

## **Volume 3 - Appendix 4**

### **Visual Impact Study**

**Prepared by H&E Architects**



# SYDNEY OPERA HOUSE LOWER CONCOURSE IMPROVEMENTS

Lower Concourse, Sydney Opera House, Bennelong Point, Sydney  
Visual Impact Study | Ver 3.0 | 07.2019

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# 1.0 INTRODUCTION



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PREAMBLE

This Visual Impact Study has been prepared to support a Development Application (DA) and Environmental Impact Statement (EIS) for:

- Proposed alterations to the glazing alignment on the Lower Concourse of the Sydney Opera House, affecting the tennancy commonly known as "Opera Bar"
- Provision of new shade structures, as a replacement for the existing umbrellas to external areas of the places commonly known as "Opera Bar" and "Opera Kitchen" also on the Lower Concourse.

This Visual Impact Statement responds to submissions from the Department of Planning, Heritage and Environment and the City of Sydney that were made in relation to a previous Development Application lodged, in 2016, in relation to a similar proposals.

"Urban design and visual impacts" were identified as important issues for consideration in relation to this application. This study has been prepared to demonstrate the proposal's consideration of, and response to these issues.

This study has been prepared on behalf of the Sydney Opera House, in consultation with the stakeholder tenants (Opera Bar & Opera Kitchen), and reflects the current architectural design and all associated consultant coordination at the time of the preparation of this study.

This study has been prepared by Glenn Cunnington, Director of H&E Architects, Registered Architect # 6415.

METHODOLOGY

This study illustrates the potential impact of the proposed works on key views to and from the Sydney Opera House and its precinct. The location of vantage points for the "key" views selected is shown on the Location Plans herein.

The study presents "before" (existing photo) and "after" (photomontage) images taken looking from key public vantage points. The location of vantage points from which the base photography has been taken have been accurately located. The base photography has been taken by a professional photographer.

The photomontage imagery superimposes rendered images of accurately computer modelled geometry which precisely describes the proposal.

The 3D computer model has been developed using Autodesk Revit building information modelling software.

The Visual Impact Study imagery has been rendered from the same platform as the architectural drawings have been generated. Accordingly the rendered geometry is an accurate representation of the proposal.

Please note that the process of photographic superimposition is not "perfect" However the author is confident that the imagery presented in this study accurately depicts the visual impacts expected in reality.

Unless otherwise stated photography included in this report was taken by Ben Guthrie Photography and all graphics, architectural drawing and details have been prepared by H&E Architects.

OVERVIEW OF THE PROPOSAL

The Sydney Opera House is an Australian icon. Its dramatic architectural form is recognised the world over. It provides a world class performing arts venue and is considered a masterpiece of late modern architecture.

The hospitality precinct that's housed in the lower concourse supports the function of the SOH. This precinct provides essential hospitality facilities for patrons of the Opera House and the public in general. Venues such as the Opera Bar & Opera Kitchen are renowned for the quality of their offer and the experience they provide. The SOH and their operators are committed to improving the experience for visitors to the site whilst respecting its cultural significance.

As part of this on ongoing commitment to improve facilities it is proposed to:

- Modify the glazing alignment along the Lower Concourse to improve pedestrian flow and attain better utility of the Lower Concourse.
- Replace the existing umbrellas with new shade structures offering improved weather protection with better integrated services in a more aesthetically complimentary form

The concept and design development of this proposal has been developed in recognition of the design principles established by Utzon for the site.

An assessment of the new structures is provided following with comparative commentary outlining the differences between the existing and proposed structures.

CONTEXT

The context is established by the flowing modern form of the existing structure, the proximity to the harbour and the greater development that defines Circular Quay which includes most notably the Ferry Terminal, Cahill Expressway, Harbour Bridge and Opera House.

The existing structures that are the subject of the application are relatively insignificant in the greater context. This is particularly evident from distant vantage points across Sydney Cove and from the North Shore as can be seen from Locations 1 and 2.

These structures sit relatively low visually and appear just above the waterline and below the parapet of the Upper Concourse.

The existing umbrellas, are not complimentary to the finer context established by the Opera House forecourt, the cascading concourses and adjacent sea wall. And this can be seen by review of imagery from vantage points 3, 4, 5 and 6.

In regard to the proposal with respect of the shade structures, despite the small increase in size the proposed form remains modest in scale. In this regard, like the existing umbrellas, the proposed shade structures are insignificant in the greater context. In fact the visual impact of either the existing or proposed is barely perceptible from the distant vantage points represented by Locations 1 and 2.

Regardless the proposed shade structures are designed to be more in harmony, in terms of form, detail and materiality with the finer established context than the existing umbrellas. This improved relationship is clearly illustrated by proposed views from the closer vantage points. It is also evident that the improved forms have no adverse impact on views to or from the Opera House, the Upper Concourse or Forecourt.

FORM

The existing umbrellas are of a generic design and are “umbrella like” in form. The form of the individual umbrellas is symmetrically balanced but asymmetrically arranged and lacks the dynamics reflected in the form of the Opera House and its details.

The arrangement of the individual umbrellas limits the covered area and results in joints between the umbrellas that lack design finesse and have ineffective weatherproofing. The proposed shade structures are of a custom design developed with consideration of context, function and the Utzon Design Principles.

The overall design is more architecturally responsive and consistent with the design quality of the Opera House and precinct in general. However the design and detailing is also simplistic and restrained so as not to compete in prominence with the architecture of the Opera House.

VISUAL IMPACT

The proposed shade cover represents an increased covered area... Approximately 19%. The overall height is about the same and the north-south dimension increases minimally. Accordingly, in the context of the site, and particularly in respect of distant views to the Opera House and surrounds this increase is insignificant.

It is clear that due to the relative size of the Opera House, other neighbouring buildings and geographic features that the impact of the new shade structure is insignificant and has no detrimental impact of the visual setting of the Opera House.

The proposed form reflects the horizontality of the concourses in general. It is designed such that the form of the new structure will have no detrimental impact on views to or from the Opera House and surrounding precinct. The new shade structure references the established geometry of the existing concourses including the radial grid but is an otherwise independent structure. Accordingly the new structure does not interfere with the form and continuity of curvature of the existing concourses.

The visual connection between the forecourt and lower concourse will not be obscured. In fact despite the increase in size the new forms are expected to appear simpler, less distracting than the existing umbrellas and more harmonious with the existing super structure.

CONCLUSION

The proposed design response is the result of considerable effort to maximise the potential of the project to offer improvements in shade, weather protection acoustics etc. in a more architecturally sympathetic manner without detrimental visual impact.

The proposal has been developed with understanding and consideration of the Utzon Design Principles and provides a more appropriate design response to the existing umbrellas in this regard.

By review of the “before” and “after” imagery presented in this study it is evident that the proposal provides an improved architectural and functional response without any detrimental visual impact.

2.0

LOCATION PLAN

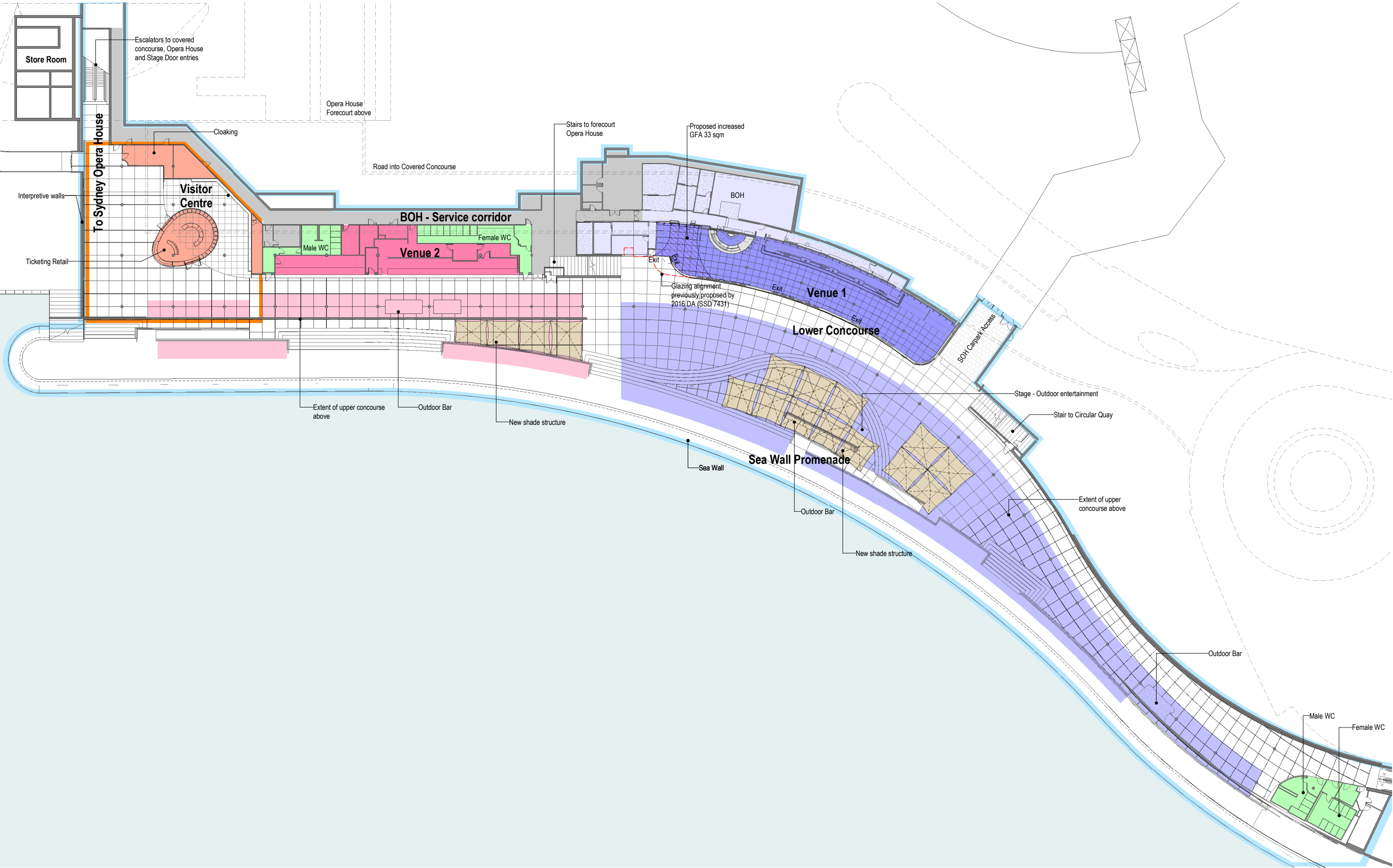
Lower Concourse, Sydney Opera House, Bennelong Point, Sydney

Legend

- Replace Existing Shade Structures
- Modify Existing Glazing line
- Extent of DA (SSD9794) - Aligns with DA 44/85/0511
- Extent of Welcome Centre DA (SSD6353)
- Venue 1 - Internal Seating
- Venue 1 - External Seating
- Venue 1 - BOH and Kitchen
- Venue 2 - BOH and Kitchen
- Venue 2 - External Seating
- BOH storage and Service corridor
- Welcome Centre Tennancy
- WC

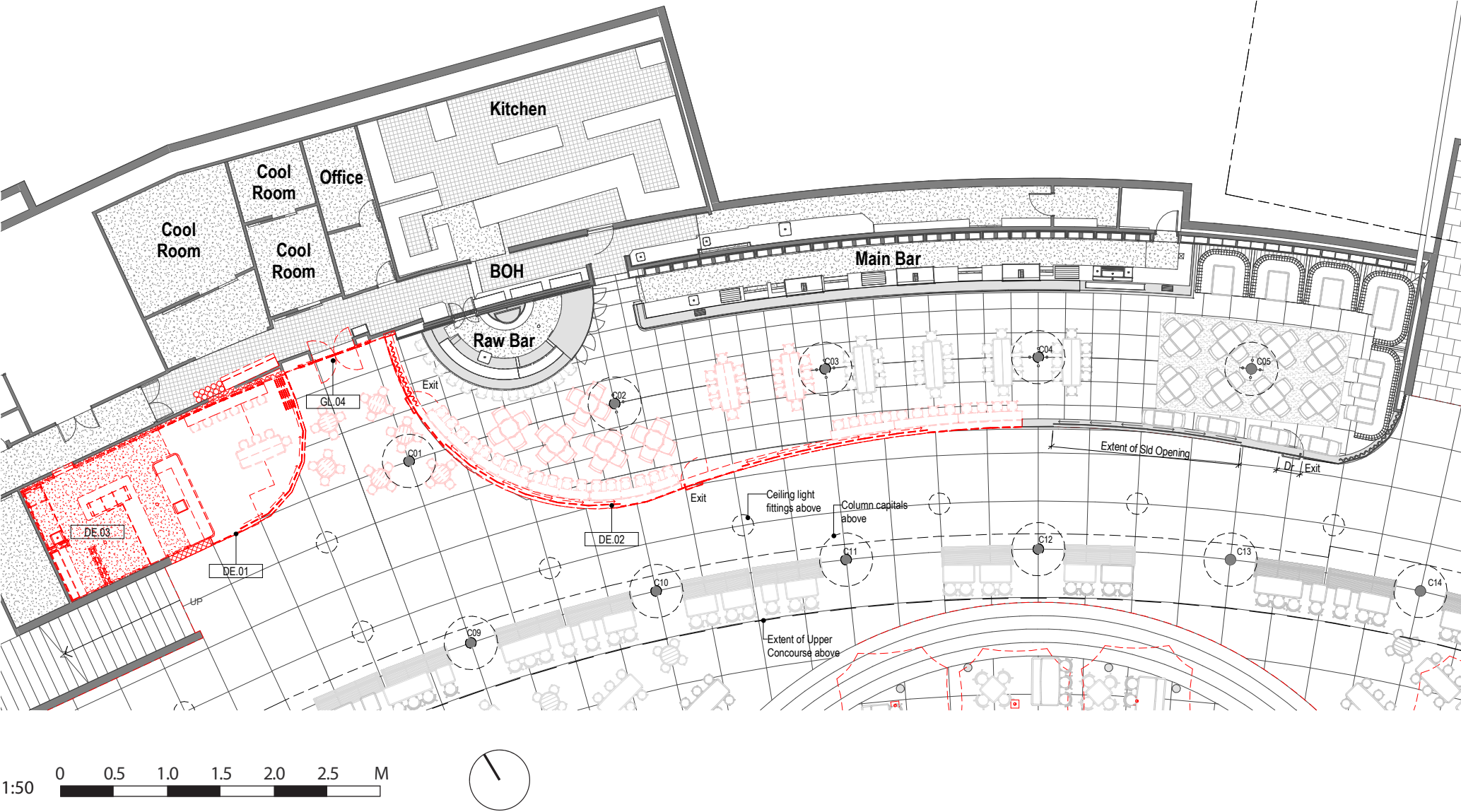


2.0 LOCATION PLAN



# 3.0 GLAZING LINE AMENDMENT

Existing Floor Plan

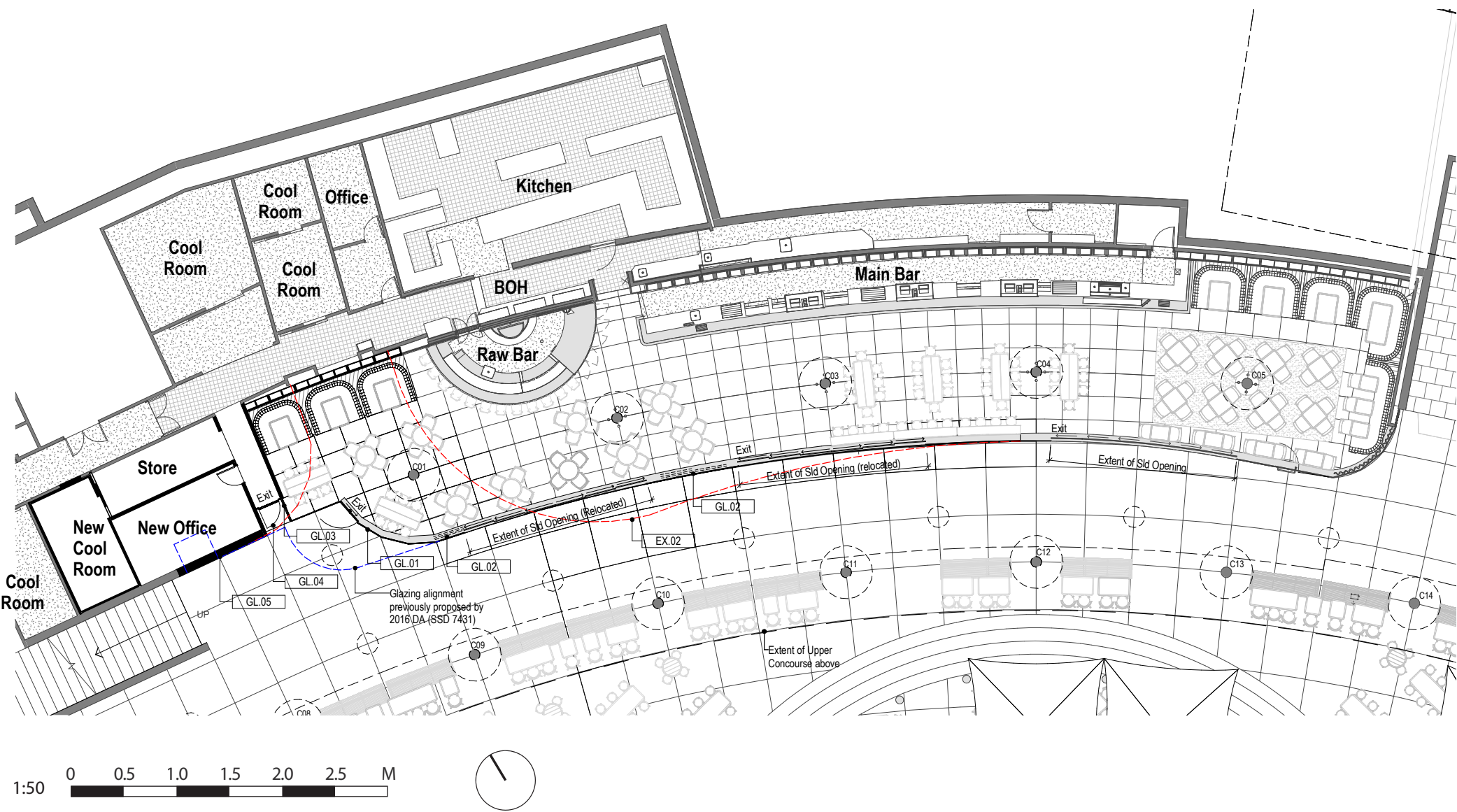


- Legend**
- DE.01 Demolish existing "Meat and Cheese Area" glazing line.
  - DE.02 Partially demolish part of the existing Main Bar area glazing.
  - DE.03 Demolish meat and cheese area fitout.
  - DE.04 Remove existing bronze door



# 3.0 GLAZING LINE AMENDMENT

Proposed glazing line



## Legend

- EX.02 Existing glazing line
- GL.01 Proposed glazing line
- GL.02 Stacking location for sliding glass panels (similar to existing)
- GL.03 Extend full height glazing to match existing and return to solid brass door repositioned from existing fire exit
- GL.05 Clad new wall in stone to match existing (full height) and return into fire door



## 4.0 PHOTO MONTAGE

### View 01 - Existing





## 4.0 PHOTO MONTAGE

View 01 - Proposed





## 4.0 PHOTO MONTAGE

View 02 - Existing





## 4.0 PHOTO MONTAGE

View 02 - Proposed

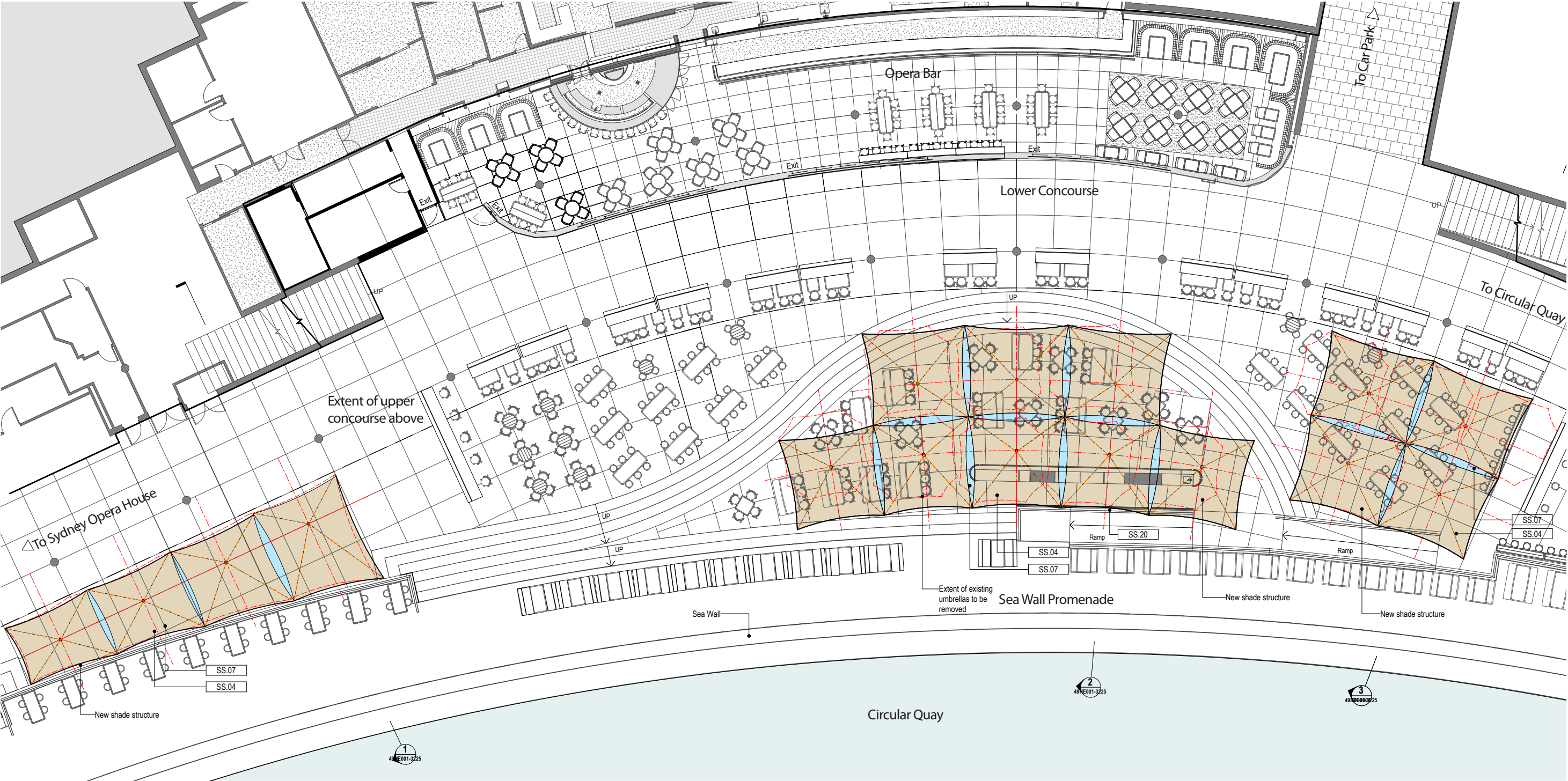




5.0

PROPOSED SHADE STRUCTURE

Plan



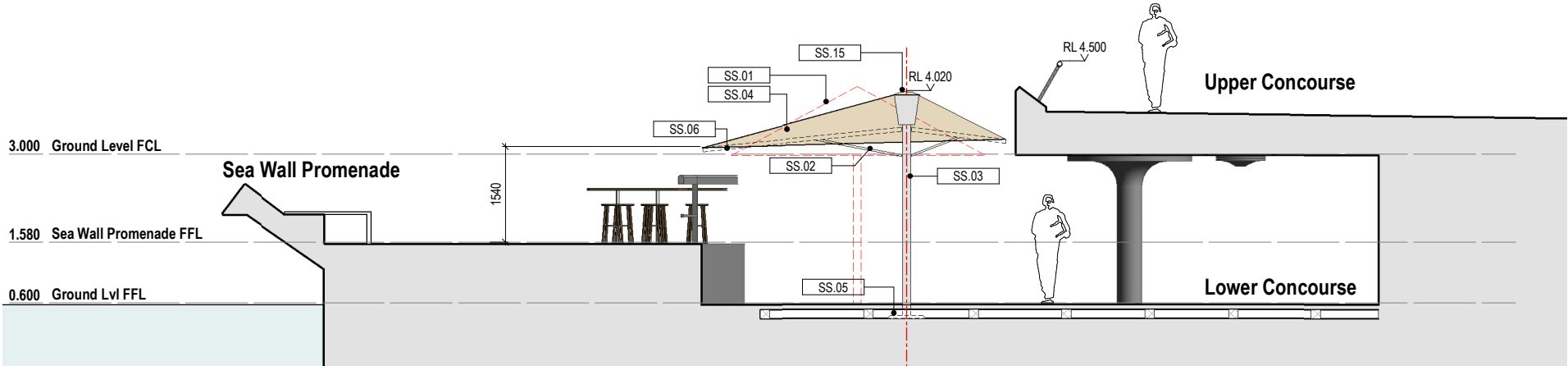
Legend

- SS.04 Tensile fabric equal to Serge Ferrari Soltis, colour closest approved match to Dulux Coconut Husk, to be designed and installed to approved details.
- SS.07 Tensile fabric, Serge Ferrari 402, Translucent infill between umbrella elements as indicated on plan.
- SS.20 Free standing Pull-up Shade Screen, Design to future detail in consultation with the DAP

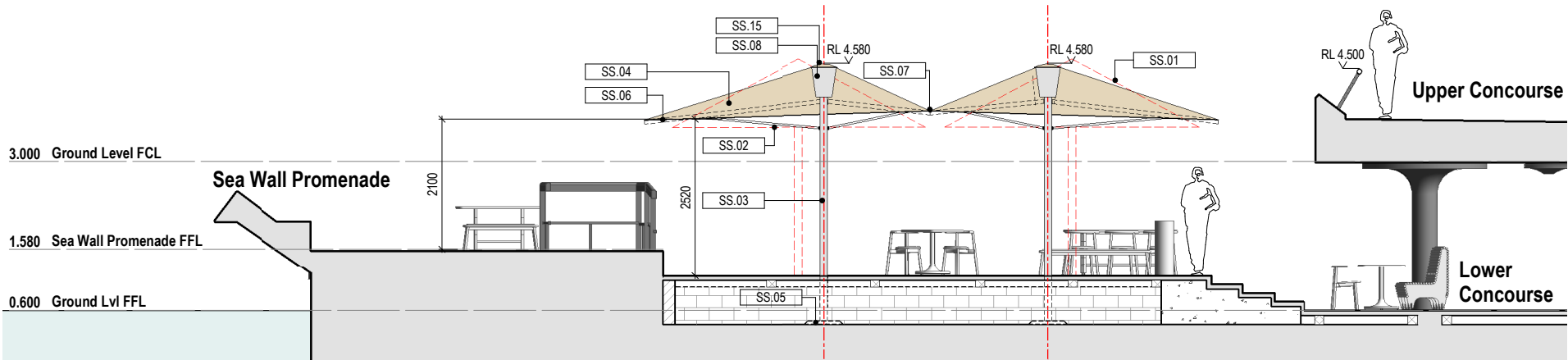


# 5.0 PROPOSED SHADE STRUCTURE

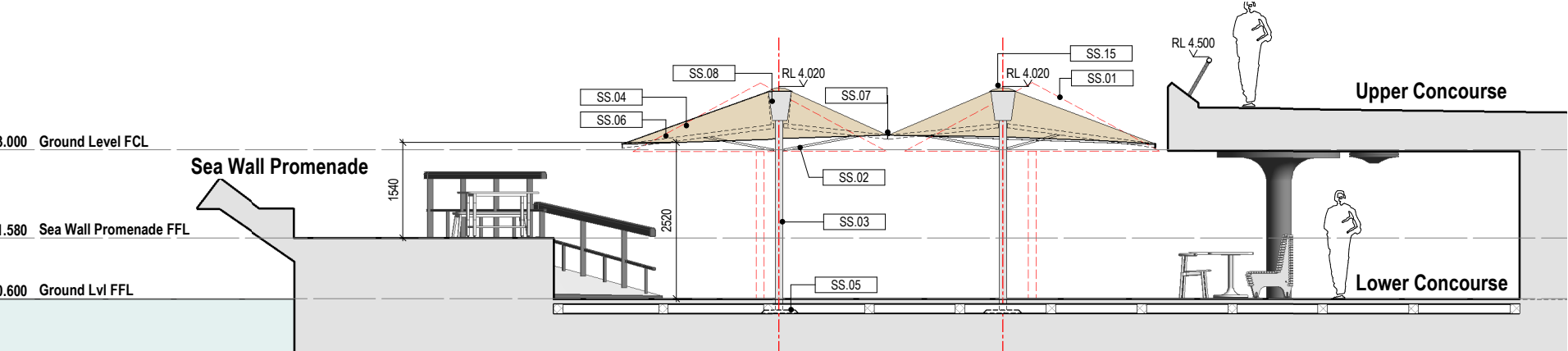
Section



Section A



Section B



Section C

## Legend

- SS.01 Existing umbrellas to be removed. Patch and repair ex pavers where fixings are removed to an approved standard.
- SS.02 SS Shade structure struts designed and fabricated to approved detail.
- SS.03 SS shade structure masts designed and fabricated to approved detail.
- SS.04 Tensile fabric equal to Serge Ferrari Soltis, colour closest approved match to Dulux Coconut Husk, to be designed and installed to approved details.
- SS.05 SS base plate and fixing in accordance with the structural engineer's design and specification
- SS.07 Tensile fabric, Serge Ferrari 402, Translucent infill between umbrella elements as indicated on plan.
- SS.08 Removable approved perforated stainless sheet panels with discreet secure SS fixings designed to conceal services infrastructure including GPS table location system, wifi extenders, lighting drivers, speaker connections, CCTV connections, heater junctions etc as required. Design to facilitate the installation and provide access for the ongoing maintenance of services.
- SS.15 SS column cap to manufacturers detail with integrated structural connection to columns. Powder coat finish colour: closest approved match to dulux 'coconut husk'.



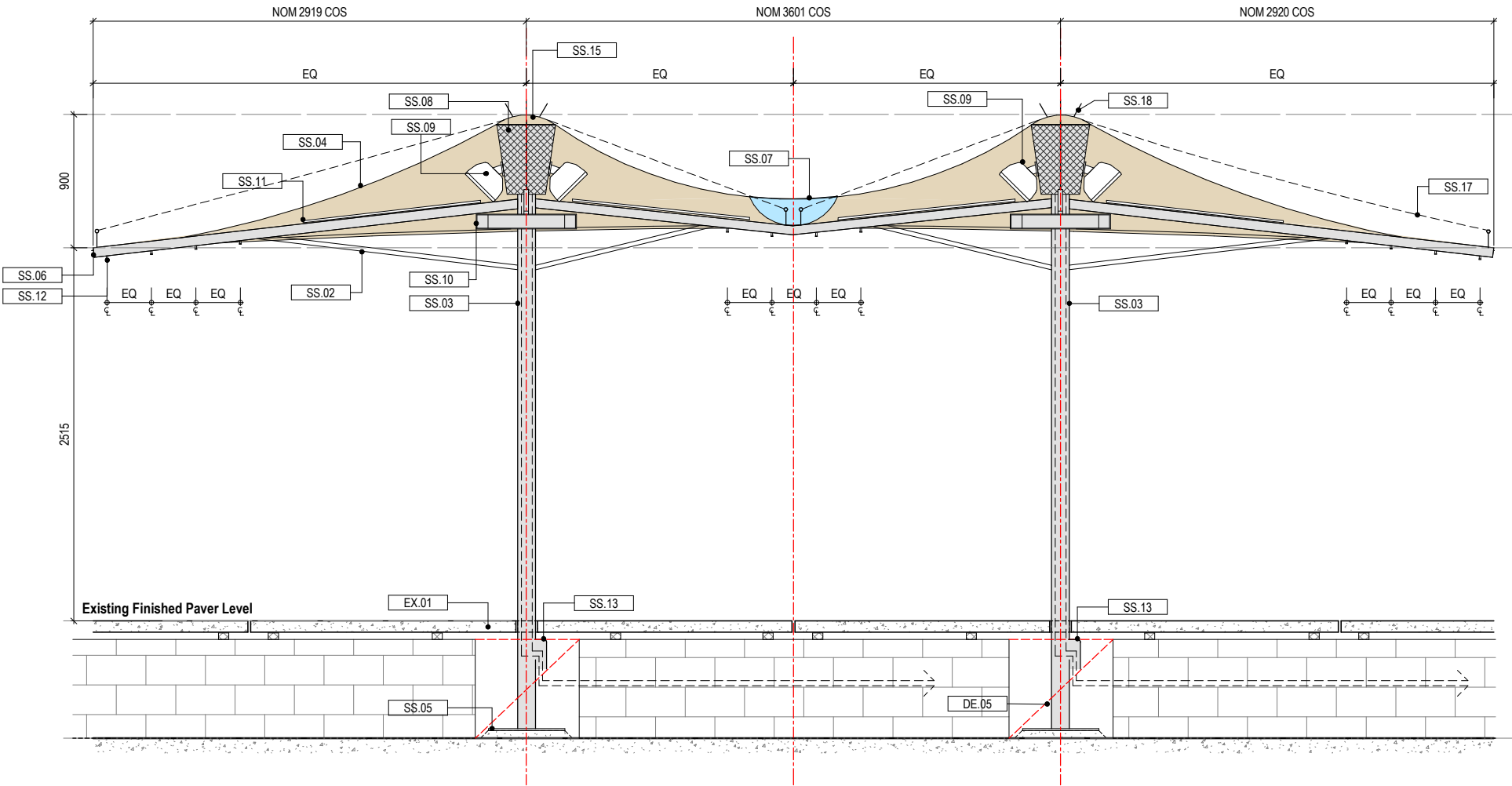


# 5.0 PROPOSED SHADE STRUCTURE

## Shade Structure Services Details

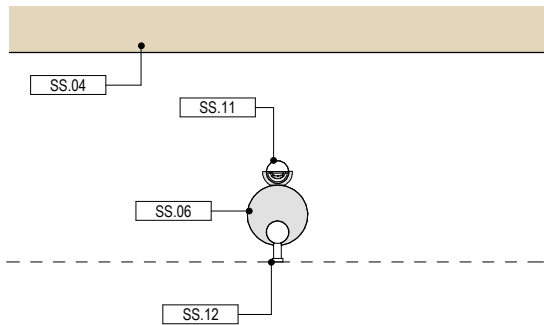
### Legend

- DE.05 Cut section of block wall out as required to facilitate fixing for shade structure columns
- EX.01 Existing granite pavers to remain insitu. Neatly cut around shade structure columns providing consistent clearance
- SS.02 SS Shade structure struts designed and fabricated to approved detail.
- SS.03 SS shade structure masts designed and fabricated to approved detail.
- SS.04 Tensile fabric equal to Serge Ferrari Soltis, colour closest approved match to Dulux Coconut Husk, to be designed and installed to approved details.
- SS.05 SS base plate and fixing in accordance with the structural engineer's design and specification
- SS.06 SS shade structure outriggers designed and fabricated to approved detail. Powder coat finished, closest match to dulux coconut husk.
- SS.07 Tensile fabric, Serge Ferrari 402, Translucent infill between umbrella elements as indicated on plan.
- SS.08 Removable approved perforated stainless sheet panels with discreet secure SS fixings designed to conceal services infrastructure including GPS table location system, wifi extenders, lighting drivers, speaker connections, CCTV connections, heater junctions etc as required. Design to facilitate the installation and provide access for the ongoing maintenance of services.
- SS.09 Indicative speaker locations. Speaker similar to void indigo 6 pro with colour matched finish (to dulux "coconut husk" with adjustable mounting brackets. Location, specification and configuration tbc with acoustic and audio-visual consultants. Speakers are to generally be directed away from residential apartments to the south and downwards from their mounting position towards patrons.
- SS.10 Infra-red electric heating with variable control and zoned wiring. Specifications and configuration tbc with experienced contractors.
- SS.11 Strip led up-lighting to the underside of the shade structure fabric fabricated from proprietary suitably weather-proof strip led fitted within proprietary aluminum housing with integrated acrylic diffusers to effect even distribution of light over the underside of the canopy. Fit led strip in 2 or 3 independently controlled sections to facilitated graduated illumination of the underside of the fabric to compensate for the variable proximity of the strip light to the fabric.
- SS.12 Misting nozzles. Misting runs within framing only. All connections made in accessible locations. Nozzles protrude through outriggers.
- SS.13 All service connections to run under pavers in accordance with service consultants requirements. Weather proof penetration in accordance with shade structure manufacturers details.
- SS.14 Custom SS bracket fixed to outrigger
- SS.15 SS column cap to manufacturers detail with integrated structural connection to columns. Powder coat finish colour: closest approved match to dulux 'coconut husk'.
- SS.16 Perforated SS gusset to facilitate the mounting of service infrastructure
- SS.17 Stainless Steel bird wire to approved details
- SS.18 Stainless Steel bird spikes to approved details
- SS.19 Indicative equipment within SS gusset. Equipment including, GPS table location system, wifi extenders, lighting drivers, speaker connections, CCTV connections, heater junctions etc.



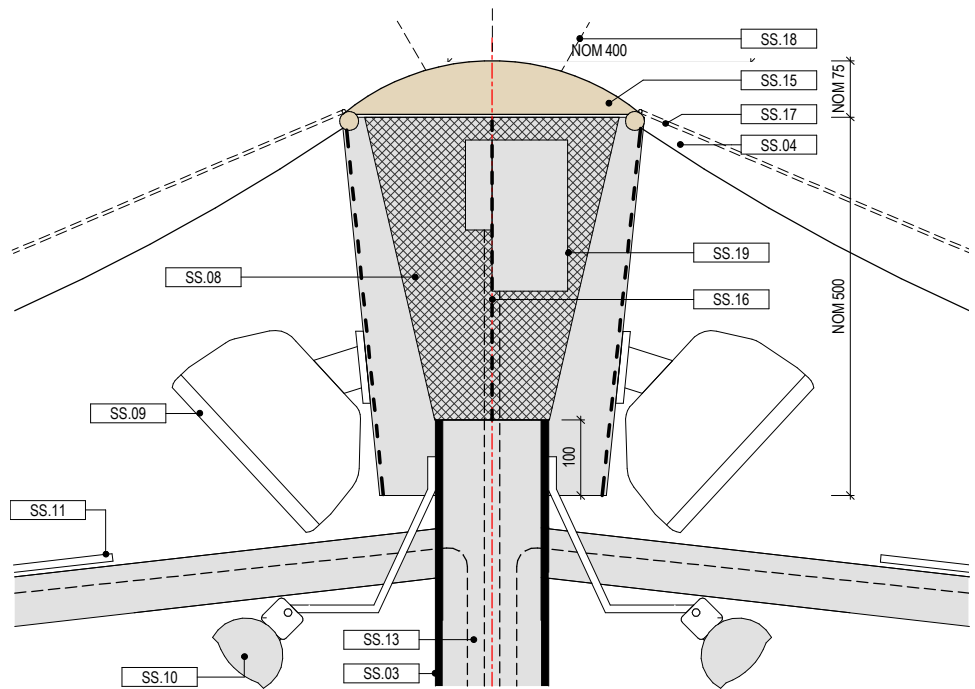
1 Detail Section - Shade Structure Services

1:20



2 Detail Section - Service bracket

1:5



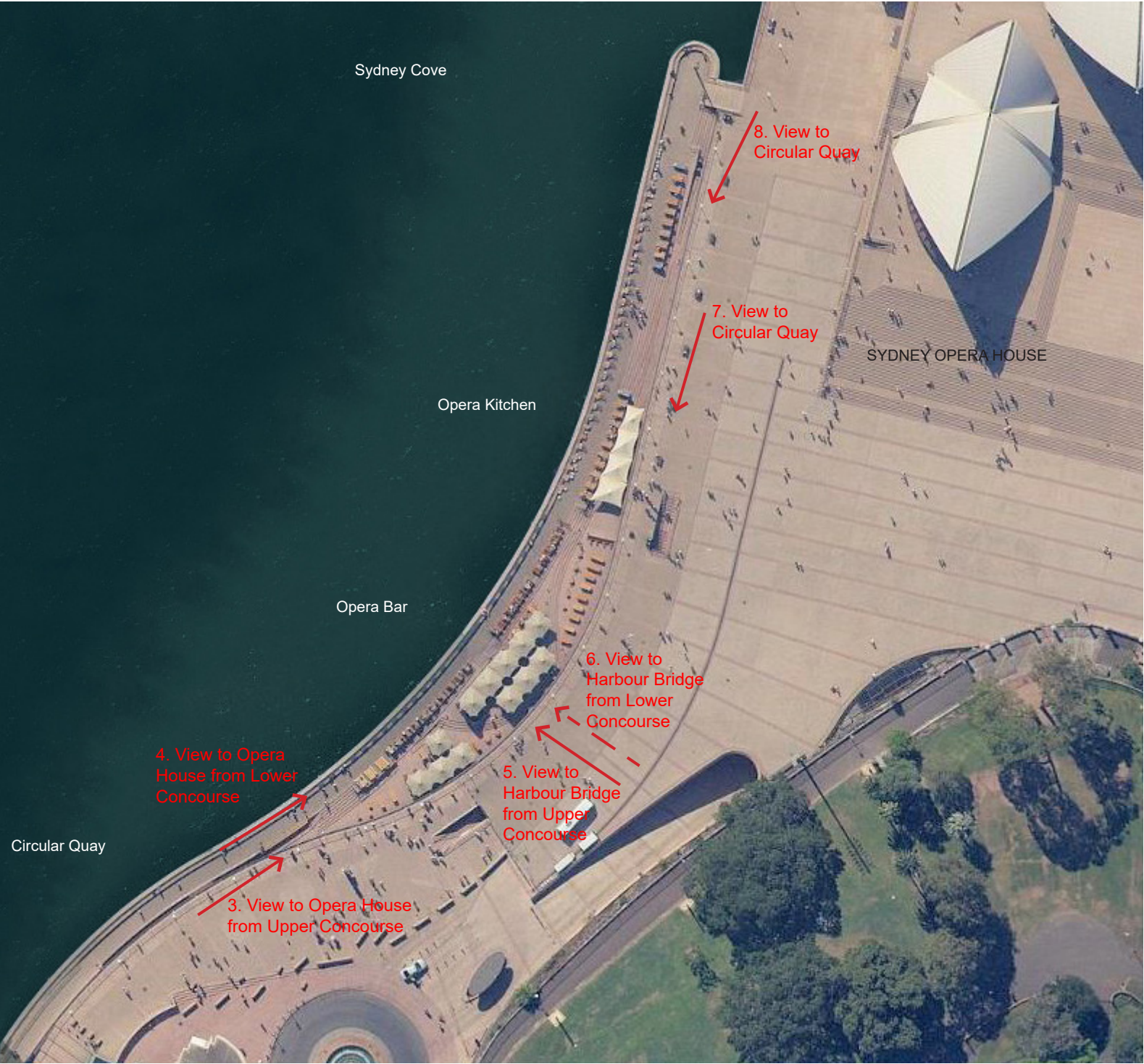
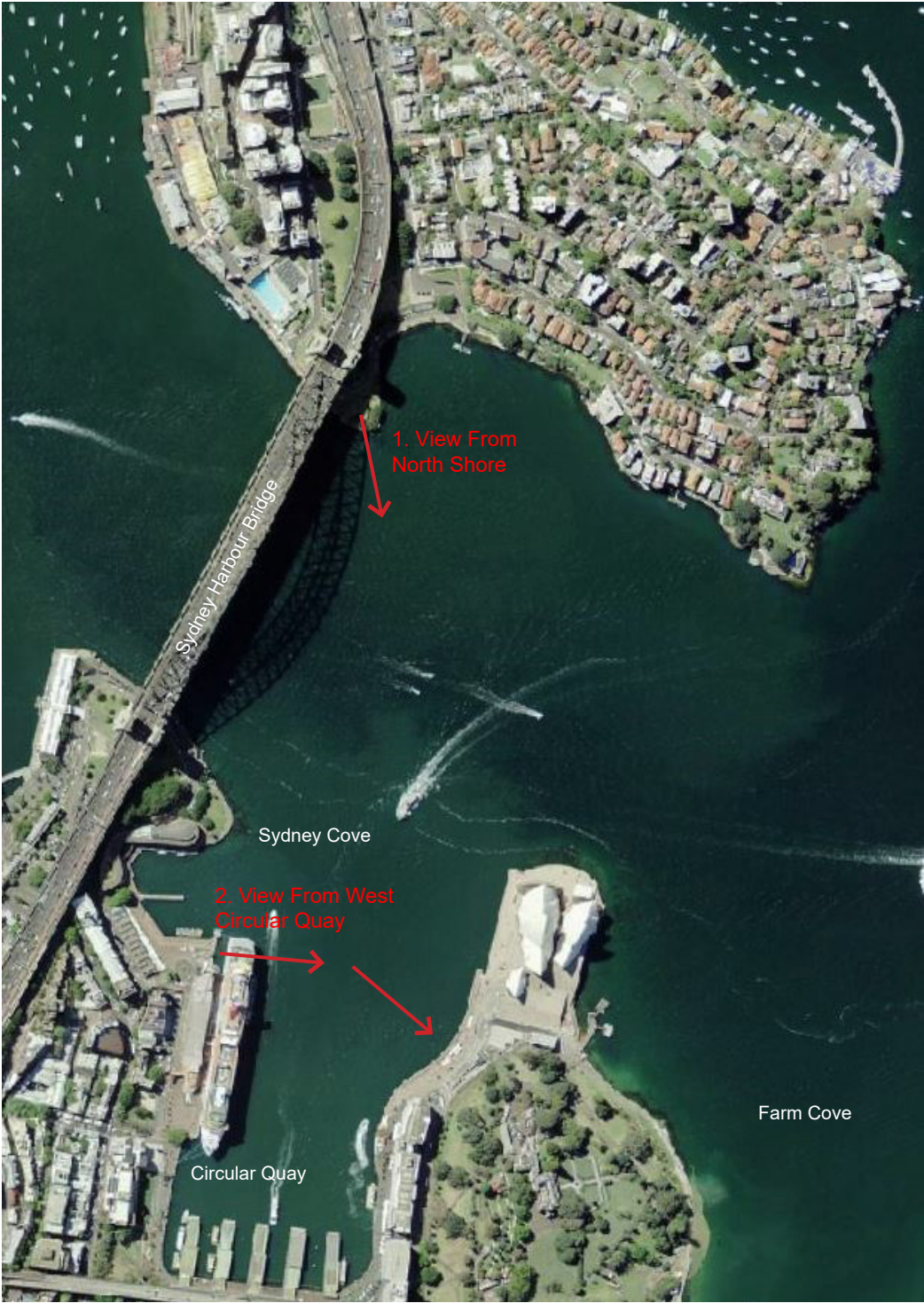
3 Detail Section - Shade Structure Services

1:5



# 6.0 KEY VIEWPOINTS

Location Plan showing selected key Public Viewpoints



Location Plans showing selected key Public Viewpoints  
Source: Spatial Information Exchange



## 7.0 PHOTO MONTAGE

View 01 - Existing



View from North Shore - **Existing**  
Ben Guthrie Photography



## 7.0 PHOTO MONTAGE

View 01 - Proposed



View from North Shore - **Proposed**  
Ben Guthrie Photography



# 7.0 PHOTO MONTAGE

View 02 - Existing



View from West Circular Quay - **Existing**  
*Ben Guthrie Photography*



7.0 PHOTO MONTAGE

View 02 - Proposed



View from West Circular Quay - **Proposed**  
*Ben Guthrie Photography*



## 7.0 PHOTO MONTAGE

### View 03 - Existing



View to Opera House - **Existing**  
*Ben Guthrie Photography*



## 7.0 PHOTO MONTAGE

View 03 - Proposed



View to Opera House - **Proposed**  
*Ben Guthrie Photography*



## 7.0 PHOTO MONTAGE

### View 04 - Existing



View to Opera House - **Existing**  
*Ben Guthrie Photography*



## 7.0 PHOTO MONTAGE

View 04 - Proposed



View to Opera House - **Proposed**  
*Ben Guthrie Photography*



## 7.0 PHOTO MONTAGE

View 05 - Existing



View to Harbour Bridge - Existing  
*Ben Guthrie Photography*



## 7.0 PHOTO MONTAGE

View 05 - Proposed



View to Harbour Bridge - **Existing**  
*Ben Guthrie Photography*



## 7.0 PHOTO MONTAGE

View 06 - Existing



View to Harbour Bridge - Existing  
*Ben Guthrie Photography*



## 7.0 PHOTO MONTAGE

View 06 - Proposed



View to Harbour Bridge - Existing  
*Ben Guthrie Photography*



## 7.0 PHOTO MONTAGE

View 07 - Existing



View to Circular Quay - **Existing**  
*Ben Guthrie Photography*



## 7.0 PHOTO MONTAGE

View 07 - Proposed



View to Circular Quay - **Proposed**  
*Ben Guthrie Photography*



## 7.0 PHOTO MONTAGE

View 08 - Existing



View to Circular Quay - **Existing**  
*Ben Guthrie Photography*



## 7.0 PHOTO MONTAGE

View 08 - Proposed

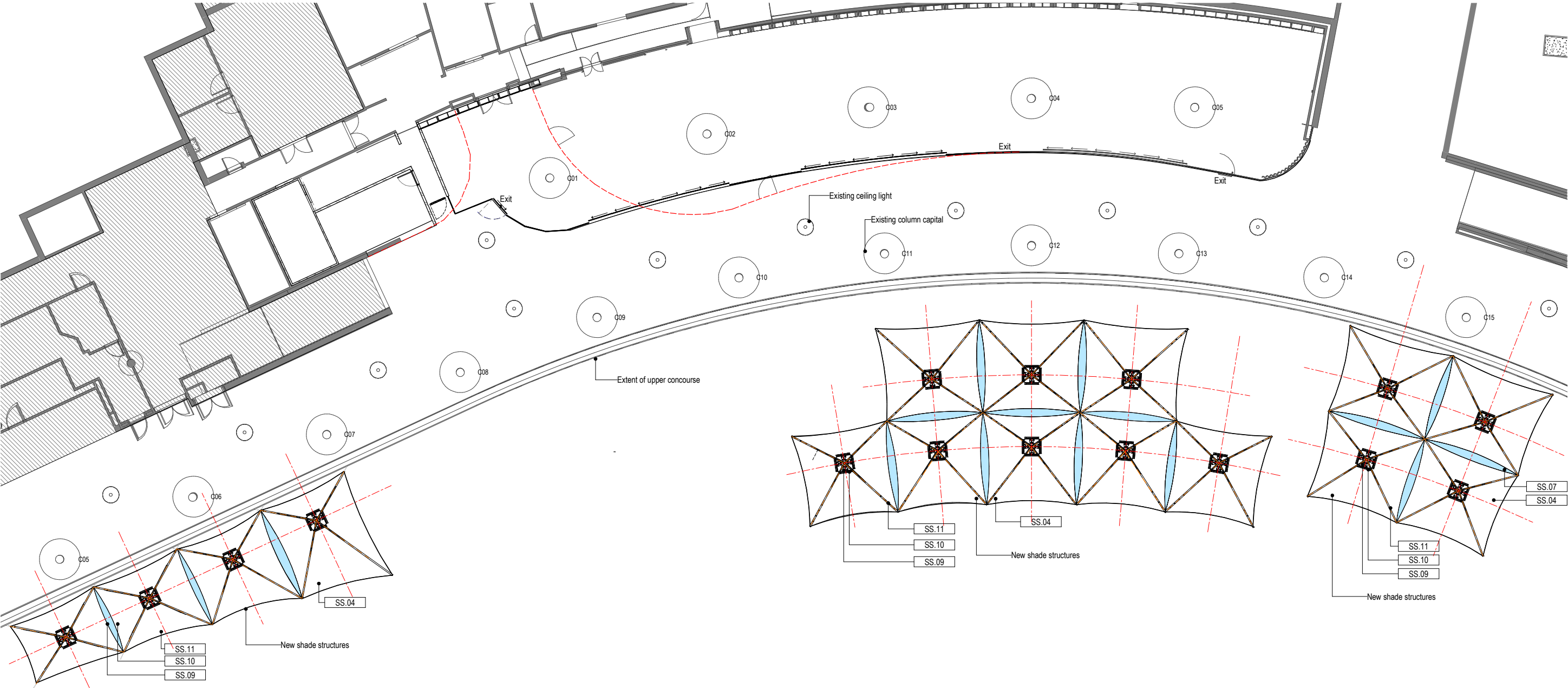


View to Circular Quay - **Proposed**  
*Ben Guthrie Photography*



# 8.0 PROPOSED SHADE STRUCTURE

## Reflected Ceiling Plan



- Legend**
- SS.04 Tensile fabric equal to Serge Ferrari Soltis, colour closest approved match to Dulux Coconut Husk, to be designed and installed to approved details.
  - SS.07 Tensile fabric, Serge Ferrari 402, Translucent infill between umbrella elements as indicated on plan.
  - SS.09 Indicative speaker locations. Speaker similar to void indigo 6 pro with colour matched finish (to dulux “coconut husk” with adjustable mounting brackets. Location, specification and configuration tbc with acoustic and audio-visual consultants. Speakers are to generally be directed away from residential apartments to the south and downwards from their mounting position towards patrons.
  - SS.10 Infra-red electric radiant heating with variable control and zoned wiring. Specifications and configuration tbc with experienced contractors.
  - SS.11 Strip led up-lighting to the underside of the shade structure fabric fabricated from proprietary suitably weather-proof strip led fitted within proprietary aluminum housing with integrated acrylic diffusers to effect even distribution of light over the underside of the canopy. Fit led strip in 2 or 3 independently controlled sections to facilitated graduated illumination of the underside of the fabric to compensate for the variable proximity of the strip light to the fabric.





9.0 COMPARISON TABLE

Design Consideration	Existing Umbrellas	Proposed Umbrellas	Comment
Minimise visual clutter	<ul style="list-style-type: none"><li>• Have poorly integrated and cluttered services.</li><li>• The connection detail between individual umbrellas is functionally and aesthetically poor.</li></ul>	<ul style="list-style-type: none"><li>• Exhibit a more streamlined structure.</li><li>• Provide better integrated services (lighting, AV, heating, data, security, etc.).</li><li>• Provide a seamless connection between individual umbrellas facilitating better weather protection and a more efficient structure.</li></ul>	<ul style="list-style-type: none"><li>• The exiting umbrella structures are of little architectural merit and have been positioned without consideration to the UDPs.</li><li>• The proposal intends to replace the existing umbrellas with new, similar, but more architecturally resolved umbrellas with better integrations of services, sited to respond to the UDP criteria whilst improving weather protection in the most appropriate locations.</li></ul>
Integration with SOH architecture	<ul style="list-style-type: none"><li>• Are prosaic and temporal in appearance.</li><li>• Are temporary and unconsidered in appearance.</li><li>• Are reversible with minimal impact on existing fabric.</li></ul>	<ul style="list-style-type: none"><li>• Relate to the radial grid and established geometry of the Lower Concourse.</li><li>• Are more considered in design from both functional and aesthetic aspects..</li><li>• Remain relatively "prosaic" and temporal in appearance.</li><li>• Are reversible with minimal impact on existing fabric.</li></ul>	<ul style="list-style-type: none"><li>• Note that the Opera Kitchen shade structures geometrically resolve between the geometry of the upper concourse parapet and the Sea Wall Promenade and are therefore non-symmetrical.</li></ul>
Impact on views to SOH	<ul style="list-style-type: none"><li>• Negligible impact on views to and/or across the Lower Concourse or Forecourt from any readily accessible public vantage point.</li></ul>	<ul style="list-style-type: none"><li>• Negligible impact on views to and/or across the Lower Concourse or Forecourt from any readily accessible public vantage point.</li></ul>	
Perception of continuous roof (marquee)	<ul style="list-style-type: none"><li>• Do not appear "roof-like".</li><li>• Appear as umbrellas within the Lower Concourse space.</li></ul>	<ul style="list-style-type: none"><li>• Do not appear "roof-like".</li><li>• Appear similarly as umbrellas within the Lower Concourse space.</li></ul>	
Maximise weather protection and patron comfort	<ul style="list-style-type: none"><li>• Poor connection detail results in ineffective coverage between individual umbrellas significantly reducing the overall effectiveness of the umbrellas in most circumstances.</li></ul>	<ul style="list-style-type: none"><li>• Provides improved overall coverage in the most appropriate areas.</li><li>• Improved connection detail provides significantly improved weather protection between individual umbrellas.</li></ul>	
Shade Structure Coverage (m2)	257.2	306.1	
% Increase	0.0%	19.1%	Note that the connection between the existing umbrellas is not seamless, thereby reducing their effective coverage in wet weather.
Shade Structure Coverage ADJUSTED TO REFLECT USABLE AREA* ONLY (m2)	247.4	292.8	
% Increase ADJUSTED TO REFLECT USABLE AREA* ONLY	0.0%	18.3%	Note that the connection between the existing umbrellas is not seamless, thereby reducing their effective coverage in wet weather.

\* Note, usable area refers to the undercover area that is not above stairs or a principal access route and thereby readily usable for seated and/or standing patrons.



