



# Planning

**MAJOR PROJECT ASSESSMENT  
BENNELONG DRAIN DIVERSION  
SYDNEY OPERA HOUSE  
MP 09\_0122 (Project Application)**

Director General's Environmental Assessment  
Report  
Section 75I of the  
Environmental Planning and Assessment Act  
1979

August 2010



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## EXECUTIVE SUMMARY

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This is a report on a project application seeking approval for the construction of a new section of stormwater drain to divert the existing Bennelong Drain from its route currently located under the Sydney Opera House (SOH) to a new route discharging at Farm Cove.

The site of the SOH has a street address of 2 Circular Quay and Macquarie Street, Sydney (Lot 4, DP 787933 and Lot 5, DP 775888). The subject site is bounded by the SOH Monumental Steps to the north, Macquarie Street to the west, the Botanical Gardens/Tarpeian Wall to the south and Farm Cove to the east.

The SOH Trust (the proponent), is seeking project approval for the diversion of the existing drain from where it enters the SOH site at the south-western end. It will extend to the proposed discharge point within the seawall at Farm Cove between the Royal Botanic Gardens Queen Elizabeth II Gate and the Man O' War Jetty. The realignment of the drain is considered a necessity as it will meet current operational requirements and support the delivery of future projects within the SOH precinct.

On 26 June 2009, the Director General, as delegate of the Minister, formed an opinion that the project is a major project pursuant to Schedule 3 of MD SEPP, and therefore is development to which Part 3A applies. The Minister is the approval authority. The Capital Investment Value (CIV) of the proposal is **\$7.5 million**, creating **56** full-time equivalent construction jobs.

The site is zoned Parks and Community Places under the *Sydney Local Environment Plan 2005* (LEP 2005). The proposal is permissible and consistent with the objectives of the zone.

The proposal was exhibited from 3 March to 2 April 2010. The Department received a total of 8 submissions from public authorities, including NSW Maritime Authority, Sydney Water (2), Industry and Investment NSW, Commonwealth Department of Environment, Water, Heritage and the Arts (2), and Heritage Branch of the Department of Planning. No public submissions were received. Key agency issues included:

- heritage impacts
- stormwater infrastructure
- sediment deposition, turbidity and scour
- water quality impacts.

On 16 June 2010, the proponent submitted a Response to Submissions to address issues raised during the exhibition period, particularly in relation to potential heritage impacts. The Department is satisfied that the response satisfactorily addressed the issues raised.

The project would realign the Bennelong Drain and provide flexibility for future projects proposed under the Sydney Opera House Strategic Building Plan. The project is considered to be justified as it will support existing operations and is an essential precursor to other projects, which will improve the functionality of the building and site.

The Department has assessed the merits of the project and is satisfied that the impacts of the proposed development have been adequately addressed by the proponent's EA and Response to Submissions, including the Final Statement of Commitments, and can be adequately mitigated by the Department's recommended conditions to ensure a satisfactory level of environmental performance. On these grounds, the Department considers the proposal is acceptable and should be approved, subject to conditions.

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# 1 BACKGROUND

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## 1.1 THE SITE

A site inspection was conducted by Department officers on 29 June 2010.

### 1.1.1 Site location and description

The Sydney Opera House (SOH) has the real property description of Lot 4 DP 787933 and Lot 5 DP 775888, with a street address of 2 Circular Quay and Macquarie Street, Sydney. The site is located at Bennelong Point. It is generally bordered by Sydney Harbour to the north, Farm Cove to the east, Sydney Cove to the west, and the Royal Botanic Gardens to the south. The site is within the LGA of the City of Sydney (**Figure 1**).

The SOH constitutes an exceptionally visible and obvious component of the Sydney Harbour panorama, primarily due to its location on the tip of Bennelong Point, and the design of the building itself. The building and its surroundings are one of Australia's most recognised and widely known icons. On 28 June 2007, the SOH was included on the UNESCO World Heritage List, listed as a great architectural work of the 20th century, both in architectural form and structural design.

The SOH is operated and maintained by the Sydney Opera House Trust, a statutory body under the *Sydney Opera House Trust Act 1961*.

### 1.1.2 Existing land use

The SOH was designed by Jørn Utzon and Ove Arup & Partners, winner of the 1957 design competition for the site. After a lengthy period of construction, the SOH was formally opened on 20 October 1973.

The SOH is 183 metres long and has a width of 120 metres at its widest point. It covers an area of approximately 1.8 hectares. It is an expressionist modern design, with a series of large precast concrete panels ('shells'), supported by precast concrete ribs, forming the roof of the structure. Its roof is covered with 1.056 million glossy white and matte cream tiles.

These shell structures are set upon a vast platform and are surrounded by terrace areas that function as pedestrian concourses and forecourts. The 2 largest 'shells' contain the main performance halls – the Concert Hall and Opera Theatre. The smaller 'shell' contains the Bennelong Restaurant. The remaining performance spaces are located on the sides of the two larger shell groupings.

The Southern Forecourt is located directly south of the Monumental Steps and to the north of the Royal Botanic Gardens. This area is primarily used as a pedestrian thoroughfare. The Southern Forecourt is also used to host outdoor concerts and performances. The Man O' War Jetty protrudes from the seawall at the south-eastern side of the site and acts as a wharf to private charters and boats.

## 1.2 SURROUNDING DEVELOPMENT

Bennelong Point is bounded by the north, east and west by Sydney Harbour. To the south of the site is the Royal Botanic Gardens. Medium-density residential development is located approximately 200 metres to the south-west on Macquarie St, which terminates at a roundabout south of the site.

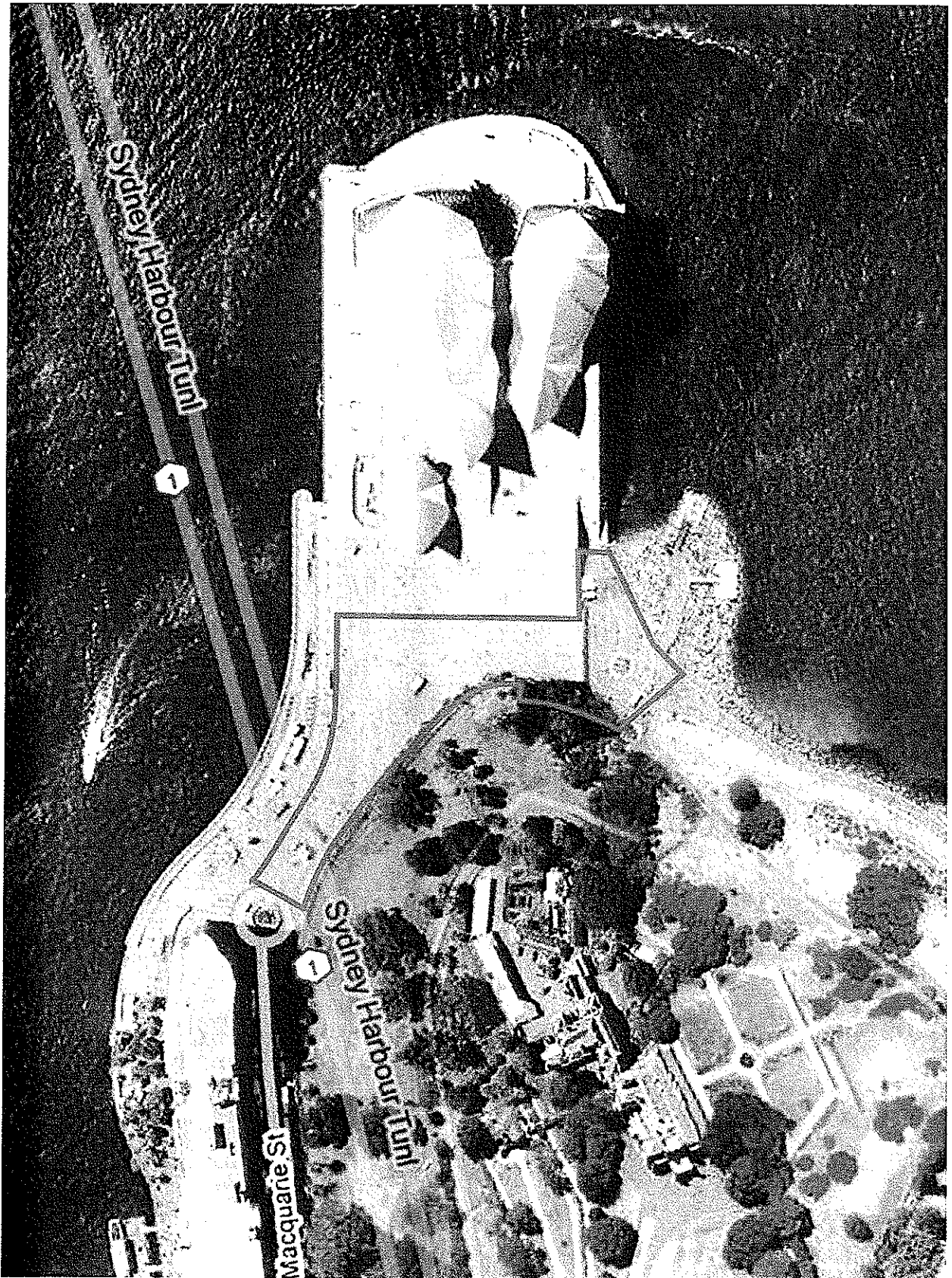


Figure 1: Aerial View of the Site

### **1.3 STRATEGIC CONTEXT**

#### **1.3.1 NSW State Plan**

The NSW State Plan seeks to achieve improved urban environments and deliver attractive and sustainable development through reductions in greenhouse gas emissions and development in close proximity to existing centres, services and transport. The State Plan aims to improve the design of cities, centres and suburbs. The Bennelong Drain diversion will achieve this by assisting in the ongoing renewal and retention of the Sydney Opera House and its environs.

#### **1.3.2 Sydney Metropolitan Strategy “City of Cities”**

The Sydney Metropolitan Strategy was developed to support the continuing economic growth of Sydney and enhance its standing as a global city. The proposed drainage diversion will satisfy the Metropolitan Strategy objectives by promoting and preserving an Australian icon for the public benefit. The site is also subject to the draft Sydney City Subregional Strategy. The proposal will support one of draft Strategy's aims of enhancing cultural precincts by enabling future projects at the SOH to be realised once the drain is diverted.

## 2 PROPOSED DEVELOPMENT

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### 2.1 THE PROPOSED DEVELOPMENT

#### 2.1.1 Diversion of the Bennelong Stormwater Drain

The project involves the construction of a new section of drain from the point where the Bennelong Drain enters the SOH site, adjacent to the air intake structure for the Sydney Opera House Car Park. The Sydney Opera House Car Park is a separate entity owned by State Property Authority and leased by the Trust Company of Australia. The new section of drain would run in an easterly direction close to the Tarpeian Wall, around the southern side of the exhaust airshaft of the car park, extending to the proposed discharge point at Farm Cove (Figure 2).

#### 2.1.2 New section of drain

The new section of drain would be a box culvert measuring approximately 1.5m wide by 1.5m high (internal dimensions) and 1.8m wide by 1.9m high (external dimensions) at its junction point. The culvert then increases in size to approximately 2.4 m wide by 1.8m high (internal dimensions) and 2.7m wide by 2.2m high (external dimensions) along the majority of the diversion route. The drain would be constructed using prefabricated sections of concrete box culvert. A 4.4m deep pit would be constructed at the junction between the existing drain and the new section of drain. The junction pit would include a cover to enable access for maintenance. The access cover would be located within a narrow strip of feature garden located at the southern extreme of the site against the base of the Tarpeian Wall. The new section of drain would be approximately 106m long (Figure 2).

An area of approximately 8m by 8m would need to be excavated around the proposed new junction to construct and install the required infrastructure. Excavation would also be required along the route of the proposed diversion. The width and depth of the excavation would vary and would generally be between 2m-3.2m wide to enable the drain to be installed. The construction compound around the drain would be approximately 10m wide depending on the final construction method developed by the contractor.

An 8m long section of the original Bennelong Drain would be removed to allow construction of the junction between the Bennelong Drain and the new section. The remaining existing oviform drain would be unaffected. The existing section of drain would be blocked off at the diversion point and at the obsolete outlet.

#### 2.1.3 Outlet

The discharge point for the new section of box culvert drain would be located within the seawall at Farm Cove, immediately above the seabed between the Royal Botanic Gardens Queen Elizabeth II gate and the Man O' War Jetty. The discharge point would involve a new outlet through the seawall approximately 2.4m wide by 1.8m high (internal dimensions), and 2.7m wide by 2.2m high (external dimensions).

The majority of the outlet would be visible above the mean sea level, which in this location would be approximately 0.38m above the bottom of the culvert. The mean high water level would be 0.93m above the bottom, meaning just under half of the outlet would be visible at high tide.

The drain would be lined with sandstone to match the existing fabric of the seawall to approximately 1-1.5m from the outlet (Figure 3).

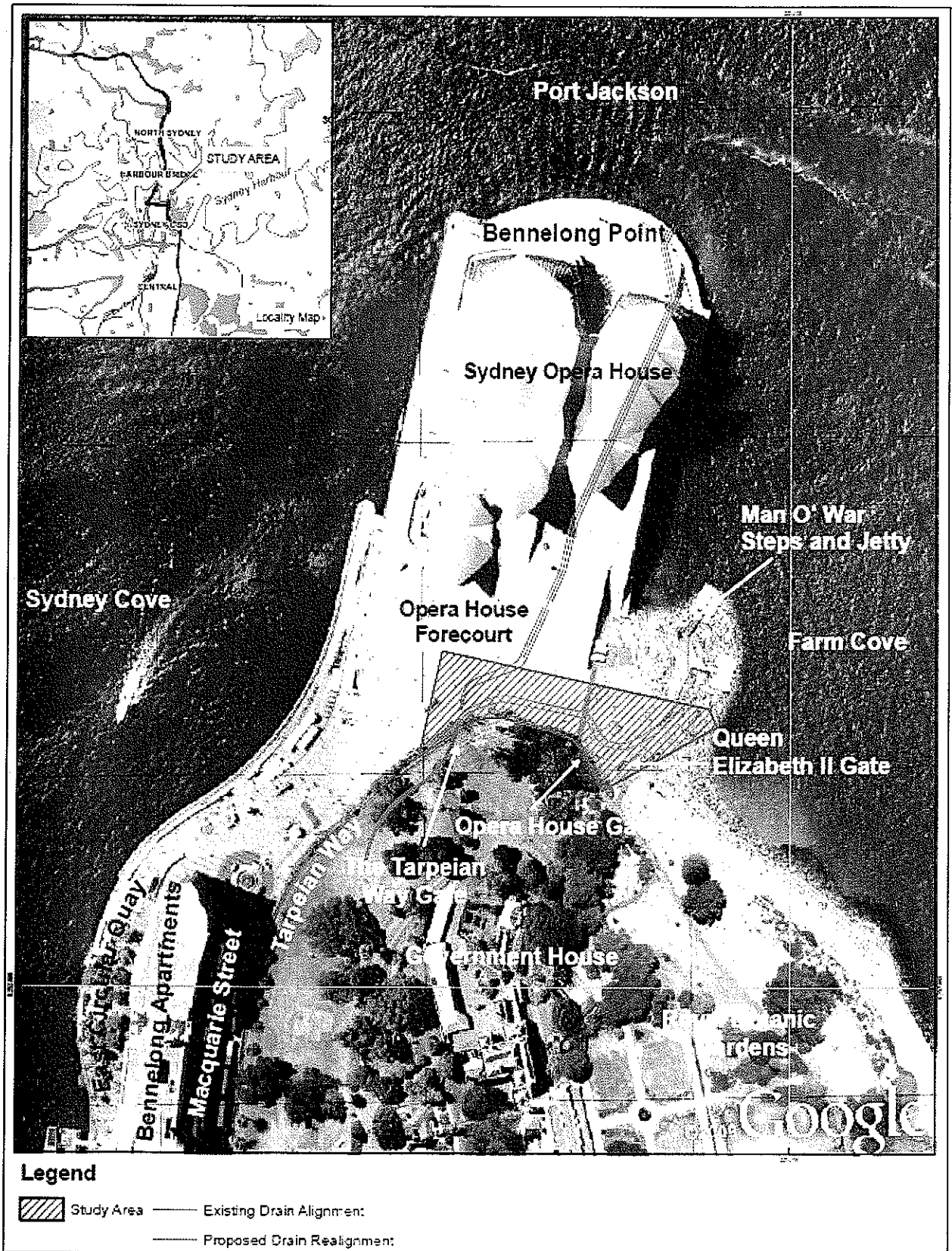
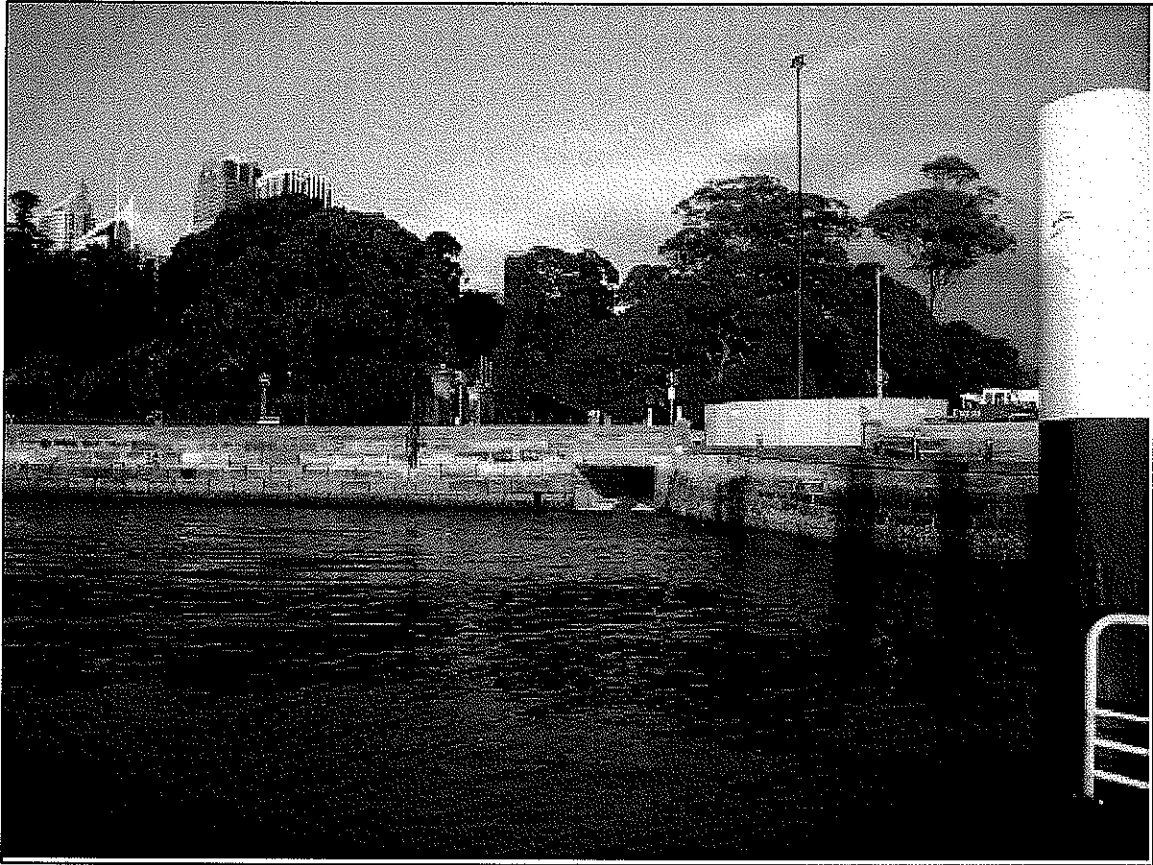


Figure 2 – Stormwater drain path



**Figure 3** – View of the proposed outlet from Man 'O' War Jetty at low tide. The opening is lined with sandstone

## 2.2 RESPONSE TO SUBMISSIONS

Due to the issues raised in submissions, lodgement of a Preferred Project Report was not required. However, a Response to Submissions Report was submitted on 16 June 2010, that addressed the key issues raised by government agencies, particularly in relation to heritage impacts. A consideration of the key issues raised is provided in Section 5 of this report.

A copy of the Response to Submissions is contained in **Appendix C**.

### 3 STATUTORY CONTEXT

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#### 3.1 MAJOR PROJECT DECLARATION

On 26 June 2009, the Director General, as delegate of the Minister, formed an opinion that the project is a major project under Schedule 3 – Part 1 (Sydney Opera House) of *State Environmental Planning Policy (Major Development) 2005* (MD SEPP), and is development to which Part 3A applies. The Minister is the approval authority.

#### 3.2 PERMISSIBILITY

The site is zoned Parks and Community Places under *Sydney Local Environmental Plan 2005*. The works are permissible with consent.

#### 3.3 DIRECTOR GENERAL'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS (DGRS)

On 24 July 2009, the Department issued DGRs for the project, providing key issues for the Proponent to address as follows:

- Heritage and Archaeology, including Management Plan for the SOH,
- Hydrological Analysis and Infrastructure;
- Water Quality and Aquatic Habitat;
- Geotechnical;
- Demolition and Excavation;
- Structural Engineers Report; and
- Safe Work Method Statement.

On 15 February 2010, the EA was lodged by the proponent and was considered to satisfactorily address the DGRs. The DGRs are provided in **Appendix A**.

#### 3.4 OBJECTS OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

The Minister's consideration and determination of a project application under Part 3A must be consistent with the relevant provisions of the EP&A Act, including the objects set out in Section 5 of the Act.

The objects of the EP&A Act in section 5 are as follows:

- (a) *to encourage:*
- (i) *the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,*
  - (ii) *the promotion and co-ordination of the orderly and economic use and development of land,*
  - (iii) *the protection, provision and co-ordination of communication and utility services,*
  - (iv) *the provision of land for public purposes,*
  - (v) *the provision and co-ordination of community services and facilities, and*
  - (vi) *the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and*
  - (vii) *ecologically sustainable development, and*
  - (viii) *the provision and maintenance of affordable housing, and*
- (b) *to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and*
- (c) *to provide increased opportunity for public involvement and participation in environmental planning and assessment.*

The Department has considered the objects of the EP&A Act and considers that the application is consistent with the relevant objects. The assessment of the application in relation to these relevant objects is provided in Section 3.5 and Section 5 of this report.

The EP&A Act adopts the definition of Ecologically Sustainable Development (ESD) found in the *Protection of the Environment Administration Act 1991*. Section 6(2) of that Act states that ESD "requires the effective integration of economic and environmental considerations in decision-making processes" and that ESD "can be achieved through" the implementation of the principles and programs including the precautionary principle, the principle of inter-generational equity, the principle of conservation of biological diversity and ecological integrity, and the principle of improved valuation, pricing and incentive mechanisms. In applying the precautionary principle, public decisions should be guided by careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment and an assessment of the risk-weighted consequences of various options.

The Department has fully considered the objects of the EP&A Act, including the encouragement of ESD in its assessment of the application. While an assessment of ESD issues is contained in Section 5.3 of this report, it is noted that due to the nature of the proposal, ESD matters were not significant. Nevertheless, on the basis of this assessment, the Department is satisfied that the proposal encourages ESD, in accordance with the objects of the EP&A Act.

### 3.5 SECTION 75I(2) OF THE EP&A ACT

Section 75I(2) of the Act and clause 8B of the Environmental Planning and Assessment Regulation 2000 provides that the Director General's report is to address a number of requirements. These matters and the Department's response are set out as follows:

<b>Section 75I(2) criteria</b>	<b>Response</b>
Copy of the Proponent's environmental assessment and any preferred project report	The Proponent's EA is located on the assessment file and in a CD-Rom in <b>Appendix B</b>
Any advice provided by public authorities on the project	All advice provided by public authorities on the project for consideration is set out at <b>Appendix D</b> and <b>Section 4</b> of this report.
Copy of any report of the Planning Assessment Commission in respect of the project	The project was not referred to the Planning Assessment Commission.
Copy of or reference to the provisions of any State Environmental Planning Policy that substantially govern the carrying out of the project	Each relevant SEPP that substantially governs the carrying out of the project is identified and assessed in <b>Section 3.6</b> of this report.
Except in the case of a critical infrastructure project – a copy of or reference to the provisions of any environmental planning instrument that would (but for this Part) substantially govern the carrying out of the project and that have been taken into consideration in the environmental assessment of the project under this Division	An assessment of the development relative to all environmental planning instruments is provided in <b>Section 3.6</b> of this report.
Any environmental assessment undertaken by the Director General or other matter the Director General considers appropriate.	The environmental assessment of the project application is this report in its entirety.
A statement relating to compliance with the environmental assessment requirements under this Division with respect to the project.	The Proponent's EA addressed the DGR requirements and is considered to have satisfied those requirements as addressed in this report.
<b>Clause 8B criteria</b>	<b>Response</b>
An assessment of the environmental impact of the project	An assessment of the environmental impact of the proposal is discussed in <b>Section 5</b> of this report.
Any aspect of the public interest that the Director General considers relevant to the project	The public interest is discussed in <b>Section 5</b> of this report.
The suitability of the site for the project	The suitability of the site for the project is discussed in <b>Section 5</b> of this report.

Copies of submissions received by the Director General in connection with public consultation under section 75H or a summary of the issues raised in those submissions.

A summary of the issues raised in the submissions is provided in **Section 4** of this report.

### 3.6 ENVIRONMENTAL PLANNING INSTRUMENTS (EPIS)

#### 3.6.1 Application of EPIs to Part 3A projects

To satisfy the requirements of section 75I(2)(d) and (e) of the EP&A Act, this report includes references to the provisions of the EPIs that govern the carrying out of the project and have been taken into consideration in the environmental assessment of the project application.

The primary controls guiding the assessment of the proposal are:

- State Environmental Planning Policy (Major Development) 2005;
- Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005;
- Sydney Harbour Foreshores Area Development Control Plan 2006;
- Environment Protection and Biodiversity Conservation Act 1999;
- Heritage Act 1977; and
- Sydney Local Environmental Plan 2005

An additional control to be considered in the assessment of the proposal is:

- *Management Plan for the Sydney Opera House (2005)* (Management Plan 2005).

The Department has considered the proposal against the objectives and aims of these instruments and Management Plan 2005, and is satisfied that the proposed project, subject to the implementation of the recommended conditions of approval, is generally consistent with the provisions of these instruments.

#### 3.6.2 State Environmental Planning Policy (Major Development) 2005

On 26 June 2009, the Director General, as delegate of the Minister, formed an opinion that the project is a major project under Schedule 3 – Part 1 (Sydney Opera House) of *State Environmental Planning Policy (Major Development) 2005* (MD SEPP) and is thus identified as development to which Part 3A applies. The Minister is the approval authority.

#### 3.6.3 Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005

SREP 2005 covers the area of Sydney Harbour and its catchment, including the site of the SOH. SREP 2005 establishes planning principles and controls for the management of the Sydney Harbour catchment as a whole. Under SREP 2005, the site of the SOH is a heritage item within the Foreshores and Waterways Area of the Sydney Harbour Catchment, and the 'City Foreshore Area' is designated as a Strategic Foreshore Site.

Part 3, Division 2 of SREP 2005, lists a number of matters to be considered by the consent authority. Where relevant, these matters have been considered and addressed in the Department's consideration of the proposed application, and do not raise any matters of concern. The proposal is therefore considered consistent with SREP 2005.

#### 3.6.4 Sydney Harbour Foreshores Area Development Control Plan 2006 (DCP 2006)

Bennelong point is located within the Sydney Harbour Foreshore Area under DCP 2006. Section 4.17 of the DCP relates to seawalls located along the foreshore area. This section states that where a seawall is being upgraded, a similar material is to be used. Consistent with this, the Department is satisfied that the project's use of sandstone is consistent with the existing seawall material.

#### 3.6.5 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The site of the SOH is listed on both the World Heritage List and National Heritage List under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Actions that significantly affect world or national heritage listed sites require approval under the EPBC Act.

However, the SOH is the subject of a Bilateral Agreement entered into between the Australian and NSW Government in August 2005, pursuant to section 45 of the EPBC Act. Under the terms of this agreement, the assessment regimes under the EP&A Act are automatically accredited under the EPBC Act. The terms of the agreement require that the proposed actions be in accordance with the *Management Plan for the Sydney Opera House* in force under the Environmental Planning and Assessment Amendment (Sydney Opera House Management Plan) Regulation 2005.

Therefore, any approval under the provisions of the EPBC Act would be satisfied by approval under Part 3A of the EP&A Act, provided that the proposal is compliant with the *Management Plan for the Sydney Opera House 2005* (Management Plan 2005). In this case, as the application is considered consistent with the Management Plan 2005, no separate assessment under the EPBC Act is required.

### **3.6.6 The Heritage Act 1977**

Section 75U of the *Environmental Planning and Assessment Act 1979* (EP&A Act) states that an approval under Part 4 of the *Heritage Act 1977* is not required for approved projects under Part 3A. However, in the case of the SOH site, both statutory approvals under Part 3A of the EP&A Act and Part 4 of the *Heritage Act 1977* are required.

This is a result of the Management Plan 2005, which is in force under section 288 of the Environmental Planning and Assessment Regulation 2000 (the Regulation). The Management Plan 2005, states that any proposed development on the site, assessed under Part 3A of the EP&A Act, will also require approval under Part 4 of the *Heritage Act 1977*. This approval is granted by the Heritage Office and is sought after the Minister's approval under Part 3A of the EP&A Act.

The Archaeological Management Plan (AMP) and Heritage Impact Statement (HIS) prepared by Godden Mackay Logan, and Response to Submissions assesses the proposal in relation to its potential heritage impacts. The Department considers they demonstrate the proposal will have no detrimental impacts upon the heritage significance of the SOH and is subsequently consistent with the Management Plan 2005.

### **3.6.7 City of Sydney Local Environmental Plan 2005**

The site is zoned Parks and Community Places under the *Sydney Local Environment Plan 2005* (LEP 2005). The proposed development is permissible under the LEP 2005.

### **3.6.8 Management Plan for the Sydney Opera House (2005) (Management Plan 2005).**

The Management Plan 2005, sets out the statutory framework for the assessment and approvals process and provides a brief summary of the World Heritage values and National Heritage values of the SOH. It does not provide the policies that are to protect and conserve the National and World heritage values of the site. The terms of the Management Plan 2005, are given effect by the Regulation.

Under the provisions of the Management Plan 2005, any proposed development on the site would require statutory approvals under both the EP&A Act and the NSW *Heritage Act 1977*. The Archaeological Management Plan, Heritage Impact Statement and Response to Submissions have been prepared to satisfy the requirements of the Management Plan 2005. The proposal demonstrates consistency with the Management Plan 2005.

## 4 CONSULTATION

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### 4.1 PUBLIC EXHIBITION

Under section 75H(3) of the EP&A Act, the Director General is required to make the Environmental Assessment (EA) of a project publicly available for at least 30 days.

After accepting the EA for the Project Application, the Department:

- made the EA publicly available from 3 March 2010 to 2 April 2010:
  - on the Department's website; and
  - at the Department's Information Centre and the City of Sydney Council offices;
- notified landowners in the vicinity of the site about the exhibition period by letter;
- notified relevant authorities and City of Sydney Council by letter; and
- advertised the exhibition in the Sydney Morning Herald and The Daily Telegraph.

This satisfies the requirements in section 75H(3) of the EP&A Act.

During the assessment process the Department also made a number of documents available for download on the Department's website. These documents included the:

- Project Application;
- Director General's environmental assessment requirements;
- Environmental Assessment; and
- Response to Submissions.

### 4.2 SUBMISSIONS RECEIVED ON ENVIRONMENTAL ASSESSMENT

During the exhibition period, the Department received 8 submissions from agencies, including NSW Maritime Authority, Department of Environment, Climate Change and Water (DECCW), the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA) (2), NSW Heritage Branch, NSW Industry and Investment and Sydney Water (2).

No public submissions were received.

A summary of the issues raised in the submissions is provided below and a copy of submissions included in **Appendix D**.

The Department's consideration of key issues raised in submissions is contained in Section 5 of this report. Appropriate conditions of consent have been recommended where requested by agencies.

#### 4.2.1 NSW Maritime Authority

NSW Maritime raised the following issues:

- Sediment deposition;
- Water quality and turbidity; and
- Scour.

*Response* – The Department considers the matters raised have been adequately addressed in the proponent's EA and Response to Submissions. Sediment deposition can be adequately managed and scour is not anticipated due to sandstone outcrops. Water quality impacts would not increase as the drain already discharges into Sydney Harbour. Detailed consideration is given to these matters in Section 5.

#### 4.2.2 Department of Environment and Climate Change and Water

The Department of Environment, Climate Change and Water (DECCW) raised no concerns in relation to the proposal, however, made the following general comments:

- A commitment that a comprehensive Sediment and Erosion Control Plan will be developed.
- That all noise generating activities need to be assessed and managed.

*Response* - The proponent's Statement of Commitments outlines that a Sediment and Erosion Control Plan and Noise Management Plan will be prepared. The Department will impose conditions requiring these Plans are prepared.

#### **4.2.3 Department of Environment, Water, Heritage and the Arts**

The Department of Environment, Water, Heritage and the Arts' (DEWHA) first submission dated 23 March 2010, outlined the following:

- the impact of the proposal on the National Heritage values of the Sydney Opera House; and
- measures to ensure compliance with the Sydney Opera House accredited management plan policies.

Given the issues raised by DEWHA, the proponent's Response to Submissions was forwarded for their consideration. DEWHA's response dated 8 July 2010, noted that although the works would have an impact on the SOH's National Heritage values, impacts would be minimised by:

- Careful supervision of the removal and replacement of forecourt fabric;
- Sympathetic design of the stormwater outfall opening using sandstone to match the existing sea wall fabric; and
- Retaining and protecting the existing ovoid drain where possible while recording those parts of the ovoid design to be removed.

Notably, DEWHA raised no concerns in relation to the works and supported the proponent's Final Statement of Commitments.

*Response* – The Department notes DEWHA raises no concerns in relation to the proposed works, subject to the implementation of the proponent's Final Statement of Commitments.

#### **4.2.4 Heritage Branch**

The Heritage Branch raised no concerns in relation to the proposal and requested two conditions are imposed in any approval, including:

- Ground disturbance associated with the diversion of the Bennelong Drain is to be monitored by an archaeologist to ensure that the archaeological potential of the area has been appropriately established.
- Should any historical relics be unexpectedly discovered in any areas of the site not subject to an excavation permit, then all excavation or disturbance of the area is to stop immediately and the Heritage Council of NSW should be informed in accordance with section 146 of the *Heritage Act 1977*.

*Response* - The Department will include the above conditions as part of the project approval.

#### **4.2.5 Industry and Investment NSW**

Industry and Investment NSW responded to the submission and indicated that they have no objection to the project provided that the Statement of Commitments is adopted and implemented in full.

*Response* –The proponent's Statement of Commitments will form part of the project approval.

#### **4.2.6 Sydney Water**

Sydney Water's first submission dated the 18 March 2010, outlined a number of issues in relation to the project, including:

- Size of the culvert;

- Sediment accretion;
- Floating boom issues;
- Creation of a drainage easement;
- Design of the culvert to meet Sydney Water's standards; and
- Sydney Water ownership of the drain after the completion of works.

On 25 May 2010, Sydney Water lodged a second submission, which outlined no objection to the proposal in principle. While a number of details need to be resolved in the finalisation of the detailed design, Sydney Water stated these matters do not need to delay the determination of the proposal.

*Response* - The Department notes the detailed design matters will be assessed by Sydney Water when the proponent applies for a Section 73 Certificate, which will be conditioned in the approval. Further matters are addressed in Section 5.

## 5 ASSESSMENT

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Key issues considered in the Department's assessment of the Environmental Assessment include:

- Heritage and Archaeology
- Hydrological Analysis and Infrastructure
- Water Quality and Aquatic Habitat
- Noise and vibration impacts
- Public interest

### 5.1 HERITAGE AND ARCHAEOLOGY

The Department considers potential heritage and archaeological impacts associated with the works are the removal of forecourt paving, removal of sections of the existing Bennelong Drain (refer to **Figure 4**), and construction of the stormwater outlet in the seawall.

The Archaeological Management Plan (AMP) and Heritage Impact Statement (HIS), prepared by Godden Mackay Logan, provides a comprehensive assessment of the proposed development and its impact on the heritage significance of the SOH and potential Aboriginal and historical archaeological resources.

The Plan outlines the forecourt of the SOH has potential to contain significant historical archaeological remains associated with the phases of the development of Bennelong Point. Nevertheless, the extent of the impact on the site's archaeological significance is relatively minor. The intended works would not affect any known Aboriginal sites and the study area has a low potential to contain in-situ Aboriginal archaeological evidence. Archaeological monitoring is proposed and subsequent archaeological remains exposed within the areas of excavation would be removed following appropriate archaeological investigation and recording.

The HIS outlines that the proposed works do not physically impact on the SOH or have an adverse impact on the State, National or World Heritage values of the SOH. Furthermore, the visual impact of the proposed stormwater outlet on its setting and adjacent heritage items is minor and acceptable. The HIS states the National Heritage values of the SOH are primarily related to Jørn Utzon's outstanding design of the building and the venue being a cherished performing arts centre.



**Figure 4** – Exposure of the Bennelong Drain as sliced through in the Opera House Car Park cavern.

The paving material chosen for the forecourt is consistent with Utzon's design intent, and will be carried out with matching materials, texture and colour. Impacts on the seawall, possibly constructed in the 1860s and representing one of the earlier surviving sections of seawall surrounding Bennelong Point, will be minimised by the use of sandstone to line the outlet.

DEWHA initially highlighted potential impacts of the proposal on the National Heritage values and compliance with the Management Plan 2005. The proponent's Response to Submissions included a section addressing the concerns raised by DEWHA. The Department forwarded a copy to DEWHA for their review. DEWHA confirmed that although the works will have an impact on the National Heritage values because of the intervention in significant fabric, this intervention will be minimised by replacement of forecourt fabric, as well as, the sandstone design of the stormwater outfall, and by retaining and protecting the existing ovoid drain where possible. DEWHA also supported the proponent's Final Statement of Commitments and raised no concerns about the potential heritage impacts of the proposal.

The Heritage Branch of the Department similarly supports the proposal subject to the implementation of mitigation strategies. These include the methodologies outlined in the HIS, ground disturbance being monitored by an archaeologist, and imposition of a condition requiring works to stop should archaeological relics be found.

The Department accepts the proposed works do have a minor material effect on the National Heritage values of the SOH. However, on balance, these impacts, including visual impacts, will be contained and relatively minor, and will only have a short-term negative impact during the construction phase of the project.

These works, coupled with the preservation and protection of remaining sections of the drain, limit the degree of impacts to an acceptable and appropriate level, and ensures they are consistent with the management policies identified in the Management Plan 2005. In addition, the Department will impose a number of conditions to ensure these relatively minor impacts are further minimised.

## **5.2 HYDROLOGICAL ANALYSIS AND INFRASTRUCTURE**

The Bennelong Drain catchment has an area of approximately 72 hectares. It is bounded by Clarence Street to the west, Bathurst Street to the south, Macquarie Street to the east and Sydney Harbour to the north. The existing drainage system consists of a series of drains aligned in a north/south direction within the Sydney CBD. Stormwater runoff generally flows in a northerly direction through these stormwater drains, until it reaches Alfred Street at Circular Quay (**Figure 5**).

At Alfred Street, the drainage system branches into three outlets. The primary outlet is the Bennelong Drain, which veers in a north-east direction towards Bennelong Point. This drain is rectangular (3.05m wide by 1.22m high) and discharges into Sydney Harbour. Two smaller drains for the catchment discharge at Alfred Street, one near the Loftus Street intersection and the other near the Phillip Street intersection.

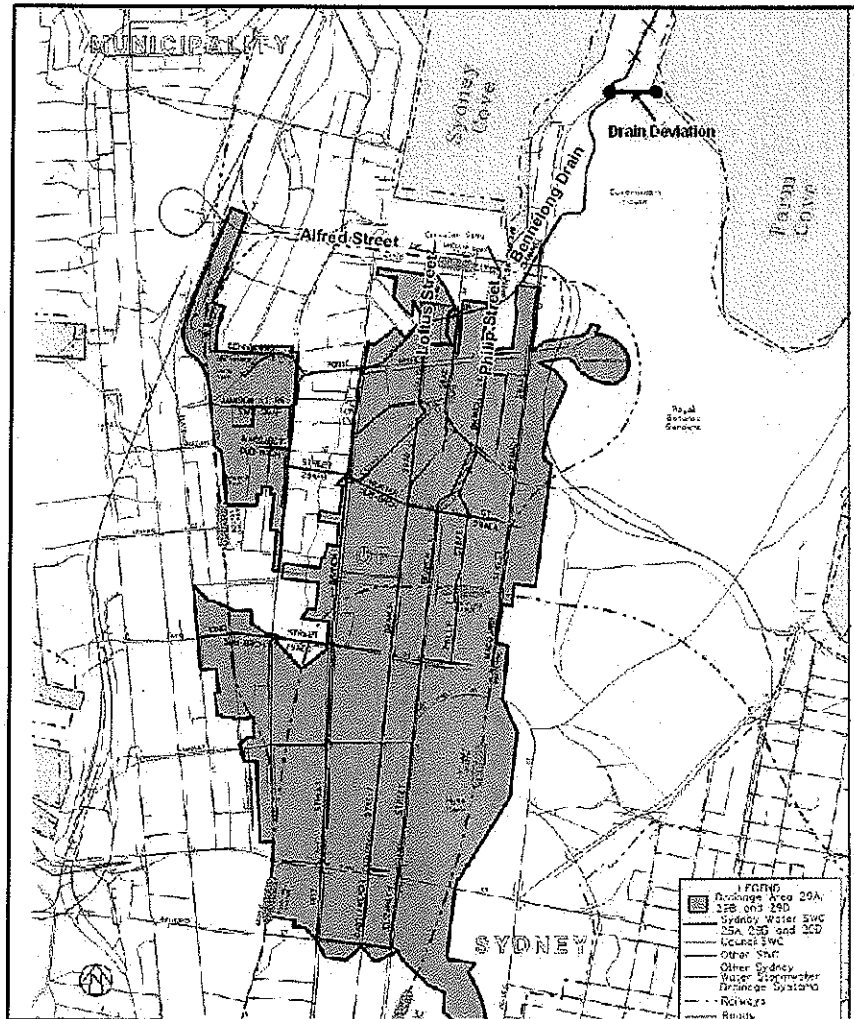


Figure 5 – Bennelong Drain catchment

The Hydrology and Drainage Assessment (HDA) considered construction impacts, upstream flooding impacts and sediment deposition. Assessment of the sediment yield potential of the catchment, drainage outlet velocities, sediment entrainment characteristics, and the location of the discharge points, suggests that sediment deposition may become an issue at the new outlet location over time. In particular, sediment is expected to be deposited in an area of limited circulation at the corner of the groyne with the existing eastern seawall. However, much of this depends on the actual sediment yield in the Bennelong catchment and the effectiveness of the sediment trap that is located in the Sydney Opera House Car Park, immediately upstream of the project.

Sydney Water has reviewed the proposal and considers that detailed design of the drain will need to be resolved, including preferred pollution control measures. However, this should not preclude the determination of the subject application. The HDA recommends that a monitoring program be established to monitor the amount of sediment that may be deposited at the outlet once it has been commissioned with the quantity of sediment discharged being further quantified post construction. If the sediment yield is found to be significant, a potential mitigation strategy would be to upgrade the sediment sump that is currently located within the Sydney Opera House car park, immediately upstream of the project.

In addition, the HDA recommends that that a boom be temporarily installed at the proposed diversion outlet to monitor and capture any floating debris and gross pollutants that may be discharged into Farm Cove. Sydney Water initially raised questions about the effectiveness of

this strategy, and has instead suggested a preference for possible gross pollutant controls at the new outlet.

As the proponent's Final Statement of Commitments outlines that a strategy will be prepared with Sydney Water to rectify and resolve any potential issues, and as Sydney Water has supported the project in principle, the Department is satisfied from the details submitted that the construction of the stormwater diversion drain would be capable of supporting flow velocities.

In relation to scour, the EA outlines that this issue is not considered significant as the immediate area around the outlet is sandstone bedrock and generally resistant to discharge. In addition, the submitted Final Statement of Commitment identifies measures to monitor the outlet and any scouring that may occur.

### 5.3 WATER QUALITY AND AQUATIC HABITAT

An Aquatic Ecology Assessment Report (AEA) indicates that a number of threatened species have been recorded within the study area (the 'study area' for the purpose of the flora and fauna assessment is 5km radius surrounding the site), or have the potential to occur. The report indicated that there were no threatened species observed within the intertidal zone. Although the majority of matter around the area of the proposed outlet was foreign man-made items littering the ocean floor, such as tyres, bottles, bricks, scrap metal and other construction material, the survey area retained a diversity of habitat suitable for a variety of aquatic biota. The only fish species observed during the survey were two Smooth Toadfish and one Fan-bellied Leatherjacket.

Of most significance was a small localised area of *Zostera* seagrass. The seagrass was observed from 3.9m to 7.8m, providing approximately 20% cover with moderate epiphytic growth. The area occupied by the seagrass lay within close proximity to an area that experiences a high level of disturbance. The extent of this seagrass bed was minimal and estimated to be approximately 20m<sup>2</sup>.

This was the only threatened species identified within the survey area considered to have the potential to be impacted by the project through sediment mobilization, which has the potential to decrease water quality and smother seagrass and algae in the immediate vicinity of the study area during both construction and operation. The Department notes that the proponent has committed to a monitoring program and implementation of appropriate safeguards to ensure the immediate area is not affected. Subject to the implementation of these measures and appropriate conditions of approval, the Department is satisfied that aquatic habitat impacts will be minor.

During operation, the new outlet also has potential to result in a short-term localised impact on water quality during periods when stormwater is discharged from the drain. The EA submits that as the project involves relocating an existing outlet, as well as, the high chance of mixing, there would be no change to the overall quality of water discharged to Sydney Harbour from the Bennelong Drain, and far field impacts are not considered significant. For these reasons, the Department is satisfied that there will be no negative impacts on water quality as a result of the drain diversion.

In terms of habitat loss, the main potential for habitat loss would be the removal of the small section of seawall to construct the outlet. However, as this section is relatively small and occupied by intertidal habitat, which is prevalent within Sydney Harbour, overall impacts are considered to be of minimal adverse consequence.

## 5.4 NOISE AND VIBRATION

Noise impacts associated with the proposal will occur during the construction phase of the project. Key sources of construction noise include hydraulic rock breakers, circular saws, dump trucks and excavators.

A Construction Noise and Vibration Assessment has been prepared as part of the EA. Attended noise measurements were undertaken at nominated locations, including Macquarie Street roundabout near the Bennelong Apartments, SOH steps, rear of the SOH, Tarpeian Way (near Government House) and northern end of the Royal Botanic Gardens. The background noise levels and predicted noise levels are shown in **Tables 1 and 2**.

Noise monitoring results and site observations indicate that the ambient noise environment is typical of an urban environment. Noise modeling reveals that the nearest affected residences at the Bennelong Apartments would experience a noise level of 51dBA, which is below the existing  $L_{A90}$  background level of 60dBA.

The most affected locations would be the SOH and forecourt, and the northern section of the Royal Botanic Gardens. The Department considers the impacts to the Gardens to be relatively minor and localised, and appropriate mitigation measures recommended by the assessment report will further reduce potential noise impacts.

**Measured background noise levels, dB(A) 15 minute**

Monitoring location	$L_{A90}$	$L_{Aeq}$	$L_{Amax}$
L1 – Macquarie Street roundabout (Bennelong Apartments)	60	63	73
L2 – Sydney Opera House steps	53	55	68
L3 – Rear of Sydney Opera House	58	60	69
L4 – Tarpeian Way near Government House	52	55	69
L5 – Northern end of the Royal Botanic Gardens	47	50	73

**Table 1 – Measured background noise levels**

**Predicted construction noise levels, dB(A)**

Potentially affected receiver	Noise criteria	Noise level
Government House	57 (52) <sup>5</sup>	48
Bennelong Apartments <sup>6</sup>	57 (52) <sup>4</sup>	51
Sydney Opera House	Internal Criteria	63
Sydney Opera House forecourt	60	See contour map
Royal Botanic Gardens	60	(Figure 4.1)

**Table 2 – Predicted noise levels**

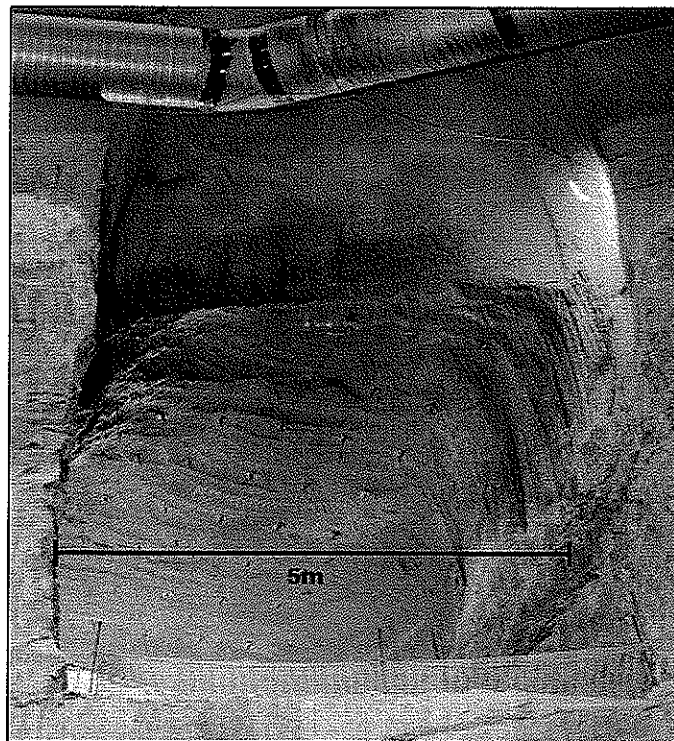
The excavator and breaker are the only items of equipment on site that are anticipated to generate appreciable vibration impacts. The assessment report outlines there is the potential for other equipment to cause ground vibrations, although these are expected to be minimal. Government House and Bennelong Apartments residences are located over 100m from the site

therefore excavation activities are unlikely to produce vibration levels that are perceptible at these receivers.

Overall, the Department is satisfied that project would not result in detrimental noise and vibrations impacts, and that the appropriate mitigation measures recommended by the Final Statement of Commitments will further reduce potential noise impacts.

## 5.5 DEMOLITION AND EXCAVATION

A report accompanying the EA has investigated geotechnical issues in relation to the project. Information from bore holes carried out by the Department of Public Works in 1989 for the construction of the inlet and outlet ventilation shafts to the Sydney Opera House Car Park indicate that geological conditions along the route of the diverted drain comprise about 1m to 3m of fill overlaying good quality Hawkesbury Sandstone. The fill is less than 2m deep over most of the length of the relocated drain. It only becomes deeper adjacent to the seawall (Figure 6).



**Figure 6** – View into the exhaust tunnel taken from within the Sydney Opera House car park during its construction. The relocated drain will pass over the top of this tunnel.

Based on excavations for the ventilation egress shaft, the fill comprises mostly crushed sandstone and sandstone fragments from the original quarrying operations, overlain by road pavement materials. It is anticipated that between 1500m<sup>3</sup> and 3000m<sup>3</sup> of waste will be removed from the site. Of this less, than 1000m<sup>3</sup> will comprise fill materials. The fill materials will be excavated by backhoe and the underlying sandstone will be cut by rotary saw and then excavated within the lines of saw cuts by hydraulic impact breakers.

The EA anticipates that there will be no contaminated waste encountered during the excavations and that the fill materials will be classified as general solid waste, in particular, building and demolition waste. There are no indications available to date that waste possessing hazardous characteristics will be encountered during excavation. However, as the excavations are undertaken, the exposed fill materials will be assessed for the presence of any materials that could have hazardous characteristics. Testing will be undertaken if such materials are observed.

The Department considers the proposed works have been tailored to site specific conditions and are capable of accommodating the drain diversion. A Construction Management Plan will be required to be prepared to ensure the removal of materials is undertaken in a manner that minimises amenity impacts on adjacent residences.

#### **5.6 THE PUBLIC INTEREST**

The Department accepts the stormwater diversion works will facilitate and assist in providing public benefits in terms of greater operational flexibility for future projects proposed under the Sydney Opera House Strategic Building Plan. The project will support existing operations, and is an essential precursor to other projects which will improve the functionality of the building and site, such as the proposed vehicle and pedestrian safety project.

## 6 CONCLUSION

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The Department has reviewed the environmental assessment and considered advice from public authorities in accordance with section 75I(2) of the Act, and all the relevant environmental issues associated with the proposal have been assessed.

The key issues raised in submissions and in the assessment related to heritage and archaeological impacts, sediment control, water quality and aquatic impacts, and noise and vibration impacts associated with construction.

The Department considers these issues to have been satisfactorily addressed, and a number of conditions are recommended to mitigate potential impacts as a result of the proposal.

The proposed stormwater diversion will allow for future work associated with the SOH to commence, whilst improving the functionality of the building and site. The works are considered compliant with the relevant environmental planning instruments and Management Plan 2005.

On these grounds, the Department considers the site suitable for the proposed drainage realignment works and that the project is in the public interest. All relevant impacts on the World and National Heritage values of the SOH have been considered and are deemed to be minor and acceptable.

Consequently, the Department recommends that the project be approved, subject to conditions.

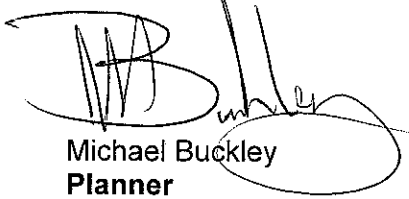
## 7 RECOMMENDATION

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It is recommended that the Deputy Director General, as delegate for the Minister for Planning:

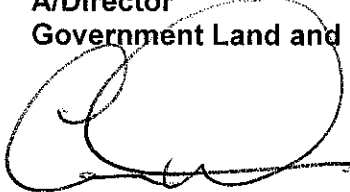
- a) **Consider** the findings and recommendations of this report;
- b) **Approve** the project application (MP 09\_0122), subject to conditions, under section 75J(1) of the EP&A Act, having considered all relevant matters in accordance with (a) above; and
- c) **Sign** the attached Instrument of Approval (**TAG A**).

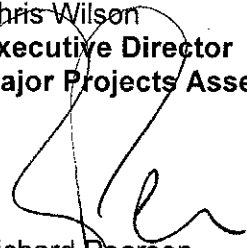
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