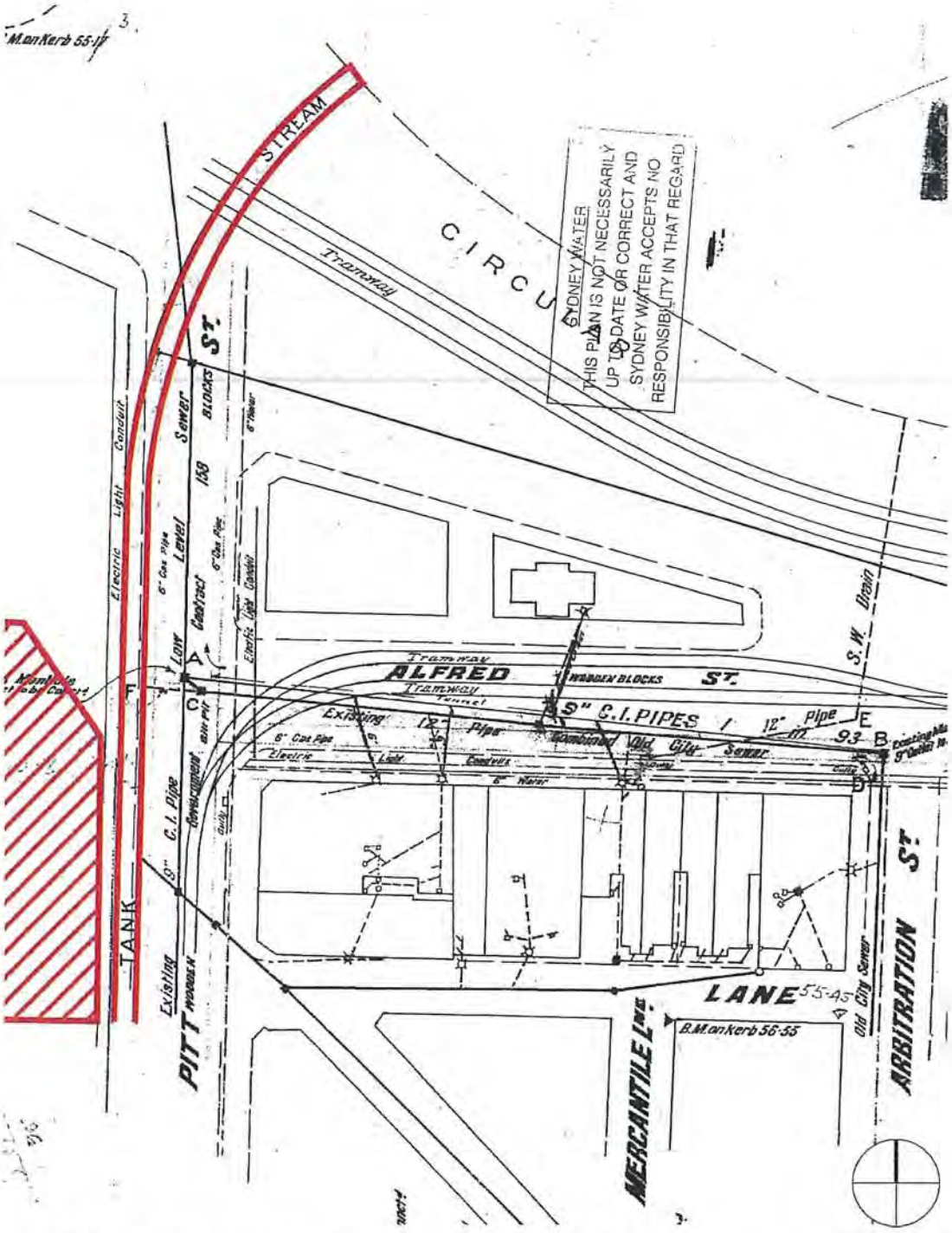

Figure 3.11: 1922 Sydney Water Board survey for the Northern Sewer branch, showing the position of the Tank Stream drain and its entry point into the harbour. The drains relationship to the site boundary is also shown. (Source: Sydney Water Plans Room with GML additions)

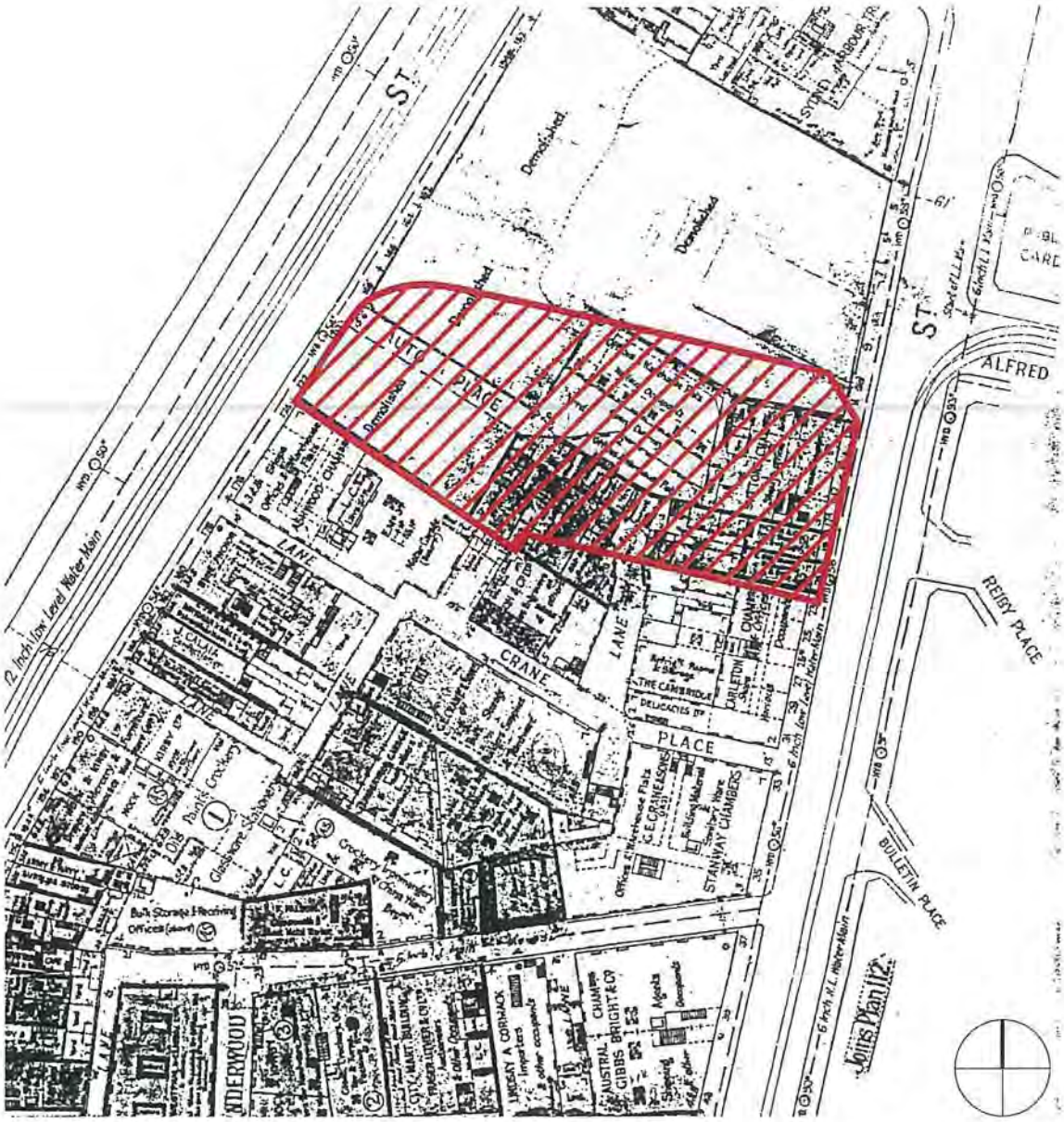

Figure 3.12: Sydney Fire Underwriters Association Plan 1924–1949. These plans were started during the 1920s and updated until the late 1940s. This plan shows the demolition of buildings in preparation for the construction of the Cahill Expressway and remodelling of Circular Quay. The work included the extension of Alfred Street through to meet George Street. (Source: City of Sydney Council Archives with GML additions)

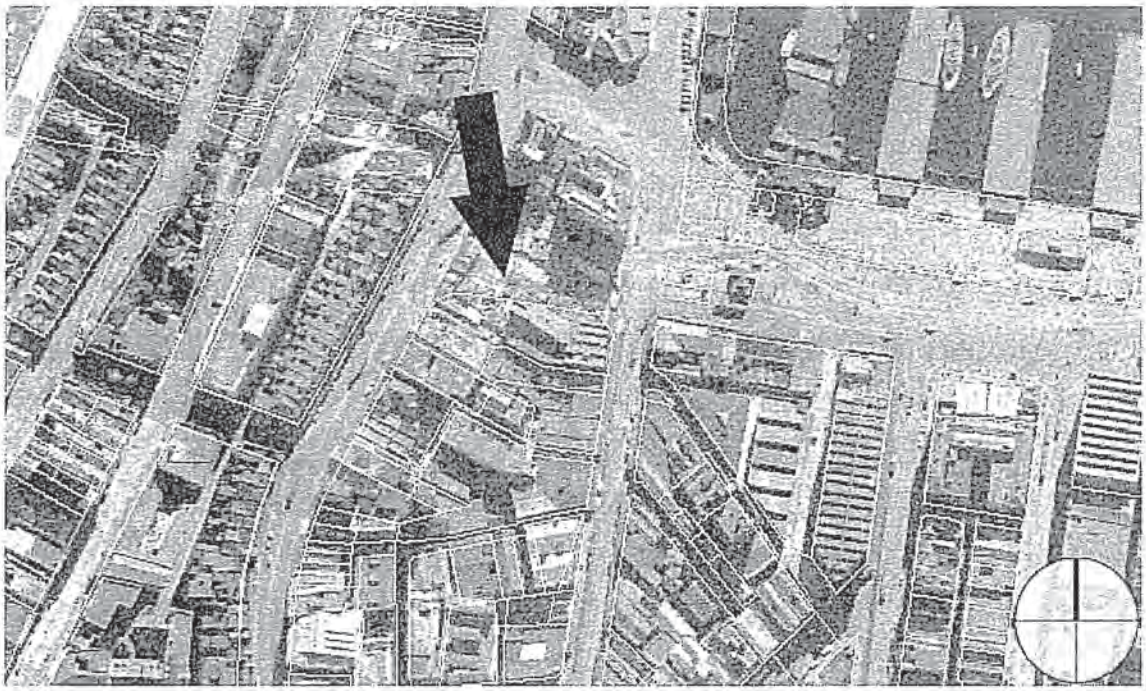

Figure 3.13: 1943 aerial photograph with the current cadastre information shown. The site is arrowed. Note the buildings being demolished (in the future Herald Square area) as shown on Plan 10. (Source: Department of Lands)

Figure 3.14: Aerial view west along Alfred Street, showing the site on the corner of Alfred, Pitt and George Streets. The completed Cahill Expressway is on the right. (Source: City of Sydney Council Archives)

Figure 3.15: 1965 image showing the excavation and shoring for the below-ground levels of the Gold Fields House development. This view is looking east to Pitt Street, note the bystander on street level (beneath the Theiss sign). The tank stream is in Pitt Street behind the shoring. (Source: City of Sydney Council Archives)

Figure 3.16 : Architect's model of the Gold Fields House site and its relationship to the AMP building at the opposite end of the Quay. Gold Fields House was designed by Peddle Thorp Walker, the same architects that designed the AMP building. (Source: City of Sydney Council Archives)

Figure 2.17: View south across Circular Quay showing the completed Gold Fields House 1966. (Source: City of Sydney Council Archives)

4.0 The Heritage Values of the Site

4.1 Introduction

An assessment of the subject site's significance has not been undertaken as part of this interpretation strategy. The following summary statement of heritage values is drawn from the historical overview in Section 4.0.

On the traditional land of the Cadigal people, the subject site was occupied from the earliest phase of European settlement in Sydney. The area to the south and west of Sydney Cove has been used for commercial purposes since the eighteenth century. The area was characterised by wool and bond stores as well as a diversity of retail shops and traders throughout the nineteenth and early twentieth century. At one stage the subject site was occupied by a jam factory, a timber merchant and a cement store. This typified the mixed use and industrial nature of the precinct.

By the 1950s the city was rapidly modernising and warehouses were being demolished to make way for multi-storey commercial buildings. Between 1956 and 1964 Sydney experienced a building boom and the capital value of new building stock in the city soared.[6] Gold Fields House was one of the first modern sky scrapers to be constructed following the removal of the height restriction on city buildings in 1957. The building was designed to complement the AMP Tower, which is located at the eastern end of Alfred Street. Both buildings were designed by Peddle Thorp & Walker. These buildings form bookends of Circular Quay and the Cahill Expressway.

4.2 Themes and Key Messages

In preparing to interpret places, it is important to present their past in an informative, interesting and easily accessible way. This is achieved through communicating the key themes and stories which have formed the site. These have been derived from the historical overview for One Alfred Street (Section 3.0).

A national framework of historic themes has been developed by the Australian Heritage Commission, published in 2001. The Australian Historic Themes Framework aims to 'assist in structuring research and to emphasise the historical values of a place to reverse the prevalence of fabric-based assessment by identifying historical processes that might be used in assessing and interpreting heritage significance'. Nine national theme groups were identified, with focused subthemes based on activities. The Heritage Branch, Department of Planning (formerly the NSW Heritage Office), has also developed state historic themes that, to a large degree, link with the national framework.

The identification of themes which relate to One Alfred Street will enable the development of interpretive messages. Interpretive messages will provide direct and tangible links to the site's heritage which will, in turn, enhance the public's appreciation and understanding of it.

Thematic interpretation at One Alfred Street site should be developed from the topics included in the following table.

NSW State Theme	*Historic Theme*

NSW: Aboriginal Cultures and interactions with other cultures

The Cadigal people are the traditional owners of this place and today Aboriginal life and culture continues to make a significant contribution to the life and diversity of the City of Sydney.

NSW: Commerce

The precinct was previously occupied by merchants and traders. From the mid-1950s the city of Sydney underwent rapid urban transformation. The diversity of low-scale industrial and mercantile development was replaced by Gold Fields House, one of the first high-rise buildings in the City of Sydney when it was completed in 1966. The site reflects the changing nature of the City's economy and a move towards service based industries.

NSW: Towns, Suburbs and Villages

The history of the site demonstrates the evolution of the city's urban form and fabric. Prior to 1957 a limit was placed on the height of all buildings in the CBD. The removal of the height limit was part of the City's new commitment to growth and progress. The diverse range of commercial and industrial buildings were demolished to make way for high-rise buildings which are now characteristic of Circular Quay. Gold Fields House was one of the first skyscrapers to be built as part of this phase of urban development. The building was designed by Peddle Thorp and Walker, the architectural firm that also designed the AMP building. Gold Fields House was designed as a book end to the AMP building at Circular Quay.

NSW: Transport

The site layout reflects the changes to the precinct brought about by the Cahill Freeway. The construction of the Cahill Expressway between 1955 and 1962 transformed the precinct and necessitated the demolition of numerous small scale commercial developments which had characterised the southern end of Circular Quay. High-rise developments now characterise the Alfred Street and Circular Quay precinct. Gold Fields House was constructed as part of this phase of modernisation.

NSW: Utilities

The Tank Stream lies immediately to the east of One Alfred Street. The Tank Stream was the main source of freshwater to Sydney Cove in the 18th Century and its location was instrumental in the choice of settlement for the First Fleet Settlers.

5.0 Proposed Development

5.1 Introduction

The demolition of Gold Fields House which currently occupies the subject site has been approved by the City of Sydney. This demolition will make way for a new residential and commercial development. This development will consist of two towers, one being 55 stories high and the other 14. The majority of the floor space will be devoted to residential development with office, retail, bars and restaurants located on the lower levels.

A plaza will be open to the public at ground level and will flow into Herald Square extending the existing public space. The plaza and public areas of the two buildings provide opportunities for the interpretation of the site through public art and landscape design (see figures 5.1 to 5.3).

A previous archaeological assessment of the site has concluded that the construction of Gold Fields House destroyed all potential archaeological remains within the footprint of the building from the pre war phases of the site. This archaeological assessment identified a possibility of some 19th century archaeological remains outside the footprint of Gold Fields House on the George Street side. These archaeological remains will fall outside the footprint of the future building and as such will not be appropriate for interpretation.

The Tank Stream is located immediately to the east of the subject site and therefore is an appropriate subject for interpretation through secondary sources. The history of the site and its various phases of occupation and use convey a very different image of Circular Quay. Historical imagery can be used to convey the site's evolution and development. As such opportunities for interpretation will come from the integration of historical sources into the fabric and finishes of the future development.

5.2 Associated Places and People

The following groups of people may have an interest in One Alfred Street and may be able to add to the knowledge and understanding of the site's history or values. It may be appropriate to invite their input and participation in the interpretive planning process:

- Aboriginal people—including Cadigal people with traditional associations with the locality and the Metropolitan Local Aboriginal Land Council;
- former building/site owners/staff/ PTW architects and associated family members;
- people with an interest in the place including members of the Royal Australian Historical Society, the City of Sydney historians, Australian Institute of Architects and PTW archivists; and
- local area workers and residents.

5.3 Existing and Potential Audiences

Accessible interpretation of heritage values will help to ensure the place is appreciated by specific identified audiences, visitors and the wider community into the future.

Interpretation is most successful when it is targeted specifically to audience needs in terms of orientation, information and personal safety and when it responds to known audience behaviour.

Projected audience groups include:

- employees who will be working in the new buildings proposed for the site;
- residents and owners of the proposed buildings as well as their guests;
- other city workers from nearby office buildings;
- other visitors to the City of Sydney;
- heritage enthusiasts; and
- learning audiences including primary, secondary, tertiary and lifelong learners.

5.4 Interpretive Resources

In order to interpret the experiences and historical development of One Alfred Street it is essential to identify all the resource materials that have capacity to inform one or all segments of the potential audiences about their significant values. These resource materials include:

- the historic maps and imagery which illustrate the evolution of the site from small scale commercial shops and warehouses in the nineteenth and early twentieth centuries to Gold Fields House and the technologically sophisticated residential development proposed for the site; and
- the Tank Stream, as well as historic maps and imagery, which illustrate the earliest phases of settlement in Sydney Cove.

Further resources may be identified as associated people are contacted for input and participation in the interpretation planning process. Further discussion regarding the potential interpretive initiatives which draw upon these elements is presented in Section 6.0.

Figure 5.1: View over the proposed forecourt. (Source: Kerry Hill Architects)

Figure 5.2: Proposed forecourt to new building showing circular waterfeature in foreground. (Source: Kerry Hill Architects)

Figure 5.3: View to the east along the proposed forecourt. (Source: Kerry Hill Architects)

6.0 Interpretation Recommendations

6.1 Interpretive Objectives to Engage and Stimulate Audiences

A range of possible interpretive initiatives are outlined below. A selection may be selected for implementation to interpret the history and heritage values associated with One Alfred Street.

6.2 Interpretive Aims or Objectives to Engage and Stimulate Audiences

By interpreting the many and diverse heritage values of One Alfred Street, there is an opportunity for people to appreciate the historic themes and stories of the place. By making connections with the past, visitors will better understand the context of their surroundings and value them.

The potential interpretive initiatives have been identified in order to communicate the heritage and history of the site with authenticity and sophistication.

The range of potential initiatives include:

- ground inlays:
- interpretive signage; and
- public art.

Together, the proposed interpretive devices aim to convey information about the heritage values significant to the place. They provide opportunities for people to engage with the cultural significance of One Alfred Street.

By focusing on the historic documentation, as well as archaeological evidence, workers and visitors to the city can be provided with direct and tangible links to the history of the place which will, in turn, enhance their enjoyment and understanding of the values and meanings associated with the site, in the context of the changing historical texture and fabric of the city.

6.3 Potential Interpretive Initiatives

The following range of potential initiatives has been developed to interpret the site's historic themes to identified and potential audiences using a variety of media.

To ensure best practice for interpretive media, all initiatives must be authentic and site-specific. A commitment to high-quality design development and consistency, as well as rigorous evaluation in the development stages, is also vitally important.

This report recommends that resources be set aside to develop practical design and evaluation guidelines for interpretation, to ensure a unified, accessible and consistent interpretive experience.

6.4 Media and Locations

On-site Interpretive Initiatives

Interpretive Initiative	Media	Examples
Interpretation of the historical landform and Tank Stream		
• To interpret the location and history of the Tank Stream in an engaging yet subtle way, inlays and paving may be used. • Inlays associated with the line of the Tank Stream on the eastern section of the allotment may effectively communicate its location and significance. • Consideration may be given to interpreting the historic allotment boundaries with this technique within the subject site. • Inlays or markers of the pre-settlement coastline in the plaza area could demonstrate the process of land reclamation. • To interpret the multiple past uses of the site such as taverns, traders, jam factory, cement store and slaughterhouse, these words could be expressed in inlays.	• Ground inlay expressed in contrasting paving floor or paving finish following the line of the existing waterway. • Interpretive sign in brushed stainless steel, with ink-filled recessed text mounted in floor, finished flush with floor treatment. • These may be located in publicly accessible outdoor areas and may be appreciated by casual visitors to the site.	

On-site Interpretive Initiatives

Interpretive Initiative	Media	Examples
Interpretation of the Development of the Site.		
• To present the history of the site in the broader context of the high-rise development in the City of Sydney. • Signage should be expressive and consider interesting and engaging ways to present the significance of the site. • Historical plans or images of buildings which have previously occupied the site could be displayed in public areas of the building. • Images of the site prior to the construction of Gold Fields House. • Words such as Livingston's wine tavern, tea merchant traders, slaughterhouse, jam factory, cement works, etc may be used to convey the diverse history and use of the site. Images related to the construction of Gold Fields House, especially pictures of riggers and dogmen drinking beer on the construction site to interpret the dramatic changes to workplace safety in the construction industry since Gold Fields House was erected.	• Text-based screens, acid-etched stainless steel. • Large toughened glass panels with digital prints using a montage of historical imagery. • These may be incorporated into the finishes of external walls, lobbies and partitions. • These may be located in public internal areas and are intended to engage frequent visitors. • May be incorporated into proposed bench seating or planters, or stair risers.	   

On-site Interpretive Initiatives

Interpretive Initiative	Media	Examples
• Public art for the site, in line with the City of Sydney Public Art Policy 2006 and the Art Strategy prepared by Barbara Flynn, should be recognised for its excellence and provide a source of inspiration and pride for the citizens of Sydney. • Public art should communicate the historical identity, local character and distinctiveness of the site and start conservations about the urban environment. It should also reflect the historical significance of the site. • The concept should be inspired by the historic layering and evolution of the site. The artwork should communicate with sophistication and complexity the evolution and transformation from Cadigal Land to an urban morphology with small allotments in multiple ownerships to a single city super block. • The artwork could reference previous uses of the site and the evolution of use to an inner city residential development.	• Soundscape, lighting, plantings, digital prints, water, steel, stone, glass, etc • The artwork will engage all users of the site and could have landmark qualities. Multiple artworks could be used to address both internal and external areas.	    

6.5 Telling the Stories of One Alfred Street

6.5.1 Aboriginal Cultural Heritage Initiatives

The consideration of Aboriginal cultural heritage interpretation—which needs to engage with the local Aboriginal community who are the rightful interpreters of their heritage—is beyond the scope of this interpretation strategy. However, there may be an opportunity to provide interpretive signage or public art within the development that acknowledges Sydney as the traditional country of the Cadigal people and also the ongoing contribution of Aboriginal people to the life and culture in Sydney.

6.5.2 Interpretive Displays

To help build public awareness and interest, a selection of imagery based on key historic themes—providing a sense of place-can be developed. In busy urban environments interpretation should be eye-catching, well-designed and image-rich. Interpretive text should be concise.

The development has the potential to reach not only the residents who occupy the apartments but also the office workers and restaurant patrons who access the site on a daily basis. This will enable the public to learn more about the site and the history of the city through well designed interpretive displays and easy access to history.

Signage

Signage is ideal for conveying static information at sites and can include text, maps and imagery. Signage should be sensitively designed and thoughtfully sited to enhance the visitor experience and articulate the significance of the place. For many audiences signage is a comfortable and familiar technique, yet today's audiences are increasingly sophisticated and expect far more than a sign to communicate what is significant about a place. Given the design and style of the proposed development, traditional signs may appear awkward in otherwise sleek interior spaces. As such, maps and simple information should be incorporated into the existing finishes. For example, maps and simple text could be printed on glass, stainless steel or stonework surfaces. This would then integrate the interpretation with the built form of the development.

Groundworks/Surfaces

Changing patterns and textures in paving surfaces can be used to interpret the location of former structures, prior use of places such as the garage forecourt area, and the location, footprint and scale of built features that will be demolished as part of the proposed retail development. For example, the route of the Tank Stream could be expressed through paving treatments or contrasting floor finishes on the footpath immediately outside the building. Such inlays are not only an effective means of communicating where historic items were located but can also be used to communicate memories or intriguing fragments of information associated with former uses of the site. Inlays enable many layers of the past to be communicated. They provide a means for including material from a range of historic periods. In this way, inlays can be used to convey information about the use of the site.

This kind of interpretation is often subtle and yet adds an important layer of information that can include quotations, artwork or patterns inlaid into concrete surfaces. Depending on the material selected, this initiative is relatively cost effective and adds both texture and a discrete layer of information that will complement the interpretation of the site in its urban context.

Public Art

The historically rich urban landscape, stories and heritage significance of One Alfred Street can be expressed through plantings, sculpture, lighting, soundscapes, murals and other creative media. Urban artwork can involve and engage new audiences. It is a great mechanism for attracting other thoughts and perspectives on places. It can help reveal aspects of places that are not visible and can provoke a sensory reaction on the part of the visitor. Public artwork could reference the previous uses of the site, for example as a lumber yard or jam factory. Public art displayed in an urban setting, either on an ephemeral or permanent basis, can enliven and enrich the environment and draw significant audiences to the locality.

Urban artworks can often stimulate emotional responses or spiritual connections that other interpretation techniques or devices cannot. The City of Sydney has prepared a Public Art Policy and Strategy. It will be available for public comment soon. In the meantime, the City of Sydney has an Interim Public Art Policy, 2006, that guides and informs the assessment and selection of public art commissioned or proposed to the City. The vision in the policy states:

> *The City of Sydney will create a public art program which is both internationally recognised for its excellence and a source of inspiration and pride for its citizens.*[7]

At One Alfred Street there are opportunities for public art to be integrated into the building's public plaza and foyer. The creative process may be informed by and respond to the historic themes and past uses associated with the site and its context.

6.6 Images for Potential Interpretive Signage

The following images may be considered for use on interpretive signage. The images communicate previous configurations of the subject site, indicating prior land forms and uses throughout the history of European settlement. While these images would be very effective and informative if displayed in conjunction with short didactic text, they would also be highly effective if incorporated into the fabric of the building and future public artworks.

The first two images illustrate the original landform of the subject site. The subject site lies across reclaimed land which used to be part of the sandy marshes at the mouth of the Tank Stream. These images or the shape of the early shore line could be incorporated into the design of the glass finishes at ground level. Alternatively, the original shore line could be traced in paving across the forecourt of the site and in the lower public area.

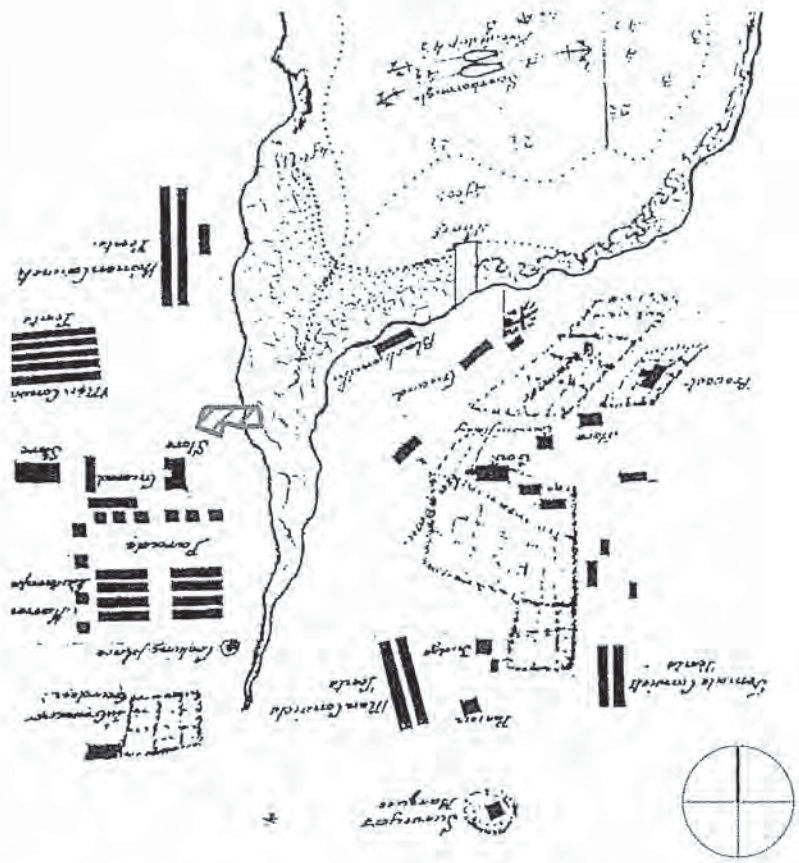

Figure 6.1: The 1788 survey of Sydney Cove with the approximate location of the subject site indicated. (Source: Ashton, P and D Waterson, 2000, *Sydney Takes Shape*, HEMA, Sydney)

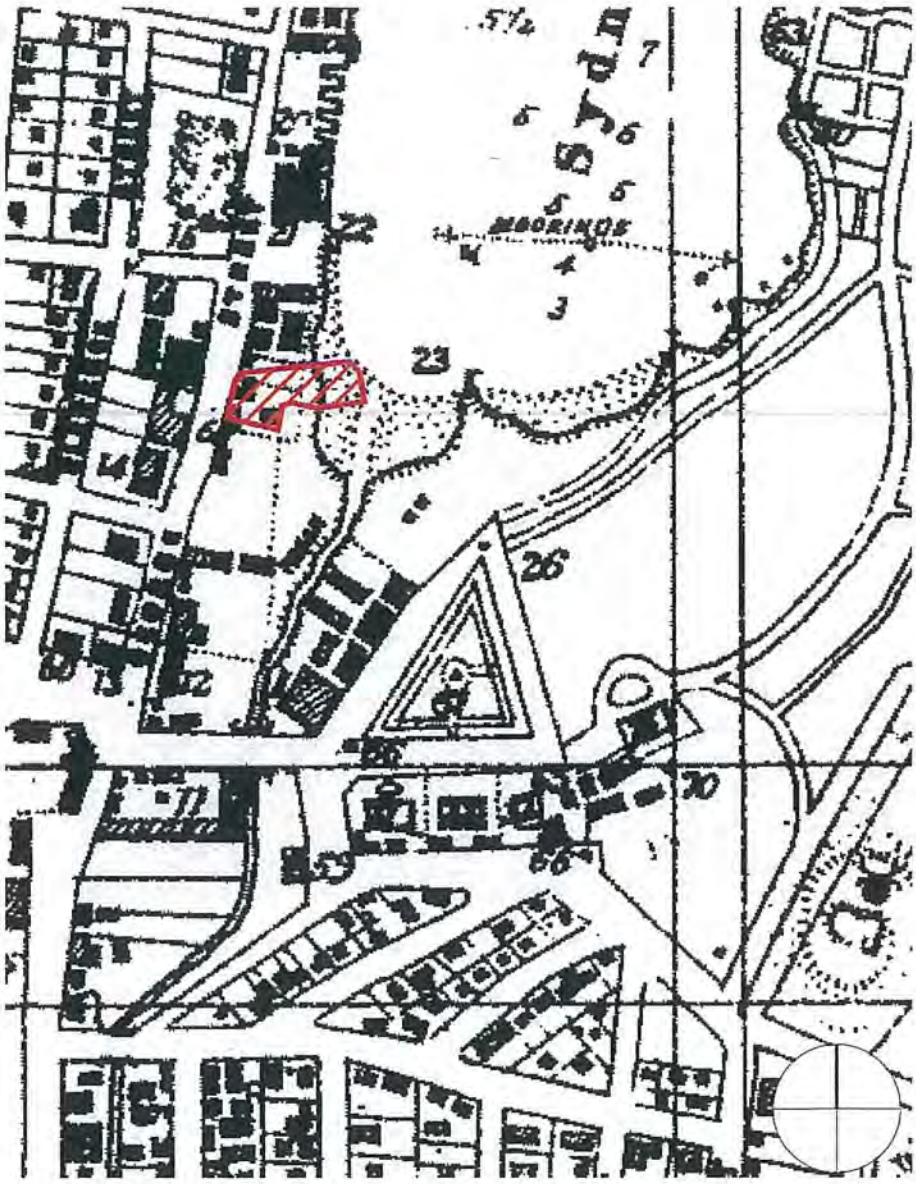

Figure 6.2 The 1822 plan of Sydney Cove. The mouth of the Tank Stream has yet to be reclaimed and is still depicted as a sandy marsh. A number of structures are depicted on the George Street frontage of the subject site. (Source: Ashton, P and D Waterson, 2000, *Sydney Takes Shape*, HEMA, Sydney)

The following images relate to the site as part of a light industrial and warehousing district. The low rise Victorian and early twentieth century structures were characteristic of the area before its transformation to a modern commercial district. The images reflect the relatively modest and working class nature of the area which contrasts with the proposed use of the site.

Figure 6.3: The warehouses and factories which occupied the site in the 1960s. (Source: City of Sydney Archives)

Figure 6.4: View of Alfred Street and the subject site. (Source: City of Sydney Archives)

Figure 6.5: A 1963 aerial view of Alfred Street and the Cahill Expressway. The subject site is still occupied by low-rise commercial and light industrial developments. (Source: City of Sydney Archives)

The following images relate to the postwar modernisation of the site. These images could be incorporated into interpretive signage in the internal areas of the towers. They would illustrate the development of the site from an industrial trading precinct to a commercial services hub in the late twentieth century. They would also depict the men who worked on the construction of the Gold Fields House Building.

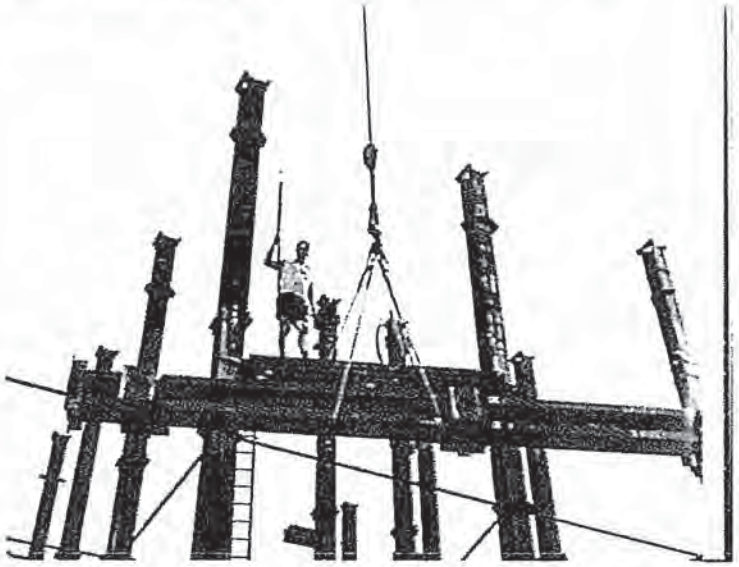

Figure 6.6: Images of the construction workers on the Gold Fields Site. (Source: City of Sydney Archives)

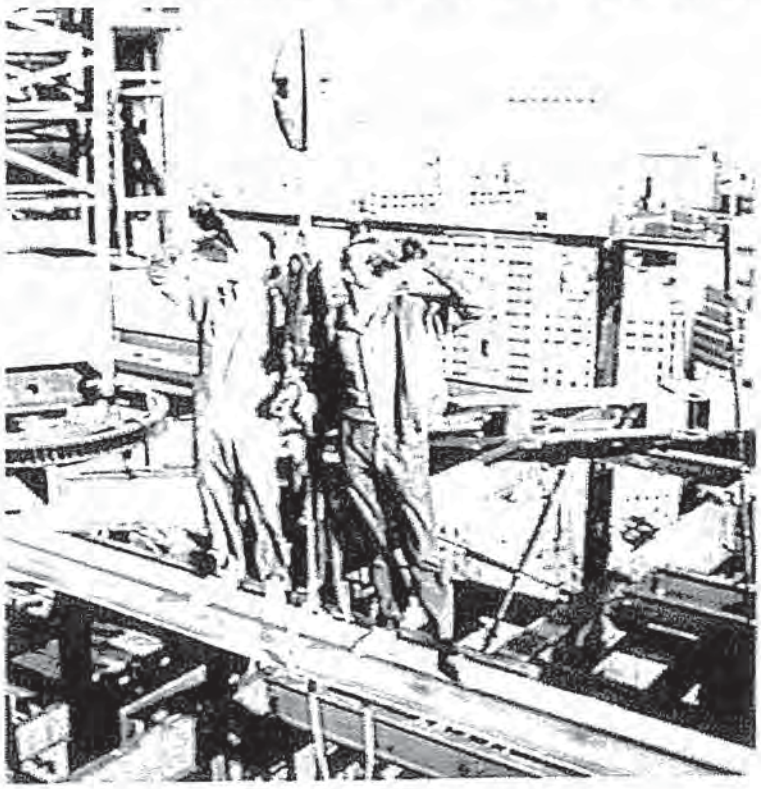

Figure 6.7: Images of the riggers and dogmen on the Gold Fields Site drinking beer. They are celebrating the last girder being mounted on the framework. (Source: City of Sydney Archives)

Figure 6.8: View of Alfred Street and the Gold Fields House construction site. (Source: City of Sydney Archives)

Figure 6.9: The construction of Gold Fields House was underway in 1965. This photograph demonstrates the contrast between the new high-rise commercial development and the warehousing and industrial precinct in the background. (Source: City of Sydney Archives)

The final two pictures depict the completed building. The building appears sleek and modern, which is in direct contrast to the light industrial character of the precinct only a decade before. These images could be incorporated into the finishes of the new building in the lobby and lift areas. Alternatively, the images could provide creative input to future public art programs on the site.

Figure 6.10 The modernist city, the air conditioning louvres on Gold Fields House demonstrating the new, sleek skyscraper design. (Source: City of Sydney Archives)

Figure 6.11 Circular Quay looking south in 1966 following the completion of Gold Fields House. The AMP tower and Gold Fields House act as bookends for the quay. (Source: City of Sydney Archives)

7.0 Conclusions

Interpretation of the history and significance of the site in its urban context is an integral part of the future planning and development of One Alfred Street.

Interpretation plays an important role in sustaining the history of the City of Sydney and communicating heritage values. By telling the stories associated with places significant values may be communicated to the community and visitors alike. This will enhance public appreciation and understanding of the city as an urban environment that has been shaped and changed in response to industrial, economic and social circumstances.

There is a range of opportunities for interpretation at One Alfred Street. With the proposed re-development of the site there are opportunities within the public areas of the new building where interpretation may be incorporated to add visual interest, texture and detail. The select implementation of the initiatives identified in this report will help maintain and realise important aspects of Sydney's urban and social history.

Following client review of this interpretation strategy the subsequent stages of interpretation planning will include implementation and fabrication of select interpretation initiatives. These tasks and responsibilities are outlined below.

7.1 Development and Implementation Tasks and Responsibilities

Tasks	To be carried out by
Interpretation Plan: Stage 2—Content Development	
Client and stakeholder comments on interpretation strategy	Client/Stakeholders/Interpretation Consultant
Confirm appropriate media for interpretive initiatives	Client/Project Architect/Interpretation Consultant
Confirm appropriate locations for interpretive initiatives	Client/Project Architect/Interpretation Consultant
Concept development for interpretive initiatives and media	Client/Project Architect/Graphics/Interpretation Consultant
Select images for use on interpretive media, seek permission to use or copyright to selected images	Interpretation Consultant
Prepare text for interpretive media	Interpretation Consultant
Provide summary of installation tasks and an overview maintenance strategy for interpretive media	Client/Project Architect/Interpretation Consultant
Interpretation Plan: Stage 3—Implementation	
Design of interpretive media	Graphic designer, with Interpretation Consultant
Production of interpretive media	Graphic designer/ Producer/fabricator in collaboration with interpretation consultant
Installation of interpretive media	Installation staff overseen by Project Architect/Builder/Graphic designer/Interpretation Consultant (as required)

8.0 Endnotes

[1] http://www.cityofsydney.nsw.gov.au/barani/themes/theme1.htm, accessed 25th February 2009.

[2] Yarwood, A T 'Johnston, George (1764 - 1823)', *Australian Dictionary of Biography*, Volume 2, Melbourne University Press, 1967, pp 20-22

[3] Weingarth, J 1924 The Head of Sydney Cove, in the Journal of the Royal Australian Historical Society, Vol X, Part V, p293.

[4] Andrews, G 1986, *Port Jackson 200: 1786-1986*, Reed Books, Sydney, p67.

[5] Letter Department of Railways to Cumberland County Council 17 September 1959, Sydney City Council Archives

[6] Ashton, P 1993 *The Accidential City: Planning Sydney Since 1788*, Hale and Iremonger, p 79.

ENDORSED
CONSERVATION MANAGEMENT PLAN
Heritage Council

Date endorsed
20/2/2005
Date expires
20/2/2009
Copy no. 2 of 2 stamped copies
S90/04382
NSWHO File

Sydney WATER

TANK STREAM

Conservation Management Plan

For Asset Management And Sydney Water Corporation

Jan 2005

NSW Heritage Office

3 Marist Place
Parramatta NSW 2150
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Telephone: 61 2 9873 8500
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File: H03/00237
Our Ref:
Your Ref:

Mr Maclaren North
Heritage Manager
Sydney Water Corporation
PO Box A53
SYDNEY SOUTH NSW 1232

Att: Ms Clare O'Brien

Dear Sir

Re: CMP Manual and Tank Stream Conservation Management Plans

The Director of the Heritage Office under delegation from the Heritage Council considered the above conservation management plans prepared by Sydney Water on 22nd February 2005, and resolved as follows:

That the Director of the Heritage Office under delegation from the Heritage Council:

1. **endorses the conservation management plans titled *Sydney Water Conservation Management Plan Manual* prepared by Sydney Water for Sydney Water dated January 2005 for a period of five years and *Tank Stream Conservation Management Plan* prepared by Sydney Water for Sydney Water dated January 2005 for a period of five years; and**
2. **agrees that this endorsement will apply to the Standard Exemption no 6 issued in accordance with section 57(2) of the Heritage Act, 1977.**

Thank you for submitting the plan for consideration for endorsement. If you have any queries please contact Bruce Baskerville on the above number.

Yours sincerely

Cameron White
Principal Heritage Officer
Listings Council
23/2/05

PO Box A53

Sydney South NSW 1232

Phone (02) 9350 6969

Commercial in Confidence

Front Cover Images:

Above - Tank Stream Water Colour by F Garling 1842, State Library of NSW ML420

Below – Tank Stream Tunnel 2002, Sydney Water

June 2003

EXECUTIVE SUMMARY

Conservation Management Plans (CMPs) determine the significance of a heritage item and recommend appropriate conservation and management policies. They are prepared to set guidelines and standards, and establish significance through investigation of the historical development of an item, using documentary, pictorial, oral and physical evidence. In NSW CMPs for places of state heritage significance have a legal status that is binding upon the owner of the heritage item.

This CMP has been prepared in conformity with best practice guidelines. The first section is descriptive and culminates in the statement of significance. This is followed by the development of recommended policies and actions to direct future conservation and management.

Why is the Tank Stream important?
The presence of the Tank Stream determined the placement of the settlement established by the arrival of the First Fleet in 1788, and its fresh water helped ensure the colony's survival. It is therefore intimately associated with the earliest moments of the European presence in Australia.

As a result of that association, the Tank Stream has a symbolic value to the Australian community and this is reflected in a high recognition and interest in it as a heritage item. It is also important as an early stormwater channel, for its technological importance and other values, although these are less than the symbolic role.

The statement of significance [Chapter 4] sets out the significance of the place in detail.

What is the Tank Stream?
An issue identified in the CMP is that the physical item, its legal curtilage and the original course of the stream are all different. The original Tank Stream has been lost by later channelisation and development. The original channel has also been modified in sections through time. Little fabric from pre-1857, when it was channelised as part of the Sydney sewer and stormwater system, demonstrably survives, and the bulk of the older sections date from the mid- to late-nineteenth centuries, with extra sections that are less than fifty years old, as a result of underground basement construction.

In referring to the 'Tank Stream', this term is defined to encompass several meanings:

- The historical stream;
- The existing stormwater drain;
- The tunnel of brick and stone fabric enclosing the current storm water drain;
- The sections of the former route; and

- The idea of the tank stream which has evolved over time and combines fact and fiction and is not necessarily related to reality.

The CMP addresses all of these aspects of the Tank Stream, although is limited in its ability to control activities outside the area directly under its own control. The description of the history [Chapter 2] and physical evidence [Chapter 3] provides the detailed analysis of what remains of the Tank Stream through its different historical phases.

How should the Tank Stream be conserved?

The framework for the future conservation and management of the Tank Stream is directed by legislative obligations and by Sydney Water's own policy directives. These include the need to continue managing it as part of the Sydney stormwater system.

Chapters 5 and 6 look at the statutory and user requirements respectively. Sydney Water needs to undertake specific actions and establish policies and strategies to comply with these requirements. These are set out as a program of action within the policy chapter [Chapter 7] and the Maintenance Schedule [Chapter 8].

The future of this Conservation Management Plan

The final version of this CMP will be endorsed by Sydney Water and the Heritage Council of NSW. Upon endorsement, this CMP will form the basis for statutory exemptions under the *Heritage Act*. All work undertaken in accordance with the endorsed CMP will be exempt from approval. The CMP will also initiate the start of conservation works and the development of supporting documentation for the Tank Stream.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION

This section introduces the Tank Stream Conservation Management Plan brief and objectives, defines the methodology and limitations of the report, identifies the project team, report authors and contains the glossary and abbreviations.

1.1 Background and Context of the CMP

Sydney Water is steward of a vast range of heritage resources, from engineering industrial heritage to archaeological sites, built heritage and moveable objects. These include many items that still have an important role in delivering water services to Sydney's residents.

Some 222 of these assets possess heritage values and are listed on Sydney Water's S.170 Heritage and Conservation Register, that was submitted to the Heritage Council of NSW in 2002. Of these 222, 59 were assessed to be of State significance through the S.170 Register process and these are entered on the State Heritage Register (SHR).

Sydney Water has determined that conservation management plans (CMPs) should be prepared for its State significant heritage items. This will assist in enabling Sydney Water to meet its heritage objectives and obligations, including legislative compliance and stakeholder expectations. CMPs are considered the best tool to effectively manage the significance of Sydney Water's most important heritage assets.

Preparation of CMPs for SHR items provides for strategic planning and management of heritage items. This planning is, consistent with Sydney Water's ecologically sustainable development and heritage strategy commitments, Heritage Council policy, NSW government total asset management policy and conservation industry accepted best practice.

1.2 Objectives and Brief

The objective of the CMP Project is to enable Sydney Water to achieve best practice heritage management of its State significant heritage items to the satisfaction of the agency, regulators and stakeholders. Sydney Water recognises that conservation management planning is an ongoing process. As general principles Sydney Water intends that:

- All state significant heritage items will be managed in accordance with the *Burra Charter* and the *Australian Natural Heritage Charter*.
- Sydney Water recognises that it holds these resources as a steward on behalf of the public.
- The continued operation of Sydney Water's infrastructure is fundamental to understanding and maintaining its significance.
- Significance resides primarily at the level of the systems and schemes within the systems. The significance of individual items or places contributes to a greater whole.
- Sydney Water may divest itself of heritage items that are not required for operational reasons provided that the retention of significance can be assured.
- CMPs for state significant items will be prepared to a standard equal to world's best practice for conservation management.

To meet these objectives Sydney Water assembled an in-house team to prepare the CMPs over a three year period. Where necessary, additional consultants will be engaged to assist in the preparation of the CMPs. The project included developing a model CMP which meets Sydney Water needs and satisfies external stakeholders, preparing CMPs for SHR listed items, ensuring the CMPs are suitable for Heritage Council endorsement and that the CMPs may be incorporated into Sydney Water's Environmental Management Systems and Asset Plans. The Tank Stream has been chosen as the first CMP to be prepared by the in-house conservation planning team. The Tank Stream pilot status is fitting as it is the oldest and most significant of Sydney Water's heritage items and is one of the most recognised by the public for its historical value.

1.3 Site Identification

The Tank Stream is an archaeological relic, a linear stormwater drain and tunnel and an icon of colonial Australia. It is located beneath the streets at the centre of the central business district of the City of Sydney. The availability of a fresh watercourse was the primary reason for the 1788 First Fleet settlement at Sydney Cove. The Tank Stream is named for the tanks cut into it by the early settlers, their first modification of the natural system, in 1803. Since serving an initial and limited function as fresh water supply, the Tank Stream has been used as a combined sewer and stormwater drain. The primary current function of the Tank Stream is to serve as a stormwater drain for the Sydney Catchment to the north of the line of King Street. The Tank Stream is owned and managed by Sydney Water.

The current operative heritage curtilage of the Tank Stream is defined on Plan Number 1665, kept by the NSW Heritage Council under the *Heritage Act* 1977 (NSW) [Appendix A]. The plan is a 1989 representation of the stormwater drain and enclosing tunnel route extending from King Street and running parallel between George and Pitt Streets, to Bridge Street, and then beneath Pitt Street, to emerge at the Sydney Cove seawall. The SHR listing also protects an area of three metres from all surfaces of the Tank Stream structure. The Tank Stream listing affects a number of properties, identified in the State Heritage Register listing. The SHR listing is provided in Appendix B.

The Tank Stream is an icon and is known as part of the earliest European history of Sydney, It retains a presence in peoples' minds that is different to the physical reality. As outlined in Chapter 4, the Tank Stream is defined to embrace the following meanings as derived from the Godden Mackay Logan report Tank Stream Tunnel Stage 1 – Preliminary Assessment of Significance and Issues, prepared for Sydney City Council, 1995:6):

- The 'natural' tank stream being the small watercourse draining the catchment south from Sydney Harbour.
- The existing fabric of the stormwater drain.
- The tunnel of brick and stone enclosing the stormwater drain.
- The sections of the former route of the Tank Stream.
- The concept of the 'Tank Stream' as experienced, depicted and taught to generations of Australians.

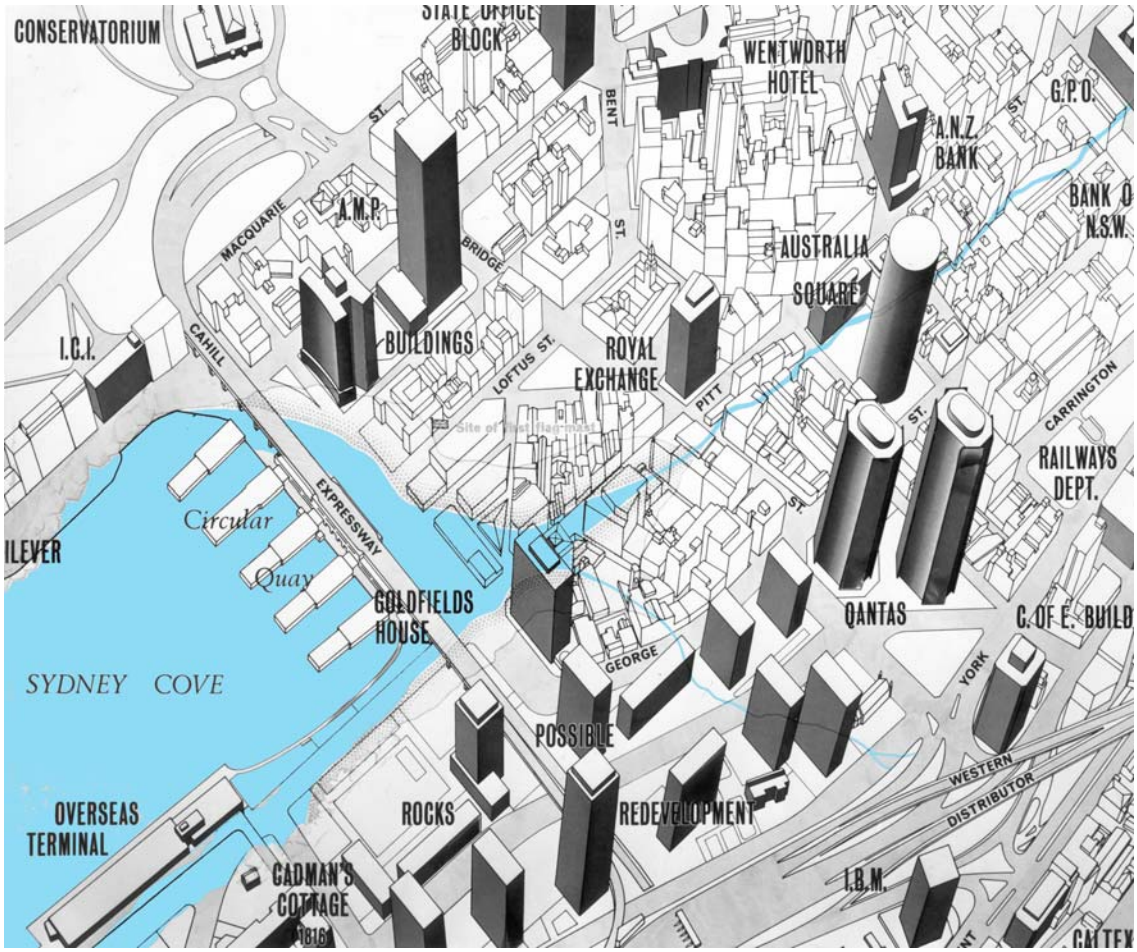


FIGURE 1-1 Illustrates the path of the original water course route and bed, beneath the Sydney urban form as at 1964, published in the Sydney Water Board Journal, January 1964:121.

1.4 Heritage Listing Status

The Tank Stream is protected through the following statutory heritage listings:

- The Register of the National Estate, under Section 22 of the *Australian Heritage Commission Act* 1975 (Commonwealth).
- The State Heritage Register, under Section 31 of the *Heritage Act* 1977 (NSW).
- Sydney Water's s.170 Heritage and Conservation Register, under Section 170 of the *Heritage Act* 1977 (NSW).
- Schedule 3 of the Central Sydney Heritage LEP 2000, under the *Environmental Planning and Assessment Act* 1979 (NSW).

The Tank Stream is recognised through the following non-statutory heritage listing:

- The National Trust of Australia (NSW).

Full details of the listings are contained in Appendix B.

1.5 Authorship, the Study Team and Acknowledgments

This CMP has been prepared by an in-house team of heritage practitioners engaged by Sydney Water.

- Denis Gojak, CMP Project senior project officer, was responsible for leading the CMP. Denis wrote the executive summary, the CMP's archaeological analysis and Chapter 6 –Primary Heritage Management Issues with input from the team.
- Jon Breen coordinated the team's historical and archival research and Jon Breen and Denis Gojak wrote Chapter 2 –Historical Description.
- Zoran Popovic wrote Chapter 3 –Physical Description, Chapter 7 –Conservation Policies and Chapter 8 – Implementation.
- Lisa Rogers wrote Chapter 1 – Introduction, Chapter 4 – Assessment of Significance and Chapter 5 – Heritage Management Framework.

All team members contributed to the assembly of information, analysis and discussion of drafts. Team members have agreed to be identified as joint authors of the entire CMP for purposes of intellectual copyright.

Natasha Abulafia and Clare O'Brien have provided project management and administrative support to the preparation of this CMP.

The CMP was quality reviewed by Project Managers Natasha Abulafia and Clare O'Brien. MacLaren North, Sydney Water Heritage Manager and Phil Bennett, Sydney Water Heritage Advisor reviewed the internal draft. The Conservation Management Plan Steering Committee also assessed the draft document.

The final draft was reviewed by the NSW Heritage Office, National Trust of Australia [NSW] and Institution of Engineers [Australia] before its formal endorsement by the Heritage Council of NSW. The endorsement of the CMP by the Heritage Council of NSW means the CMP is recognised as endorsed for the purposes of the *NSW Heritage Act* 1977 (NSW).

Acknowledgment is made of the contribution of following organisations and individuals to the CMP project and this report in particular:

- Bruce Baskerville of the NSW Heritage Office and the Heritage Council of NSW
- Council of the City of Sydney – Archivist Mark Stephens
- Sydney Water employees including David Dunkerley, Rudy Sicha, Alex Twigg Patterson and Michelle Howard.

1.6 Methodology and Structure of the Report

The structure of CMPs follow the broad framework established by the *Burra Charter* [Australia ICOMOS, 1999]. More detailed guidance for the structure and matters that should be considered have been developed by a number of authorities. These include:

- NSW Department of Urban Affairs and Planning and NSW Heritage Office [1996 and updates], *NSW Heritage Manual*, particularly guidelines for assessing heritage significance.
- JS Kerr [current edition - 2000], The conservation plan: a guide to the preparation of conservation plans for places of European cultural significance
- NSW Heritage Office [2003], A suggested table of contents for a conservation management plan that can be endorsed by the NSW Heritage Council
- NSW Heritage Office [2003], Heritage Council of NSW: Conservation Management Plan Assessment Checklist.

These guides consistently require a clear sequence of actions:

- Investigating significance
- Assessing significance
- Managing significance.

The *Conservation Plan* requires the conservation management plan process to be undertaken in a clear sequence of work. This is recommended to protect the integrity of the process, that is, separating the assessment of significance from the subsequent consideration of practical requirements and management constraints.

The first stage is to understand the place, by gathering documentary and physical evidence, undertaking investigations that will inform about how the place was created and reached its present form, and what the intangible values may be that are part of the social context of the item.

The second stage requires coordinating and analysing that evidence and assessing and stating significance. This is generally undertaken under a number of criteria, and leads to the statement of significance, which is a concise, testable description of the physical and intangible values that are the most important aspects of the place.

The third stage requires the development of conservation policies and their implementation. It involves gathering information for the development of conservation policy including the physical requirements, external requirements, requirements for retention of significance and the clients requirements or feasible uses. Conservation policies are then developed and strategies and options for their implementation prepared.

The methodology adopted for the Tank Stream involved the team assessing the significance of the Tank Stream, identifying the major heritage management issues and developing policy and strategies for the implementation of recommendations. The main elements and sequence undertaken is identified below, the process reflects that recommended in the *Conservation Plan* (Kerr, 2000:3) and the NSW Heritage Manual (DUAP 1996:12).

TANK STREAM CONSERVATION MANAGEMENT PLAN PROCESS

[This sequence of work is concurrent to stakeholder consultation and document review processes.]

Sydney Water Asset Management determines need for CMPs for State Heritage Register listed items

Establishes steering committee to manage CMP Project

Engage team to prepare CMPs

Framework brief formulated

CMP Program established, Tank Stream chosen as pilot CMP

INVESTIGATE SIGNIFICANCE

Gather evidence – geographic and historic context

Gathering documentary evidence and literature review

Gather physical evidence, course and catchment site inspection

ASSESS SIGNIFICANCE

Co-ordinate and analyse evidence

Assess and state significance

MANAGE SIGNIFICANCE

Gather information for development of Conservation Policy

Draft Conservation Policy based on significance assessment

Consider heritage management issues

Consider operational requirements, physical condition, and requirements to retain significance

Develop conservation policy

Formulation of schedules of conservation works and maintenance plans.

FIGURE 1-2 Conservation Management Plan Process.

1.7 Limitations of the Report

The CMP Project as a whole recognises the following issues:

- Sydney Water considers that the S.170 Register effectively identified the significant heritage assets of Sydney Water. It is recognised that the Register is a live document which requires ongoing revision and consolidation. The CMP process is not designed to revisit the comprehensive identification and assessment of these heritage assets, but to focus on the formulation of policies for their management. The CMP document is designed to be a 'live' electronic document.
- The S.170 Register was not preceded by a thematic history of the agency, which would research the social, political and economic context for the development of services and assets and explain the context for which such assets were constructed. Future preparation of a thematic history would ensure the S.170 Register is comprehensive, and that items are assessed in the overall context of the relevant themes and their relative rarity. Preparation of a thematic history is beyond the scope of this CMP, but themes have been identified using the place history, and are incorporated in the significance assessment methodology.
- The need for the identification and inclusion of movable heritage in the S.170 Register is addressed in the Sydney Water Moveable Heritage Strategy. A comprehensive assessment of the Sydney Water moveable collection is beyond the scope of the CMP Project. Where applicable, moveable items have been identified and recommendations made for their conservation.

In relation to the Tank Stream the limitations of the report include the following matters, discussed in more detail in Chapter 6:

- Sydney Water manages the Tank Stream to the extent of its control and ownership. There are many private and public interests in the Tank Stream including environmental regulators and planners, such as the EPA, Heritage Council of NSW and Sydney City Council There is potential for both these public and private interests to impact upon the Tank Stream. The Heritage Council and Sydney City Council are the only authorities with the potential to manage the significance of the Tank Stream where it passes through private property. This report can only seek to provide best practice policy advice, which may be used by these organisations to influence the co-ordinated management of the Tank Stream.
- A survey of the route including where it crosses individual property boundaries and a comprehensive and authoritative historical research and fabric documentation of the Tank Stream has not been undertaken.
- The extent of property ownership and control of the Tank Stream alignment has never been clearly established. Sydney Water owns the structure through which the stormwater flows, that is, the drain and enclosing tunnel. The Tank Stream curtilage (as defined by the SHR listing curtilage) impacts a wide range of private property and Sydney Water appears to have largely negotiated with private owners in the absence of formal legal agreements for access or relied upon its powers under the *Sydney Water Act* 1994 (NSW) or other legislation to manage the Tank Stream and potential impacts such as vegetation. Easements are inconsistently applied and varied in extent and this document does not attempt to resolve these issues.
- Physical access to the Tank Stream is limited because it is a confined space. As a result there has been a reliance upon existing recordings, including closed circuit filming, and previous interpretations of changes to the fabric. There has been no systematic re-inspection of the physical evidence for this CMP, and the outer surface of the Tank Stream drain remains almost completely inaccessible to view.

1.8 Sources of Information

The report has been prepared using primary and secondary documentary material and physical evidence.

Principal documentary resources included historic records including sketches photographs, plans, maps and surveys, oral histories and published information. Compilation of the CMP involved utilising the electronic and hard copy resources of the Plan room and Archives of Sydney Water, and external sources including City of Sydney Archives, NSW Heritage Office Tank Stream property files and the State Library of NSW.

Physical evidence was gathered through site surveys which were conducted above ground on 20 March 2003 and within the tunnel on 2 April 2003. This investigation consisted of non-intrusive observation. Physical evidence was also assessed through review of a 1998 CCTV inspection of most of the sections of the stormwater channel.

The following reports were particularly relied upon to guide the preparation of this CMP. The third report was used for significance assessment.

- McIllwraith [1952], 'The Tank Stream' *Sydney Water Board Journal*, for an overview of the historical development of the Tank Stream.
- Godden Mackay Logan [1995a], Tank Stream Site, Sydney GPO, Management and Interpretative Advice, report to Sydney City Council.
- Godden Mackay Logan [1995b], Tank Stream Tunnel, Stage 1 – Preliminary Assessment of Significance and Issues, report to Sydney City Council.

1.9 Glossary of Terminology and Abbreviations

1.9.1 General terminology

Australia ICOMOS – the Australian National Committee of ICOMOS (International Council on Monuments and Sites). Australian professional heritage organisation affiliated with the International Council on Monuments and Sites. Australia ICOMOS publishes the *Burra Charter.*

Burra Charter – published by the Australia ICOMOS Charter for Places of Cultural Significance, the *Burra Charter* is the Australian authoritative statement of heritage conservation philosophy.

CMP - conservation management plan, prepared in accordance with Burra Charter and NSW Heritage Manual guidelines. A CMP identifies the significance of a place and the appropriate policies to retain and reveal that significance.

Curtilage – defined by the *NSW Heritage Manual* to mean "the area of land (including covered by water) surrounding an item or area of heritage significance which is essential for retaining and interpreting its heritage significance. It can apply to land that is integral to the heritage significance of the built heritage including archaeological elements or a precinct that includes buildings, works, relics, trees or places and their setting."

Environmental heritage – defined by the *Heritage Act* 1977 (NSW) to mean "those places, buildings, works, relics, moveable objects and precincts, of State or local heritage significance."

Environmental planning instrument – includes a local environmental plan, (LEP) a State environmental planning policy (SEPP) or a regional environmental plan, (REP) prepared under the *Environmental Planning and Assessment Act 1979* (NSW) (EPAA).

Development – defined in the Heritage Act 1977 (NSW) in relation to land, means, "the erection of a building on that land, the carrying out of a work in, on, over or under that land, the use of that land or of a building or work on that land and the subdivision of that land."

Harm – defined in the *Heritage Act* 1977 (NSW) to mean "in relation to a building or work – demolish, or in relation to a relic or moveable object – damage, despoil , move or alter or in relation to a place or precinct – damage, despoil or develop the land that comprises the place or is within the precinct, or damage or destroy any tree or other vegetation on, or remove any tree or vegetation from, the place or precinct."

Heritage Council of NSW – the Heritage Council of NSW, established by Section 7 of the *Heritage Act* 1977 (NSW).

Heritage Office – the NSW Heritage Office, within the Planning and Infrastructure portfolio, consisting of professional heritage staff who administer the relevant legislation, support the Heritage Council of NSW and promote the conservation of heritage.

Local heritage significance – defined by the *Heritage Act* 1977 to mean "in relation to a place, building, work, relic, moveable object or precinct, means significance to an area in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item."

Relic – defined by the Heritage Act 1977 (NSW) to mean "any deposit, object or material evidence (a) which relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and (b) which is 50 or more years old."

S.170 Register – A heritage and conservation register prepared by Sydney Water under S. 170 of the *Heritage Act* 1977 (NSW).

State heritage significance – defined by the *Heritage Act* 1977 (NSW) to mean "in relation to a place, building, work, relic, moveable object or precinct, means significance to the State in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item."

Sydney Water (Corporation) – A Statutory State Owned Corporation constituted by the Sydney Water Act 1994 and responsible for the provision of drinking water, wastewater services and stormwater services to the communities of Sydney, the Blue Mountains and the Illawarra. In using the name Sydney Water, predecessor entities such as the Sydney Water Board and the Metropolitan Water, Sewerage and Drainage Board are included.

1.9.2 Heritage Conservation practice terminology

In order to achieve a consistency in approach to conservation of built fabric by all those involved in the project, a standardised terminology for conservation processes has been adopted from the *Burra Charter* (Article 1). These adopted definitions are as follows:

Adaptation - modifying a place to suit proposed compatible uses.

Compatible use - use that respects the cultural significance of a place. Such a use involves no, or a minimal impact on significant fabric.

Conservation - all the processes of looking after a place so as to retain its cultural significance. It includes maintenance and may, according to circumstances, include restoration, preservation, reconstruction and adaptation, and will commonly be a combination of two or more of these.

Maintenance - the continuous protective care of the fabric and setting of a place, and is distinguished from repair. Repair involves restoration or reconstruction and it should be treated accordingly.

Preservation - maintaining the fabric of a place in its existing state and retarding deterioration.

Reconstruction - returning the place as nearly as possible to a known earlier state and is distinguished from restoration by the introduction of materials (new or old) into the fabric. It does not necessarily mean going back to the earliest stage of construction or even to one date for the entire building. Reconstruction is associated with recapturing the expression of the place at points in history which are either important or at which the place demonstrated a greater functional clarity or design expression. This is not to be confused with either re-creation or conjectural reconstruction which outside the scope of the *Burra Charter.*

Restoration - returning the existing fabric of a place to a known earlier state by removing accretions or by reassembling existing components without the introduction of new material.

2 HISTORICAL OUTLINE

This section investigates the historical development of the Tank Stream. The historical analysis traces the evolution of the current form of the 'Tank Stream', beginning with the naturally evolved catchment and environment, indigenous occupation and colonial and later settlement. The history tracks the development of the water supply, waste disposal and stormwater systems, Sydney Water and its predecessor organisations, and provides an assessment of the ability of the surviving fabric of the Tank Stream to demonstrate these historical phases.

2.1 Geological Landform Processes

The Tank Stream was the name given to the watercourse that drains the small catchment formed by two ridges straddling a narrow inlet running south from Sydney Harbour. It extended about 1.5 km from north to south, and at its widest point was about half a kilometre wide. There was a small area of swampy ground, a perched swamp, near its head. The creek was small and the watercourse was feeble and intermittent at best. Elsewhere in Port Jackson its name would not be consequential and it would have long ago disappeared from public memory. This site differs in that this stream attracted the first European occupiers of Australia to settle in its immediate vicinity. Therefore its name is known to all school children and it forms part of Australia's image of its own past.

The Tank Stream catchment's history extends well before 1788 and far before human times. It was created, as was the rest of Port Jackson, by the cutting action of water through the Hawkesbury and Narrabeen Sandstones laid down during the Permian period. Refer to Taylor, 1970 and Branagan et al, 1976 for summaries of Sydney's Pleistocene and Holocene development. During the Pleistocene period of the last 2 million years there were at least 20 glacial maxima ('ice-ages') when the seas would retreat as water was taken up into the expanding ice-caps and glaciers, dragging the shoreline from near its current position to perhaps 20 kilometres eastwards. When this happened the fall of creeks and rivers would have changed, causing them to cut deeply into the sandstone bedrock. Port Jackson's craggy, cliff-lined appearance and deep coves were the result of repeated down-cutting during the glaciations.

The stream runs between two ridges that flank a small cove. Its mouth is now completely concealed under reclaimed land and two centuries of urban development. Removing the modern shoreline would reveal a narrow inlet that terminates in the Tank Stream. The stream ran through mud flats that extended perhaps a third of the way up the cove, although from examination of early European depictions these are as much a product of white settlement as the period before. The stream ended and the cove began at the present line of Bridge Street.

The banks of the creek are shown in early illustrations as defining a wide shallow channel. The soils comprising the catchment are buried remnants, where they survive at all. The area of the Tank Stream is listed by Chapman and Murphy (1991) as disturbed, but the surrounding higher ground is part of the eroded Gymea soil landscape. Where this occurs elsewhere the lower levels immediately bordering the drainage lines are usually Hawkesbury soil landscapes. These are shallow siliceous sands that are extremely eroded and of low fertility, often with rock outcrops and residual gravels (Chapman and Murphy 1991: 44-48). The perched swamp would have had a very different soil profile, as it probably developed in a natural depression that would have accumulated humic sediment.

The Hawkesbury and Gymea soils supported dry sclerophyll open woodlands with an often dense understorey. The perched swamp near the head of the Tank Stream would have been characterised by the presence of paperbarks and tea trees, with sedges and other wetland plants (Benson and Howell, 1990). The catchment provided a range of environments– marine, estuarine, rock platform, creek, open forest, wetland – within a short distance that Aboriginal people who occupied the southern shore of Sydney Harbour could exploit for food and materials. The stream itself offered fresh water and the exposed sandstone of the headlands offered places of shelter.

2.2 Aboriginal Occupation

Due to the impact of the arrival of European colonists from 1788 and the almost immediate effect that this had upon established patterns of subsistence our knowledge of the Aboriginal people of the Sydney district is limited. Both casual and systematic observations of settlers in the first decades provide some insight but even basic information is missing or ambiguous. There is even disagreement within both the Aboriginal and wider community about the name of the group that occupied the area of Sydney. This is partly based on confusion about what level of the social hierarchy from family group, band, clan, dialect and language is being described.

The most recent major synthesis (Attenbrow 2002) favours Gadigal (often also seen as Cadigal) as the name of the group that had some accepted proprietorial rights and obligations for the land around Sydney Cove. The Gadigal were a group ('clan' or band) that spoke the coastal dialect of Dharug, which makes them part of a larger grouping within the Sydney region. The term Eora, which appears to mean 'people' was used as a term of self-reference but does not seem to refer to a specific group.

Even the names of the Aboriginal landscape are largely gone. In the vicinity of the Tank Stream the known names are Warrang (Wee-rong and other variants) for Sydney Cove, Talla-wo-la-dah for a section of The Rocks, Tarra for Dawes Point and Tu-bow-gule for Bennelong Point (Attenbrow 2002: 8-13). The names of the small stream and the other features in the catchment have been lost.

The nature of Aboriginal occupation inferred from observations and archaeological evidence suggests that the territory of the Gadigal was sufficient to support a population of possibly several hundred people year-round, although seasonal changes of resources may have required movement to other territories.

The Tank Stream SHR curtilage includes an unknown quantity of undisturbed land within its boundary. Where this survives it has a potential to retain environmental data, such as pollens reflecting pre-European vegetation, and the evidence of Aboriginal occupation. This is an extremely rare and fragile resource that survives only by chance. Evidence of this occupation was discovered during excavations at Angel Place in 1996. (Godden Mackay Logan,1996)

2.3 Establishing the Immediate Historical Context of the Development

The reason for the relocation of the First Fleet's settlement from Botany Bay to Port Jackson when the First Fleet arrived in 1788 is well known. Botany Bay's soils were not suitable for agriculture and there was no evident potable water available. Port Jackson immediately to the north was supplied with protected anchorages and more importantly one cove had a small stream that appeared to be a constant water source sufficient for the needs of the settlers. The stream had a less evident but tangible role in dividing the

settlement into two halves – the eastern being the preserve of the government and administrative functions and the western being where the convicts lived.

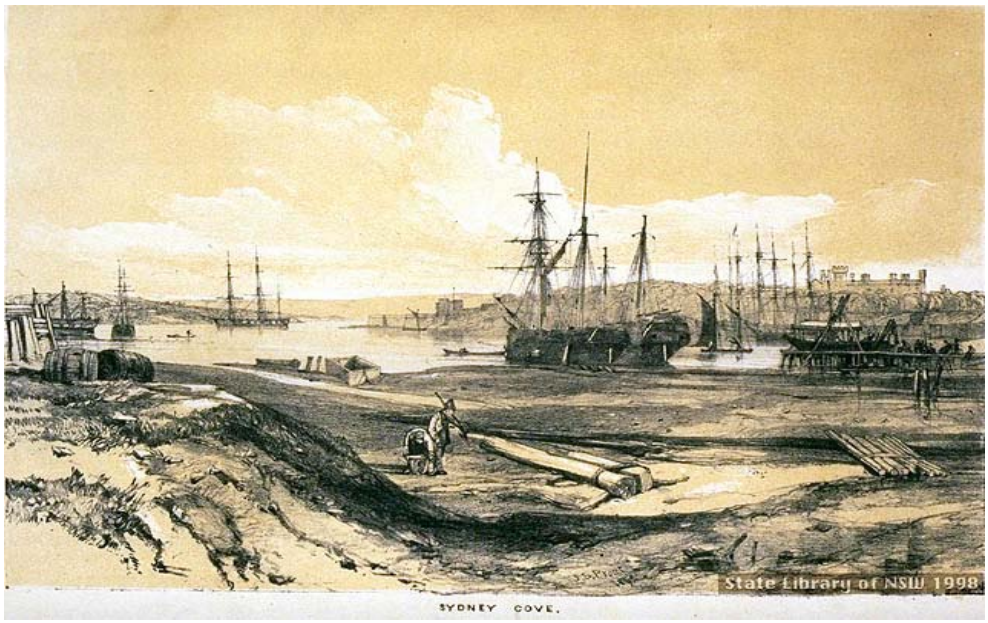


FIGURE 2-1 Prout J.S. Sydney Cove C. 1843. Mitchell Library, Sydney Water.

This image shows the desultory outlet of the Tank Stream into the mud flats of pre-Circular Quay Sydney Cove. The Tank Stream played an important role in shifting tonnes of mud into the cove, making large sections of it unnavigable

As the water source for both humans and their livestock maintaining the water quality was essential. The small catchment of only 72 hectares was insufficient to consistently provide water during dry weather. If, as is supposed, it was fed by springs near the head of the stream, these may not have had sufficient discharge to allow the stream to run in all climates.

The Tank Stream appears in many maps and illustrations of the settlement. The changing depiction of it provides some useful chronological information. This is presented in Table 2-1 below.

Table 2-1 Depictions of the Tank Stream in Maps and illustrations.

Date	Source	Note
1788	Fowkes in Ashton & Waterson 2000: 6-7	Stream not named. 'Head of spring' indicated at start of stream. The surrounding land is not differentiated, but sawpits and a shingling party are marked as operating near the head of the stream.
1788	Stockdale in Ashton & Waterson 2000: 8-9	Full length not shown, but its exit into Sydney Cove is marked firstly by shading indicating mud flats, then a second line indicating shallow water.

Date	Source	Note
1802	Lesueur in Ashton & Waterson 2000: 14-15	Shown to its full length. Named as 'Ruisseau' (stream). The Bridge Street bridge goes over the mouth of the stream. From Bridge Street to Hunter Street it mainly forms a rear lot line to houses fronting George Street, and less so those on Spring Street. Above Hunter Street there are small regular lots on both George and Pitt Street that use the stream as their rear boundary.
1807	Meehan in Ashton & Waterson 2000: 16-17	Not named. Shown ceasing between King and Market streets. Properties backing onto the stream shown stopping at a line off the stream. Tank Stream tanks show 2 chains (40 m) north of Hunter Street, and very close to the alignment of the stream.
1822	Unidentified in Ashton & Waterson 2000: 18-19	Stream shown as being wide from mouth to mid way between Hunter and King Streets, then narrow. Extends to Market street and shown as running between George and Pitt Streets.
1831	Hoddle, Lanner and Mitchell in Ashton & Waterson 2000: 20-21	Shown as open to King Street and then not indicated above that point.
1842	J.S. Prout painting	View of Tank Stream facing north from near Hunter Street. Shows Bridge Street bridge. Stream is a wide (20 metres) channel with a flat bottom and steep unconsolidated sides. There is no evidence of either revetments or slope stabilisation or of any deliberate formation of the water course (The description more accurately accords with the figure currently included FIGURE 2-2)
1842	F. Garling painting	Very close to Prout's in date and viewpoint. Structures almost identical, but with different activities going on in mid-ground (FIGURE 2-4).
No date	Unknown – in Sydney Water Tank Stream display	c. 1850 view from near Hunter Street facing north. Shows probably the western tank with single long-handled pump. Date, artist and author not known (FIGURE 2-3).
c.1843	Prout drawing	Sydney Cove, showing small channel of Tank Stream water in the mud flats of Sydney Cove (FIGURE 2-1)
1854	Woolcott and Clarke in Ashton & Waterson 2000: 26-27	Shown as open between Bridge and King Streets only. An embayment was formed by the construction of Semicircular Quay, with the Bon Accord Bridge providing a pedestrian link around edge of the quay. Beneath it ran the tidal channel back level with Macquarie Place.

From 1788 to its formalisation as a sewer in the 1850s and 60s there was a major increase in the density of occupation in the area surrounding the Tank Stream, and also dramatic changes to the entire catchment as the population density increased and construction intensified. Some of the broad-scale environmental changes that can be generalised in this period are listed:

- Increasing population from 1788 with cesspits as the only formal sewer arrangements.

- Reliance until the completion of Busby's Bore in 1837 on Tank Stream water as main water supply.
- Run-off carries with it human and animal wastes, domestic rubbish and industrial wastes, plus sediments from land clearance.
- Proportion of land occupied by buildings, structures and hard surfaces increased to at least 50% by c. 1860, while the great majority of trees are lost, and vegetation being restricted to grasses. As a consequence run-off increases.
- The swamp at the head of the Tank Stream was lost early on, perhaps by 1802.

FIGURE 2-2 Skinner Prout, the Tank Stream, Sydney 1942, State Library of NSW.

This version is a c.1874 hand-coloured lithograph adapted for a book on Australia by E.C. Booth (National Library of Australia Rex Nan Kivell collection NK2458/18)

Governor Phillip was forced in 1791 to enclose the Tank Stream in a fence to keep stock out. This was as much to prevent trampling and muddying of the water as for hygiene. Ditches were cut alongside the stream, presumably to intercept dirty water that would otherwise pollute the water supply. These measures were *ad hoc* and ultimately ineffective. Tanks to store and hold water were cut into the bedrock near the present location of Australia Square in 1790. There were either three or four tanks, with sources not being definitive. An undated and unsourced drawing, probably c. 1850, is the only known illustration of one of the tanks (Figure 2-3). It shows a rectangular, possibly square, depression to the west of the junction of Pitt and Hunter Street. A large water pump stands on an indistinctly drawn assembly within the boundaries of the tank. The tanks are believed to have been about 5m deep and held 20,000 litres (GML 1996: 9).

FIGURE 2-3 Unknown Artist – Detail of Illustration showing probable square water tank and pump

[Sydney Water collection. Date unknown. Displayed in the foyer of SWC Head Office]

As houses were established on both sides of the stream, with the low point as their back boundary, it soon became fouled with human and animal wastes and rubbish, as well as sediment inwash. In as early as 1795 orders were made to prevent the cutting of trees or grazing stock within a 15-metre distance of the stream. Further orders clarified that penalties for encroaching within this area would result in both a fine and the demolition of offending structures.

The bridge over the Tank Stream was constructed by 1792, and was located at the head of the cove, crossing the Tank Stream at its widest point. The bridge is shown as a single stone arch in the middle distance in paintings by Prout and Garling in the 1840s (the bridge is shown in Figures 2-2 & 2-4). This form of the bridge is known as the Bon Accord Bridge and replaced earlier wooden structures. Users paid a toll to cross the bridge. Its foundations would be within the streambed and may survive beneath modern Bridge Street.

The redevelopment of the GPO site has provided some information on what is probably typical building development activity in the vicinity of the Tank Stream through time. The removal of the 1927 building, in the centre of the GPO Block allowed the area around the Tank Stream to be investigated (Casey and Lowe 1998). This showed that sandstone brick drains, probably dating to pre 1820, had been built to carry wastewater and possibly sewage towards the Tank Stream, as had later constructions on the site (FIGURE 2-4). The occupation surfaces had been destroyed by later construction, leaving only the base courses of the drains.

Coring in the area revealed buried soil from the original Tank Stream bed, within about 8 metres of the current sewer line centre. This was dated to 24,330 BP. Two additional areas opened up had been disturbed by construction works from the 20th century, resulting in the loss of much of the original open channel and oviform pipe.

The environmental data recovered from sampling bores in the vicinity of the Tank Stream included pollens and spores, as well as macroscopic leaf remains and charcoals. The radiocarbon dates (16,920 BP and 24,330 BP) reflect the last glacial maximum, when the sea level was perhaps 100 metres lower than now and the stream bed would have cut further into the bedrock.

A plan relating to the construction of the oviform sewers (Plan OCP 30) shows the placement of the oviform channel section so that the maximum width is at about the level of the stream bed, with the tapering cut into the substrate, and the superstructure covered with fill. Beneath the oviform the stream bed deposit was gravel and sand, possibly indicating a period when the stream was actively flowing and scouring out finer sediments.

These deposits contained representative artefacts typical of the mid-nineteenth century period. The survival of Tank Stream related deposits can only be determined for a small number of blocks along its route due to the lack of systematic investigation. These are documented in Table 2-2.

Table 2-2 Schedule of known or likely archaeological/pre-channelisation deposits that may survive.

Location	Impact	Likely survival	Source
16-20 Bridge Street	2 basement levels	AZP 1992 identifies as destroyed	EHA 1996
22-30 Bridge Street	1 basement level and substation below that	AZP 1992 identifies as destroyed	EHA 1996
15-17 Hunter Street		Assessment suggests survival of accompanying deposits from c. 1833 / evidence of 1833 construction and later deposits only. Earlier deposits disturbed.	AHMS 1999
Hunter Street – exact location unknown	Excavation for stone conservation	Any recording done?	DPWS 1998
GPO site	1927 building	All deposit removed	Casey and Lowe 1998
GPO site	1942 building	Major disturbance from construction	Casey and Lowe 1998
GPO site	Martin Place frontage	Eastern side of original line disturbed	Casey and Lowe 1997
King Street	Resurfacing King Street	Surface 200 mm only disturbed – earlier fabric not revealed	Austral 1998
400 George Street	Pile excavations		
Pitt Street between Market and King Streets	Complete destruction	All buildings in this block have at least 1 basement level. This amount of excavation would destroy all but the lower stream bed channel of the stream.	Direct observation

Location	Impact	Likely survival	Source
Street junction – Pitt and Market Streets	Unknown – probably most of resource destroyed	Some impact from services and street resurfacing	Assumed
South of Market Street	Unknown – probably most of resource destroyed	Impact on the channel and swamp land from: Building construction Underground services Open-cut building of railway	Assumed

2.3.1 Post-contact Aboriginal History

There is no specific historical association between post-contact Aboriginal groups and the Tank Stream. While contemporary observers note the presence of Aboriginal people in Sydney until the late nineteenth century, the activity around the Tank Stream makes it unlikely that it was regularly relied upon for Aboriginal subsistence in this period.

2.3.2 Sydney Water Organisational History

The Tank Stream had ceased to be part of Sydney's water supply by the time the first systematic regulation of water services was established as part of the Sydney City Council's role. An understanding of how it was incorporated into the new system, both bureaucratically and technologically, is essential to understanding its history. Rosemary Broomham has dealt with the administrative history of the organisation in detail, in her study *Draft Historic Review of the formation of the Water Board* (1992).

2.3.3 Early City Council Responsibilities

Prior to completion of the Upper Nepean Water Supply Scheme in 1888, Sydney was very much an Eastern Suburbs town for water and sewer purposes. The Council of the City of Sydney administered the water supply and sewerage systems. The Upper Nepean scheme represented a dramatic change to the way in which Sydney harvested its water supply. It was a change of water catchment that represented an improvement in water security, seen as vulnerable to an enemy landing force and an improvement in water quantity, quality and availability. The City Council's Water and Sewer Department supplied water and sewer for a distance of 8 kilometres from the city. This organisation was adequate when the water catchment was at Lachlan Swamps and Botany Swamps and the consumers were in adjacent local government areas at places such as Newtown and at the outskirts of Marrickville.

The City Council's sanitary policies were directed by the developing understanding of the relationship between quality of life, improved sanitation and health impacts. When it was established the prevailing belief was that disease transmission occurred as a result of vapours generated by stagnant water and putrescible material. The role of microbiological organisms in disease transmission had to wait for the work of Pasteur and others in coming decades. Provision of water focussed as much on its visible appearance and smells as any microscopic organisms that it may have contained.

Combined sewer stormwater systems, including the Tank Stream were developed to relieve Sydney of its human waste and stormwater. This was particularly critical in a city

where the rain tended to fall in storms and the topography meant that lower areas were flooded rapidly.

Overlying the Council's concerns about ensuring the health and quality of life of its citizens was an increasing focus from the mid-nineteenth century onwards about moral cleanliness. Victorian values stressed the link between spiritual cleanliness, peoples' character and class. Sanitation increasingly became a focus for political discussion because it was seen as integral to the personal interests of both the middle and lower classes and for the significant civic reform movements of the late nineteenth century (eg Mayne 1982, Fitzgerald 1992).

FIGURE 2-4 Garling, F. Tank Stream 1842, Mitchell Libraray 420.

Under the new Upper Nepean scheme, water was to be brought from 100 kilometres away from Sydney with the intention of also providing supplies to areas such as Campbelltown, Bankstown and Concord. The legislation to set up the Board of Water Supply and Sewerage (BWSS) had been passed in 1880, but not proclaimed until 1888 when the Upper Nepean Scheme was completed. This Scheme, coupled with the earlier railway system, formed a spine to transform Sydney from being an Eastern Suburbs town to a broad city. The Upper Nepean Scheme had already been operating on a limited basis for 18 months by virtue of the Hudson Brothers Emergency Scheme. This allowed Upper Nepean Water to be sent to the Botany Lakes, to in turn be pumped to the City in the conventional way, as had happened for the previous 30 years.

The Board established to operate this new much more complex scheme was made up of the Water Branch of the City Council, along with sections of other inner-City councils, and staff from the Public Works Department (PWD) who had been the builders and promoters of the Scheme. The official Board was made up of a distinguished architect as president, along with two PWD branch heads, two City Council aldermen and two suburban council aldermen.

Sydney's water solutions became unashamedly technological in character. They were major engineering projects and relied upon the investment of significant colonial capital to achieve what was seen as a social good. The dominance of engineers on the boards and as hero figures within the history of Sydney Water remains a constant theme.

2.3.4 Sewer Development

In 1889 there was further major development completed, similar in scope and magnitude to the water supply changes and with interchangeable personnel, that is the commissioning of the Northern (Bondi) Ocean Outfall and the Southern Division (Botany Sewage Farm) Outfall. These represented dramatic reductions in the amount of sewage entering the Harbour. The organisation had already included 'sewerage' in its title, in readiness for this event. These sewerage and water supply works represent major investments by the government in its urban infrastructure.

All of these schemes have in common that they were prepared by local staff but ratified by William Clark, the eminent British hydraulics engineer with Indian colonial experience. On the same inspection trip he visited parts of country New South Wales and then also consulted in Adelaide for the South Australian Government. His guide was the up and coming PWD engineer and surveyor Thomas W. Keele, who later became the fourth President of the M.B.W.S.&S.

2.3.5 The Organisation

In c.1892, the Hunter District Water Board was formed, and to prevent confusion, the Sydney Board had "Metropolitan" added as a prefix to its title.

In the early days the MBWSS was a relatively uninfluential organisation as it was meant to be an adjunct to the PWD of NSW and its technical appointed board members were full-time branch heads of the PWD. The Water Board was primarily an operating authority, whereas all major construction was planned for and carried out by the PWD. The concept was defined as 'dual control'. An early attempt to overcome these obvious problems was the appointment of C.W. Darley as the Board's president who was already Engineer-in-chief for Water and Sewer for the whole of NSW. There were amalgamations of the Water Board's Water and Sewerage branches with their opposite numbers in the PWD, so that the Water Board, as an independent entity responsible to its consumers, had even less independent advice. This was during the crisis of the 1890's Depression.

When C W Darley was promoted to be Engineer-in-chief for the entire PWD in 1896, as part of re-organisation, he resigned his presidency and the original president TS Rowe, an eminent architect, was re-appointed. The Board's minister was also the Minister for Public Works. Following the death of TS Rowe, Jacob Garrard, a former minister for Public Works, Member for Balmain and former Morts Dock boilermaker became president and this was now a full-time position. The Board's staff, as distinct from the Board members had transferred from the City Council. The City Council also retained dominance of the Board compared with suburban elected local government representatives.

A crisis for the board was the 1895-1902 drought. This led to the 1902 Sydney Water Royal Commission. The Commission resulted in the building of the Cataract Dam, as a means to augment the Upper Nepean Water Supply Scheme, and recommendations for other major water supply improvements, such as the Lower Canal. The operation of the Water Board was also closely monitored in that each major project had to be approved by the Joint Parliamentary Sub-Committee on Public Works.

In 1919 the Dept of Railways received authority to form their own construction branch and similarly in 1924, the Water Board obtained a new Act and new name to Metropolitan Water Sewerage & Drainage Board to be responsible for their own engineering program. The Water Board suffered a major debacle with the failure of its new Pressure Tunnel in 1929 and a subsequent 1932-3 royal commission. The 1924 Act was further amended to increase the technical focus of the Board. This coincided with the terrible effects of the 1930s Great Depression which was preceded by the earlier transfer of large numbers of PWD staff to the M.W.S.&D.B.

Despite the depression, the Pressure Tunnel was re-mediated and work resumed on Nepean and Woronora Dams. The major work at SWSOOS 2 and the North Georges River Sub-main (*NGRS*) was commenced as well as demolishing the existing head office and construction of a new building. T H Upton led the organisation through the 1930s and World War II. It was during the war that he carried out the preliminary work at Warragamba Dam, along with W G Hudson who later became the First Chief Commissioner of the Snowy Mountains Scheme.

Following completion of Warragamba Dam, the Board then turned its resources over the next 20 years to overcoming the sewer backlog. This was to involve the building of inland sewerage treatment plants, as well as upgrading treatment at the ocean outfalls. A symbol of this massive works program, and the expansion of the organisation was the construction of the new Head Office in 1965. In overcoming the sewer backlog, this meant that the Board actually carried out significant excavation and building works within peoples' backyards, often with excavation machinery and deep timbered trenches. As time progressed, planning allowed for building sewers and watermains in 'green field' sites, which only required connection after a house was built and before the residents moved in. Other utilities organisations were able to lay their services in roads and footpaths, whereas with sewer this often needed to be in public lands and taking advantage of gravity where possible.

2.3.6 Stormwater development

Stormwater was an issue not fully envisioned in the original M.B.W.S.&S. However, within a few years of inception, the Minister for Public Works found that the Water Board was the ideal authority to deal with large sized stormwater catchments, particularly in inner city areas. This growing process, with the Board having strong roots in local government, was formalised in 1924 with the change in the board's title to include 'drainage'. The major expansion of the stormwater systems actually occurred well after that date when Public Works became responsible for state-wide unemployment relief projects, which included many stormwater channels both by the Water Board control and those operated by others.

The growth of the system can be demonstrated by water quality being determined by the Botany catchments. Water screening was carried out at Potts Hill for 25 years, after which it was moved westward to Pipehead which allowed for the system to incorporate the suburb of Parramatta, which had previously been supplied by the local council. It also provided greater volumes of water for Sydney's North Shore via the Ryde Water Pumping Station. By c.1970 the screening of water was increasingly carried out at Prospect. Eventually all screening was carried out at Prospect, and the Pipehead screening operation was closed, coinciding with the closure of the Lower Canal following its replacement by an enlarged tunnel. The next milestone was the replacement of the Prospect screening works by the Prospect water filtration plant.

2.4 Initial Development of the Tank Stream

2.4.1 Item Development as Part of the Water and Sewerage System

The Tank Stream's role in providing fresh water for Sydney is described above in section 2.3. In this role it was superseded by Busby's Bore. Various dams were added over time within the catchment area at the Lachlan Swamps, which now fall within Centennial Park. As the city's population increased, water from the lower levels of the Lachlan Swamps needed to be pumped by a steam pump, so that it too could flow to the City through Busby's Bore. It was a continuing process of increasing the water harvest from the defined catchment. A dam across the Cooks River at Tempe, completed in 1839, was a failure because of salting, when tides downstream of the dam permeated through the dam wall and made the water undrinkable.

The Tank Stream became an unofficial sewer by 1826 and an official sewer in 1857. Unofficial or at least informal sewers were laid prior to 1857 and incorporated the Tank Stream. Aird (1961: bet. pp. 134-5) shows an 'old' sewer running down King Street from the Hyde Park Barracks area and entering the Tank Stream north of King Street. This tributary of the Tank Stream is shown variously as a circular vitreous clay pipe or an open channel. The channel may have been a 'slops line' and therefore not meant to carry sewage.

Other sewers were built in the 1850s to remove sewer and stormwater in the older parts of the city. These combined sewers discharged into the harbour which was a convenient engineering outcome, although one that caused increasing social discontent as the volume increased and social attitudes changed. The most significant of the combined sewers for the Tank Stream story is the Bennelong Sewer that discharged into the harbour at Bennelong Point, with a locally manufactured special tide valve to prevent water ingress. Its construction was oviform, with lines running down the main north-south streets. A branch ran westwards down Hunter Street and originally spanned the open Tank Stream. This is now visible in the roof of the accessible part of the Tank Stream passage.

The effect of the Bennelong Sewer was to drastically reduce the stormwater catchment for the Tank Stream, as it intercepted water reaching as close as Pitt Street. Consequently the Tank Stream was far less effective in flushing sewage and this is likely to have prompted modifications such as the conversion of sections to an ovoid shape to improve their scouring.

The Tank Stream has also acted as part of the street cleansing process, especially since Sewerage Pumping Station (SPS) 16 was constructed, with the interception chamber of c.1900. The purpose of the Interception Chamber is to stop dry weather flow, which contains high concentration of waste matter, from going to Bennelong Point. The Interception chamber redirects this flow to Bondi Sewer. The chamber is a relatively simple structure, and its operation is based on difference in levels of the channels involved. Due to this structural simplicity, few elements of this type are ever modified and it is believed that the Interception Chamber remains in its original layout and detail.

For some time before Upper Nepean in 1888, the Tank Stream would have also carried salt water, which was stored in City Council reservoirs and distributed via a network of salt water mains that ran alongside the hydraulic power mains. The purpose of this was for street cleaning and dust suppression, and salt water used to save supplies of fresh water.

The Tank Stream has remained as a stormwater channel within the central Sydney system over the past century. Changes have largely been restricted to replacement of

sections of channel with more modern pipe forms as increasingly large buildings and deeper basements encroached upon the Tank Stream. The perception of the Tank Stream as historic remained but there was little connection between its public recognition and the surviving physical relic. Where there had to be impacts upon the stream these were carried out without substantial regard for the preciousness of the fabric. As a result there was little hindrance to the developers of the post-World War II period having an impact upon the Tank Stream. This has resulted in the complete destruction of a number of sections of the channel and their replacement with pipes.

The detailed development and change to the Tank Stream has been tabulated below (Table 2-3). This is based primarily upon McIlwraith (1951), Breen (1996) and the Sydney City Council Commissioners minutes from 1854-1885.

Table 2-3 Changes to the Tank Stream Fabric

Date	Change	Location
1788-1826	Clearing of vegetation within the vicinity of stream, construction of dwellings, grazing and watering of animals.	Mainly lower Tank Stream
1790	Cutting of tanks for water storage	North of modern Hunter Street
1790	Chiselling of stone and inset of additional slabs into base of stream to improve flow in a shallow V profile	Upstream of the tanks, i.e. south of Bond Street
1791	Enclosure within a fence against livestock and trespass	Unknown
1792	First bridge crossing	On modern Bridge street alignment
1810	Cut-off drains along side of Tank Stream channel to reduce inflow of polluted stormwater	Unknown, but likely to be upstream of tanks only
1826	Tank Stream disallowed for drinking by Governor Brisbane. Governor Darling arranged for seven wells to be dug in the city. Governor Darling employed people to repair existing sewers.	Tank Stream was the only watercourse then available for connecting sewer, slops or stormwater
1832	Construction of sewers seriously discussed.	-
1833	Water from partly built Busby's Bore used to pipe water to ships	Likely to have been "Circular Wharf", adjacent to Macquarie St. Previously pumped water from spring at corner of O'Connell St and Bent St, which otherwise flowed down Spring St to the eastern tank.
1842	City Council incorporated	
c.1850	Semi Circular Quay was formed which necessitated the extension of the Tank Stream for the area north of Bridge St.	North from Bridge St, as part of Semi Circular Quay. To the west of the present Pitt St.
1855	Brickworks at Newtown was purchased, along with vitreous clay pipes and Roman	

Date	Change	Location
	Cement	
1857	Work completed on first part of the Bennelong Sewer to discharge sewage as far out as possible into the harbour. This would service the more elevated areas, whereas the Tank Stream would handle the lower elevation areas. Bennelong passed over the open Tank Stream in Hunter St and King St as a bolted cast iron oviform aqueduct. This sewer (and possibly stormwater) network had the effect of draining the swamp area that had previously supplied some water to the Tank Stream, making the Tank stream more polluted by being less 'cleansed'. The section of the Tank Stream from the Sydney Cove to the Interception Chamber in Pitt St was completed, approx. 200 m. * The section at the mouth (approx. 5 m has been strengthened with concrete in the two filleted corners (Section *). The next 10 m is sandstone arch. The next 15 m section ** has had the original stone floor overlaid with concrete, date unknown. The remaining section up to the Interception Chamber, (approx. 170m is sandstone arch).	* from sea wall at Circular Quay to the Interception Chamber at Crane Place.
1858	Independent outfalls also completed at Woolloomooloo, Hay Street and Black Wattle Bay. Over the next 20 years, approx 10 other minor outlets were also opened.	In adjoining catchments.
1860	The sandstone arch between Bridge St and Hunter St was constructed. This was done to reduce the odours from the previously open sewer/ stormwater that up until that time had been more of a slops line.	Between Bridge St and Hunter St.
1866	Section from south of Hunter St to Martin Place was formed as an open stone channel. In late 1870s was converted by roofing with an arch to oviform, whereas more southerly section was oviform invert with a flat roof, where it passes under Challis House. (With northerly section, there were minor alterations in 1878). (The whole of this was replaced by a concrete pipe in 1962 ** and a steel pipe in 1958) *. (Other parts were replaced in 2001 *** as part of the Angel Place project). Two sections were laid as oviform through the future GPO. To the south, two sections were laid as brick oviform and with some amendments in 1878.	Hunter St to Martin Place.

Date	Change	Location
1878	The Brick oviform section from the Interception Chamber to Bridge St was constructed by contract for the City Council. This was built to replace the open section that ran through private property. At the southern end there is a transition section (reducer), which leads into the sandstone arch, which is in Tank Stream Way (formerly Hamilton St).	From Interception Chamber to Bridge St, basically in Pitt St.
1879	The section from Bridge St to Hunter St, with its sandstone arch roof in place had its floor slabs lifted and re-instated with mortar foundations to water proof the floor for its use as a sewer. In addition a terra cotta 'scouring channel' was cut into the centre of the floor. The section immediately upstream of Hunter St was built as oviform. This included a terra cotta flow channel. The next section upstream was also constructed. It was a bottom only oviform, and part of it was built underneath an existing stone arch bridge. (The whole of this section, including the stone arch bridge, seems to have been removed in c.1960).	From Bridge St to Hunter St and Hunter St to area near Empire Lane.
1880	Brick oviform was constructed for the full width of King St and terminating.	King St
1898	SPS 16 constructed. The section immediately downstream of the interception chamber, has an interception pipe leading to SPS 16 from the tidal weir.	Pitt St, near Crane St.
1940	Section just upstream of Martin Place was replaced with concrete pipe under the GPO in 1940. This replaced 1866 brick oviform.	Immediately south of Martin Place.
1951	Stormwater drainages charges were introduced for parts of the City of Sydney from 16/11/1951	
1958	Replacement, at the rear of 105-107 Pitt St.	South of Hunter St.
1962	Replacement, at the rear of Commercial Union House	Further south in Pitt St.
1965	Replacement within Australia Square. Construction of Tank Stream visitor access space.	Between Bond St and Curtin St.
1975	Replacement within basement of New Zealand Insurance Building	North of Bond St.
2001	Replacement in Former GPO site	South of Martin Place.
2002	Replacement within Angel Place project	Angel Place, to the north of Martin place.

Following the gold rushes of the 1850s and 60s Sydney became flushed with capital, much of which was invested in new city buildings. The primitive urban infrastructure of the first half of the nineteenth century was inadequate to meet the needs for Sydney's

expansion and suburbanisation and for the intensification of construction in the city's core. Infrastructure projects included the Sydney-Parramatta railway, development of Semi-Circular Quay to improve the inadequate shipping facilities in the Harbour and other work. Many of these involved the City Council. The Bennelong Sewer was built during the 1850s, opening in 1857, and was built using the latest technology – specifically oviform cross-sections to maximise flow rate.

Work started on the Tank Stream covering in the late 1850s in the Bridge Street-Hunter Street section. This work was necessary to reduce smells from the reduced flow resulting from the Bennelong Sewer's construction and the draining of the head swamp and also allowed much closer development near to and over sections of the former stream. The need for materials for the construction of the sewers required that the City Council purchase brickworks at Newtown. This supplied the bricks and ceramic products needed for the drainage works. The form of the channel includes a mixture of stone and brick used for the lower halves of the stream. The Botany Swamps water supply was finished in late 1859. This added to the Busby's Bore water supply, and provided a significant expansion in the availability of drinking quality water for businesses and residents in the City centre as well as in expanding suburbs.

South of King Street the flow of the Tank Stream was redirected to an unknown destination, but it ceased to contribute significantly to the northern flow from that time onwards.

The typical form of the open channel was a convict period shallow V profile, perhaps with cut-off drains along the sides, dating from 1810. The stream was first covered in c. 1860 with a sandstone arch roof. This probably eliminated the need for the cut-off drains. The stone arch was built using well-made ashlar-laid sandstone blocks with a soft mortar that included visible lime specks. Masons marks are visible on the stones, recording the limited number of masons involved in the work of cutting the blocks. Where the Bennelong sewer crossed the line of the Tank Stream at Hunter Street it lay below the crown of the arch and was therefore incorporated into the stonework. Immediately downstream of the Bennelong sewer crossing is a possible expansion chamber, slightly larger in height than normal, to reduce the effect of the constricted flow. The expansion chamber gradually reduces in height to return to the normal arch height. The lowest course of masonry tapers in this section.

Although covered over in 1860 the reduction in overall flow meant that it was less efficient in moving sewage, so in 1879 a contract was let to reduce the problem. This required that the floor slabs were lifted and re-bedded, and to cut in and place a central terracotta flow channel. In cross-section this was probably semi-circular, c. 150mm wide. This was placed in the section from Bridge to Hunter streets. Immediately to the south of Hunter Street an oviform structure was built, still using the terracotta flow channel (Specification for alterations to the Tank Stream sewer, 1879, City of Sydney Archives CRS 65/1391), for about 35 metres. Continuing south the channel, for a short section, included an extra-wide arch, with an oviform base and copings on either side of the channel. Between Hunter Street and King Street the channel remained open to c.1879. It was then covered over, but converted to oviform profile. Surviving parts of the channel are constructed completely of brick, but sections of stone channel were likely to have been rendered as well with a brick arch covering. In the sections constructed entirely of brick a basal terracotta channel, which also acted as spring for the correct oviform profile, was inserted at the invert (lowest point) of the channel. North of Bridge Street an existing timber covering was replaced, but the channel was not otherwise enclosed.

The Bondi Sewer was opened in 1889. Its effect on the Tank Stream was to reduce stormwater and sewage going into the stream from the south of Martin Place by

intercepting it and redirecting it to the ocean outfall at Bondi. The system was designed to mainly divert sewage, but on very wet days it would overflow and sewage would be carried into the western end of Circular Quay by the Tank Stream. North of Martin Place combined sewage and stormwater continued to be carried. The construction of Sewage Pumping Station 16 in 1898 allowed the diversion of sewage near Alfred Street at the Quay. This was in response to public concerns about harbour pollution and the increasing knowledge of the link between infectious diseases and sanitation standards. The NSW Board of Health's Chief Medical Officer J. Ashburton-Thompson was one of the leading investigators of such modes of disease transmission, and his reports to the NSW Parliament were instrumental in shaping public health policy and influencing the management of sanitation in NSW (Curson 1985).

At an unknown time the terracotta flow channel was concreted over, perhaps as sections were broken or damaged. This has impeded the flow of the channel. Rendering of the channel walls has also made it difficult to be definitive about the composition of all sections.

Impacts in the second half of the twentieth century include the construction of buildings with substantial basements, as already discussed, with occasional impacts upon the Tank Stream itself. Less visible, but equally important for the surviving fabric, has been the reduced physical maintenance, as sections become inaccessible, and the poor design of inlets in recent years. As an example the terracotta flow channel between Hunter Street and Bridge Street that had been invisible beneath concrete has been exposed in the past five years. Similar gradual loss of fabric through attrition and natural deterioration of materials is apparent throughout the observed sections of the Tank Stream, such as loss of mortar between sandstone blocks, scouring of weak beds within the sandstone bedrock and deterioration of metal and timber fixtures.

Through its history the Tank Stream has channelled a more diverse flow of water than any other natural or human-built stream in Australian history. It began with the water from the small swamp at its head, then took spillage from Busby's Bore, water from the Botany Swamps scheme. It also took saltwater from the City Council's system of saltwater mains, dissipated hydraulic water from the privately owned high pressure network, Upper Nepean scheme water from 1886 onwards, Warragamba water from 1938 onwards, possibly Shoalhaven water from c. 1975, and most recently recycled waters from street cleaning after a public event.

The past thirty years has seen a resurgence of community interest in Australian history, especially for the colonial period. Because it figures so prominently within Australia's European foundation and because there is so little else remaining that is tangible from this period, the Tank Stream has been a focus of this enthusiasm. The development of Australia Square was a catalyst for accommodating the public's interest. When it was built a section of the Tank Stream's stone arch was destroyed to provide for underground carparking. The Sydney Water Board was able to negotiate the construction of a large public access chamber. This would be used to provide public tours of the stream.

The Tank Stream has been accessed for public tours in the past, proving to be extremely popular. Even though tours are currently limited there is no evident lessening of demand for access. Interestingly, although in the past there had been little connection between the recognition of the importance of the Tank Stream and the surviving fabric, this has changed. Many people now confuse the enclosed channel with the original stream, conflating convicts, early governors and masons marks into an intricate story that neither reflects the real story of the site's development or successfully conveys the many ways in which this is important to modern society. The publicly available literature on the Tank

Stream is variable in quality and reliability of content. It often perpetuates confusion in that the information is selective and romanticises certain aspects of the history.

Five low key sculptures have been installed along the Tank Stream's route. These have been created by Lynne Roberts-Goodwin, commissioned by the City of Sydney for its Sculpture Walk 2000. They provide a combination of historical text, imagery of flowing water and attempt to set this in relation to the topography of pre-European Sydney. The City of Sydney interprets the significance of the Tank Stream in other ways, for example the City has also recently launched a web-based virtual historical exhibition, 'Water, water, every where' (http://www.cityofsydney.nsw.gov.au/waterexhibition) which explores the changing uses of water in the City.

2.4.2 Thematic Framework

A thematic framework identifies historical processes that may play a significant role in creating and shaping different types of heritage places. Its purpose is to provide an alternative way of grouping sites for comparison to those that are more commonly used, such as grouping by function, designer, location or date of construction.

An example of a historical theme would be public health – a 1920s regional hospital may be thematically associated with a mid 19th century Sydney sewer, an 1880s suburban cemetery that was established during an epidemic, a 1950's baby health centre or a horse-drawn goldfields ambulance. All demonstrate different manifestations of the same historical process – the need to ensure public health – and each reflects responses that are dictated by the immediate needs and circumstances that prevail.

A single heritage place or element may reflect a variety of themes, and similar types of objects may reflect different themes. One of the roles of the historical section of a CMP is to identify the themes that are relevant for each heritage place.

There are frameworks for historic themes that have been established at a national level by the Australian Heritage Commission and at the State level by the NSW Heritage Council. They are not strictly comparable but many of the themes can be matched closely. Both levels of theme need to be considered, as do local themes. Local themes may be sub-sets of national and state themes, or may be generated by the history of the place.

Sydney Water's historic role has been the provision of water for consumption, management of stormwater and disposal of sewage. As a result it lacks the historical variety a more eclectic collection of heritage places may have, but is able to demonstrate in considerable detail how its themes have evolved and developed over time.

The following table (Table 2-4) identifies some of the predominant themes and names potential sub-themes and presents examples of physical evidence or historical context in the Tank Stream fabric that reflects the theme. The themes were numbered according to the AHC system.

Table 2-4 Identified Historic Themes.

National theme / sub-theme	State theme / sub-theme	Proposed local theme	Item-specific physical evidence or historical context that reflects the theme

National theme / sub-theme	State theme / sub-theme	Proposed local theme	Item-specific physical evidence or historical context that reflects the theme
Peopling Australia			
2.3. Coming to Australia as a punishment	Convict	Using convicts for public works	Convict labour involved in construction of tanks Water supply for convict colony
2.4.4. Migrating through organised colonisation	Migration		Original stream and its placement in Sydney Cove
Developing local, regional and national economies			
3.4. Utilising natural resources	Utilities	Accessing natural water supply	Original stream bed Original swamp Aboriginal use of local environment
		Controlling rainfall run-off	Stormwater use from 1820s onwards, and major construction in 1850s
3.11.1. Regulating waterways	Utilities	Early environmental control	Reservation for water quality
3.11.5. Establishing water supplies	Utilities	Urban drinking water systems	First water source for colony Tanks cut into bedrock
3.14. Developing an Australian engineering and construction industry	Technology	Developing service infrastructure and assets	Tanks cut into bedrock Original built drain Later changes to drain to conform to new technology
Building settlements, towns and cities			
4.1.1. Selecting township sites	Land tenure		Original stream as chosen by Governor Phillip
4.2. Supplying urban services	Utilities	Sydney sewage and sanitation	Original masonry drain Later changes to drain to upgrade capacity of drain
4.2. Supplying urban services	Utilities	Sydney stormwater	Original masonry drain Later changes to drain to upgrade capacity of drain
4.6. Remembering significant phases in the development of settlements, towns and cities		Romanticising early Sydney	Public perception of Tank Stream as part of early colonial history Tank Stream toponyms, illustrations, physical evidence

3 PHYSICAL DESCRIPTION

This section identifies and analyses the existing physical evidence or fabric of the Tank Stream. This analysis follows the historical investigation of significance to assess the Tank Stream's material evidence.

3.1 Physical Curtilage

3.1.1 Location and Landscape Description

The surviving part of the underground Tank Stream channel starts below the foundations of buildings on the south side of King Street, Sydney, between Pitt and George Streets and runs north to Circular Quay.

On its way to Circular Quay, it passes below Martin Place, Hunter Street, Bond Street and Bridge Street. It runs directly below several city landmarks, including GPO Building, Angel Place, Australia Square and the northernmost 250 metres of Pitt Street.

The surviving fabric includes a variety of sections and segments, created in different periods and from various materials. The curtilage of Tank Stream is defined in the SHR as 'three metres from all surfaces' of the historic item's fabric.

The Tank Stream is divided into two sub-catchments – the northern and southern Tank Stream – which divide at Martin Place. The area to the south of King Street is serviced by other stormwater systems and is excluded from the operational definition of the Tank Stream drain.

3.1.2 Urban Context, Streetscape and Architectural Layout of Built Components

The Tank Stream runs below one of the areas with the highest level of urban sensitivity in Australia. Due to the nature of the Tank Stream and the fact that it does not directly present to the wider public, it does not visually participate in the streetscape nor significantly affect presentation of any other historic structures or heritage items. However, position of the Tank Stream is identifiable as the lowest point in street.

A small section of historic Tank Stream fabric is also included in the presentation of the GPO building, and several locations within the city are decorated with plaques commemorating the Tank Stream. The latter include pedestrian areas in King Street, Martin Place and Bridge Street.

The Tank Stream also gave its name to a pub in Bridge Street and Tank Stream Way – the laneway connecting Bridge Street with Abercrombie Lane and formerly part of Hamilton Street.

3.1.3 Functional / Operational Curtilage – Position within the Catchment / System

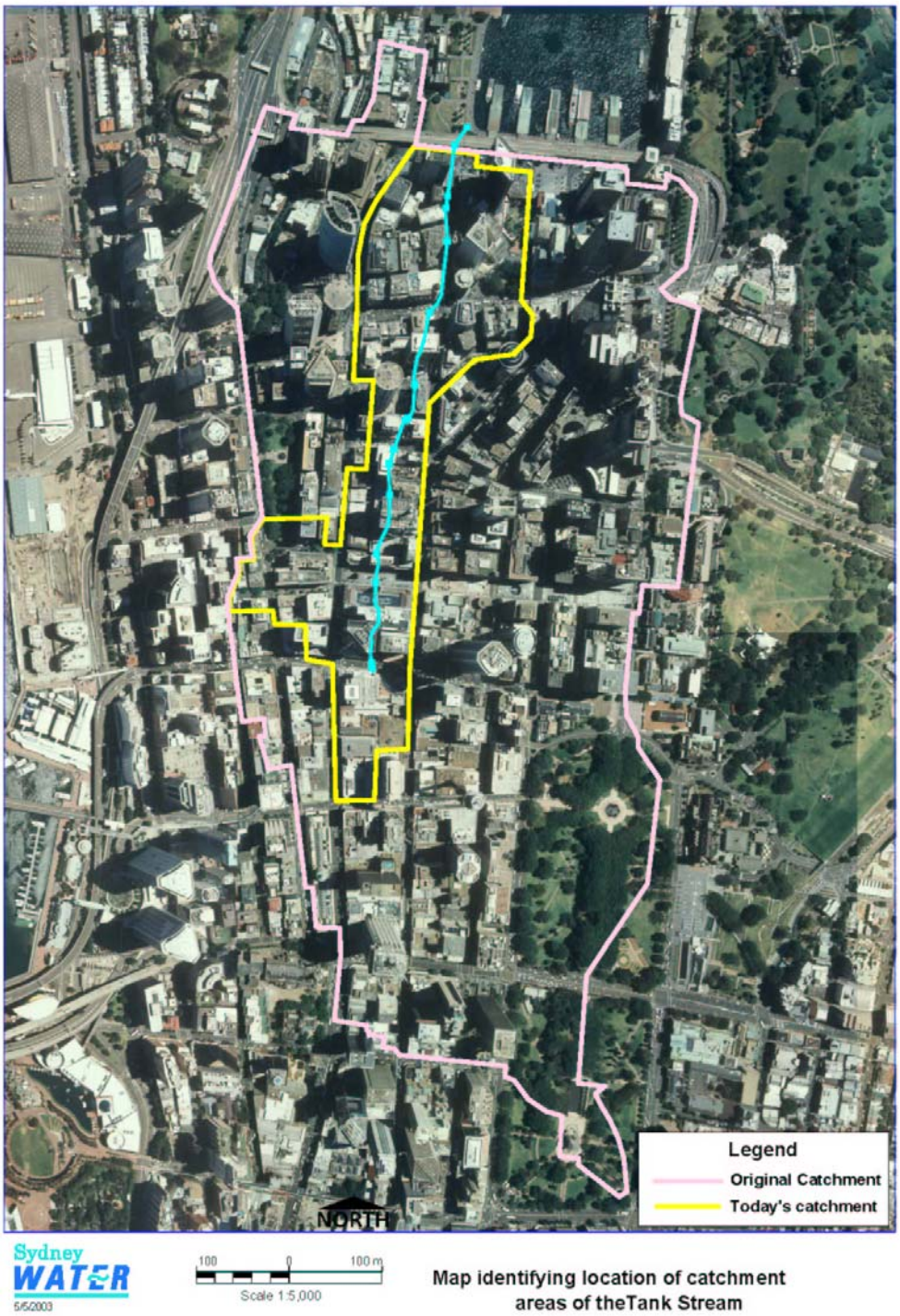


FIGURE 3-1 Tank Stream Catchment.

The Tank Stream today is effectively the stormwater channel of the commercial inner City and is connected to other parts of the drainage, former sewerage and water services.

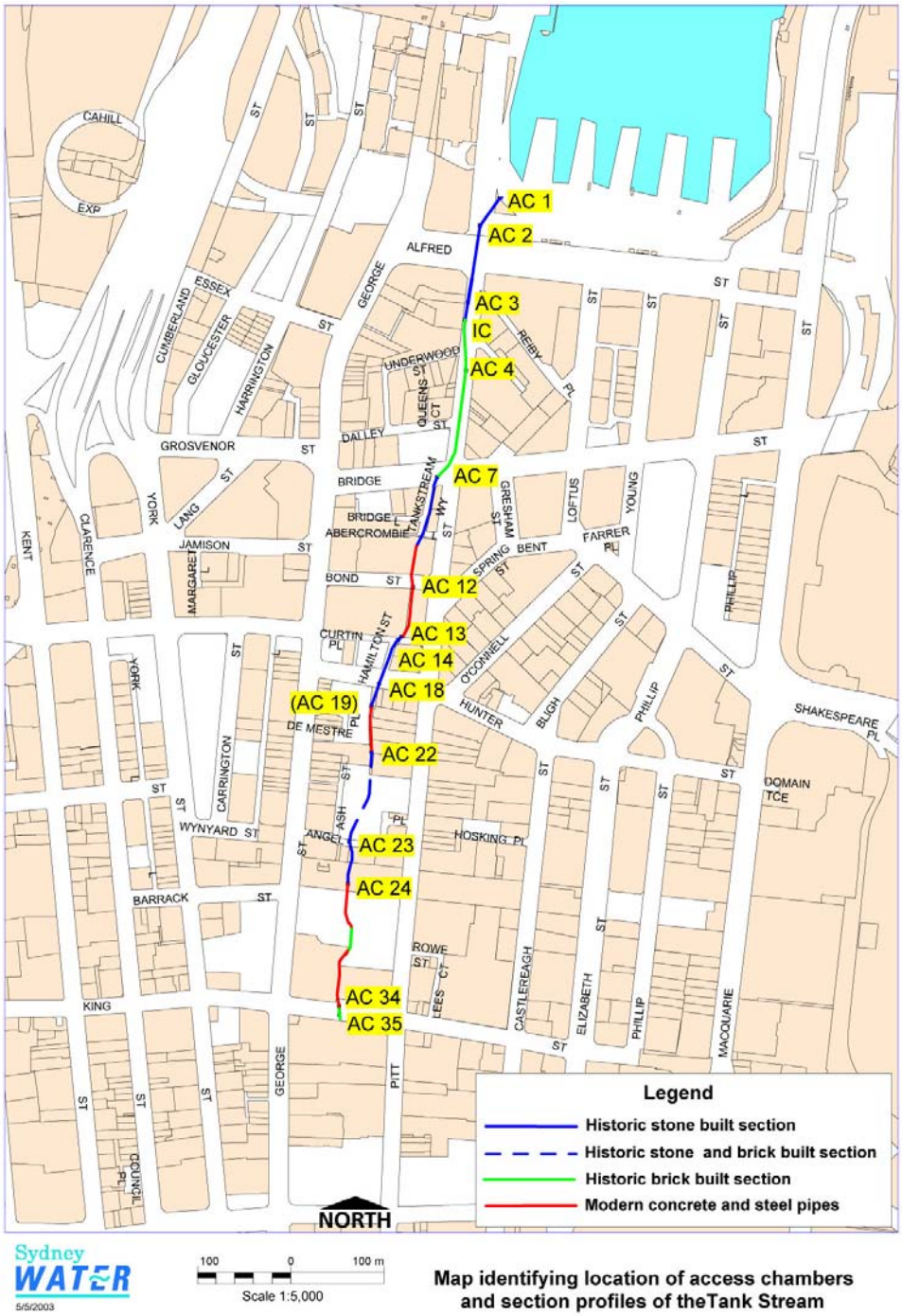


Figure 3-2 Historic and new profiles of the Tank Stream.

Its original catchment area of about 72ha, bounded by Circular Quay, Macquarie Street, Hyde Park, Bathurst and York Streets to Cahill Expressway is today reduced to about 17.5ha, bounded by Circular Quay, Loftus Street, Bent Street, Pitt Street, Market Street, King Street, Clarence Street, Barrack Street, York Street, Wynyard Street, Wynyard Lane and George Street to Circular Quay (see Figure 3-1).

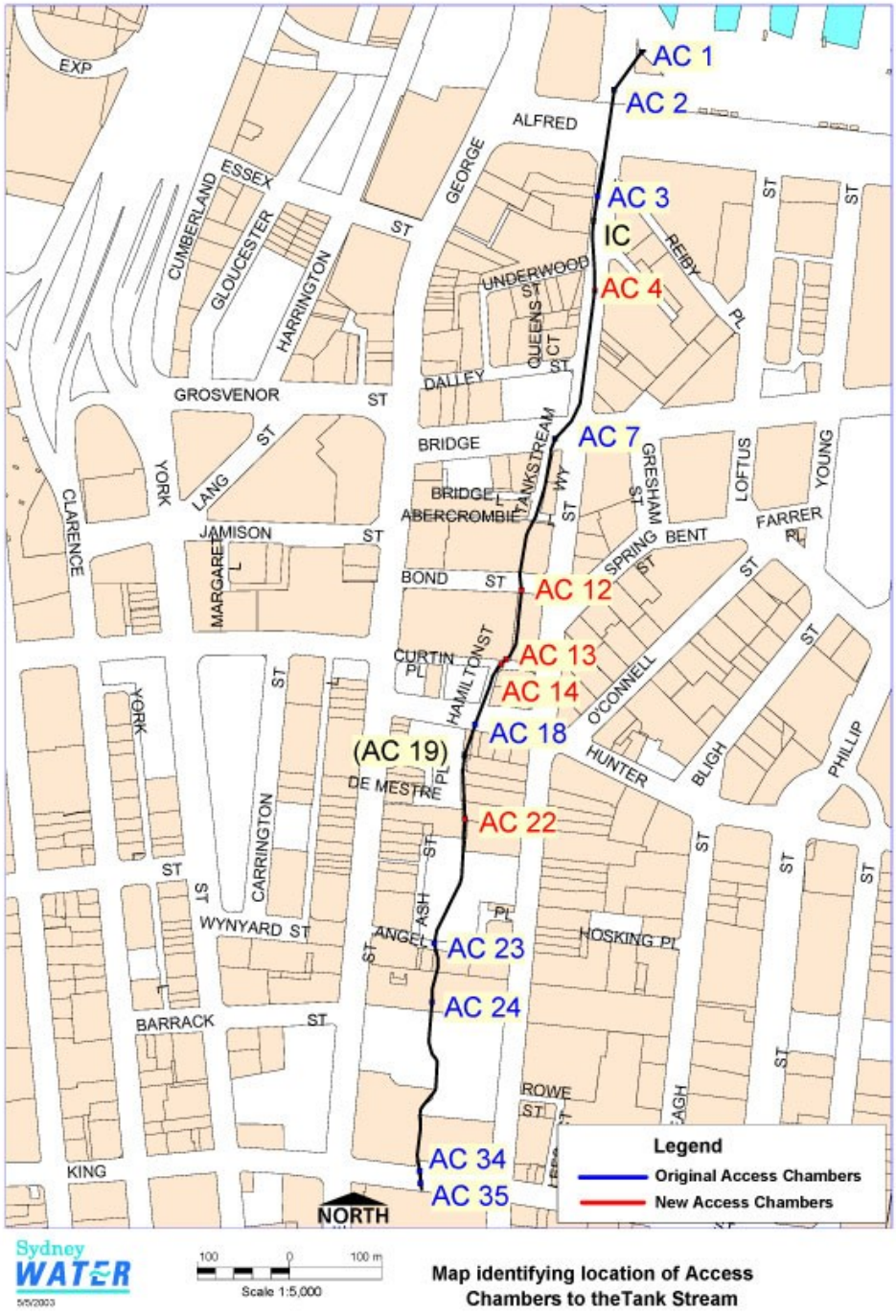


FIGURE 3-3 Historic and New Access Chambers.

The chambers were inspected visually from the street level and via the CCTV recording. The surviving access chambers can generally be classified as historic (over fifty years old) or modern. Access Chambers AC 24 and AC 22 are located within buildings and not accessible externally.

This significant reduction of the original catchment area took place through the introduction of the Bennelong outfall system, which drains significant portions of the original catchment. In case of an overflow of the Bennelong outfall system, the catchment area of Tank Stream increases significantly, which causes severe overflows. In particular, there are three significantly affected points being King Street between intersections with

George and Pitt Streets, Curtin Place and Bond Street [Stormwater Management Unit, Southern Region, Sydney Water Board 1992-1993, *Sydney CBD Flood Study*].

3.2 Basic Description of the Item

The following description of the surviving Tank Stream fabric included in the heritage listing follows the flow of the drainage channel, from south to north. It should be read in conjunction with the maps presented in Figures 3.1–3.3, which detail the location of the access chambers and different sections of the Tank Stream, and the Table 3-1, which details the section profiles.

Access Chambers

The access chambers' identification numbers used in this description were supplied by Sydney Water's Maintenance Crew, and run in the direction opposite to the flow of the Tank Stream, i.e. from the outlet in the north to the south.

Each access chamber was generally created at the time when the associated section was last time modified. Some access chambers (including historic AC 4 and AC 18, and all modern access chambers –see Figure 3-3) feature original metal covers from the period of their creation.

Access chamber are simple structures, and can generally be described as built in brick, on a circular plan, with a diameter of about 0.9m, dimensioned to allow for access of one person. Each access chamber is fitted with step-irons built into the chamber wall.

From King Street to Martin Place

The surviving part of the historic drainage channel begins with a brick wall located several metres to the south of access chamber AC 35. The Tank Stream runs from this point in a generally northerly direction to the outlet in vicinity of Circular Quay.[1] The access chamber is located below the south side of King Street, between intersections with Pitt and George Streets. The brick wall is considered to be a dead end, as the sections further upstream were lost during redevelopments of this area of Pitt Street.

This southernmost section of the Tank Stream stretches northwards reaching access chamber AC 34 below King Street. The profile of the channel in this section is oviform, with dimensions about 810mm broad by 1220mm high. It forms part of the channel that was probably built in 1866 as an open sewer, and converted to a closed channel when the covering arch was added in 1876, as described in the previous chapter.

The section is about 13m long and generally straight in configuration. From the dead end, the channel runs northwards about 3 metres to access chamber AC 35, and then another 10 metres to the access chamber AC 34, where it transforms into modern circular profile.

A CCTV survey of non-traversable sections of the Tank Stream, conducted by Sydney Water in 1998, shows that the lower part of the oviform profile is rendered, while the top part is of uncoated bricks. This may partly be due to the building technology, and partly a consequence of the creation of the channel in two stages, which is supported by the 1879

[1] For operational reasons the Access chamber numbers were allocated upstream, with AC 1 closest to the outlet, and AC 35 located at the extreme point upstream.

contract that specified construction of an invert and walls only [Specification for alterations to the Tank Stream sewer, 1879, City of Sydney Archives, CRS 65/1391]

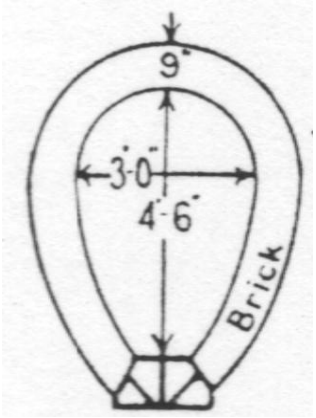


FIGURE 3-4 Profile of the Tank Stream between access chambers AC 35 and AC 34 (McIllwraith 1951)

This generally also matches the profile between AC 34–AC 24 and AC 07 to the Interception Chamber. Similar profile with apparently stone bottom survives between AC 24–AC 23 and AC 23–AC 22. A similar full brick profile of smaller dimensions is between AC 22–AC 18. See Table 3-1.

As noted above, the profile of this section matches the typical 'brick oviform' profile [McIllwraith, 1951; See above Figure 3-4] built with a flat bottom of terra-cotta elements. The smoothness of rendering in this section also indicates that brick is the primary material of the lower part of the channel, unlike the situation noted in some other areas.

In the vicinity of AC 35, about 6 metres downstream, are junctions with two modern branches of the drain channel, tributaries to the Tank Stream from east and west. These branches are of modern concrete pipes, numbered CP 56 and CP 57, and have a diameter of, respectively, 225 and 300mm.

About 2m upstream from AC 34, a cast iron aqueduct passes through the channel. This is probably part of the historic sewer aqueduct created in 1857, now disused, which was enclosed into the upper part of the channel when the Tank Stream was covered in 1876.

The next section to the north, between access chambers AC 34 and AC 24, goes through the densely built street block between King Street and Martin Place. The Tank Stream in this section consists of three identifiable segments. It begins with a modern cement lined concrete pipe, 750mm in diameter, continues through part of the surviving historic oviform profile approaching the GPO building, and then through stainless steel box-profile of dimensions 1070mm by 750mm.

The section between access chambers AC 34 and AC 24 is about 163m long, deviating several times through the block. Numerous inlets are also present in this section, mainly modern profiles of 300-400mm in diameter.

At about 11m downstream from AC 34, the channel runs through a chamber of formed concrete, comprising the access chamber AC 33. Another interesting feature is a cross intersection with two inlets simultaneously, about 43m downstream from AC 34.

About two metres downstream from AC 33, the channel profile changes to oviform, smoothly rendered in the lower part, similar to the full-brick sections described above.

The bottom of the profile is flat, indicating it probably consists of terra-cotta base inserts. [McIllwraith 1951].

The next segment downstream consists of the above-described stainless steel profile, created as major parts of Tank Stream below the GPO building were replaced during works on restoration of the building in 2000-2001. This segment reaches Martin Place, about five metres north of the GPO building.

Access chambers AC 32 to AC 25 do not exist in the current disposition of this section of Tank Stream, indicating they were probably removed with the introduction of the modern segments of the channel.

From Martin Place to Angel Place

Section between Access chambers AC 24 and AC 23 stretches between the south edge of Martin Place and Angel Place. It is, again, a typical oviform –oval profile, with dimensions about 810 by 1220mm, similar to the previously described oviform profiles. Presumed date of construction is therefore 1866 for the lower part, with the top added c. 1876.

The results of the CCTV research show render lining in this section damaged in a regular rectangular pattern of ca. 700 by 400mm. As mentioned above, McIllwraith described all oviform profiles of these dimensions as built in brick.

The described damages however indicate that the lower part was built of larger, presumably sandstone, blocks and that calcification occurred under the render lining damaging its visible layer, tracing position of the saturated mortar joints.

The section between access chambers AC 24 and AC 23 is about 42m long, and comprises a junction with the branch joining the Tank Stream from the west, about 10m downstream from AC 24. Several minor inlets, mainly circular vitreous clay profiles of 300-400mm in diameter, are also tributaries to this section.

The 1998 CCTV record shows the lower part of the oviform profile as rendered, with the top of non-rendered bricks, similar to the previously described oviform section between access chambers AC 34 and AC 24. The CCTV record also shows that a segment of this section, about 15 metres downstream from AC 24, was modified. In this segment, flat iron beams were placed above the lower, presumably sandstone, part of the channel on top of the original coping.

From Angel Place to Hunter Street

The section between Access chambers AC 23 and AC 22 starts at Angel Place and runs northwards, ending half-way between Angel Place and Hunter Street, near the Commercial Union House. Like the previous section, it is a typical oviform profile, about 810mm by 1220mm, constructed about 1866 (the lower part), with the top added in 1876.

The section is about 95m long, generally straight, with a mild deflection after about 52m downstream, and interspersed with numerous inlets. These inlets are mainly circular vitreous clay profiles of 300-400mm in diameter.

The rectangular calcification pattern under render lining is also notable in this section, indicating it was probably built utilising techniques and materials similar to those of the previous section.

At about 95m, the course of the channel deflects mildly and the profile changes to modern circular pipes, apparently cement lined. This, next section downstream, comprises Access chambers AC 22 to AC 19, and is located in the vicinity of Empire Lane. It is approximately 36m long, and consists of two segments: a sector created in 1962 of concrete pipes, and a shorter sector of steel pipes laid in 1958 and 1978. Both sections are 1350mm in diameter, and both circular profiles feature a formed cement invert in the bottom part of the pipes.

This section of Tank Stream also features numerous active inlets from both the eastern and western direction, mostly vitreous clay profiles of about 300mm in diameter. Several blocked and apparently disused inlets are also notable. The 1998 CCTV record shows very few stains in this section, indicating relatively high degree of smoothness of the modern materials used.

About 25m downstream from AC 22, the stream runs through a brick chamber, about 1.5m long, separating the two segments described above.

The change is identifiable through the change of the cement lining colour. In the second segment, the formed inlet on bottom of the pipe appears to be tiled, or formed of terra-cotta elements.

Access chambers AC 21, AC 20 and AC 19 are not identifiable in the CCTV record, indicating that access to these chambers is blocked. Blocking possibly occurred when the original fabric was replaced in the 1960s. About 36m downstream from AC 22, the channel reaches the presumed position of access chamber AC 19, and the profile tapers back into oviform, similar to sections previously described, but of slightly smaller dimensions.

The section between access chambers AC 19 and AC 18 is of dimensions 710mm by 1070mm, and apparently fully brick built. This section starts in the vicinity of Empire Lane, and ends on at AC 18, on the south side of Hunter Street, with a total length of about 22m, although the length in the original contract was ‘125 feet’ (about 38m).

From Hunter Street to Bond Street

The next section downstream runs between access chambers AC 18 and AC 13, the latter being located in the vicinity of Curtin Place. The section is about 35m long, and runs generally straight. The tanks which were cut early in the European history of the stream were in this section, but are not known to survive.

The Tank Stream profile in this section is semi-circular stone arch, approximately 1500mm by 3000mm, with floor formed as a shallow v-shape to increase the flow speed, constructed c. 1879. Intriguingly, locations of access chambers of this section generally cannot be identified in the available documents nor in lieu, with the exception of access chamber AC 14 located in the immediate vicinity of AC 13.

The section between access chambers AC 13 and AC 12, running below Australia Square, has a total length of about 86m. The profile of this section is concrete box, with dimensions about 1220 by 1830mm, created in 1962 during the development of Australia Square.

In the immediate vicinity is also the Sydney Water Meeting Room used for inspections and tours of the Tank Stream. It is a c.10 by 5 metres room, created in part of the basement of Australia Square Tower, accessed via a set of stairs from Curtin Place. The Tank

Stream channel is accessed from the entry area to the chamber, and is protected by a watertight hatch cover.

From Bond Street to Bridge Street

This section between access chambers AC 12 and AC 07, stretching between Bond Street and Bridge Street, comprises two readily identifiable segments, with a total length of about 100m.

The first of the two segments of this section starts on Bond Street, to the north of Australia Square, and runs to Abercrombie Lane, being about 60m long. The profile of this section is boxed concrete, b/h about 1220/1830mm. It runs through the basement of NZ Insurance Corporation Building, created in 1975, where it forms an aqueduct about 53m long.

The profile of the segment between Abercrombie Lane and Bridge Street, built c.1860, is semi-circular stone arch, approximately 1500mm by 3000mm, generally matching the profile of the section between AC 13 and AC 18. The channel runs generally straight in this segment, for about 40m.

In a manner similar to that of other stone arch sections, the bottom of the profile was added as a shallow V-shape to maintain the hydraulic capacity. Another interesting feature of this segment is the stone-built transformation chamber, located in the vicinity of Bridge Street. Location of access chambers, other than AC 12 and AC 07, cannot be identified in the current configuration.

From Bridge Street to Circular Quay

Section between AC 07 and the interception chamber located below corner of Pitt Street and Crane Place, is about 185m long. Constructed c.1878, the section starts with the above-mentioned transition from stone arch to typical brick oviform profile, about 810mm by 1220mm. From AC 07, located on the south side of Bridge Street, it runs north-northwest about 48m to the access chamber AC 4, before it turns north, and continues another c. 137m below Pitt Street to the interception chamber.

From this point, Tank Stream runs directly north, through access chamber AC 03, to AC 02 located approximately 100m to the north of the interception chamber, on the north side of Alfred Street. In this section, the profile reverts to semi-elliptic stone arch about 3000mm in width, while the height varies between c. 1100 and c. 1400mm. The bottom was formed as shallow v-shape flattened in the central area.

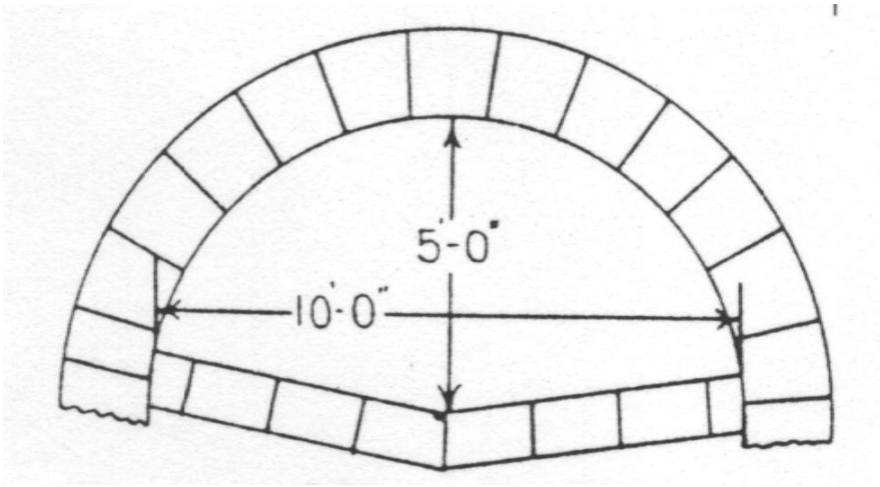


FIGURE 3-5 **Profile of the Tank Stream between Access Chambers AC 18-AC 13 and part of the section AC 12-AC 07 from Abercrombie Lane to Bridge Street (McIllwraith 1951).**

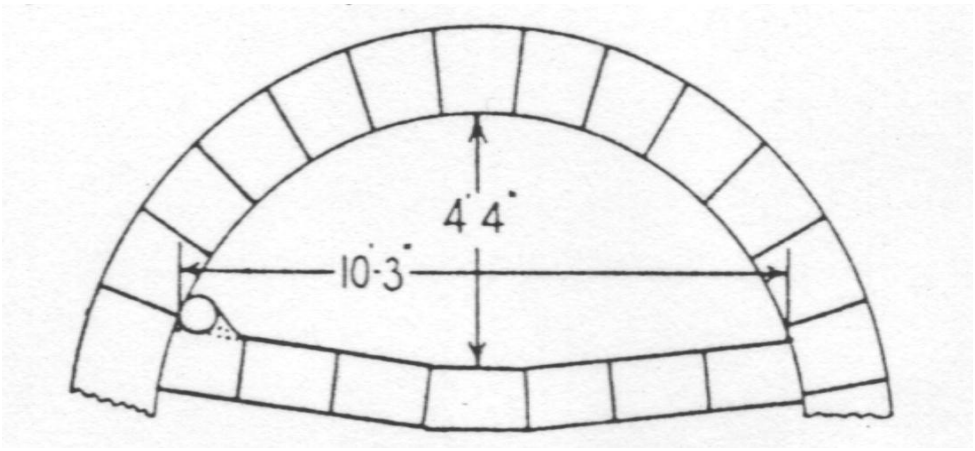


FIGURE 3-6 **Profile of the Tank Stream between the Interceptio n chamber and Access chamber AC 02 (McIllwraith 1951).**

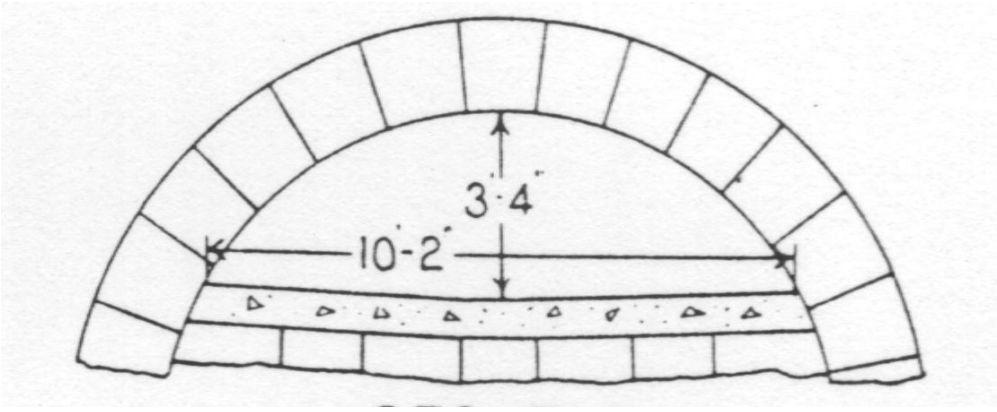


FIGURE 3-7 **Profile of the Tank Stream from the Access Chamber AC 02 to the Outlet (McIllwraith 1951).**

Table 3-1 Profiles of the Tank Stream.

Tank Stream Section Profiles		
Location:	Profile:	Date:
KING STREET to MARTIN PLACE		
AC 35–AC 34, King Street	Brick Oviform, b/h=810 by 1220mm, L=13m	1866, top c.1876
AC 34–AC 24, King Street towards GPO Building	Cement Lined Concrete Pipe, d=750mm, L= 43m	1990s
AC 34–AC 24, to the South of GPO Building	Brick Oviform, b/h=810 by 1220mm, L=18m	1866, top c.1876
AC 34–AC 24, below the GPO Building	Stainless Steel Box-profile, b/h=1070 by 750mm, L=100m	2000
MARTIN PLACE to ANGEL PLACE		
AC 24–AC 23, Martin Place to Angel Place	Stone and Brick Oviform, b/h=810 by 1220mm, L=42m	1866, top c. 1876
ANGEL PLACE to HUNTER STREET		
AC 23–AC 22, Angel Pl to Comm Union House	Stone and Brick Oviform, b/h=810 by 1220mm, L=95m	1866, top c.1876
AC 22–AC 18 Comm Union House to Empire Ln	Cement Lined Concrete Pipe, d=1350mm, L=25m	1962
AC 22–AC 18 near Empire Lane	Cement Lined Circular Steel Pipe, d=1350mm, L=11m	1958
AC 22–AC 18, Empire Lane to Hunter Street	Brick Oviform Profile, b/h=710 by 1070mm, L=22m	1866, top c. 1876
HUNTER STREET to BOND STREET		
AC 18–AC 13, Hunter Street to Curtin Place	Semi-circular Stone Arch, b/h=3000 by 1500mm, L=35m	1860
AC 13–AC 12, Australia Square	Concrete Box-profile, b/h=1220 by 1830mm, L=86m	1962
BOND STREET to BRIDGE STREET		
AC 12–AC 07, Bond Street to Abercrombie Lane	Concrete Box-profile, b/h=1220 by 1830mm, L=60m	1975
AC 12–AC 07, Abercrombie Lane to Bridge Street	Semi-circular Stone Arch, b/h=1500 by 3000mm, L=40m	1860
BRIDGE STREET to CIRCULAR QUAY		
AC 07 to the Interception Chamber, Bridge Street to Crane Place	Brick Oviform Profile, b/h=810 by 1220mm, L=185m	1878
Interception Chamber to AC 02, Crane Place to Alfred Street	Semi-elliptic Stone Arch, b/h=3000 / 1100–1400mm, L=100m	1860
AC 02 to the Outlet, Alfred Street to Circular Quay	Semi-elliptic Stone Arch, b/h=3000 / 1100–1400mm, L=32m	1860

At AC 02, the channel turns about 45 degrees, and runs about 32m northeast to Sydney Harbour. The profile of this final section is generally similar to that of the previous section, however, it underwent significant modifications as segments were repaired or paved with concrete. The final segment, about 5 metres long, was replaced with a concrete profile. The Tank Stream now discharges into Circular Quay from an opening that is visible during low tides on the west end of the bank of Sydney Cove.

3.3 Operational Issues

3.3.1 Engineering / Technical Description

As noted in the previous section, the Tank Stream runs in a generally northerly direction from King Street to Circular Quay, for a total length of about 1.7km. The bottom of the channel is laid about 3-5m below the ground level.

Sections of the Tank Stream vary in length and profile. In a typical situation, sections are identifiable as built around the same date and uniform in profile and material. The easiest way to trace the course of the channel is to follow it through the access chambers identified by unique numbers.

The sections of the Tank Stream are usually straight but can deflect by about 10-15°, and run through occasional junctions and chambers built in brick or cast in concrete. The channel also features numerous active and disused inlets, forming tributaries to the main stream.

3.3.2 Condition and Integrity

The Tank Stream generally is in good to excellent condition in all sections, and is fully functional as a drainage channel. The modern (post-1950s) sections generally are in excellent condition and have no known functional issues. The surviving sections of the historic fabric generally are in good condition. Occasional repairs are required, especially where mortar joints have been washed out.

Integrity of the visible historic fabric varies from section to section, and is generally high in the identified historic sections. The overall integrity of fabric can be assessed as relatively high, taking into account the specific nature of the item and the fact that representative sections of the built channel are preserved and in good condition.

3.3.3 Operational Links

As noted above, the Tank Stream is generally a closed system. However, on occasion of an overflow in the adjacent Bennelong Outfall system, the excessive rainwater drains through the Tank Stream causing floods in the CBD area.

Moveable Heritage Elements and Machinery Components

There are no moveable elements or machinery components identified as part of the item.

3.3.4 Archaeological Evidence

The Aboriginal and early colonial archaeological resource relating to the Tank Stream's history as an open running stream is likely to be extremely patchy and its survival purely a matter of good fortune. It is not possible to predict on the basis of current historical or archaeological knowledge where such deposits may survive. Where such evidence is

present it will be significant both as sources of information that is otherwise very rare in Sydney – evidence of Aboriginal life in Sydney Harbour, and the very earliest periods of colonial Sydney – and for its tangible link with the Tank Stream and its place in Australia's own historical development.

The rarity of the sites and their uncertain occurrence requires that ground disturbance in areas of potential should be done with an aim to minimise the risk of incidental loss, i.e. through open area rather than sondage exposure.

Other evidence of occupation of the stream banks before it was channelled are of probable local significance. The likelihood of encountering sites is shown in the table 3-2 below.

Table 3-2 Potential Archaeological Evidence

Potential archaeological evidence	Ability to provide information	Likelihood of survival	Archaeological significance
Aboriginal occupation			
Open camp sites Stone artefacts Shell middens	May demonstrate subsistence activities. Would add to a small corpus of known surviving sites and artefacts in Sydney CBD. Survival in urban context is extremely rare. Archaeological evidence can test validity of contact period historical record.	As demonstrated by archaeological monitoring, where site development has been shallow there is potential for campsites and archaeological objects to survive.	High local significance.
Tank Stream creek – undisturbed	Would provide valuable environmental data on Sydney prior to European arrival. Probability of survival is likely to be very low.	Generally appears to have been disturbed first by channelling and then encapsulation of stream. There may be small localised pockets of surviving stream bed deposits that survive where the pipe alignments have 'straightened' the route.	State significance.
European occupation			
Land grants Blocks held uncleared Blocks cleared Grazing or farming Fences	Such activity is usually ephemeral and insubstantial. *In situ* burnt roots may represent the clearing and burning of bush. The 15 metre cordon around the stream would have pushed early domestic construction well outside the SHR curtilage.	Negligible, as this will be ephemeral and likely to be vulnerable for later development.	Low local significance.
Three [?four] ground tanks	Would confirm what number were actually made, their form and exact location.	As exact location is not certain it cannot be assumed that these have been destroyed by later construction. Depth of the tanks may assist in their partial survival.	State significance

Potential archaeological evidence	Ability to provide information	Likelihood of survival	Archaeological significance
Use of open stream as a local water supply, then sewer Sections of intact stream sediments / creek line	Tangible link to First Fleet settlement Provides evidence of changes to the stream from water source to eventual conversion to enclosed sewer. Highly variable usage along its length. Evidence of stream uses may survive outside the 3 metre curtilage.	Unlikely to be any direct evidence of the open stream As the channelling of the stream may have straightened its course it is possible that sections of the stream were cut off and remain preserved. Most likely these will be sections of bank and stream bed sediments or water scours preserved in bedrock.	State significance
Drainage pipes connecting to stream Refuse into open stream	Provides evidence of changes to the stream from water source to eventual conversion to enclosed sewer. Highly variable usage along its length. Evidence of stream uses may survive outside the 3 metre curtilage.	Most refuse will date to late 19th century and filling in of channel but there may be earlier deposits with sufficient integrity for archaeological analysis.	High local significance

3.3.5 Aboriginal Archaeology

There is little archaeological evidence of Aboriginal occupation of the Tank Stream area surviving. Due to the impact of the arrival of European colonists from 1788 and the almost immediate impact that this had upon established patterns of subsistence our knowledge of the Aboriginal people of the Sydney district is limited. The Tank Stream SHR curtilage includes an unknown quantity of undisturbed land within its boundary. Where this survives it has a potential to retain environmental data, such as pollens, phytolithus and flake tools, reflecting pre-European vegetation, and the evidence of Aboriginal occupation. This is an extremely rare and fragile resource that survives only by chance.

The likely locations of Aboriginal sites are expected to be along the former creek banks and around the edge of the swamp source for the Tank Stream. These have suffered heavily from the impact of later changes to the stream and adjoining development, and their survival is unlikely to be assured.

3.3.6 Historical Archaeology

Table 3-3 Schedule of known or likely archaeological/pre-channelisation deposits that may survive (build up as required).

Location	Impact	Likely survival	Source
16-20 Bridge Street	2 basement levels	AZP 1992 identifies as destroyed	EHA 1996
22-30 Bridge Street	1 basement level and substation below that	AZP 1992 identifies as destroyed	EHA 1996
15-17 Hunter Street		Assessment suggests survival of accompanying deposits from c. 1833 / evidence of 1833 construction and later deposits only. Earlier deposits disturbed.	AHMS 1999
Hunter Street – exact location unknown	Excavation for stone conservation	Any recording done?	DPWS 1998
GPO site	1927 building	All deposit removed	Casey and Lowe 1998
GPO site	1942 building	Major disturbance from construction	Casey and Lowe 1998
GPO site	Martin Place frontage	Eastern side of original line disturbed	Casey and Lowe 1997
King Street	Resurfacing King Street	Surface 200 mm only disturbed – earlier fabric not revealed	Austral 1998
400 George Street	Pile excavations		

The physical evidence that relates to the development of the Tank Stream prior to its channelisation was set out in Chapter 2 as part of the historical narrative.

Bore hole investigations of deposits adjacent to the Tank Stream will not pick up either localised changes in strata or any density of cultural deposits (cf. boreholes documented in Austral 1996).

Archaeological evidence relating to the period from the 1850s onwards would include the construction of the oviform sewer, including evidence of construction *in situ*, the backfilling of the channel, later opening up of the pipe for maintenance, repair and major replacement. It would also include some evidence of structural supports designed to allow buildings to be built next to or over the stream.

Artefacts associated with construction and fill of the channel are likely to be part of general urban refuse disposal and difficult to provenance exactly. This diminishes their usefulness for investigation.

3.4 Natural Heritage

3.4.1 Notable Geological Features and Issues

There are no known notable geological features. The line of the stream is partially cut into Hawkesbury Sandstone. No dykes or other intrusions are known in the vicinity of the stream line.

3.4.2 Notable Natural Heritage Features and Issues

In accordance with the current SHR definition, the protected area includes the drainage channel and its curtilage, defined as three metres from all surfaces of the item. Although the item is stretching below a relatively long area, there are no identified natural heritage values.

3.5 Evidence of Environmental Issues

3.5.1 Evidence of Contamination

There are no known contaminated areas of the item. However, it is considered that some of the historic Tank Stream fabric may be affected with chemical or biological pollution from periods when the channel was used as a sewer. This type of pollution penetrates stone walls and floors of the channel, and remains stored in the affected areas for decades. Occasional sewer overflows also are a source of pollution.

3.5.2 Presence of Threatened Species

As noted above, the Tank Stream and its curtilage subject to this report are not considered suitable habitat for many living species of flora or fauna.

3.5.3 Aboriginal Environment

Separate consultation will be undertaken with representative Aboriginal Land Councils.

3.6 Heritage Items in the Vicinity

As noted above, Tank Stream runs below some of the most sensitive areas of the city of Sydney. Being concealed under the ground and excluded from the streetscape, it does not affect views to other heritage items or otherwise affect their presentation. No significant links with other heritage items in the vicinity were identified.

4 ASSESSMENT OF SIGNIFICANCE

This chapter explains the heritage significance of the Tank Stream. An analysis of the significance of the Tank Stream is made by addressing each of the NSW Heritage Assessment Criteria and a Statement of Significance is presented summarising the value of the Tank Stream for current and future generations.

4.1 The Concept of Heritage Significance

The principles of heritage significance as applied to Australian heritage conservation practice are contained in the Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance (Australia ICOMOS 1999). This document and its accompanying guidelines provide the structure for consistent methodologies to identify, assess and manage significant heritage places.

Heritage significance, or cultural significance, is defined in Article 1.2 of the Burra Charter as meaning the 'aesthetic, historic, scientific, social or spiritual value for past, present or future generations.' (Australia ICOMOS, 1999:2).

The Australia ICOMOS 'Burra Charter Guideline – Cultural Significance' (Australia ICOMOS: 1988) clarifies the meanings of these terms, as summarised below. Significance assessment explains the value of the Tank Stream in these terms.

Aesthetic value is defined in the guidelines to the Burra Charter as including aspects of sensory perception, including consideration of the form, scale, colour, texture and material, the smells and sounds associated with the place and its use.

Historic value encompasses the history of aesthetics, science and society. A place may have historic value because it has influenced, or been influenced by, a historic figure, event, phase or activity.

Scientific value acknowledges the scientific or research value of a place, the data available and the potential for the item to yield further substantial information.

Social value outlines the attributes of a place, which have become a focus of spiritual, political, national or other cultural esteem to a majority or minority group. (Australia ICOMOS 1988:2).

According to the Burra Charter, significance is embodied in the place itself, its fabric, setting, use, associations, meanings, its relationship to other items, within the response that the item stimulates in those who value it now and in historical records that allow us to understand it in its own context. The cultural value and significance of an item may change as a result of its continuing history, or our understanding of the significance may change as a result of new information about it.

The establishment of the significance of an item is a pre-requisite to making decisions about the items future. The Assessing Heritage Significance guideline (2001 edition) in the NSW Heritage Manual states that the main objective of assessing significance is to produce a succinct statement of significance, being a summary of the item's heritage values. The assessment of significance does not involve consideration of management and regulatory issues not related to the item's value, which are dealt with in the discussion of heritage management issues and development of conservation policy. Kerr's A Conservation Plan (2000) explains that significance assessment provides a clear

understanding of the nature and level of significance of a place by identifying and assessing the attributes, which make a place of value to our society.

The Burra Charter provides for the assessment of the cultural value of natural places, and also refers to The Australian Natural Heritage Charter (2002) for advice on interpreting natural significance. The assessment of natural heritage significance is guided by the principles contained in the Australian Natural Heritage Charter published by the Australian Heritage Commission. This document defines natural significance as meaning the importance of ecosystems, biological diversity and geo-diversity for their existence value or for present or future generations in terms of their scientific, social, aesthetic and life support value. The Charter states that natural heritage incorporates a spectrum of values, from intrinsic existence value at one end, to anthropocentric socially based values at the other.

Determining the significance of places of heritage value is the basis for planning their future. A clearly determined significance permits informed decisions ensuring that the expressions of significance are retained, enhanced or at least minimally impacted upon. A clear understanding of the nature and degree of significance will determine the parameters for future change.

The following significance assessment is prepared using the Burra Charter, the Assessing Heritage Significance guideline and the social significance assessment prepared using the "What is social value" publication. (Australian Heritage Commission, 1994)

4.2 Previous Heritage Assessments

4.2.1 Significance assessed in reports

The significance of the Tank Stream has been assessed at various times at the project level, through the evaluation of significance of the entire Tank Stream, or individual elements, in a number of assessments prepared as part of development consent or archaeological permit applications. These titles are identified in the annotated reference list to this chapter.

Two reports which address the significance of the Tank Stream in more detail were prepared in 1995 by Godden Mackay Logan, for Sydney City Council. These reports were envisaged by Sydney City Council to be a preliminary step to the formulation of a more comprehensive management and interpretation policy, by the Council, the Heritage Council of NSW and Sydney Water.

The reports, the Tank Stream Tunnel Stage 1 – Preliminary Assessment of Significance and Issues (GML 1995a) and Tank Stream Site, Sydney GPO, Management and Interpretative Advice (GML 1995b) paid particular reference to the section of the Tank Stream within the GPO development site, but assessed the significance of the Tank Stream as a whole. Similarly the 1996 Godden Mackay Logan studies produced for Angel Place, including the Angel Place Project Heritage Impact Statement and Proposed Angel Place Re-development Application for Archaeological Test Trenching under S60 and S140, Heritage Act 1977 (NSW) (GML 1996) adopted the significance assessments established in the earlier reports. These reports identified that a key issue in the consideration of significance of the Tank Stream, is addressing the layers of meaning of the Tank Stream. The Tank Stream was defined to encompass the following elements:

- The historical stream.
- The existing stormwater drain.
- The tunnel of brick and stone fabric enclosing the current storm water drain.

- The sections of the former route.
- The idea of the Tank Stream, which has evolved over time and combines fact and fiction and is not necessarily related to reality. (GML 1995:6)

The assessment of significance and statement of significance as prepared in the GML report (1995) was reproduced in the 2002 review of the Sydney Water S.170 Register and is discussed below.

4.2.2 Significance assessed through Register listings

Heritage assessments for the Tank Stream have also been compiled, to some extent, through the process of assessment of nominations to heritage registers. For a full discussion of the various register listings of the Tank Stream and their status refer to Chapter 5. However, while the Tank Stream is listed on all the applicable heritage registers, comprehensive heritage assessments have not necessarily been prepared by the nominator or organisation administering the specific register.

The assessments provided in the relevant listing records are discussed below, full excerpts of the listings are attached in Appendix B.

State Heritage Register (Listing No. 636)

The State Heritage Register listing record does not include a heritage assessment or statement of significance. The Heritage Council report recommending the listing provides advice on the significance of the Tank Stream and recommended the management level of significance being at the State level.

Section 170 Register (Listing No. 4573709)

The significance of the Tank Stream was assessed as part of the comprehensive review of the Sydney Water S.170 Register endorsed by the Heritage Council of NSW in 2000. This is the most comprehensive assessment to date, using the criteria as promulgated by the Heritage Council of NSW.

The S.170 Register listing adopted the heritage assessment and statement of significance prepared by Godden Mackay Logan in their 1995 report, Tank Stream Tunnel, Stage 1 – Preliminary Assessment of Significance and Issues (GML 1995a, b).

Central Sydney Heritage Local Environmental Plan (Listing No. 7001)

The significance of the Tank Stream is briefly acknowledged in the listing of the Tank Stream Tunnel and tanks in the Central Sydney Heritage Local Environmental Plan. It is also identified in the Central Sydney Archaeological Zoning Plan, which acts as an additional schedule of sites to which the provisions of the LEP apply.

National Trust listing

The National Trust classified the Tank Stream in 1985, the cited reason for its listing being the ‘the site of the settlement and Sydney Cove, and the original water supply for the colony from 1788 to 1820, the Tank Stream has considerable heritage significance to the people of Sydney’.

Register of the National Estate (Listing No. 014322)

The Register of the National Estate listing states that the Tank Stream is 'of symbolic significance as the site of and water supply for, the First Settlement of Sydney, of historic significance in the development of Sydney's water supply and of sewerage engineering systems'.

4.3 NSW Heritage Assessment Criteria

To be listed on the State Heritage Register, an item must meet one or more of the assessment criteria within the Heritage Act 1977 and published in an extended form with inclusion and exclusion guidelines in Assessing Heritage Significance (NSW Heritage Office 2001).

The NSW heritage assessment criteria extrapolate the generic values outlined in the Burra Charter. The criteria include two historic values (a) historical evidence and (b) historical association; (c) aesthetic value; (d) social value; (e) research potential and two qualifiers to enable comparative assessment, (f) rarity and (g) representative.

The established significance of an item may be of Local or State level. State significance means that an item is of significance to the people of NSW, local significance means that an item is significant to the people of a local area.

Assessing Heritage Significance also offers guidelines for inclusion and exclusion in the heritage listing, to assist in making a heritage assessment. The criteria as presented in the guideline are outlined below, with the inclusion and exclusion criteria.

The exclusion criteria are not to be applied in isolation from the inclusion guidelines, but should assist in clarifying and testing the conclusions made.

Criterion (a) - An item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area)

Guidelines for Inclusion	Guidelines for Exclusion:
shows evidence of a significant human activity	*has incidental or unsubstantiated connections with historically important activities and processes*
is associated with a significant activity or historical phase	*provides evidence of activities and processes that are of dubious historical importance*
maintains or shows the continuity of a historical process or activity	*has been so altered that it can no longer provide evidence of a particular association*

Criterion (b) - An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history or the cultural or natural history of the local area.

Guidelines for Inclusion	Guidelines for Exclusion:
shows evidence of a significant human occupation	*has incidental or unsubstantiated connections with historically important people and events*
is associated with a significant event, person, or group of persons	*provides evidence of people and events that are of dubious historical importance*
	has been so altered that it can no longer provide evidence of a particular association

Criterion (c) - An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area)

Guidelines for Inclusion	Guidelines for Exclusion:
shows, or is associated with, creative or technical innovation or achievement	*is not a major work by an important designer or artist*
is the inspiration for a creative or technical innovation or achievement	*has lost its design or technical integrity*
is aesthetically distinctive	*its positive visual or sensory appeal or landmark and scenic qualities have been more than temporarily degraded*
has landmark qualities	*has only a loose association with a creative or technical achievement*
exemplifies a particular taste, style or technology	

Criterion (d) - An item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons

Guidelines for Inclusion	Guidelines for Exclusion:
is important for its associations with an identifiable group	*is only important to community for amenity reasons*
is important to a community's sense of place	*is retained only in preference to a proposed alternative*

Criterion (e) - An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area)

Guidelines for Inclusion	Guidelines for Exclusion:
has the potential to yield new or further substantial scientific and/or archaeological information	*the knowledge gained would be irrelevant to research on science, human history or culture*
is an important benchmark or reference site/ type	*has little archaeological and research potential*
provides evidence of past human cultures that is unavailable elsewhere	*only contains information that is readily available from other resources or archaeological sites*

Criterion (f) - An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history

Guidelines for Inclusion	Guidelines for Exclusion:
provides evidence of a defunct custom, way of life or process	*is not rare*
demonstrates a process, custom or other human activity that is in danger of being lost	*is numerous but under threat*
shows unusually accurate evidence of a significant human activity	
is the only example of its type	
demonstrates designs or techniques of exceptional interest	
shows rare evidence of a significant human activity important to a community	

Criterion (g) - An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places; or cultural or natural environments

Guidelines for Inclusion	Guidelines for Exclusion:
is a fine example of its type	*is a poor example of its type*
has the principal characteristics of an important class or group of items	*does not include or has lost the range of characteristics of a type*
has attributes typical of a particular way of life, philosophy, custom, significant process, design, technique or activity	*does not represent well the characteristics that make up a significant variation of a type*
is a significant variation to a class of items	
is part of a group which collectively illustrates a representative type	
is outstanding because of its setting, condition or size	
is outstanding because of its integrity or the esteem in which it is held	

4.4 Discussion of Significance, Definition of the Tank Stream, Curtilage

The heritage significance of the Tank Stream is drawn from its tangible and intangible characteristics. Its tangible characteristics encompass the structure, including accessible and normally concealed or hard to reach areas, the physical evidence of construction, use and change from repairs and upgrading. The Tank Stream's physical fabric also to an extent includes the surface topography of central Sydney, with its line defined as the lowest point in several streets, as well as place names. Its intangible values include its associations with past historical events and processes, links to named individuals or identifiable groups and to the representation of values that arise from such connections.

The material evidence of the Tank Stream can demonstrate philosophies or customs, designs, functions, techniques, processes and styles, uses and associations with events or persons. The intangible characteristics arise from associational links with people and events for which there is no surviving physical evidence.

The following significance assessment embraces all of the following references, defining the Tank Stream to comprise: the small watercourse draining the catchment south from Sydney Harbour, the existing fabric of the stormwater drain, the tunnel of brick and stone enclosing the stormwater drain, the sections of the former route of the Tank Stream and the concept of the "Tank Stream" as experienced, imagined and taught to generations of Australians' (GML 1995 a, b). For the purposes of the assessment of the values enshrined in the fabric and associated, the Tank Stream is defined to include one or more of these layers of meaning. Restricting consideration of the significance of the Tank Stream to the fabric owned by Sydney Water or the management easement is inappropriate and should be only a subset of the assessment of the overall significance of the place.

The significance of the Tank Stream chiefly arises from its role in the location of the first European settlement at Sydney Cove. This importance is derived from the association with the concept of the 'Tank Stream' for which potentially only a small chance of physical evidence remains existing with this period of its history. The highest level of significance of the Tank Stream arises therefore, from that for which there is potentially no surviving fabric. As discussed in Chapter 3, the physical form of the Tank Stream today contains fabric which is of high significance, however this is of lesser importance than the association with the First Fleet and the early years of the colony.

The existing three metre curtilage from all surfaces of the Tank Stream, as discussed in Chapter 1, protects the integrity of the existing route stormwater channel and enclosing tunnel. This curtilage has arisen from this perspective, and as a management imperative, by minimising the inclusion of areas not related to significance under the then permanent conservation order (PCO) system, which prohibited any kind of demolition within the (then) PCO boundary. Sydney City Council, through the planning system, provides protection for elements that link to the Tank Stream, streetscape, urban design and development control.

The current listing focuses on the tangible fabric of the stormwater drain and the tunnel, however, the primary significance of the Tank Stream arises from its historic association. The significance assessment of the Tank Stream can address the intangible values of the Tank Stream. The development of this intangible aspect of significance can then be further developed for interpretation. The Tank Stream has a strong identity and appeal to the public, however, the current experience of the existing tunnel does not present the historical significance values of the place.

4.4.1 Relevant Principles for Defining a Re-evaluated Curtilage

The current SWC s.170 Heritage Register defines the Tank Stream curtilage as:

> *The boundary of the Tank Stream is the physical limits of the enclosing structures which contain the stream. In most areas, this comprises brick drains, with some sections of concrete construction.*

As presented above, the whole area of current and historic Tank Stream catchment is to a degree sensitive to major works and changes, although the impact of this fact is academic rather than practical. The area immediately adjacent the extant conduit has a higher sensitivity however in considering a re-evaluated curtilage, the following factors need to be taken into account:

- the archaeological potential of the grounds surrounding the extant conduit is low, and
- these grounds have no significance on their own merit.

This means that the importance of the area surrounding the conduit is largely reduced to its importance as the physical and structural support to the conduit. In analysing this further, different parts of the conduit have different significance levels, and different ground portions have different geological and sensitivity structural potential. In effect, the relevant buffer zone to be protected by the SHR listing will thus vary in accordance with the specific conditions of each location considered.

The general principle, established by the experience in similar cases, indicates that the following buffer zones are required, (measured from all sides of the conduit):

- a zone of 1m should be absolutely prohibited for any new development,
- a zone of 3m should be generally prohibited for new development, and any works within this zone should be overseen by a suitably qualified structural engineer,
- a zone of 10m should be considered structurally highly sensitive, and works within this zone should be approved by a suitably qualified structural engineer.

Within the buffer zones, the elements should retain their previously endorsed level of significance. The zones should end on the ground surface, and repairs of surface elements including roads, pavements and other should not be considered to have an impact on the Tank Stream curtilage, and should be excluded from the requirements of the s.60 of the NSW Heritage Act.

4.5 Application of NSW Heritage Assessment Criteria

The assessments developed in the application of this criteria are based on the Tank Stream assessment contained in Sydney Water's S.170 Register prepared by AWT and endorsed by the Heritage Council in 2002. That Register had substantially reproduced the Godden Mackay Logan 1995 assessment discussed above.

Criterion (a) - An item is important in the course, or pattern, of NSW's cultural or natural history;

The Tank Stream was the single most important factor in determining the location of the first permanent European settlement in Australia and the location of the city of Sydney.

The Tank Stream strongly figures in the story of the first European settlement in Australia, juxtaposed with the eighteenth and nineteenth century British penal practice of using convicted felons as forced colonists, in pursuit of imperial expansion and with the subsequent expansion of colonisation and displacement of the indigenous population.

The course of the Tank Stream influenced Governor Arthur Phillip's placement of the first camp and has continued to be the basis of the pattern of development around which the drainage system, city streets and the wharves at Circular Quay have evolved.

The Tank Stream is a cultural landscape that represents a continuum of land use spanning generations. The layers of modification and human impact on the Tank Stream demonstrate the historic processes of resource exploitation, sanitary reform and social order movements.

Early administrative decisions and the topography of Port Jackson influenced the urban form of Sydney that exists today. Governor Phillip decided to establish the main body of the settlement to the western side of the valley, which established the pattern of administrative and legal functions on the eastern side of the Stream, and military convict and civil establishments on the west.

The Tank Stream is associated with Australia's first environmental law, an attempt to protect the fresh water resource for the settlement by Governor Phillip who established a 50ft green belt on either side of the stream and further attempts by subsequent Governors to protect the stream from contamination.

The Tank Stream demonstrated the failure of these attempts in the early degradation of the stream, which served as a combined sewer and stormwater drain, before environmental concerns in the twentieth century separated these functions.

The Tank Stream is associated with the earliest European bridge in Australia and the fabric demonstrates layers of changing hydrological practices, function and historical processes.

The Tank Stream is a visible reminder of the past that demonstrates the chronological process of human use and occupation, indigenous and non-indigenous and is symbolic of Australian environmental practices and management. The Tank Stream's fabric demonstrates the evolution of changing function and use of the Tank Stream from water supply, sewage and stormwater to predominantly stormwater.

The State Heritage Register inclusion guidelines met:

- Shows evidence of a significant human activity
- Is associated with a significant activity or historical phase
- Maintains or shows the continuity of a historical process or activity

Criterion (b) - An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history;

The original watercourse and catchment would have provided a resource for exploitation by the Gadigal people who occupied the southern shore of Sydney Harbour at contact and their ancestors. As a result of the severity of this displacement the Tank Stream has become symbolic of the European settlers immediate appropriation of essential resources and Aboriginal dispossession.

The Tank Stream influenced, and has been influenced by, Governor Phillip and subsequent early governors of the Australian colony. The course of the stream determined Phillip's citing of the first camp and this early administrative decision influenced the subsequent urban form of Sydney. Since the arrival of the First Fleet, the right to use the Tank Stream resource has been managed by public authorities.

Early public policy concerns with sanitary reform and social order generated the establishment of a public water supply, sewage and stormwater system for Sydney. The Tank Stream is associated in the public mind with the early colonial period and the First Fleet.

The State Heritage Register inclusion guidelines met:

- Shows evidence of a significant human occupation
- Is associated with a significant event, person or group of persons

Criterion (c) - An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW ;

The continuing function of the Tank Stream as a stormwater drain provides an evocative sensory experience, conveying the unique appeal of experiencing an historic and functioning stormwater drain. The subterranean experience of entering well-preserved sections of the Tank Stream provide a suggestive journey into the past.

The Tank Stream features fine quality stonemasonry and brickwork from the nineteenth century, human scale and an intriguing form showing layers of different phases of construction. This includes modifications introduced to improve the operation, e.g. terracotta drains.

The Tank Stream is one element of Sydney Water's water, stormwater and sewerage infrastructure which collectively, demonstrate Sydney Water's historic and continuing pattern of innovation. The Tank Stream exhibits the oviform style that was then perfected in the Bennelong Sewer.

The Tank Stream is a landmark archaeological site, but does not in an obvious sense present to the street. It manages however to convey aesthetic appeal through its strong sense of identity. The Tank Stream provides a strong sense of a hidden and unique part of Sydney, beneath the centre of Australia's most populous and developed city.

The Stream features in many early maps, paintings and etchings of the colony, centred on the bridged stream, as the nexus of the developing settlement, and this well known and frequently romanticised view of the colony is integral to many people's image of early Sydney.

The State Heritage Register inclusion guidelines met:

- Shows or is associated with, creative or technical innovation or achievement
- Is aesthetically distinctive
- Has landmark qualities

Criterion (d) - An item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons;

The Tank Stream is an important component of the early history of Sydney which many Australians encounter during their history education, currently encountered in the Human Society and its Environment primary school curriculum. As a result, the stream is widely known and respected as an iconic symbol of the early colony and a tangible link with pre-contact Australia. The Tank Stream provides a historical grounding and reference point for community identity and sense of place.

The Tank Stream's value to the community is evidenced by the popularity of the Tank stream tours and by the regular past and present historical coverage of the Tank Stream in the media. The presentation of the Tank Stream in the media is romanticised and the popularity of the Tank Stream stems from its mysterious inaccessibility.

The popularity of the occasional guided tours of the Tank Stream attests to a significant level of interest in and recognition of the rare and historic qualities of the stream by the general public. Whilst the Tank Stream is not accessible to the public, other than annual tours, the level of awareness of the Tank Stream is high and knowledge about past tours of the Tank Stream is high. The Tank Stream gives a strong sense of identity, the social significance arises from an appreciation of the Tank Stream as a visible trace of the past.

The Tank Stream provides an essential community function as a stormwater drain but has value to the community beyond this utility. The social value of the Tank Stream is based on its historical significance and 'idea' of the Tank Stream. The inaccessibility of the Tank Stream may contribute to its social significance and imagined manifestation. The experience of the Tank Stream and its sense of place for the general public is largely interpreted through education and interpretation through the media.

The present community esteem of the Tank Stream has evolved over time, and is consistent with the growth of a heritage and environmental consciousness since the 1970s. While surveys have not been undertaken to gauge levels of community appreciation and understanding of the Tank Stream, the social significance of the Tank Stream can be drawn to a certain extent. The level of community awareness of the tours is significant, considering their limited past and present application.

The Tank Stream is important to a variety of people, organisations and communities. By virtue of its continuing maintenance and usage, Sydney Water engineers and employees have come to highly value the Tank Stream as one of the most historic components of the Sydney sewerage system. Past and present civic commissioners and politicians, heritage professionals, engineers and underground enthusiasts such as the 'Cave Clan' group all value the Tank Stream site for a variety of reasons.

The State Heritage Register inclusion guidelines met:

- The Tank Stream is important for its associations with an identifiable group
- The Tank Stream is important to a community's sense of place.

FIGURE 4-1 Public Tour of the Tank Stream during the Heritage Festival 2003, photograph by David Southcott, Sydney Water, 13 April 2003.

Criterion (e) - An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history.

The Tank Stream comprises segments of brick and stone oviform and pipe sections. The physical fabric and construction techniques of these sections have potential to yield information contributing to an understanding of early construction and waterproofing techniques associated with water and drainage and with early brick manufacturing techniques.

The course of the Tank Stream largely follows that of the original stream. Those areas have the potential to contain deposits related to pre-contact settlement and the earliest period of European settlement. As discussed in Chapter 3, this potential is unlikely and it is not possible to predict on the basis of current historical or archaeological knowledge where such deposits may survive.

Where such evidence is present, it will be significant as both source of information that is very rare in Sydney, providing evidence of Aboriginal life around Sydney Harbour and the earliest periods of colonial Sydney, and for its tangible link with the Tank Stream and its place in Australia's own historical development.

Potential evidence of Aboriginal occupation, including campsites, stone artefacts and shell middens, has the ability to add to the small corpus of knowledge of known surviving sites and artefacts in Sydney CBD.

The Tank Stream has the potential to yield evidence of the undisturbed Tank Stream creek, which would provide valuable data on Sydney prior to European contact.

Study of the Tanks has the potential to reveal information concerning the tools used in their construction, holding capacity of the tanks, their form and exact location.

Considered as part of a system, the Tank Stream can illustrate important periods in the development of Sydney's water supply and sewer and stormwater drainage network.

The State Heritage Register inclusion guidelines met:

- Has potential to yield new or further substantial scientific or archaeological information.
- Is an important benchmark or reference site or type

Criterion (f) - An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area);

Rarity

The Tank Stream is a unique historical feature which is central to the history of the settlement of Sydney by Europeans.

The presence of a fresh water supply was single most important reason for the siting of European settlement at Sydney Cove.

It is a rare tangible link with the pre-European contact landscape and the original watercourse route.

The fabric of the Tank Stream and its enclosing stormwater drain contains rare surviving evidence of the eighteenth and nineteenth century water supply and sewerage construction in the one linear site.

In the one site, the Tank Stream demonstrates evolved environmental management and a range of technologies, from Aboriginal custodianship, early exploitation and pollution, to the separation of stormwater and sewage functions and designation as stormwater system. It is rare for the same watercourse route to have been used for water supply, sewerage and drainage and possesses fabric that reflects all of these uses over a lifespan.

FIGURE 4-2 Demolition of the Tank Stream 1965,

[Sydney Water File Reference 148388F3]

The State Heritage Register inclusion guidelines met:

- Shows rare evidence of a significant human activity important to a community.
- Is the only example of its type.

Criterion (g) - An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places; or cultural or natural environments.

Representativeness

The Tank Stream is representative of a significant collection of water and wastewater heritage assets from the mid-nineteenth century onwards. From the operational perspective the Tank Stream competently serves as a stormwater drain, from the historical and social perspective, the Tank Stream serves to represent the system and Sydney Water as a whole, as its most high profile, historic and valued heritage item.

The fabric of the Tank Stream and of the enclosing stormwater drain is representative of a range of technologies associated with water reticulation, sewerage and drainage for a period of two centuries.

The stream has potential to contain archaeological deposits which demonstrate characteristics of the pre-contact period, early period of penal settlement and later colonial phases.

The progression of the Tank Stream is representative of the city of Sydney, the various changes to the Stream reflect Sydney's urban development.

Early orders issued by Governor Phillip and subsequent Governors represent the first official attempts by the settlement to protect the quality of the water supply. This was driven, as is consistent with developing economies, by the need to protect a scarce resource, to extend it's continued exploitation until a replacement is found.

The State Heritage Register inclusion guidelines met:

- Is outstanding because of its integrity or the esteem in which it is held.
- Is outstanding because of its setting, condition or size.
- Has the principal characteristics of an important class or group of items.
- Has attributes typical to a way of life, philosophy, custom, significant process, design, technique or activity.

4.6 Comparative Analysis and Level of Significance

The Tank Stream was assessed to be of State heritage significance and listed on the State Heritage Register in 1989. The Tank Stream is of State significance because it was the primary reason for the siting of the 1788 First Fleet settlement in Sydney Cove and was critical to the survival of the colony in its first years.

As such the Tank Stream is unique and rare. It is representative of a variety of significant historical processes and themes including the use of convicts for public works and the development of public utilities, water, sewage and stormwater systems.

4.7 Statement of Significance

The Tank Stream is significant because it was the reason the First Fleet settlement was established in Sydney Cove, and therefore influenced the future shape of Sydney over two centuries. It is linked in the public mind with the period of first European settlement and retains value as an iconic representation of that period and is interpreted as a metaphor of the period of contact and early urban settlement in Australia.

The Tank Stream itself has retained an identity through the functional changes from being a fresh water supply, through subsequent use as combined sewer and stormwater drain to its current function as a stormwater drain. It is an important survivor of the first period of organised and integrated water management in an Australian city. The stone-cut water tanks, which may survive archaeologically, are important symbols of the reliance upon water in the colony, both in absolute terms and as an indication of the fragility of the European presence in Australia.

The surviving fabric documents mid-nineteenth century sanitation design and construction, and subsequent changes in methods and also the theory of urban wastewater management. This evidence is preserved in the drain enclosing the Tank Stream, in physical evidence of change, and may also be present archaeologically in buried parts of the Tank Stream line.

The archaeological evidence of the Tank Stream has the potential to contain deposits that can contain information about pre-human and pre-urban environments in Sydney, Aboriginal occupation and early non-indigenous occupation of Sydney. The fabric enclosing the watercourse demonstrates one of the most comprehensive collections of hydrological technology in Australia.

The sections of the former Tank Stream south of King Street that survive have potential for retaining evidence of the earliest periods of its human use, although this is likely to have been severely compromised by development. The swampy source of the stream may provide evidence of past environmental conditions.

4.8 Grading of Significant Elements

4.8.1 Levels of Significance

Various aspects and components of the item make differing contributions to its overall significance. These differing contributions can be related to a number of factors, including:

- Relative age
- Original quality
- Degree of intactness and general condition
- Extent of subsequent modifications
- Association with important people or events
- Ability to demonstrate a rare quality, craft or construction process
- Contribution to the overall architectural imagery and spatial composition

Individual elements are identified within a graded system of values to rank their differing contribution to the overall cultural significance of the item and site. These grades of elements are as follows:

- ***Exceptional Significance*** –Element makes a VITAL contribution to the overall significance of the place.
- ***High Significance*** –Element makes a CONSIDERABLE contribution to the overall significance of the place.
- ***Medium Significance*** –Element makes SOME contribution to the overall significance of the place.
- ***Low Significance*** –Element makes RELATIVELY LITTLE contribution to the overall significance of the place when compared to other elements or aspects.
- ***Intrusive*** –Element is a disruptive influence to the overall significance, or an inappropriate later addition which obscures a clear understanding of the original nature of the place and its evolutionary development.

This grading has been established as a planning tool, to assist in developing appropriate conservation measures for the treatment of the item fabric and the grounds.

Each level generates different requirements for retention, conservation and adaptation. This is discussed further in the Chapter 8.0 –*Conservation Policies*.

In general, good conservation practice encourages the focussing of change or upgrading of an historic asset to those areas or components that make a lesser contribution to significance. The areas or components that make a greater or defining contribution to significance should generally be left intact or changed with the greatest care and respect.

Elements of Exceptional and High Significance essentially define the character and important qualities of the historic item.

Elements of Medium or Low Significance may be regarded as being of peripheral importance within the overall identity of the item or place. They contribute to the significance, but do not define the essential character which can be appreciated by the wider community.

4.8.2 Schedule of Significant Elements

Identified elements and components of the Tank Stream have been individually assessed and are graded in the table below.

Table 4-1 Grading of Significance of individual elements

Element	Significance	Comment
Line of the Tank Stream	State significant for its historical associations and community values	Whole line from swamp source to outlet, as demonstrated by above ground evidence such as paperbark trees, low point in landscape, toponyms

Element	Significance	Comment
Stream bed and banks	State significant for its archaeological potential and as demonstration of the former shape of the 'pristine' stream	Survival is likely to be haphazard only
Evidence of Aboriginal occupation – pre-European contact	High local significance for its archaeological research value, but of state significance for its symbolic connection to the history of contact	Survival is likely to be haphazard only
Water source from arrival of First Fleet into early 19th century. Includes stream, ground tanks, water control measures.	State significant for association with First Fleet, and early colonial settlement, - historical, archaeological, symbolic	Survival is likely to be haphazard only Parts of the tanks may survive below ground
Evidence of activities in vicinity of stream in early European period – rubbish dumping, drains, ad hoc use	High local significance for its research potential and demonstrating major aspects of the history of the stream	Survival is likely to be haphazard only
Creation of formal drainage system in mid 19th century – oviform drain, connections to other drains – pipe and evidence for construction	State significant as early formal water management system, historical value and archaeological value in revealing how the drain was built. State significant for the 'line' of the drain.	Survival verified in sections only, later replacements tend to obliterate earlier evidence, but this is not certain The line has had a number of additions and changes, the classification refers to the original construction only
Subsequent changes and additions to the drain channel.	State significant – those relating to the period prior to 1950. Local significance – those sections constructed from 1950 onwards. Little significance – those sections added in 1988 or subsequently.	Distinction based on construction date relates to the availability of source material to understand the Tank Stream's development, and also the strong aesthetic character of the earlier sections
Substrate and surrounding soils	Variable – see comments	Substrate and soil is only significant where it contains evidence of former stream bed and bank formation. Adjoining soils may include archaeological deposits from other significant sources but these need to be ascertained case by case
Fill over drain	Local significance - Fill over the drain that has remained undisturbed since the mid 19th century. Nil significance – fill that has been disturbed by reworking or redeposition since 1900.	The date of fill may be difficult to ascertain, and should be assumed to be of local significance until demonstrated otherwise

Element	Significance	Comment
Airspace over stream	State significance – visual identification of lowest point in landscape Nil significance – airspace volume above Tank Stream alignment	
Toponyms, names of businesses etc	Local significance	
Memorials, sculpture, interpretation	Local significance	

5 HERITAGE MANAGEMENT FRAMEWORK

This section outlines the relevant legislative and policy management framework applying to the Tank Stream. It outlines the Commonwealth, State and Local government heritage management systems, specifies relevant Sydney Water policies and environmental management affecting the Tank Stream and details the community organisations with an interest in the Tank Stream.

5.1 Introduction

In addition to consideration of Commonwealth and State legislation and local government delegated legislation, community attitudes and expectations impact conservation policy. Certain non-statutory controls and impacts affect the management, use and development of Sydney Water's heritage assets. Sydney Water is also seeking to demonstrate innovation and best practice in self-regulating heritage management.

5.2 Australian Statutory Context

Australia's natural and cultural heritage is protected by State and Commonwealth legislation. Current reform of the national heritage regime will clarify the responsibilities of the Commonwealth government with respect to managing national heritage, that is, places of heritage of significance to the whole of Australia. The Commonwealth government is also responsible for meeting Australia's international obligations for protection of World Heritage through the World Heritage Convention. New South Wales manages the State's significant heritage, and local governments have delegated management responsibility for heritage of significance to the local area through the environmental planning and land use system.

5.3 Commonwealth Law

5.3.1 Australian Heritage Commission Act 1975

Section 22 of the *Australian Heritage Commission Act 1975* (AHC) establishes the Register of the National Estate. (RNE) The RNE is defined in Section 4 of the *AHC Act 1975* as 'those places, being components of the natural environment of Australia, or the cultural environment of Australia that have aesthetic, historic, scientific or social or other special value for the future generations as well as for the present community.' The RNE serves as an important resource to identify and promote the conservation of the heritage of Australia, however the Act only imposes legislative constraints on Commonwealth agencies. The Tank Stream is 'registered' in the Register of the National Estate/Interim Register of the National Estate as the 'Tank Stream Tunnel, Pitt Street, Sydney. The listing, made in 1987 is recorded as listing number 014322 and is attached at Appendix B.

As a new Commonwealth heritage regime is being established, the *AHC Act 1975* will be repealed by the Environment and Heritage Legislation Amendment Bill (No. 1) 2002 (Cth) and the Australian Heritage Council Bill 2002 (Cth), as detailed in Section 5.3.3. Sydney Water's management and actions are not constrained as a result of the listing in the Register of the National Estate. The Australian Heritage Commission has no power to regulate Sydney Water's actions that might affect a place on the register.

Further information:

- The tank stream listing in the Register of the National Estate may be searched online at: http://www.ahc.gov.au/register/easydatabase/database.html#legal.

5.3.2 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*) seeks to integrate protection of the environment consistent with principles of ecologically sustainable development. Chapter 5.5.3 addresses the current amendments to the *EPBC Act 1999*. These amendments will widen the scope of that legislation to protect heritage of national significance, as well as of international significance, (world heritage) and regulate the impact of activities on the natural and cultural values of heritage of national significance.

The *EPBC Act* currently deals with matters of national environmental significance, or that are conducted on Commonwealth land or by Commonwealth agencies. Those matters of national environmental significance are defined to include World heritage properties and Ramsar wetlands of international importance. There is potential for application of the current *EPBC Act* in relation to the CMP process where activities are undertaken by Sydney Water affecting a matter of national environmental significance such as a World Heritage listed place or Ramsar wetland of international importance or which has a significant impact on Commonwealth land. The Tank Stream is not affected by the *EPBC Act*, as it is not one of the currently defined matters of national environmental significance.

Further information:

- Download the EPBC Act
- Sydney Water accessible – Sydney Water Corporation Regulatory Database http://connectnet/Apps/window.cfm?app=./regdb/legislation.cfm
- Public – Australian Legal Information Institute (Austli) http://www.austlii.edu.au/au/legis/cth/consol_act/epabca1999588/

5.3.3 Environment and Heritage Legislation Amendment Bill (No. 1) 2002

The Commonwealth Parliament is currently considering new heritage legislation that will identify, conserve and protect places of national heritage significance and regulate the impact of activities on national heritage places. Three bills were introduced, including the *Environment and Heritage Legislation Amendment Bill* (No. 1) 2002, which amends the *EPBC Act*. These Bills establish a National Heritage List, a Commonwealth Heritage List and a new Australian Heritage Council to replace the Australian Heritage Commission. The Register of the National Estate is expected to be retained, managed by the new Australian Heritage Council, to serve in a non-statutory educational and promotional role.

A place will be included in the National Heritage List if the Minister is satisfied it has one or more national heritage values, defined as having aesthetic, historic, scientific or social significance, or other significance, for current and future generations of Australians. The new regime provides protection for places on the new heritage list; contains provisions requiring management plans for nationally-listed places and establishes an approval process in relation to actions that may have a significant impact on a National Heritage

place. If the proposed Bill is passed by Parliament, it is likely that a site of such high significance as the Tank Stream may be considered a site of national heritage significance and listed on the National Heritage List. The actual level of participation of the Commonwealth government, given the State's Constitutional powers, in protecting places of National heritage significance is limited. The Tank Stream CMP may be prepared with a view to the potential future Commonwealth government policy to address the national heritage management principles made under the Act, which are consistent with Sydney Water's heritage management approach and the methodology and content of the Tank Stream CMP.

Further information:

- Commonwealth heritage listings
  http://www.ea.gov.au/epbc/about/amendments/index.html
- Download the draft national heritage management principles
- http://www.ea.gov.au/heritage/law/heritageact/national.html

5.4 State Law

The *Heritage Act 1977* (NSW) (*Heritage Act*) and the *Environmental Planning and Assessment Act 1979* (NSW) (*EP&A Act*) are the primary legislative sources enabling the identification, conservation and management of heritage items in New South Wales.

The *Heritage Act* is specifically concerned with the identification and protection of the State's environmental heritage while heritage planning is integrated within the strategic planning, development control and environmental assessment provisions in the *EP&A Act*.

5.4.1 Primary Legislation

5.4.2 NSW Heritage Act 1977 (NSW)

The *Heritage Act* is concerned with identifying and conserving the environmental heritage of the State of New South Wales. The *Heritage Act* established the Heritage Council of NSW to provide advice to the Minister for Planning on heritage matters and the NSW Heritage Office, to provide technical and administrative support to the Heritage Council. Environmental heritage means those places, buildings, works, relics, moveable objects, and precincts of State or local significance.

The *Heritage Act* defines heritage as the historical, scientific, cultural, social, archaeological, architectural, natural, or aesthetic value of a place, building, work, relic, moveable object or precinct to an area, for an item of local heritage significance, or the State, for an item of State heritage significance.

The *Heritage Act* established the State Heritage Register, (SHR) a list of State significant heritage items in New South Wales and controls activities in relation to the identification, conservation and management of those items. The *Heritage Act* also contains special provisions for government instrumentalities under s.170 and provides specific protection for archaeological relics. Section 140 applies only to unlisted archaeological relics, which are not listed on the State Heritage Register.

State Heritage Register

The Heritage Council considers the impact of change on the heritage significance of an item listed on the SHR or protected under the *Heritage Act* and is the sole consent authority for certain activities under s.60 and s.140 of the *Heritage Act*. The Sydney Water owned State Heritage Register listings resulted from Sydney Water's development of a s.170 Heritage and Conservation Register of heritage assets and an assessment of the level of significance of each item. Further consolidation and review of the Register may result in additional listings, and potentially, removal of listings from the State Heritage Register. There are currently no Sydney Water owned heritage items subject to an interim heritage order or s.136 order to prevent harm under the *Heritage Act*.

The Tank Stream is currently listed on the State Heritage Register under s.31 of the *Heritage Act* under listing number 00636 (formerly permanent conservation order 00636 made in June 1989) Full listing details in Appendix B or at the Heritage Office website at: http://www.heritage.nsw.gov.au/07_subnav_02_2.cfm?itemid=5045604 The boundary of the Tank Stream listing has a curtilage of 3 metres from all surfaces as shown in heavy black on plan catalogued H.C. 1665 in the office of the Heritage Council of NSW and attached in Appendix A.

Impact of State Heritage Register listing

Listing on the State Heritage Register requires Heritage Council s.60 approval to undertake any of the activities that are specified in s.57 (1):

- Demolish the building or work;
- Damage or despoil the place, precinct or land, or any part of the place, precinct or land;
- Move, damage or destroy the relic or moveable object;
- Excavate any land for the purpose of exposing or moving the relic;
- Carry out any development in relation to the land on which the building; work, or relic is situated, the land that comprises the place, or land within the precinct;
- Alter the building, work, relic or moveable object;
- Display any notice or advertisement on the place, building, work, relic, moveable object or land, or in the precinct; and
- Damage or destroy any tree or other vegetation on or remove any tree or other vegetation from the place, precinct or land.

The approval body must, in considering the application, assess the extent to which the proposed activity affects the heritage significance of the item; any representations made on the application and other relevant matters (s.62) An application made under s.60 may be granted partially, conditionally or unconditionally or may be refused (s.63). As the Tank Stream is listed on the State Heritage Register, s.60 approval is technically required from the Heritage Council to undertake any of the activities specified in s.57(1). As discussed in 5.6, there are a number of exemptions to this requirement.

5.4.3 Archaeological Approvals

The *Heritage Act* provides specific provisions to protect archaeological resources not already listed or subject to an order under the *Heritage Act*. A permit under s.140 (or s.60 if the archaeological resource is itself a state heritage item) must be obtained where the proponent suspects a relic will be disturbed (discovered, exposed, moved, damaged or destroyed) by excavation. A relic is any deposit, object or material evidence which relates

to the settlement of the area that comprises New South Wales, not being Aboriginal settlement and is 50 or more years old. (Part 1 (4)).

The Heritage Council may allow the excavation with conditions (s.141(1) (a)) or refuse to issue a permit (s.141(1) (b)). A permit may be revoked or varied once issued. (s.144)

Where the planning stage indicates that an activity affects archaeological sites or areas where archaeological sites may be found, an archaeological assessment must be prepared, in accordance with the *Archaeological Assessments* Guideline in the *NSW Heritage Manual* and issued by the NSW Heritage Office. The Archaeological Assessment will determine the significance of potential archaeological remains, the impact the proposed works will have and a recommendation regarding the need for an excavation permit.

The legislative system and procedure of obtaining archaeological approvals, like the impact of the SHR listing on these requirements are explained in detail in the Chapter 5 of the CMP Manual.

5.4.4 Activities exempted from approval

There are various mechanisms to accredit processes or plans that will minimise the requirement for Sydney Water to obtain approvals and permits from the Heritage Council for its operations. These relate to minor works or activities which will have a minimal impact on the heritage significance of an item. The Minister may make an order, gazetted under the *Heritage Act*, which exempts an activity or class of activities, or persons or class of persons from the requirement to obtain approval under the *Heritage Act*.

Sydney Water may rely on a set of universal exemptions made under the *Heritage Act* which apply to items listed on the SHR. Sydney Water may also rely on a set of universal exceptions that apply to unlisted non-Aboriginal archaeological relics. Unique to Sydney Water are a set of agency specific 'exceptions' in force. These may also be supplemented by 'site specific' exceptions which may apply to sites listed on the SHR.

When making changes to a heritage place

The *Heritage Act* provides for standard exemptions from the requirement to obtain approval under s.57(1) when making changes to sites listed on the State Heritage Register. The exemptions are made under s.57(2) of the *Heritage Act*. On 7 March 2003 the Minister for Planning revoked all existing standard exemptions and granted new exemptions under Section 57(2) from Section 57(1) of the *Heritage Act*. The new exemptions relate to:

- maintenance and cleaning; repairs;
- painting;
- excavation;
- restoration;
- development endorsed by the Heritage Council or Director of the Heritage Office;
- minor activities with no adverse impact on heritage significance;
- non-significant fabric;
- change of use;
- new buildings;
- temporary structures;
- landscape maintenance;
- signage;
- burial sites and cemeteries;
- compliance with minimum standards and orders;

- safety and security and
- movable heritage items.

Any works done pursuant to the exemptions must be carried out in accordance with NSW Heritage Office guidelines including '*The Maintenance of Heritage Assets: A Practical Guide'* 1998, '*Movable Heritage Principles 2000'* and '*The Heritage Council Policy on Managing Change to Heritage Items*.' (Not yet released) The exemptions state, "any thing done pursuant to the exemptions must be specified, supervised and carried out by people with knowledge, skills and experience to the work."

The exemptions do not apply to anything affecting relics, places, items or sites of heritage significance to Aboriginal people, or affecting traditional access by Aboriginal people. Sydney Water is able to utilise the standard exemptions from gaining approval to make changes to a heritage place listed on the State Heritage Register or when excavating any land in NSW which may disturb an archaeological relic. Some of the activities, including excavation, require the Director of the Heritage Office be notified that the exemption will be relied upon, and the Director must indicate satisfaction that the activity meets the exemption. Full details of the exemptions, and notification and schedule of activities requiring notification, are available at:

http://www.heritage.nsw.gov.au/bnav05_index.htm.

When excavating land:

In some circumstances an excavation permit may not be required when disturbing or excavating land in NSW:

Sydney Water can rely on universal general exceptions, made under s.139(4) of the *Heritage Act* which except Sydney Water from the requirement to obtain an excavation permit (under subsection (1) and (2) of s.139) from the Heritage Council when undertaking certain general activities including those relating to:

- Demolition and Maintenance of Bridges (not listed on the State Heritage Register;)
- Underground Utility Services (not listed on the State Heritage Register);
- Active Underground Domestic Services;
- Foundations of Standing Buildings;
- Monuments and Grave Markers; and
- Survey Marks.

An order detailing specific exceptions relating to the protection of relics may also be gazetted. The Heritage Council has gazetted a set of archaeological 'exceptions' under s.139(4) of the *Heritage Act* in relation to Sydney Water. These apply in addition to the general standard exceptions. The organisation is exempted from the requirement to obtain an excavation permit from the Heritage Council when undertaking a set of specific activities:

- Local excavations;
- Trench excavations;
- Destruction of common assets;
- Emergency works.

On 7 March 2003, exceptions to subsections (1) and (2) of section 139 of the *Heritage Act* were also gazetted which provide that: for excavations or disturbance of land where an archaeological assessment has been prepared demonstrating little likelihood of disturbance of relics, or where the disturbance will have minor impact or where the excavation involves the removal of fill deposited on the land, then an excavation permit is not required. To meet this exemption, the applicant must write to the Director and be notified that the director is satisfied the activity meets the exemption.

Conservation works specified in a Conservation Management Plan

The exemptions provide for the preparation of a conservation management plan, submitted to the Heritage Council of NSW for endorsement under clause 18 of the *Heritage Regulation 1999*. Standard Exemption No. 6 of the Schedule of Exemptions to Subsection 57 (1) of the *Heritage Act* made under subsection 57(2) exempts the proponent from approval for specific conservation works endorsed by the Heritage Council, that is, development identified as exempt development by a conservation policy or conservation management plan endorsed by the Heritage Council of NSW. Sydney Water is not required to provide notice to the Director of the Heritage Council when it is relying on this exemption.

Site specific exemptions/exceptions

In addition to the general exemptions and archaeological exceptions and Sydney Water agency specific exemptions, site specific exemptions also apply to the Tank Stream.

These were made in June 1989 under s.57(2) at the time of the original listing and specified that the following activities be exempted from s.57(1):

"Sydney Water Board's operational and maintenance requirements which could involve some modification to inlets, provided that such modifications do not significantly affect the historic fabric or integrity of the Tank Stream. Eradication of noxious plants and animals."

The full set of exemptions and exceptions made under the *Heritage Act* are listed in full at www.heritage.nsw.gov.au. Site specific exemptions, however, are attached to the State Heritage Register listing record for that site. The exemptions sit on top of each other, and provide Sydney Water with the authority to pursue its operational works which do not negatively impact the significance of the Tank Stream, without delay.

Heritage Agreements

Another mechanism which provides for the administration of the *Heritage Act* in an efficient and strategic manner is through heritage agreements. The *Heritage Act* provides for the entering into of heritage agreements under s.39 of that Act. The Minister may, in consultation with the Heritage Council, enter into a heritage agreement with Sydney Water in relation to the conservation of an item listed on the State Heritage Register. Heritage agreements may cover a range of matters, including the exemption of specified activities of a specified kind from Part IV of the *Heritage Act*, that is, the controlled activities and approvals provisions. The agreement continues with the transfer of title to the land.

5.4.5 Minimum Standards of Maintenance and Repair

The *Heritage Act* specifies minimum standards of maintenance and repair of items listed on the State Heritage Register. The minimum standards are detailed in the Heritage Regulation 1999, made under s.118 of the *Heritage Act*. A CMP endorsed by the Heritage Council may provide that one of the minimum standards will not apply, or alternately the plan may impose additional standards for the maintenance and repair of the item.

The minimum standards apply to buildings, works and relics listed, or within a precinct listed on the State Heritage Register.

Relevant to the Tank Stream, Sydney Water must inspect to identify maintenance and repairs, carried out at least once every 12 months to ensure compliance with section 119, clauses 12-17 of the Act and once every 3 years in respect to the standards set out in clause 17. The standards require security measures appropriate to the site and essential maintenance and repair including taking of measures to maintain a stable environment for in situ archaeological relics and maintenance and repair of structural elements, fixtures and fittings.

Heritage management by government agencies

The *Heritage Act* imposes specific obligations on government instrumentalities (as defined by the Act) who manage a significant collection of heritage assets on behalf of the public. Section 170 of the *Heritage Act* requires Sydney Water to identify, conserve and manage heritage owned, occupied or controlled by Sydney Water.

Sydney Water has kept a Heritage and Conservation Register made under s.170 of the *Heritage Act*. (S.170 Register) since 1987, when the *Heritage Act* was amended to include this section. The s.170 Register must include items subject to an interim heritage order or listing on the State Heritage Register, or identified in an environmental planning instrument. The s.170 Register must also include items that are not currently identified on a statutory heritage list but are considered to be of heritage significance to the agency. Heritage assets include moveable and natural heritage items, and items of significance to indigenous communities. The s.170 Register is required to be accessible to the public and reviewed regularly. A substantial review of the Sydney Water s.170 Register concluded in 2001.

Amendments to the *Heritage Act* in 1998 required government instrumentalities to effectively manage, rather than simply identify, heritage assets. The *Heritage Act* prescribes that Sydney Water must give the Heritage Council 14 days advance notice of its intention to remove an item from the s.170 Register, transfer ownership, cease to occupy or demolish any item listed on the Register. Sydney Water has voluntarily adopted standard management guidelines which apply to items listed on the s.170 Register to comply with the due diligence requirement.

The Tank Stream has been listed on the Sydney Water s.170 Register since 1987. (State Heritage Inventory Number 4573709, refer full details of Register in Appendix B.) The listing boundary is specified as the physical limits of the enclosing structures which contain the stream. In compliance with s.170 Sydney Water must maintain the Tank Stream with due diligence and in compliance with, (if notified of the release of, by the Heritage Council or the Minister), government heritage asset management guidelines and principles.

Section 170 requires Sydney Water to notify the Heritage Council of any intention to transfer ownership, cease to occupy (use) or demolish the Tank Stream.

Further information on the NSW Heritage Management System

- Public accessible - Visit the website of the NSW Heritage Council/NSW Heritage Office at http://www.heritage.nsw.gov.au/ for guidelines and policies.
- Download the *NSW Heritage Act 1977 (NSW*) at the Government of NSW Legislation Home Page, http://www.legislation.nsw.gov.au/
- Sydney Water accessible – Sydney Water Corporation Regulatory Database http://connectnet/Apps/window.cfm?app=./regdb/legislation.cfm
- S.60 and S.140 permit application forms may be accessed at http://www.heritage.nsw.gov.au/bnav05_index.htm

5.4.6 Environmental Planning and Assessment Act 1979 (NSW)

The *Environmental Planning and Assessment Act* 1979 (*EP&A*) governs land use planning in NSW. In relation to heritage, the *EP&A Act* requires environmental assessment of development proposals, provides for the inclusion of provisions relating to

heritage conservation in environmental planning instruments and provides for environmental impact assessment processes.

Environmental Planning Instruments

Environmental Planning Instruments (EPI) specify the State and local statutory development control framework and the provisions of environmental planning instruments are law. The *EP&A Act* provides for the creation of State Environmental Planning Policies, (SEPPs) Regional Environmental Plans (REPs), Local Environmental Plans (LEPs) and Development Control Plans (DCPs). LEPs are made by local government, usually contain a schedule of items of environmental heritage in the area to which the LEP applies and may include clauses dealing with conservation of items of environmental heritage. Works likely to affect a listed heritage item will typically require development consent from the local council. The local council may also require the preparation of a CMP to accompany any development application, preparation of a statement of heritage impact and archival and photographic recording mechanisms.

SEPPs and REPs are made by the State government. SEPPs are concerned with matters of significance for environmental planning for the State, however SEPPs may also deal with specific planning matters as well as broad policy. The Department Infrastructure Planning and Natural Resources (DIPNR) is currently reforming the plan making practice through the PlanFirst project, which involves replacing the above plans with State planning policies, regional strategies and local plans.

Development Consent and Environmental Impact Assessment

Where development consent is required under Part IV of the *EP&A Act*, the environmental assessment provisions of that part will apply. This requires a consent authority to consider the provisions of any relevant environmental planning instrument, including development control plans and consider the likely impacts of that development, including environmental impacts on both the natural and built environments.

A development application made by or on behalf of the Crown must not be refused consent or have conditions attached, without the written approval of the Minister for Planning. Some building work by the Crown does not require development consent, however must be certified by or on behalf of the Crown that is complies with the technical provisions of the State's building laws, that is, the Building Code of Australia.

Certain environmental planning instruments provide exemptions from the requirement to obtain approval from local councils. Relevant to Sydney Water are the provisions of the *Environmental Planning and Assessment Model Provisions 1980* (EP&A Model Provisions), and the *State Environmental Planning Policy No. 4 – Development Without Consent.* (SEPP 4). The *EP&A Act* Model Provisions serve to exempt authorities such as Sydney Water from obtaining local government approval for certain works. This includes the need to obtain consent for any development at or below ground level. Sydney Water is generally exempted this way however the individual local government provisions must be identified through consultation with the local government heritage planner as the heritage protection clauses of an LEP may not follow the *EP&A Act* Model Provisions.

SEPP 4 exempts certain development from the requirement to obtain development approval. For example, Clause 9 exempts the applicant from obtaining approval to alter a building or work, however this does not apply to heritage items, archaeological sites or conservation areas. Clause 11(1) of SEPP 4 exempts certain classes of Sydney Water activities (such as the construction of sewage treatment works, development consisting of emergency work and development consisting of routine maintenance) from the

requirement to obtain development consent from a local council (where consent is normally required under an Environmental Planning Instrument). However Clause 11E(2) provides that this exemption does not apply if the emergency or maintenance work involves demolition of a building or work listed as a heritage item in any EPI.

Where Sydney Water is not required to obtain development consent from a local council, the environmental impact of its activities will still need to be evaluated. Where development consent is not required under the relevant environmental planning instruments, then the potential impact of the activity on the environment is assessed under Part V of the *EP&A Act*.

Section 111 of the *EP&A Act* imposes a duty on determining authorities (public authorities) to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity. Clause 228 of the Environmental Planning and Assessment Regulation 2000 requires the determining authority to, among other things, consider 'any affect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historic, scientific or social significance or other special value for present or future generations.'

Sydney Water, as determining authority, may determine to assess the environmental impact by preparing a statement of environmental effects, (SEE) a review of environmental factors, (REF) or an Environmental Impact Statement. (EIS) The Department of Planning and Transport assesses Sydney Water development proposals which are permissible without development consent and are likely to significantly affect the environment, requiring preparation of an EIS.

Tank Stream Local Environmental Management

The Tank Stream may be impacted by the activities of Sydney Water, and the activities of other local and state government organisations and development carried out by the private sector, in a variety of ways. The local planning instruments are outlined below, however analysis of the application of these instruments to entities other than Sydney Water, which may still impact the Stream, is beyond the scope of this CMP.

Central Sydney Planning Controls (or City Plan) provide the urban planning framework for the development and conservation of the city of Sydney. The Council of the City of Sydney is the consent authority for development applications except where the Central Sydney Planning Committee is the consent authority for major development. The authority's City Plan comprises a set of environmental planning instruments made under the *EP&A.* These comprise the Central Sydney Local Environmental Plan 1996; Exhibition of Draft City of Sydney Local Environment Plan 2002; Central Sydney Heritage Local Environmental Plan 2000 and the Central Sydney Development Control Plan 1996.

Central Sydney Local Environmental Plan/Heritage Local Environmental Plan

The Central Sydney LEP 1996 provides for several land use zones in the City of Sydney. These zones include city centre, city edge, residential, maritime and transport and parks and community places. The objectives of each zone are specified in Part 3 Zoning, of the Central Sydney LEP. The majority of the Tank Stream route is zoned City Centre, although it is also impacted by the parks and community places and maritime and transport zones. The development objectives of the city zone include the facilitation of the conservation of items and areas of heritage significance. (clause 18(i)) The zoning also provides that development consent is not required for development listed as exempt development in the *Central Sydney Development Control Plan 1996 Amendment No. 10* 1996 (DCP), however development consent is still required for heritage items.

The current relevant heritage planning instrument affecting the Tank Stream is the *Central Sydney Heritage Local Environmental Plan 2000* (Central Sydney HLEP 2000) which repeals the previous *Central Sydney Local Environmental Plan 1992 – Conservation of Heritage Items.*

The purpose of the plan is to conserve the heritage of the City of Sydney, integrate heritage conservation into the planning and development control process and ensure that any development does not adversely affect the heritage significance of the heritage items or of heritage streetscapes.

Sydney City Council has an existing interpretation program launched in 2000, a sculpture by Lynne Roberts-Goodwin, which communicates the historical value of the Tank Stream. In five separate sites, linear blue light glass modules identify the old watercourse and inscriptions record the voices of early settlers. The City of Sydney has strong sense of ownership in the conservation and management of the Tank Stream. Current initiatives to interpret the heritage of the city include the current virtual water history exhibition: http://www.cityofsydney.nsw.gov.au/waterexhibition/. This website explores the history and meaning of the Tank Stream and associated elements, such as the Tank Stream Fountain, at Alfred Street, which is dedicated to “all the children who have played around the Tank Stream.”

The Tank Stream Tunnel and Tanks, King Street to Circular Quay, (No 41 CSHI No 7001) is listed on Schedule 3 Archaeological townscape/landscape items of the Central Sydney HLEP 2000, as shown in Appendix B. Associated elements recognised by Sydney City Council include the Tank Stream Fountain and Tank Stream Way.

The Central Sydney HLEP 2000 provides that the consent authority may grant development consent on a potential archaeological site only if it has considered an assessment of how the proposed development would affect the conservation of the site and any relic known or reasonably known to be located at the site. (Clause 14) A potential archaeological site is defined as a site known to the consent authority to have Aboriginal or non-Aboriginal archaeological potential having regard to the Archaeological Zoning Plan for Central Sydney, the City of Sydney Cultural Heritage Database (City of Sydney Archaeological Resource) and the Aboriginal Heritage Information Management System (AHIMS). The HLEP 2000 requires development consent for activities specified in Clause 7(1) of the HLEP. Development consent is not required by this clause if the proposed development is consistent with a plan of management prepared for any item, including the Tank Stream, listed in Schedule 3 of the HELP. Development consent is also not required if the proposed development is maintenance or of a minor nature, and in the opinion of the Council, will not adversely affect the heritage significance of the heritage item. Clause 14 requires the consent authority to consider an assessment of how the proposed development would affect the conservation of the site and any relic known or reasonably likely to be located at the site.

Sydney City Council are exhibiting a Draft City of Sydney LEP 2002. If made, this LEP will repeal the Central Sydney HLEP 2000. The draft LEP integrates the currently Central Sydney HELP 2000 in its entirety, in ‘Part 6 – Heritage Provisions.’

Archaeological Zoning Plan

In 1992, the City of Sydney issued an Archaeological Zoning Plan for the city. This identified and documented to a basic level the remaining below ground archaeological resource in the city. The Plan identified areas within Central Sydney which contain archaeological potential. The zoning plan has no legal status, and is an advisory document. The zoning plan found that only 5 to 10% of the surveyed area identified some

archaeological potential. The plan found that “of this percentage, the areas of high archaeological potential (AAP) located in the most significant historical area account for approximately 2% of the total resource. This area is defined as the Tank Stream catchment area, the area of initial European settlement and contains unique evidence relating to the development and transformation of Sydney.

5.5 Sydney Water Corporation Legal Framework

Sydney Water as a Statutory State Owned Corporation is affected by a wide range of NSW statutes, relevant to water, regulatory, environment and corporate governance. The principal equal objectives of Sydney Water, as prescribed in the *State Owned Corporations Act* 1989, are to be successful businesses, to exhibit a sense of social responsibility and to conduct their operations in compliance with the principles of ecologically sustainable development. (ESD)

The Corporation’s enabling legislation is the *State Owned Corporations Act* 1989 and the *Sydney Water Act* 1994. The *Sydney Water Catchment Management Act* 1998 (SWCM Act) constituted the Sydney Catchment Authority, a statutory body, to own and manage catchment sites. The *Independent Pricing and Regulatory Tribunal and Other Legislation Amendment Act* 2000 establish IPART as the regulator of NSW utilities. IPART is responsible for making recommendations to the Portfolio Minister on Sydney Water's Operating Licence in respect to the granting, transfer or cancellation of the licence, terms and conditions and annual and day to day compliance with the licence.

5.5.1 Other Relevant Legislation

Regulatory controls affecting heritage assets can be imposed through other NSW legislation including but not limited to:

- National Parks and Wildlife Act 1974;
- Water Management Act 2000;
- Sydney Water Act 1994;
- Protection of the Environment Operations Act 1997;
- Local Government Act 1993

National Parks and Wildlife Act 1974 (NSW)

The *National Parks and Wildlife Act* 1974 (NPW Act) regulates the creation and operation of National Parks, Nature Reserves and other specified areas. This Act is the principal NSW legislation dealing with the management of Aboriginal heritage. It contains provisions to protect Aboriginal objects and places and regulates the taking of native fauna and flora throughout the State.

The NPWS is also concerned with recognising contemporary Aboriginal associations and connections to the landscape. This includes associational links for which there is no surviving physical evidence and continuing relationship of Aboriginal culture to the land.

If a proposed activity requires the removal or destruction of Aboriginal objects then one or more permits under s.87 and/or s.90 will be required. Consultation with NPWS is required at all stages of project planning and assessment.

The NPWS administers AHIMS. AHIMS replaces the NSW Aboriginal Sites Register and contains information on Aboriginal objects, places and heritage values in NSW, that are

known to the NPWS. Search requests are processed by NPWS for a fee as specified at the NPWS website at http://www.npws.nsw.gov.au/culture/ahims/htm.

The surrounds of the Tank Stream may contain objects subject to the NPWA, therefore any activities requiring the removal or destruction of Aboriginal relics require approval under either the NPWA or from the NPWS.

Sydney Water Act 1994

Section 44 of the *Sydney Water Act 1994* (*Sydney Water Act*) provides that, where Sydney Water infrastructure is located on land not owned by Sydney Water, provides, by creating a covenant, that owners must avoid any other structure or action that may compromise the operation of such infrastructure. Section 46 of the *Sydney Water Act* provides for the removal of trees and shrubs that interfere with infrastructure, without creating a covenant. Section 46 of the *Sydney Water Act* overrides tree preservation orders and environmental planning instruments, but not orders under the *Heritage Act* 1977 and the *National Parks and Wildlife Act* 1974, or similar State law.

Section 38 of the *Sydney Water Act 1994* lists all of the stormwater system management activities including:

- Deal with the physical works [section 38(1)(a)], inspect land and buildings to deal with works [section 38(1)(h)], inspect works [section 38(1)(i)];
- Move pipes [section 43];
- Open public roads and reserves [section 42];
- Remove trees that interfere with infrastructure [section 46]

In carrying out many of these activities, Sydney Water must consider the environmental impact of its activities including the requirements of the *Heritage Act* and the *EP&A Act.*

Protection of the Environment Operations Act 1997

The Environmental Protection Authority (EPA) established under the *Protection of the Environment Administration Act 1991* regulates Sydney Water. Sydney Water is required to manage Sydney Water's stormwater system and runoff from Sydney Water land to minimise pollution of receiving waters. The NSW Government has established a Stormwater Trust to support improved urban stormwater quality management practices and to provide for a co-operative approach between various stormwater managers and interested parties. In 1998 Sydney Water was directed by the EPA to work with local councils to prepare catchment-based stormwater management plans and to evaluate potential stormwater management practices (both non-structural and structural).

Sydney Water was also required to establish a stormwater environmental improvement program containing Sydney Water's obligations arising out of the management plans. The program aimed to define roles and responsibilities with respect to stormwater management, evaluate proposed Sydney Water management actions and develop a program of works for stormwater to provide environmental protection. Sydney Water is currently investigating opportunities for dechanellising some of its concrete drainage systems and restoring previously channellised creek lines. At present, Sydney Water works to maintain the hydraulic capacity of the stormwater systems under its control to facilitate efficient drainage of the catchment areas.

5.5.2 Non-Statutory Context

Non-statutory considerations include government policies and professional charters and the expectations of interest groups and the community.

5.6 Australian Heritage Policy and Charters

5.6.1 NSW Government Total Asset Management Manual 2001

The Government's total asset management policy (TAM) relates to the strategic management of physical assets to support the delivery of agency services. TAM is part of a planning framework through which the government achieves its social, environmental and financial service outcomes by efficient means. It requires detailed plans for the management of assets that are to be acquired, maintained or disposed of. The TAM policy states that the management of heritage issues is an integral part of the management of assets and that the sustainable management of heritage values should be treated as core agency business.

The *Heritage Asset Management Guideline* recommends the preparation of a CMP, integrated with the agency's overall asset management strategy.

Further information:

- The Total Asset Management Manual is published by the NSW Government Asset Management Committee (GAMC) at http://www.gamc.nsw.gov.au/tam2000

5.6.2 Department of Urban Affairs & Planning and NSW Heritage Office NSW Heritage Manual

The Heritage Manual, published in 1996, and updated as required, is a procedural government manual outlining the system of identification, assessment and management of heritage within NSW. Of particular relevance are the guidelines relating to 'Conservation Management Documents' and 'NSW Government & Heritage' which seek to provide further policy advice on the s. 170 provisions of the *Heritage Act.* The Heritage Council recommends preparation of a Conservation Management Plan for items of State significance.

Further information:

- The Heritage Manual is published at the NSW Heritage Office website - http://www.heritage.nsw.gov.au/bnav04_subnav_02.htm

5.6.3 The Burra Charter: the Australia ICOMOS charter for the conservation of places of cultural significance 1999.

The Burra Charter expresses the principles of heritage conservation in Australia. It sets the benchmark for the conservation and management of places of cultural (heritage) significance and is widely adopted and influential in Australia. The Burra Charter can be applied to all types of places of cultural significance including natural indigenous and historic places with cultural values. Conservation practice is underpinned by three concepts; do as much as necessary to care for a heritage item, changing as little as possible to retain its significance: that any changes to a heritage item should be honest and that any change should be compatible with the cultural significance of the item. Australia ICOMOS has also published guidelines to accompany the Burra Charter. The

guidelines cover 'Conservation Policy', 'Cultural Significance' and 'Procedures for undertaking studies and reports.'

Further information:

- The Charter and guidelines are published by Australia ICOMOS and are available online at: http://www.icomos.org/australia/

5.6.4 The Australian Natural Heritage Charter – for the Conservation of Places of Natural Heritage Significance 2002.

The *Australian Natural Heritage Charter* is published by the Australian Committee for the International Union for the Conservation of Nature and Natural Resources (now known as the World Conservation Union) and is based, in structure and logic, on the Burra Charter. The Natural Heritage Charter adapts sustainable development principles, including the precautionary principle and the principle of intergenerational equity and is accepted as the authoritative charter for natural heritage conservation.

Further information:

- The Charter is published by the Australian Heritage Commission and is available online at http://www.ahc.gov.au/infores/publications/anhc/

5.6.5 Ask First: A guide to respecting Indigenous heritage places and values. (Cth) and the Aboriginal Cultural Heritage Standards and Guidelines Kit (NSW)

The *Ask First* consultation guidelines are designed to complement the Burra Charter and the Natural Heritage Charter, in providing principles and guidance with respect to the conservation and management of places with indigenous heritage values. *Ask First* provides a different emphasis in allowing the relevant Indigenous people to determine the significance of places in accordance with their culture before moving to achieve agreements on how places and heritage values should be managed. NPWS has issued Guidelines and Standards for Aboriginal heritage conservation. These are currently out of print and are being extensively revised and amended. The guidelines provide a best practice standard for the conduct of archaeological surveys for Aboriginal relics and determining Aboriginal cultural associations and values of places.

Further information:

- NPWS has developed draft Aboriginal Heritage Impact Assessment Guidelines currently on exhibition for public consultation: http://www.npws.nsw.gov.au/culture/draft_aboriginal_heritage_assessment_guidelines.pdf

5.7 Sydney Water Policies and Environmental Policy

Sydney Water plays a key role in managing Sydney's water resources and protecting the environment by providing water, wastewater and some stormwater services. The organisation sees its role as stewards of the total water cycle and natural environment. Sydney Water's ultimate corporate goal is to achieve triple bottom line reporting, that is, measuring the social and environmental performance of the organisation as well as the economic performance. Valuing and managing significant cultural and natural heritage is an integral part of Sydney Water's environmental responsibilities.

5.8 Ecologically Sustainable Development

The *Protection of the Environment Administration Act 1991* states that ESD can be achieved through application of four principles: the precautionary principle, inter-generational equity, conservation of biological diversity and ecological integrity and improved valuation and pricing of environmental resources. (s.6(2) (a)-(d)). ESD requires the effective integration of economic and environmental considerations in decision making processes. (s.6(2)) to achieve 'development that improves the quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.'

Further information (Sydney Water accessible):

- Sydney Water ESD Policy: http://connectnet/content/Policies/ESD/commitment.cfm
- Sydney Water ESD Indicators: http://connectnet/content/Policies/ESD/draft_esd_ind.cfm
- Sydney Water Towards Sustainability Report
- http://connectnet/content/Reports/TSR.cfm?ID=1258

5.8.1 Environment Plan 2000 - 2005

The Sydney Water five year Environment Plan sets the targets to achieve its environmental objectives and timetables for compliance of those objectives. Sydney Water's environmental management objective is to protect the environment by conducting its operations in compliance with the principles of ESD. One of Sydney Water's environmental objectives is to responsibly manage all of its land and water assets, achieving this through responsible management of items of heritage significance, natural resources and contaminated sites.

Further information (Sydney Water accessible):

- Sydney Water's 2000 – 2005 Environment Plan http://connectnet/content/Plans/pdf/envplan.pdf

5.8.2 Corporate Heritage Strategy 2002 - 2006

Sydney Water has adopted a corporate heritage strategy to set the direction for heritage management. A suite of actions are proposed, which revolve around achieving a set of key objectives which include developing an organisational culture which celebrates heritage, integrating heritage and operational issues and integrating heritage and ESD. This Strategy was endorsed by the Sydney Water Board of Directors in June 2002 and has been submitted to the Heritage Council of NSW.

5.8.3 Moveable Heritage Policy 2003

Sydney Water has developed a Moveable Heritage Policy and Procedures Manual which outlines a process for the acquisition and management of moveable heritage; the legislative framework governing moveable heritage management; collections development, collections management and conservation policies for the moveable collection and museological practice advice. The policy observes that moveable heritage is an important component of the organisations heritage collection and recommends that the Sydney Water s.170 Heritage Register must ultimately include moveable heritage and that CMPs can assist to identify movable heritage within its context.

5.8.4 Aboriginal Heritage Policy

Sydney Water prepared an internal policy for the protection of Aboriginal heritage. The policy provides interpretation of the *National Parks and Wildlife Act 1979* (NPW Act) and the *Environmental Planning and Assessment Act* 1979 (EP&A Act) in relation to the protection of Aboriginal heritage, and the heritage assessment and approvals processes. The policy also guides consultation with Aboriginal people and provides some policy advice on protecting significant sites.

5.8.5 Environment Management System

The Sydney Water Environmental Management System (EMS) is a management system, which ensures that all of Sydney Water's environmental legislative, corporate, and policy requirements are integrated into Sydney Water operations and implemented. The EMS is based on the international standard ISO14001. The objective of the EMS is to provide a basis for continual improvement in environmental performance through a 'Plan-do-check-act' process. The EMS will link the varied Sydney Water management systems and plans in one accessible management system. Heritage management is to be integrated into this system, including procedures developed from the conservation management plan process.

Further information (Sydney Water accessible):

- Sydney Water Environment Management System
  http://connectnet/content/msf/ems.cfm?ID=1414

5.9 Community Stakeholders

There are a number of community based conservation organisations which have an interest in heritage and other conservation organisations that have an active interest in the environmental performance of Sydney Water. Organisations such as the National Trust of Australia and the Institution of Engineers Heritage Committee, are among Sydney Water's primary stakeholders, and are also members of the Heritage Council sub-committee which is providing guidance to Sydney Water's heritage program and CMP Project.

The main forum for heritage stakeholder consultation is the Sydney Water Heritage Committee, a quarterly committee that has representation from the NSW Heritage Office, National Trust of Australia (NSW) and the Institution of Engineers. This longstanding committee is primarily focused on strategic issues, however, it is a forum for discussion of major site-specific issues.

5.9.1 National Trust of Australia (NSW)

The National Trust of Australia (NSW) is a community organisation that acquires, conserves and presents, for public benefit, lands and buildings of aesthetic, historic, scientific, social or other special values. The National Trust also maintains a Register of heritage items. Listing does not impose any additional statutory obligations, however is widely recognised as an authoritative judgement on the heritage significance of a place. The 'The Tank Stream' is classified as a heritage item by the National Trust of Australia (NSW), listed on the Register of the National Trust of Australia (NSW). Listed in 1985, the classification boundary is the extent of the present course of the Tank Stream, as shown in Appendix B.

5.9.2 Institution of Engineers (Australia)

The Institution of Engineers is a professional organisation established to support engineers and promote the profession. Engineering Heritage Australia (EHA) is the national body within the organisation responsible for implementing the Institutions concerns related to engineering, industrial and technological heritage. The organisation manages the Australian Historic Engineering Plaquing Program and the National Engineering Oral History Program. The Tank Stream is not currently listed in the Schedule of Australian Historic Engineering Plaquing Program.

Further information:

- Engineering Heritage Australia homepage and link to the plaque register, at http://www.ieaust.org.au/about_us/sig/eha/

5.9.3 Royal Australian Institute of Architects (RAIA)

The RAIA is a national association established to advance the profession of architecture. The RAIA Register of Significant **20th Century** Architecture is published online, and focuses on modern architecture. The Tank Stream is not listed on the RAIA Register.

5.9.4 Other Stakeholders

The Professional Historian's Association (PHA) was established to represent practising qualified historians. The PHA publishes an electronic heritage register, of places and objects of historical significance in NSW and the ACT, the *Register of Historic Places and Objects (ROHPO)*. The Tank Stream is not listed on the PHA Register. The Register is published online at the PHA website:

http://www.phansw.org.au/Publications/rohpo.html

The Royal Australian Historical Society (RAHS) runs an outreach program to NSW historical societies and a list of the local societies is published at the RAHS website: http://www.rahs.org.au/list.html. The Tank Stream itself and items associated with the Tank Stream are represented on the RAHS plaquing program.

5.10 Sydney Water's Heritage Conservation Goals

Sydney Water's broad conservation goals are outlined in the Heritage Strategy outlined in Section 5.8.2 of this report, -Corporate Heritage Strategy 2002 - 2006. A key element of that Strategy is that '*legislative compliance will be the minimum standard.*' The information outlined above sets out the minimum compliance requirements, however Sydney Water as an organisation is striving to move beyond a minimum compliance approach.

Through the better integration of operational and heritage issues, within the context of the ecologically sustainable development principles, Sydney Water is seeking to achieve best practice in both the delivery of water, wastewater and stormwater services and in heritage conservation. This broader goal should be borne in mind when planning works to any heritage asset. Statutory listings that apply to the Tank Stream should be checked when planning works. (See Appendix B for listings).

- Tank Stream listing record from the Register of the National Estate kept under Section 22 of the *Australian Heritage Commission Act* 1975 (Commonwealth) which also be accessed at
- http://www.ahc.gov.au/register/easydatabase/database.html#legal
- Tank Stream listing record from the Heritage Office Database listing the State Heritage Register kept under Section 31 of the *Heritage Act* 1977 (NSW) which may be also be accessed at http://www.heritage.nsw.gov.au/07_subnav_01.cfm
- Tank Stream Listing record on Sydney Water's s.170 Heritage and Conservation Register kept under Section 170 of the *Heritage Act* 1977 (NSW).
- Tank Stream listing on Schedule 3 of the Central Sydney Heritage LEP 2000 made under the *Environmental Planning and Assessment Act* 1979 (NSW) which may also be accessed at: http://www.cityofsydney.nsw.gov.au/catz_ditc_city_plan.asp
- Tank Stream Register listing record kept by the National Trust of Australia (NSW).

6 PRIMARY HERITAGE MANAGEMENT ISSUES

This chapter identifies the key issues arising from the statement of significance and the current management arrangements for the Tank Stream. This sets the context for developing appropriate policies and strategies to address these issues. The issues listed below represent best judgements about the potential risks and uncertainties that may be involved.

6.1 Retention of Significance Issues

The most significant aspect of the Tank Stream is its role in the location of first European settlement at Sydney Cove. While this link is associated with the name of the Tank Stream there are no definite physical remains relating to this stage of its history. While the physical fabric of the Tank Stream in its current form includes fabric of high significance, this is of lesser importance than the association with the First Fleet and the early years of the colony. The social significance therefore requires that this link be announced and developed in other ways.

The issue is to be resolved within an interpretation plan and strategy. This will need to incorporate the public interpretation of specific elements of Aboriginal history and Sydney's early colonial history. This is beyond the scope of the CMP.

The retention of significance of the Tank Stream drain channel and its slightly more expansive network of related infrastructure is relatively straightforward. Specific issues are identified below. Within this the main issue is that there is only poor knowledge of the broader drainage system as developed through the nineteenth century and its survival. The physical fabric of the Tank Stream is reasonably sound and its condition is not likely to compromise significance.

6.2 Built Heritage Conservation

6.2.1 Building and Construction Standards

All building and construction will be done in accordance with the Building Code of Australia and relevant Sydney Water procedures.

6.2.2 Deterioration of Fabric

There is only minor deterioration of fabric.

6.2.3 Repair and Rebuilding

Minimal level of intervention is considered to be the best way to retain as much of the surviving fabric as possible. Consequently, only the fabric that is dysfunctional should be repaired, and only the fabric that is beyond the state of repair should be removed and replaced.

In cases where the intervention is necessary, the Burra Charter advises that the new work be readily identifiable from the original on a close inspection. The repairs and replacements should not attempt to mimic the existing original.

6.2.4 Health and Safety Concerns

As a confined space the Tank Stream presents hazards to operators and members of the public who visit on tours. The main issues identified are:

- Build up of gases and the need to flush these prior to access;
- Confined spaces concerns such as provision of alternate exits;
- The need to restrict scheduled entry at times because of the potential for flooding of the Tank Stream.

These only impact upon heritage issues with respect to meeting the need for continued maintenance and because public access to the tunnel is a desirable means of interpreting the site. A full OH&S audit will be required to identify all safety issues before the reinstatement of public tours. This is identified in the Policy Section of this document Section 7.4.2.

6.3 Functional Issues and Requirements of the Sydney Water Corporation

6.3.1 Existing and Short Term Use of the Item

The Tank Stream currently acts as a stormwater drain for a small catchment to the north of Martin Place. When there is heavy flow in the Harrington Street sewer line, leading to the Bondi Ocean Outfall, there can be release of sewage into the lower Tank Stream. Where the Tank Stream experiences heavy flows it can divert excess water to the Bennelong Outfall Sewer. No identified change is planned for this arrangement.

6.3.2 Long Term Uses and Upgrades Envisaged

The potential for flooding of the Tank Stream has been identified as an issue of concern to Sydney Water. No specific plans have been made for how to solve this issue.

6.4 Ownership and Control of Land

6.4.1 Identification of owners/controllers

The documentation regarding easements and conditions of access on Sydney Water files indicates that there are inconsistencies in the placement and wording of easements on the many individual property titles that cover the line of the Tank Stream.

This CMP recommends that all easement provisions are reviewed and updated, and that they should include reference to a buffer along the line, and approximating the eventual SHR curtilage. For this to be of most benefit there should be a re-evaluation of the Tank Stream heritage curtilage.

6.5 Engineering and Scientific Heritage Issues

6.5.1 Preservation of Scientific Significance

Refer to Section 6.7 for discussion of research significance of the site. Policies in response to this aspect of significance include identifying opportunities for investigation through the *Heritage Act* relics provisions, and the retention of significant heritage relating to the Tank Stream.

6.5.2 Engineering Heritage Issues

The Tank Stream has been used for all three aspects of water utility – drinking water, sewerage and stormwater drainage. The physical fabric reflects the amalgamation of changes made to accommodate these changing roles, and especially major replacement

of existing sections with contemporary 'best practice' construction. Therefore the Tank Stream is an important example of evolving engineering practice to meet social expectations. This is identified in the statement of heritage significance Policies deriving from this aspect of its significance have been developed, requiring that evidence of all stages of historic fabric are retained, and that any new fabric should be distinguishable from the existing material.

6.6 Machinery and Moveable Heritage Conservation

6.6.1 Issues of Machinery Conservation

There are no extant items of machinery identified that relate to the Tank Stream.

6.6.2 Moveable Heritage Issues

There are no extant items of movable heritage identified that relate to the Tank Stream. Sections of the Tank Stream channel have been removed for display in the basement of the GPO Building and at the Power House Museum. These items are no longer in the management or control of Sydney Water.

6.7 Archaeological Issues

6.7.1 Aboriginal

Aboriginal archaeological sites and objects protected by the *NPW Act* may survive in the near vicinity of the Tank Stream. Such survivals will be fortuitous and cannot be predicted in advance.

Any development within the vicinity of the former stream line may contain Aboriginal objects. The three metre curtilage [nominally 10 metres total width including the channel and its walls] may not be wide enough to encompass streamside sites.

The nature of site ownership does not encourage the management of this potential resource in an optimal manner. The rarity of the sites and their uncertain occurrence requires that ground disturbance in areas of potential should minimise the risk of incidental loss of information, ie through open area excavation rather than sondage exposure. Policies for the management of the potential archaeological resource are set out in Policy 7.10.

6.7.2 Historical

The Tank Stream remains operational but some parts of it and the wider system have become defunct. Many of those parts predate systematic plan keeping and, therefore the surviving remains represent the best and sometimes the only source of information about themselves.

There has been no systematic collation of the detailed archaeological evidence of changes to the fabric within the drain that would allow interpretation and the development of a more comprehensive history of change. Policy 7.11 identifies the need to obtain this information, through a detailed archaeological recording of the fabric of the Tank Stream fabric.

Policy 7.11 also sets out the archaeological requirements for recording, assessment and oversight of works that may impact fabric and archaeological evidence. This includes a standard methodology to ensure consistency of information being retrieved.

6.8 Natural Heritage Issues

6.8.1 Management of the Cultural Landscape

The cultural landscape for which the Tank Stream forms a part is unsurprisingly multi-layered and complex. Based upon the statement of significance, this includes a surviving geological pre-human landscape that has a major city as a covering skin. There is also a landscape relating to both Aboriginal and early colonial use of the Tank Stream. These are mental constructs, and take as their evidence place names, topographic features and rare surviving visible elements. The most recent Tank Stream landscape is that of the modern city and its water utilities. This is the one most readily related back to the surviving fabric, but as is clear in the statement of significance it is not more significant than those mentioned earlier. Therefore the management of the cultural landscape of the Tank Stream has to include and develop the conservation of the important aspects of all phases of its history.

This is embedded in the policies arising from the significance of the place, and especially provision made to identify and manage concealed heritage items that may survive, and to interpret the range of heritage values.

6.8.2 Erosion Control

Not applicable

6.8.3 Vegetation Management

Planting of street trees does not currently represent a management or conservation issue.

6.8.4 Management of Animal Species

None identified.

6.8.5 Threatened Species and Endangered Ecological Communities

None identified.

6.8.6 Fire and Fuel Management

Not applicable.

6.9 Community Associations

Community consultation strategy is planned for implementation.

6.9.1 Aboriginal Association

Within the area managed by Metropolitan Local Aboriginal Land Council.

Sydney City Council – existing protocols for representation of Aboriginal heritage issues at urban sites – to be investigated as a part of coordinated community consultation process.

6.9.2 Local Community Associations

The Tank Stream is identified with Sydney's earliest urban history and is regarded as iconic. This sense of 'ownership' by the Sydney community of an important part of its past is to be managed through liaison with the Council of the City of Sydney, public interpretation and recognition of this important context.

6.9.3 Professional Organisations and Other Community Associations

The Tank Stream is identified as an important part of our heritage by professional bodies. In the past such identification has often been based upon an uncritical assertion of the significance of the extant structure. Since the early 1990s with the adoption of more robust assessment of significance this has begun to change. Consequently, this may have served to lower the relative significance of the Tank Stream in its current form as against its historical role by highlighting the lack of physical evidence. This has, however, directed heritage professionals to the complexity of the place, and the need to manage it with a hierarchy of controls.

7 CONSERVATION POLICIES

This section presents conservation policies for the future management and conservation of the Tank Stream. The policies are derived from an analysis of the interaction of the significance of the Tank Stream and the heritage constraints and opportunities that exist in managing this significance.

7.1 Introduction

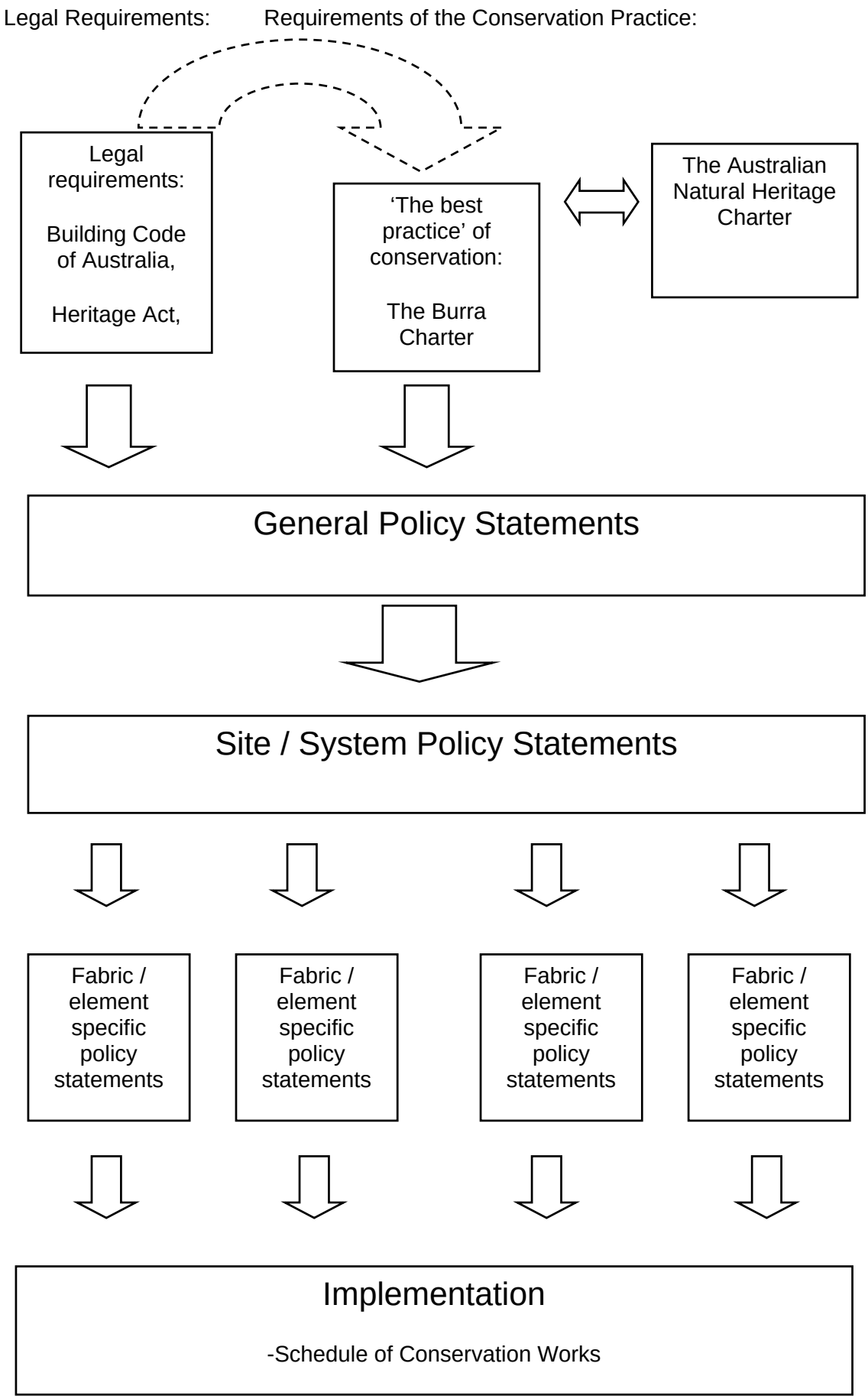
The Conservation Policy Statements presented in this Chapter have been prepared to assist with formulation of the future design approach to the conservation, maintenance and upgrading of the subject heritage item. They relate to both the built elements of heritage items and their setting. Accordingly many of the conservation policies can be taken directly into the process of developing a scheme which responds to the project requirements of Sydney Water while protecting and enhancing the essential characteristics of heritage significance.

Conservation, as discussed above, can be regarded as the management of the process of change and development, seeking to safeguard the important elements of the built environment. As such, it is one of the functions of this document to establish criteria, policies and recommendations for the future use, intervention, development and on-going conservation of the Tank Stream. In this way, the Sydney Water Corporation, as owners and managers of the place will be able to formulate proposals within a known framework of acceptable directions.

The **Policy Statements** have been formulated to guide on-going conservation management and to ensure that the impact on the heritage significance is kept to a minimum. The **Policies** arise from a consideration of the Assessment of Significance and the relevant Management Issues outlined in previous Chapters of this report.

The conservation policies reflect relevant conservation practice, primarily based on the *Burra Charter*, but also reflect the relevant legal requirements. The diagrammatic explanation of relations of the relevant legal and conservation practice requirements and the Policy Statements is shown in the Figure 7-1 (next page).

The *Burra Charter* deals primarily with conservation of the built fabric, and refers to the *Australian Natural Heritage Charter* for specific issues of natural heritage. However, it is a part of the legal system framework, and any decisions made and actions taken also have to comply with the relevant legislative requirements.


Legal Requirements:
Requirements of the Conservation Practice:
Legal requirements:
Building Code of Australia,
Heritage Act,
'The best practice' of conservation:
The Burra Charter
The Australian Natural Heritage Charter
General Policy Statements
Site / System Policy Statements
Fabric / element specific policy statements
Fabric / element specific policy statements
Fabric / element specific policy statements
Fabric / element specific policy statements
Implementation
-Schedule of Conservation Works

7.2 General Policy Statements

This section identifies *Policy Statements* with *Background* and *Interpretation Guidelines*. The *Background* provides a brief context for the *Policy Statements*, the *Policy Statements* establish the basic required conservation principles and tenets, and the *Guidelines* explain application of these.

The *Conservation Policies* cannot cover all contingencies in the longer term. The *Policies* contained in this Conservation Plan have been formulated to guide and invoke a thoughtful approach towards the initial changes. It is anticipated that they will be reviewed every five years.

7.2.1 Application of the Burra Charter

Background

The conservation of the built fabric should be undertaken in accordance with the principles of the *Burra Charter* issued by Australia ICOMOS and revised and adopted in November 1999. These principles and processes are now the accepted national standards for conservation practice in Australia. The most important direct application of the *Burra Charter* is the adoption of its *Terminology* and the Conservation Principles arising from the Charter.

Policy Statement

In dealing with the built fabric, adopt terminology and conservation principles of *The Burra Charter*.

Interpretation Guidelines

1. In dealing with the built fabric, use the terminology and definitions presented in Section 1.8 of *The Burra Charter*.

2. In dealing with the built fabric apply the following Conservation Principles, established in the Articles of *The Burra Charter*:

Cautious Approach	
All conservation work should be based on a respect for the original fabric, should involve the minimum interference to the existing fabric and should not distort the evidence provided by the fabric	*(Article 3)*
Location	
A building or work should remain in its historical location.	*(Article 9)*
Contents	
Contents, fixtures and objects contributing to the cultural significance of a place should be retained at that place.	*(Article 10)*
Change	
The contribution of all periods to the place must be respected, unless what is removed is of slight cultural significance and the fabric which is to be revealed is of much greater cultural significance.	*(Article 15)*
Removed significant fabric should be reinstated when circumstances permit.	*(Article 15)*
Adaptation	
Adaptation is acceptable where it does not substantially detract from the cultural significance of the place and involves the minimal change to	*(Article 21)*

significant fabric.	
New Work	
New work may be acceptable where it does not distort or obscure the significance of a place.	*(Article 22)*
New work should be readily identifiable as such on close inspection.	*(Article 22)*
Use *and* Conserving use	
Where the use of a place is of cultural significance it should be retained and a place should have a compatible use.	*(Article 7)*
Modifying or reinstating a significant use may be appropriate and a preferred form of conservation.	*(Article 23)*
Managing change	
Existing fabric, use, associations and meaning should be recorded before disturbance occurs.	*(Article 27)*
Disturbance of fabric	
Minimal disturbance of fabric may occur in order to provide evidence needed for the making of decisions on the conservation of the place.	*(Article 28)*
Responsibility for decisions	
The decision-making procedure and individuals responsible for policy decisions should be identified.	*(Article 29)*
Direction, supervision and implementation	
Appropriate direction and supervision should be maintained at all stages of the work.	*(Article 30)*
Records	
A record should be kept of new evidence and future decisions and made publicly available.	*(Article 32)*
Removed fabric	
Removed significant fabric should be catalogued and protected in accordance with its cultural significance. Where possible it should be stored on site.	*(Article 33)*

7.2.2 Application of the Australian Natural Heritage Charter

Background

The conservation of the natural environment should be undertaken in accordance with the principles of the *Australian Natural Heritage Charter* published by the Australian Heritage Commission in association with the Australian Committee for the International Union for the Conservation of Nature (ACIUCN) in 1996 and revised in 2002. The principles and processes of *The Australian Natural Heritage Charter* are now the accepted national standards for natural heritage conservation practice in Australia.

The *Australian Natural Heritage Charter* is directly applied through preparation of the Conservation Management Plan in accordance with the *Charter,* particularly the Articles relating to preparation of Conservation Plans (Articles 38-42 of the *Australian Natural Heritage Charter*). The *Australian Natural Heritage Charter* is also applied through the adoption of its *Terminology* and the Conservation Principles arising from the *Charter*, as outlined in the Section 1.9 of this report –*Glossary of Terminology and Abbreviations*.

Policy Statement

In dealing with the elements of natural heritage, adopt terminology and procedural recommendations of *The Australian Natural Heritage Charter*.

Interpretation Guidelines

1. In dealing with the natural environment, adopt terminology of the *Australian Natural Heritage Charter* as presented in Section 1.9 of this document.
2. In dealing with the natural environment, apply the following Conservation Principles, established in the articles of the *Australian Natural Heritage Charter*:

Basis of Conservation	
Conservation work should be based on the assessment of natural significance of a place, and should aim to retain, restore or reinstate that significance. A self-sustaining condition is preferable to an outcome that requires a high level of ongoing management intervention.	*(Articles 2, 3 and 4)*
The conservation process should involve least possible human intervention to ecological, evolutionary and earth processes, and be based on respect for biodiversity and geodiversity.	*(Article 5)*
Conservation Policy	
The conservation policy should determine uses that are compatible with the natural significance of a place and discontinue uses that detract from the significance.	*(Article 9)*
The policy should consider processes that extend beyond the stated boundaries of a place, and their level of impact or influence on the natural significance.	*(Article 10)*
Removal of Elements	
Elements of geodiversity and biodiversity contributing to the natural significance of a place should not be removed unless this is the sole means of ensuring their survival, security or preservation and is consistent with the conservation policy.	*(Article 11)*
The destruction of elements of habitat or geodiversity is unacceptable unless it is the sole means of ensuring the security of the wider ecosystem or the long-term conservation of the natural significance.	*(Article 12)*
Introduced Elements	
The conservation policy should stipulate requirements for longer-term retention, control or eradication of introduced elements, subject to their contribution to the natural significance.	*(Article 13)*
Degraded Natural Ecosystems	
Remnants of natural ecosystems that have suffered degradation beyond recover of their natural integrity may nevertheless have natural significance that should be conserved.	*(Article 14)*
Disturbance caused by extreme natural catastrophic events is not considered to be a degradation unless human modification of the natural environment has contributed to the event or the effects. If conservation decisions are needed after such events, this difference should guide the decisions.	*(Article 15)*

7.2.3 Compliance with the Building Code of Australia

Background

The *Building Code of Australia* defines standards for construction works at the national level. It is also the operative building ordinance in New South Wales for the conservation and re-use of heritage buildings and structures. Many buildings were created prior to its introduction, including most historic structures. These commonly have compliance issues, particularly with fire resistance, egress provisions and hand-railings safety. It is essential that the cultural values of the building or structure are not degraded by inappropriate responses to meeting ordinance requirements.

Policy Statement

Approaches to compliance with building ordinances for the conservation, renovation and restoration should focus on responding to the spirit and intent of the ordinances if strict compliance would be detrimental to the significance.

Interpretation Guidelines

1. Conservation and on-going use programmes should not place undue stress on the built fabric assessed as being of exceptional and high level of significance (see Section 4.7) in order to meet excessive requirements of ordinance compliance.
2. A detailed compliance strategy should be part of any documentation submitted for Development Approval for major alterations and additions.
3. Where issues are unable to be resolved in accordance with the above guidelines, advice should be sought from the Fire, Access and Services Advisory Panel (FASAP) of the Heritage Council of NSW.

7.3 Procedural Recommendations

7.3.1 Appropriate Conservation Skills and Experience

Background

The Burra Charter encourages the use of skilled and appropriate professional direction and supervision from a range of disciplines for conservation activities.

The attitudes, skills and experience and creative approaches taken in the context of a conservation project are quite different to those applied to the design and construction of new buildings. They can complement the skills of other members of a project team. However, the appropriate skills needed include the operational knowledge of Sydney Water staff.

Policy Statement

Respecting the level of significance of the subject heritage item, appropriate conservation skills and experience should be available within the project teams assembled to deal with the conservation and restoration of the historic item, and for all works generally, where significant fabric is affected, including the works prompted by operational needs.

Interpretation Guidelines

Operational, maintenance and property staff responsible for the care of this asset should undergo training in relevant heritage matters.

The list of professionals with appropriate skills and experience assembled to work on the conservation of the subject heritage item could include researchers, archaeologists, architects, structural engineers, building code compliance advisers, materials conservation and restoration specialists and cost planners, as appropriate.

External building contractors and Sydney Water project managers and trades personnel experienced in work on historic buildings should be selected for all works where significant fabric is affected, including the works prompted by operational needs. Where necessary, external contractors should undergo a 'heritage induction' prior to works commencing to the site.

Appropriate direction and supervision should be maintained from Sydney Water internal heritage staff at all stages of the work.

In cases where new works are proposed, professional consultants should liaise with Sydney Water internal heritage staff during the design, documentation and site works phases.

7.3.2 Community Consultation

Incorporating community consultation into the preparation of conservation management plans is considered to represent best practice for heritage conservation. Community consultation provides the opportunity to:

- Identify further historical information that is otherwise not preserved in documentary or physical sources.
- Determine whether the inclusion / exclusion guidelines for NSW Heritage assessment criterion D – 'strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons' are met.
- Recognise community interests that represent constraints or opportunities and therefore should be factored into conservation policies.
- Provide recognition of the community's interest in the conservation and management of heritage items.
- Encourage more positive interaction between SWC and community.

7.3.3 Treatment of Fabric of Different Grades of Significance

Background

The five-tier Grading of Significant Elements attempts to identify the relative contribution that components individually make to the overall significance of the heritage item. The five-tier system of value levels (Exceptional, High, Medium, Low, and Intrusive) is determined by a number of factors, explained in Section 4.8, Grading of Significant Elements. Chief of these is the contribution of the fabric to the identified significance of the item. This may be affected by its integrity and condition, and whether it remains in a context where its significance can be understood. This is especially important for movable heritage items such as machinery.

Policy Statement

The grading of significance as outlined in Section 4.8 is to be used as a planning tool that assists in developing a consistent approach to the treatment of different elements. The various grades of significance are to generate different requirements for retention and conservation of the individual elements.

Interpretation Guidelines

1. Elements and components of the item identified as being of **exceptional significance** should be retained and conserved *in situ*. Any work that affects the fabric or external appearance of these items should be confined to Preservation, Restoration, Reconstruction, or Adaptation as defined by the *Burra Charter*. They should also be subject to continuing care and maintenance. With respect to the Tank Stream no items of exceptional significance are known to survive. An example of an exceptional item would be the early colonial tanks cut into the banks of the stream.
2. The principles for elements graded as having **high significance** should generally follow those for elements of exceptional significance. Restoration and reconstruction of missing elements is the preferred option, subject however to other factors, including safety and feasibility. Options of adaptation, relocation or alteration to these components of the item are acceptable provided that the overall cultural significance is protected.
3. The elements graded as having **medium significance** should generally also be retained *in situ*, where appropriate. However, adaptation, relocation or alteration to these elements is acceptable provided that the cultural significance of the item is protected. Works should be considered and executed within defined programs and should not be the product of general maintenance or sporadic alterations.
4. Elements assessed as of **low significance** provide evidence of long-term use and support the character and overall quality of the place. They have particular qualities that can expand overall interpretive themes, but are generally not regarded as essential to the major aspects of significance of a building or place, often fulfilling a functional role and/or are in poor condition. Both retention and removal are acceptable options, subject to a variety of factors.
5. Elements identified as **intrusive** can reduce or obscure the overall significance of the place, despite their role as illustrators of the site's progressive development. The preferred option is their removal, conversion to a more compatible form or replacement in a way that helps to retain the overall significance of the item. These items need not be addressed immediately. No intrusive items have been identified to date.
6. The *Burra Charter* recommends a minimalist approach be taken in removing fabric graded as of **low significance** or **intrusive**. Action taken should concentrate on protecting and enhancing fabric of greater cultural significance, or allowing practical use of the item.
7. Proposed changes to suit new requirements should ideally be focussed on areas or components with low significance or intrusive elements. Where changes to more significant elements are unavoidable, they should be carefully designed to respect or retain the architectural and spatial features that contribute to the overall significance.

7.3.4 Review of the Conservation Plan

Background

This Conservation Plan proposes a framework for management of heritage issues as part of the proposed long-term management of the subject item. Circumstances, however, will inevitably change over the years as various recommendations are implemented and new requirements emerge.

Conservation Policies need to progressively respond to changing environments and situations if they are to remain relevant and ensure the long-term conservation of an item.

Policy Statement

Conservation Policies should be reviewed prior to major programs of change or upgrading.

Interpretation Guidelines

Reviews of the Conservation Policies should be based on contemporary versions of the *Burra Charter* and other guidelines provided by the NSW Heritage Office and Sydney Water.

Reviews should also take into account any other relevant legislation, planning frameworks, appropriate literature and widely recognised conservation practices and procedures.

Reviews should be undertaken by experienced conservation practitioners, in conjunction with relevant ownership and management representatives. Reviews should be undertaken no less than every five years.

7.4 Health and Safety Issues

7.4.1 Hazardous Material

Background

Prior to commencement of any works to historic buildings, a special inspection of the item is to be undertaken to identify hazardous materials. The most common hazardous materials that could be expected in historic buildings and structures are lead-based paint, asbestos fibre-cement sheeting and hazardous insulation.

In addition to this, special consideration needs to be given to disposition of historic fabric scheduled for removal or storing that may be affected by chemical or biological pollution. It is considered that some of the historic Tank Stream fabric may be affected with chemical or biological pollution as a remainder of periods when the channel was used as a sewer.

Policy Statement

At removal of any historic fabric, tests for chemical, industrial and biological pollution should be carried out on the removed elements, and the affected elements treated appropriately.

Hazardous material should be removed wherever it is considered to be a threat to health of people working on the item. However, the removal should be organised within an overall programme of conservation and executed with minimal impact on significant fabric and the overall heritage significance of the item.

Interpretation Guidelines

1. A thorough check to identify any hazardous materials should be undertaken by skilled Sydney Water personnel prior to commencement of any work.
2. If refurbishment or demolition work is likely to disturb any identified hazardous material, it is to be completely removed prior to commencement of works.
3. Removal of hazardous material should be carried out by authorised professional organisations.
4. Repairs of damage caused by deterioration of hazardous materials should be given a priority among the conservation works.
5. Where appropriate, visible surface texture of a removed hazardous material should be reconstructed after installation of non-hazardous replacement.
6. The removed elements of historic fabric should be tested for chemical, industrial and biological pollution. Any identified industrial, chemical or biological waste shall be disposed of in an adequate manner.

7.4.2 Protection from Fire and Storage of Fuel

Background

Due to the nature of the item, it is envisaged that major components of the Tank Stream have a relatively low degree risk of fire. However, the *Meeting Room*, located in the vicinity of Australia Square, has a higher degree of fire risk and may need upgrade to meet relevant safety criteria.

Policy Statement

An assessment of fire risk should be undertaken to assure compliance of the Meeting Room with the Occupational Health & Safety Act 2000, the Occupational Health and Safety Regulation 2001 and the Sydney Water Health & Safety Policy. The risk assessment should be part of the wider process of identification of the OHS risks.

Interpretation Guidelines

1. A thorough check to identify fire hazards in the Meeting Room area should be undertaken, and an Occupational Health and Safety Assessment should be prepared to ensure that the relevant criteria are satisfied.
2. The risk assessment should be undertaken by skilled Sydney Water personnel, in accordance with the Risk assessment and Project management procedures of the Quality Management system of the Environment and Innovation Division.
3. The Meeting Room in Australia Square should be upgraded to meet the criteria of the relevant legislation, as described above.

7.4.3 Access

Background

Access to the traversable sections of Tank Stream in the current situation is limited to maintenance and repairs crew inspections and occasional visits by members of the public attracted by the historic significance of the item.

The Tank Stream Operations Handbook (1994) covers all aspects occupational health and safety of the Tank Stream tours. This document was reviewed by Workcover in January 1993. The document has since been reviewed in 2002. I

It is estimated that the current access regime is generally adequate to the needs of the identified stakeholders, including the wider public, however there is a demand to open the traversable sections more often to the wider public.

The vehicular access regime is assessed as suitable, taking into account the relatively easy accessibility of the traversable sections and the nature of the item. Again due to specific nature of the item, it is assessed that disabled access to the traversable sections of the item cannot be provided within reasonable level of costs and with an appropriate safety level.

Policy Statement

Maintain the current access regime in general. Investigate possibilities for public open days to be organised on a more regular basis. If there are proposed changes to the current access regime the Tank Stream Operations Handbook will be reviewed and audited by Workcover.

Interpretation Guidelines

1. Maintain the current access regime to the site including the safety measures applied to the Meeting Room.
2. Identify public interest and investigate possibilities for organising public open days on a more regular pattern.
3. Should there be proposed changes to the current access undertake a review of the Operations Handbook and arrange review and audit by Workcover.
4. Disabled access cannot feasibly be provided to the Tank Stream.

7.5 Retention of Significance

Background

Tank Stream represents a unique item in Australia, being associated with the earliest stages of development of the city of Sydney, and some of its most important features, including, among others, the first bridge in Australia and the location immediately chosen for the city of Sydney.

The significance of the item comprises primarily social and historical aspects, and is therefore not limited to its fabric. This is emphasized through the fact that the character of the creek that formed the original Tank Stream was essentially lost as early as the 1820s, when it was transformed into a sewer.

It is therefore estimated that major part of the significance of the item will be preserved in historic documents and literature, which can be contributed to through better presentation of the item to the wider public. However, conservation of the surviving historic sewer fabric is also important, due to its ability to interpret the established significance.

Policy Statement

The Tank Stream should be retained and conserved in ways that protect and enhance the features and characteristics that define its cultural significance. Conservation should be undertaken in the context of the on-going use and sensitive development of the item as a stormwater channel. The entire length of the Tank Stream should be considered when planning for conservation.

Interpretation Guidelines

1. The surviving historic Tank Stream fabric should be retained and conserved. This includes primarily the segments created in the 19th century.
2. Retain and conserve Tank Stream as a stormwater channel.
3. Explore ways to present Tank Stream to the general public, including visitors of the Sydney CBD and tourists, that do not rely upon access below ground.
4. Identify the conservation needs of the entire Tank Stream route.

7.6 Built Environment

7.6.1 Conservation of Significant Built Fabric

Background

One of the key objectives of contemporary conservation practice is that as much as possible of the significant original fabric of a structure or place should be retained and conserved in order to preserve the essential integrity of the heritage resource for future generations.

While any conservation, alteration or upgrading activities will affect the built fabric in some way, the aim is to minimise the work necessary through responsible reuse and management planning. In this way, the authenticity of the item will be retained as much as possible and the impact on the overall significance minimised within a process of evolutionary change and good maintenance practice.

The existing built fabric of Tank Stream is generally in good condition, with some damage caused by tiring of the fabric, as evidenced by the CCTV survey and site inspection. This primarily refers to wearing of the render lining and, occasionally, washing out cement joints between sandstone blocks and bricks, but also broken stone as evidenced in the vicinity of Hunter Street.

Generally, the historic channel retains the majority of its built features, although it underwent significant alterations and important segments of its original fabric were replaced.

Policy Statement

In the context of the overall project, surviving segments of the historic built fabric shall generally be retained and conserved in accordance with the levels of significance identified in Chapter 4 – Grading of Significant Elements of this Conservation Plan.

Interpretation Guidelines

Generally

1. Retention and conservation of that fabric identified as being of high or medium significance should be a priority in future works.
2. Where significant elements need to be removed, they should be relocated to an appropriate position, or catalogued and carefully stored on the site of development.
3. All future work undertaken should be based on a respect for the original fabric, where it survives, and should involve the least possible physical intervention.
4. No future work to the item should negatively impact on the significant fabric elements and spaces.
5. Where new alterations or repairs of the historic segments are required, new materials should closely match or be sympathetic to the original. However, it is important that new work be distinguishable from the original on close inspection.
6. Decayed fabric that is not likely to cause on-going deterioration should not be repaired if by doing so the ability to successfully interpret various stages of use is degraded.

Conservation of Stonework and Brickwork

1. A regular maintenance programme should conserve all of the original stonework and brickwork.
2. Original (internal) face stonework and brickwork surfaces should remain unpainted and un-rendered.
3. Inspect the historic built sections regularly for evidence of damage and water penetration, and repair as required. Missing or damaged sections should be repaired or reconstructed, using stone and brick as appropriate to match the original elements in size, colour and texture.
4. Where replication of the damaged original or early fabric is not acceptable for operational reasons (like in the case of part of the terra-cotta inverts), these may be replaced with modern elements of different fabric.
5. For repairs and reconstructions of the historic built sections, only hydraulic mortar should be used.
6. Internal rendered and painted surfaces should continue to be painted in appropriate colours where there is reliable evidence of original paint.

7.6.2 New Services and Upgrading to Suit Contemporary Use

Background

The Tank Stream is an operating stormwater system and will remain operational in the foreseeable future. This implies a number of requirements, including that the system has to remain available for connection, current and new. The most sensitive areas to make new connections are the old sandstone sections.

Flooding regularly occurs in at least three points along Tank Stream, at King Street between George and Pitt Streets, Curtin Place and Bond Street, partly due to the fact that in case of overflow of the Bennelong outfall system, the catchment area of Tank Stream increases significantly. It is therefore estimated that a need for urgent repairs or upgrading may emerge in the upcoming years.

In spite of the occasional overflows, uneven flow capacity of different segments and the generally recognized under-capacity of Tank Stream, no new services or upgrades are anticipated. This is due to the fact that on incorporation of Sydney Water, under the legislation still current, the provision of draining services was taken over by the local government –in this case the City of Sydney.

It is estimated that security services may need to be upgraded in the future, particularly the entrance to the Meeting Room in Australia Square. While the details of this upgrade are not known at this stage, it is estimated that they will not affect any of the significant fabric identified, but are likely to be limited to the door to Curtin Place and the adjacent area.

Policy Statement

Any eventual repairs or upgrading of the flow capacity should be based on respect for the historic fabric and aim to create the required supplementary capacity through additional installations rather than replacement of the surviving significant fabric.

The modification of existing services or installation of new services in general is considered acceptable, provided that it respects the integrity of the original significant fabric.

Investigate security upgrade measures required and apply as required, providing that installation of the new services does not affect the surviving significant fabric.

Interpretation Guidelines

1. New connections can be added to modern sections of the Tank Stream where necessary.
2. New connections should be avoided in the historic stone sections. Where new connections to these sections are unavoidable, prior to commencement of works an approval should be obtained from the NSW Heritage Office.
3. Where new connections to the historic brick oviform sections are necessary, they may only be performed in accordance with the section 8.1.1 of this CMP –*On-going Operational Requirements*.
4. Should repairs or upgrading of the flow capacity be required, they are to be implemented through installation of additional pipes and detours, allowing preservation of the surviving historic fabric.
5. Should such a need emerge, assess possibility to create new drainage system connecting King Street to Darling Harbour, effectively reducing the Tank Stream catchment area and reducing the potential overflow risk.
6. Should such a need emerge, investigate possibilities for amplification of Tank Stream capacity through installation of pumping or siphon system, especially in the Bridge Street area.
7. Identify required security upgrade measures to be applied. Prior to installation of any new services, request an assessment of impact of the works proposed to the surviving significant fabric from the Sydney Water heritage adviser.

7.7 On-going Maintenance

Background

The historic fabric deteriorates due to the affects of time, weather and use. To ensure the on-going conservation of significant fabric, a regular maintenance schedule should be implemented, providing for regular inspection and remedial action where necessary.

Policy Statement

The significant original fabric of the structure should be conserved through the implementation of an on-going cyclical maintenance programme. Prevention of continuing deterioration should take priority over widespread repair or reconstruction.

Interpretation Guidelines

1. All heritage assets will comply with the Minimum Standards of Maintenance and Repair as outlined in the Heritage Regulations 1999.
2. The services and built fabric of the residence and site features are to be subject to continuing care and maintenance as set out in the On-going Maintenance Schedule.
3. In addition to regular maintenance activities, prompt preventative action and repair should be undertaken as necessary, and executed with the greatest care towards protecting the original significant fabric. No maintenance work or repairs should negatively impact on significant fabric.
4. Inspect all stormwater drainage within the Tank Stream; ensure adequate drainage from the structure, followed by the appropriate remedial works.
5. Inspection and maintenance works should be conducted by external contractors and Sydney Water project managers and trades personnel experienced in work on historic buildings and with experience in work with particular materials applied. The inspections should be conducted at one time for the whole length of the Tank Stream.
6. It is desirable to use a consistent methodology to conduct the inspections, within limits of technological feasibility. A hand-held CCTV inspection of traversable sections and a self-driven CCTV inspection of non-traversable sections are required. The preferred way to inspect the sections in the vicinity of the Circular Quay, flooded by seawater, is to engage SCUBA divers, if feasible.
7. The On-Going Maintenance Schedule should be reviewed and updated every five years to coincide with a review of the Conservation Plan, or subsequent to major programs of upgrading and re-use.

7.8 Engineering Heritage and Scientific Significance

7.8.1 Engineering Heritage Protection

Background

Some significant elements of engineering heritage were identified, including the access chamber covers, and the flat valves. The surviving access chamber covers are representative of various periods of creation, and feature distinctive design and inscriptions. The flap valves preventing discharge of gases from the drains and sewers were used all over the city area, but were otherwise rather uncommonly applied on stormwater drainage installations.

Policy Statement

Significant elements of engineering heritage, including historic access chamber covers and flat valves, should generally be preserved *in situ*. Should an element be removed due to deterioration of its fabric beyond repair or due to a public health and safety issue, the removed element should be recorded for archival purposes.

Interpretation Guidelines

1. The surviving flap valves shall be preserved *in situ*. Should further retention of an element become impossible then prior to its removal the element should be recorded for archival purposes and the record deposited with the Sydney Water Archives.
2. All access chamber covers shall be assessed for compliance with the relevant public and occupational safety legislation, primarily the *Occupational Health and Safety Act*, as applied under the *OHS Regulation* 2001. Elements scheduled for removal should be recorded for archival purposes and the record deposited with the Sydney Water Archives.
3. The removed historic elements should be stored at an allocated location in accordance with instructions of the Sydney Water Heritage Advisor and in accordance with the SWC Moveable Heritage Policy and Guidelines.

7.8.2 Conserving the Scientific Significance

Background

Scientific significance of Tank Stream is partly derived from construction techniques of creation of the channel and partly from the unique utilisation methods developed for the historic channel, particularly the introduction of terra-cotta floor elements in the stone built profiles, allowing self-cleaning of the sewer.

An important part of this aspect of significance is embossed in the historic plans and drawings, currently stored in the Sydney Water Archives, Sydney Water Plan Room and several other institutions, including the Mitchell Library, the City of Sydney Archives and the State Archives of NSW.

Policy Statement

Surviving historic plans and drawings of Tank Stream should be preserved in the SWC Archives collection. Other archives and libraries should be investigated further for documents on the Tank Stream.

Interpretation Guidelines

1. Preserve the surviving historic plans and drawings of Tank Stream currently stored with Sydney Water Archives.
2. Further investigation should be undertaken to clarify location of documents held by other archives and libraries in Sydney. The plans retrieved should be reviewed, copied and copies collected and stored with Sydney Water Archives.

7.9 Moveable Heritage and Machinery

7.9.1 Protecting Moveable Elements of Heritage Significance

There are no movable items identified.

7.9.2 Conserving the Machinery

There are no machinery items identified.

7.10 Archaeological Resources

7.10.1 Recording Archaeological Fabric

Background

Much of the relevant archaeological information on the Tank Stream is included in the earlier archaeological reports. This information of previous recordings should be collated and made available.

In the future, Tank Stream fabric should be recorded wherever resources permit, and reports of these recordings should be included in the collection.

Policy Statement

Copies of previous archaeological reports concerning the Tank Stream should be systematically collated and made available in the SWC Library. The Tank Stream should be archeologically recorded where resources permit, and any eventual reports added to the collection.

Interpretation Guidelines

1. Collate all earlier archaeological reports concerning the Tank Stream and make available through the SWC Library.
2. Wherever resources permit, archeologically record the Tank Stream, and assure that any reports eventually created are added to the collection, including reports of future works in the immediate vicinity of the Tank Stream.

7.10.2 Prehistoric (Aboriginal) Archaeological Resources

Background

Sites of Aboriginal archaeological potential are protected under clauses of the *NSW National Parks and Wildlife Act 1974*.

Policy Statement

Any potential Aboriginal archaeological resources within the Tank Stream curtilage should be conserved in accordance with the requirements of the *NSW National Parks and Wildlife Act* 1974 and their potential for interpretation considered.

Interpretation Guidelines

1. An archaeological assessment should be undertaken prior to any works below ground level, in accordance with the relevant provisions of the *NSW National Parks and Wildlife Act* 1979. This should identify the likelihood of the survival of pre-European and pre-1857 deposits, which may then contain Aboriginal objects.
2. Wherever technically feasible, works to this site should avoid areas of high archaeological potential or significance.
3. Consultation with the Metropolitan Local Aboriginal Land Council will be required prior to any proposed disturbance of identified areas of archaeological significance.
4. Should disturbance be required to areas of archaeological potential or significance, an application under section 90 of the *National Parks and Wildlife Act* will be required for this disturbance.
5. Any archaeological resources must be managed in accordance with the recommendations arising from the archaeological assessment and any approval issued by the National Parks and Wildlife Services.
6. In the event archaeological material is unexpectedly discovered during any works to this site, work shall immediately cease in the affected area and the National Parks and Wildlife Service will be contacted for advice.

7.10.3 Historic (European and Aboriginal) Archaeological Resources

Background

Sites of Historic archaeological potential are protected under clauses of the *NSW Heritage Act 1977*.

Policy Statement

Any potential archaeological resources on the property should be conserved in accordance with the requirements of the *NSW Heritage Act* 1977 and their potential for interpretation considered.

Interpretation Guidelines

1. An archaeological assessment should be undertaken prior to any works below ground level, in accordance with the relevant provisions of the NSW Heritage Act 1977. This should identify any archaeological evidence relating to the period prior to or concurrent with the construction of the Tank Stream drain and assess the significance of that evidence.
2. Wherever technically feasible, works to this site should avoid areas of high archaeological potential or significance.
3. Should disturbance be required to areas of archaeological potential or significance, an application under section 60 of the *Heritage Act* will be required for this disturbance.
4. Any archaeological resources must be managed in accordance with the recommendations arising from the archaeological assessment and any approval issued by the NSW Heritage Council.
5. In the event archaeological material is unexpectedly discovered during any works to this site, work shall immediately cease in the affected area and the Heritage Office will be contacted for advice.

7.11 Natural Heritage

There are no identified natural heritage issues.

7.12 Waste Minimisation

7.12.1 Stockpiling and Reuse of Construction Materials

Background

Historic fabric elements removed during construction works may be usable for eventual repair and maintenance works. It is assumed that this was often the case in the past, when sandstone blocks removed from the city area drains were stored in the Matraville Depot, and that the storing capacity still exists.

Policy Statement

At removal of any historic fabric, its suitability for reuse should be assessed. The material assessed as suitable should be stored in an appropriate manner and reused for further repairs.

Interpretation Guidelines

1. During intervention into surviving historic fabric, remove the fabric carefully and assess its suitability for reuse.
2. Any historic fabric removed and assessed as suitable for reuse should be stored at Matraville Depot.
3. When intervention into surviving historic fabric is necessary, check with Matraville Depot for previously removed historic fabric that is suitable for reuse in minor and major repairs.

7.12.2 Disposal of Waste During and After Works

Background

There is existing legislation and a developed Sydney Water Policy for dealing with waste.

The *Sydney Water Waste Minimisation Policy*, consistent with the principles of Ecologically Sustainable Development (ESD) (as defined in the Protection of the Environment Administration Act 1991 and as stipulated in Sydney Water's ESD Policy Statement), aims to:

- State a vision of how Sydney Water shall minimise its production of waste (referred to as 'waste minimisation' in this Policy) wherever possible; and
- Fulfil obligations, with respect to waste minimisation, under Sydney Water's special objectives, section 22 of the Sydney Water Act 1994 ("the Act"), and Sydney Water's 2000-2005 Environment Plan.

Policy Statement

Disposal of waste during and after works should be undertaken within the existing *Sydney Water Waste Minimisation Policy.*

Interpretation Guidelines

1. All waste material and disposal activities will be in accordance with the provisions of the PoEO Act, 1997, the WARR Act, 2001, and the EPAs Waste Assessment Guidelines.
2. Where feasible, waste is to be recycled. If recycling is inappropriate, waste is to be removed to an authorised waste disposal depot.
3. Removal and disposal of all hazardous wastes on site in accordance with state and national regulations and guidelines and best practice for the removal of these materials.

7.13 Social Environment

7.13.1 Management of Social Values

Background

The key aspect of heritage significance of Tank Stream is the social aspect. As described in the Statement of Significance in the Sydney Water's Section 170 Heritage Register, *the concept of the Tank Stream has evolved by association with major events and processes in the Australian history, into a remarkably strong IDEA that is not necessarily related to the existing fabric*.

It is considered that the preferred way to manage the social significance of the item is its interpretation, as means of communication with the wider public. It is also considered that the interpretation should be associated with the idea rather than the fabric.

Policy Statement

The interpretation of the Tank Stream should seek to establish and convey its significance and this should be based on the various ways the item is valued. This will require both interpretation of the place as an element of Sydney's Aboriginal and historical landscape and as an iconic site in its own right.

Interpretation Guidelines

1. Develop an Interpretation Plan for the Tank Stream defining strategic and tactical ways to present the historic item and its significance to the wider public. During the process, particular consideration should be given to the social aspect of its significance and its position within Aboriginal and European history.
2. Should public access be further restricted greater emphasis should be placed on interpretation for the public via other means (publications, signage etc)

7.13.2 Conserving the Significance for Contemporary Aboriginal Community

To be developed as part of a comprehensive consultation strategy

7.13.3 Conserving the Significance for Professional and Local Community Groups

Background

The purpose of interpretation at heritage places is to reveal and explain their significance and to allow that significance to be understood by visitors. It may additionally promote an

understanding of Sydney Water's history and corporate responsibilities, the development of the local area or other relevant explanatory contexts.

Policy Statement

Conservation and on-going use of heritage items should include interpretation of their role in the development of the locality, history of Sydney Water and in Australian history.

Interpretation Guidelines

Fundamentally interpretation must be founded upon significance as established by the statement of significance. As significance will not necessarily reside only in the fabric of a place the methods of interpretation need to be able to convey historical, social, aesthetic and other values which may be complex and not readily evident in the item, parts of its fabric or immediate locality.

The key significance of the Tank Stream is identified below:

Table 7-1 Key Aspects of Significance.

Significance	Demonstrated by evidence
Place of first European settlement	Topography and Locality – including proximity to other early colonial sites Early illustrations and maps of Sydney showing Tank Stream
First source of drinking water	No tangible evidence except name Location of tanks approximately known
Representation as a small freshwater stream	Route identified through occasional toponyms, some incidental interpretation Paperbark trees at corner of Elizabeth and Park Streets
Survival of Aboriginal sites within CBD	No current displays No place names No visible sites
Open water channel converted into covered drain	Sandstone floor and arch south of Curtin Place entrance – accessible by tours Remnant sections in GPO basement display Knowledge of former stream route
Evolving water utilities as Sydney changes	Evidence of change in below-ground section Changing access chambers reflecting different stages of development

The major historical themes it represents are listed below. Those for which the Tank Stream is either the major representative or which are the key themes for the agency are highlighted.

Table 7-2 Key Historical Themes

National theme / sub-theme	State theme / local theme	Major theme
2.3 Coming to Australia as a punishment	Convict - Using convicts for public works	√
3.4 Utilising natural resources	Utilities - Accessing natural aquifers	
3.4 Utilising natural resources	Utilities - Controlling rainfall run-off	
3.11.5 Establishing water supplies	Utilities - Urban drinking water systems	√
3.14 Developing an Australian engineering and construction industry	Technology	
3.14 Developing an Australian engineering and construction industry	Technology - Developing service infrastructure and assets	
4.2 Supplying urban services	Utilities - The Sydney Water supply	√
4.2 Supplying urban services	Utilities - Sydney stormwater	√
4.2 Supplying urban services	Utilities - Sydney sewage and sanitation	

These themes should be emphasised in any interpretation and opportunities to link the Tank Stream with other places representing the same theme should be explored.

7.13.4 Existing interpretation

The existing interpretation of the Tank Stream consists of some unobtrusive street sculpture, unobtrusive street signage, toponyms and mention in historical literature. There is a recently constructed fully equipped visitor access gallery, owned by Sydney Water, in Curtin Place, which is used infrequently. The street signage and sculptures were placed by City of Sydney Council and heritage bodies. A section of the Tank Stream is also on display at the old GPO site.

There is a high demand to access the Tank Stream as evidenced by regular enquiries for tour positions. The Tank Stream features prominently in school education about Australian history.

7.13.5 Future interpretation opportunities and issues

The most significant aspects of the Tank Stream either do not survive or are represented off-site in an ephemeral and uncoordinated manner. The Tank Stream drain itself is of considerable historical significance and its fabric tells an interesting story of changes in response to Sydney's water needs over 150 years.

There has been a considerable investment in providing visitor access to the Tank Stream. This needs to be assessed for conformity with confined spaces and other OHS legislation. There is a sustained public interest and this is supported by school curricula that cover some of the Tank Stream's historical context.

The existing interpretation on the surface is piecemeal, difficult to find and fails to comprehensively identify and convey the significance of the place.

Key stakeholders for the Tank Stream would include Metropolitan Local Aboriginal Land Council, Council of the city of Sydney, Historic Houses Trust (who manage other early colonial properties in Sydney CBD) and the general public.

Interpretation Guidelines

1. The Tank Stream should be included in a comprehensive interpretation strategy for the agency, based on the identified historical themes and established significance.
2. Because of its role in Aboriginal and early colonial Sydney opportunities for interpretation within these contexts need to be pursued and encouraged.
3. As a key geographical feature that contributed to the way that Sydney grew, consideration should be given to enhancing its visibility to street level pedestrians.
4. Public tours should continue to be offered where this is feasible. Opportunities exist in the interim to examine and develop solutions to the access and OHS issues and to streamline access arrangements.

7.14 Controls on Intervention

Background

In accordance with Article 3 of the *Burra Charter* conservation is to be based on a respect for the existing fabric of a place and should involve minimal physical intervention in order not to distort the evidence provided by the fabric.

Policy Statement

Intervention into building fabric for non-conservation purposes should generally be restricted to approved programmes of re-use, or to upgrading of service areas and facilities.

Interpretation Guidelines

Limited intervention for exploratory or research purposes, particularly to determine appropriate processes for repair and conservation is acceptable.

Intervention into the building fabric for non-conservation purposes should be restricted to approved programs of re-use, or to upgrading of services and facilities. Intervention should not be detrimental to the original fabric. The upgrade of services and facilities is permissible, provided they do not detract from overall heritage significance of the item. Intervention into any building fabric should respect the integrity of the extant material, and be limited in extent to the minimum required by the proposed works.

Any intervention into original fabric should be controlled by project managers and executed by trades personnel experienced in work on historic buildings.

8 IMPLEMENTATION OF THE PLAN

This section presents the policies for the implementation of the Tank Stream Conservation Management Plan, within the Sydney Water Environmental Management System. This chapter outlines conservation works and maintenance schedules and policies for the interpretation of the Tank Stream.

8.1 Item Management Processes

This Chapter of the Conservation Management Plan establishes general longer-term guidelines for on-going maintenance and minor works. Any future proposals for major works should be accompanied by the preparation of a new Conservation Plan. There are a number of general issues that should be addressed in the establishment of the implementation of the overall conservation strategies.

A copy of this Conservation Management Plan should be submitted to the Heritage Council of NSW for review and endorsement and deposit into the library of the NSW Heritage Office.

A copy of this Conservation Management Plan should be lodged in the Local Studies Section, City of Sydney Library. A copy of this report should be placed in the Meeting Room, Australia Square, to enable the presentation of the history of Tank Stream to visitors.

The existing course of Tank Stream should be recorded photographically prior to any work proceeding. A copy of the recording should be lodged with NSW Heritage Council, and a copy should remain with the Sydney Water Corporation.

At such time when there is a development proposal affecting sections of Tank Stream, copies of this report should be included in the information material provided by the City of Sydney Council or made available to managers or tenants, with the clear advice that it represents a guide as to acceptable future directions for the property.

All necessary work to stabilise deterioration should be carried out in accordance with the Schedule of Conservation Works, Section 8.2.

Ongoing maintenance works and inspections shall be performed at regular intervals as set out on the Schedule of On-Going Maintenance Works, presented in the Section 8.3.

Specialist consultants in the relevant fields with experience in dealing with heritage material should be commissioned as necessary to report on specific problems such as stone deterioration or hazardous materials. All necessary work recommended by consultants should be performed and shall be done having regard to significant fabric.

The Stormwater Operational Planner, in Sydney Water's Asset Management Division, should regularly monitor the schedule of maintenance works.

8.1.1 On-going Operational Requirements

As outlined above, the Tank Stream is an operating stormwater system and will remain operational in the foreseeable future. The main on-going operational implication of this, with effect on significant historic fabric, is that the system has to remain available for new connections.

The most sensitive areas to make new connections are the sections containing rare fabric of high significance, in particular the original or early sandstone sections. For addition of new connections to these sections, a section 60 application should be lodged with the Heritage Office for approval.

The new connections to historic sections of brick oviform profile are also not desirable, however, it is considered that these sections can take a greater degree of intervention without suffering a detrimental impact on their ability to interpret significance.

It is therefore considered that new connections to these sections can be approved by the SWC Heritage Manager, if:

Prior to installation of a new connection, a re-use of the nearby existing old sealed or 'dead' connections is reconsidered as an option.

Where the above is not technologically feasible, new connections tap into the existing ones out of the historic fabric area.

In cases where neither of the above two procedures is technologically feasible, new connections to historic brick oviform sections may be permitted subject to the following conditions:

- That the dimensions of the new openings and the extent of removed early fabric is kept to the physically possible minimum,
- That only materials appropriate in texture, colour and hydraulic qualities are used.

The least sensitive areas are the modern (post 1950s) sections of the Tank Stream. It is considered that no special approval is necessary for addition of new connections to these sections.

8.2 Schedule of Conservation Works

8.2.1 Conservation of Built and Engineering Structures and Fabric

The following Schedule of Conservation Works describes work that should be implemented to preserve the significant fabric. Where the damage is yet to be confirmed, further investigation on site will be required prior to the finalisation of specific repair techniques.

The level of significance of elements of surviving fabric was identified in this schedule in accordance with their relative contribution to the overall level of significance of Tank Stream, adjusted to their ability to demonstrate that significance according to condition and integrity of their surviving fabric.

Elements contributing directly to the identification of Tank Stream as an item of State level of significance are classified as being of high significance for the historic item. Elements contributing to the significance of the item at a local level are essentially identified as carrying a medium level of significance. The elements without impact on the significance of Tank Stream were classified as of low importance, and the elements identified as detracting from the significance of the whole were identified as intrusive.

It is considered that the relative importance of access chambers is relatively low, taking into account the age of some of these elements. This is due to the structural simplicity of these elements, the fact they typically present technological additions or appendices to

the conduits rather than being an integral part of the original design, and, to a degree, due to the large number of surviving elements.

It is assessed that while each access chamber older than fifty years can be seen as having *some* value, being representative of its class of elements, none of these elements associated with the Tank Stream make an important contribution to the understanding of the item, particularly taking into account the original nature of the Tank Stream.

Access Chambers and other elements missing in the current configuration of the Tank Stream were omitted from the Schedules.

SCHEDULE OF CONSERVATION WORKS TANK STREAM			
ELEMENT OR FEATURE	SIGNIF. LEVEL	COND.	ACTION/ TREATMENT
Location: Between KING STREET and MARTIN PLACE			
Brick Oviform Profile Dimensions: b/h=810 by 1220mm, length c. 13m Date of Creation: c. 1866 (lower part), top c. 1876 Position: between access chambers AC 35–AC 34, below King Street			
ACCESS CHAMBER AC 35	Medium	Good	No action required. Retain in situ.
LOWER PART (Rendered brickwork)	High	Good	Retain & conserve. Repair as required. Rendered brickwork should remain rendered. Decayed brickwork which is not likely to cause on-going deterioration should not be repaired solely for visual reasons.
UPPER PART (face brickwork)	High	Good	Retain & conserve. Repair or reconstruct missing & damaged bricks to match the existing brickwork.
TERRA-COTTA BOTTOM CHANNEL	High/ Medium	Fair	Retain & conserve. Repair or reconstruct missing & damaged elements to match existing form & finish as required.
REMAINS OF THE CAST IRON AQUEDUCT	High	Fair to Good	Retain & conserve in situ.
ACCESS CHAMBER AC 34	Medium	Good	No action required. Retain in situ.
Location: Between KING STREET and MARTIN PLACE			
Cement Lined Circular Concrete Pipe Dimensions: d=750mm, length c. 43m Date of Creation: c. 1990s Position: AC 34–AC 24 –Southern Segment, King Street towards GPO			
CONCRETE PIPE	Low	Good	No action required. Retain in situ.

SCHEDULE OF CONSERVATION WORKS TANK STREAM			
ELEMENT OR FEATURE	SIGNIF. LEVEL	COND.	ACTION/ TREATMENT
Location: Between KING STREET and MARTIN PLACE			
Brick Oviform Profile Dimensions: b/h=810 by 1220mm, length c. 18m Date of Creation: c. 1866 (lower part), top c. 1876 Position: AC 34–AC 24 –Middle Segment, to the South of GPO Building			
LOWER PART (rendered brickwork)	High	Good	Retain & conserve. Repair as required. Rendered brickwork should remain rendered. Decayed brickwork, which is not likely to cause on-going deterioration, should not be repaired solely for visual reasons.
UPPER PART (face brickwork)	High	Good	Retain & conserve. Repair or reconstruct missing & damaged bricks to match the existing brickwork.
TERRA-COTTA BOTTOM CHANNEL	High/ Medium	Fair	Retain & conserve. Repair or reconstruct missing & damaged elements to match existing form & finish as required.
MODERN FORMED CONCRETE CHAMBERS	Low	Good	No action required. Retain in situ.
MODERN INLETS AND JUNCTIONS	Low	Good	No action required. Retain in situ.
Location: Between KING STREET and MARTIN PLACE			
Stainless Steel Box-profile Dimensions: b/h=1070 by 750mm, length c. 100m Date of Creation: 2000 Position: AC 34–AC 24 –Northern Segment, below the GPO Building			
STAINLESS STEEL BOX-PROFILE	Low	Good	No action required. Retain in situ.
ACCESS CHAMBER AC 24	Medium	Good	No action required. Retain in situ.
Location: Between MARTIN PLACE and ANGEL PLACE			
Stone and Brick Oviform Profile Dimensions: b/h=810 by 1220mm, length c. 42m Date of Creation: c. 1866 (lower part), top c. 1876 Position: AC 24–AC 23, between Martin Place and Angel Place			
LOWER PART (rendered stone, blocks c 700 / 400mm	High	Fair to Poor	Retain & conserve, repair as required. Rendered stonework should remain rendered. Repaired sections to match existing form & finish.

SCHEDULE OF CONSERVATION WORKS TANK STREAM			
ELEMENT OR FEATURE	SIGNIF. LEVEL	COND.	ACTION/ TREATMENT
UPPER PART (face brickwork)	High	Good	Retain & conserve. Repair or reconstruct missing & damaged bricks to match the existing brickwork. Decayed brickwork, which is not likely to cause on-going deterioration, should not be repaired solely for visual reasons.
TERRA-COTTA BOTTOM CHANNEL	High/ Medium	Fair	Retain & conserve. Repair or reconstruct missing & damaged elements to match existing form & finish as required.
MODERN FORMED CONCRETE CHAMBERS	Low	Good	No action required. Retain in situ.
Location: Between MARTIN PLACE and ANGEL PLACE			
Stone and Brick Oviform Profile Dimensions: b/h=810 by 1220mm, length c. 42m Date of Creation: c. 1866 (lower part), top c. 1876 Position: AC 24–AC 23, between Martin Place and Angel Place			
CAST IRON PLATES	High	Fair to Good	Retain & conserve in situ.
MODERN INLETS AND JUNCTIONS	Low	Good	No action required. Retain in situ.
ACCESS CHAMBER AC 23	Medium	Good	No action required. Retain in situ.
Location: Between ANGEL PLACE and HUNTER STREET			
Stone and Brick Oviform Profile Dimensions: b/h=810 by 1220mm, length c. 95m Date of Creation: c. 1866 (lower part), top c. 1876 Position: AC 23–AC 22, between Angel Place and Commercial Union House			
LOWER PART (rendered stone, blocks c 700 / 400mm	High	Fair to Poor	Retain & conserve, repair as required. Rendered stonework should remain rendered. Repaired sections to match existing form & finish.
UPPER PART (face brickwork)	High	Good	Retain & conserve. Repair or reconstruct missing & damaged bricks to match the existing brickwork. Decayed brickwork, which is not likely to cause on-going deterioration, should not be repaired solely for visual reasons.
TERRA-COTTA BOTTOM CHANNEL	High/ Medium	Fair	Retain & conserve. Repair or reconstruct missing & damaged elements to match existing form & finish as required.

SCHEDULE OF CONSERVATION WORKS TANK STREAM			
ELEMENT OR FEATURE	SIGNIF. LEVEL	COND.	ACTION/ TREATMENT
Location: Between ANGEL PLACE and HUNTER STREET			
Stone and Brick Oviform Profile Dimensions: b/h=810 by 1220mm, length c. 95m Date of Creation: c. 1866 (lower part), top c. 1876 Position: AC 23–AC 22, between Angel Place and Commercial Union House			
MODERN INLETS AND JUNCTIONS	Low	Good	No action required. Retain in situ.
ACCESS CHAMBER AC 22	Low	Good	No action required. Retain in situ.
Location: Between ANGEL PLACE and HUNTER STREET			
Cement Lined Circular Concrete Pipe Dimensions: d=1350mm, length c. 25m Date of Creation: 1962 Position: AC 22–AC 18 –Southern Segment, Between Commercial Union House and Empire Lane			
CONCRETE PIPE	Low	Good	No action required. Retain in situ.
Location: Between ANGEL PLACE and HUNTER STREET			
Cement Lined Circular Steel Pipe Dimensions: d=1350mm, length c. 11m Date of Creation: 1958 Position: AC 22–AC 18 –Middle Segment, Vicinity of Empire Lane			
STEEL PIPE	Low	Good	No action required. Retain in situ.
MODERN BRICK CHAMBER	Low	Good	No action required. Retain in situ.
MODERN INLETS AND JUNCTIONS	Low	Good	No action required. Retain in situ.
Location: Between ANGEL PLACE and HUNTER STREET			
Brick Oviform Profile Dimensions: b/h=710 by 1070mm, length c. 22m Date of Creation: c. 1866 (lower part), top c. 1876 Position: AC 22–AC 18, Northern Segment, Empire Lane to Hunter Street			
LOWER PART (rendered brickwork)	High	Good	Retain & conserve. Repair as required. Rendered brickwork should remain rendered. Decayed brickwork, which is not likely to cause on-going deterioration, should not be repaired solely for visual reasons.
UPPER PART (face brickwork)	High	Good	Retain & conserve. Repair or reconstruct missing & damaged bricks to match the existing brickwork.

SCHEDULE OF CONSERVATION WORKS TANK STREAM			
ELEMENT OR FEATURE	SIGNIF. LEVEL	COND.	ACTION/ TREATMENT
TERRA-COTTA BOTTOM CHANNEL	High/ Medium	Fair	Retain & conserve. Repair or reconstruct missing & damaged elements to match existing form & finish as required.
MODERN INLETS AND JUNCTIONS	Low	Good	No action required. Retain in situ.
ACCESS CHAMBER AC 18	Medium	Good	No action required. Retain in situ.
Location: Between HUNTER STREET and BOND STREET			
Semi-circular Stone Arch Dimensions: b/h=3000 by 1500mm, length c. 35m Date of Creation: c. 1860 Position: AC 18–AC 13, between Hunter Street and Curtin Place			
LOWER PART (stone blocks)	High	Fair to Good	Retain & conserve, repair as required. Repairs to match existing form & finish.
UPPER PART (stonework)	High	Good	Retain & conserve. Repair or reconstruct missing & damaged blocks to match the existing stonework. Decayed stone, which is not likely to cause on-going deterioration, should not be repaired solely for visual reasons.
ACCESS CHAMBER AC 14	Low	Good	No action required. Retain in situ.
MODERN INLETS AND JUNCTIONS	Low	Good	No action required. Retain in situ.
ACCESS CHAMBER AC 13	Low	Good	No action required. Retain in situ.
Location: Between HUNTER STREET and BOND STREET			
Concrete Box-profile Dimensions: b/h=1220 by 1830mm, length c. 86m Date of Creation: 1962 Position: AC 13–AC 12, below Australia Square			
CONCRETE BOX-PROFILE	Low	Good	No action required. Retain in situ.
Location: Between HUNTER STREET and BOND STREET			
Concrete Box-profile Dimensions: b/h=1220 by 1830mm, length c. 86m Date of Creation: 1962 Position: AC 13–AC 12, below Australia Square			
THE MEETING ROOM	Low	Good	No action required. Retain in situ.

SCHEDULE OF CONSERVATION WORKS TANK STREAM			
ELEMENT OR FEATURE	SIGNIF. LEVEL	COND.	ACTION/ TREATMENT
MODERN INLETS AND JUNCTIONS	Low	Good	No action required. Retain in situ.
ACCESS CHAMBER AC 12	Low	Good	No action required. Retain in situ.
Location: Between BOND STREET and BRIDGE STREET			
Concrete Box-profile Dimensions: b/h=1220 by 1830mm, length c. 60m Date of Creation: 1975 Position: AC 12–AC 07 –Southern Segment, Between Bond Street and Abercrombie Lane			
CONCRETE BOX-PROFILE	Low	Good	No action required. Retain in situ.
MODERN INLETS AND JUNCTIONS	Low	Good	No action required. Retain in situ.
Location: Between BOND STREET and BRIDGE STREET			
Semi-circular Stone Arch Dimensions: b/h=1500 by 3000mm, length c. 40m Date of Creation: c. 1860 Position: AC 12–AC 07 –Northern Segment, Between Abercrombie Lane to Bridge Street			
LOWER PART (stone blocks)	High	Fair to Good	Retain & conserve, repair as required. Repairs to match existing form & finish.
UPPER PART (stonework)	High	Good	Retain & conserve. Repair or reconstruct missing & damaged blocks to match the existing stonework. Decayed stone, which is not likely to cause on-going deterioration, should not be repaired solely for visual reasons.
TRANSITION CHAMBER, BRIDGE ST (stonework)	High	Good	Retain & conserve. Repair or reconstruct missing & damaged stone blocks to match existing stonework. Decayed stonework, which is not likely to cause on-going deterioration, should not be repaired solely for visual reasons.
MODERN INLETS AND JUNCTIONS	Low	Good	No action required. Retain in situ.
ACCESS CHAMBER AC 07	Medium	Good	No action required. Retain in situ.

SCHEDULE OF CONSERVATION WORKS TANK STREAM			
ELEMENT OR FEATURE	SIGNIF. LEVEL	COND.	ACTION/ TREATMENT
Location: Between BRIDGE STREET and CIRCULAR QUAY			
Brick Oviform Profile Dimensions: b/h=810 by 1220mm, length c. 185m Date of Creation: c. 1878 Position: AC 07 to the Interception Chamber in Crane Place, between Bridge Street and Daley Street			
LOWER PART (rendered brickwork)	High	Good	Retain & conserve. Repair as required. Rendered brickwork should remain rendered. Decayed brickwork, which is not likely to cause on-going deterioration, should not be repaired solely for visual reasons.
UPPER PART (face brickwork)	High	Good	Retain & conserve. Repair or reconstruct missing & damaged bricks to match the existing brickwork.
TERRA-COTTA BOTTOM CHANNEL	High/ Medium	Fair	Retain & conserve. Repair or reconstruct missing & damaged elements to match existing form & finish as required.
INTERCEPTION CHAMBER, CRANE PLACE	High	Good	Retain & conserve. Repair or reconstruct missing & damaged stone blocks to match existing stonework. Decayed stonework, which is not likely to cause on-going deterioration, should not be repaired solely for visual reasons.
MODERN INLETS AND JUNCTIONS	Low	Good	No action required. Retain in situ.
ACCESS CHAMBER AC 04	Low	Good	No action required. Retain in situ.
Location: Between BRIDGE STREET and CIRCULAR QUAY			
Semi-elliptic Stone Arch Dimensions: b/h=3000 by 1100–1400mm, length c. 100m Date of Creation: c. 1860 Position: From Interception Chamber in Crane Place to AC 02, between Daley Street and Alfred Street			
LOWER PART (stone blocks)	High	Fair to Good	Retain & conserve, repair as required. Repairs to match existing form & finish.
UPPER PART (stonework)	High	Good	Retain & conserve. Repair or reconstruct missing & damaged blocks to match the existing stonework. Decayed stone, which is not likely to cause on-going deterioration, should not be repaired solely for visual reasons.
ACCESS CHAMBER AC 03	Medium	Good	No action required. Retain in situ.

SCHEDULE OF CONSERVATION WORKS TANK STREAM			
ELEMENT OR FEATURE	SIGNIF. LEVEL	COND.	ACTION/ TREATMENT
MODERN INLETS AND JUNCTIONS	Low	Good	No action required. Retain in situ.
ACCESS CHAMBER AC 02	Medium	Good	No action required. Retain in situ.
Location: Between BRIDGE STREET and CIRCULAR QUAY			
Semi-elliptic Stone Arch Dimensions: b/h=3000 by 1100–1400mm, length c. 32m Date of Creation: c. 1860 Position: AC 02 to the Outlet, between Alfred Street and Circular Quay			
LOWER PART (stone blocks)	High	Fair to Good	Retain & conserve, repair as required. Repairs to match existing form & finish.
UPPER PART (stonework)	High	Good	Retain & conserve. Repair or reconstruct missing & damaged blocks to match the existing stonework. Decayed stone, which is not likely to cause on-going deterioration, should not be repaired solely for visual reasons.
ACCESS CHAMBER AC 01	Medium	Good	No action required. Retain in situ.
MODERN CONCRETE SECTIONS	Low	Good	No action required. Retain in situ.

8.3 Schedule of On-going Maintenance Works

8.3.1 Maintenance of Built and Engineering Structures and Fabric

The On-going Maintenance Schedule refers to the cyclical maintenance works to the fabric and services that should be implemented as part of the process of on-going management of Tank Stream.

While maintenance works should generally be initiated following the completion of the Conservation Works, many of these activities are already in place as part of the regular item maintenance. The ongoing maintenance should proceed regardless of the timing of conservation works.

A record of when maintenance works are performed, any faults discovered, or repairs made should be maintained and kept alongside this maintenance schedule.

The maintenance works set out in this document will ensure the conservation of the existing significant fabric. Maintenance works have been identified by The Burra Charter as conservation works.

ON-GOING MAINTENANCE SCHEDULE TANK STREAM			
ELEMENT	EVERY YEAR	EVERY 2 YEARS	EVERY 5 YEARS
Location: Between KING STREET and MARTIN PLACE			
Brick Oviform Profile Dimensions: b/h=810 by 1220mm, length c. 13m Date of Creation: c. 1866 (lower part), top c. 1876 Position: between access chambers AC 35-–AC 34, below King Street			
ACCESS CHAMBER AC 35	Inspect condition & clean. Repair as required.	No action required.	Replace access chamber cover as required. Removed cover should be assessed by SWC Heritage Adviser for possible inclusion in the moveable heritage collection.
LOWER PART (rendered brickwork)	Conduct CCTV Inspection. Repair as required.	Repair as required. Rendered brickwork should remain rendered.	Repair, refinish & re-render as required.
UPPER PART (face brickwork)	Conduct CCTV Inspection. Repair as required.	Repair as required. Face brickwork should remain un-rendered.	Repair or reconstruct missing & damaged bricks to match the existing brickwork.
TERRA-COTTA BOTTOM CHANNEL	Conduct CCTV Inspection. Repair as required.	Repair as required. Rendered surfaces should remain rendered.	Repair or reconstruct missing & damaged elements to match the original form & finish.
REMAINS OF THE CAST IRON AQUEDUCT	Monitor condition. Repaint surfaces intended for painting.	No action required.	No action required.
OTHER INLETS AND JUNCTIONS	No action required.	No action required.	Conduct CCTV Inspection. Repair as required.
ACCESS CHAMBER AC 34	Inspect condition & clean. Repair as required.	No action required.	Replace access chamber cover as required. Removed cover should be assessed by SWC Heritage Adviser for possible inclusion in the moveable heritage collection.

ON-GOING MAINTENANCE SCHEDULE TANK STREAM			
ELEMENT	EVERY YEAR	EVERY 2 YEARS	EVERY 5 YEARS
Location: Between KING STREET and MARTIN PLACE			
Cement Lined Circular Concrete Pipe Dimensions: d=750mm, length c. 43m Date of Creation: c. 1990s Position: AC 34–AC 24 –Southern Segment, King Street towards GPO			
CONCRETE PIPE	Conduct CCTV Inspection. Repair as required.	No action required.	Conduct CCTV Inspection. Repair as required.
Location: Between KING STREET and MARTIN PLACE			
Brick Oviform Profile Dimensions: b/h=810 by 1220mm, length c. 18m Date of Creation: c. 1866 (lower part), top c. 1876 Position: AC 34–AC 24 –Middle Segment, to the South of GPO Building			
LOWER PART (rendered brickwork)	Conduct CCTV Inspection. Repair as required.	Repair as required. Rendered brickwork should remain rendered.	Repair, refinish & re-render as required.
UPPER PART (face brickwork)	Conduct CCTV Inspection. Repair as required.	Repair as required. Face brickwork should remain un-rendered.	Repair or reconstruct missing & damaged bricks to match the existing brickwork.
TERRA-COTTA BOTTOM CHANNEL	Conduct CCTV Inspection. Repair as required.	Repair as required. Rendered surfaces should remain rendered.	Repair or reconstruct missing & damaged elements to match the original form & finish.
MODERN FORMED CONCRETE CHAMBERS	Conduct CCTV Inspection. Repair as required.	No action required.	Repair as required. Un-rendered surfaces should remain un-rendered.
MODERN INLETS AND JUNCTIONS	No action required.	No action required.	Conduct CCTV Inspection. Repair as required.
Location: Between KING STREET and MARTIN PLACE			
Stainless Steel Box-profile Dimensions: b/h=1070 by 750mm, length c. 100m Date of Creation: 2000 Position: AC 34–AC 24 –Northern Segment, below the GPO Building			
Stainless Steel Box-profile	Conduct CCTV Inspection. Repair as required.	No action required.	No action required

ON-GOING MAINTENANCE SCHEDULE TANK STREAM			
ELEMENT	EVERY YEAR	EVERY 2 YEARS	EVERY 5 YEARS
ACCESS CHAMBER AC 24	Inspect condition & clean. Repair as required.	No action required.	Replace access chamber cover as required. Removed cover should be assessed by SWC Heritage Adviser for possible inclusion in the moveable heritage collection.
Location: Between MARTIN PLACE and ANGEL PLACE			
Stone and Brick Oviform Profile Dimensions: b/h=810 by 1220mm, length c. 42m Date of Creation: c. 1866 (lower part), top c. 1876 Position: AC 24–AC 23, between Martin Place and Angel Place			
LOWER PART (rendered stone, blocks c 700 / 400mm	Conduct CCTV Inspection. Repair as required.	Repair as required. Rendered stone should remain rendered.	Repair, refinish & re-render as required.
UPPER PART (face brickwork)	Conduct CCTV Inspection. Repair as required.	Repair as required. Face brickwork should remain un-rendered.	Repair or reconstruct missing & damaged bricks to match the existing brickwork.
TERRA-COTTA BOTTOM CHANNEL	Conduct CCTV Inspection. Repair as required.	Repair as required. Rendered surfaces should remain rendered.	Repair or reconstruct missing & damaged elements to match the original form & finish.
MODERN FORMED CONCRETE CHAMBERS	Conduct CCTV Inspection. Repair as required.	No action required.	Repair as required. Un-rendered surfaces should remain un-rendered.
CAST IRON PLATES	Monitor Condition. Repair as required.	No action required.	No action required.
MODERN INLETS AND JUNCTIONS	No action required.	No action required.	Conduct CCTV Inspection. Repair as required.
ACCESS CHAMBER AC 23	Inspect condition & clean. Repair as required.	No action required.	Replace access chamber cover as required. Removed cover should be assessed by SWC Heritage Adviser for possible inclusion in the moveable heritage collection.

ON-GOING MAINTENANCE SCHEDULE TANK STREAM			
ELEMENT	EVERY YEAR	EVERY 2 YEARS	EVERY 5 YEARS
Location: Between ANGEL PLACE and HUNTER STREET			
Stone and Brick Oviform Profile Dimensions: b/h=810 by 1220mm, length c. 95m Date of Creation: c. 1866 (lower part), top c. 1876 Position: AC 23–AC 22, between Angel Place and Commercial Union House			
LOWER PART (rendered stone, blocks c 700 / 400mm	Conduct CCTV Inspection. Repair as required.	Repair as required. Rendered stone should remain rendered.	Repair, refinish & re-render as required.
UPPER PART (face brickwork)	Conduct CCTV Inspection. Repair as required.	Repair as required. Face brickwork should remain un-rendered.	Repair or reconstruct missing & damaged bricks to match the existing brickwork.
TERRA-COTTA BOTTOM CHANNEL	Conduct CCTV Inspection. Repair as required.	Repair as required. Rendered surfaces should remain rendered.	Repair or reconstruct missing & damaged elements to match the original form & finish.
MODERN INLETS AND JUNCTIONS	No action required.	No action required.	Conduct CCTV Inspection. Repair as required.
ACCESS CHAMBER AC 22	Inspect condition & clean. Repair as required.	No action required.	Replace access chamber cover as required.
Location: Between ANGEL PLACE and HUNTER STREET			
Cement Lined Circular Concrete Pipe Dimensions: d=1350mm, length c. 25m Date of Creation: 1962 Position: AC 22–AC 18 –Southern Segment, Between Commercial Union House and Empire Lane			
CONCRETE PIPE	Conduct CCTV Inspection. Repair as required.	No action required.	No action required.
Location: Between ANGEL PLACE and HUNTER STREET			
Cement Lined Circular Steel Pipe Dimensions: d=1350mm, length c. 11m Date of Creation: 1958 Position: AC 22–AC 18 –Middle Segment, Vicinity of Empire Lane			
STEEL PIPE	Conduct CCTV Inspection. Repair as required.	No action required.	No action required.
MODERN BRICK CHAMBER	Conduct CCTV Inspection. Repair as required.	No action required.	No action required.

ON-GOING MAINTENANCE SCHEDULE TANK STREAM			
ELEMENT	EVERY YEAR	EVERY 2 YEARS	EVERY 5 YEARS
MODERN INLETS AND JUNCTIONS	No action required.	No action required.	Conduct CCTV Inspection. Repair as required.
Location: Between ANGEL PLACE and HUNTER STREET			
Brick Oviform Profile Dimensions: b/h=710 by 1070mm, length c. 22m Date of Creation: c. 1866 (lower part), top c. 1876 Position: AC 22–AC 18, Northern Segment, Empire Lane to Hunter Street			
LOWER PART (rendered brickwork)	Conduct CCTV Inspection. Repair as required.	Repair as required. Rendered brickwork should remain rendered.	Repair, refinish & re-render as required.
UPPER PART (face brickwork)	Conduct CCTV Inspection. Repair as required.	Repair as required. Face brickwork should remain un-rendered.	Repair or reconstruct missing & damaged bricks to match the existing brickwork.
TERRA-COTTA BOTTOM CHANNEL	Conduct CCTV Inspection. Repair as required.	Repair as required. Rendered surfaces should remain rendered.	Repair or reconstruct missing & damaged elements to match the original form & finish.
MODERN INLETS AND JUNCTIONS	No action required.	No action required.	Conduct CCTV Inspection. Repair as required.
ACCESS CHAMBER AC 18	Inspect condition & clean. Repair as required.	No action required.	Replace access chamber cover as required. Removed cover should be assessed by SWC Heritage Adviser for possible inclusion in the moveable heritage collection.
Location: Between HUNTER STREET and BOND STREET			
Semi-circular Stone Arch Dimensions: b/h=3000 by 1500mm, length c. 35m Date of Creation: c. 1860 Position: AC 18–AC 13, between Hunter Street and Curtin Place			
LOWER PART (stone blocks)	Conduct CCTV Inspection. Re-point as required.	No action required.	Repair or reconstruct missing & damaged blocks to match the original form & finish.
UPPER PART (stonework)	Conduct CCTV Inspection. Repair as required.	No action required.	Repair or reconstruct missing & damaged blocks to match the original form & finish.

ON-GOING MAINTENANCE SCHEDULE TANK STREAM			
ELEMENT	EVERY YEAR	EVERY 2 YEARS	EVERY 5 YEARS
ACCESS CHAMBER AC 14	Inspect condition & clean. Repair as required.	No action required.	Replace access chamber cover as required.
MODERN INLETS AND JUNCTIONS	No action required.	No action required.	Conduct CCTV Inspection. Repair as required.
ACCESS CHAMBER AC 13	Inspect condition & clean. Repair as required.	No action required.	Replace access chamber cover as required.
Location: Between HUNTER STREET and BOND STREET			
Concrete Box-profile Dimensions: b/h=1220 by 1830mm, length c. 86m Date of Creation: 1962 Position: AC 13–AC 12, below Australia Square			
CONCRETE BOX-PROFILE	Conduct CCTV Inspection. Repair as required.	No action required.	No action required.
THE MEETING ROOM	Monitor condition. Repair as required.	No action required.	No action required.
MODERN INLETS AND JUNCTIONS	No action required.	No action required.	Conduct CCTV Inspection. Repair as required.
ACCESS CHAMBER AC 12	Inspect condition & clean. Repair as required.	No action required.	Replace access chamber cover as required.
Location: Between BOND STREET and BRIDGE STREET			
Concrete Box-profile Dimensions: b/h=1220 by 1830mm, length c. 60m Date of Creation: 1975 Position: AC 12–AC 07 –Southern Segment, between Bond Street and Abercrombie Lane			
CONCRETE BOX-PROFILE	Conduct CCTV Inspection. Repair as required.	No action required.	No action required.
MODERN INLETS AND JUNCTIONS	No action required.	No action required.	Conduct CCTV Inspection. Repair as required.

ON-GOING MAINTENANCE SCHEDULE TANK STREAM			
ELEMENT	EVERY YEAR	EVERY 2 YEARS	EVERY 5 YEARS
Location: Between BOND STREET and BRIDGE STREET			
Semi-circular Stone Arch Dimensions: b/h=1500 by 3000mm, length c. 40m Date of Creation: c. 1860 Position: AC 12–AC 07 –Northern Segment, Between Abercrombie Lane to Bridge Street			
LOWER PART (stone blocks)	Conduct CCTV Inspection. Re-point as required.	No action required.	Repair or reconstruct missing & damaged blocks to match the original form & finish.
UPPER PART (stonework)	Conduct CCTV Inspection. Re-point as required.	No action required.	Repair or reconstruct missing & damaged blocks to match the original form & finish.
TRANSITION CHAMBER, BRIDGE ST (stonework)	Conduct CCTV Inspection. Re-point as required.	No action required.	Repair or reconstruct missing & damaged blocks to match the original form & finish.
MODERN INLETS AND JUNCTIONS	No action required.	No action required.	Conduct CCTV Inspection. Repair as required.
ACCESS CHAMBER AC 07	Inspect condition & clean. Repair as required.	No action required.	Replace access chamber cover as required. Removed cover should be assessed by SWC Heritage Adviser for possible inclusion in the moveable heritage collection.
Location: Between BRIDGE STREET and CIRCULAR QUAY			
Brick Oviform Profile Dimensions: b/h=810 by 1220mm, length c. 185m Date of Creation: c. 1878 Position: AC 07 to the Interception Chamber in Crane Place, Between Bridge Street and Daley Street			
LOWER PART (rendered brickwork)	Conduct CCTV Inspection. Repair as required.	Repair as required. Rendered brickwork should remain rendered.	Repair, refinish & re-render as required.
UPPER PART (face brickwork)	Conduct CCTV Inspection. Repair as required.	Repair as required. Face brickwork should remain un-rendered.	Repair or reconstruct missing & damaged bricks to match the existing brickwork.

ON-GOING MAINTENANCE SCHEDULE TANK STREAM			
ELEMENT	EVERY YEAR	EVERY 2 YEARS	EVERY 5 YEARS
TERRA-COTTA BOTTOM CHANNEL	Conduct CCTV Inspection. Repair as required.	Repair as required. Rendered surfaces should remain rendered.	Repair or reconstruct missing & damaged elements to match the original form & finish.
INTERCEPTION CHAMBER, CRANE PL	Conduct CCTV Inspection. Repair as required.	No action required.	Repair or reconstruct missing & damaged blocks to match the original form & finish.
MODERN INLETS AND JUNCTIONS	No action required.	No action required.	Conduct CCTV Inspection. Repair as required.
ACCESS CHAMBER AC 04	Inspect condition & clean. Repair as required.	No action required.	Replace access chamber cover as required.
Location: Between BRIDGE STREET and CIRCULAR QUAY			
Semi-elliptic Stone Arch Dimensions: b/h=3000 by 1100–1400mm, length c. 100m Date of Creation: c. 1860 Position: From Interception Chamber in Crane Place to AC 02, Between Daley Street and Alfred Street			
LOWER PART (stone blocks)	Conduct CCTV Inspection. Re-point as required.	No action required.	Repair or reconstruct missing & damaged blocks to match the original form & finish.
UPPER PART (stonework)	Conduct CCTV Inspection. Re-point as required.	No action required.	Repair or reconstruct missing & damaged blocks to match the original form & finish.
ACCESS CHAMBER AC 03	Inspect condition & clean. Repair as required.	No action required.	Replace access chamber cover as required. Removed cover should be assessed by SWC Heritage Adviser for possible inclusion in the moveable heritage collection.
MODERN INLETS AND JUNCTIONS	No action required.	No action required.	Conduct CCTV Inspection. Repair as required.
ACCESS CHAMBER AC 02	Inspect condition & clean. Repair as required.	No action required.	Replace access chamber cover as required. Removed cover should be assessed by SWC Heritage Adviser for possible inclusion in the moveable heritage collection.

ON-GOING MAINTENANCE SCHEDULE TANK STREAM			
ELEMENT	EVERY YEAR	EVERY 2 YEARS	EVERY 5 YEARS
Location: Between BRIDGE STREET and CIRCULAR QUAY			
Semi-elliptic Stone Arch Dimensions: b/h=3000 by 1100–1400mm, length c. 32m Date of Creation: c. 1860 Position: AC 02 to the Outlet, between Alfred Street and Circular Quay			
LOWER PART (stone blocks)	Conduct CCTV Inspection. Re-point as required.	No action required.	Repair or reconstruct missing & damaged blocks to match the original form & finish.
UPPER PART (stonework)	Conduct CCTV Inspection. Re-point as required.	No action required.	Repair or reconstruct missing & damaged blocks to match the original form & finish.
ACCESS CHAMBER AC 01	Inspect condition & clean. Repair as required.	No action required.	Replace access chamber cover as required. Removed cover should be assessed by SWC Heritage Adviser for possible inclusion in the moveable heritage collection.
MODERN CONCRETE SECTIONS	Conduct CCTV Inspection. Repair as required.	No action required.	No action required.

8.4 Interpretation Strategy

8.4.1 General principles

The purpose of interpretation at heritage places is to reveal and explain their significance and to allow that significance to be understood by visitors. It may also promote an understanding of Sydney Water's history and corporate responsibilities, the development of the local area or other relevant explanatory contexts.

Fundamentally interpretation must be founded upon significance as established by the statement of significance. As significance will not necessarily reside only in the fabric of a place the methods of interpretation need to be able to convey historical, social, aesthetic and other values which may be complex and not readily evident in the item, parts of its fabric or immediate locality.

The key significance of the Tank Stream is identified in Table 7-1 and the major historical themes it represents are listed in Table 7-2. These themes should be emphasised in any interpretation and opportunities to link the Tank Stream with other places representing the same theme within and outside SWC should be explored.

8.4.2 Existing interpretation

The existing interpretation of the Tank Stream consists of some unobtrusive street sculpture, minimal street signage, toponyms and mention in historical literature. There is a recently constructed fully equipped visitor access gallery in Curtin Place, which is not used. Sydney Water owns the visitor access gallery, while City of Sydney Council and heritage bodies placed the street signage and sculptures.

There is a high demand to access the Tank Stream as evidenced by enquiries for irregular tour positions. The Tank Stream features prominently in school education about Australian history.

8.4.3 Future interpretation opportunities and issues

The most significant aspects of the Tank Stream either do not survive or are represented off-site in an ephemeral and uncoordinated manner. The Tank Stream drainage system itself is of considerable historical significance and its fabric tells an interesting story of changes in response to Sydney's water needs over 150 years.

There has been a considerable investment in providing visitor access to the Tank Stream. This needs to be assessed for conformity with confined spaces and other OHS legislation. There is a sustained public interest and this is supported by school curricula that cover some of the Tank Stream's historical context.

The existing interpretation on the surface is piecemeal, difficult to find and fails to comprehensively identify and convey the significance of the place.

Key stakeholders for the Tank Stream would include Metropolitan Local Aboriginal Land Council, Council of the City of Sydney and the Historic Houses Trust, who manage other early colonial properties in Sydney CBD.

8.4.4 Strategy

The Tank Stream should be included in a comprehensive interpretation strategy for the agency because it represents a number of the major historical themes of SWC.

Interpretation of the Tank Stream's role in Aboriginal and early colonial Sydney needs to be pursued and encouraged.

Public tours should continue to be offered where this is feasible. Opportunities exist in the interim to examine and develop solutions to the access and OHS issues and to streamline.

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State

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Exhibition of Draft City of Sydney Local Environmental Plan 2002

Central Sydney Heritage Local Environmental Plan 2000

Central Sydney Development Control Plan

State Owned Corporations Act 1989

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Independent Pricing and Regulatory Tribunal and Other Legislation Amendment Act 2000

National Parks and Wildlife Act 1974

Sydney Water Act 1994

Protection of the Environment Operations Act 1997

O.C.P. 138
Sh. 2

O.C.P. 138
SHEET 2

SYDNEY SEWERAGE WORKS

138

TANK STREAM

138

Scale 80 Feet to One Inch

Before Improvements

See Council Plan No 267

CIRCULAR QUAY

KING STREET

PITT STREET

HAMILTON STREET

Sheet 14

861

DRAWING No

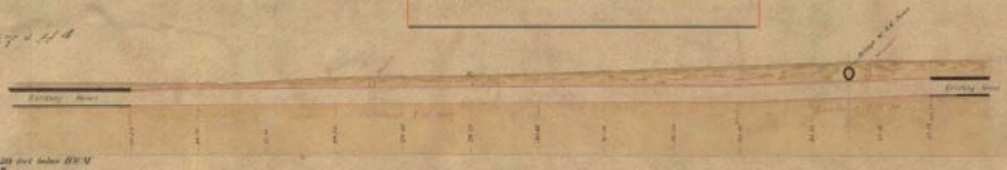
O.C.P. 267

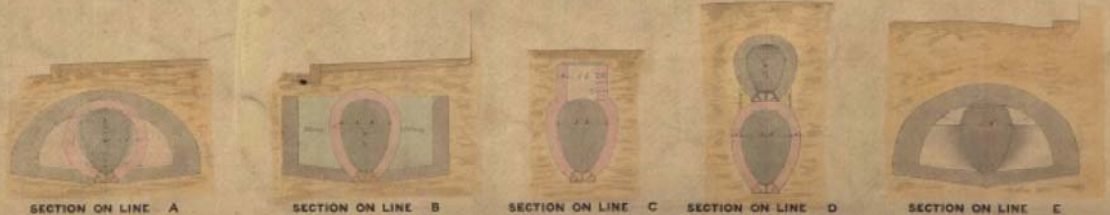
SYDNEY SEWERAGE WORKS

SECTION A

CONTRACT N°

DEVIATION OF THE TANK STREAM SEWER





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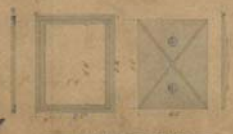
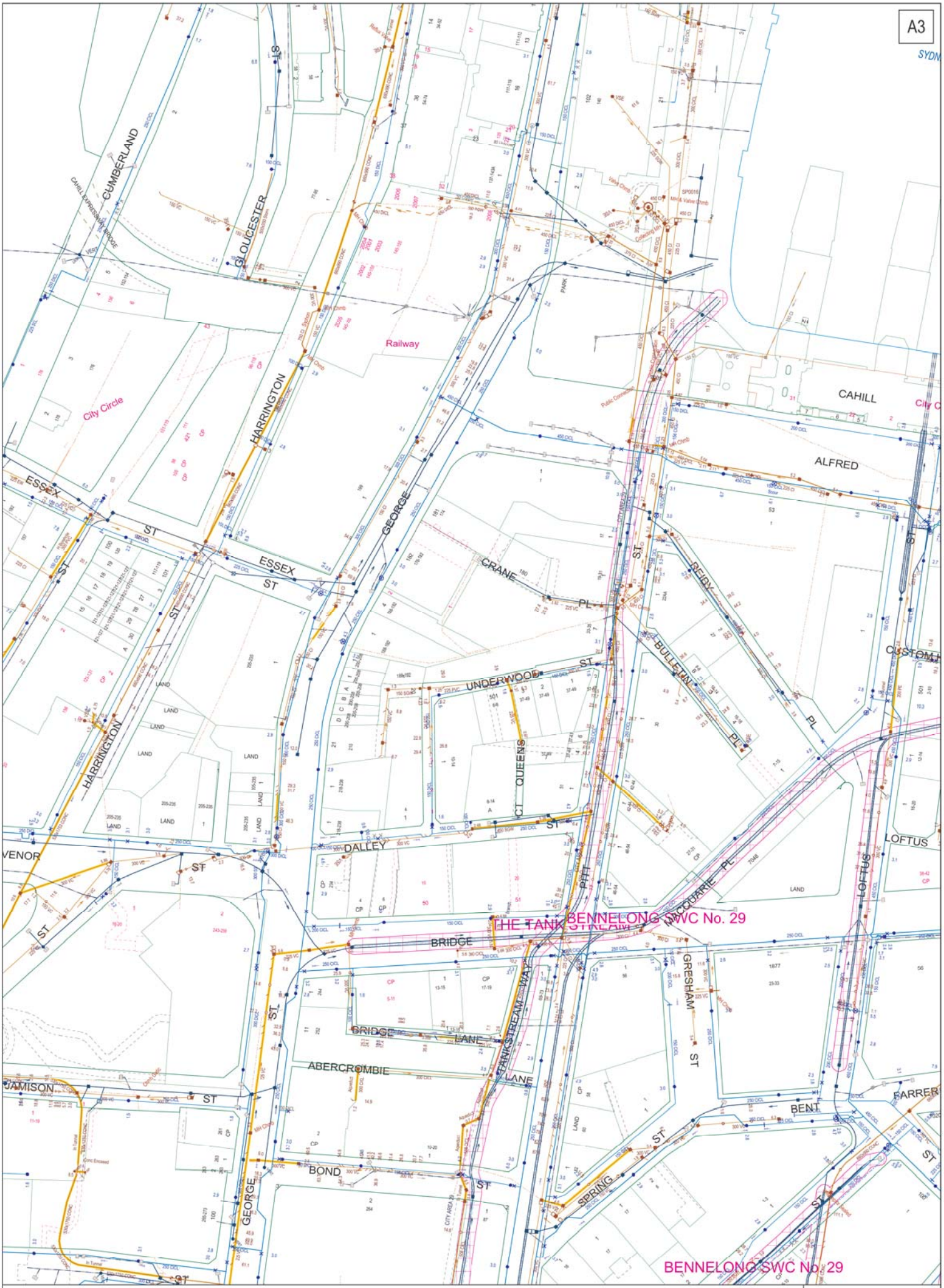


MANHOLE COVER

GULLY DETAILS



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Pitt St and Underwood Street
Sydney NSW 2000

DBYD Job No: 355437

DBYD Sequence No: 22023137

Scale: 1:1500

Date of Production: 11/07/2011

Plan 1 of 1

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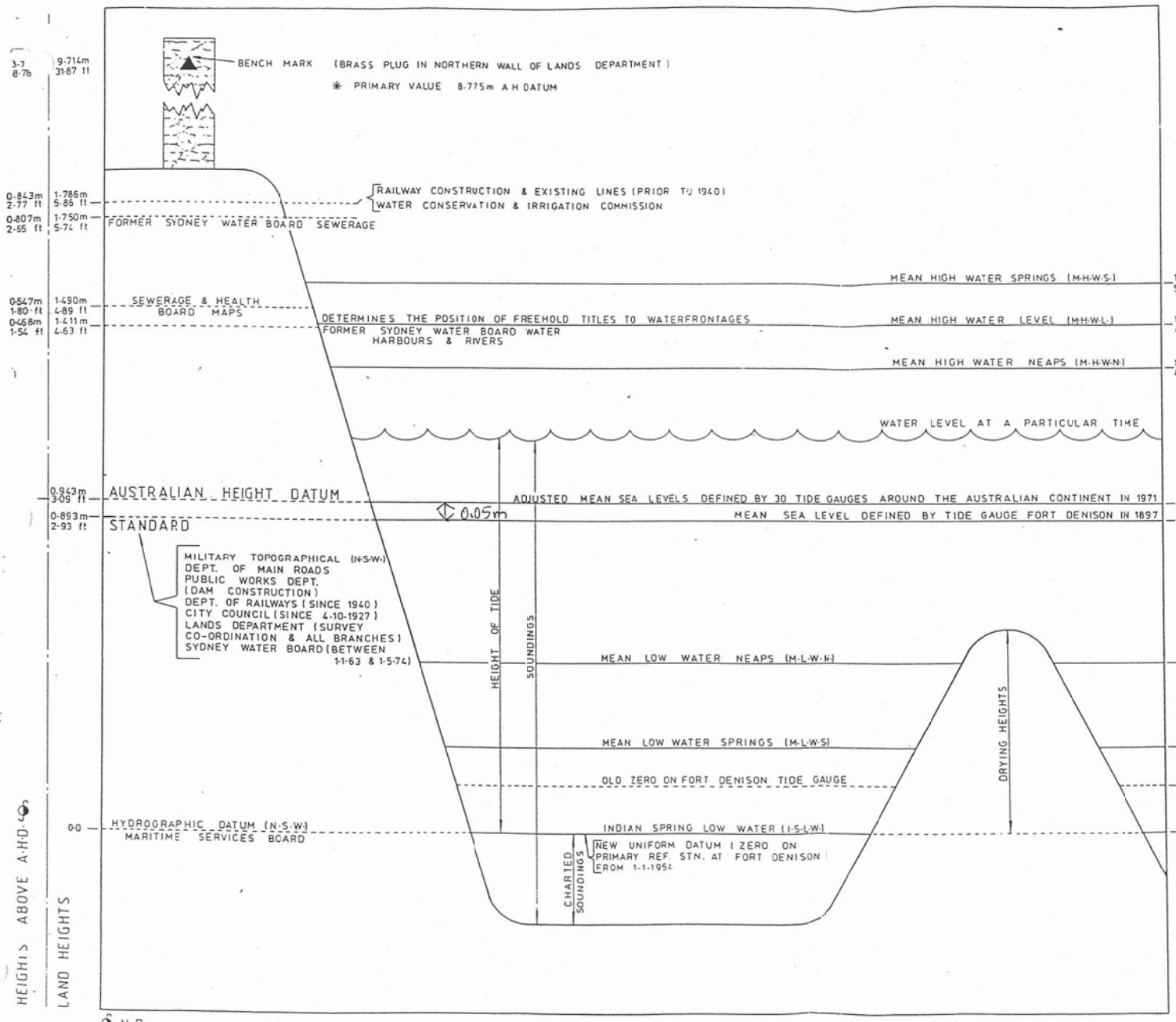


N·B· AN APPROXIMATION OF AUSTRALIAN HEIGHT DATUM HAS BEEN DERIVED BY APPLYING THE UNIFORM CORRECTION OF -0·050m TO STANDARD DATUM IN THE SYDNEY & SOUTH COAST METROPOLITAN AREAS OF OPERATION (SEE ENGINEER IN CHIEF'S INSTRUCTION OF 1·5·74) FOR OTHER AREAS CONSULT SURVEY BRANCH COMPUTING RECORDS (O/C GROUP 40)

REFERENCE DRAWING

SURVEY BRANCH — DRAFTING MANUAL
ENGINEERING SURVEY PLANS
DIAGRAM 22

METROPOLITAN WATER SEWERAGE AND DRAINAGE BOARD
SYDNEY, N.S.W. A1-5

RELATIVE VALUE OF LEVELS — PRIMARY REFERENCE STATION SYDNEY

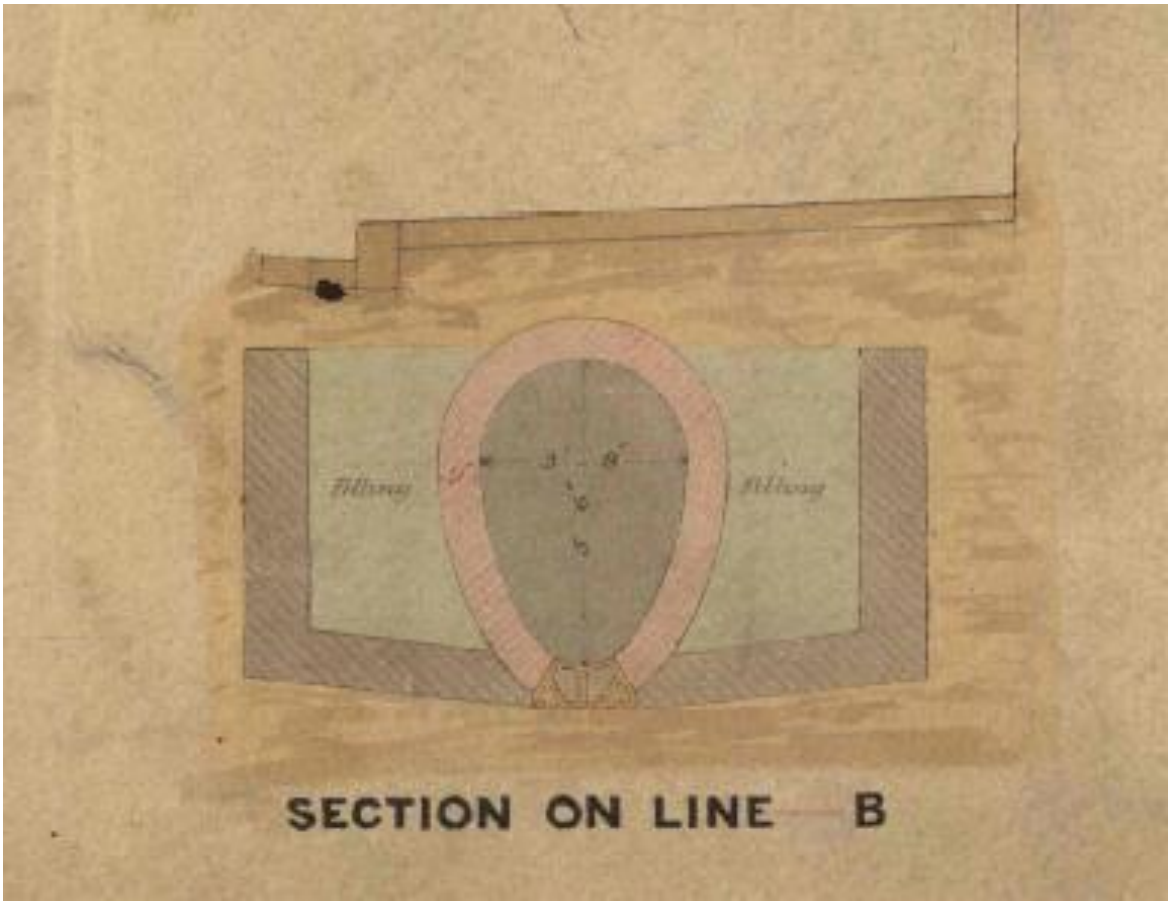
ITEM No.	W/O	AC. No.	FILE No.
DESIGNED	DRAWN M HIGGINS	CHECKED V K	REG. No.
EXAMINED			ISSUE / DRAWING No. WBS 1623

RECOMMENDED — CHIEF ENGINEER (DESIGN)
APPROVED — DEPUTY CHIEF ENGINEER (SURVEY & PLT)

DATE OF NEGATIVE	LETTER	DETAIL OF AMENDMENT	APPD BY	DATE

Tank Stream Issues

33-35 Pitt Street, Sydney



Section through Tank Stream adjacent to 33-35 Pitt Street. 1878, OCP

Report to

Lend Lease

September 2013

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Executive Summary

RESULTS

- This report has identified that the there were two stages of Tank Stream construction within the section of Pitt Street adjacent to the subject site.
  - The 1850s stone channel drain
  - 1878 brick oviform drain.
- The Tank Stream is listed on the SHR (636) and is of State Heritage Significance. The SHR curtilage is 3m from all surfaces.
- The Tank Stream is a State significant Sydney Water asset listed on its S170 heritage register.
- The Tank Stream is listed on Sydney LEP 2012 as a State significant heritage item.
- The Heritage Branch, OEH has identified the need for a Statement of Heritage Impact (SOHI) and application to be made as part of any works within the 3m curtilage of the Tank Stream.
- At least two recent applications where basements were being extended with the 3m curtilage were approved under an Integrated Development Application (IDA) to the City of Sydney and included an approval from the Heritage Council.
- Current understanding is that there is no basement at the front of the 33-35 Pitt Street building.

RECOMMENDATIONS

1. Need to understand the proposed new design and develop a strategy for managing the curtilage of the Tank Stream.
2. Obtain survey advice to refine the location of the Tank Stream curtilage in relation to the proposed development.
3. Obtain engineering advice on suitable engineering approaches.
4. As part of writing a SOHI have a meeting with the Heritage Branch, OEH to understand their requirements in relation to the Tank Stream and the proposed design.
5. Write a Statement of Heritage Impact (SOHI) outlining impacts within the 3m curtilage. This can be written separately or included within the SOHI for built heritage.
6. Obtain an approval from the Heritage Branch as part of an IDA, S63, or a S57(2) Exemption or S60 application.

Contents

Appendices

Tank Stream & 33-35 Pitt Street, Sydney

1.0 Background

1.1 Background

The northern section of Pitt Street, adjacent to the 33-35 Pitt Street, contains a segment of an operational Sydney Water asset, the Tank Stream. It has been proposed that 33-35 Pitt Street be redeveloped with a multi-storey tower with basement. The Tank Stream is listed on the State Heritage Register (SHR).

This report presents a brief review of information about the Tank Stream. This information is suitable for use in a Heritage Impact Statement. Historian Caroline Plim has undertaken detailed research into the background of this Pitt Street section of the Tank Stream. It is unusual as it contains the original stream bed, later reclamation, an 1850s stone-built channel and the 1878 brick oviform drain which is still in use today.

As part of this research we have also developed an understanding of the issues in relation to heritage issues and approvals process, statutory process, integrated development and construction strategies undertaken on the nearby 1 Alfred Street and the adjacent 19-31 Pitt Street site which also fronts onto the Tank Stream. We have reviewed a number of archaeological assessments and heritage reports for surrounding properties which have provided general background:

Mirvac (188-194A George Street): D/2012/893

- Godden Mackay Logan, *Heritage Assessment and Impact Statement*, October 10, 2012.
- Godden Mackay Logan, *200 George Street, Sydney, Heritage Assessment and Impact Statement for Redevelopment*, June 2012.
- Godden Mackay Logan, *190 and 200 George Street and 4 Dalley Street, Sydney, Heritage Assessment and Impact Statement for Demolition Works*, April 2012.

Fairfax (19 Pitt Street): D2010/1533

- Rappaport, *Statement of Heritage Impact, Proposed New Building at 19-31 Pitt Street Heritage Impact*, September 2010.

Valad (1 Alfred Street): D 2010/2029

- Godden Mackay Logan, *One Alfred Street Redevelopment, Heritage Impact Statement and Archaeological Assessment*, November 2010.

1.2 Study Area

This report addresses the section of Pitt Street immediately east of 33-35 Pitt Street, north of Underwood Street and to the south and Crane Place (Figure 1.1).

1.3 Authorship

This report was written by Dr Mary Casey, Director, Casey & Lowe and Caroline Plim, historian. It was reviewed by Tony Lowe, Director, Casey & Lowe. Jenny Winnett did the overlays of historic plans.

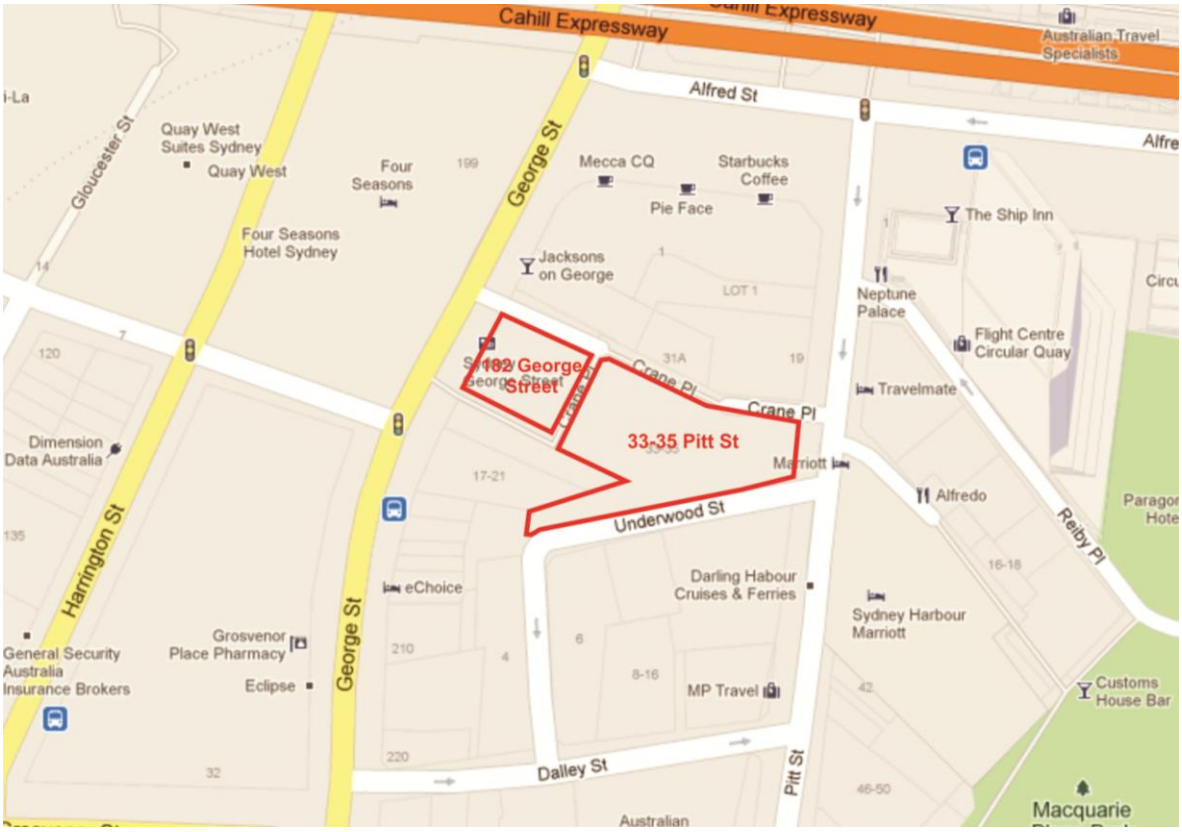

Figure 1.1: Location of the study area highlighted in red. Source: Google Maps 2012.

1.4 Acknowledgements

Warwick Bowyer, Lend Lease
Phil Bennett, Sydney Water, Program Leader, Heritage
David Grasby, Sydney Water, Asset Manager, Stormwater

1.5 Limitations

This report provides information on issues associated with the development of 33-35 Pitt Street in relation to the Tank Stream. This research includes historical background on the Tank Stream and a review of statutory issues.

1.6 Abbreviations

CCSA	Council of the City of Sydney Archives
CP	Crown Plan
IDA	Integrated Development Application
LPI	NSW Land and Property Information
ML	Mitchell Library
NLA	National Library of Australia
OCP	Old Council Plan
OEH	Office of Environment & Heritage
SLNSW	State Library of NSW
SRNSW	State Records of NSW

2.0 Study Area

2.1 Description of Site

The Tank Stream underlies Pitt Street immediately adjacent to 33-35 Pitt Street. The CMP identifies that the Tank Stream includes:

- The 'natural' tank stream being the small watercourse draining the catchment south of Sydney Harbour.
- The existing fabric of the stormwater drain.
- The tunnel of brick and stone enclosing the stormwater drain.
- The sections of the former route of the Tank Stream.
- The concept of the 'Tank Stream' as experienced, depicted and taught to generations of Australians.

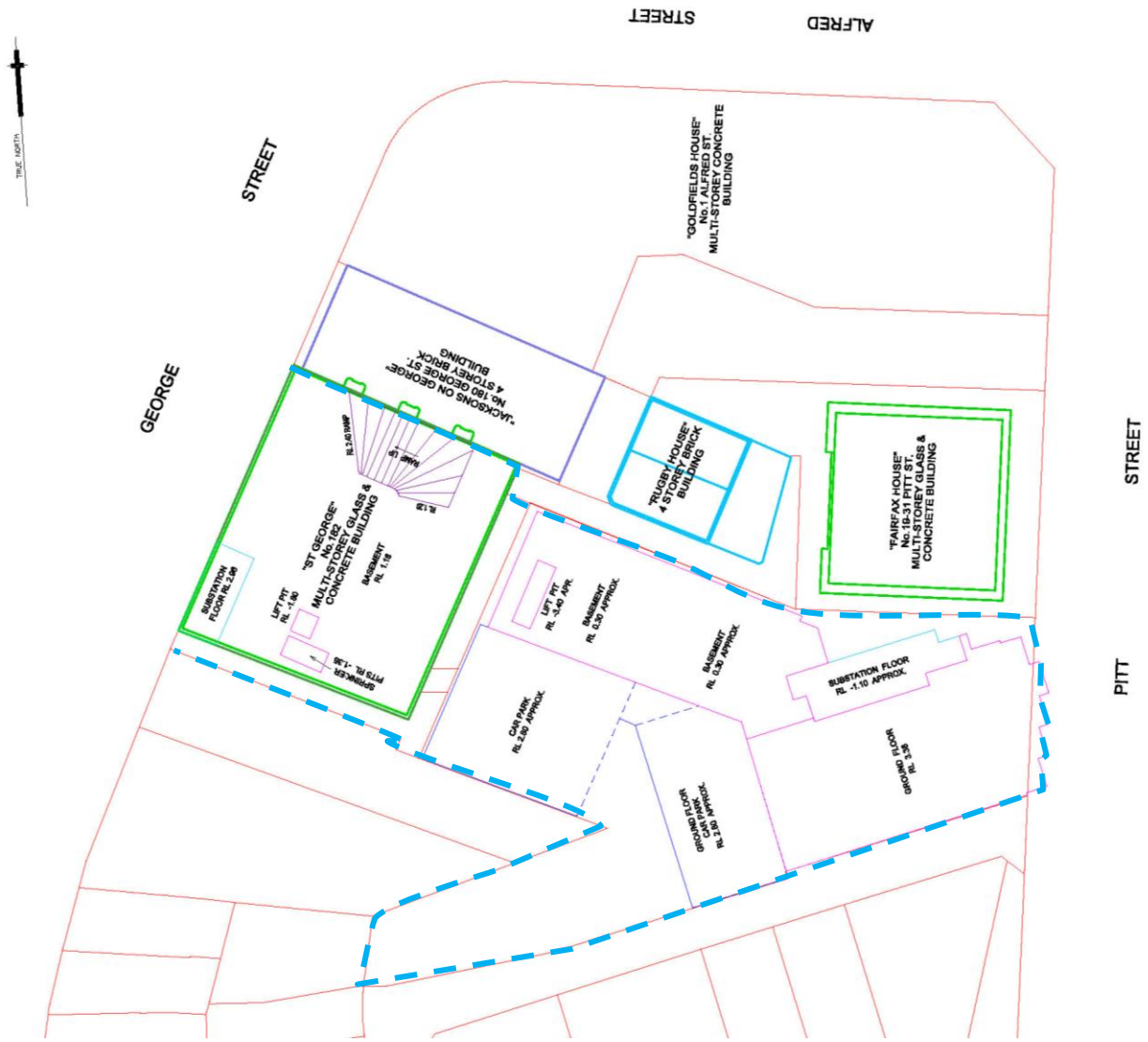

Figure 2.1: Survey plan indicating the RLs on floor levels and position of basements within the development area. This plan has been used as the basis for assessing the archaeological potential of areas. Rygates

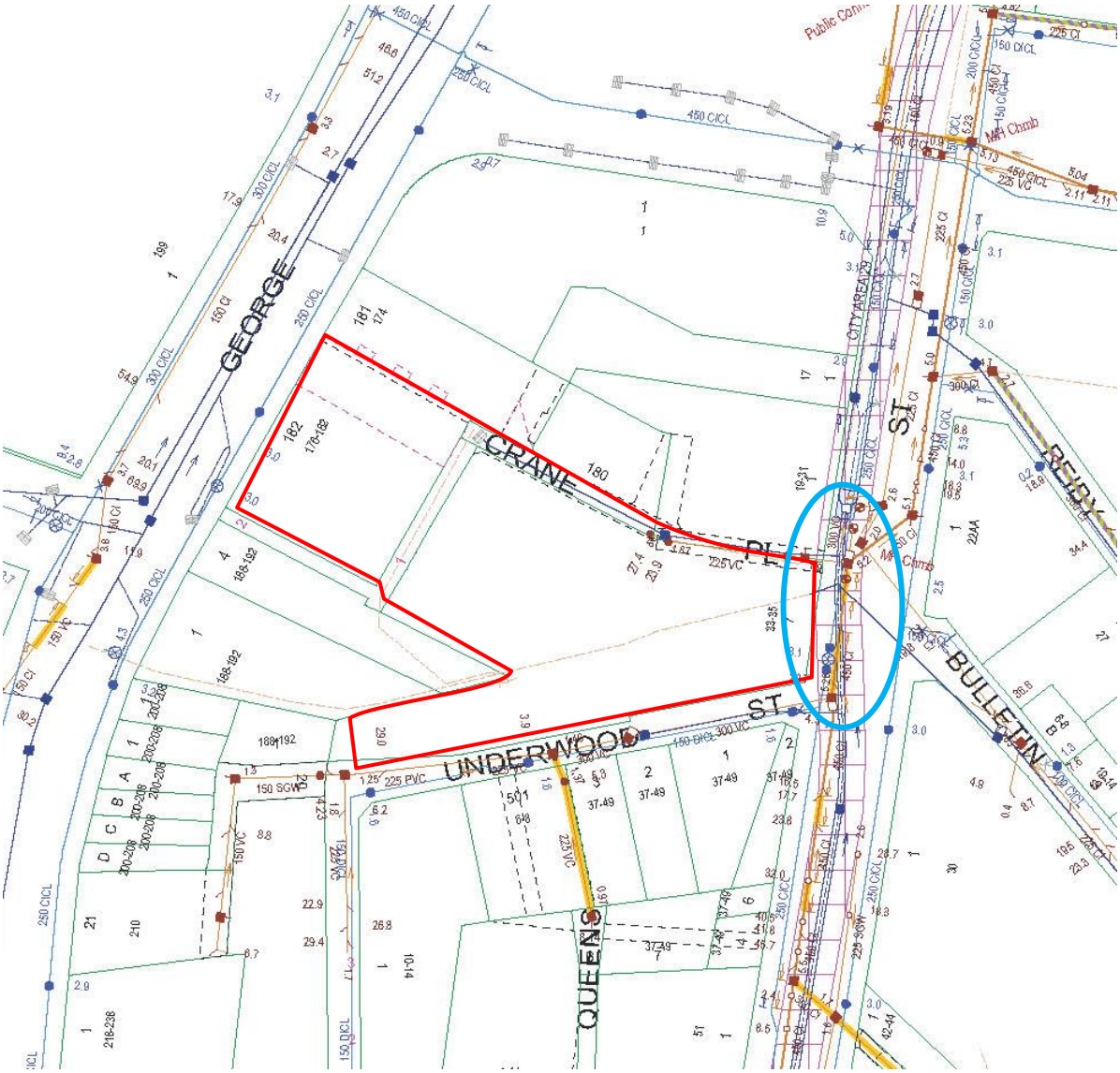

Figure 2.2: Sydney Water plan showing the purple outline of the curtilage of the Tank Stream immediately adjacent to 33-35 Pitt Street (blue oval).

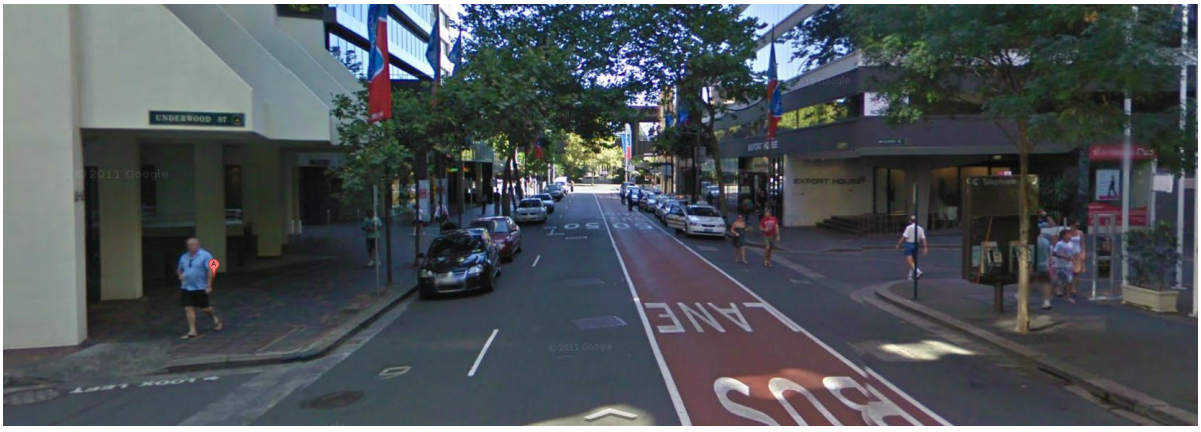

Figure 2.3: View to north along Pitt Street with 33-35 Pitt Street immediately to the west.

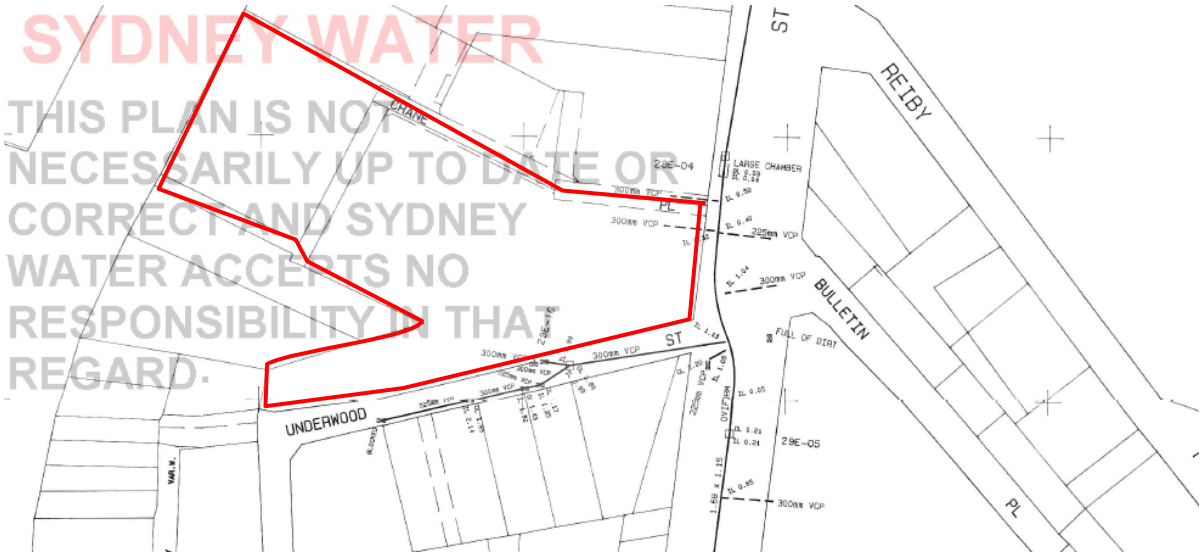

Figure 2.4: Sydney Water plan showing the Tank Stream oviform drain, and a secondary drain from Underwood Street running into the Tank Stream drain in Pitt Street. No. 33-35 Pitt Street is immediately to the west.

2.2 Selection of Tank Stream Images

Figure 2.5: Section of brick oviform drain joining arched stone section of Tank Stream. Google

Figure 2.6: Section of Tank Stream with stone floor and flat roof. Google

Figure 2.7: Birck oviform section of drain with rendered base and exposed brick upper part. Google

Figure 2.8: Section of brick oviform drain from arched stone section of Tank Stream. Google

Figure 2.9: Section of oviform Tank Stream with teracotta base. This should be similiar to the section in Pitt Street, adjacent to 33-35 Pitt Street. GPO Sydney