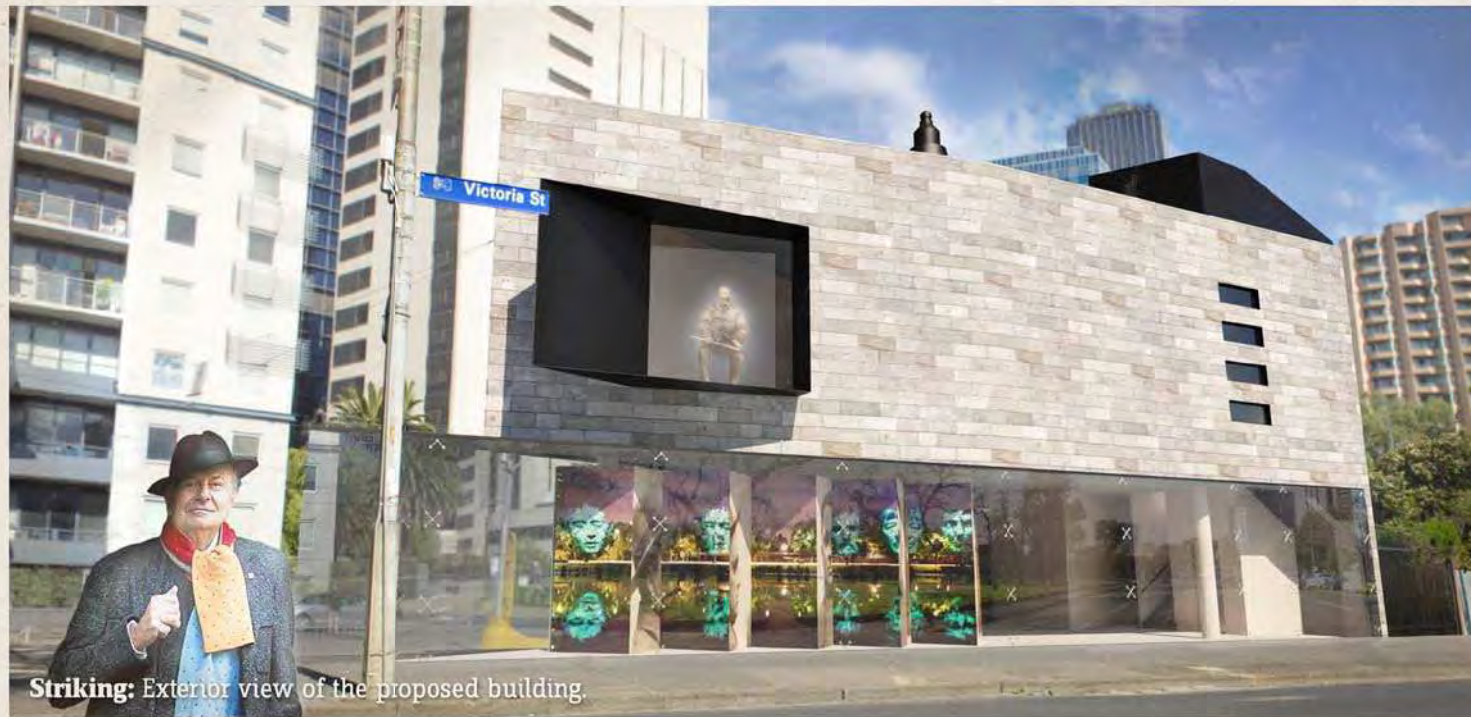




The Royal Society of Victoria

PROMOTING SCIENCE AND ENGINEERING SINCE 1854

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Striking: Exterior view of the proposed building.

Museum of the Hoddle Grid

The Royal Society site is the ideal location for a Museum of the Hoddle Grid as it is positioned at the junction of the north east corner of the Grid and the surrounding streets.

The 3D representation also allows for the gently sloping valley between Batman's Hill, Flagstaff Hill and Eastern Hill to be represented, together with the gully in the middle of the grid which was built over and became Elizabeth Street.

It is the hinge of Melbourne.

The holograms allow 3D representations of the buildings of the city to be pulled up out of the Grid. People can walk through the representation, and individual buildings can be switched on and off to allow a more detailed discussion.

(left) Map of central Melbourne showing location of brick houses, mud buildings, public buildings and boarded houses. J. Williamson, c. 1839, map. Accession number: MAFS LB 821.0: A (1839) WILLIAMSON. From the State Library of Victoria Maps Collection.

Royal Society Goals & Objectives

The Royal Society have called for any proposal that involve or consider the Society's mission to promote the sciences in Victoria. There are multiple connections between the Royal Society's goals and objectives and the Museum of the Hoddle grid.

The scientific survey of the colony of Port Phillip and future Victoria, including the mapping of suitable terrain for various productive uses such as agriculture, is one such

connection. It is not clear if Hoddle himself was involved with identifying suitable sites for mineral exploration, but Hoddle's department was instrumental in the opening up of the Victorian countryside for exploitation.

Another connection is the history between the Royal Society and the Museum of Victoria; from the outset, the Royal Society's purpose has been the promotion of science for the benefit of the community.

So for instance, the museum, water supply, stormwater and sewerage systems and crematorium for Melbourne were all planned at the Royal Society, and particularly the science related to these.

The Royal Society Site



The eastern end of the triangular Royal Society of Victoria site is positioned at the north-east corner of Melbourne's Hoddle Grid, and is in close proximity to the Royal Exhibition Building and Melbourne Museum in Carlton Gardens. The site is on a highly visible corner, passed each day by thousands of people.

The Hoddle Grid

The Hoddle Grid, named after its designer Robert Hoddle, was laid out in 1837 in the same month that Hoddle arrived in Port Phillip.

Hoddle was appointed senior surveyor, and with his assistants D'Arcy and Darke, took charge of the work which had been started by Robert Russell. Hoddle's first map covered the area from Flinders Street to Lonsdale Street, and from Spencer Street to Spring Street. The principal streets were made 30 metres wide, and the smaller streets, originally intended to provide rear entrances, 10 metres wide. It has proved to be far-sighted for public utility.

The long axis of the Grid is orientated at 70 degrees clockwise from true north, to align approximately with the course of the Yarra River, while the majority of Melbourne is orientated at 8 degrees clockwise



Robert Hoddle's survey of the town of Melbourne in 1837 Sydney map M/6 (Victorian Public Record Office VPRS 8168/P2 Historic Plan Collection, Unit 6167, Sydney M8)

Ground Floor

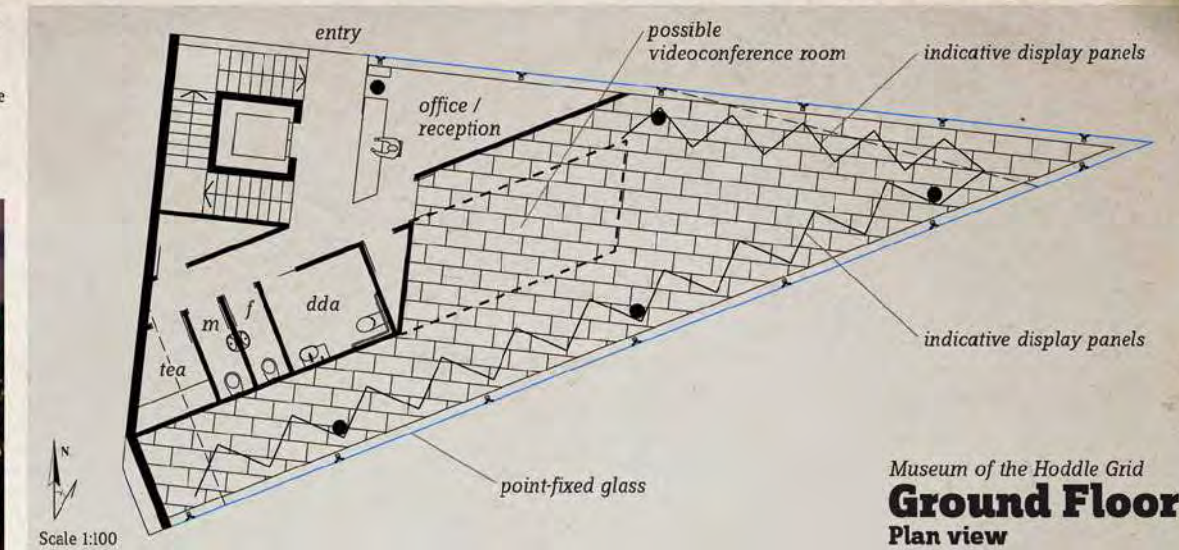
Glass Display Case

The ground floor is a non-accessible glass display case, presenting large-format information and large exhibits relating to public events such as White Night Melbourne:



White Night: Craig Walsh's Monuments (Georgia Moodie, ABC) craig@craigwalsh.net

or exhibitions at the Old Treasury Building on Spring Street. Examples shown to the right.



Scale 1:100



Reception Office

The entry is from Victoria Street, on the north side of the building.

Immediately inside is the reception and office associated with the

Museum of the Hoddle Grid
Ground Floor
Plan view

first floor Museum of the Hoddle Grid, together with toilets and access stairs and lift. The stairs and lift serve both the first floor and the rooftop.

First Floor

Museum of the Hoddle Grid

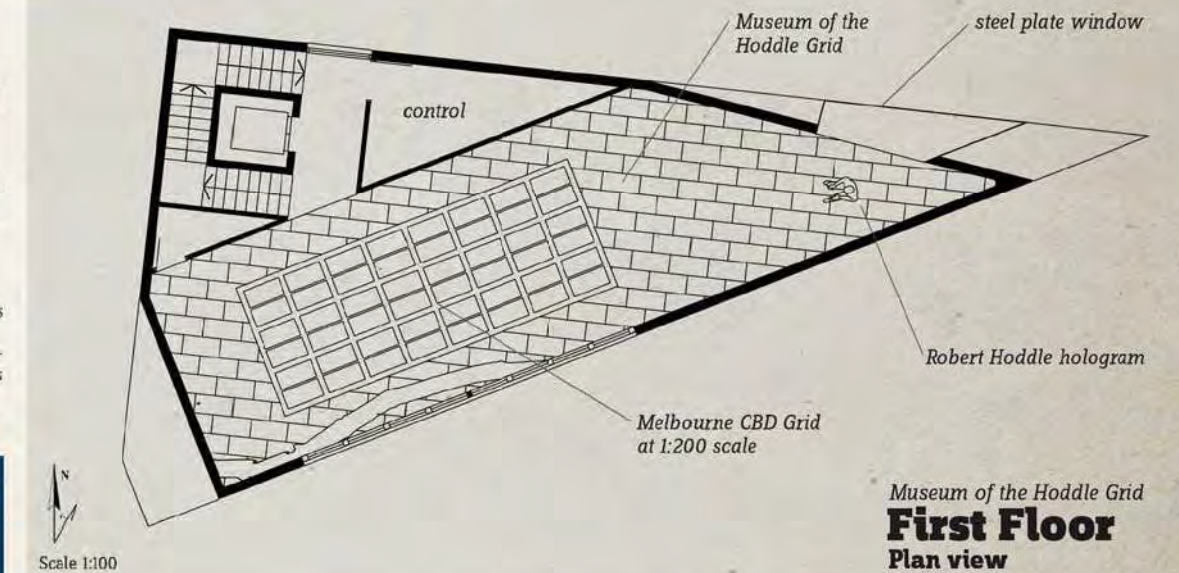
There is no central repository for the information and original documents relating to the laying out of Melbourne's central grid.

The State Library of Victoria, Museum Victoria, Melbourne Town Hall and the City Museum in the Old Treasury Building all hold elements relating to this story.

Rather than collecting original papers from the various institutions (who understandably may be unwilling to part with them), 3D holograms would enable virtual avatars to be overlaid to tell the definitive story of the origins of Melbourne.

Learn More...

A comprehensive overview of the Museum of the Hoddle Grid continues on Page 03



Scale 1:100

Museum of the Hoddle Grid
First Floor
Plan view

Roof Level

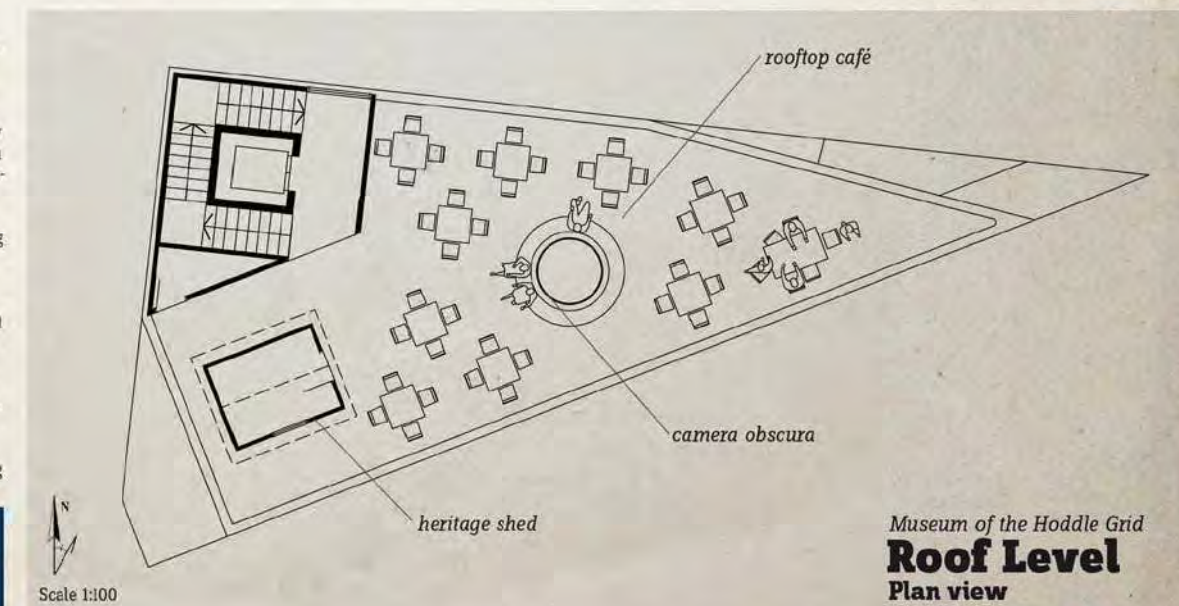
Melbourne Weather Bar - Open Air Bar and Café, Existing Shed and BOM Instruments

The eastern tip of the Royal Society site was well known for the Bureau of Meteorology weather data instruments which once occupied the site. These instruments have now been moved to another site, leaving the grass and 1920s heritage shed behind. The grass and shed are now proposed to be moved onto the roof of the new building as part of the new Bar and Café.

The BOM could be invited to reinstall the weather data collecting instruments on the roof if the conditions are favourable, or perhaps bring back some of their interesting obsolete equipment.

Learn More...

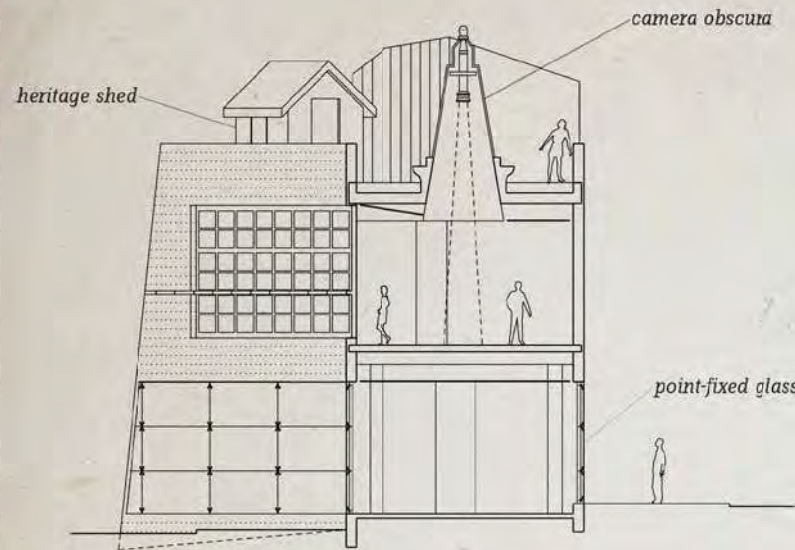
about the unique green roof technology on Page 02



Scale 1:100

Museum of the Hoddle Grid
Roof Level
Plan view

Through the lens of the Camera Obscura



Mounted above the roof are a series of lenses in a steel cylinder, covered by a protective hood open to one side.

Under the hood and facing out through the opening is a plain mirror, protected by a pane of glass. The light from any object passes through the glass. The mirror is set at an angle, reflecting the light down through the lens and into the room below, where an image of the object is visible when the room is darkened.

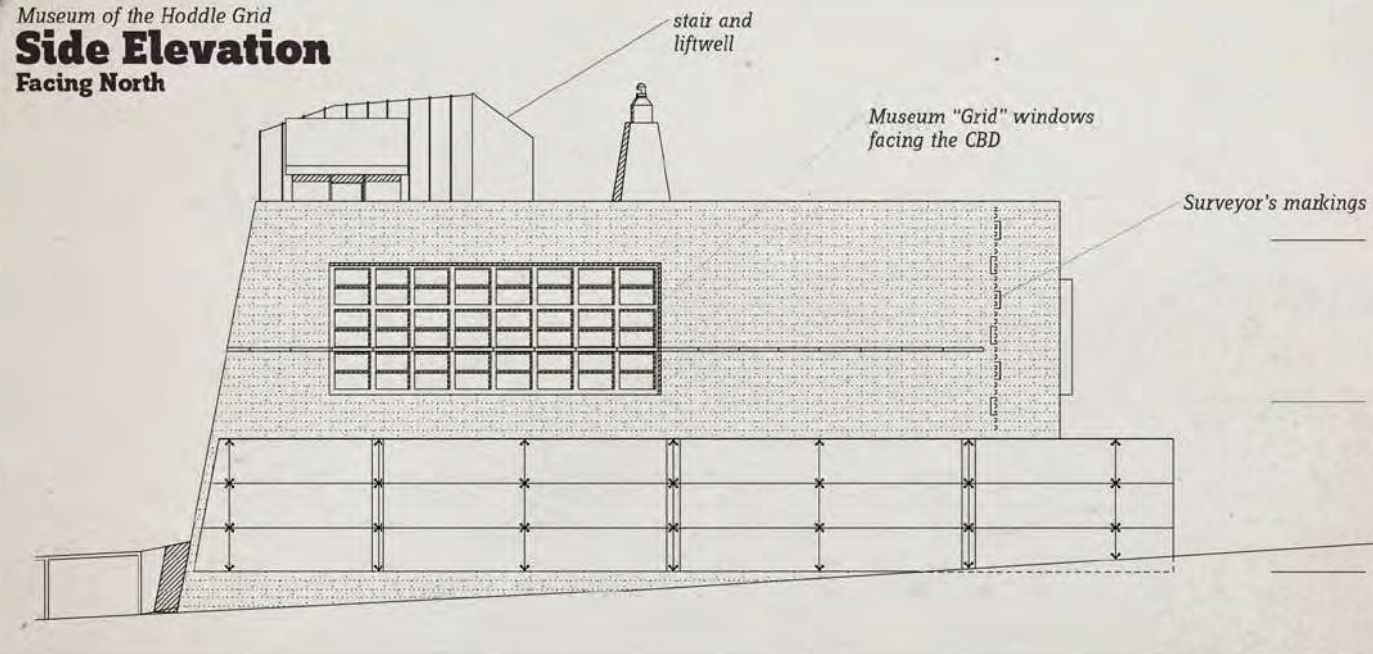
The mirror tilts and rotates to change the view. The image is not magnified, but is reproduced at life size. It is also

correctly orientated. The lenses also focus the image. The quality of the image is excellent.

This will allow the features of the current Melbourne to be related to the Museum of the Hoddle Grid presented in the room below.

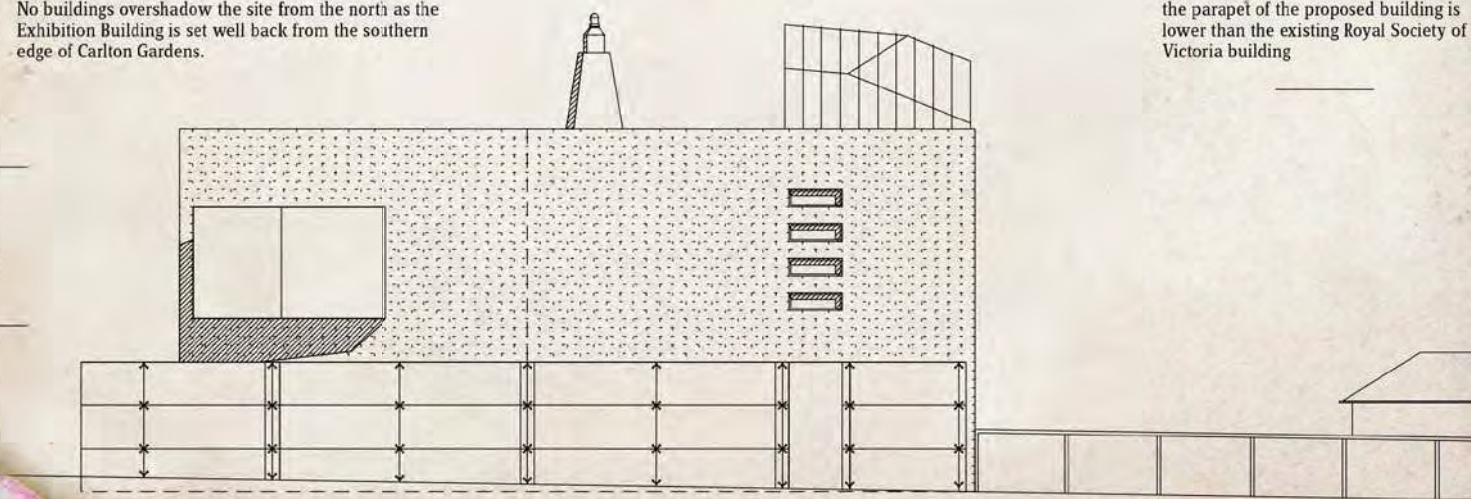


Museum of the Hoddle Grid Side Elevation Facing North



Museum of the Hoddle Grid Royal Society Site Facing South

No buildings overshadow the site from the north as the Exhibition Building is set well back from the southern edge of Carlton Gardens.



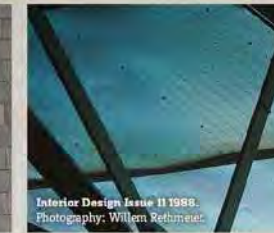
Materials



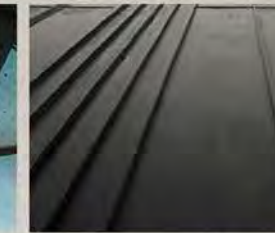
The ground floor vitrine is surrounded with point-fixed glass.



The upper floor is clad in bluestone, the most Melbourne of materials.



Electroplated steel sheet ceilings provide a bright floating plane to both the ground and first floors.



The lift and stair box on the roof is clad in standing seam zinc.



Above Left: Paint to steel plate: International Paint Interthane - 870 Metal Effects 'Dark Storm'
Above Right: Powder coating to aluminum windows: Interpon D2015 Ultra Commercial Collection 'Sable Asteroid' Texture Y1371A

Green Roof Technology

Green roof technology in Australia is relatively new, with the first such projects appearing in the last 15 years.

In Europe, this technology is highly advanced and well understood, and the knowledge and management protocols have been adopted in Australia and modified to address the local conditions.

The benefits of green roofs include:

- Sustainable management of site stormwater
- Thermal improvements to the building, including heat island effect and building insulation
- Greening and cooling of public open space, and
- Ecological and biodiversity benefits

Green roofs are well suited to constrained urban spaces such as the Royal Society site.

Extensive and Intensive Green Roofs

There are two categories of green roof; these are extensive and intensive.

Extensive green roofs use a shallow growing media of up to 200mm depth. Intensive green roofs are constructed using a deeper layer of growing media; at least 200mm up to 400mm or deeper.

An intensive green roof is proposed for the site. A mix of grasses, ground covers, flowers, shrubs and even trees can be planted. Paths, walkways and seating can be interspersed to provide access for people to interact with the natural environment and dine and work in the park-like setting.

Green Roof Design

A range of factors are considered when designing a green roof.

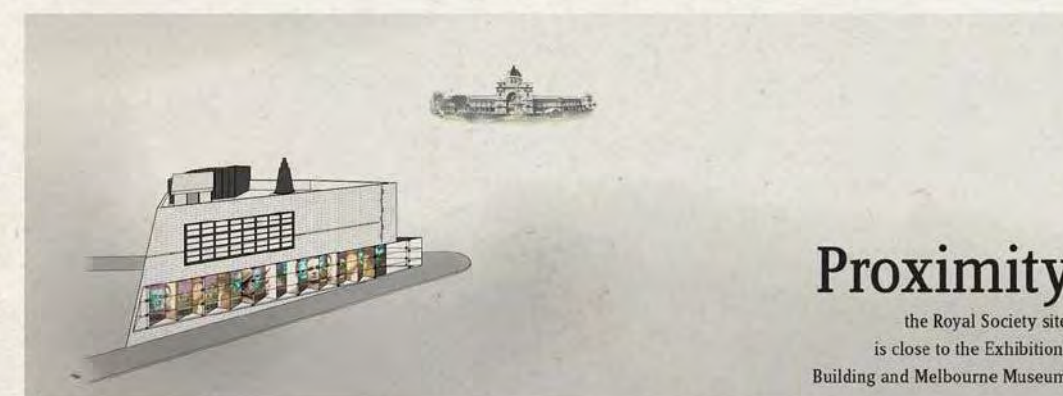
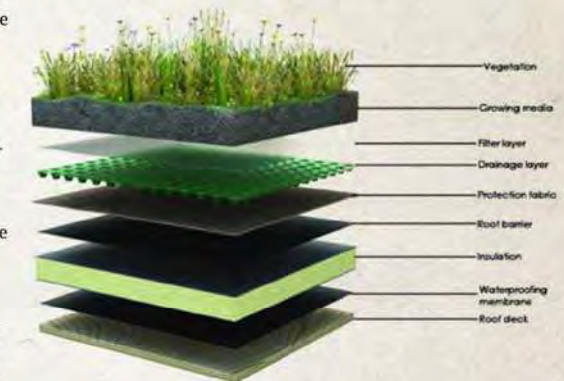
These include:

- Overall aspirations. For example, this may include food production, biodiversity and/or aesthetics
- Media selection, water holding capacity and overall weight of the system
- Plant selection; robust and reliable is best
- Maintenance requirements
- Access for both construction and maintenance
- Climate, including an understanding of changed climatic conditions on the roof. Roofs store or radiate heat and temperatures and exposure to solar radiation and wind are important considerations in plant and media selection.
- Drainage and irrigation
- Weight loading and load bearing capacity; this includes both dead and live loads as well as transient loads brought about by wind or seismic activity

Schematic of the necessary layers

The growing substrate is predominantly inorganic material with a small proportion of organic matter. A filter sheet retains the substrate

and prevents wash-through into the drainage layer. A protection mat, which may also be an insulating layer, and a root barrier are used to protect the underlying waterproof membrane.



Proximity

the Royal Society site is close to the Exhibition Building and Melbourne Museum



A look inside the Museum of the Hoddle Grid

Buildings, both constructed and wrecked, are presented as 3D holograms over the Grid to illustrate the evolution of the city, and could be updated whenever part of the city is altered. Discoveries of information relating to a historical aspect of the city could also be accommodated by altering the computer program.

The Grid is shown in the centre of the floor at a scale of 1:200; at this size, 101 Collins Street, which has a height to the top of its spire of 260 metres, would be 1.3 metres high.

A corresponding window, matching the Grid at 1:200 scale, is positioned



CBD from the South West. <http://www.melbourne1946.com/page2/index.html>

in the southern wall. This would allow glimpses of the surrounding buildings.

At the eastern end of the floor appears a hologram of Robert Hoddle, overlooking his plan of Melbourne; a large plate steel framed window sits alongside him, allowing Hoddle to be seen in the building at night by passers-by like a ghostly apparition.

Hoddle is joined by Robert Russell; this arrangement would allow them both to present their respective views in relation to the original Grid layout of Melbourne.



Holography

Professor Miles Lewis notes that, while a Museum of the Hoddle Grid is an interesting idea, it would need to be presented in a highly interactive way to make it interesting to the public.

3D 'augmented reality' computer technology is developing at a fast pace.

The Age recently published an article about Tony Robbins, who appeared as a hologram at his Business mastery event in Melbourne while he was in Miami in the United States.

There are a number of universities and the like developing holograms and augmented reality. At <https://www.youtube.com/watch?v=3d7sQfIBAwk> a doctor has a discussion with a holographic avatar on stage.

John Underkoffler's TED talk here mentions the MIT Media Lab:

https://www.ted.com/talks/john_underkoffler_drive_3d_data_with_a_gesture

A discussion has already been held with MIT's Media Lab regarding developing the method of presenting holograms and 3D virtual reality for the museum.

Steffen Walz, the Founder and Director of RMIT's Games & Experimental Entertainment Lab (GEElab) has expressed an interest in contributing to this project, and notes that there is an upcoming Museums and the Web Asia conference at the Melbourne Convention and Exhibition Centre between October 5-8, 2015.



Tony Robbins appears live as a hologram from the other side of the world ARHT Media

The details can be found here: <http://mwa2015.museumsoftheworld.com>

MWA2015 features speakers from around the world, presenting their latest work and research findings. The Melbourne Museum and the State Library of Victoria are key contributors to the conference.

The GEElab has been working with the Oculus headsets for a while now; one of Steffen's PhD students has been getting some press about this recently: <http://www.techworld.com.au/article/583169/mind-controlled-game-developer-taps-into-users-brains-feedback/>

Visit Victoria

Premier Daniel Andrews recently merged Tourism Victoria with Victorian Major Events Company to form Visit Victoria. This project would fit well with the intent of this new body.

Contributors

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Reel Pictures Animation Studio (Michael Wentworth-Bell)
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Nigel Westbrook and Paul Evans
Architects

Contact

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Business

Cost Plan

1. Executive Summary

The estimated total end cost is \$3,293,000.

2. Project Description

Ground Level

Entrance, with reception and office, toilets and feature display area.

Level 1

Museum of the Hoddle Grid interactive display area, office and server room

Roof

Rooftop Melbourne Weather bar / café, including relocated heritage shed.

External Works

Make good of footpaths, paving and the like.

While most of the specialist display and interactive equipment is not covered in this cost plan, we have included the Camera Obscura.

3. Cost Plan Summary

Description and Estimated Cost
Demolition and removal: \$17,000
Building Construction: \$2,544,000
External Works \$35,000
Net Construction Costs: \$2,596,000
Contingencies and Escalation: \$348,000
Total Construction Costs: \$2,944,000
Fees and Charges: \$349,000
Loose Furniture and Equipment: excluded
TOTAL END COST: \$3,293,000

4. Basis of the Cost Plan

Building Works Items

The estimate is based on areas, lengths and approximate quantities measured from the initial design sketches and documents. The rates that have been applied are based on material, plant and labour costs that are current at the report date.

The rates are based on the works being part of a continuous project work stream, without staging, and are undertaken in an optimal and reasonable timeframe with minimal requirement for out-of-hours or undue overtime work. The rates are further based on a project tendered on a competitive basis, within a reasonable timeframe and with a good level of documentation.

5. Items Included and Excluded

Items Specifically Included

The following items are specifically included in the cost plan:

- Camera Obscura
- Grass roof
- Existing shed relocation
- Contingencies
- Escalation to completion in 2017
- Consultant fees

Items Specifically Excluded

The following items are specifically excluded from the cost plan:

- Loose furniture and equipment
- Displays and Holograms
- Specialist AV systems
- Architectural lighting
- Significant out of hours work
- Ground contamination
- Asbestos or other hazardous materials
- Heritage and archaeological
- GST

6. Project Risks

This document describes and details an initial cost plan for the proposed Royal Society site redevelopment. It is

based on the level of information available at the time as well the documents that have been produced and made available by the design consultants. The risks that attach to the works and consequently to the cost estimate include the following key items:

- Existing in-ground services impacting on the works
- Adverse soil conditions on site
- Unknown items such as contamination, hazardous materials and archaeological factors
- Delays to the project
- Procurement strategy differs from assumption in the cost plan
- Changes in the construction market conditions
- Client directed changes to brief, scope or documents
- Changes to technology

7. Contingencies

Noting the risks that attach to the project this cost seeks to mitigate and manage them through the inclusion of contingency allowances. The following contingency categories are included in the compilation of the cost plan:

Design Contingency

An allowance of 5% has been added to the net construction cost estimate to cover design related risks including scope and items that may be added to the design and additional detail that is included as the design process progresses.

Construction Contingency

An allowance of 5% has been added to the net construction cost estimate to cover risks attached to the construction of the works; including builder's variations and client changes.

8. Escalation

Cost escalation is included at a rate of 2.0% per annum up to tender stage and at 3.0% per annum during construction.

9. Infrastructure Connections

Resolve of the final cost will require an investigation of the existing connections and title conditions.

Item and Description

Item and Description	Quantity / Unit / Rate / Total
Building Works	Item / \$17,000
Demolition and Removals	327 / m2 / 7,780 / 2,544,000
Building Construction	Item / \$35,000
External Works	327 / m2 / 7,939 / 2,596,000
Net Construction Cost	Item / 5% / 126,000
Design Contingency	Item / 5% / 132,000
Escalation	
To tender in 2016	Item / 2% / 56,000
During construction ending 2017	Item / 2% / 34,000
Total Construction Cost	327 / m2 / 8,719 / 2,944,000
Fees	%
Consultant	Item / 11.0 / 308,000
Authority	Item / 1.0 / 41,000

Total End Cost

327 / m2 / 7,986 / 3,293,000

Note:

- Camera Obscura is included
- Grass roof is included
- Existing heritage shed relocation onto the roof is included
- Exclusions
- Artwork
- Staging costs
- Ground contamination
- Asbestos and other hazardous materials
- Displays
- Holography
- Specialist AV systems
- Architectural lighting
- Operating and recurrent costs
- Finance costs
- Land costs
- GST

Demolition and Removals

Site Preparation	Item / 14,500
Preliminaries	Item / 1,600
Margin	Item / 900
Total	Item / 17,000

Building Construction

Substructure	327 / M2 / 180 / 59,020
Columns	327 / M2 / 66 / 21,680
Upper Floors	327 / M2 / 267 / 87,307
Staircases	327 / M2 / 107 / 35,000
Roof	327 / M2 / 463 / 151,509
External Walls	327 / M2 / 2,514 / 822,073
External Doors	327 / M2 / 18 / 6,000
Internal Walls	327 / M2 / 492 / 160,897
Internal Screens	327 / M2 / 15 / 5,000
Internal Doors	327 / M2 / 20 / 6,400
Wall Finishes	327 / M2 / 90 / 29,446
Floor Finishes	327 / M2 / 287 / 93,895
Ceiling Finishes	327 / M2 / 343 / 112,160
Fittings	327 / M2 / 95 / 31,070
Special Equipment	327 / M2 / 820 / 268,000
Hydraulics	327 / M2 / 135 / 44,000
Mechanical Services	327 / M2 / 214 / 70,000
Fire Services	327 / M2 / 30 / 9,810
Electrical Services	327 / M2 / 153 / 50,000
Vertical Transportation Services	327 / M2 / 382 / 125,000
Builders Work in Connection	327 / M2 / 27 / 9,000
Preliminaries	327 / M2 / 707 / 231,300
Margin	327 / M2 / 357 / 116,700

Total

Landscaping	327 / M2 / 7,781 / 2,544,267
Preliminaries	Item / 30,000
Margin	Item / 3,300
Total	Item / 35,000