat on the floor.

The fire hose reel system will be connected to the 150mm dedicated fire services ring main infrastructure and fed by the dedicated fire pump set.

### 10.4.4 Automatic fire detection and emergency warning systems

The fire detection systems will consist of the following main items:

- Fire Indicator Panel (FIP)
- Master Evacuation Control Panel (MECP)

- Fire control centre in accordance with the BCA
- Electrical services infrastructure
- Smoke detectors, thermal detectors and manual call points
- Warden Intercommunication Phones, speakers, red/amber flashing lights and electrical infrastructure

Smoke detectors are to be installed in accordance with AS1670.1 on all floors for early warning and control of smoke management systems.
The smoke detection system will be connected to the emergency warning system which in turn is connected to a network of speakers throughout the complex for early warning and aide in the evacuation of the precinct in an emergency.

### 10.4.5 Portable fire extinguishers

Fire extinguishers will be provided in accordance with the BCA throughout the building. Portable Fire Extinguishers will be located within all fire hose reel cupboards, adjacent electrical switchboards and within plant rooms, to enable trained building personnel to provide rapid response to a fire if safe to do so. The fire extinguishers shall be of the type suitable for the environment in which they are installed.
They will be rechargeable, hand operated and suitably identified.

### 10.4.6 Special hazards

The fire protection services for the communication and/or computer rooms will be fully determined during detailed design, but based on the current concept design are likely consist of Multi-Aspirated Smoke Detection (MASD) systems for very early warning of smoke presence.

### 10.4.7 Smoke management

Smoke control in a fire situation by the mechanical services systems shall be a combination of compliance with AS 1668.1 and BCA requirements. The fire fan control panel for use by Fire and Rescue NSW is to be installed in the Fire Control Room (FCR).

## 10.5 Design considerations for the tower

Inclusion of fire brigade relay pumps for each 35m pressure zone of the building will be required; meaning a relay pump room accessible directly from the fire stair including six pumps will be required. The final pump size will be governed by the height of the building, with pump size increasing with the building height. To maintain acceptable pressures within each pressure zone, pressure reducing valves will be required within each pressure zone and on each fire riser.

## 10.6 Heritage structure design considerations

Reticulation of fire protection services through the Lands Building will require accessing and reticulating pipework through floor voids so as not to disturb the existing internal heritage fabric.

## 10.7 FIP, FFCP and MECP

The FIP and MECP are to be installed in the Fire Control Room (FCR) located at ground level (currently proposed under Farrer Place) while a mimic panel will be located in each entrance lobby. A series of meeting s will be required between Aurecon Fire Engineering and the Fire and Rescue NSW, to discuss the overall building strategy as the design develops as mentioned in section 12.

## 10.8 Plant replacement and maintenance strategy

All plant areas are proposed to be served with goods lifts or for the upper floors of the tower via combined goods/ passenger lifts. The lifts will give consideration to the reasonable plant maintenance and replacement requirements.

For the fire services it is anticipated that any pump components that may require replacement through the life of the building can be introduced and removed via the goods lifts in a component by component fashion.

Other passive elements including storage tanks will be designed in modular fashion (except where concrete tanks are proposed) in order to facilitate repairs and replacement.

# 11. Fire Engineering

## 11.1 Introduction

Fire engineering solutions will form a critical aspect of the design for the Sandstones Precinct. The buildings are considered as being of a Highly Significant Heritage Value at State and National level. With all buildings of a Significant Heritage value there is a requirement to utilise the existing heritage building and architectural features, and integrate them into the design and use of the building.

This challenge results in the need for fire engineering solutions to be able to demonstrate that the existing structure and features do not compromise the life safety of the people within and around the building, and that the building complies with the Performance Requirements of the Building Code of Australia (BCA).

As such the following sub-sections outline the design intent with respect to fire engineering solutions for the scheme and are presented as initial concepts for further detailed design.

## 11.2 Preliminary BCA assessment

Working with the Principal Certifying Authority (Modern Building Certifiers), and the design consultant team a number of identified elements of the project are likely to be subject to alternative fire engineering solutions. These solutions are likely to be required as the elements based on current assessment have been deemed not comply with the deemed to satisfy (DtS) recommendations of the BCA, with respect to fire and life safety. These are outlined below:

- Existing structure fire resistance is required to be investigated.
- Stair pressurisation.
- Fire isolated stairs discharge internally with the building.
- Less than 2 exits are proposed from certain areas of the Lands Building.
- Existing heritage doors swing against the direction of egress.
- Distances between alternative exits are exceeded.
- Corridors exceed 40m.
- Apartment doors may be greater than 6m to an exit or a point of choice to exits.
- Fire Control Room is not accessible directly from the street.
- Fire Hose reels will not be provided on guest bedroom/apartment floors.
- Smoke Exhaust from the top of the atria will be rationalised.
- Light wells are proposed which do not meet the atria criteria of the BCA.
- Windows in the internal fire isolated stairs are non-compliant.
- WIP phones will not be provided.

A series of meetings will be required between Aurecon Fire Engineering and the Fire and Rescue NSW, to discuss the overall building strategy during the development of the design.

## 11.3 Key fire engineering requirements

### 11.3.1 Fire protection services

The following outlines the key elements of the fire protection strategy that will be required based on preliminary assessment of the scheme:

- The fire control room containing the fire indicator panel and the fire fan controls will be located underground, however will be accessed directly from street via a fire isolated stair.
- All sprinklers throughout the building will be of the fast response type; however the use of concealed heads will be permitted. The activation temperature of the heads will generally be 69°C however this is subject to a more detailed assessment of the area in which they are located during detailed design.
- AS 1670.1 smoke detection and alarm system will be required throughout the buildings.
- SSISEP (occupant warning) system will be required throughout the buildings.
- Rooms for persons with disabilities and for emergent disabilities will be provided with alternate alarm systems – suitable to alert the occupants, this may include vibration pillows, and or flashing alert lights.
- Use of the existing heritage stairs for egress, discharging within the building.
- The buildings will be subject to a staged evacuation to be determined through detailed design in collaboration with Fire and Rescue NSW and Raffles, the hotel operator.
- A fire shutter (or similar) will be provided to separate the buildings, where they are linked underground, a pass door will be provided for access.
- Fire alarm mimic panels will be located in the manager's office, and the concierge/check-in desks.
- The egress stairs will be shared between the different areas of the building.
- The fire safety systems (sprinklers, detection, alarm, hydrants) will be common throughout the buildings.
- Each guest room will form a separate fire compartment, similarly the ball room, car park, and servicing yard will be fire separated from each other and the rest of the building.
- Operable windows from the guest rooms into the internal light wells will not be permitted and the windows must be fixed shut and smoke sealed from the light well.

### 11.3.2 Smoke hazard management

The following outlines the key elements of the smoke control strategy based on a preliminary assessment of the scheme:

- Exhaust to each atrium void. Nominally up to 30 m3/s each.
- Makeup air for atrium extract twill come from opening doors at the ground floor plane. The smoke exhaust rate may be influenced and restrained by the extent of makeup air available due to the heritage façade in the Lands Building. The smoke exhaust rates in the Education Building may be similarly restrained
- The centralised fresh air fans will run and operate zone smoke control to achieve a performance based solution. Motorised dampers included at each floor take off to allow closing on fire floors and opening on non-fire floors. No pressure requirement is targeted.
- The Lands Building roof top habitable spaces will have air pressurisation systems to run and pressurise the rooms and the access corridors up to the point of the fire stairs.
- The Ballroom will be provided with dedicated smoke exhaust. Makeup air will be via a combination of natural makeup via the entryways and mechanical makeup via the air handling and dedicated makeup air systems.
- The tower will be provided with DtS stair pressurisation and mechanical, fan driven, relief systems.
- Kitchen exhaust systems may continue to run during fire and will be selected and configured for this purpose.
- Fire dampers will be provided at all fire rated boundaries. It is noted that the existing condition of the fire rating will need to be further investigated at the next stage of planning. The mechanical systems are to be designed to assume that all floors and guest room walls, retail, food and beverage tenancies are fire boundaries and require fire dampers or fire rated ductwork in accordance with BCA and Australian standard code requirements.

### 11.3.3 Stair pressurisation

All fire stairs are expected to be provided with essential stair pressurisation supply from the roof plant levels of both buildings. Generally air will be proved into the top of the stairs in lieu of dedicated stair pressurisation shafts.

Relief air will be via a dedicated relief air system within the Lands Building. Within the Education Building, relief will be via the atrium smoke exhaust fans.

## 11.4 Authority services

As the design continues to progress it will be essential to undertake stakeholder meetings and include the Fire Brigade (FRNSW). The key purpose of these meetings is to discuss the Fire Engineering alternative solutions to the non-compliances with the Building Code of Australia and gain in principle agreement to continue to develop the design in coordination with the architect.

## 11.5 Design considerations for tower

As a result of the tower height, evacuation zones (holding areas) will be required in the tower and the current proposal would be to locate these on the tower plant floors. This is a location where evacuating occupants can rest if required prior to completing their evacuation. It is also recommend that at least one evacuation lift is provided to the tower. The rest areas will be provided with communications to allow conversations between occupants, building management and the fire brigade. The evacuation lifts must also serve the evacuation rest zones.

## 11.6 Heritage structure design considerations

The fire resistance of the existing structures will need to be ascertained, through more detailed investigations at the next stage of planning. This will include inspections of existing floors and walls. It is likely that there will be hidden penetrations between floors and rooms; these will need to be fire rated and the implications for the existing finishes to the buildings considered during detailed design.

Currently the buildings are provided with numerous fire places, and chimneys. The use of these fire places will form part of the detailed fire engineering assessments as the project develops. It is likely that a more detailed investigation will need to be undertaken to understand the relationships between the multiple fire places/ chimneys and the penetrations through the buildings structure as the design progresses. The use of naked real flame fires will trigger a range of fire safety review requirements and are not recommended in the redevelopment.

# 12. Acoustics

## 12.1 Introduction

The purpose of this section is to highlight the intended acoustic design impacts and considerations of the design and development of the scheme. The current considerations are preliminary and conceptual in nature based on the current scheme and other design and reference information currently available.

These recommendations are in accordance with the Raffles Hotels and Resorts Design and Construction Standards, October 2010 version 3.1 or otherwise noted as the basis for acoustic requirements. These may be reconsidered or departed from in consultation with Raffles and the design team during later stages of development to suite the requirements of the heritage aspects of the Lands and Education Buildings. The section considers the requirements for both the heritage and tower components.

## 12.2 Architectural requirements

The advice within this report has been based on visual inspections and reference material made available for the precinct. It is assumed that the construction of the façades is sandstone with single hung sash windows; the flowing is tiles with concrete slabs and the walls throughout the building are sandstone or plasterboard.

Further details and recommendations will be provided as the design progresses.

### 12.2.1 Sound insulation

Sound insulation refers to a specific building element's (Walls, Floors, etc.) acoustic ability to reduce noise transmission from one space to another.

**Walls**
Table 12-1 presents the required sound insulation ratings as per the design standard.

| Hotel space | Partition type | Noise Isolation Class (NIC) | Weighted Sound Reduction Index (Rw) |
|---|---|---|---|
| Lobby and Circulation | Perimeter walls | >50 | >55 |
| Food and Beverage | Perimeter walls | >50 | >55 |
| Kitchen | Perimeter walls | >50 | >55 |
| Retail | Perimeter walls | >45 | >50 |
| Pre-function | Perimeter walls | >54 | >59 |
| Ballrooms | Perimeter walls | >54 | >59 |
| Ballrooms | Walls above operable partition track | >50 | >55 |
| Ballrooms | Operable partitions | >50 | >55 |

| Hotel space | Partition type | Noise Isolation Class (NIC) | Weighted Sound Reduction Index (Rw) |
|---|---|---|---|
| Meeting Rooms | Perimeter walls | >54 | >59 |
| Boardrooms | Perimeter walls | >54 | >59 |
| Guestrooms | Party walls | >52 | >57 |
| Guestrooms | Shaft and chase walls at bathroom | >52 | >57 |
| Guestrooms | Elevator shaft walls | >52 | >57 |
| Guestrooms | Corridor walls | >52 | >57 |
| SPA | Treatment rooms perimeter walls | >52 | >57 |
| Executive Offices | Perimeter walls | >48 | >53 |
| Administrative Offices | Perimeter walls | >42 | >47 |
| Mechanical plant | Perimeter walls | >60 | >65 |
| Laundry | Perimeter walls | >48 | >53 |

**Airborne sound insulation criteria for different spaces (Source: Raffles Hotels and Resorts Design and Construction Standards, October 2010 version 3.1).**

It is understood that the majority of guestroom partition walls will be newly constructed. The remainder of existing partitions are of sandstone construction. The following guestroom party wall example constructions are given as a guide only. Further details on partitions will be developed at a later stage of the project.

Guestroom party wall construction examples:

- 75mm concrete with 13mm high density plasterboard on a 64mm steal stud frame with 50mm acoustic insulation (Rw = 62). Or;
- 2x high density plasterboard either side of 148mm double stud framing with 50mm acoustic insulation (Rw = 58).

**Doors**
The acoustic rating of doors to guestrooms will require an acoustically rated door set or proprietary acoustic doors. The minimum acoustic rating for guestroom doors is likely to be Rw 40 - 45. As a guide this can typically be achieved with a 48mm solid core door and full perimeter seals. The door requirements will be determined during detailed design.

Where interconnecting doors between guestrooms are intended the acoustic rating is required to be considerably higher and two high rating doors will be required.

It should be noted that no door grilles or undercuts shall be installed in doors with greater than Rw 35 rating. Alternative relief air paths (e.g. acoustic transfer ducts) shall be used.

**Floors**
The construction of the flooring/ ceilings determines the amount of impact noise control between guestrooms and other guestrooms.

As per the design standard a noise impact rating of IIC 65 is required between stacked guestrooms. IIC stands for Impact insulation class and represents the noise impact performance measured in a lab, the higher the number the better the performance.

To meet this IIC rating in addition to the assumed concrete slab a 35mm concrete on 25mm mineral fibre board; or carpet flooring with an acoustic underlay will be required. Where guestrooms contain heritage tile flooring, any noise sensitive spaces below (such as, other guestrooms) shall provide a suspended acoustic ceiling as opposed to changing the heritage flooring.

This acoustic ceiling will help with the reduction of airborne noise from footfall on timber or tile. Structure borne noise from footfall is a risk associated with heritage flooring and will need to be considered further as the design progresses. A solution often used is to setup a mock acoustic ceiling and heritage flooring test room to determine the amount of structure borne noise transfer between guestrooms.

As an example, if noise from structure borne footfall (high-heals on tile or wood) noise levels are too high, it may be required to use rugs and hallway runners for each guestroom with a heritage floor; or install an acoustic underlay under the flooring/tiles; or Higher rated acoustic ceilings for the rooms below.

## 12.3 Reverberation control

Reverberation control refers to the acoustic characteristics of surface finishes to absorb sound. The following Table 12-2 represents the types of acoustic treatments that may be required throughout the project. Acoustic treatment will be compared against the Australian standards for building interiors AS/NZS2107:2000 and further details will be provided during detailed design.

| Hotel space | Design Standard RT (seconds) | Example acoustic treatment |
|---|---|---|
| Guestrooms | ≤ 0.8 | Carpet flooring/rugs<br>Typical hotel furnishings |
| Guest Corridors | 0.4 – 0.6 | Acoustic ceiling/wall treatment<br>Carpet flooring or hall runners |
| Boardrooms<br>Meeting rooms | 0.6 – 0.8 | Acoustic ceiling/wall treatment<br>Carpet flooring |
| Lobby and Circulation | ≤ 1.5 | Acoustic ceiling/wall treatment |
| Administrative Offices | 0.4 – 0.6 | Acoustic ceiling or wall treatment |
| Ballrooms | 0.8 - 1.2 (without any operable partitions)<br>≤ 1.2 (for individual room) | Acoustic ceiling<br>Carpet flooring |

## 12.4 Mechanical services requirements

### 12.4.1 External noise emissions

Noise emissions from external mechanical equipment are required to meet City of Sydney Council and NSW Industrial Noise Policy regulations at surrounding property boundaries. The impact of these noise emissions on internal ambient noise levels should also be minimised. To determine the noise emissions criteria a noise impact assessment must be undertaken. To meet the requirements the following mitigation methods have been considered:

- Selection of quiet units
- Acoustic louvres
- Screening barriers

### 12.4.2 Internal ambient noise levels

Internal ambient noise levels refer to the noise level experienced inside the particular room of the hotel. The limit includes a combination of external and internal noise sources. Table 12-3 presents the internal ambient noise level associated with this project outlined in the design standard. The internal ambient noise levels will be compared with the City of Sydney Council's requirements.

| Hotel space | Internal noise level design range LAeq (dB) |
|---|---|
| Lobby and Circulation | 35 – 40 |
| Food and Beverage | 40 – 50 |
| Retail | 45 – 55 |
| Pre function | 40 – 45 |
| Ballrooms | 30 – 35 |
| Meeting Rooms | 30 – 35 |
| Boardrooms | 30 – 35 |
| Guestrooms | 30 – 35 |
| Guest Corridors | 40 – 45 |
| SPA Treatment Rooms | 30 – 35 |
| Administrative Offices | 45 – 50 |
| Heart of House Areas | 45 - 55 |

### Air-conditioning noise

It is understood the intention for mechanical ventilation strategy is for 1 or 2 units within the guestrooms located above the bathroom hub (or next to the bathroom hub within equipment cupboards) and supplemented within the window sill box space.

Based on typical mechanical units acoustic mitigation will be required to meet the internal ambient noise levels. This mitigation has been predicted to be up to 2 acoustic lined bends per Inlet/outlet.

The units themselves will be required to be wrapped with an acoustic mass barrier product or encased in a plasterboard box to prevent case radiated noise. Further details will be provided in the design stages.

## 12.5 Noise ingress

Noise from external sources is to be controlled to meet the internal ambient noise requirements as per Table 12-3 above. The glazing construction is the main controlling factor for external noise.

### 12.5.1 Glazing

**Heritage buildings**
It is assumed the existing construction is 6mm glass in a sash type frame and a sandstone facade. This type of window construction is unlikely to meet the internal ambient noise requirements outlined in the design standard and the City of Sydney Guidelines. It is expected a double skin or secondary glazing system will be required.
Based on the existing construction and an example noise level of a similar location in the city it is predicted a second skin is required to be minimum 10-12mm sealed glass with a minimum air-gap of 12mm between the existing glazing.

Openable windows are likely to be required for cleaning purposes, as such, a well-sealed glazing system should be used that can meet the internal ambient noise requirements when closed. Alternatively an optional acoustic shutter/screen system could be used where the room's occupants have the choice to close the noise out.

The internal environment without the second skin will be in excess of the design standards and may disturb the sleep of the hotel's guests. To reduce the risk of the design of the glazing system a full acoustic test and assessment is highly recommended.

Glazing design and impacts on the façade will require further assessment and development during detailed design in consultation with Raffles, the design team and the heritage consultant.

**Tower**
The design of the glazing system shall be determined based on the external noise environment and the internal space type requirements. Measurements and predictions shall be made with the consideration for existing noise and future plant equipment noise to ensure the internal noise targets are met. For city areas double glazed or acoustic laminated glazing type systems are typical. The design of the façade will be coordinated with the façade engineer an architect as part of detailed design.

## 12.6 Construction noise

There is a risk of noise and vibration from the construction of the proposed development due to the extensive excavations required and the preservation of heritage building elements.

To manage construction noise the following may be applicable:

- The use of new/well maintained equipment
- Temporary noise barriers (hoarding)
- Limit noisy equipment use to specific hours
- Noise and vibration monitoring

A construction noise impact statement in-line with the City of Sydney Construction requirements will be required at a later stage of planning and design development to ensure noise from the construction of the project will not affect the surrounding neighbourhood or the heritage building elements.

## 12.7 Vibration isolation

Mechanical equipment located in or above guestrooms will require resilient spring mounts to reduce vibration noise affecting the guestrooms.

All water pipes, mechanical services and plant room equipment should be provided with vibration isolators. The following list shows typical types of vibration isolation that will be considered:

- Curb mount isolators
- Restrained spring mounts
- Steel spring mounts
- Neoprene mounts

Additional advice will be provided in the detailed design stage.

## 12.8 Plant rooms

All plant room perimeter walls are recommended to meet an acoustic rating of NIC 60 (Rw 65) as per the design standard.

### 12.8.1 Rooftop plant

The intention of installing plant in the ceiling void of floor 4 has the risk of noise intrusion to the guest rooms below and therefore noise mitigation and an acoustic enclosure of the plant area will be required.

The construction of the enclosure as per the design standard is to meet NIC 60 (Rw 65). The addition of unit wrapping and quiet unit selection may reduce the acoustic requirements needed.

Example constructions that may meet NIC 60 (Rw 65) based on Gyprock redbook constructions:

- 1x13mm dense plasterboard 70mm stud depth and 50-75mm acoustic insulation either side of 75mm Hebel panel (total 261mm),

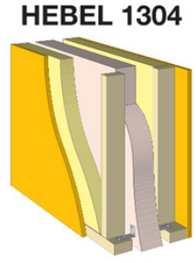



Figure 12-1: Example plantroom enclosure

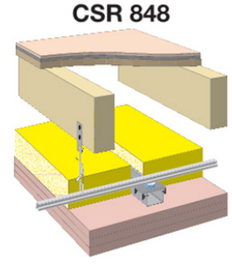



Figure 12-2: Example plant room enclosure

Or,

- Flooring 1x19-20mm particleboard (15kg/m2) on timber joists with a suspended ceiling system containing 3x16mm dense plasterboard and 150-200mm acoustic insulation (11kg/m3)

In addition to the acoustic rated enclosure all equipment should be vibration isolated as per section 12.6 and 12.7.

(Restrained spring mounts, steel spring mounts, curb mount isolators).

Further details will be reviewed at later stages of the design development.

## 12.9 Generators

Generator rooms have the potential to generate noise and vibrations that could affect guests. The following guidance is presented in the design standard:

- Space provision to accommodate large mufflers and silencers.
- Absorptive finishes in the generator room should be included when feasible.
- Structural support for the generator, an inertia base with two to three times the mass of the generator, and potentially a floating floor (when a slab-on-grade condition is not possible).
- Minimized floor deflections to allow efficient operation of spring isolators. Seismic requirements must also be evaluated.
- Spring vibration isolators and inertia bases with two to three times the mass of the generator is required in most applications.
- Hospital-grade silencers (or better) for combustion exhaust.
- Silencers with large cross-sectional areas to meet insertion loss requirements and accommodate low pressure drop tolerances typical of generator radiator fans.
- Vibration isolation hangers and flex connection for all ductwork and piping.
- Resiliently suspended ceilings may be required for spaces below the generator room.

Generators have been planned to be located in basement plant areas to maximise distance from bedrooms as well as offer the best opportunity to introduce solid acoustic dampening structure to mitigate noise and vibration risks.

## 12.10 Risers

The intended design of guestrooms includes a hub island in room. The services riser may have to extend vertically through other rooms.

Where a riser passes through another room other than the one it is servicing, an acoustic rating of NIC 52 (Rw 57) is required. As an example the following construction will meet this rating:

- 3x13mm dense plasterboard on one side and 1x13mm dense plasterboard on the other side of 64mm stud steel frame and 75mm acoustic insulation.

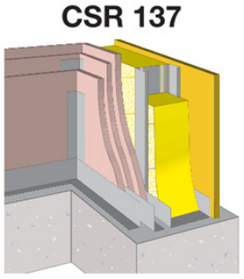



**Figure 12-3: Example riser construction (Gyprock Redbook)**

## 12.11 References

The following referenced documents are to be used in the design and construction of the development:

- Australian and New Zealand Standards AS/NZS 2107: Acoustics – Recommended design sound levels and reverberation times for building interiors.
- City of Sydney Council Development Control Plans, Construction noise, Construction hours.
- New South Wales – Industrial Noise Policy.
- New South Wales – Interim Construction Noise Guideline.
- Raffles Design and Construction Standards V3.1 2010.

# 13. Vertical Transport

## 13.1 Introduction

This section describes the expected Vertical Transportation (VT) services relevant to the development of the Sandstone Precinct. All discussions and observations made in this report are done based on existing documentation available at the time, and a preliminary assessment of the lifting requirements in Appendix M (Aurecon Stacking Plan Rev 1 Dated 28/05/15).

It is understood that the proposed scheme will comprise a luxury hotel and private residential tower development located within the Sydney CBD and integrated into the two existing sandstone buildings, namely the Lands Building and the Education Building, comprising broadly the following accommodation and spaces:

- Lands Buildings:
  - Ground Floor Reception Lobby
  - Three floors of guest rooms / function space
  - High rollers floor / cigar bar and other special function areas
  - Ceiling void plant areas/ rooms
- Education Building:
  - Eight levels of basement including plant, service areas, back of house and car park
  - Ballroom
  - Ground floor Lobby and concierge
  - Five floors of Guest rooms and associated facilities
  - Ten floors of dual key rooms / apartments
  - 50 Floors of serviced apartments, Health club and penthouse levels (multi-level apartments)
  - Tower rooftop helideck
  - A lower, mid and upper level plant floor (currently proposed for levels 19, 47 and 63)

The most significant aspects requiring VT design input are therefore:

- Identification of the various lifts and their intended usage within the development.
- Providing a superior level of service to the guests within the facility.
- Providing adequate information to the design team to assist in further development of the design.
- Providing lifting service to meet the needs of the local inspecting authorities or applicable codes for the scheme.
- Providing functional and reliable lift services to all users.
- Providing sufficient lifting services to service the plant floors and function/ amenity levels of the tower.

## 13.2 Relevant codes and standards

The lifts will be designed in accordance with the following codes and standards:

- AS1735.1-12 inclusive
- BS EN81 - Safety Rules for the construction and installation of lifts
- CIBSE Guide D – Transportation systems in buildings
- BS 5655 – Lifts and Service Lifts
- NCC (Building code of Australia)
- Disability (Access to Premises Buildings) Standard 2010
- All local regulations in relation to safety and inspections and maintenance

## 13.3 Review of VT plant

During the current design process the following lifts have been identified and included in the scheme:

- Lands Building:
  - Lifts 1 & 2: Public Guest Lifts (Servicing Ground Level – 04)
  - Lifts 3 & 4: Public Guest Lifts (Servicing Ground Level – 04)
  - Lifts 5: Public Guest Lift (Servicing Ground Level – 04)
  - Lifts 6 & 7: BOH Dedicated Goods Lift (Servicing Ground Level – 03)
  - Lifts 8 & 9: BOH Dedicated Goods Lift from loading dock (Servicing Level B2 – Ground Level)
  - Lifts 10: Public Lift to clock tower (Servicing Ground Level & 08)
- Education Building:
  - Lifts 1 – 3: Serviced Apartment Lifts/Goods (Servicing Level 01, Level 02 and Levels 21 -74)
  - Lifts 4 & 5: Tower apartment lifts and Function Level ( Servicing Level 01, Level 02 and Level 8 – 20)
  - Lift 6: BOH Dedicated Goods Lift (Servicing Level B2 - 02 and Level 8 – 20)
  - Lift 7 & 8: Car park lifts, Ballroom lifts and Education hotel lifts (Servicing Level B8 – 07)
  - Lifts 9: BOH lift Education hotel/car park (Servicing Level B8 – 07)

Based on the preliminary assessment, the above lift numbers appear adequate, and traffic simulations have proven that there is adequate passenger lifts within the current design to meet the industry accepted levels of service detailed within industry guidelines.

There appears to be adequate levels of flexibility still within the calculations for future massaging of the room and bed numbers, subject to client acceptance of waiting times and levels of service. This will be confirmed and the assessment updated as part of the design development process in consultation with the architect.

With relation to the number of passenger/ guest lifts verses services lifts, there is typically one dedicated goods lift provided for every two guest lifts in a hotel development, however this will be further assessed and refined during detailed design to take into consideration the specific nature of operational and servicing requirements of the development.

## 13.4 Passenger waiting times

Traffic simulations for the residential component of the tower and hotel have been, where possible, based luxury type buildings as outlined by CIBSE Guide D.

These criteria include:

| **Target Criteria Residential Building As per CIBSE guide D** | | | | |
|---|---|---|---|---|
| 3.12.3 Residential Buildings | | | | |
| Population Calculation - Table 3.12 | | | | |
| Type | Luxury | Normal | Low Income | |
| Studio | 1 | 1.5 | 2 | |
| 1 Bedroom | 1.5 | 1.8 | 2 | |
| 2 Bedroom | 2 | 3 | 4 | |
| 3 Bedroom | 3 | 4 | 6 | |
| | | | | |
| Design Criteria (5 minute, two way) | | | | |
| Type | Luxury | Normal | Low Income | |
| Interval(s) | 45 - 50 | 50 - 60 | 50 - 70 | |
| Two Way HC | 8% | 6 - 8% | 5 - 7% | |

| **Target Criteria Hotel Building** | | | | |
|---|---|---|---|---|
| Building population | 1.5 - 1.75 | persons per bed | | |
| Handling Capacity | 12 - 15% | Building population in 5 minutes | | |
| Average Waiting time | 40 - 60 | Seconds | | |

Based on the information obtained within Appendix k the following operational criteria could be achieved:

- Lands Building:
  - Guest Lifts: HC 15% Average Waiting Time 20.2 Sec
- Education Building:
  - Service Apartment Lifts: HC 8% Average Waiting Time 46.5 Sec
  - Dual Key Lifts: HC 8% Average Waiting Time 49.7 Sec
  - Guest Lifts: HC 15% Average Waiting Time 17.5 Sec

Note in order to achieve the 59.0 sec for the hotel guest/ carp park/ ballroom lifts a third guest/ hotel visitor lift (10 lifts in total in the Education Building) has been included in the initial calculation (Appendix K); noting the current architectural scheme includes two lifts to service this part of the hotel (9 lifts in total in this building). It is acknowledge that the 10th lift this is based on the waiting time criteria target above and other visitor/ guest traffic assumptions which will be further assessed as part of detailed design process. This will include further assessment of utilisation of the various areas of the hotel, assessment of internal flows and other operational considerations in keeping with the uniqueness of the heritage buildings and Raffles operational requirements.

In addition, while in some instances of other destination floors may be selected e.g. Food and Beverage or pool levels, it can be difficult to estimate what the percentage of usage these floors will attract. Hence a preliminary assumption of 50% in and 50% out traffic flow has been used at this time.

## 13.5 Car interior finishes for guest/ resident lifts

The proposed finished for the passenger lifts will be as per subject to the intended usage. As such, passenger lifts should integrate and match the ambience of the lobby and related guest areas of the architectural design.
Security will restrict passengers to all floors unless they present their room proximity card within the lift to gain access to guest room floor(s) and public spaces.

All lifts will be provided with door scanning devices that illuminate and scan the entrance in a 3D manner.

Elevators shall be quiet in operation and deliver a superior level of service to the house guests.

Handrails and controls (Braille) will be required to provide equal levels of service convenience to disabled guests shall be provided. This will be confirmed following a detailed DDA assessment as part of detailed design.

Where practical, lobby controls shall be interfaced into the lobby finishes and interior design.

All guest lifts shall incorporate an audible gong indicating the direction of travel.

## 13.6 Car interior finishes for services lifts

Services lifts will be robust in design and designed specifically for hard wear and tear.

Goods lifts shall be designed for high traffic and finishes shall be impact resistant and easy to clean. The use of Stainless Steel on all walls and ceiling is recommended.

Floors shall be heavy duty and hard wearing; consideration may be given to stainless steel chequer plate provided the locality of the lift does not result in noise being generated from trolleys to guest room areas.

All lifts will be provided with door scanning devices that illuminate and scan the entrance in a 3D manner.

Elevators shall be quiet in operation to ensure that back of house operations do not inconvenience guests.

Handrails and controls (Braille) will be provided as required providing equal levels of service convenience for disabled staff members. This will be in accordance with any DDA requirements identified as part of detailed design.

Where practical, lobby controls shall be interfaced into the lobby finishes and interior design.

All service lifts shall incorporate an audible gong indicating the direction of travel

## 13.7 Monitoring of lifts within the development

It is expected that a remote monitoring system will be required to monitor and supervise the operation of the lifts.

This system shall enable a security operator to isolate lifts from service remotely or to bring each lift individually to a floor.

Emergency communications systems shall be installed to facilitate two way emergency communications with the security operator. In the event that the security desk is unattended the emergency communication system shall divert to the emergency contact number of the lift service provider.

Security will restrict passengers to all floors unless they present their room proximity card within the lift to gain access to guest room floor(s) and public spaces.

Single lift pits will be fitted with emergency means of communication to maintain a safe working environment for the service providers technicians, these types of communication systems shall connect to the security desk.

## 13.8 Fire lift

As the Education Building height is greater than a 23m effective height, during a fire / emergency it would be expected that at least one lift in each bank will need to service each floor within that bank and be suitable for stretcher provisions. This requirement will need further discussion with the design team once levels served have been refined as part of detailed design.

## 13.9 Types of lifts

In line with the preliminary lifts car load, speed, duty and vertical travel of the lifts within this project will incorporate both Machine Room Less (MRL) Lifts within the Lands Building and Overhead Traction (requiring machine room) and MRL lifts in the Education Building and tower above.

## 13.10 Preliminary lift dimensions

The indicative dimensions of the lifts are based on a preliminary assessment of the scheme through its development and are intended to be indicative of the lifting requirements for the current scheme. Small discrepancies with the architectural scheme as it currently stands will be further investigated and finally aligned as part of design development. Notwithstanding this preliminary assessment, as summarised below and more fully indicated in Appendix K, provides the firm basis on which the core design of the precinct can proceed.

## LANDS BUILDING

| | Guest Lifts | | Guest Lifts | | Guest Lift | Goods | | Goods | | Public |
|---|---|---|---|---|---|---|---|---|---|---|
| Lift Car Load (kg) | 1275 | 1275 | 1275 | 1275 | 1275 | 1500 | 1500 | 1500 | 1500 | 1275 |
| Lifts Car Speed (mps) | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1 | 1 | 1 | 1 | 1.6 |
| Floors Served | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 3 | 3 | 9 |
| Car Doors (mm) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Lift Car Width | 2000 | 2000 | 1450 | 1450 | 1600 | 2150 | 2150 | 2150 | 2150 | 1450 |
| Lift Car Depth | 1450 | 1450 | 2000 | 2000 | 2150 | 1600 | 1600 | 1600 | 1600 | 2000 |
| Lift Car Height | 2400 | 2400 | 2400 | 2400 | 2600 | 2400 | 2400 | 2400 | 2400 | 2400 |
| Door Width | 1200 | 1200 | 1200 | 1200 | 1400 | 1200 | 1200 | 1200 | 1200 | 1200 |
| Door Height | 2100 | 2100 | 2100 | 2100 | 2100 | 2100 | 2100 | 2100 | 2100 | 2100 |
| Pit Depths | 1600 | 1600 | 1600 | 1600 | 1800 | 1600 | 1600 | 1600 | 1600 | 1600 |
| Headroom | 4500 | 4500 | 4500 | 4500 | 4500 | 4500 | 4500 | 4500 | 4500 | 4500 |
| Machine Room | MRL | MRL | MRL | MRL | MRL | MRL | MRL | MRL | MRL | MRL |
| Lift Rating | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass |
| Lift Shaft Width | 2800 | 2800 | 2500 | 2500 | 2500 | 2750 | 2750 | 2750 | 2750 | 2500 |
| Lift Shaft Depth | 2250 | 2250 | 2500 | 2500 | 2750 | 2750 | 2750 | 2750 | 2750 | 2500 |

All dimensions subject to ajustement subject to succesful lift supplier standard products

## EDUCATION BUILDING

| | Serviced Apartments | | | Dual Key | | Goods | Public/ Hotel Guest | | | Goods (Lift 10) |
|---|---|---|---|---|---|---|---|---|---|---|
| Lift Car Load | 2000 | 1275 | 1275 | 1275 | 1275 | 2000 | 1600 | 1600 | 1600 | 1500 |
| Lifts Car Speed | 7 | 7 | 7 | 2.5 | 2.5 | 5 | 5 | 5 | 5 | 5 |
| Floors Served | 52 | 48 | 43 | 15 | 15 | 21 | 15 | 15 | 15 | 15 |
| Car Doors | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| Lift Car Width | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1650 | 1650 | 1650 | 2000 |
| Lift Car Depth | 2100 | 2100 | 2100 | 2100 | 2100 | 2100 | 2150 | 2150 | 2150 | 1450 |
| Lift Car Height | 2600 | 2600 | 2600 | 2600 | 2600 | 2600 | 2600 | 2600 | 2600 | 2400 |
| Door Width | 1100 | 1100 | 1100 | 1100 | 1100 | 1100 | 1200 | 1200 | 1200 | 1200 |
| Door Height | 2100 | 2100 | 2100 | 2100 | 2100 | 2100 | 2100 | 2100 | 2100 | 2100 |
| Pit Depths | 4500 | 4500 | 4500 | 4500 | 4500 | 4500 | 4500 | 4500 | 4500 | 4300 |
| Headroom | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 | 5000 | 5000 | 5000 | 4500 |
| Machine Room | 3700 | 3700 | 3700 | 3700 | 3700 | 3700 | MRL | MRL | MRL | MRL |
| Lift Rating | Class ( | Pass | Pass | Pass | Pass | Class C | Pass | Pass | Pass | Pass |
| Lift Shaft Width | 2500 | 2500 | 2500 | 2500 | 2500 | 2500 | 2500 | 2500 | 2500 | 2600 |
| Lift Shaft Depth | 2600 | 2600 | 2600 | 2600 | 2600 | 2600 | 2500 | 2500 | 2500 | 2500 |

# Consultant Assessments

# Heritage Assessment

## The Lands Building, 23–33 Bridge Street

### History and Heritage Significance

The Lands Building, 23–33 Bridge Street, Sydney is an exceptional sandstone Victorian Free Classical style public building designed by NSW Colonial Architect James Barnet for the NSW Department of Lands. It was built in two stages, with the northern half completed in 1881 and the southern half completed in 1893. The Lands Building is a landmark in Sydney and has significance for its aesthetic/technical, historical, associative, social, representative and rarity values.

The Lands Building is listed on the State Heritage Register (SHR No. 00744). It is also listed as a heritage item on Schedule 5 of the Sydney Local Environmental Plan 2012 (Item No. I1683), and included within the 'Colonial Sydney' area nominated to the National Heritage List. A Conservation Management Plan (CMP) was prepared for the building by the Government Architect's Office Heritage Group in March 2015. The CMP was endorsed by the NSW Heritage Council in May 2015.

### Significant Fabric and Spaces

The Lands Building is highly intact externally and internally, retaining most of its original, significant internal fabric and spaces, including rare Australian red cedar joinery, marble floors, plaster wall finishes, moulded plaster coffered ceilings that respond to the building's structure, fireplaces, stairs and balustrades, and internal structure. There is also significant moveable heritage throughout, including furniture and surveying equipment. The sandstone facade is highly intact, featuring sculptures of prominent surveyors and the like, as is the roof, which is defined a variety of roof forms, lanterns and a clock tower.

Generally, all original fabric and spaces within the building are of Exceptional or High significance, as defined in the 2015 CMP. This includes the overall form of the building, including its roof line, and its planning—namely its internal arrangement with rooms arranged along a continuous hallway that wraps around an internal courtyard/lightwell, which is divided in two by a central strong room/records store and stairs on either side, which rise through the building. Each floor has a cast iron and steel walkway (High significance) which provides access to the four-storey toilet blocks (Little significance) in each lightwell. The offices spaces (High significance) were originally (and remain) a mix of large open spaces, used for drafting, and smaller single offices.

There are some later, intrusive or low significance additions to the building, including the lifts in the northern lightwell (intrusive) and the mezzanine level (intrusive). The original goods lift, which was located in the northern stairwell, has been removed. The concrete fire stairs in the northern part of the building are intrusive.

### Description of the Proposal

The proposal is to convert the Lands Building into a hotel, with reception and restaurants on the ground floor and rooms on the upper floors. Other spaces such as the strong rooms on each floor and the rooftop west and east dome rooms and central dome will have a communal use (ie they will not be hotel rooms). Each hotel room will have its own bathroom, contained within a 'pod'. It is proposed that the existing service spaces that run around the central corridors will be re-used for new services, and that previously modified spaces next to the stairwells be adapted for new lifts. The existing lift cores would be removed, as would the two toilet blocks in the lightwells.

### Potential Heritage Impacts/Benefits of the Proposal

The proposed approach is to acknowledge, and respond to, the Lands Building's significant fabric and layout, and to minimise impacts/alterations required for new walls, services and fittings. The new work will mostly be reversible, and undertaken in a way that is distinguishable from significant fabric.

The proposal would have the following potential benefits for the heritage significance of the Lands Building:

- greater access for the general public, which would allow for greater interpretation of the building's history and heritage significance.
- reinstatement of the original ground floor spaces by removal of the recent mezzanine insertions;
- removal of intrusive fabric in the lightwells (the recent lift core and toilet blocks) and other spaces;
- re-opening of the original, significant balconies; and
- rationalising of the top floor circulation to provide a more dignified access to the western and eastern domes.

Generally, the proposal would have the following potential adverse impacts on the heritage significance of the Lands Building:

- loss of its significant use and historic public function as government offices, specifically by the Lands and Planning departments, for which it was designed;
- obscuring understanding of original layout through the subdivision of significant large internal spaces for smaller rooms; and
- alteration of some original fabric through the insertion of new walls and services including air conditioning, hydraulic services and lifts.
- While there is no change to the external envelope of the Lands Building, the tower on the adjacent Education Building would alter the setting of the Lands Building and affect the visual relationship between the two buildings.

GML HERITAGE

## CMP Conservation Policy

The 2015 CMP provides detailed policies for the conservation, and future development and use of the Lands Building. The conservation policies seek to ensure that the new use for the building should adopt a long-term 'whole of building' approach (ie provide a single owner and use for the building), minimise physical changes to fabric and spaces, and that heritage impacts be the major consideration for any proposals. The CMP identifies a range of significant views and vistas to the Lands Building, including from Bent Street to the southeast, Bridge Street to the west (and a shorter view line from Bridge Street to the east), Loftus Street and Macquarie Place to the north and Spring Street to the southwest.

It also identifies key aspects of building's significance that must be conserved, including the external form and detailing of the building, its internal layout (including the hierarchy of office spaces, corridors and multi-storey central records storage rooms) and internal decorative and technical features (including the survey base line in the ground floor and design features for ventilation, fire safety, light transfer and climate control).

The CMP's conservation policy state that fabric and spaces of Exceptional and High significance should be retained and conserved. Elements of Moderate significance should also be retained, but could be altered or demolished providing the change complies with the other policies in the CMP. Elements of Little significance can be removed or altered if it enables practical use of the building. Removal of intrusive elements, such as the current intrusive partitioning and mezzanines, is encouraged. The access from the lifts to the western and eastern domes could also be resolved.

The conservation policy recommends that alterations and new work respect and complement significant fabric, and encourages the use of high quality yet simple contemporary design over inappropriate period design (ie where evidence of original fabric is not available).

## Conservation Approach and Compliance with CMP

The proposed design represents a careful and thoughtful approach to inserting the new hotel use into the Lands Building. It is a whole-of-building approach with a single use, which conforms with the CMP policy for new uses.

The hotel use would require subdivision of significant internal spaces to create individual rooms. These works would not comply with the conservation policy, which encourages the reinstatement of original spaces. However, the proposed approach is for most of the changes to be reversible. For example, impacts on significant fabric have been managed by careful design of the hotel spaces to ensure that new walls do not interrupt significant doors and windows, and that they are placed in response to the building structure, which is expressed in the ceilings. The insertion of bathrooms/wet areas into the interior spaces throughout the building has the potential to have a substantial impact due to the removal of original fabric This has been addressed by designing the bathroom 'pods' to stand free of significant original walls and not extend to the ceilings. This would reduce the impact of these insertions on original fabric and ensure that the spatial volumes are still able to be interpreted. The proposed re-use of existing, original service tunnels above the corridors for the new services would also help minimise impacts on significant fabric. Services would be grouped to minimise impacts on this fabric. Significant joinery, and ceiling, floor and wall finishes would be retained throughout. Intrusive elements such as the mezzanine and lift shaft would be removed, in compliance with the conservation policy.

The new use will help ensure the long-term conservation of the Lands Building. It would increase the potential for the general public to visit this state significant public building and expand opportunities for its interpretation—particularly within the ground-floor lobby, bars and restaurants. This is consistent with the conservation policy which states that 'a use which enables a wider appreciation of the significant interiors of the building should be favourably considered.'

The future of the building's moveable heritage items will be determined with the preparation of a detailed moveable heritage management plan during the detailed design stage.

# Heritage Assessment

## Department of Education Building, 35–39 Bridge Street

### Heritage Significance

The Department of Education Building, 35–39 Bridge Street, Sydney is a high quality sandstone Federation Free Classical style public building built in two stages—the first (northern half) designed for the Department of Public Instruction by NSW Government Architect George McRae and completed in 1914; and the second (southern half) designed for the Department of Agriculture by private firm John Reid & Sons and completed in 1930. The Department of Education Building is a landmark in Sydney and has significance for its aesthetic/technical, historical, associative, social, representative and rarity values and research potential.

The Department of Education Building is listed on the State Heritage Register (SHR No. 00726). It is also listed as a heritage item on Schedule 5 of the Sydney Local Environmental Plan 2012 (Item No. I1684), and included within the 'Colonial Sydney' area nominated to the National Heritage List.

A Conservation Management Plan (CMP) was prepared for the building by City Plan Services in March 2015. The CMP was endorsed by the NSW Heritage Council in May 2015.

### Significant Fabric and Spaces

Generally, the Department of Education Building is highly intact externally. The sandstone facade is highly intact and the roof features significant lanterns for the galleries below. Originally the office spaces had little decorative detail, in contrast to the highly decorative Lands Building. Internally the building retains aspects of its 1930 layout of offices arranged around a central lightwell This was extensively altered by an office fit-out in 1996 which included modifications to the internal layout to rationalise the building's circulation. A three-storey southern rooftop addition was also made at this time. This altered the building's external profile, as viewed from surrounding streets While the 1996 modifications changed the internal character, they are mostly reversible and the earlier character recoverable. Generally, all original fabric and spaces within the building are of Exceptional or High significance, as defined in the 2015 CMP. This includes the overall form of the building, excluding the southern rooftop additions, and the building's structure. The internal planning and lightwell is of High significance, specifically the arrangement of rooms around an internal courtyard/lightwell, the lightwell walls and fenestration and entrances from Bridge and Loftus streets and Farrer Place. The offices were originally a mix of large, open-plan spaces (Moderate significance) and a suite of elaborately decorated offices for the Minister (Exceptional significance). The seventh floor comprises a substantial gallery space of Exceptional significance. There is also significant moveable heritage including furniture throughout and student artworks in the seventh-floor galleries

The 1996 modifications include new circulation corridors around the perimeter of the central lightwell; a curved steel and glass structure occupying a portion of the original rectangular lightwell footprint from the first floor up; a new lift core and toilets on the lightwell's southern wall; and a three-storey roof addition on the southern half of the building. These additions are identified in the CMP as being of Moderate significance.

### Description of the Proposal

The proposal is to convert the Department of Education Building into a hotel, with reception and restaurants on the ground floor and rooms on the upper floors, an underground ballroom beneath the lightwell, a connection to the Lands Building beneath Loftus Street, and underground carparking beneath Farrer Place. Some spaces, such as the gallery on the seventh floor, will have a similar use (ie these spaces will not be hotel rooms). Each hotel room will have its own bathroom. The 1996 modifications and additions would be removed, including the southern rooftop addition. The previous rectangular form and volume of the internal lightwell would be recovered through removal of the 1996 additions, although there would be new structure and other additions in portions of this space.

A 37-storey tower is proposed above the Department of Education Building. The supporting structure for the proposed tower requires the replacement of most surviving sections of the original lightwell walls with concrete sheer walls. The southern portion of the lightwell will also contain a bank of lifts servicing the tower above.

The tower would be substantially set back from all four street frontages, ranging from 17.5–21m from the building's Bridge Street elevation and 4–7m from the other facades. The tower is visually separated from the Education building through use of a recessed structure above the historic building's roof. The visible soffit of the tower would be approximately 8m above the Department of Education Building's roofline.

### Potential Heritage Impacts/Benefits of the Proposal

The proposed approach is to acknowledge and respond to the building's significant fabric and layout, and to minimise impacts/alterations required for new walls, services and fittings. While conversion of the building into a hotel will result in the loss of its historically significant function, the new use would provide for greater access for the general public, which would allow for greater interpretation of the building's history and heritage significance.

The removal of the 1996 intrusions, particularly the unsympathetic southern rooftop addition and structures within the lightwell, would also be a positive outcome for the Department of Education Building.

#### Interior Modifications

The proposed interior modifications will have some impacts on the heritage significance of the building. The proposed hotel use will remove the opportunity to reinstate the significant large internal open-plan office spaces of the building, which are currently subdivided into smaller office spaces, by perpetuating the subdivision through the adaptation for hotel rooms. This would also result in some loss of original fabric through the insertion of new walls and services including air conditioning, hydraulic services and lifts.

While removal of the 1996 additions within the lightwell will be a positive move, the structure for the tower will require removal of the lightwell's original walls and fenestration and their replacement with concrete sheer walls and new fenestration. The design for the lightwell interior is elegant, using high quality finishes, such as sandstone, that respond to the quality of the significant sandstone exterior. The proposed fenestration within the lightwell will also respond to the lightwell's existing semi-circular windows. Nevertheless, the proposal would result in the loss of the existing lightwell walls and fenestration, which have been identified as being of High significance, and the ability to understand this as part of a historic building. The insertion of a bank of lifts to serve the tower above is designed to maximise transparency and retain interpretation of the lightwell's original form and spatial quality, which are being reconstructed.

Significant internal fabric in the gallery spaces, foyers, staircases, minister's office would be retained. The future of the moveable heritage items within the building will be determined with the preparation of a detailed moveable heritage management plan.

### External Modifications

The building's external sandstone walls and parapets, along with their decorative features would be conserved.

The proposed tower would have a range of impacts on the form, setting and landmark qualities of the Department of Education Building. The tower would also adversely affect the setting of the neighbouring Lands Building when viewed from certain parts of the public domain, particularly in oblique views along Bridge Street.

The deep setback from Bridge Street would assist in mitigating some of the tower's impacts, for example from various positions in Bridge Street. From some positions, the backdrop created by the tower would not greatly alter the existing backdrop of towers against which the Education Building is already read. Further, the tower's presence within streetscape views along Bridge Street would be partly obscured by existing towers, such as the Governor Macquarie building. In other views the tower would be much more prominent and dominant.
The smaller setbacks of the tower from Farrer Place, Loftus Street and Young Street (ranging between 4–7 metres) would mean that the tower would form a far more immediate backdrop above the parapets of the Education Building when viewed from surrounding streets, particularly in views from the south, southeast and southwest.

The smaller setbacks of the tower from Farrer Place, Loftus Street and Young Street (ranging between 4–7 metres) would mean that the tower would form a far more immediate backdrop above the parapets of the Education Building when viewed from surrounding streets, particularly in views from the south, southeast and southwest.

## CMP Conservation Policy

The 2015 CMP provides detailed policies for the conservation, and future development and use of the Department of Education Building. The conservation policies seek to ensure that the new use for the building adopt a long-term 'whole of building' approach (ie provide a single owner and use for the building), avoid physical changes to significant fabric and spaces, and retain the art galleries on Level 7.

The CMP's conservation policy states that fabric and spaces of Exceptional and High significance should be retained and conserved. Elements of High significance could be adapted, but the adaptations should be reversible. Elements of Moderate significance should also be retained, but could be adapted. Elements of Little significance can be removed or altered, providing fabric and spaces of greater significance are not impacted.

Vertical additions to the Department of Education Building are contemplated in the CMP, but the conservation policy requires that these are no higher than the top of the existing lift motor room and that any additions that require intervention into highly significant fabric should not be permitted. The CMP states that 'Any roof top additions must be designed, scaled and sited such that they do not challenge the architectural scale, power and dominance of the main building volume.' The conservation policy also recommends that any proposal for roof-top additions take into account the impact on the building's aspect as seen from Bridge Street, Bent Street and O'Connell Street, and that the physical and visual setting of the building on Farrer Place be maintained and preserved.

# Heritage Assessment

## Conservation Approach and Compliance with CMP

The proposed design of the base scheme represents a thoughtful approach to inserting the new hotel use into the Department of Education Building. It is a whole-of-building approach with a single use, which conforms with the CMP policy. The new use will help ensure the long-term conservation of the Education Building. It would increase the potential for the general public to visit this state significant public building and expand opportunities for its interpretation—particularly within the ground-floor lobby, bars and restaurants. This is consistent with the conservation policy which states that 'a use which enables a wider appreciation of the significant interiors of the building should be favourably considered.'

The conservation policy requires that the open-plan spaces of Exceptional and High significance—including the galleries on Level 7 and the minister's offices on Level 2—be retained and not subdivided, while spaces of lesser significance that currently have an office fit-out could continue to be subdivided. The proposed approach complies with this conservation policy, as the galleries and minister's offices would be retained without subdivision.

Impacts on significant fabric have been managed by careful design of the hotel spaces to ensure that new walls do not interrupt significant doors and windows, and that they are placed in response to the building structure. Significant joinery, and ceiling, floor and wall finishes, where remaining, would be retained throughout. The 1996 additions within the lightwell would be removed, allowing the original form of the lightwell to be reinstated and its significant fabric to be revealed, which would comply with the conservation policy.

The option scheme, which includes the tower, would not comply with the CMP conservation policy. While minor vertical additions are contemplated in the CMP, the conservation policy requires that these be no higher than the height of the existing lift motor room. A tower was not contemplated in the CMP and by implication is not supported by it. In certain views, the tower would challenge architectural scale, power and dominance of the main building volume contrary to the CMP policy. Further, the new structure for the tower may require replacement of the lightwell's walls, which would not comply with the CMP's recommendation that it be conserved. However, the lightwell itself as a major spatial and technical element of the building would be retained.

The future of the building's moveable heritage items will be determined with the preparation of a detailed moveable heritage management plan during the detailed design stage.

## Archaeological Resource

An overview of the precinct's potential archaeological resource and its significance is contained in the CMPs prepared for each heritage building in March 2015 and an Archaeological Assessment prepared for the entire site (including roads and public reserves) by Urbis in November 2014.

The site's potential archaeological resource and its significance is summarised in table (right).

The proposed development has the potential to impact the site's archaeological resource to various degrees, depending on the location and nature of the required ground disturbance works. Some of the works that have the potential to adversely impact the preserved archaeology include installation of services and other necessary infrastructure, such as lift wells, footings etc., as well as the underground loading and carpark entrance from Young Street. For example, the construction of the loading dock and underground carpark may impact on both the historical archaeological remains associated with the new guardhouse and Aboriginal remains, should they still be present.

However, the proposed methodology for the underground connection between the Lands Building and the Department of Education Building (beneath Loftus Street) has been designed to avoid impacts on any potential archaeology. The proposed depth of excavation would be greater than the depth of the known and potential archaeological remains and the construction methodology would seek to retain any archaeology above the new underground connection—including Bennelong Storm-water Channel No. 29 and remnants of any deep subsurface elements, such as wells and/or cisterns. An adequate clearance zone between the works and the archaeological features would be developed as part of the avoidance/mitigation strategy.

The final design would be informed by archaeological test excavation, which would identify the existence (or absence) of subsurface features, including wells/cisterns. These features, if identified, would likely require excavation to determine their maximum depth. The depth and location of the proposed underground spaces would then need to be adjusted to ensure that State significant archaeology is retained in situ, where possible. Where avoidance of impacts to the site's archaeological resource is not possible, thorough archaeological investigation and interpretation would be undertaken.

**The site's potential archaeological resource and its significance is summarised in the table below:**

| Phase | Description | Location | Potential | Archaeological Significance |
|---|---|---|---|---|
| 1: Pre-European Settlement (1788) | Aboriginal objects, middens, burials. | Across the site. | Low | Yet to be assessed |
| 2: (1788–1810) | Structural remains and deposits associated with the first permanent residences for civil officers. | Across the site. | Low | State |
| 3: (1810–1845) | Structural remains and deposits associated with the Judge-Advocate's residence (later used as the Colonial Secretary's residence). | Underneath the Department of Education Building and Loftus Street. | High | State |
| 3: (1810/12–1845) | Structural remains and deposits associated with the new Guard House. | Underneath Young Street. | High | State |
| 3–6: (1810–1912) | Structural remains and deposits associated with the Colonial Secretary's residence (later used as the Colonial Secretary's office). | Underneath the southern part of the Department of Education Building. | Low | State |
| 3–5: (1810–1888) | Structural and depositional remains associated with the Surveyor General's office (formerly Chief Judge's house). | Underneath the Lands Building. | Low | State |
| 4–present | Bennelong Storm-water Channel No. 29 | Running underneath Loftus Street in the north-south direction. | Extant | Local |

# Planning Assessment

## 1. Planning approach methodology

The preferred planning approach would be to secure consent for the State Significant Development Stage 1 (SSD 6751) application as currently submitted, and then pursue further Stage 1 and 2 applications for the progressive offer, which proposes an alternate design for development of the existing Education building and incorporates, amongst other changes, the tower building element on the existing Education building. This approach is recommended, given that the current SSD application is well advanced, with the proponent, Government Property NSW submitting a Response to Submissions Report to the Department of Planning and Environment (DP&E) in May 2015. This also enables the successful tenderer to make a separate application for any works outside of the scope of the currently submitted SSD application (SSD 6751). Landowners consent to the submission of a further Stage 1 application for the progressive offer from Government Property NSW will be required.

We understand the next steps are for DP&E to finalise their assessment of SSD 6571, which would include issuing draft conditions of consent, following which a determination would be made. Following receipt of the consent for SSD 6571, a Stage 2 SSD application would be submitted for works that are consistent with the SSD 6571 stage 1 approval, either across both buildings or for the Lands Building only, however this would be dependent on the final staging strategy.

Following the above and landowners consent from Government Property NSW, a Stage 1 SSD application would be submitted for the progressive offer, which is proposed to contain hotel accommodation, serviced apartments and other similar tourist related activities. The progressive offer, in particular the works and proposed land uses which form part of the tower and lower building elements within the Education Building, is for tourist related purposes and consistent within clause 13(2) of Schedule 1 of SEPP (State and Regional Development) 2011.

Given the extent of variation sought under the Sydney LEP 2012 for height it is recommended that a Planning Proposal be submitted with the Stage 1 application for the progressive offer, to amend Sydney LEP. Whilst Clause 89E of the Act enables a partly prohibited component of a SSD to be considered, given the extent of variation sought to the height controls, a LEP amendment can be made by DP&E at the same time as the SSD process.

### Stage 1 Development Consent (SSD 6571):

- The Stage 1 SSD 6571 lodged by Government Property NSW is currently under assessment. Any non-conforming scheme, such as the progressive offer, will require a new Stage 1 DA to be lodged and assessed. Therefore the initial priority would be to secure consent for currently submitted stage 1 SSD 6571.
- Following the issue of the Stage 1 SSD 6571, a Stage 2 SSD would be submitted, which would be consistent with Stage 1 above. The Stage 2 SSD application would enable the works to be carried out in stages, such as sub-terrain and/or early works, or works within the Lands Building and then works within the Education Building, or other combinations as finally determined within the staging strategy.
- As the proposal meets the exemption requirements under Clause 6.21(6) of the SLEP 2012, a design competition would not be required to be completed to meet the objectives of 'Design Excellence' under the LEP

The overall planning pathway is described in **Figure 1** below and the indicative steps in the development process illustrated in F**igure 2.**

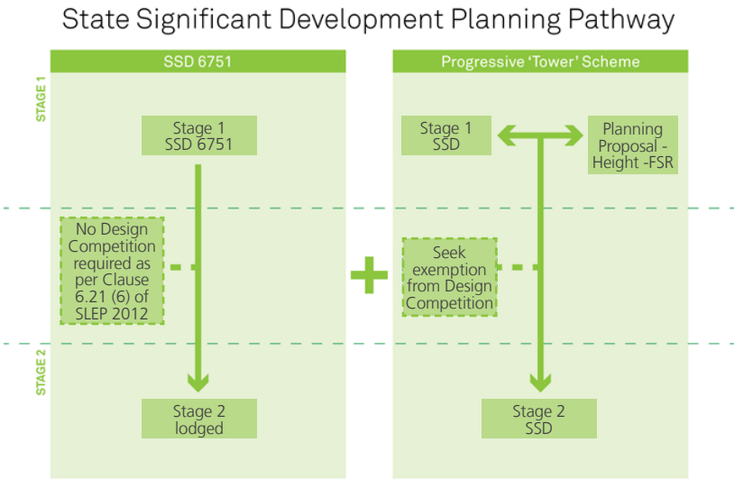



**Figure 1 Overall Planning Pathway**

### Stage 1 & 2 SSD for progressive offer proposal:

- A new stage 1 DA would be required for the progressive offer, given the substantive changes to the already submitted (to be determined) Stage 1 DA (SSD 6571);
- A concurrent LEP amendment request (Planning Proposal) would be submitted to DP&E under s89E(5) of the EP& A Act to amend the height, FSR and parking controls, in the Sydney LEP 2012 to permit the progressive offer. The Planning Proposal would be considered in conjunction with the new Stage 1 DA. If approval is be granted to the new Stage 1 DA, the Secretary may make the LEP amendment at the time of the granting of approval.
- A number of planning considerations would need to be thoroughly addressed in the Stage 1 progressive offer proposal, which is described further in Section 2.
- Stage 2 (detailed design) applications would be lodged for the approved Education building with the tower element following receipt of the Stage 1 progressive offer consent above.

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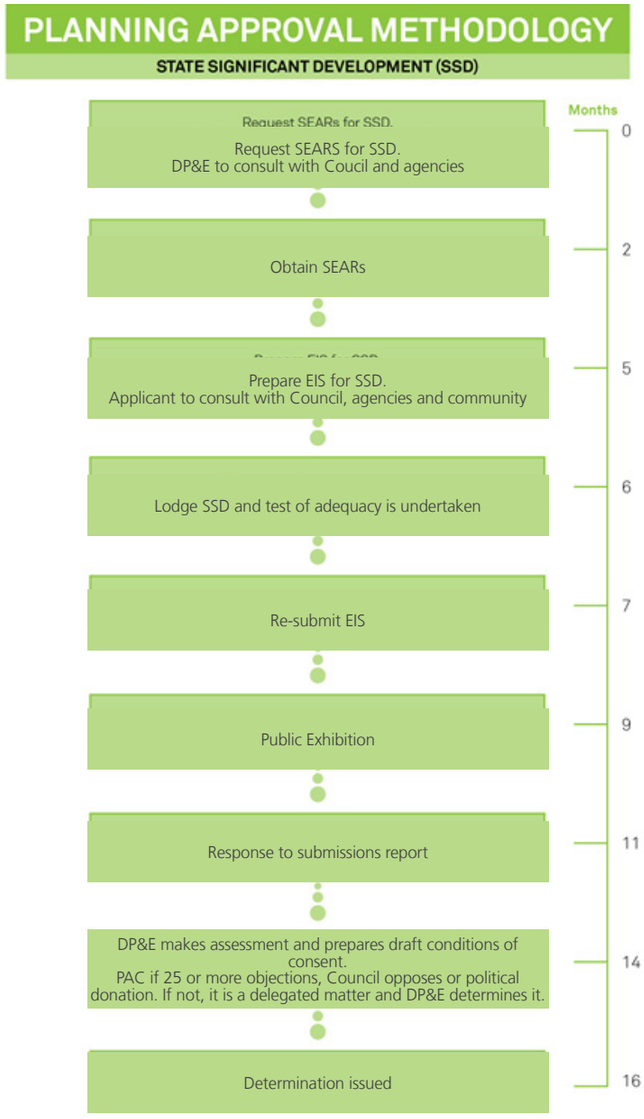
## Design Competition Requirements under Sydney LEP 2012 for progressive offer:

- Under Clause 6.21 of the Sydney LEP 2012, a Design Competition is required for all development taller than 55m or with a site area greater than 1500sqm (in Central Sydney), or that has a capital value greater than $100 million;
- As SSD, the Director General can waive the requirement for a Design Competition under Clause 89E of the EP&A Act 1979. The requirement for a Design Competition acts as a partial prohibition as the Clause requires that the consent authority not grant consent unless the competitive process has been undertaken. However, Clause 89E(3) permits the Director General to approve a SSD application "despite the development being partly prohibited by an environmental planning instrument";
- Additionally Clause 6.21(6) of the Sydney LEP 2012 permits the consent authority to waive the requirement for a Design Competition if it considers the requirement to be 'unreasonable or unnecessary'. In this instance the requirement is considered 'unreasonable or unnecessary' due to unique circumstances as:
  - The subject design is the result of a competitive tender process, of which the shortlisted consortia have formed from a significant number of entries;
  - The design proposed is fully resolved and demonstrated in detail, which is similar in scope to a detailed Design Competition; and
  - The design is a criteria of the tender situation.
- The proponent may seek to have the requirement for a Design Competition waived, otherwise a Design Competition will be required prior to lodgement of a Stage 2 application.
- Justification would be that architects engaged are a renowned, internationally recognised firm with proven capability in designing landmark projects.

The detailed steps for a SSD application are outlined in Figure 2 below. These steps are the same for either a Stage 1 or 2 SSD application, however do not include the Planning Proposal which would be submitted as part of the progressive offer, which would seek to amend the Sydney LEP controls for height on the site.

**Figure 2 Planning Approval Methodology**



# Planning Assessment

## 2. Key Planning Issues

There are a number of planning issues associated with development proposal for the progressive offer that will require attention as part of the design development and ultimate planning assessment of the project. The key issues and a suggested approach to each issue is provided below.

### Solar Access to Public Spaces

Clauses 6.17 and 6.19 of the Sydney LEP 2012 prohibits development above the Sun Access Plane and to certain public spaces including Chifley Square. The site is affected by the Sun Access Plane for the Domain and Royal Botanic Gardens. In addition, Clause 3.2.1.1 of the Sydney DCP 2012 seeks to minimise overshadowing to public places including Farrer Place. Accordingly, the proposal will need to demonstrate compliance with the Sun Access Plane and minimise overshadowing to other public spaces in close proximity.

The tower incorporates a slender built form that has been specifically designed not to create any additional overshadowing to key public places including Chifley Square, Martin Place and the Botanic Gardens in accordance with the Sun Access Plane requirements in the Sydney LEP 2012 and Clause 6.19.

The tower creates some additional overshadowing to the steps on 1 Bligh Street at 21 June between 12.00pm and 12.30pm. However, by 12.30pm a significant number of the steps are in light, which increases till 2.00pm when the area is overshadowed by an existing building. By 2.00pm the majority of the lunch period for workers is completed.

The tower design should ensure that acceptable solar access is achieved for surrounding public spaces, particularly between the hours of 12.00pm and 2.00pm when many office workers utilise the spaces for lunch.

### View loss to surrounding buildings

Due to the site's important location adjacent the harbour, it will be important to minimise view loss to surrounding buildings.

View loss is most frequently considered through the *Planning Principle Tenacity Consulting v Warringah [2004]*. The Planning Principle for 'impact on public domain views' in *Rose Bay Marina Pty Ltd v Woollahra Municipal Council [2013]* is also relevant.

Although the principles outlined in the Tenacity case are generally applied for affected surrounding residential development, not commercial development, the tower should be designed to minimise view loss to surrounding commercial towers due to the iconic views of the harbour.

Importantly the proposal ensures that partial views have been retained from 1 Bligh Street to the Harbour Bridge and Circular Quay area. The tower does not appear to disrupt views from all of the aspects of the 1 Bligh Street tower, as views to the north will still be able to be achieved above Young and Loftus Streets.

### Non-compliance of height, FSR and parking controls

The subject proposal seeks to substantially vary the height control and, to a lesser extent, the FSR and parking controls on the Education Building. Whilst cumulatively across both the Education and Lands Buildings the total FSR would be compliant, the nature and wording of the FSR controls is such that FSR is calculated for each site. As discussed in Section 1, it is recommended that a concurrent Planning Proposal be lodged to amend these controls along with a Stage 1 application for the progressive offer in order to resolve this matter.

### Proximity of basement to rail corridor

Under SEPP (Infrastructure) 2007, concurrence is required from RailCorp prior to determination of development within proximity to the identified 'Interim Rail Corridor – CBD Rail Link and CBD Metro'.

The current proposal includes a number of basement levels in excess of the below-ground development proposed in Stage 1 SSD application SSD6751. The SSD6751 EIS advises that Transport for NSW has indicated that 'minor' excavation will be considered acceptable within proximity to the rail corridor.

Consultation with Transport for NSW will be required to identify the acceptable depth that the basement can be located, so as not to impact on the rail corridor.

### Car Parking and services under local public roads and Farrer Place

Any parking, services or uses located under local roads or areas identified for public recreation require approval from the relevant landowners. The proposal includes parking access shared through Governor Phillip Tower with basement uses and parking under Farrer Place and Loftus Streets. Parking access shared through Governor Phillip Tower will require further negotiations with the affected land owners.

Any use of land under the local road network of Gresham Street and Loftus Street and projections into Farrer Place requires approval from the City of Sydney as the landowner. The City of Sydney's submission to the Stage 1 DA indicated that they would be willing to enter into discussions with the successful proponent regarding the subterranean spaces, subject to adequate resolution on a number of design and use issues.

Early discussions should be had with the City of Sydney and the owners of Government Phillip Tower to determine whether they would be willing to provide Owners Consent and enter into a lease agreement for the proposed subterranean uses and car parking access.

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# Traffic Assessment

## Loading and Car Parking Access

The proposal includes the construction of a luxury 5 star accommodation facility with associated retail, restaurants and function space. The currently proposed total number of Hotel Rooms and Serviced Apartments are 207 & 0 respectively for Base Scheme, and 197 & 136 respectively for Option Scheme.

Several access arrangements have been examined during this stage as summarized in Table 1.

**Table 1: Evaluation of Potential Access Arrangements**

| Access Option | Evaluation |
|---|---|
| Entry portal within Farrer Place | - Not recommended due to the constrained area and the negative impacts to the public space |
| Entry portal via Loftus Street impacted | - Not recommended due to the probability of archaeology |
| Entry portal via Bridge Street | - Not recommended due to nature of Bridge Street (heavy use, etc…) |
| Entry portal via Bent Street | - Not recommended due the impacts to precinct's traffic considered to create |
| Vehicular Access off Gresham Street and Loftus Street | - Difficult location for entry/exit movements on corner.<br>- Underpinning of load bearing heritage structure.<br>- Significant constraint on vehicle sizes |

The ideal scenario would be to share access with Governor Philip Tower (GPT) car park and break through into area under Farrer Place, this is because of the following:

- Best outcome to minimise precinct traffic impacts
- Best outcome for public realm

The negotiation of this option would be conducted further during the following stage; however, a two way portal located on Gresham Street is assumed to be the design's back-up option for the current stage.

## Parking Demand

Three parking demand scenarios were examined, including:

- Scenario 1 – This scenario assumes that parking is to be provided in accordance with LEP/DCP and RMS requirements for each land-use independently of other uses.
- Scenario 2 – Whilst the hotel/ serviced apartment parking rate is consistent with Scenario 1, all other uses are fully supporting the hotel function and would not generate a parking requirement. Any external guests would use other means of transport.
- Scenario 3 – Whilst the hotel/ serviced apartment parking rate is consistent with Scenario 1, all other uses are parking supporting the hotel function and would only require 50% of the maximum formal parking rate.

Based on the analysis of the above scenarios, the proposed development would have the ability to sufficiently meet the required demand of the highest parking demand scenario.

Notwithstanding the above, the site is located in very close proximity to good levels of public transport and surrounding public car parking stations. As such there would be potential for the public (non tenant) users of the site to access the development site without generating demand for on site parking or demands which could not be accommodated within off site facilities.

The different scenarios and associated parking demand presented reflect the opportunities for various parking provision strategies for the development, all of which appear feasible from a development prospective.

Given the location of the proposed development and the surrounding transport network it is suggested that Scenario 1 is not an appropriate development strategy. As with most developments/land-uses in the Sydney CBD a certain proportion of guests are likely to use public transport (e.g. train, bus, ferry and Taxi) to access the development, hence councils control refer to maximum provisions.

Contrary to the above, it is unlikely to assume that all external trips (excluding hotel guests) would arrive and depart from the development using public transport. Therefore some parking provisions for external guests should be provided.
Considering the above, Scenario 3 may provide a better indication of the true parking demand for the proposed development.

The preferred scenario will be developed through discussions between the proponent, the approval authorities and transport agencies.

## Bus Network

The transport network surrounding the site is highly complex and subject to significant changes associated with the CBD and South Eastern Light Rail Project and other government and private initiatives. Current investigations with these changes are not yet complete and largely confidential and no opportunities exist for discussions with the related agencies.

Publicly available information indicates that Elizabeth Street and Castlereagh Street will become the new north-south CBD bus spine with the following areas used for bus layovers/stopping:

- Young Street and Phillip Street
- Gresham Street , Bridge Street , Pitt Street and O'Connell Street

With those changes, Bent Street is likely to see a very significant increase in bus operations and both sides of Gresham Street will be utilised as bus areas with volumes on the east side expected to increase in the AM peak significantly.

These planned transport network modifications are incompatible with the proposed development of a luxury hotel; because they represent a significant increase in bus traffic on Gresham and Loftus Streets. Such a high volume of bus traffic immediately surrounding the luxury accommodation would generate a significant negative impact on the ability of the proposed luxury accommodation use to be utilised and viewed as such. Three options were identified and analysed for their potential to relieve the proposed volume of bus traffic on Gresham Street and to allow the proposed pedestrianised public realm on Loftus Street:

- Option 1 – Reroute buses that are utilising Loftus Street & Gresham Street
- Option 2 – Utilise the Circular Quay Public Transport Interchange
- Option 3 – Utilise the off-street parking at the Domain

Table 3 and Table 4 list the strengths and weaknesses of each option in terms of set Key Performance Measures (KPI's) that were identified to evaluate the options. Further investigation into these and other options is required during later stages of development.

**Table 3: Options Comparison – Strengths**

| Evaluation Item | Option 1 | Option 2 | Option 3 |
|---|---|---|---|
| Bus Stops | Due to the rerouting, increased catchment area will be added to the bus routes | Consolidating the major stops with other Public Transport modes | Consolidating the CBD bus terminals |
| Commuter Travel Distance | - | Minimise the distance between changing modes | - |
| General Network Change | Potential additional for bus stops along the new routes, which will relieve other stops | The interchange might be built independently from the Light Rail Project | Improve utilisation of an existing off-street parking structure |
| General | Fastest option to adopt and modify | Consolidate all Public Transport modes in one location | Reducing the dwelling time in the City's stops |

**Table 4: Options Comparison – Weaknesses**

| Item | Option 1 | Option 2 | Option 3 |
|---|---|---|---|
| Bus Stop | Removing 3 stops from the congested bus network | Challenges in terms of designing the terminal | Challenges in terms of designing the terminal |
| Bus Travel Distance | Increased for some routes | Slight increase | Increased for some routes |
| Commuter Travel Distance | Increased for some routes | Slight increase | Increased for some routes |
| General Network Change | Network modification required in terms of bus lane or bus stop, including intersections | - | Altering an existing parking area |
| General | Increased complexity to ongoing investigations | Timelines for the various projects not well aligned | Reducing the overall parking capacity of the CBD |

The preferred option will be developed in conjunction with the related authorities after the release of the future bus plans in the vicinity of the development.

# ESD Assessment

This development is a significant regeneration project. Maintaining the heritage aspects of the Lands and Education buildings is a principal feature that ensures the life-cycle impacts of this development can be significantly reduced by reusing this existing structure. Hotels and service apartment developments are known to be significant uses of energy and water in operation and as such the project team has focused the ESD approach for this development on the operation of the facility and interior fit-out where the biggest environmental influences can be anticipated.

## Raffles and ESD

Fairmont Raffles Hotels have developed their own Sustainability Design and Construction Standards for new Hotels and Refurbishments and they are considered an environmental leader in this area within the hotel industry. Raffles aim to expand on their existing stewardship agreement into the areas of sustainable design and construction and for this project it is proposed that they achieve a LEED v4 New Construction certified rating with US Green Building Council Institute. LEED v4 is an internationally recognised third party certification scheme that encompasses energy, water, resource and materials efficiency in design, construction and operation. By adopting this rating tool in addition to the existing Raffles Hotels Sustainability Design and Construction Standards the project team will optimize energy efficiencies, promote integrated building practices, consider environmental impacts of products and equipment used, reduce resource consumption and ensure materials sections are environmental favourable wherever practical.
As part of the Raffles project delivery method a LEED Accredited Professional to be part of the design and delivery team and Surface Design would propose to complete this role for this project.

The existing Raffles Hotel standards for sustainable design encompasses all areas of a Hotel design that include the hotels suites and rooms, leisure facilities such as pools, spas and other recreational facilities that include function and conference areas. The standards set minimum design, construction and operational metrics that need to be met through building services design, materials selections, construction management and consumption and monitoring objectives to be met in operation. Some of the initiatives that form part of these design standards have been derived from the LEED suite of tools and include:

- Develop and implement storm-water management plans for the site to prevent any additional impacts on the existing infrastructure systems and reduce flows wherever possible and pollutants
- Restore existing habitats where applicable to a site
- Reduce light pollution and undertake design assessment to comply
- Enzyme food products so that landfill waste volumes can be reduced in operation
- Adopt renewable materials
- Utilise reflective roof surfaces to reduce heat island effects
- Water efficient fixtures and use of recycling water systems such as rainwater collection and reuse
- Test and commission all building services to appropriate standards and employ independent consultants to review the design and commissioning process

As part of their environmental agenda Raffles plans to fully adopt the Green Partnership Programme and Eco Meet concepts across all its properties. The Green Partnership Programme focuses on improvements in waste management, energy and water conservation, as well as community outreach through local groups and partnerships.

Environmental benefits are realised through reduced utilities consumption and best practices. The programme emphasises on sustainability and encompasses everything from recycling and organic waste diversion in the hotel's kitchens to retrofitting energy efficient lighting. An audit report records the environmental initiatives of each hotel. It also allows for the tracking of the hotel's progress and ensures that hotels are carrying out the Green Partnership mandate.

The **key sustainability goals** that have been proposed include:

- LEED Accredited Professional is to be engaged throughout the design process. This will ensure the Raffles sustainability objectives can be delivered which are derived from the Leadership in Energy and Environmental Design (LEED) international rating tool
- Achieve LEED v4 New Construction Certified rating with US Green Building Council Institute
- Energy and water efficiency is to be benchmarked against the Australian NABERS Hotel ratings scheme
- 20% improvement in potable water consumption compared to average NABERS Hotel Water rating
- Use Interiors materials that meet LEED Materials standards for emissions
- Appropriate management of storm-water which includes no increase to storm-water flows from the site above existing levels and treatment of minimum 90% of all storm-water to Best Management Practices (BMPs)
- Appropriate materials selections to ensure indoor air quality
- Establish Product Stewardship contracts with suppliers of materials, furniture and equipment to reduce operational wastes
- Provide building monitoring systems that will enable the operators to report and set ongoing environmental goals for operation of the hotel
- Recycle and recover at least 90% of all construction and demolition wastes and implement environmental and IAQ construction management plans for all site works

# Surface Design

**To meet the above goals the above the following initiatives are proposed:**

## Energy

The project proposes to benchmark its energy consumption against the NABERS Hotel Energy rating tool. The target would be to achieve a minimum 3.5 star NABERS Energy Rating in operation and this would be achieved through efficient mechanical systems, LED lighting, energy star rated equipment and other energy efficiency initiatives.

## Water

The project proposes to benchmark its water consumption against the NABERS Hotel Water rating tool and LEED Water credit standards. Initiatives under consideration include efficient water fixtures to a minimum 5 star WELS rating for tap-ware, 3 star WELS ratings showers and other LEED standards for process water usage, collection of and reuse of rainwater on the site, appropriate water efficient laundry management services.

## Materials

The indoor environment of the hotel spaces is considered an important aspect for ensuring public health. It is proposed that all adhesives, sealants, paints, carpets and flooring are low VOC. All composite wood products are to contain no urea formaldehyde content or less than 0.5mg/L. The use of PVC items shall be minimised or any PVC items must be manufactured to Best Practice Guidelines. The extent of Heat Island Effects shall be reduced where possible for any new roofing materials and implement roof top gardens.

## Operational Management

Raffles recognise the importance of ensuring that they can reduce operational impacts of their hotels in terms of resource consumption. As part of their design standards water filtration systems are encouraged to reduce wastes generated to landfill along with composting of food wastes wherever possible. The commissioning and building tuning of services during different seasons are key to ensuring the energy efficiency of the hotel operation and Raffles encourages the investigation of alternative energy sources in operation that include the design of recovery or regenerative systems for mechanical, hot water and lift services to reduce operational energy consumption.

0010185433, Chengdu,

**Raffles City Chengdu** — **GOLD**,

**LEED BD+C: Core and Shell (v2.0)** — **AWARDED FEB 2014**

| SUSTAINABLE SITES | | AWARDED: 10 / 15 |
|---|---|---|
| SSc1 | Site selection | 1 / 1 |
| SSc2 | Development density and community connectivity | 1 / 1 |
| SSc3 | Brownfield redevelopment | 0 / 1 |
| SSc4.1 | Alternative transportation - public transportation access | 1 / 1 |
| SSc4.2 | Alternative transportation - bicycle storage and changing rooms | 1 / 1 |
| SSc4.3 | Alternative transportation - low emitting and fuel efficient vehicles | 1 / 1 |
| SSc4.4 | Alternative transportation - parking capacity | 1 / 1 |
| SSc5.1 | Site development - protect or restore habitat | 0 / 1 |
| SSc5.2 | Site development - maximize open space | 1 / 1 |
| SSc6.1 | Stormwater design - quantity control | 0 / 1 |
| SSc6.2 | Stormwater design - quality control | 0 / 1 |
| SSc7.1 | Heat island effect - non-roof | 1 / 1 |
| SSc7.2 | Heat island effect - roof | 1 / 1 |
| SSc8 | Light pollution reduction | 0 / 1 |
| SSc9 | Tenant design and construction guidelines | 1 / 1 |

| WATER EFFICIENCY | | AWARDED: 4 / 5 |
|---|---|---|
| WEc1.1 | Water efficient landscaping - reduce by 50% | 1 / 1 |
| WEc1.2 | Water efficient landscaping - no potable water use or no irrigation | 1 / 1 |
| WEc2 | Innovative wastewater technologies | 0 / 1 |
| WEc3.1 | Water use reduction - 20% reduction | 1 / 1 |
| WEc3.2 | Water use reduction - 30% reduction | 1 / 1 |

| ENERGY & ATMOSPHERE | | AWARDED: 7 / 14 |
|---|---|---|
| EAc1 | Optimize energy performance | 3 / 8 |
| EAc2 | On-site renewable energy | 0 / 1 |
| EAc3 | Enhanced commissioning | 1 / 1 |
| EAc4 | Enhanced refrigerant Mgmt | 1 / 1 |
| EAc5.1 | Measurement and verification - base building | 2 / 1 |
| EAc5.2 | Measurement and verification - tenant submetering | 0 / 1 |
| EAc6 | Green power | 0 / 1 |

| MATERIAL & RESOURCES | | AWARDED: 5 / 11 |
|---|---|---|
| MRc1.1 | Building reuse - maintain 25% of existing walls, floors and roof | 0 / 1 |
| MRc1.2 | Building reuse - maintain 50% of existing walls, floors and roof | 0 / 1 |
| MRc1.3 | Building reuse - maintain 75% of existing walls, floors and roof | 0 / 1 |

| MATERIAL & RESOURCES | | CONTINUED |
|---|---|---|
| MRc2.1 | Construction waste Mgmt - divert 50% from disposal | 1 / 1 |
| MRc2.2 | Construction waste Mgmt - divert 75% from disposal | 1 / 1 |
| MRc3 | Materials reuse - 1% | 0 / 1 |
| MRc4.1 | Recycled content - 10% (post-consumer + 1/2 pre-consumer) | 1 / 1 |
| MRc4.2 | Recycled content - 20% (post-consumer + 1/2 pre-consumer) | 0 / 1 |
| MRc5.1 | Regional materials - 10% extracted, processed and manufactured regionally | 1 / 1 |
| MRc5.2 | Regional materials - 20% extracted, processed and manufactured regionally | 1 / 1 |
| MRc6 | Certified wood | 0 / 1 |

| INDOOR ENVIRONMENTAL QUALITY | | AWARDED: 6 / 12 |
|---|---|---|
| EQc1 | Outdoor air delivery monitoring | 1 / 1 |
| EQc2 | Increased ventilation | 1 / 1 |
| EQc3 | Construction IAQ Mgmt plan - during construction | 1 / 1 |
| EQc4.1 | Low-emitting materials - adhesives and sealants | 1 / 1 |
| EQc4.2 | Low-emitting materials - paints and coatings | 0 / 1 |
| EQc4.3 | Low-emitting materials - carpet systems | 0 / 1 |
| EQc4.4 | Low-emitting materials - composite wood and agrifiber products | 0 / 1 |
| EQc5 | Indoor chemical and pollutant source control | 0 / 1 |
| EQc6 | Controllability of systems - thermal comfort | 1 / 1 |
| EQc7 | Thermal comfort - design | 1 / 1 |
| EQc8.1 | Daylight and views - daylight 75% of spaces | 0 / 1 |
| EQc8.2 | Daylight and views - views for 90% of spaces | 0 / 1 |

| INNOVATION | | AWARDED: 4 / 5 |
|---|---|---|
| IDc1 | Innovation in design | 3 / 4 |
| IDc2 | LEED Accredited Professional | 1 / 1 |

| TOTAL | 36 / 62 |
|---|---|

# Heritage Facade Assessment

## Heritage Façade Condition and Development

### Reuse and regeneration

Expectations of a buildings performance has changed significantly since the Lands and Education Building were first constructed. Today, buildings are expected to meet stringent thermal and acoustic performance requirements, promote health and well being of its users, be durable, and meet a minimum load standard as well as keeping the weather outside.

Raising the standard of the façades of these building to modern performance criteria often requires significant intervention and investment that is normal beyond the standard annual maintenance allocation.
By incorporating their works in total upgrade not only provides the opportunity to reinstate the façades to their original grandeur but upgrade their performance to meet modern expectations and extent their life expectancy preserving the buildings historical value for future generations.

The Retention of the façade meets a primary Sustainability mandate of avoiding waste and materials consumption and also educating society of the value of preservation and that progress can go hand in hand.

### Façade Impact on Building Energy Performance

The existing façade to both the Lands and Education buildings do not comply with current National Code of Construction for energy efficiency requirements as the glazing is without performance, is in various states of repair and has high air leakage air rates compared to modern buildings. This along with the uninsulated mass sandstone construction leaves the building to freely exchange heat with the external environment. The condition of the glazing has been identified in the window condition survey of the Education Building (2012) and the Lands building (2007) both recommend repairs to the windows particular the timber windows of the Lands Building but do not address the thermal performance requirements of the windows.

It is expected that for all internal environments to benefit, both thermally and acoustically, the glazing is repaired as noted in the reports and that secondary glazing is added to the inner surface of the window reveal.

The use of an internal secondary glazed element preserves the appearance of the building while meeting current code requirement and permitting a variety of uses within. The opportunity to increase and better the performance of the overall glazing may include the addition of a performance double glazed unit for inclusion in the secondary glazed element. This will be developed to suit the project requirements while avoiding risks to the façade such as thermal shock of the existing glass.

The compliance of the glazing with the NCC / BCA is conditional on the solid elements meeting the thermal insulation requirements as stipulated in the BCA, Heritage factors may impact on this being achieved and special dispensation from the certifiers is required, alternative methods of compliance may also be pursued through Section J JV3 assessment during the design development. This will impact on all perimeter walls interacting with the external environment.

### Durability and Integrity

The mass nature of sandstone as a material provides a longevity to the building fabric not easily achieved with modern building materials. The nature of mass sandstone has the benefit of material reuse through repair rather full replacement. The condition of the sandstone has been documented in 2007 for the Lands Department Building which has identified required repairs and set a clear strategy for undertaking these repairs. Some of the works were identified as urgent but it is not clear what works were completed. From our viewing of the building some of the identified repairs have clearly not been completed and some areas of degradation appear to have worsened or have defects not recorded in the 2007 report.

Neither building appears to have been cleaned recently, the last note repairs and cleaning is noted as 1978 to 1980, the ledges and parapets are stained with biological matter. The cleaning of the sandstone will form part of the redevelopment and restoration works along with the repairs to the buildings after both buildings are assessed.

The condition of the windows varies between the buildings and the reports identify areas of degradation and repairs required to bring the windows up to standard. The 2007 report shows the windows in the Lands Building to be of varying levels of required repairs and given that 8 years have passed some of these may need to be replaced. The 2012 report of the Education shows primary steel framed windows of reasonable state of repair and lists out required repairs. Both of these reports will need to be consolidated and extent of the repairs ratified.

The Lands Department Building has a number of roof types and materials used. These range from ornate “onion” dome to the clock tower, large domes and flat and sloped sheeted roofing to various support structures, these all appear to be roofed in copper sheeting.

Both building have a number of flat roof or balcony areas that are membraned. The condition of these membrane is not commented on in condition reports and will need to be confirmed.

### Initiating works – Consolidated Condition Survey

The condition surveys provide for each building have been undertake at different times for different elements of the façades. Given the current state of the buildings and the time span since last recorded repairs we believe that full condition surveys for both buildings will need to be undertaken to develop a complete scope of repairs and upgrade of the stone, windows, flashing, membrane and roofing materials and their supports

This survey should be undertaken with a view of the proposed design to optimise the outcome of the recommendations.

### Health and Safety

It is typical for buildings of this age to have asbestos in the pointing typical from repairs and possible to have asbestos in the window putty. The Lands Department Building report has had 21 samples tested for asbestos all samples were returned negative however it is not clear if the window were also tested or only the repair mortar from sandstone. The window report for the Education Building did not test for asbestos and this should be included in the refurbishment assessment works for the project.

# Surface Design

# Hotel Market Assessment

# HOTEL CONSULTANCY SERVICES
## SANDSTONE PRECINCT
## BRIDGE STREET, SYDNEY
## REPORT FOR
## CENTURION GROUP
## JULY 2015

CBRE

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CBRE

**Hotel Consultancy Services Report**
**Sandstone Precinct, Bridge Street Sydney**
**July 2015**

# EXECUTIVE SUMMARY

**Property:** Sandstone Precinct

Bridge Street

Sydney, NSW Australia

**Prepared for:** Centurion Group of Companies

**Prepared by:** Ken Smith, Regional Director CBRE Hotels

**Instructions:** Centurion is in the tendering stage of acquisition of a leasehold interest in the Sandstone Precinct, a historically significant redevelopment of the Lands and Education buildings in Bridge Street Sydney. This exercise focuses specifically on providing Centurion with a Notional Economic Assessment of the hotel component of the opportunity.

CBRE has drawn on published data and extensive industry knowledge of the hospitality sector to achieve the outcomes expressed in this report.

**Critical Assumptions:** The assessment is based on plans provided on 26 June 2015 prepared by appointed architects to the project, Grimshaw Architects. A copy of these plans and room schedule (Revision 9) are appended to this report.

It is also based on an offering of the property through a leasehold interest as offered/proposed to be agreed with the NSW Government.

The hotel will be managed by an experienced internationally recognised professional hotel operator.

**Facility Profile:** The property will be developed to a "luxury" standard befitting the heritage aspects of the two buildings. The hotel is proposed to have three room components, a luxury heritage element that will be pitched to the market currently satisfied in Sydney by the Park Hyatt; an element that will stand at the top of the current 5 star market in the size of the rooms proposed and a serviced apartment element in the lower levels of a tower that will rise over the Education building.

The facilities will include the following:

Rooms — Total room count of 301 that will comprise:

- Heritage luxury suites (51) within the completely restored Lands Building ranging in size from 32 square metres to 167 square metres, average size 77.33 square metres.
- Luxury rooms and suites (113) within the partially restored Education Building ranging in size from 37 square metres to 168 square metres, average

| | | |
|---|---|---|
| | | size 49.01 square metres.<br>■ A serviced apartment component on levels 9 to 18 of the Education Tower with a total of 140 keys with an average size of approximately 45 square metres.<br>The rooms will be appointed with contemporary amenities and facilities. |
| | Conference/ Function Facilities | Ballroom, conference room, meeting rooms and a variety of function rooms. |
| | Hotel F&B | Restaurant/Bar/Lounge to the ground floor lobby in Education |
| | External F&B | Five to six restaurants/cafes. |
| | Leisure & Recreation Services | Provided in the residential tower servicing both the hotel guests and residents. |
| | Car Parking | Limited spaces accessed via car lift |
| | Retail Spaces | Five to seven spaces to the ground floor of the Lands Building. |
| Notional assessment On Completion in 2022 | $495,000,000. | |

**Hotel Consultancy Services Report**
**Sandstone Precinct, Bridge Street Sydney**
**July 2015**

**SANDSTONE PRECINCT**

| MARKET ANALYSIS SUMMARY | | | | | | | Analysis Date 8-Jul-15 |
|---|---|---|---|---|---|---|---|
| **Year Ending December** | | | **2021** | **2022** | **2023** | **2024** | **2025** |
| Figures Expressed in (A$) | | | | | FORECAST | | |
| **Forecast Assumptions** | | CAGR | | | | | |
| | CPI | 2.4% | 2.4% | 2.6% | 2.4% | 2.4% | 2.4% |
| | Nominal Wage Growth | 2.9% | 3.0% | 2.9% | 2.9% | 2.7% | 2.7% |
| **Hotel** | No. of Rooms | | 301 | 301 | 301 | 301 | 301 |
| | Occupancy Rate | | 69.3% | 73.6% | 75.0% | 74.8% | 75.0% |
| | Average Daily Rate (ADR) | 3.0% | 729 | 751 | 773 | 796 | 820 |
| | RevPAR | 5.1% | 505 | 552 | 580 | 596 | 615 |
| | Base Management Fee | | 1.0% | 1.0% | 1.0% | 1.0% | 1.0% |
| | Incentive Management Fee | | | | Performance Based | | |
| | FF&E Reserve | | 1.0% | 2.0% | 3.0% | 4.0% | 4.0% |
| **Hotel Operation** | | | | | Figures Expressed in (A$'000) | | |
| Total Revenue | | 4.9% | 75,015 | 81,983 | 85,956 | 88,406 | 90,924 |
| Total Departmental Expenses | | 3.9% | -32,080 | -34,302 | -35,632 | -36,551 | -37,427 |
| Total Departmental Income | | 5.7% | 42,935 | 47,681 | 50,324 | 51,855 | 53,497 |
| Undistributed Operating Expenses | | 3.0% | -15,425 | -16,031 | -16,512 | -16,970 | -17,363 |
| Gross Operating Profit | | 7.1% | 27,510 | 31,650 | 33,811 | 34,885 | 36,134 |
| Base Management Fee | | | -750 | -820 | -860 | -884 | -909 |
| Incentive Management Fee | | | -1,873 | -2,158 | -2,307 | -2,380 | -2,466 |
| Fixed Charges | | 2.5% | -1,572 | -1,612 | -1,651 | -1,696 | -1,732 |
| Replacement Reserves (FF&E) | | | -750 | -1,640 | -2,579 | -3,536 | -3,637 |
| Net Operating Profit (EBITDA) | | 5.0% | 22,564 | 25,421 | 26,415 | 26,389 | 27,390 |
| Retail Income | | | 2,941 | 3,016 | 3,089 | 3,163 | 3,240 |
| Net Operating Income (EBITDA) | | | 25,505 | 28,436 | 29,504 | 29,552 | 30,630 |
| **Capital Expenditure** | | | | | | | |
| Hotel | | | 0 | 0 | 0 | 0 | 0 |
| Retail | | | 0 | 0 | 0 | 0 | 0 |
| **Net Cash Flow** | | 4.7% | **25,505** | **28,436** | **29,504** | **29,552** | **30,630** |
| % Net Profit EBITDA of Total Revenue | | | 30.1% | 31.0% | 30.7% | 29.8% | 30.1% |
| **Running Yield** (EBITDA) | | | | | | | |
| *After FF & E & Management* | | | 5.2% | 5.7% | 6.0% | 6.0% | 6.2% |

| MARKET ANALYSIS APPROACHES | | | *Result* |
|---|---|---|---|
| Capitalisation of Inflation Adjusted Stabilised Year | | **5.50%** | 498,000,000 |
| Discounted Cash Flow 5Yr | Discount Rate | **7.50%** | 493,000,000 |
| | Terminal Yield | **5.50%** | |

| *Adopted Market Analysis Parameters* | |
|---|---|
| Initial Yield | 5.15% |
| Stabilised Yield | 5.54% |
| Price per Room (A$) | 1,644,518 |
| 5 Yr DCF IRR | 7.40% |
| Terminal Yield | 5.50% |

**ADOPTED MARKET ANALYSIS**
**A$ 495,000,000**
**Four Hundred Ninety Five Million Dollars**

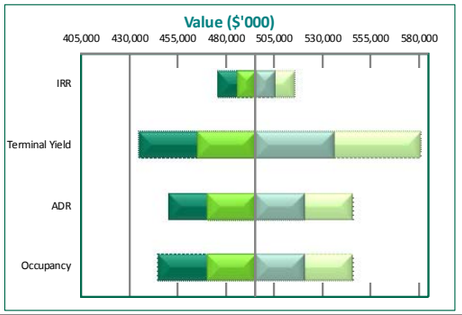
**Sensitivity Analysis** Figures Expressed in (A$'000)

**Five Year DCF Sensitivity by IRR and Terminal Yield**

| Terminal Yield | 1.00% | | Internal Rate of Return | | 1.00% |
|---|---|---|---|---|---|
| | 8.40% | 7.90% | 7.40% | 6.90% | 6.40% |
| 6.50% | 420,000 | 430,000 | 435,000 | 445,000 | 455,000 |
| 6.00% | 445,000 | 455,000 | 465,000 | 475,000 | 485,000 |
| 5.50% | 475,000 | 485,000 | **495,000** | 505,000 | 515,000 |
| 5.00% | 510,000 | 520,000 | 535,000 | 545,000 | 555,000 |
| 4.50% | 555,000 | 570,000 | 580,000 | 590,000 | 605,000 |

**Market Analysis Sensitivity by Trading Variance**

| ADR | 5.00% | | | Occupancy | 5.00% |
|---|---|---|---|---|---|
| 495,000 | -5.00% | -2.50% | 0.00% | 2.50% | 5.00% |
| -5.00% | 405,000 | 425,000 | 450,000 | 470,000 | 495,000 |
| -2.50% | 425,000 | 450,000 | 470,000 | 495,000 | 520,000 |
| 0.00% | 445,000 | 470,000 | **495,000** | 520,000 | 545,000 |
| 2.50% | 470,000 | 495,000 | 520,000 | 545,000 | 570,000 |
| 5.00% | 490,000 | 520,000 | 545,000 | 570,000 | 595,000 |




***This analysis is purely for the purposes of a guide and sets out one permutation in support of our market analysis.***

*Note: Our observations above and the body of this report provide our opinion of the properties as at the date of the report. This opinion has been based on many factors including our research data and knowledge of the property market and reflects the nature and standard of the properties, inherent characteristics and current market conditions. Whilst it is impossible to predict with any degree of accuracy future trends, we have endeavoured to provide the likely short to medium term performance prospects for the properties on the basic assumption that future market and economic conditions do not vary from those that existed at the date of the report. Due to the periodic volatility of the market brought about by various factors including changing economic and market conditions, caution must be exercised when referring to envisaged future trends, as these cannot be guaranteed.*

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**Assumptions, Disclaimers, Limitations and Qualifications Summary:**

This report is provided subject to the assumptions, disclaimers, limitations and qualifications detailed throughout this report. No reliance should be placed on this advice and no responsibility is accepted for any investment decision made that is based on this report. This advice is for the use only of the party to whom it is addressed and for no other purpose. No responsibility is accepted to any third party who may use or rely on the whole or any part of the content of this report.

**Definitions and Terminology:**

**Uniform System of Accounts:** The Uniform System of Accounts for the Lodging Industry (USALI) establishes standardised formats and account classifications to guide individuals in the preparation and presentation of financial statements. It is the internationally accepted format for the lodging industry. The latest version is the Eleventh Revised Edition.

**Room Nights Available (RNA):** This is the total number of guestrooms (keys) in a property which are available for rent multiplied by the number of nights in a period.

**Room Nights Occupied (RNO):** Room Nights Occupied excluding complimentary guests in a period. Total Rooms Occupied includes Complimentary Guests and is more generally used.

**Average Daily Rate (ADR):** The average charge paid by hotel guests on a per room per night basis. It is expressed net of GST and other direct taxes and is calculated by dividing the total rooms revenue by the rooms occupied over a given period.

**Occupancy Percentage:** This is the ratio of rooms occupied (including complimentary guests) to rooms available over a given period. The total occupancy percentage includes complimentary guests.

**Rooms Revenue Per Available Room (RevPAR):** This measures the room's revenue yield a property receives relative to the rooms available and is calculated by dividing the total room's revenue by the rooms available for a given period.

**Total Revenue:** The total revenue for the hotel expressed net of GST and other direct taxes. This is usually separated into revenue from rooms, food and beverage, other operated departments and rents and other income.

# 1 INTRODUCTION

## 1.1 Instructions

We refer to a request by the Centurion Group to provide advice on the notional economic assessment of the hotel component of the Sandstone project as referenced in plans provided on 26 June 2015.

CBRE has drawn on extensive industry knowledge of the hospitality sector from within the company, published tourism and hotel performance data and CBRE developed investment data.

We have not canvassed direct market feedback through direct market interviews with existing accommodation providers or investors to meet the objectives of this assignment.

## 1.2 Critical Assumptions

- The hotel will be branded, professionally marketed and managed by a nationally or internationally recognised hotel operating company.
- The hotel may operate under a management agreement on terms and conditions typical in the current market and include fees based on 1.0% of Gross Revenue and 7.0% Net Operating Profit. FF&E allowances of 1.0% in year one, 2.0% in year two, 3.0% in year three and 4% in year 4 and each subsequent year. It is acknowledged that management fees are a negotiable item.
- Any management agreement entered into would allow the hotel to be sold with vacant possession without compensation payable to any incumbent manager.
- No major political or economic disturbance or major 'shock' event will occur during the projection period.
- That there will be no change to the plans that would impact its operation, earning potential and assessment through the development of detailed operational drawings.
- Development will be permitted in accordance with the concept proposed.

## 1.3 Liability & Confidentiality

CBRRE accepts no responsibility for the use of the advice contained in this report.

No responsibility is accepted or assumed to any third party, nor should there be any reliance upon this report by any third party, without our express written agreement. Neither the whole of the report, nor any part of it, may be published in any document, statement, circular or otherwise by any party other than CBRE, nor in any communication with any third parties, without the prior written approval of CBRE of the form and context in which it appears.

# 2 TOURISM AND REGIONAL MARKET OVERVIEW

## 2.1 General Economic and Tourism Overview

The Australian hotel market continues to perform strongly with occupancies maintaining an upward trend, particularly over the last twelve months.

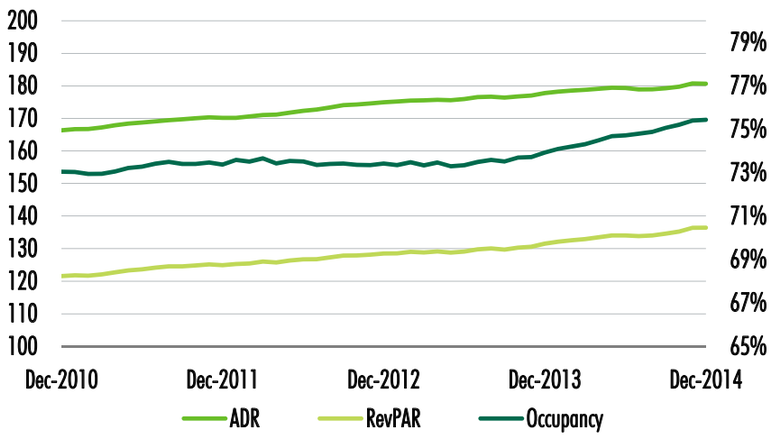
Underpinning this position of strength, that has attracted unprecedented levels of investment into property and hotel market, has been Australia's economic growth that has averaged almost 3% per annum for the last seven years.

As the Australian economy transitions from mining investment to export production and the Australian dollars falls to levels that support the balance of trade position and tourist visitations, market fundamentals are positioned to support solid longer term performance well into the future.

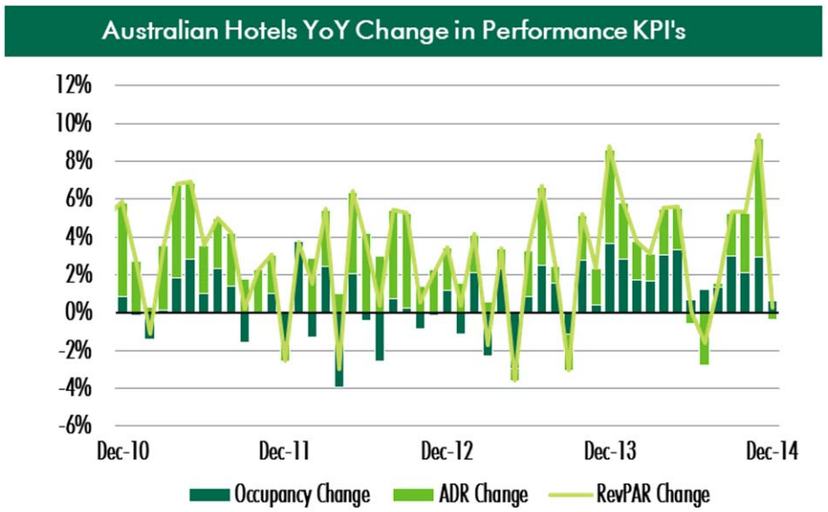
The Australian market has shown (refer Charts 1 & 2):

- Positive occupancy growth (month on month over the previous year) for the last 12 months.
- Positive ADR growth (month on month over the previous year) for 8 of the last 12 months.
- RevPAR has increased 12% since December 2010.

Australian Hotels Rolling 12 Month Performance KPI's




Source: STR Global, CBRE Hotels 2015




Source:STR Global, CBRE Hotels 2015

The Australian market is not homogeneous and is a combination of different markets that, because of their particular local economic and political circumstance, sometimes perform in quite different directions.

The focus for future investment will no doubt follow the gateway "high barrier to entry" market of Sydney and the broad based demand/"event driven" market of Melbourne for capital following the larger stable markets from a risk/return perspective. Brisbane and Perth offer diversification benefits for astute investors and are poised to benefit from Government infrastructure support, however future supply should be monitored.

### National Visitors & Visitor Nights

National visitor nights for domestic visitors has had minimal uplift recently, as increased competition from overseas leisure destinations was offset by cheaper airfares both domestically and internationally. There has been a noticed shortening in the average length of stay and in leisure tourism.

International visitation has fared well over recent years, with downturns in historically strong European and Western markets (due to the Global Financial Crisis, GFC) being replaced by the growing middle class Asian traveller, however, a strong Australian Dollar has had dampening effect on the stronger growth profile up until late 2013. More recently, improving international economies and a softer Australian Dollar, has seen international travel increase substantially.

### International Market

The following highlights international tourism to Australia reported for the Year Ending (YE) December 2014 by TRA:

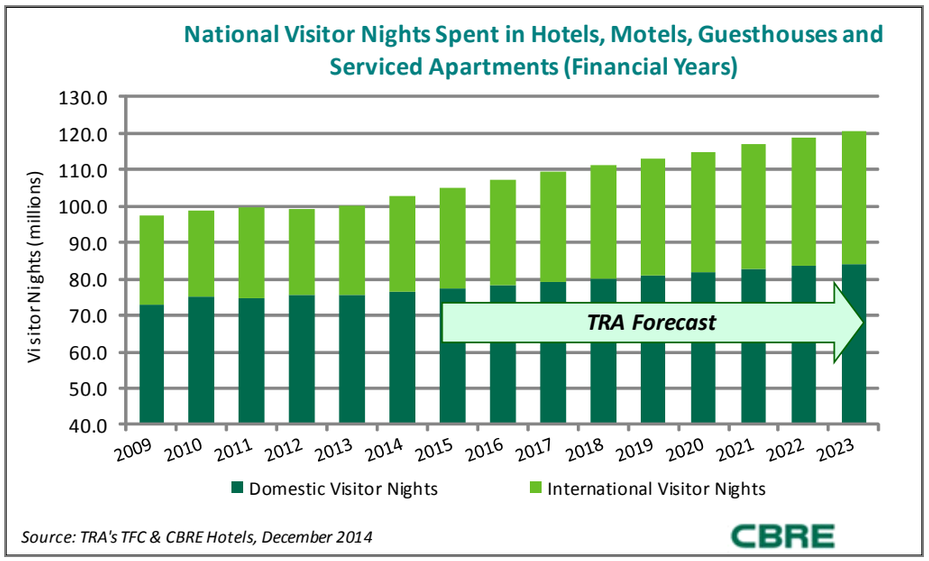
- There were 6.36 million international visitors to Australia aged 15 years or over who stayed a total of 223 million nights. This was an increase of +7.7% in visitors and an increase of +2.7% in visitor nights compared to the previous year. This equates to an average of 35 nights per visitor;
- International visitors spent an average $3,231 per person, excluding prepaid international airfare and transportation. The average nightly expenditure was $92.

### Domestic Market

The following information discusses the domestic tourism market in Australia for the year to Year Ending (YE) December 2014:

- Residents aged 15 and over took 81.44 million overnight trips, an increase of +7.4% on the previous year, and spent 309 million nights away from home in Australia, an increase of +9.3% on the previous year, signalling the continued improvement in domestic travel numbers following the GFC (see following graph);
- Expenditure by all overnight domestic visitors amounted to $54.43 million, excluding motor vehicle hiring expenditure. This is +5.7% above the previous year.

The following graph shows TRA's Tourism Forecast Committee's (TFC) analysis of national visitor nights in commercial accommodation across Australia. This shows a similar outcome for domestic visitors' use of commercial accommodation which recorded an increase of +1.0% for Financial Year (FY) 2014; this is forecast to continue at modest annual increases at around +1.2% per annum to FY 2019. According to TFC, international visitors' use of commercial accommodation increased by approximately +8.2% in FY 2014, improving from a growth rate of +4.1% in FY 2013. The difference in historical and projected growth between the two markets is shown in the graph below.



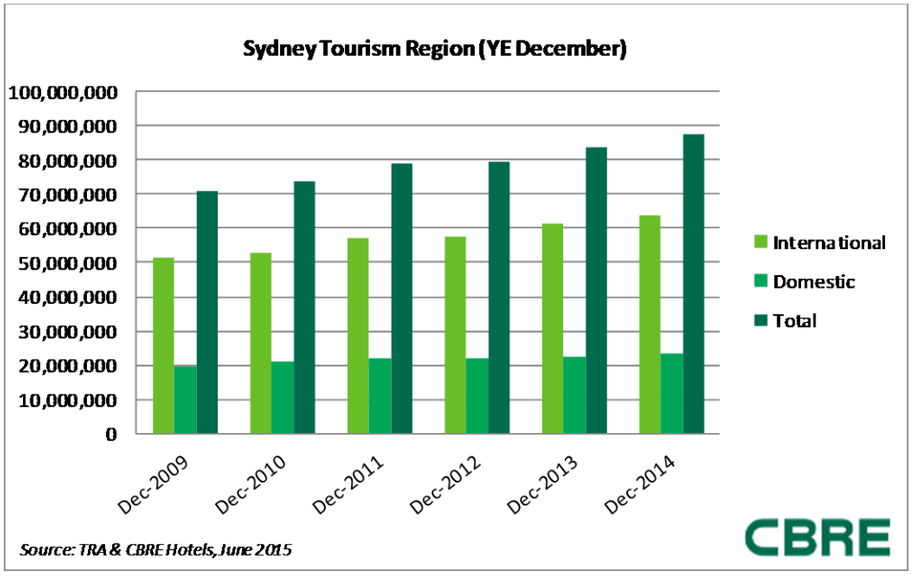
## 2.2 Sydney Tourism Region

Sydney is the most prestigious city in Australia, attracting visitors from all over the world who come to experience the unique blend of Australian culture that comes from the city's multiculturalism, beach culture and thriving, sophisticated metropolis. Long considered the business capital of Australia, Sydney's geographic proximity to Asia has also earned it the reputation as the "Gateway to Asia", especially as Sydney is Australia's biggest carrier, Qantas' most significant domestic and international operations hub. Some general key facts include:

- Tourism contributes over AUD 20 Billion annually to the Sydney economy.
- Sydney is the capital of New South Wales and has a population over 4.5 million.
- The largest proportion of Asia Pacific regional headquarters in Australia and 48% of the top 500 companies by revenue in Australia are based in Sydney.
- The city is one of the world's premier tourist destinations for attractions which include the Sydney Opera House, Harbour Bridge, world famous beaches and the Blue Mountains.

Sydney boasts an array of international sporting, cultural and entertainment venues which complement the major events held in this city including:

- New Year's Eve fireworks display
- Royal Easter Show
- Sydney to Hobart Yacht Race
- Sydney Film Festival
- Australian International Motor Show
- Australia Day festivities
- Gay & Lesbian Mardi Gras
- Cultural events such as concerts & festivals
- Darling Harbour Fiesta
- Sydney International Food Festival
- World sporting events at the Sydney Olympic Stadium (ANZ Stadium)

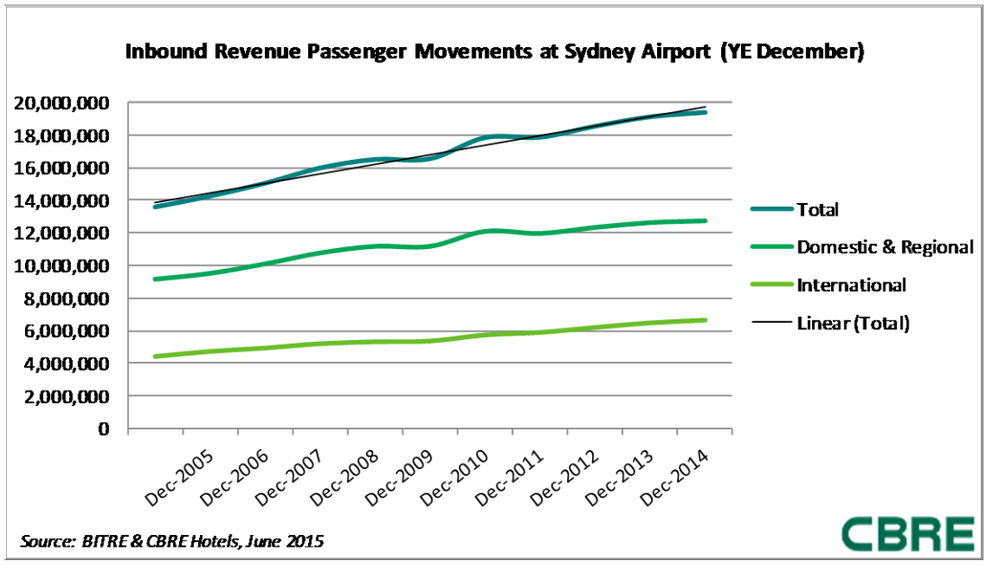


### Airport Passenger Movements

Since recovering from a drop in traffic as a consequence of the external shocks between 2001, post-Olympics blues and the GFC, both international and domestic traffic has continued to increase at significant levels.

Sydney remains the most important international gateway city to Australia from Asia, Europe and the U.S and has benefited as much as any of the major cities with the proliferation of low cost airlines in Australia. However, increasing use of cities such as Darwin, Perth, Adelaide and Gold Coast as international gateway cities by predominantly Asian and Middle Eastern carriers will gradually take a greater chunk of the transit business from Sydney airport.

Year end June 2014 saw demand return, with record revenue passenger movements and some 3% growth reflecting the improvements in economic conditions.




### Visitation and Segmentation

The below data was sourced from TRA for the Year Ending (YE) December 2014:

- The top three source markets:
    - 13.6% of visitor nights were sourced from China;
    - 11.3% of visitor nights were sourced from New South Wales;
    - 7.1% of visitor nights were sourced from United Kingdom;
- In total, Sydney received some 87,275,173 total visitor nights in the Year Ending (YE) December 2014, which is an increase of 4.1% from the Year Ending (YE) December 2013;

The average length of stay was 2.7 nights for domestic visitors, while international visitors stayed an average of 21.2 nights in the Year Ending (YE) December 2014.

## Source Markets

To the Year Ending (YE) December 2014, international visitor arrivals to Sydney were recorded at 3,006.9 thousand, an increase of 6.7% from the previous year, and equating to 26.1% of all visitation to the region (and 73.2% of visitor nights to the region).

The annual increases or decreases for selected key international markets for Year Ending (YE) December 2014 compared to the Year Ending (YE) December 2013 are listed in the following table:

| Largest International Source Markets | Rank: | | Number of: | | Share of Total: | | Length of Stay | Value Change on Previous Year: | | Value Change Rank: | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Visitor Nights | Visitors | Visitor Nights | Visitors | Visitor Nights | Visitors | | Visitor Nights | Visitors | Visitor Nights | Visitors |
| China | 1 | 1 | 11,843,910 | 465,859 | 18.5% | 15.5% | 25.4 | 1,059,672 | 71,488 | 20 | 20 |
| United Kingdom | 2 | 4 | 6,213,933 | 302,803 | 9.7% | 10.1% | 20.5 | 183,294 | - 4,394 | 13 | 2 |
| Korea | 3 | 5 | 4,079,745 | 142,783 | 6.4% | 4.7% | 28.6 | - 344,636 | - 3,723 | 3 | 3 |
| United States of America | 4 | 3 | 3,288,465 | 309,702 | 5.1% | 10.3% | 10.6 | - 161,136 | 28,683 | 4 | 19 |
| New Zealand | 5 | 2 | 3,234,804 | 341,157 | 5.1% | 11.3% | 9.5 | 259,050 | 8,047 | 16 | 14 |
| India | 6 | 10 | 2,920,303 | 89,324 | 4.6% | 3.0% | 32.7 | - 428,194 | 12,413 | 2 | 17 |
| Japan | 7 | 6 | 2,906,166 | 135,978 | 4.6% | 4.5% | 21.4 | - 660,150 | - 5,322 | 1 | 1 |
| Hong Kong | 8 | 9 | 2,083,411 | 95,859 | 3.3% | 3.2% | 21.7 | 518,873 | 8,167 | 19 | 15 |
| All Other | | | 27,287,772 | 1,123,458 | 42.7% | 37.4% | 24.3 | 1,881,838 | 73,897 | | |
| **Total** | | | **63,858,509** | **3,006,922** | | | **21.2** | 2,308,612 | 189,255 | | |

*Source: TRA & CBRE Hotels, June 2015*

From the table above, it is evident that most international visitors to Sydney are from the China, United Kingdom and Korea having ranked as the top three source markets (in terms of number of visitors). Nevertheless, it is interesting to note that compared to last year, visitors from Japan have decreased the most relative to all other source markets. In terms of visitor nights, the Japan source market's decline was also most significant; -660,150 visitor nights compared to Year Ending (YE) December 2013.

To the Year Ending (YE) December 2014, domestic visitor arrivals to Sydney were recorded at 8,527.0 thousand, equivalent to a 2.3% increase on the same period last year, and equating to 73.9% of all visitation to the region.

The annual increases or decreases for all domestic source markets (per state) for the Year Ending (YE) December 2014 compared to the Year Ending (YE) December 2013 are listed in the following table:

| Largest Domestic Source Markets | Rank: | | Number of: | | Share of Total: | | Length of Stay | Value Change on Previous Year: | | Value Change Rank: | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Visitor Nights | Visitors | Visitor Nights | Visitors | Visitor Nights | Visitors | | Visitor Nights | Visitors | Visitor Nights | Visitors |
| New South Wales | 1 | 1 | 9,892,682 | 4,394,505 | 42.2% | 51.5% | 2.3 | - 79,466 | 140,379 | 4 | 7 |
| Queensland | 2 | 3 | 4,552,470 | 1,234,172 | 19.4% | 14.5% | 3.7 | 400,295 | 101,452 | 6 | 6 |
| Victoria | 3 | 2 | 4,204,811 | 1,512,729 | 18.0% | 17.7% | 2.8 | 681,644 | 40,390 | 7 | 5 |
| Western Australia | 4 | 5 | 1,863,052 | 418,271 | 8.0% | 4.9% | 4.5 | 712,041 | 157,630 | 8 | 8 |
| Australian Capital Territory | 5 | 4 | 1,259,770 | 537,665 | 5.4% | 6.3% | 2.3 | - 113,901 | - 129,426 | 3 | 1 |
| South Australia | 6 | 6 | 920,404 | 280,789 | 3.9% | 3.3% | 3.3 | - 367,906 | - 69,822 | 1 | 2 |
| Tasmania | 7 | 7 | 632,343 | 122,184 | 2.7% | 1.4% | 5.2 | 130,994 | - 3,092 | 5 | 4 |
| Northern Territory | 8 | 8 | 91,132 | 26,709 | 0.4% | 0.3% | 3.4 | - 220,554 | - 47,091 | 2 | 3 |
| **Total** | | | **23,416,664** | **8,527,024** | | | **2.7** | 1,143,147 | 190,420 | | |

*Source: TRA & CBRE Hotels, June 2015*

From the data above, it is apparent that visitors from the New South Wales and Queensland are the most significant in Sydney, although their length of stay is not as long as most other

domestic source markets. Nevertheless, visitor nights from the South Australia have decreased most considerably in the domestic market (-367,906).

## Purpose of Visit

The main reasons for visitors to travel to Sydney for the Year Ending (YE) December 2014 were:

| Visitors | International | Share of Total | Domestic | Share of Total | Total | Share of Total |
|---|---|---|---|---|---|---|
| Holiday | 1,682,847 | 54% | 2,377,772 | 28% | 4,060,619 | 35% |
| Visiting Friends and Relatives | 735,006 | 24% | 3,320,964 | 39% | 4,055,970 | 35% |
| Business | 382,097 | 12% | 2,301,992 | 27% | 2,684,089 | 23% |
| Education | 134,473 | 4% | 102,114 | 1% | 236,588 | 2% |
| Employment | 69,544 | 2% | 19,593 | 0% | 89,137 | 1% |
| Other Purpose of Visit | 10,047 | 0% | 453,061 | 5% | 463,108 | 4% |
| In Transit/Not Asked/No Other Purpose | 103,789 | 3% | 23,566 | 0% | 127,355 | 1% |
| **Total** | **3,117,804** | | **8,599,061** | | **11,716,866** | |

*Source: TRA & CBRE Hotels, June 2015*

These visitors were equivalent to the following number of visitor nights:

| Visitor Nights | International | Share of Total | Domestic | Share of Total | Total | Share of Total |
|---|---|---|---|---|---|---|
| Holiday | 19,316,688 | 30% | 6,069,775 | 26% | 25,386,463 | 29% |
| Visiting Friends and Relatives | 16,393,789 | 26% | 9,981,928 | 43% | 26,375,718 | 30% |
| Business | 3,636,343 | 6% | 5,683,034 | 24% | 9,319,377 | 11% |
| Education | 16,846,512 | 26% | 316,691 | 1% | 17,163,203 | 20% |
| Employment | 7,119,223 | 11% | 68,115 | 0% | 7,187,339 | 8% |
| Other Purpose of Visit | 392,743 | 1% | 1,264,829 | 5% | 1,657,572 | 2% |
| In Transit/Not Asked/No Other Purpose | 153,209 | 0% | 32,292 | 0% | 185,501 | 0% |
| **Total** | **63,858,509** | | **23,416,664** | | **87,275,173** | |

*Source: TRA & CBRE Hotels, June 2015*

And, correspond to the following lengths of stays:

| Average Length of Stay | International | Domestic | Total |
|---|---|---|---|
| Holiday | 11.5 | 2.6 | 6.3 |
| Visiting Friends and Relatives | 22.3 | 3.0 | 6.5 |
| Business | 9.5 | 2.5 | 3.5 |
| Education | 125.3 | 3.1 | 72.5 |
| Employment | 102.4 | 3.5 | 80.6 |
| Other Purpose of Visit | 39.1 | 2.8 | 3.6 |
| In Transit/Not Asked/No Other Purpose | 1.5 | 1.4 | 1.5 |
| **Total** | **20.5** | **2.7** | **7.4** |

*Source: TRA & CBRE Hotels, June 2015*

## Type of Accommodation

The main types of accommodation used by visitors in Sydney for the Year Ending (YE) December 2014 were:

| Type of Accommodation | Visitors | Share of Total | Visitor Nights | Share of Total | Average Length of Stay |
|---|---|---|---|---|---|
| Hotel/Resort/Motel/Motor Inn/Serviced Apts | 5,442,627 | 46% | 16,470,145 | 19% | 3.0 |
| Private Accommodation | 5,174,468 | 44% | 35,956,394 | 41% | 6.9 |
| Backpacker/Hostel | 425,679 | 4% | 3,987,506 | 5% | 9.4 |
| Rented House/Apartment/Flat/Unit | 418,172 | 4% | 28,035,582 | 32% | 67.0 |
| Caravan Park/Camping | 77,505 | 1% | 424,293 | 0% | 5.5 |
| Guest House/Bed & Breakfast | 64,199 | 1% | 271,660 | 0% | 4.2 |
| Other Commercial Accommodation | 34,524 | 0% | 166,477 | 0% | 4.8 |
| Other Accommodation | 160,547 | 1% | 1,960,944 | 2% | 12.2 |
| In Transit/Not Asked | 481 | 0% | 1,922 | 0% | 4.0 |
| **Total** | **11,798,201** | | **87,274,922** | | **7.4** |

*Source: TRA & CBRE Hotels, June 2015*

## 2.3 Sydney Accommodation Supply and Demand

### Accommodation Supply

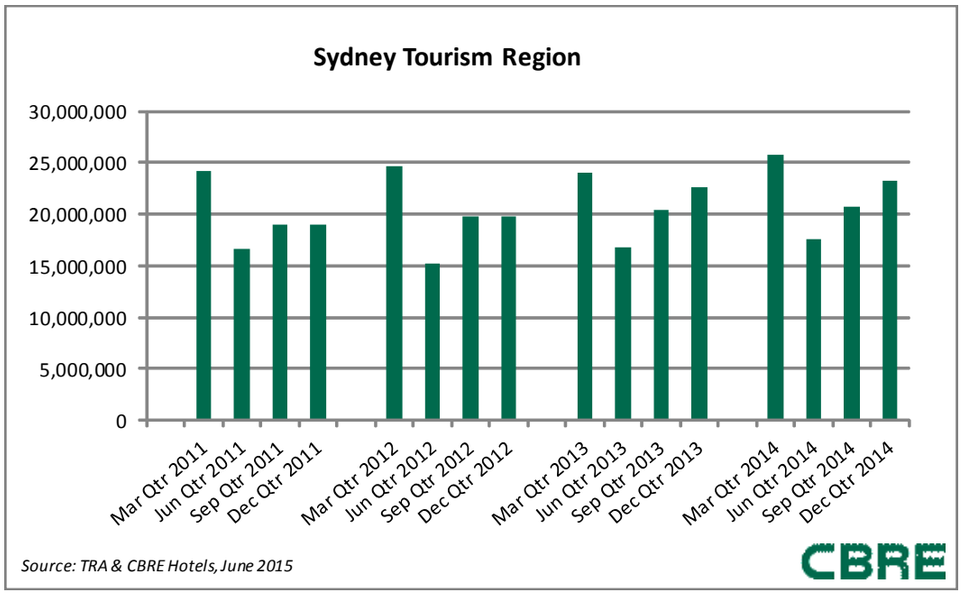
There has recently been a number of commercial accommodation establishments developed within the last two years, predominately in the metropolitan area and serviced apartment style.

### Accommodation Demand

Sydney, as Australia's premier gateway and financial centre, attracts demand from a wide variety of sources. It accommodates high levels of domestic corporate demand mid-week, domestic leisure on weekends, international corporate business thought-out the year and international leisure in the warmer months.

Steadily increasing visitor arrivals and a lack of significant new supply in the Sydney accommodation market has led to a period of sustained occupancy levels over the last five years. Demand softened somewhat due to the global and local economic crisis. However, the Sydney market was better placed than most to 'weather the storm' with a wide and varied demand base from corporate, leisure, special interest, and MICE. Consumer and business confidence returned after the GFC bouncing back strongly, with this likely to continue in the foreseeable future, economic conditions permitting.

We have reviewed the seasonal nature of the tourism industry and we have identified both peak seasons and lull periods based on room nights sold. In general, Occupancy levels typically peak in February and March and again in mid-September and November. These months tend to be the strong periods for business travel, as well as conferences and exhibitions.




## New Supply

The Sydney hotel market has enjoyed a relatively stable supply for a number of years since the massive development seen prior to the 2000 Olympic Games. While there are a number of hotel developments under construction or planned for the next few years across Greater Sydney, most proposed developments are located in city fringe or suburban locations.

Within the Sydney City Total Star graded market there are a number of mooted hotel developments over the next 5 years. We note that the Menzies Hotel, The Stamford Plaza, Mercure Potts Point and Vibe Goulburn are proposed to be redeveloped into an alternate use and represents the withdrawal of existing room supply. The following table details the proposed hotel developments along with the properties mooted for conversion.

| Property | Proposed Rooms | Status | Stage | Probability | Proposed Opening |
|---|---|---|---|---|---|
| Greenland Primus Hotel | 173 | Commenced | Construction | 100% | 2017 |
| Frasers Broadway | 60 | Commenced | Construction | 100% | 2016 |
| City Hotel Australia | 76 | Commenced | Construction | 100% | 2016 |
| Sydney CBD Hotel | 64 | Commenced | Construction | 100% | 2016 |
| The Menzies | -446 | Possible | Dev app | 100% | 2016 |
| Four Points By Sheraton Extension | 222 | Commenced | Construction | 100% | 2016 |
| The Tank Stream Hotel | 282 | Commenced | Construction | 100% | 2016 |
| Druids House | 136 | Possible | Dev Approval | 75% | 2016 |
| Holiday Inn Darling Harbour | 24 | Possible | Dev App | 25% | 2016 |
| The Stamford | -105 | Possible | Early Planning | 100% | 2016 |
| Vibe Goulbourn St | -191 | Firm | Dev Approval | 100% | 2016 |
| Commonwealth St Mxd Dev | 82 | Possible | Dev App | 50% | 2017 |
| Mercure Potts Point | -227 | Firm | Dev Approval | 100% | 2016 |
| Quest Sussex St | 163 | Possible | Dev App | 75% | 2017 |
| Wentworth Av Mxd Dev | 148 | Possible | Dev Approval | 75% | 2017 |
| Hyde Park Inn Expansion | 92 | Possible | Dev Approval | 50% | 2017 |
| Adina George & Hunter | 150 | Possible | Early Planning | 100% | 2017 |
| Mrs Banks Boutique Hotel | 30 | Possible | Dev App | 25% | 2017 |
| Convention Centre Hotel | 616 | Possible | Dev App | 100% | 2017 |
| 116 Bathurst St | 124 | Possible | Dev Approval | 100% | 2018 |
| City Crown Apartments | 42 | Commenced | Construction | 100% | 2018 |
| Lloyd's Inn (Sydney) | 108 | Possible | Dev Approval | 25% | 2018 |
| York St Hotel | 75 | Early | Site Acquisition | 75% | 2018 |
| Royal Botanic Gardens | 150 | Early | Early Planning | 0% | 2018 |
| Gold Fields House | 300 | Early | Early Planning | 100% | 2019 |
| City Tattersalls Club | 100 | Possible | Sketch Plans | 25% | 2019 |
| Former Coca-Cola Building | 62 | Possible | Dev Approval | 25% | 2019 |
| Barangaroo South - Crown | 350 | Possible | Early Planning | 100% | 2019 |
| The Sandstone Precinct | 250 | Possible | Tender | 75% | 2020 |
| *Total Proposed Rooms* | *2,910* | | | | |
| *Probability Adjusted Rooms* | *2,237* | | | | |
| ABS market June 14 | 17631 | 13% | | | |

Based on our probability weighting the city and surrounds will likely see a net increase of rooms over the next five years which represents a modest 13% increase.

## 2.4 Sydney 5 Star Hotel Accommodation Market Overview

| Year | No of Estm'ts | No of Rooms | Nights Available | % Change | Nights Sold | % Change | Occupancy % | ADR | % Change | RevPAR | % Change |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Jun-08 | 28 | 7,869 | 2,862,869 | 4.93% | 2,276,705 | 6.63% | 79.5% | $236.63 | 2.81% | $188.18 | 4.5% |
| Jun-09 | 28 | 8,012 | 2,912,202 | 1.72% | 2,204,574 | -3.17% | 75.7% | $219.56 | -7.21% | $166.21 | -11.7% |
| Jun-10 | 27 | 7,952 | 2,914,923 | 0.09% | 2,415,896 | 9.59% | 82.9% | $212.94 | -3.01% | $176.49 | 6.2% |
| Jun-11 | 24 | 7,112 | 2,810,039 | -3.60% | 2,403,550 | -0.51% | 85.5% | $231.10 | 8.52% | $197.67 | 12.0% |
| Jun-12 | 24 | 7,086 | 2,542,913 | -9.51% | 2,132,976 | -11.26% | 83.9% | $249.03 | 7.76% | $208.88 | 5.7% |
| Jun-13 | 24 | 7,097 | 2,589,698 | 1.84% | 2,230,805 | 4.59% | 86.1% | $251.97 | 1.18% | $217.05 | 3.9% |
| Jun-14 | 25 | 7,417 | 2,678,608 | 3.43% | 2,312,715 | 3.67% | 86.3% | $264.08 | 4.81% | $228.01 | 5.0% |
| Key | | | | | Nights Sold CAGR | 0.26% | | RevPAR CAGR: | 3.25% | | |
| ADR: Average Daily Rate | | | | | Nights Available CAGR | -1.10% | | ADR CAGR: | 5.81% | | |
| RevPAR: Revenue Per Available Room | | | | | | | | | | | |

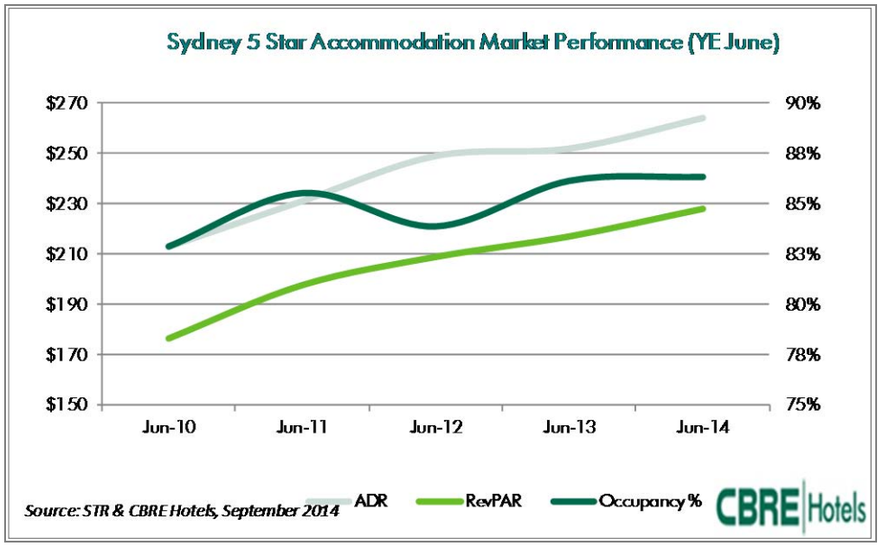
*Source: ABS & CBRE Hotels, September 2014*

CBRE Hotels

Over the past four years the occupancies in the Sydney 5 Star Tourism region have been relatively constant, stabilising in the mid 80% region since 2010, with occupancies for 2014 reaching record levels. This is partially due to minimal new supply being introduced to the Sydney market over recent years, low ADR and strong corporate demand.

The onset of the GFC saw hotels across the Sydney CBD drop ADR in a bid to attract demand, recording the largest decrease in room rates since the post Sydney Olympics period. With improvement in both local and global economies and the market consistently achieving occupancies in the mid 80% range hotels gained the confidence to increase rates with levels now above pre GFC levels.

The following graph depicts the strong period of growth enjoyed by the Sydney 5 star accommodation market over the last four years.



## 2.5 Sydney Hotel Market Outlook

### Short term to Medium Term

With minimal new supply, occupancies are likely to remain high with room rate growth at inflationary levels at least. We understand that a number of hotels are planning refurbishment programs over the next few years, which will result in some constrained periods, with a number of rooms out of operation. This should positively impact other star classes given there will be a new level of ADR achieved once these new products come on board. The reopening of the Sydney Convention Centre in 2017 following its extensive redevelopment should also contribute to improved operating conditions.

### Longer term (2018 and beyond)

Given the recent strong market performance experienced and the expectation that this will continue, a number of hotel and serviced apartment projects are being proposed. It will be some time before these projects come to fruition which should see occupancies remain in the 80% range in the foreseeable future and room rate growth continue.

# 3 SYDNEY LUXURY TOURISM MARKET AND THE SANDSTONE PRECINCT PROJECT DYNAMICS

Having regard to our analysis of the market and the features of the proposed development we comment on the ability of the Sandstone Precinct to match required market characteristics and expectations.

| Consensus between characteristics and the Hotel offering | | |
|---|---|---|
| **Market Observations** | | **Proposed Hotel Profile** |
| ■ There is a lack to true luxury accommodation in the Sydney market. | → | There is a real sense of place created by the development within the heritage buildings and utilising the complete Lands building structure. |
| ■ Room sizes are quite modest in most of Sydney's five star accommodation. | → | The room sizes proposed are quite generous which will differentiate the hotel from the current 5 star stock. |
| ■ There is limited luxury management/ brands in the Australian market. | → | A luxury brand would proudly associate with Sydney, the location and the features provided by this development. |
| ■ Most visitors arrive by hired vehicle. | → | There is limited parking proposed. |
| ■ Guest require a variety of dining options and many experience outside options. | → | The property proposes to have multiple F&B outlets. |
| ■ The city is attractive to both business and leisure market segments. | → | The hotel is located in the heart of the commercial office precinct with easy access to the leisure areas of Sydney Harbour, the Sydney Opera House, multiple quality dining facilities, the historic Rocks area. |
| ■ Supply growth is anticipated to remain flat. | → | No evident threat of competing new product in the city with the exception of the potential hotel to be included in the Goldfields House site redevelopment. |
| ■ | → | |
| **Market Conflict between expectations/requirements and the proposed facilities.** | | |
| ■ Visitors to Sydney accommodation prefer harbour views. | → | The hotel does not satisfy this requirement. Limited harbour views will be available from the upper levels (Serviced Apartment component). |
| ■ Contemporary diners prefer an alfresco option. | → | All the restaurants proposed are internal. |

## 3.1 Potential Competitors

We are aware that the Chinese investor Wanda is proposing to develop a luxury boutique hotel in its Goldfields House site redevelopment overlooking Sydney harbour.

While the location of this property is arguably better than the Sandstone Precinct, given that they proposed to develop residential accommodation and this will be presented to maximise price by being located in the elevated component of the building, this would relegate the hotel to the lower levels which would have limited harbour views.

Wanda proposes to operate the hotel under its own brand. Such a brand will likely have limited market acceptance until critical mass is developed globally.

# 4 DEVELOPMENT MATRIX

The property is proposed to comprise:

| | |
|---|---|
| Rooms | The property will be developed to a "luxury" standard befitting the heritage aspects of the two buildings. The hotel is proposed to have three room components, a luxury heritage element that will be pitched to the market currently satisfied in Sydney by the Park Hyatt; an element that will stand at the top of the current 5 star market in the size of the rooms proposed and a serviced apartment element in the lower levels of a tower that will rise over the Education building.<br><br>The facilities will include the following:<br><br>Rooms — Total room count of 301 that will comprise:<br><br>■ Heritage luxury suites (51) within the completely restored Lands Building ranging in size from 32 square metres to 167 square metres, average size 77.33 square metres.<br><br>■ Luxury rooms and suites (113) within the partially restored Education Building ranging in size from 37 square metres to 168 square metres, average size 49.01 square metres.<br><br>■ A serviced apartment component on levels 9 to 18 of the Education Tower with a total of 140 keys with an average size of approximately 45 square metres.<br><br>The rooms will be appointed with contemporary amenities and facilities. |
| Conference/ Function Facilities | Ballroom, Conference room and three Function/Meeting rooms.<br><br>The ballroom is located to the lower levels of the Education building with dedicated access off Loftus Street and the hotel lobby.<br><br>The Conference centre is located on an upper level of the heritage element of Education building and could be designed to provide a series of meeting rooms to support both the larger spaces and casual meeting room demand. |
| Hotel F&B | Restaurant/Bar/Lounge to the ground floor lobby in Education |
| External F&B | Five to six restaurants/cafes. |
| Leisure & Recreation Services | Provided in the residential tower servicing both the hotel guests and residents. |

| | |
|---|---|
| Car Parking | Limited spaces accessed via car lift |
| Retail Spaces | Five to seven spaces to the ground floor of the Lands Building. |

The majority of the rooms can be classed as suites given their generous size and are designed to provide a range of categories from heritage suites in the Lands building, contemporary rooms and suites in the Education building and grand suites in the Lands building suitable for celebrities and social and political leaders. Given the adaption of heritage buildings, each room will be individually designed. Room categories based on size are detailed in the following table.

| Room Category | Size range sq.m. | Avg Size | No | Location/Features |
|---|---|---|---|---|
| Standard | <40 | 37.3 | 13 | |
| Serviced Apartments | 45 | 45.0 | 140 | 10 Floors in Education/ contemporary |
| Superior | 40 to 56 | 48.5 | 111 | All but 20 located in Education/contempory. |
| Luxury | 59H to 138 | 81.9 | 30 | 22 in Lands, 8 in Education /Heritage |
| Royal/Presidential Suites | 165 to 188 | 160.7 | 7 | Six in Lands and I in Education/Heritage |
| **Total** | | | **301** | |

While not ultimately determined by proposed management, based on market expectations and maximising economic return, the table following details the facilities included in the development and the proposed or possible use.

| **Hotel Managed Facilities** | | | |
|---|---|---|---|
| **Plan Level** | **Building/Level** | **Area** | **Function** |
| Level B2 | Education below ground | 538 | Ballroom Plus Pre Function 298 sq.m. |
| Level B1 | Education below ground | 493 | Conference (Pre Function) |
| Level B1 | Education below ground | 298 | Four Meeting Rooms |
| Level 1 | Lands (Loftus) | 185 | Muesum |
| Level 2 | Lands | 185 | Library |
| Level 2 | Education Lobby Upper | 556 | Main Restaurant (Breakfast / tea room) |
| Level 3 | Lands | 154 | Meeting |
| Level 4 & 5 | Lands | 228 | Cigar Room |
| Level 4 & 5 | Lands | 242 | Billiard Room |
| Level 4, 5 & 6 | Lands | 440 | High Roller |
| Level 7 | Education | 734 | Conference/Exhibition |
| **Externally Leased Facilities** | | | |
| **Plan Level** | **Building/Level** | **Area** | **Function** |
| Level 0 | Lands/Ground (Bridge & Gresham) | 379 | Restaurant/Café |
| | Lands/Ground (Bent & Gresham) | 386 | Long Bar |
| Level 1 | Lands/ Ground (Loftus) | 114 | Restaurant/Café |
| | Lands/ Ground (Loftus) | 222 | Restaurant/Café |
| | Education /Ground (Bridge)(A) | 300 | Restaurant/Café |
| | Education /Ground (Bridge)(A) | 328 | Restaurant/Café |
| Level 0 | Lands/Ground (Bridge & Gresham) | 408 | Retail (4 to 7 spaces) |
| (A) - Approx. | | | |

# 5 FINANCIAL DETAILS AND ANALYSIS

## 5.1 Introduction

We have prepared a notional trading performance for the property assuming accepted industry benchmarks. It is prepared so that an 'appraisal upon completion' can be undertaken to assist in the feasibility analysis. The purpose of these figures is solely to be a guide of likely future outcomes based on the assumptions adopted.

The process of preparing a trading forecast has included:

- Review the local competitive market for the room rates being achieved and assess the rates that the subject is likely to achieve considering such matters as location, quality, size of rooms and facilities provided.
- Review of hotel occupancies to assess the level that the subject is likely to achieve considering such matters as location, quality, and facilities provided.
- Apply other revenue, cost and expense benchmarks to determine a potential trading income.
- Cash flow format has been presented in accordance with the Uniform System of Accounts for the Lodging Industry.

An overview of the financial performance of the property has been compiled, and addresses the business profile, average room rates, occupancy, average spend per guest, department revenue and costs, and overhead and fixed expenses. An analysis of the parameters adopted in preparing our financial forecast, is included within each commentary.

## 5.2 ADRs and Occupancy Rates

Based upon our analysis of the market and under professional management, a new, luxury product can expect to achieve room rates and occupancy as detailed in the following table, expressed in $2014.

| Room Type | | Avg Size | No | ADR 2014$ | Occupancy |
|---|---|---|---|---|---|
| Standard | <40 | 37.25 | 13 | 300 | 81.2% |
| Serviced Apartments | 45 | 45.00 | 140 | 400 | 77.3% |
| Superior | 40 to 56 | 48.52 | 111 | 500 | 77.3% |
| Luxury | 59H to 138 | 81.90 | 30 | 1,000 | 65.7% |
| Royal/Presidential Suites | 165 to 188 | 160.71 | 7 | 10,000 | 19.33% |
| **Average** | | | **301** | **543.32** | **75.0%** |

We have prepared our forecast for ADR and occupancy, on the assumption that the introduction of the subject property will occur in 2021and applied the following ADR growth to reflect potential rooms revenue.

| Room Rate Growth | | $ADR |
|---|---|---|
| 2015 | 5.00% | 570.49 |
| 2016 | 5.00% | 599.01 |
| 2017 | 5.00% | 628.96 |
| 2018 | 4.00% | 660.41 |
| 2019 | 3.00% | 686.82 |
| 2020 | 3.00% | 707.43 |
| 2021 | 3.00% | 728.65 |

## 5.3 Rooms Department

The following analysis of the Room's division details forecast average rates and occupancy together with payroll and other costs.

| SANDSTONE PRECINCT<br>ROOMS DEPARTMENT ANALYSIS AND ADOPTED FORECAST | | | | | |
|---|---|---|---|---|---|
| A = Actual, B = Budget, YTD = Year to Date, F = Forecast | | | ADOPTED | ADOPTED | ADOPTED |
| MONTHS | | | YEAR 1 | YEAR 2 | YEAR 3 |
| PERIOD ENDING | | | 2021 | 2022 | 2023 |
| INCOME | | | | | |
| | | Occupancy | 69.3% | 73.6% | 75.0% |
| | | ADR (A$) | 728.65 | 750.51 | 773.03 |
| | | RevPAR | 504.72 | 552.35 | 580.01 |
| COSTS | | | | | |
| | Payroll | A$ / Occ Rm | 98.39 | 97.11 | 98.60 |
| | Other | A$ / Occ Rm | 118.87 | 121.91 | 124.86 |
| Total Rooms Costs | | A$ / Occ Rm | 217.26 | 219.02 | 223.46 |
| | | A$ / Avail Rm | 150.49 | 161.19 | 167.66 |
| Rooms Profit | | A$ / Occ Rm | 511.39 | 531.49 | 549.57 |
| | | A$ / Avail Rm | 354.23 | 391.16 | 412.35 |
| | | % Rev | 70.2% | 70.8% | 71.1% |

## 5.4 Food and Beverage Department

Department revenue is derived from the restaurant, bar, room service and conferences / functions. The following table provides an overview of the Food and Beverage department.

| SANDSTONE PRECINCT<br>FOOD & BEVERAGE DEPARTMENT AND ADOPTED FORECAST | | | | | |
|---|---|---|---|---|---|
| A = Actual, B = Budget, YTD = Year to Date, F = Forecast | | | ADOPTED | ADOPTED | ADOPTED |
| MONTHS | | | YEAR 1 | YEAR 2 | YEAR 3 |
| PERIOD ENDING | | | 2021 | 2022 | 2023 |
| INCOME | | | | | |
| Food | | A$ / Occ Rm | 147.58 | 151.36 | 155.02 |
| Beverage | | A$ / Occ Rm | 43.05 | 44.15 | 45.22 |
| F & B Other | | A$ / Occ Rm | 40.00 | 41.02 | 42.02 |
| F & B TOTAL | | A$ / Occ Rm | 230.63 | 236.53 | 242.26 |
| | | A$ / Avail Rm | 159.75 | 174.08 | 181.77 |
| COSTS | | | | | |
| F & B | Cost of Food Sold | % Rev | 37.5% | 37.5% | 37.5% |
| | Cost of Bev Sold | % Rev | 37.5% | 37.5% | 37.5% |
| | Payroll - Total | % Rev | 42.5% | 40.9% | 40.4% |
| | Other | % Rev | 5.0% | 5.0% | 5.0% |
| Total F & B Costs | | % Rev | 78.5% | 76.9% | 76.4% |
| | | A$ / Occ Rm | 181.04 | 181.82 | 184.99 |
| Food & Beverage Profit | | % Rev | 21.5% | 23.1% | 23.6% |
| | | A$ / Occ Rm | 49.59 | 54.71 | 57.26 |

These levels are in keeping with actual trading for similar venues.

## 5.5 Other Operating Departments

Other Trading Departments in this case includes miscellaneous income from other services provided by the hotel.

An analysis of forecast trading expectation is included in the following table.

| SANDSTONE PRECINCT<br>OTHER TRADING DEPARTMENT AND ADOPTED FORECAST | | | | | |
|---|---|---|---|---|---|
| A = Actual, B = Budget, YTD = Year to Date, F = Forecast | | | ADOPTED | ADOPTED | ADOPTED |
| MONTHS | | | 12 | 12 | 12 |
| PERIOD ENDING | | | 2021 | 2022 | 2023 |
| INCOME | | | | | |
| M O D | | A$ / Occ Rm | 25.00 | 25.49 | 26.06 |
| | | A$ / Avail Rm | 17.32 | 18.76 | 19.55 |
| R O I | | A$ / Occ Rm | 1.45 | 1.40 | 1.40 |
| | | A$ / Avail Rm | 1.00 | 1.03 | 1.05 |
| COSTS & PROFIT | | | | | |
| MOD | Cost of Sales | % Rev | 3.0% | 3.0% | 3.0% |
| | Payroll | % Rev | 70.0% | 68.8% | 68.4% |
| | Other | % Rev | 20.0% | 20.0% | 20.0% |
| Total MOD Costs | | % Rev | 93.0% | 91.8% | 91.4% |
| | | A$ / Occ Rm | 0.00 | 0.00 | 0.00 |
| MOD Profit | | % Rev | 7.0% | 8.2% | 8.6% |
| | | A$ / Occ Rm | 1.75 | 2.10 | 2.25 |
| Total ROI Costs | | % Rev | 0.0% | 0.0% | 0.0% |
| | | A$ / Occ Rm | 0.00 | 0.00 | 0.00 |
| ROI Profit | | % Rev | 100.0% | 100.0% | 100.0% |
| | | A$ / Occ Rm | 1.45 | 1.40 | 1.40 |

## 5.6 Undistributed Operating Expenses

The Uniform System of Accounts for Hotels provides for four categories of expenses which relate to the operation of the hotel and which are not easily identified within any one operating department. The table below provides our analysis of ratios adopted in our cash flow forecast for the hotel.

| SANDSTONE PRECINCT<br>UNDISTRIBUTED EXPENSES ANALYSIS AND ADOPTED FORECAST | | | | |
|---|---|---|---|---|
| A = Actual, B = Budget, YTD = Year to Date, F = Forecast | | ADOPTED | ADOPTED | ADOPTED |
| MONTHS | | YEAR 1 | YEAR 2 | YEAR 3 |
| PERIOD ENDING | | 2021 | 2022 | 2023 |
| UNDISTRIBUTED EXPENSES | | | | |
| Administration & General | | | | |
| Total A&G Expenses | A$ / Avail Rm | 53.29 | 55.34 | 57.01 |
| | % Rev | 7.8% | 7.4% | 7.3% |
| Sales & Marketing | | | | |
| Total S&M Expenses | A$ / Avail Rm | 46.94 | 48.20 | 49.45 |
| | % Rev | 6.9% | 6.5% | 6.3% |
| Property Operation & Maint. | | | | |
| Total R&M Expenses | A$ / Avail Rm | 21.73 | 22.51 | 23.17 |
| | % Rev | 3.2% | 3.0% | 3.0% |
| Utilities | A$ / Occ Rm | 26.63 | 26.99 | 27.54 |
| | A$ / Avail Rm | 18.45 | 19.87 | 20.66 |
| | % Rev | 2.7% | 2.7% | 2.6% |

Costs have been adopted in line with industry parameters and are forecast to increase in line with market expectations.

## 5.7 Overhead Expenses

### 5.7.1. Property Costs

Overhead property costs include Insurance and Rates and Taxes.

Statutory charges for Council Rates and Land Tax are based on the charges currently being made increased to completion at 5% per annum.

Property Insurance has been allowed at a cost today of $300,000 and increased at 3% per annum.

### 5.7.2. Furniture, Fittings & Equipment Reserve

It is common for hotel management agreements to provide for the provision of a reserve to fund ongoing works (not of a capital nature) to ensure that the quality of the hotel in terms of FF&E (furniture, fittings and equipment) is maintained to a standard to ensure trading is not compromised.

An allowance of 1.0% of total revenue has been included within our forecast for year one, 2% in year two, 3% from year three and 4% per annum thereafter.

## 5.8 Management Fees

Management fees have been assumed as follows:

Base Fee: 1.0% of Total Revenue

Incentive Fee: 7.0% GOP (Gross Operating Profit)

## 5.9 Rental Income

Detailed below is a schedule of the rental adopted for those spaces that may be externally leased. They are expressed in $2014 and escalated to 2021 at 4% per annum the rate applied to the majority of Sydney CBD retail leases.

We have adopted a rental incentive of 10% of the rental payable which is the rate consistent with Sydney CBD retail lettings.

| Externally Leased Facilities | | | | |
|---|---|---|---|---|
| Function | Area | $/sm. (2014) | $p.a. (2014) | Total |
| Restaurant/Café | 379 | 500 | 189,500 | |
| Long Bar | 386 | 700 | 270,200 | |
| Restaurant/Café | 114 | 1,250 | 142,500 | |
| Restaurant/Café | 222 | 1,000 | 222,000 | |
| Restaurant/Café | 300 | 1,500 | 450,000 | |
| Restaurant/Café | 328 | 1,500 | 492,000 | 1,766,200 |
| Retail (4 to 7 spaces) | 408 | 2,000 | 816,000 | 816,000 |
| | | | | 2,582,200 |
| Incentive | | | 10% | 2,323,980 |
| Growth per annum to 2021 | | | 4% | 2,940,576 |

## 5.10 CPI & Wages Indices

As detailed earlier, revenues have been assessed on the basis of market opinion and not an indexation factor. Operational costs and expenses are varied in accordance with occupancy and inflationary effects. In this respect we have adopted an underlying rate of inflation of 2.5% per annum and wages cost increase at 3% per annum.

## 5.11 Summary of Trading Forecast

A summary of our 5 year cash flow forecast for the property follows on the next page:

**SANDSTONE PRECINCT**
**FIVE YEAR TRADING FORECAST**

( Expressed in Escalated A$ Values )

| PERIOD | Year 1 | | Year 2 | | Year 3 | | Year 4 | | Year 5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| YEAR ENDING December | 2021 | | 2022 | | 2023 | | 2024 | | 2025 | |
| ROOMS | 301 | | 301 | | 301 | | 301 | | 301 | |
| OCCUPANCY | 69.3% | | 73.6% | | 75.0% | | 74.8% | | 75.0% | |
| AVERAGE DAILY RATE (A$) | 728.65 | | 750.51 | | 773.03 | | 796.22 | | 820.10 | |
| ADR GROWTH | | | 3.0% | | 3.0% | | 3.0% | | 3.0% | |
| RevPAR | 504.72 | | 552.35 | | 580.01 | | 595.78 | | 615.33 | |
| | A$' s | Ratio | A$' s | Ratio | A$' s | Ratio | A$' s | Ratio | A$' s | Ratio |
| REVENUE | | | | | | | | | | |
| ROOMS | 55,451,054 | 73.9% | 60,684,247 | 74.0% | 63,722,880 | 74.1% | 65,634,566 | 74.2% | 67,603,603 | 74.4% |
| FOOD & BEVERAGE | 17,551,170 | 23.4% | 19,124,771 | 23.3% | 19,969,820 | 23.2% | 20,452,155 | 23.1% | 20,946,139 | 23.0% |
| MINOR DEPARTMENTS | 1,902,521 | 2.5% | 2,060,902 | 2.5% | 2,147,852 | 2.5% | 2,200,332 | 2.5% | 2,252,861 | 2.5% |
| RENTALS & OTHER INCOME | 110,000 | 0.1% | 112,812 | 0.1% | 115,545 | 0.1% | 118,660 | 0.1% | 121,194 | 0.1% |
| TOTAL REVENUE | 75,014,745 | 100.0% | 81,982,733 | 100.0% | 85,956,097 | 100.0% | 88,405,712 | 100.0% | 90,923,797 | 100.0% |
| DEPARTMENTAL EXPENSES | | | | | | | | | | |
| ROOMS | 16,533,552 | 29.8% | 17,709,169 | 29.2% | 18,420,176 | 28.9% | 18,906,745 | 28.8% | 19,373,367 | 28.7% |
| FOOD & BEVERAGE | 13,776,982 | 78.5% | 14,701,420 | 76.9% | 15,249,596 | 76.4% | 15,632,624 | 76.4% | 15,995,158 | 76.4% |
| MINOR DEPARTMENTS | 1,769,344 | 93.0% | 1,891,181 | 91.8% | 1,962,500 | 91.4% | 2,011,688 | 91.4% | 2,058,450 | 91.4% |
| RENTALS & OTHER INCOME | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% |
| TOTAL DEPARTMENTAL COSTS | 32,079,879 | 42.8% | 34,301,770 | 41.8% | 35,632,271 | 41.5% | 36,551,056 | 41.3% | 37,426,975 | 41.2% |
| DEPARTMENTAL INCOME | | | | | | | | | | |
| ROOMS | 38,917,502 | 70.2% | 42,975,078 | 70.8% | 45,302,704 | 71.1% | 46,727,822 | 71.2% | 48,230,236 | 71.3% |
| FOOD & BEVERAGE | 3,774,188 | 21.5% | 4,423,351 | 23.1% | 4,720,225 | 23.6% | 4,819,531 | 23.6% | 4,950,981 | 23.6% |
| MINOR DEPARTMENTS | 133,176 | 7.0% | 169,721 | 8.2% | 185,352 | 8.6% | 188,644 | 8.6% | 194,411 | 8.6% |
| RENTALS & OTHER INCOME | 110,000 | 100.0% | 112,812 | 100.0% | 115,545 | 100.0% | 118,660 | 100.0% | 121,194 | 100.0% |
| TOTAL DEPARTMENTAL INCOME | 42,934,866 | 57.2% | 47,680,963 | 58.2% | 50,323,825 | 58.5% | 51,854,656 | 58.7% | 53,496,821 | 58.8% |
| UNDISTRIBUTED OPERATING EXPENSES | | | | | | | | | | |
| ADMINISTRATION & GENERAL | 5,854,781 | 7.8% | 6,079,440 | 7.4% | 6,263,636 | 7.3% | 6,440,665 | 7.3% | 6,592,659 | 7.3% |
| SALES & MARKETING | 5,156,555 | 6.9% | 5,295,602 | 6.5% | 5,433,315 | 6.3% | 5,586,134 | 6.3% | 5,711,922 | 6.3% |
| PROPERTY OPERATION & MAINT. | 2,386,910 | 3.2% | 2,472,923 | 3.0% | 2,545,137 | 3.0% | 2,616,474 | 3.0% | 2,677,167 | 2.9% |
| UTILITIES | 2,026,801 | 2.7% | 2,182,538 | 2.7% | 2,270,263 | 2.6% | 2,326,371 | 2.6% | 2,381,258 | 2.6% |
| TOTAL UNDISTRIBUTED EXPENSES | 15,425,048 | 20.6% | 16,030,503 | 19.6% | 16,512,351 | 19.2% | 16,969,644 | 19.2% | 17,363,007 | 19.1% |
| GROSS OPERATING PROFIT | 27,509,818 | 36.7% | 31,650,460 | 38.6% | 33,811,474 | 39.3% | 34,885,012 | 39.5% | 36,133,815 | 39.7% |
| MANAGEMENT FEES | | | | | | | | | | |
| BASIC MANAGEMENT FEE | 750,147 | 1.0% | 819,827 | 1.0% | 859,561 | 1.0% | 884,057 | 1.0% | 909,238 | 1.0% |
| INCENTIVE MANAGEMENT FEE | 1,873,177 | 2.5% | 2,158,144 | 2.6% | 2,306,634 | 2.7% | 2,380,067 | 2.7% | 2,465,720 | 2.7% |
| TOTAL MANAGEMENT FEES | 2,623,324 | 3.5% | 2,977,972 | 3.6% | 3,166,195 | 3.7% | 3,264,124 | 3.7% | 3,374,958 | 3.7% |
| INCOME BEFORE FIXED CHARGES | 24,886,494 | 33.2% | 28,672,488 | 35.0% | 30,645,279 | 35.7% | 31,620,888 | 35.8% | 32,758,856 | 36.0% |
| FIXED CHARGES | | | | | | | | | | |
| LEASE RENT | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% |
| RATES & TAXES | 1,203,071 | 1.6% | 1,233,822 | 1.5% | 1,263,712 | 1.5% | 1,297,781 | 1.5% | 1,325,495 | 1.5% |
| INSURANCE | 368,962 | 0.5% | 378,393 | 0.5% | 387,560 | 0.5% | 398,008 | 0.5% | 406,508 | 0.4% |
| TOTAL FIXED CHARGES | 1,572,033 | 2.1% | 1,612,215 | 2.0% | 1,651,272 | 1.9% | 1,695,789 | 1.9% | 1,732,002 | 1.9% |
| NET OPERATING INCOME | 23,314,461 | 31.1% | 27,060,274 | 33.0% | 28,994,007 | 33.7% | 29,925,099 | 33.8% | 31,026,854 | 34.1% |
| REPLACEMENT RESERVES (FF&E) | 750,147 | 1.0% | 1,639,655 | 2.0% | 2,578,683 | 3.0% | 3,536,228 | 4.0% | 3,636,952 | 4.0% |
| ADJUSTED NET OPERATING INCOME | 22,564,313 | 30.1% | 25,420,619 | 31.0% | 26,415,324 | 30.7% | 26,388,871 | 29.8% | 27,389,902 | 30.1% |
| RETAIL INCOME | 2,940,576 | 3.9% | 3,015,738 | 3.7% | 3,088,797 | 3.6% | 3,163,401 | 3.6% | 3,239,807 | 3.6% |
| TOTAL NET INCOME | 25,504,889 | 34.0% | 28,436,357 | 34.7% | 29,504,121 | 34.3% | 29,552,272 | 33.4% | 30,629,710 | 33.7% |

# 6 HOTEL ASSESSMENT RATIONALE

## 6.1 Indicative Appraisal

In providing this advice we note that this assessment in no way purports to represent a formal valuation of the project 'as if complete' but is purely an indication of a likely outcome in the future based on the assumptions adopted.

In considering the 'upon completion' assessment, a wide range of sales evidence has been considered, with each transaction having varying degrees of comparability.

Based upon our consideration of the various price effecting criteria relevant to this property and this assessment, we are of the opinion that an appropriate investment yield of 5.50% would be considered to be a fair reflection of the market range for the subject property profile.

Our assessment has been made based on the following technical approaches:

- Capitalisation Analysis
- Discounted Cash Flow Analysis

The parameters within each approach have been selected after comparison to appropriate sales evidence and comparative risk in trading levels.

## 6.2 Hotel Assessment Summary

We summarise our various assessment approaches on the following page, including a sensitivity analysis based on variations in investment parameters, occupancy rates and ADR:

**SANDSTONE PRECINCT**

| MARKET ANALYSIS SUMMARY | | | | | | | Analysis Date 8-Jul-15 |
|---|---|---|---|---|---|---|---|
| **Year Ending December** | | | **2021** | **2022** | **2023** | **2024** | **2025** |
| Figures Expressed in (A$) | | | | | FORECAST | | |
| **Forecast Assumptions** | | CAGR | | | | | |
| | CPI | 2.4% | 2.4% | 2.6% | 2.4% | 2.4% | 2.4% |
| | Nominal Wage Growth | 2.9% | 3.0% | 2.9% | 2.9% | 2.7% | 2.7% |
| **Hotel** | No. of Rooms | | 301 | 301 | 301 | 301 | 301 |
| | Occupancy Rate | | 69.3% | 73.6% | 75.0% | 74.8% | 75.0% |
| | Average Daily Rate (ADR) | 3.0% | 729 | 751 | 773 | 796 | 820 |
| | RevPAR | 5.1% | 505 | 552 | 580 | 596 | 615 |
| | Base Management Fee | | 1.0% | 1.0% | 1.0% | 1.0% | 1.0% |
| | Incentive Management Fee | | | | Performance Based | | |
| | FF&E Reserve | | 1.0% | 2.0% | 3.0% | 4.0% | 4.0% |
| **Hotel Operation** | | | | | Figures Expressed in (A$'000) | | |
| Total Revenue | | 4.9% | 75,015 | 81,983 | 85,956 | 88,406 | 90,924 |
| Total Departmental Expenses | | 3.9% | -32,080 | -34,302 | -35,632 | -36,551 | -37,427 |
| Total Departmental Income | | 5.7% | 42,935 | 47,681 | 50,324 | 51,855 | 53,497 |
| Undistributed Operating Expenses | | 3.0% | -15,425 | -16,031 | -16,512 | -16,970 | -17,363 |
| Gross Operating Profit | | 7.1% | 27,510 | 31,650 | 33,811 | 34,885 | 36,134 |
| Base Management Fee | | | -750 | -820 | -860 | -884 | -909 |
| Incentive Management Fee | | | -1,873 | -2,158 | -2,307 | -2,380 | -2,466 |
| Fixed Charges | | 2.5% | -1,572 | -1,612 | -1,651 | -1,696 | -1,732 |
| Replacement Reserves (FF&E) | | | -750 | -1,640 | -2,579 | -3,536 | -3,637 |
| Net Operating Profit (EBITDA) | | 5.0% | 22,564 | 25,421 | 26,415 | 26,389 | 27,390 |
| Retail Income | | | 2,941 | 3,016 | 3,089 | 3,163 | 3,240 |
| Net Operating Income (EBITDA) | | | 25,505 | 28,436 | 29,504 | 29,552 | 30,630 |
| **Capital Expenditure** | | | | | | | |
| Hotel | | | 0 | 0 | 0 | 0 | 0 |
| Retail | | | 0 | 0 | 0 | 0 | 0 |
| **Net Cash Flow** | | 4.7% | **25,505** | **28,436** | **29,504** | **29,552** | **30,630** |
| % Net Profit EBITDA of Total Revenue | | | 30.1% | 31.0% | 30.7% | 29.8% | 30.1% |
| **Running Yield** (EBITDA) | | | | | | | |
| *After FF & E & Management* | | | 5.2% | 5.7% | 6.0% | 6.0% | 6.2% |

| MARKET ANALYSIS APPROACHES | | | *Result* |
|---|---|---|---|
| Capitalisation of Inflation Adjusted Stabilised Year | | **5.50%** | 498,000,000 |
| Discounted Cash Flow 5Yr | Discount Rate | **7.50%** | 493,000,000 |
| | Terminal Yield | **5.50%** | |

| *Adopted Market Analysis Parameters* | | |
|---|---|---|
| Initial Yield | | 5.15% |
| Stabilised Yield | | 5.54% |
| Price per Room (A$) | | 1,644,518 |
| 5 Yr DCF | IRR | 7.40% |
| | Terminal Yield | 5.50% |

**ADOPTED MARKET ANALYSIS** — **A$ 495,000,000**
**Four Hundred Ninety Five Million Dollars**

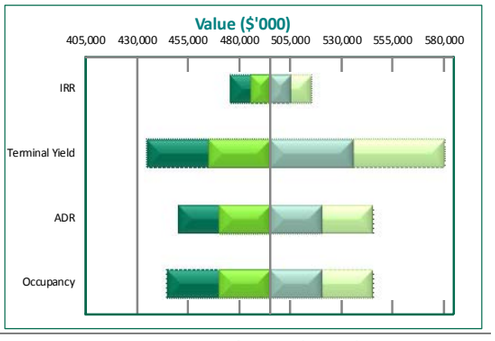
**Sensitivity Analysis** — Figures Expressed in (A$'000)

**Five Year DCF Sensitivity by IRR and Terminal Yield**

| Terminal Yield | 1.00% | Internal Rate of Return | | | 1.00% |
|---|---|---|---|---|---|
| | 8.40% | 7.90% | 7.40% | 6.90% | 6.40% |
| 6.50% | 420,000 | 430,000 | 435,000 | 445,000 | 455,000 |
| 6.00% | 445,000 | 455,000 | 465,000 | 475,000 | 485,000 |
| 5.50% | 475,000 | 485,000 | **495,000** | 505,000 | 515,000 |
| 5.00% | 510,000 | 520,000 | 535,000 | 545,000 | 555,000 |
| 4.50% | 555,000 | 570,000 | 580,000 | 590,000 | 605,000 |

**Market Analysis Sensitivity by Trading Variance**

| ADR | 5.00% | | | Occupancy | 5.00% |
|---|---|---|---|---|---|
| 495,000 | -5.00% | -2.50% | 0.00% | 2.50% | 5.00% |
| -5.00% | 405,000 | 425,000 | 450,000 | 470,000 | 495,000 |
| -2.50% | 425,000 | 450,000 | 470,000 | 495,000 | 520,000 |
| 0.00% | 445,000 | 470,000 | **495,000** | 520,000 | 545,000 |
| 2.50% | 470,000 | 495,000 | 520,000 | 545,000 | 570,000 |
| 5.00% | 490,000 | 520,000 | 545,000 | 570,000 | 595,000 |




*This analysis is purely for the purposes of a guide and sets out one permutation in support of our market analysis.*

# 7 CONTACT DETAILS

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