Taronga Zoo
Taronga Conservation Society Australia
29-Feb-2016
Doc No. 60315004-TZ-RPT-ESD-001

Ecologically Sustainable Design Report for EIS

Australia Habitat and Taronga Wildlife Retreat

Ecologically Sustainable Design Report for EIS

Australia Habitat and Taronga Wildlife Retreat

Client: Taronga Conservation Society Australia

ABN: N/A

Prepared by

AECOM Australia Pty Ltd
Level 21, 420 George Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia
T +61 2 8934 0000 F +61 2 8934 0001 www.aecom.com
ABN 20 093 846 925

29-Feb-2016

Job No.: 60315004

AECOM in Australia and New Zealand is certified to the latest version of ISO9001, ISO14001, AS/NZS4801 and OHSAS18001.

Quality Information

Document Ecologically Sustainable Design Report for EIS

Ref 60315004

Date 29-Feb-2016

Prepared by Richard Lee

Reviewed by Le Han Tan

Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
0	24-Feb-2016	DRAFT	Ian Dixon Team Leader	
1	29-Feb-2016	Incorporated Taronga Zoo Comments	Ian Dixon Team Leader	

Table of Contents

Executive Summary

This Development Application phase Ecologically Sustainable Design report has been prepared for the proposed development of a new animal exhibit and eco-tourist facility known as the “Australia Habitat & Taronga Wildlife Retreat” (The Development) within the grounds of Taronga Zoo, Mosman NSW.

This report is intended to provide an overview of the development’s proposed environmentally sustainable design strategies and operational energy efficiency initiatives, which include but is not limited to:

- Passive Design Principles;
- Energy and Water Efficiency;
- Sustainable Material Selection;
- Indoor Environmental Quality;
- Waste Minimisation;
- Ecology.

1.0 Introduction

This Ecologically Sustainable Design (ESD) report has been prepared for the Development Application submission for the proposed development of a new animal exhibit and eco-tourist facility known as the “Australia Habitat & Taronga Wildlife Retreat” (The Development) within the grounds of Taronga Zoo, Mosman NSW.

This report outlines the sustainability design strategy for The Development including details of how various initiatives may be adopted to reduce operational energy and water consumption, improve indoor environment for occupants and meet the required regulatory requirements including the National Construction Code (NCC) Building Code of Australia (BCA) Section J and the Secretary’s Environmental Assessment Requirements (SEARs).

In addition to meeting statutory requirements, The Development is targeting a 5 Star Green Star Design & As Built v1.1 rating (as administered by the independent Green Building Council of Australia).

1.1 The Proposed Development

The Taronga Zoo Centenary Redevelopment Plan will include the “Australia Habitat & Taronga Wildlife Retreat” development as follows:

- The new Taronga Wildlife Retreat pods, a new overnight conservation experience where visitors are able to experience close-up encounters with Australian animals and enjoy tours and talks within the Australian landscape including morning and evening animal encounters;
- The new Guest Lodge to accommodate reception, bar, guest interaction facilities with adjacent platypus exhibit and animal encounter facilities;
- A new kitchen and dining facility adjacent to the existing Taronga Function Centre; and
- A new wildlife sanctuary housing animals such as wallabies, bandicoots, echidnas, platypus, koalas and freshwater eels.

The proposed development site is shown in Figure 1 below.

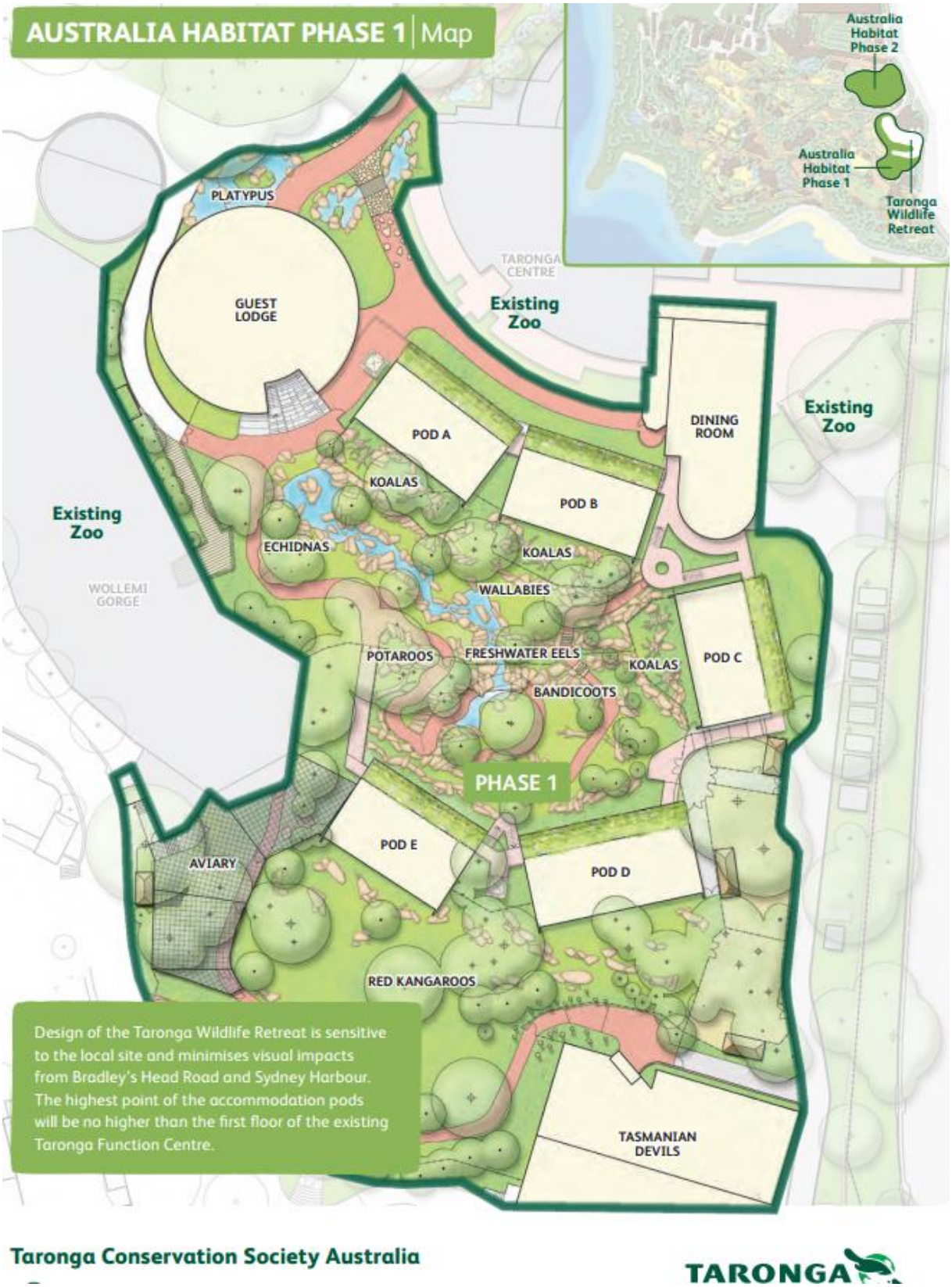

Figure 1 **Proposed Australia Habitat & Taronga Wildlife Retreat development site [Image obtained from Taronga Zoo Australia Habitat and Wildlife Retreat Fact Sheet - https://taronga.org.au/sites/default/files/AustraliaHabitatAndTarongaWildlifeRetreatFactsheet.pdf]**

2.0 Statutory and Policy Requirements

2.1 Building Code of Australia

The Development must comply mandatorily with the energy efficiency design & construction requirements of the BCA Section J, either through the Deemed-to-Satisfy (DTS) requirements or through an alternate solution (Verification Method). Access for equipment maintenance and facilities for energy monitoring will also be provided.

The BCA Section J requirements include DTS or alternative solution design & construction compliance with the following (as well as the NSW Section J):

- Part J1 Building Fabric
- Part J2: Glazing
- Part J3 Building Sealing
- Part J5: Air-conditioning and Ventilation Systems
- Part J6: Artificial Lighting and power
- Part J7: Heated Water Supply and Swimming Pool and Spa Pool Plant
- Part J8: Access for Maintenance and Facilities for Monitoring

2.2 SEARs Energy Efficiency Policies

2.2.1 Secretary's Environmental Assessment Requirements (SEARs)

Section 17 of the SEAR document (reference SSD 7419) requires the following to be addressed in the Environmental Impact Statement:

17. Ecologically Sustainable Development (ESD)

- Identify how the development will incorporate ESD principles in the design and construction phases of the development;
- Demonstrate how the development will incorporate operational energy efficient measures.

3.0 Voluntary Design Guidelines

3.1 Green Star Design & As Built v1.1 Rating Tool

The Green Building Council of Australia (GBCA) released the Green Star Design & As Built v1.1 rating tool as a holistic framework for the design and construction of new buildings and major refurbishments. The rating tool is provided to support sustainable planning, design and construction of high-performance buildings. The Development is targeting a 5 Star Green Star rating for The Development is currently being considered and further discussed in the following section.

The Green Star Design & As Built v1.1 rating tool can help to:

- Minimise the environmental impact of the development;
- Minimise the use of non-renewable energy source;
- Achieve real cost savings;
- Receive recognition for green leadership.

4.0 Sustainability Initiatives

Taronga Zoo is committed to deliver and operate a facility that is economically, environmentally and socially sustainable. A number of initiatives will be implemented for The Development to achieve this vision which covers energy, water, material, user amenity convenience and also social sustainability aspects (such as creating employment opportunities for local and indigenous stakeholders).

The sustainability vision for The Development will be integrated including optimising life-cycle considerations. The Development is targeting a 5 Star Green Star rating under the newly released Design and As Built V1.1 Tool. Depending on the program, it could be possible for The Development to be the first building of its kind in Australia to achieve formal Green Star certification using this new rating tool.

A number of sustainability initiatives for The Development have been considered for Green Star and will be further developed during the detailed design phase. These are intended to improve building energy efficiency, reduce the environmental impacts of the development, enhance economic and social benefits and offer high quality indoor and outdoor amenity to building users.

The sustainability initiatives include:

- Environmental & Building Management;
- Architectural & Passive Design;
- Water Efficiency;
- Energy Efficiency;
- Indoor Environment Quality;
- Sustainable Materials;
- Ecology;
- Waste Minimisation;
- Transport; and
- Social benefits.

4.1 Environmental & Building Management

The following environmental & building management initiatives are considered for The Development:

- Building commissioning and tuning procedures to ensure systems are operating as intended and operational efficiency
- Building information which assists with building operation, management and maintenance.
- Setting environmental benchmarks for energy, water, Greenhouse Gas emissions to ensure the development is consistently monitored and benchmarked against recognised environmental performance criteria. This information can be publically displayed for visitor's educational purposes.

4.2 Architectural & Passive Design

The Development will be designed with adherence to good passive design strategies to minimise the need for energy use and reduce operational carbon emissions. The strategies considered include:

- High levels of insulation to accommodation suites to reduce incoming heat gain and/or loss;
- Provision of natural ventilation to accommodation suites with supplementary heating and cooling available during peak ambient design conditions, to reduce energy use;
- External shading designed to minimise the impact of peak solar load during summer season;
- Green screen overhanging the accommodation to provide additional shading;
- Maximisation of daylight to occupied areas to reduce reliance on electric lighting;
- Part elevation of buildings from ground level to minimise foot print; and

- Retaining mature trees to provide shade from summer sun.

4.3 Water Efficiency

The following water saving / water efficient initiatives are considered for The Development:

- Potable water demand reduction will be achieved through the use of water efficient fixtures with high WELS rating (e.g. minimum 4 star WELS rating for fixtures)
- Fire system test water will not to be expelled during testing, but contained within a re-circulation system.
- The zoo benefits from an existing centralised stormwater capture and treatment facility which provides recycled water for wash down and flushing toilets. The design is to incorporate a local stormwater / rainwater capture system with the zoo's centralised system used for top up. Feasibility of connecting the retreat in to the existing network will be explored at the detailed design stage.
- The use of hardy local native species throughout any landscaped areas will create a low-maintenance landscape requiring minimal water.
- The water features on-site will include water-saving system which minimises water usage and water wastage.
- Metering will be installed for all major water uses in the building including an effective mechanism for monitoring consumption (i.e. BMS system with an appropriate sub metering infrastructure to help monitor the buildings performance).
- Note: Greywater and blackwater treatment are not considered viable for the site and whilst they would have environmental benefits through further potable water reduction the technology would not currently be financially sustainable when considering life cycle cost considerations.

4.4 Energy Efficiency

The following energy efficient initiatives are considered for The Development:

- Energy efficient mechanical plant with appropriate zoning to automatically respond to varying heat loads and thermal requirements of the buildings will be implemented.
- Accommodation will be fitted with ceiling fans;
- Accommodation will be fitted with switches which deactivates air conditioning when the room is unoccupied or windows are opened;
- Internal temperature set points and humidity levels will be relaxed to improve reduce energy consumption and plant capacity levels without impacting on thermal comfort.
- Energy efficient LED lighting will be used throughout the project, appropriately zoned with controls to ensure it is switched off when not required.
- The potential to use daylight controlled lighting in areas with good levels of daylight will also be investigated;
- Metering will be installed for all major energy uses within the development including an effective mechanism for monitoring energy consumption (i.e. BMS system with an appropriate sub metering infrastructure to help monitor the buildings performance).
- Low and zero carbon technologies for onsite energy generation - such as Photovoltaic will be investigated along with solar hot water.

4.5 Indoor Environmental Quality (IEQ)

The following IEQ initiatives are considered for The Development:

- Indoor environment initiatives will be targeted to deliver thermal comfort, adequate ventilation as well as acoustic and visual amenity.

- Thermal comfort will be addressed through the high performance glazing & building fabric, natural ventilation and HVAC system.
- Visual amenity will be provided by ensuring occupants have access to suitable daylight and comfortable levels of artificial lighting.
- All buildings have been designed to maximise view across the harbour and visual connection to the wildlife exhibit
- Indoor air quality will benefit from high ventilation rates and use of materials that contains no or low VOC / Formaldehyde content.

4.6 Sustainable Materials

The following sustainable material initiatives are considered for The Development:

- Extensive use of Cross-Laminated Timber (CLT). CLT will reduce building weight, foundation strength, embodied carbon, and allow pre-fabrication there-by reducing ground impact and construction programme.
- Timber selection is proposed to be recycled, certified sustainable (e.g. Forest Stewardship Council) or composite material.
- Excavated materials such as sandstone will be reused on the project where possible and as a minimum stored by the Zoo for use at other locations of the site.
- Where possible, vegetation removed to make way for the facility will be reused as browse (food) for the animals on site and climbing & shelter structures for current and new exhibits.

4.7 Ecology

The following ecology initiatives are considered for The Development:

- Non-native species will be removed, and where practical mature native species will be retained.
- All new landscaping to be local Australian native species.
- A new wildlife exhibit with native Australian animals (e.g. wallabies, koalas etc.) which will further enhancing the ecological value of the development site.

4.8 Waste Minimisation

The following waste minimisation initiatives are considered for The Development:

- Implementation of the waste principle of Avoid, Reduce, Reuse and Recycle
- Waste collection which allows for the sorting and storing of recyclable items
- Adoption and compliance with the NSW Government Resource Efficiency Policy

4.9 Transport

The following transport initiatives are considered for The Development:

- A Travel Plan which includes a site specific transport assessment and development of sustainable transport initiatives.
- Guest will be encouraged to use public transport including Sydney ferries which provide regular service to the Zoo. Currently up to 30% of visitors to the existing Roar n Snore use this mode of transport and it is anticipated similar usage will occur for the new facility.

4.10 Social Benefits

Some of the social sustainability principles considered includes:

- The project is being designed as an inter-generational and multicultural retreat that provides inclusive environments for all ages, abilities and cultures.
- The Development will be included as part of the Zoos Reconciliation Action Plan which will continue to build and enhance cultural appreciation amongst staff and visitors
- The development will provide a range of employment opportunities that will provide opportunity for the local communities. Facilitating this employment facility will be considered in the design.
- Promotion of healthy choices through access to healthy food and beverage offered within the retreat

5.0 Summary

The “Australia Habitat & Taronga Wildlife Retreat” will be designed and constructed to a high environmental standard.

The project will investigate and implement a range of environmental sustainability and energy efficiency initiatives consistent with ‘Australian Best Practice’, including the targeting of a 5 Star Green Star Design & As Built v1.1 rating.

This ESD DA report demonstrates the intent and general compliance of The Development with the Energy Efficiency and Sustainability objectives of the BCA and SEARs.