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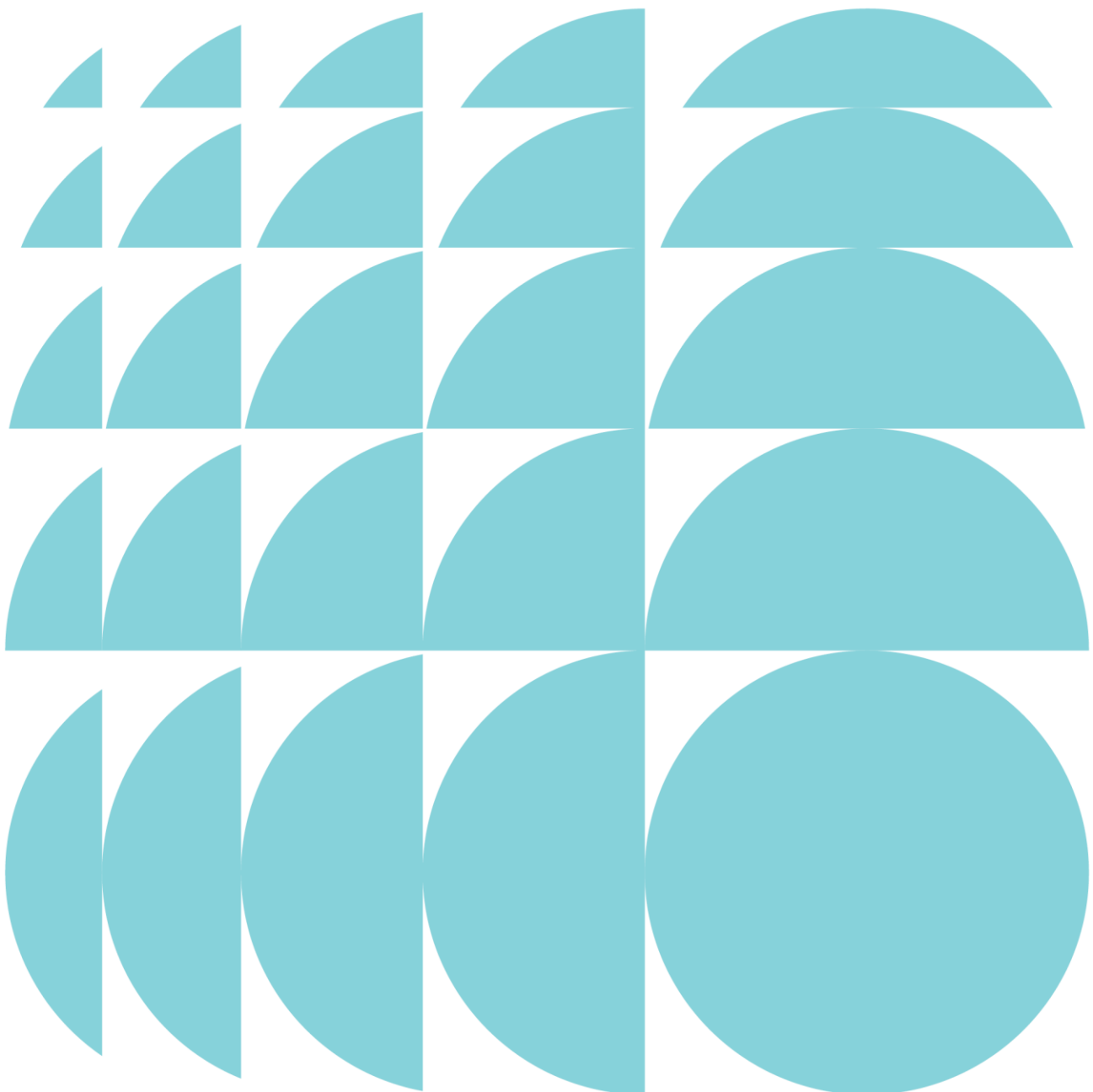
State Significant Development Application 8008

Response to Submissions Report

Taronga Zoo, Sydney
African Savannah and Congo Forest Exhibits

Submitted to Department of Planning and
Environment
On behalf of Taronga Zoo Conservation Society
Australia

14 November 2017 | 16527



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14 November 2017

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Executive Summary

Purpose of this Report

This Response to Submissions Report (RtS) is submitted to the Department of Planning and Environment (DPE) as part of a Development Application under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). It relates to a proposal for the development of two new animal exhibits, known as the African Savannah and Congo Forest exhibits within Taronga Zoo, Sydney.

Under Clause 2 of Schedule 2, of the State Environmental Planning Policy (State and Regional Development) 2011, development on the Taronga Zoo site with a capital investment of more than \$10 million is deemed State Significant Development (SSD). The proposed new exhibits will have a capital investment value of approximately \$37.5 million, and are therefore considered to be SSD.

The Environmental Impact Statement (EIS) for the proposal was publicly exhibited between 4 August 2017 and 4 September 2017, during which time submissions were received from the DPE, state agencies and Mosman Council.

Overview of the Project

Taronga Zoo is one of Australia's most popular attractions and together with the Taronga Western Plains Zoo attracts more than 1.5 million visitors annually (2014-2015).

The proposed development results from a \$164.5 million capital works development program to transform zoo facilities and visitor experiences over the next 10 years. The program is co-funded by the NSW Government and will deliver eight major wildlife exhibits at Taronga Zoo, including the African Savannah and Congo Forest exhibits, Wildlife Hospital upgrades and nine exhibit upgrades at Taronga Western Plains Zoo.

The Development Application (DA) seeks approval for two new animal exhibits, known as the African Savannah and Congo Forest exhibits. The project scope, for which approval is sought, includes the following:

- Partial demolition of the existing African Safari exhibit;
- Partial demolition of the existing Orangutan Rainforest exhibit and aviaries;
- Construction of a new African Savannah exhibit for Giraffe, Zebra, Lion, Ostrich Meerkat and Fennec Fox species;
- Construction of a new Congo Forest exhibit for, Eastern Lowland Gorillas and Okapi;
- Cliff Edge Village visitor amenities;
- Interpretative and directional signage; and
- Relocation, upgrade and augmentation of services as required.

Overview of Submissions

The EIS was exhibited from 4 August 2017 and 4 September 2017 with a total of eight submissions were received from government agencies, including:

- Department of Planning and Environment (as part of the request for a RtS report);
- Office of Environment and Heritage (OEH)
- Office of Environment and Heritage: NSW Heritage Council (Heritage Council);
- Environment Protection Authority (EPA);
- Transport for NSW (TfNSW);
- Roads and Maritime Services (RMS);
- Foreshores and Waterways Planning and Development Advisory Committee (the Committee); and
- Mosman Council (Council).

Additionally, the Department of Planning and Environment provided comments as part of the notification of submissions.

No public submissions were received.

The main issues identified within these submissions included:

- Heritage (Aboriginal and archaeological);
- Visual impact;
- Landscaping and trees;
- Noise;
- Construction management;
- Traffic and parking; and
- Operational management.

Proposed Amendments to the Proposal

In response to the issues raised within the submissions, a number of amendments have been made to the proposed development. The amendments relate primarily to exhibit size, layout and built form elements within the African Savannah and African Waterhole precincts and can be summarised as follows:

- Reduction of Giraffe back of house and viewing area footprint including:
 - Consolidation of Giraffe house and indoor yard;
 - Reduction of Giraffe House roof canopy in size and height; and
 - Separation of proposed Giraffe House from existing heritage Giraffe House.
- Relocation of Ostrich shelter;
- Minor reduction of the number of African Savannah huts and entry structures;
- Relocation of and internal consolidation of Lion back of house including the reduction of lion dens from ten to six;
- Reconfiguration of Lion viewing area and introduction of Lion keeper talk area;
- Reduction in Lion Exhibit from two to one area;
- Revised visitor circulation through Lion Exhibit including removal of existing raised boardwalk and proposed canopy structure;
- Removal of Cliff Village structures;
- Minor design modifications to Zebra viewing structure;
- Design modifications to Meerkat back of house structure;
- Minor internal modifications to Meerkat back of house;
- Minor internal modifications to Fennec Fox back of house;
- Consolidation of Africa Place viewing structures;
- Reconfiguration of public amenities; and
- Revised exhibit landscaping.

Conclusion and Justification

The proposal, identified as a State Significant Development, has been subject to an EIS and, subsequently to this RTS. The potential environmental, social and economic impacts, both direct and cumulative, have been identified and thoroughly assessed as part of the EIS and also as part of this RTS. No significant adverse environmental, social or economic impacts have been identified by the proposal in preparing the EIS or the RTS. Any potential environmental and/or cultural impacts identified will be mitigated through the implementation of measures for the construction and operation of the proposal (refer to **Section 8.0** of this RTS).

The proposed African Savannah and Congo Forest Exhibits will provide new modern exhibits which meet best practice in animal welfare, access and circulation and visitor experience, contributing to Taronga Zoo's world class reputation in animal care, education and the immersion of people with wildlife. Significant steps have been taken in the planning and design of this development to ensure it is sustainable and any environmental impacts are minimised.

The potential impacts of the development are acceptable and are able to be managed as outlined within the safeguard and mitigation measures contained within the EIS and its appended technical reports, and this RTS. Given the planning merits of the proposal, the proposed development in our assessment warrants approval by the Minister for Planning and Environment.

1.0 Introduction

1.1 Purpose of this Report

The purpose of this RTS is to respond to submissions and key issues raised the Department of Planning and Environment (DPE) and other government stakeholders during the exhibition of the EIS. This RTS has been prepared to satisfy the provisions of Section 89G of the EP&A Act and Section 85A of the *Environmental Planning and Assessment Regulation 2000* (EP&A Reg). Each of the submissions received has been collated, analysed and addressed (as relevant).

This RTS also provides a description of design amendments made to the proposed African Savannah and Congo Exhibits which have been undertaken to address submissions received and also to reduce the overall environmental impact of the proposal. In addition to this amendment description, this RTS provides further environmental assessment to accommodate the change to the proposal and serves as an addendum to the technical specialist reporting provided within the EIS.

1.1 Background to the Project

1.1.1 Taronga Zoo Capital Works Program

Taronga Zoo is one of Australia's most popular attractions and together with the Taronga Western Plains Zoo attracts more than 1.5 million visitors annually (2014-2015). Taronga Zoo has a world class reputation in education and the immersion of people with wildlife. A core function of the zoo is to increase visitor understanding of conservation practices and increase awareness of the importance of conservation and preservation of animal species.

The proposed development results from a \$164.5 million capital works development program to transform zoo facilities and visitor experiences over the next 10 years. The program is co-funded by the NSW Government and will deliver eight major wildlife exhibits at Taronga Zoo (including the African Savannah and Congo Forest exhibits), and nine exhibit upgrades at Taronga Western Plains Zoo.

1.2 Objectives of the Project

The proposal has a number of key issues and drivers which need to be addressed. Project objectives include:

- Maintain a high standard of animal welfare and care;
- Provide an enhanced visitor experience;
- Ensure DDA compliant site access for all throughout new exhibit areas;
- Protect items of heritage and cultural significance;
- Capitalise on existing topography, vegetation landscape features within the proposal;
- Engage and consult with multiple stakeholders;
- Address operational and attendance issues to ensure ongoing viability of the zoo;
- Address site access and construction issues to mitigate potential impacts of the development;
- Utilise existing services by locating, capping and/or re-routing services; and
- Ensure visitor and staff safety during construction and operation.

Animal Welfare

As a conservation organisation with the responsibility for care of wildlife, Taronga Conservation Society Australia (TCSA) ensure that at all times the needs, interests and welfare of the animals is a primary consideration. Many zoo exhibits, including the existing Savannah exhibit, created more than 20 years ago, cannot achieve these aims, and as such have to evolve with modern welfare and life science.

To persevere with old exhibit designs, layouts and features is likely to put Taronga Zoo not only at odds with modern welfare and life science, but existing and emerging animal welfare legislation, including the expectations, guidelines and requirements established under the *Exhibited Animals Protection Act 1986* (EAPA).

The primary drivers for promoting animal welfare for the large animal species that will be housed within the African Savannah and Congo Forest exhibits can be distilled to three inter-related primary considerations:

- The provision of large amounts of space that provide choice for the animals, such as shade or sun, shelter or open elements, dense foliage or open space, sharp or gentle gradients and aspects with height or lower exhibit areas;
- The provision of environmental complexity, including different sights, sounds, smells, textures and mediums; and
- The provision of socially appropriate group structures with the capacity to seek isolation or refuge from group activity and natural aggression when desired.

The proposed exhibits seek to employ current thinking in animal housing to ensure TCSA are leaders within this space, and providing exhibits designs beyond minimum National Animal Welfare Standards compliance requirements. The proposal will result in new purpose-built facilities which will provide modern enclosures, allowing functional, best-practice and safer day-to-day operations and management and substantial increases in animal enclosure footprints and amenity.

Visitor Experience

TCSA's vision for the visitor is to provide a shared future for wildlife and people, creating custodians for the wild. The current animal exhibits no longer meet local and international tourist experience expectations. As such, they require upgrades to improve visitor experience, access and circulation.

The proposal seeks to deliver a choreographed, craft journey that turns guests into custodians for the wild, incorporating interpretative and educational signage and intimate animal encounters throughout. A primary driver of the proposal is compliance with the *Disability Discrimination Act 1992* (DD Act) providing accessible pathways throughout the exhibits.

1.2.1 Approval Pathway

State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP) was adopted on 1 October 2011 and identifies State Significant Development (SSD).

Pursuant to Clause 5 of Schedule 2 of the SRD SEPP identifies that 'development that has a capital investment value of more than \$10 million on land identified as being within Taronga Zoo is declared to be SSD for the purposes of Section 89C of the EP&A Act. Consequently, the new African Savannah and Congo Forest exhibits are SSD requiring assessment under Part 4 of the EP&A Act with the Minister as the consent authority. As such, a State Significant Development Application (SSDA) was lodged with the DPE in July 2017

1.3 Overview of the Original Proposal

The Development Application (DA) seeks approval for two new animal exhibits, known as the African Savannah and Congo Forest exhibits. The original application as submitted and publicly exhibited sought approval for:

- Partial demolition of the existing African Safari exhibit, including the removal of:
 - Giraffe House (1940) and back-of-house;
 - Zebra back-of-house;
 - Meerkat exhibit, back-of-house and yards;
 - Octagonal Shelter (northern);
 - Public amenities; and
 - Paths, steps, ramps, fencing, garden beds and kerbs.

- Partial demolition of the existing Orangutan Rainforest exhibit and aviaries; including the removal of:
 - Orangutan exhibit, enclosure and back-of-house;
 - Turner House; and
 - Paths, bitumen road, steps, ramps, fencing, garden beds and kerbs.
- Construction of a new African Savannah exhibit for Giraffe, Zebra, Lion, Ostrich Meerkat and Fennec Fox species. The new exhibit will include:
 - 2,881m² Giraffe and Zebra exhibit;
 - 2,821m² Lion exhibit;
 - 394m² Meerkat/ Fennec Fox exhibit;
 - Holding dens and back-of-house facilities;
 - Animal food preparation area / equipment store;
 - Animal management infrastructure;
 - Containment fences;
 - Themed landscaping;
 - Public viewing, milling and seating areas; and
 - Visitor and staff circulation and access paths.
- Construction of a new Congo Forest exhibit for, Eastern Lowland Gorillas and Okapi. The new exhibit will include:
 - 2,726m² Gorilla exhibit;
 - 929m² Okapi exhibit;
 - Holding dens and back-of-house facilities;
 - Animal food preparation area / equipment store;
 - Animal management infrastructure;
 - Containment fences;
 - Themed landscaping;
 - Public viewing, milling and seating areas; and
 - Visitor and staff circulation and access paths.
- Cliff Edge Village visitor amenities;
- Interpretative and directional signage; and
- Relocation, upgrade and augmentation of services as required.

1.4 Overview of the Amended Proposal

In response to the issues raised within the submissions, a number of amendments have been made to the proposed development. The amendments relate primarily to exhibit size, layout and built form elements within the African Savannah and African Waterhole precincts and can be summarised as follows:

- Reduction of Giraffe back of house and viewing area footprint including:
 - Consolidation of Giraffe house and indoor yard;
 - Reduction of Giraffe House roof canopy in size and height; and
 - Separation of proposed Giraffe House from existing heritage Giraffe House.
- Relocation of Ostrich shelter;
- Minor reduction of the number of African Savannah huts and entry structures;

- Relocation of and internal consolidation of Lion back of house including the reduction of lion dens from ten to six;
- Reconfiguration of Lion viewing area and introduction of Lion keeper talk area;
- Reduction in Lion Exhibit from two to one area;
- Revised visitor circulation through Lion Exhibit including removal of existing raised boardwalk and proposed canopy structure;
- Removal of Cliff Village structures;
- Minor design modifications to Zebra viewing structure;
- Design modifications to Meerkat back of house structure;
- Minor internal modifications to Meerkat back of house;
- Minor internal modifications to Fennec Fox back of house;
- Consolidation of Africa Place viewing structures;
- Reconfiguration of public amenities; and
- Revised exhibit landscaping.

The proposed amendments are further described at **Section 5.0**.



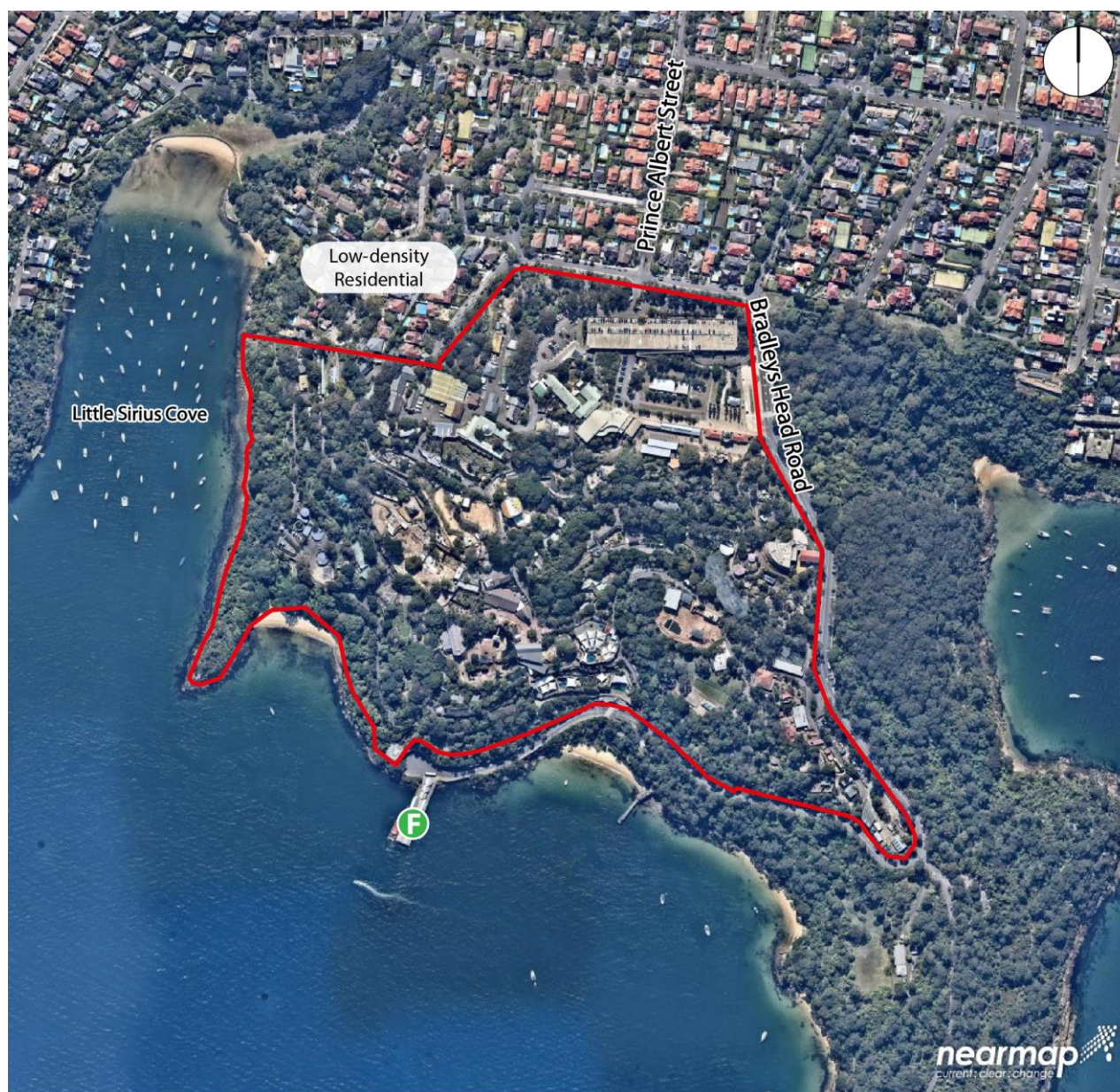
Figure 1 – Proposed Landscape Plan (as exhibited)

Source: GDA



1.5 Site Location and Context

Taronga Zoo is located approximately four kilometres north of the Sydney Central Business District (CBD), on the northern shore of Sydney Harbour within the Mosman Council Local Government Area (LGA). Irregular in shape, the zoo is bound by Bradleys Head Road to the east, Athol Wharf Road and Sydney Harbour to the south, Little Sirius Cove to the west and Whiting Beach Road to the north. The zoo is divided into eight zoo-geographic regions, over 21 hectares and is home to over 4,000 animals and 340 species. The site's locational context is shown at Figure 1.



 Taronga Zoo

Figure 3 – Aerial context map

Source: NearMap/ Ethos Urban

The proposed African Savannah and Congo Forest Exhibit sites are located within the central area of Taronga Zoo. The African Savannah Exhibit area will replace the existing African Safari exhibits, including the Giraffe Encounter, Zebras, Himalayan Tahr, Barbary Sheep, Fennec Fox and Meerkats and is located on the western side of the zoo towards Little Sirius Cove. The Congo Forest Exhibit area will replace the existing Gorilla and Orangutan Facility exhibit. The two areas will be joined by the African Waterhole. It is located to the east of the African Savannah Exhibit, centrally to the zoo site, approximately 175 metres south of the main entrance. The location of the new exhibit sites relative to the overall Taronga Zoo grounds is shown in **Figure 2** below.

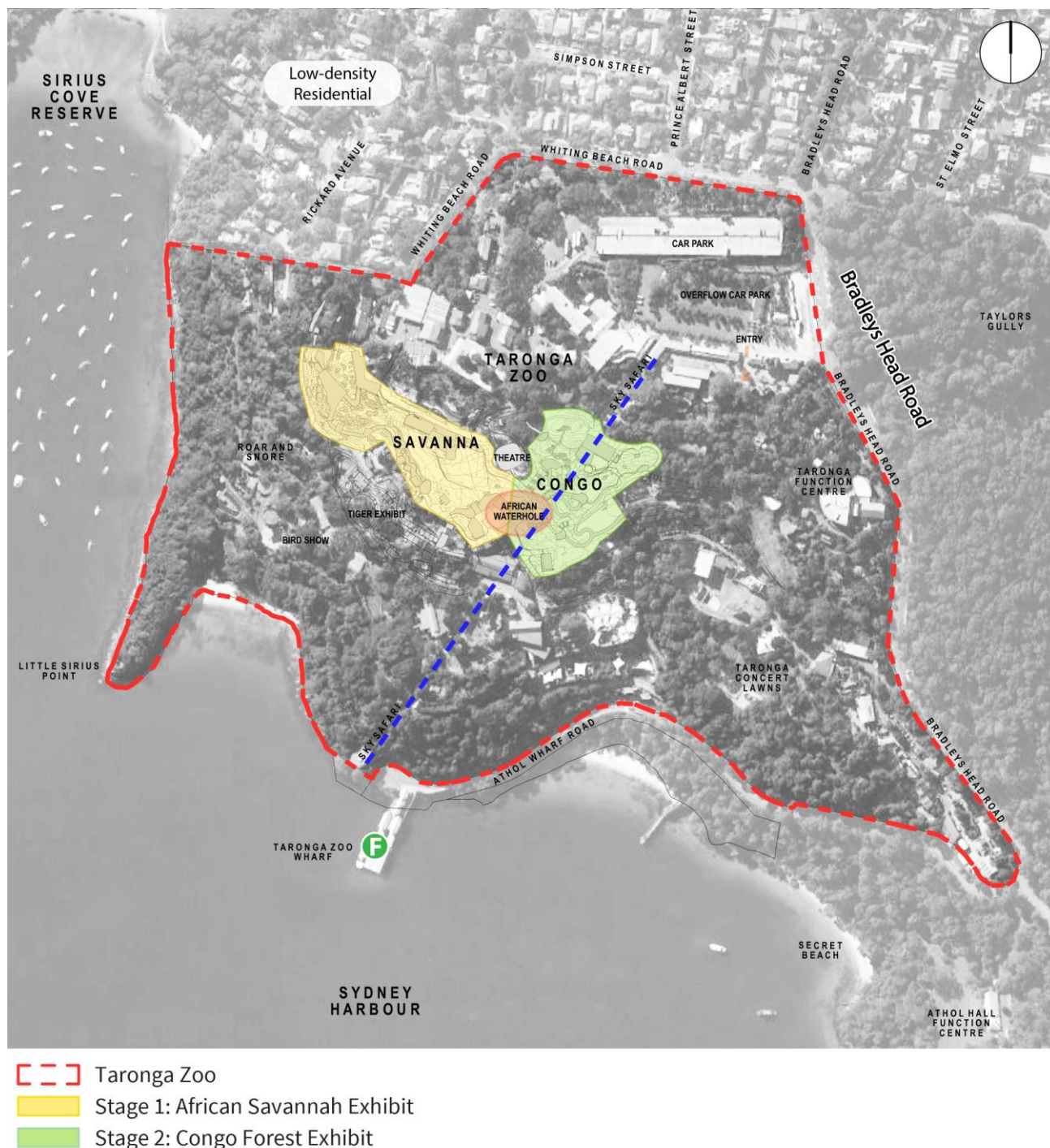


Figure 4 – Location of the African Savannah and Congo Forest exhibit sites within the Taronga Zoo grounds

Source: TZG/ Ethos Urban

1.6 Structure of this Report

The RTS includes the following sections:

- **Section 1 Introduction:** Provides an introduction to the proposal, the site context, the statutory approval process and the structure of the RTS.
- **Section 2 Exhibition and Consultation:** Provides a description of the consultation which has been undertaken as part of the proposal to date.
- **Section 3 Overview of Submissions:** Provides an analysis of the submissions received during the exhibition of the EIS and identifies key issues raised.
- **Section 4 Response to Submissions:** Provides a response to the key issues received from submissions including responses prepared by TCSA's technical specialists.
- **Section 5 Proposal Amendment:** Provides a description of the amendment to the proposed exhibits.
- **Section 6 Further Environmental Assessment:** Provides an environmental assessment of the amendment to the proposal design with reference to technical specialist addendums where relevant.
- **Section 7 Revised Mitigation Measures:** Provides a list of revised recommendations and mitigation measures based on the technical studies undertaken.
- **Section 8 Conclusion.**

Technical studies prepared to support this RTS are appended to this report.

2.0 Exhibition and Consultation

2.1 Activities prior to EIS Exhibition

During the preparation of the EIS, a number of consultation activities with key stakeholders took place in order to create an open dialogue during the design phase.

TCSA consulted with State authorities, agencies and organisations as well as community stakeholders prior to the exhibition of the EIS as per the requirement of the Secretary's Environmental Assessment Requirements (SEARs). Full details of consultation were provided in the Consultation Outcomes Report appended to the EIS. Key government stakeholders were invited to a briefing session and include:

- Department of Planning and Environment (DPE);
- Environmental Protection Agency (EPA);
- Transport for NSW (TfNSW);
- Roads and Maritime Services;
- Office of Environment and Heritage;
- NSW Fire Brigade;
- NSW Rural Fire Service;
- Mosman Mayor and Councillors;
- Mosman Chamber of Commerce;
- RSPCA;
- PETA; and
- Animals Australia.

A briefing session was held between the project team and the DPE on 24 May 2017.

In addition, surrounding residents and landowners were invited to a community information session which was held on Wednesday 10 May 2017 at Taronga Zoo, from 6pm to 7:30pm. Six interested stakeholders attended, and had the opportunity to ask questions and provide comment directly to the project team and via feedback forms provided at the session.

Key issues raised during communications and stakeholder engagement activities included:

- The height of the new Giraffe canopy;
- The design of the new theatre;
- Impact of construction upon local traffic;
- Ensuring that animal welfare standards were being maintained or improved;
- Strategic tree removal, relocation and replanting;
- Protecting Heritage features;
- Noise management; and
- Improving accessibility.

TSCA's past consultation with and engagement with the community has improved awareness and understanding of the project, and has given the applicant a sound understanding of the matters that are of most interest to the community.

2.2 Public Exhibition

The EIS was placed on exhibition between 4 August 2017 and 4 September 2017 in accordance with Section 89F(1)(a) of the EP&A Act. Hard copies of the EIS were available for public review at several locations.

The EIS (and associated supporting technical studies) was made available to the public in electronic format on the DP&E website (http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8008) during this time.

3.0 Overview of Submissions

A total of eight submissions were received during the recent exhibition of the EIS (between 4 August 2017 and 4 September 2017) all from government agencies. No public submissions were received. The primary objective of this RTS is to collate, analyse and respond to the submissions received during the exhibition of the EIS.

An overview of the submissions and a summary of the process undertaken to ensure the submissions have been accurately responded to is provided below.

3.1 Submissions received

Submissions were received from the following government agencies:

- Department of Planning and Environment (as part of the request for a RTS report);
- Office of Environment and Heritage;
- Office of Environment and Heritage: NSW Heritage Council;
- Environment Protection Authority;
- Transport for NSW;
- Roads and Maritime Services;
- Foreshores and Waterways Planning and Development Advisory Committee; and
- Mosman Council.

No public submissions were received.

3.2 Submissions Response Methodology

Each submission varied in terms of the number and types of issues raised, with some agencies raising more issues than others (dependant on their function and responsibility). Each agency submission was reviewed in detail to identify the key issues.

Those submissions were then provided to the relevant technical specialists of the zoo's project team for consideration and preparation of a response. Where additional information was required to respond to the submission issue raised, it has been provided within this RTS report.

3.3 Summary of key comments

Based on the review of submissions and analysis of comments and issues raised, the following are the key issues identified during the public exhibition period of the Savannah and Congo proposal:

- Heritage (Aboriginal and archaeological);
- Visual impact;
- Landscaping and trees;
- Noise;
- Construction management;
- Traffic and parking; and
- Operational management.

4.0 Response to Submissions

This section provides a summary of the key issues raised in the submissions.

4.1 Department of Planning and Environment

The DPE required additional information in response to a number of issues relating to:

- Heritage;
- Visual impact;
- Landscaping and trees;
- Noise impacts; and
- Exhibit areas.

4.1.1 European Heritage

An Addendum Heritage Impact Assessment (Addendum HIA) has been prepared by Geoffrey Britton (refer to **Appendix D**) in response to the DPE's request for additional information as well as to address the amendments to the proposal. A response to DPE's comments and request for additional information is provided in **Table 1** below.

Table 1 – Response to DPE comments – heritage

Comment	Response
Further consideration is to be given to the conclusion of the HIA that the proposed development would likely result in a significant change in both the cultural experience, landscape and built form of the zoo with adverse implications for the heritage value of the zoo as a whole.	<p>As outlined in Section 1.4, a number of design amendments have been made in response to the DPE and agency submissions. The amendments relate primarily to exhibit size, layout and built form elements within the African Savannah and African Waterhole precincts and include:</p> <ul style="list-style-type: none"> • Reduction and relocation of the new Giraffe House; • Relocation of the lion back of house; • Revised visitor circulation through the lion exhibit; and • Removal of the Cliff Village structures. <p>In summary, the Addendum HIA concludes that the proposed amendments have resulted in a substantial contraction in the extent of the proposed works and positive outcomes through the retention of listed heritage items. As a result almost half of the earlier assessed heritage impacts for the proposal have been either reduced or eliminated.</p> <p>The heritage impacts of the amended proposal are further discussed at Section 6.1.1 below.</p>
Further consideration is to be given to the recommendations contained in section 8.3 of the HIA (particularly nos 2 to 6).	<p>As a result of the proposed amendments to the exhibits, the recommended migratory measures noted at Section 8.3 of the HIA report have now largely been addressed. How the proposal, as amended, has addressed the recommendations have been discussed in detail within the Addendum. In summary:</p> <ul style="list-style-type: none"> • Due to the revised visitor circulation through the lion exhibit the Octagonal Shelter is no longer part of the intended circulation route. This will result in the retention of traditional views from the structure without modification; the structure will no longer be publicly accessible. However, the structure will be preserved and will remain intact with the potential to be reactivated as a public lookout in the future (recommendation no. 2). • The Grand Staircase (59L) and the rustic stone seating (58L) will form an important component of the proposed Africa Place. TCSA are committed to ensuring that the new landscape elements convincingly engage with the staircase, flanking seats and palms. Further, the revised scheme provides for a link at the top of the Grand Staircase to the Centenary Theatre Plaza, reactivating the staircase (recommendation no. 3). • The scale and form of the Giraffe House (including roof area and height) have been greatly reduced. The revised proposal will have considerably less impact on the setting of the giraffe enclosure, the 1924 Giraffe House, key views and appreciation of the giraffes themselves. Further, the eastern bay of the new Giraffe House has been removed and the entire structure relocated further

Comment	Response
	<p>west to provide greater separation between the new and the existing 1924 Giraffe House (recommendation no. 4).</p> <ul style="list-style-type: none"> • The overall extent and scale of the African Waterhole precinct and Cliff Village has been reduced, with the deletion of three proposed structures. Landscaping will provide screening to surrounding buildings and back of house areas (recommendation no. 5). • With the removal of the Cliff Village structures significant views towards Sydney Harbour will be retained with additional viewing opportunities created (recommendation no. 6).
<p>Further consideration is to be given to the identified unresolved aspects with potentially adverse heritage impacts on the setting of retained section 170 items.</p>	<p>Section 7.2.1 of the HIA prepared as part of the EIS noted some aspects of the scheme that appeared to be somewhat unresolved from a design perspective. This mainly concerned the area of Africa Place, particularly the engagement of the proposal with existing heritage features such as the Grand Staircase. The amended proposal provides greater links and connections with these elements, maintaining them as a significant feature of the exhibit areas. TCSA and the project team acknowledge the importance of ensuring a convincing integration of the proposed new design around these elements. This will be further resolved and refined during detailed design development.</p>
<p>Further consideration on the loss of a number of built and landscape elements/ structures graded as high/ exceptional/ some significance (State/ Local levels) located within the site which will have a major adverse impact on the significance of the overall site.</p>	<p>The Addendum HIA notes that the number of s170-listed heritage items affected by the proposal (Sections 7.1.5 and 7.2.5 of the HIA) remains largely consistent between the original and amended proposal. Notwithstanding, the amendments will result in the following:</p> <ul style="list-style-type: none"> • The Octagonal Shelter would no longer be impacted or enveloped by a mesh structure; • The 1924 Giraffe House will no longer be enveloped or dwarfed by the new Giraffe House; • The rustic seats (76L and 55L) will remain in situ; • Only one tree of assessed Exceptional significance is proposed to be removed; and • Only one structure of assessed Exceptional significance (1940 Giraffe House) is proposed to be removed. <p>Further, it is noted that language such as "... will have a <i>major adverse impact on the significance of the overall site</i>" is not contained within the HIA when referring to the cumulative impact of the proposal. Rather the HIA states that "Taronga Zoo as a whole (s170 Item 82A of assessed State Significance) will be affected by the loss/modification of its parts" (HIA Sections 7.1.5 and 7.2.5); "New precincts would result in a substantial area of the zoo site being modified with the loss of early layout and some key structures" (HIA Tables 7.2 and 7.5); and "... the resultant development would likely result in a significant change in both the cultural experience and landscape and built form of Taronga Zoo" (HIA Section 8.1). This is arguably not the same as determining that there would be a major adverse impact on the overall zoo site.</p> <p>It is noted that the proposed amendments substantially reduce the adverse impacts on items of heritage and cultural significance.</p>
<p>Further consideration of the proposed addition of large scale structures and alterations to the Serpentine path which will have a cumulative adverse impact on the traditional setting and identified view corridors within the site and expansive views from the site across Sydney Harbour to the city skyline.</p>	<p>As noted above the proposal has been amended to reduce the number and scale of structures throughout the precinct, specifically the reduction in the height and bulk of the Giraffe House and the removal of the Cliff Village structures.</p> <p>As part of the proposal, Serpentine Path (north) will no longer be publicly accessible being required to provide additional exhibit area and back of house access. Given the significance of the pathway, the Addendum HIA noted both positive and negative outcomes of the proposed closure of the pathway:</p> <ul style="list-style-type: none"> • Positive: <ul style="list-style-type: none"> – Some access will be retained along the pathway, albeit only staff access; – Levels are not proposed to be significantly altered where the path is retained; and – It would be possible to reinstate the full pathway and public access if changes were made to the zoo master plan in the future.

Comment	Response
	<ul style="list-style-type: none"> Negative: <ul style="list-style-type: none"> No public access along the path and the distinct hairpin bend which provides viewing opportunities out from the zoo. However, it is noted that whilst not publicly accessible the views will not be modified as a result of the proposal and could be reinstated; and Some physical impact is expected where a fence is constructed within the path area that will require some archaeological over view.
Provide details of any other amendments whereby the extent of heritage impacts could be further mitigated.	The revised proposal has addressed many of the proposed heritage mitigation measures outlined in the HIA submitted with the EIS, resulting in an improved heritage impact of the proposal. The Addendum HIA reinforces the additional measures to mitigating heritage impacts including historical archiving and interpretation strategies and TCSA's commitment to these recommendations. Further, it is anticipated that during the detailed design development of Africa Place will further integrate the proposed structures with its surroundings.
Address the Taronga Zoo Conservation Strategy 2002 (TZCS) within the HIA, particularly, section 12 'Conservation Policy'.	The HIA provided as part of the EIS does reference and provide commentary on the <i>Taronga Zoo Conservation Strategy 2002</i> (TZCS), as the Strategy together with the <i>Archaeological Management Plan 2004</i> , are key planning and management documents with respect to the zoo's heritage resources. However, both these documents are referred to and summarised within the subsequent <i>TZ African Precinct Strategic Heritage Advice 2006</i> (APSHA) which more specifically addresses the issues of the African Precincts (the site of the proposed African Savannah and Congo Forest Exhibits) over the entire zoo. It is considered that the APSHA is more pertinent to the DA area and, accordingly, the HIA report devotes over a page of discussion to the APSHA policies (that reiterate relevant policies from the TZCS and AMP) as part of the assessment of consistency of the proposal, discussed at Section 7.1.7 of the HIA.
Address further the impact of the development on specific views of heritage value to and from the site within the HIA.	<p>Views within, to and from the African Precincts are included in the specific view assessments of the Taronga Zoo Landscape Management Plan 2006. Each of these views were numbered and mapped. It is these views of assessed heritage value that have been referred to in the HIA report where the potential impact of the proposed development has indeed been considered. This is discussed under 'Setting' for both precincts and summarised for example in Tables 7.4 and 7.7 in the HIA.</p> <p>Furthermore, a comprehensive Visual Impact Statement (refer to Appendix C) has been prepared by Ethos Urban in collaboration with Geoffrey Britton, TZG and TCSA to further assess the impact of the proposal on significant views to and from the site. Refer to Section 4.1.2 and Section 6.1.2 for further discussion.</p>
Provide a diagram which clearly shows the alignment of the Original and Early Paths (item 99L) overlaid on the projects architectural and/or landscape plans.	A diagram showing the overlay of the Original and Early Paths (item 99L) on the proposed development footprint (as amended) is included at Figure 5, Figure 6 and Appendix I .
Table 27 in the EIS appears to incorporate comments in the consideration of heritage impact that do not stem from the HIA. The table also does not include the HIA's comments regarding the impact on the zoo as a whole.	Table 27 in the EIS relating to the assessment of heritage impacts of identified items of significance incorporates content from the HIA (paragraphs and tables 7.2-7.2 and 7.5-7.7) and commentary provided by TCSA on the justification/ reasons for the identified impact including key project drivers such as animal management and life sciences measures. In response to DPE's comments Table 27 has been revised in Section 6.1.1 of this report (refer to Table 6).

Comment	Response
The HIA appears to include some discrepancies regarding items within the two precincts i.e. between tables 5.1 and 7.2, and between tables 5.3 and 7.5. The significance of a number of items is not also stated.	It is noted that the HIA does contain some minor discrepancies between tables in Section 5 (Significance) and Section 7 (Assessment of Heritage Impact). This is attributed to the fact that the site areas had changed in places over time between the initial HIA Briefing and up to the final scheme before lodgement of the DA. An implication of this is that it became complex to account for items included in tables for 'Items within the Precinct' and 'Items in the vicinity of the Precinct' where precinct boundaries were adjusted. The items listed under the latter tables (7.2 and 7.5) are correct.
Table 7.5 in the HIA lists item 55 (rustic stone seats) as being retained while drawing A-050 (rev 6) denotes the seats as being removed and relocated.	The rustic seats (55L) are to be retained. Table 7.5 of the HIA is correct. The Demolition Plan (A-050) has been updated to ensure consistency (refer to Appendix B).
Confirm the proposed new location of items 145M (bollards), rustic stone seats (76L), and if applicable, rustic stone seats (55L).	As all of the rustic seats (55L, 58L and 76L) are proposed to be retained in situ the only 'hard' landscape elements proposed for relocation are the sandstone piers (Item 143M) and the Edwardian-period fencing and gate (128L). In both cases the TCSA has undertaken to ensure the items are appropriately reused in areas of the zoo where similar period elements are evident and committed for conservation.

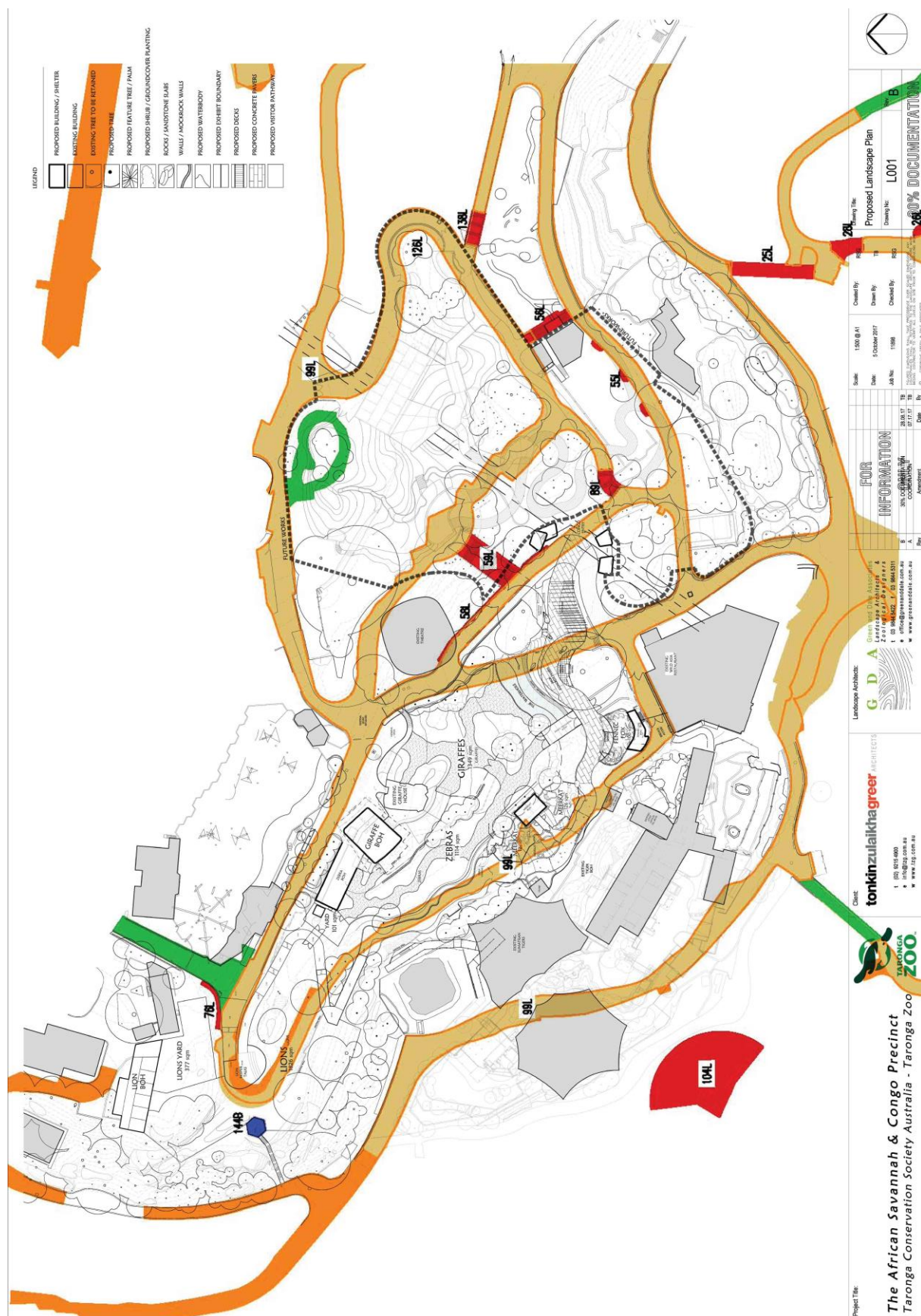


Figure 5 – Overlay of Original and Early Paths (99L)

Source: TCSA/ GDA



Figure 6 – Treatment of Early and Original Paths within exhibit boundary

Source: TCSEA/ GDA

4.1.2 Visual Impact

In response to the DPE's request for additional information, a comprehensive Visual Impact Statement (VIS) has been prepared to assess potential impacts of the proposed development (as amended) on significant views to, from and within the zoo, Sydney Harbour and key harbour vantage points. The VIS has been prepared with reference to the following:

- Taronga Zoo Landscape Management Plan 2006 (LMP 2006);
- Taronga Zoo Conservation Strategy 2002 (CS 2002);
- Taronga Zoo Master Plan Urban Design Principles and Visual Analysis 2001 (Master Plan); and
- *Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (SHREP 2005).*

These documents informed the identification of significant views to, from and within the proposed exhibit areas. The objectives, guidelines and principles of these documents subsequently formed part of the assessment criteria against which a determination of the appropriateness of the visual impact of the proposal was undertaken. The assessment of significant views and the conclusions of the VIS are discussed further at **Section 6.1.2** below.

Further, a detailed consideration of the Taronga Zoo Master Plan Urban Design Principles and Visual Analysis 2001 has been provided at **Appendix J**, which assesses the proposals consistency with the relevant guidelines and character statements.

4.1.3 Landscaping and Trees

Table 2 outlines the DPE's comments relating to landscaping and trees and the proponents response.

Table 2 – Response to DPE comments – landscaping and trees

Comment	Response
The Landscape Report provides a list of typical planting sizes and mature tree sizes. Please provide a specific breakdown of the number of each proposed tree species together with proposed planting size, mature size and length of time until maturity. The Department notes the HIA refers to intended replacement planting as 'advanced size'.	<p>An Indicative Tree List has been provided at Appendix L which details the proposed tree species along with the planting size, maturity size and length of time until maturity to address the DPE's comments.</p> <p>It is noted that the HIA refers to replacement planting of significant heritage trees as 'advanced size' where achievable, as opposed to all proposed planting across the precincts.</p>
Confirm the net loss or gain of significant trees (i.e. trees rated minimum of 'high value').	<p>A total of 555 trees are located within the boundary of the proposed exhibit areas. Of these:</p> <ul style="list-style-type: none"> • 189 trees are to be removed, consisting of: <ul style="list-style-type: none"> – 38 trees of 'high value' – 67 trees of 'moderate value' – 84 trees of 'low value' • 7 ('high value') trees to be transplanted. • 359 trees are to be retained in situ. <p>As such, the proposal will result in a net loss of 38 existing trees rated a minimum of 'high value'.</p>
Confirm the proposed location of trees to be transplanted.	<p>A Tree Transplant Plan (A-610) has been prepared by GDA and is included at Appendix B. The plan confirms the indicative location of the seven trees (of high value) and one shrub proposed to be retained and transplanted as part of the proposal.</p>

4.1.4 Noise Impacts

In relation to noise impacts, the DPE have sought confirmation as to "*whether the proposed development incorporates the methods outlined within the Acoustic Report (section 6.3.4) to mitigate animal noise in outdoor areas during defined night time hours*".

TCSA can confirm that in accordance with current animal management practices, the lions will be kept in their dens at night (from sunset to 7-7:30am), rather than in outdoor areas. For the well-being of the animals, access to outdoor areas is available, however TCSA advise that lions who are kept in captivity are not likely to venture outside at night, unless they are unwell or escaping a position of conflict. Furthermore, it is understood that lions typically roar twice a day, around feeding time (10am and 5pm). As such, roaring of lions outside of the dens during night time hours would be an atypical situation.

Notwithstanding, the mitigation of animal noise during both daytime and night time hours has been considered in the design development of the lion exhibit and back of house areas. The enclosure is proposed to be construction of blockwork with no doors or openings out of dense facing in a northern or western direction (towards sensitive residential receivers). Windows and openings on the northern façade correspond to back of house office and storage areas. This is reinforced through the proposed re-location and re-orientation of the lion back of house. The revised location offers significant shielding from local topography and existing buildings contributing to the attenuation of noise from the lion dens.

Acoustic Studio (refer to **Appendix F**) have assessed the distance and shielding attenuation, and the likely attenuation through open mesh grills from south-facing openings as well as from the proposed Bondek type roof (with internal insulation). Predicted roaring noise levels from inside the den are approximately 56-61dB(A) at the nearest residential receiver, assuming the maximum noise level roar. The more typical roaring noise level would be 45-51dB(A) at the nearest residential receiver. This complies with the Sleep Awakening Level and Sleep Disturbance Screening Level.

Due to the location of the lion dens and the existing topography, outdoor areas (which lions may access at night) are well shielded from residential receivers. For this reason solid fences would not provide any additional noise benefit. Where they have been provided as part of the proposal, they do not perform any acoustic function. Should lions roar at maximum volume from the outdoor areas, Acoustic Studio, predict noise levels at the nearest sensitive residential receiver to be approximately 61-66dB(A), generally complying with the Sleep Awakening Level (at worst exceeding the Sleep Awakening Level by 1dB). However, this level would be approximately 51-56dB(A) if a more typical roar noise level (as measured by Acoustic Studio at Perth Zoo) was applied. This is below Sleep Awakening Level assuming residential windows facing the zoo are open sufficiently to provide natural ventilation.

Additionally, the DPE have sought further information relating to the *“potential noise impacts from any changes to the ‘Roar and Snore’ activities and any other activities undertaken within the proposed exhibits outside general zoo operating hours”*.

TCSA have confirmed that there is no proposal to alter the existing ‘Roar and Snore’ operations, or any other zoo activities which may take place outside general zoo opening hours as a result of the African Savannah and Congo Forest exhibits. Current operations for Roar and Snore commence the sessions at 7:30pm. Visitors will have the opportunity to visit the lion enclosure during the tour, however as noted above lions will generally only roar around feeding time at approximately 10am and 5pm. It is concluded that there would be no night time impacts due to Roar and Snore patrons visiting the lion enclosure.

4.1.5 Exhibit Areas

The DPE have *“sought further details of the existing uses of areas to be removed to allow the proposed increase in total exhibit space”*.

In accordance with the project objectives the proposed development (as amended) will result in the delivery of larger modern enclosures for a reduced number of species within the African Savannah and Congo Forest exhibit areas. Increased exhibit footprints have been achieved through the removal and consolidation of existing exhibits, rationalisation of visitor circulation and efficient use of ancillary areas and back of house space. It is noted that the proposal will not result in the expansion of the Taronga Zoo facilities outside the zoo boundary.

The following modifications are proposed to occur to accommodate the exhibit footprints:

- **Removal of Bird Aviaries:** Expansion of the Gorilla Exhibit is achieved in part through the removal of the existing bird aviaries to the north of the Exhibit boundary. It is noted that some of these aviaries have already been removed as part of other developments within the zoo.

- **Partial removal of Serpentine Path:** It is proposed to close Serpentine Path (north) to provide additional exhibit area for the Gorilla Exhibit and provide staff back of house access only.
- **Removal of Barbary Sheep Exhibit:** The Barbary Sheep Exhibit will be removed to accommodate the lion exhibit. Partial removal of the mock rock will also occur. The Barbary Sheep will be relocated to an alternative exhibit area away from construction disruption so to ensure the continuation of their breeding program and to increase species diversity to ensure Taronga continue to practice the highest level of animal welfare.
- **Removal of Squirrel Monkey Exhibit:** The Squirrel Monkeys were moved to their current location, behind the Centenary Theatre in the old Orangutan Rainforest Exhibit, temporarily during the construction of the Institute Building to the north-west of the site. It was always planned to return the Squirrel Monkey to their original exhibit location. This would leave the Orangutan Rainforest Exhibit empty and redundant.
- **Removal of Bongo Exhibit:** The Bongo Exhibit will be relocated to alternative exhibit areas away from the proposed exhibits to reduce disruption to breeding programs and to continue advocacy of conservation and animal welfare.
- **Turner House:** The removal of Turner House, understood to be a former zookeepers residence, is proposed to be removed to accommodate the Okapi Exhibit footprint and back of house area.
- **Relocation of public amenities:** The existing parents room and toilets located to the south of the Giraffe enclosure are proposed to be relocated as part of the proposal to allow for the construction of the Giraffe exhibit and African Waterhole.
- **Relocation of the Zebra back of house:** The Zebra back of house is proposed to be relocated and consolidated with the Giraffe back of house. This will provide additional area from the consolidation of access etc.
- **Removal and consolidation of visitor circulation:** The proposal results in the removal and consolidation of visitor circulation through the exhibits. The existing raised boardwalk through the lion exhibit will be removed creating additional footprint, the access ramp will be removed to provide additional footprint for the Gorilla exhibit and the original pathway to the south of the Centenary Theatre will be removed to provide for the expansion of the Giraffe exhibit and the African Waterhole.
- **Repurposing of the existing Cassowary Yard:** The lion back of house area will be located in the currently redundant and publicly inaccessible Cassowary Yard (former location of Steven's Lookout) which consists of old shading, concrete pits, fencing and walls.

The revised Existing and Demolition Plan (A-050) provided at **Appendix B** documents the removal of these items and others. **Table 4** at **Section 5.3.1** documents the existing and proposed exhibit areas.

4.2 Office of Environment and Heritage

The Office of Environment and Heritage (OEH) provided a written submission which recommended “*that a full Aboriginal cultural heritage assessment to be prepared consistent with the SEARs*”.

An Aboriginal Archaeological Assessment (May 2017) was prepared by Dominic Steele Consulting Archaeology (DSCA) as part of the EIS. The assessment was prepared in accordance with the requirements of the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECW 2010) to identify potential Aboriginal archaeological constraints that may exist for the proposal and how to mitigate potential impacts to any documented or potential archaeological sites, objects or areas of sensitivity. The assessment concluded that no identified tangible Aboriginal objects or areas of potential archaeological sensitivity will be impacted by the proposal. It was therefore concluded that the proposal would not result in an adverse impact upon the Aboriginal archaeological values of the place and that no Aboriginal archaeological constraints are apparent for the proposal proceeding as planned.

Additionally, in accordance with the requirements of the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (2005) and *Aboriginal Cultural Heritage Requirements for Proponents* (DECCW 2010), TCSA have actively engaged with the Metropolitan Local Aboriginal Land Council (MLALC) regarding the proposal and proposed changes to the zoo in general. An inspection of the study area was undertaken by DSCA and a representative of the MLALC on 15 July 2016. No Aboriginal archaeological or cultural heritage constraints have been identified by the due diligence assessment which was completed with the MLALC.

Notwithstanding, TCSA has resolved to undertake a comprehensive Aboriginal Archaeological and Cultural Heritage Assessment (AACHA) in accordance with the *Aboriginal Cultural Heritage Requirements for Proponents* (DECCW 2010). The assessment and associated Aboriginal consultation is being undertaken by DSCA on behalf of TCSA.

Whilst the requirements are more directly tailored to securing an Aboriginal Heritage Impact Permit (AHIP) or consent or statutory approval under the *National Parks and Wildlife Act 1974* (NPWS Act 1974) it is noted that these are not required for the proposal. The requirements will be applied to the AACHA to guide consultation with registered Aboriginal parties, in order to identify and assess Aboriginal cultural heritage values and additional potential Aboriginal archaeological constraints.

In the preparation of the AACHA the following activities have been undertaken to date:

- The proponent has placed a notification in the Mosman Daily (local newspaper). A copy of the notification will be provided within the AACHA in accordance with the guidelines. It is noted that Aboriginal people have a minimum 14 days after the notice was published to register an interest;
- The proponent provided written notification to approximately 35 Aboriginal community groups in accordance with a list provided by OEH. It is noted that Aboriginal people have a minimum 14 days after the letter was sent to register an interest;
- The proponent has provided written notification to the Heritage Division, the National Title Tribunal, the Registrar *Aboriginal Land Rights Act* (ALR Act 1983) and Native Title Services Corporation (NTSCorp);
- Eight Expressions of Interest (EOI's) have been received from 'registered Aboriginal parties' (RAPs) to date;
- An EOI has been received from the Metro Land Council; and
- The proponent is currently preparing a draft AACHA ready for distribution to the RAPs and any late EOI's to obtain comment. It is noted that RAP's will have a minimum of 28 days after the proponent provides the draft content to provide written or oral comment.

Moving forward, the following activities will be undertaken:

- If required, the proponent will convene an on-site walk and talk with the RAPs;
- The proponent will consider and incorporate written or oral comments and finalise the AACHA; and
- The proponent will make the final AACHA available to the RAPs and relevant LALCs. It is noted that no AHIP application is required for the proposal.

It is proposed that the above process and finalisation of the AACHA occur concurrently with the assessment of the DA by the DPE. It is considered that this is acceptable given the findings of the Aboriginal Archaeological Assessment (May 2017) and the commitment to and commencement of the Aboriginal consultation process and preparation of the AACHA. The final AACHA will be provided to the DPE and OEH for review and consideration upon completion and prior to the determination of the DA.

4.3 Office of Environment and Heritage: NSW Heritage Council

The Office of Environment and Heritage: NSW Heritage Council (Heritage Council) submission raised a number of issues relating to European and archaeological heritage.

4.3.1 European heritage

The OEH's submission noted that the SoHI (HIA) and the EIS in relation to visual and built heritage differ in their conclusions. The EIS should be amended to be consistent with the HIA and the EIS Section 6.10.4 should include specific design modifications as per the HIA.

An Addendum HIA (refer to **Appendix D**) has been prepared to assess the heritage impacts of the development, as amended. The conclusions of the Addendum HIA have been provided at **Section 4.1.1** and **Section 6.1.1** of this report. It is noted that due to the significant amendments to the proposal in response to the submissions the heritage impacts of the proposal on items of significance, views and experience of the zoo has been greatly reduced. Additionally, as outlined in **Section 4.1.1** and the Addendum HIA the recommendations of the HIA relating

to specific design modifications have been addressed by the revised proposal. Remaining recommendations of the HIA have been incorporated in the Revised Mitigation Measures at **Section 7.0**.

Further, the OEH noted that the HIA recommends a number of mitigation measures including modifications in the scale and form of the proposed new structures that will lessen any adverse impacts on the proposal. The proposed design should, be amended to address the recommendations prior to any approval.

As discussed in **Section 1.4** and **Section 4.1.1** the proposal has been amended to address the recommendations of the HIA and the key issues raised in the submissions. As a result, the potential adverse heritage impacts of the proposal have been greatly reduced. Further integration of existing retained heritage items within the exhibit areas will be explored during detailed design development.

The recommended conditions of consent are noted by TCSA and have been addressed as part of the proposed Mitigation Measures (refer to **Section 7.0**).

4.3.2 Archaeological heritage

In response to the Heritage Council's request, a Historical Archaeological Assessment (HAA) has been prepared by Dominic Steele Consulting Archaeology (DSCA) and is included at **Appendix E**. The assessment has been prepared to assess potential (non-Aboriginal) archaeological impacts that may result from the proposed exhibits. The report should be read in conjunction with the Heritage Impact Assessment (June 2017) and the Due Diligence Aboriginal Archaeological Assessment (May 2017) submitted as part of the EIS. The findings of the report are summarised below.

With the exception of the historic pathway layout which remains, in part, through the exhibit site area, the site as a whole is located within an area of the zoo which has previously been assessed and zoned as having largely low to nil identified potential for subsurface historical archaeological evidence to be present.

The proposal will result in the potential impact on one specific piece of the original path (99L) located adjacent to the eastern boundary of the giraffe enclosure (identified in yellow in **Figure 6**) and potential archaeological elements at the former site of 'Steven's Lookout' located to the north-west of the existing Savannah exhibit and currently publicly inaccessible (refer to **Figure 7** and **Figure 8**). The paths are of State significance and any 'relics' identified at the Lookout would be items of Local significance.

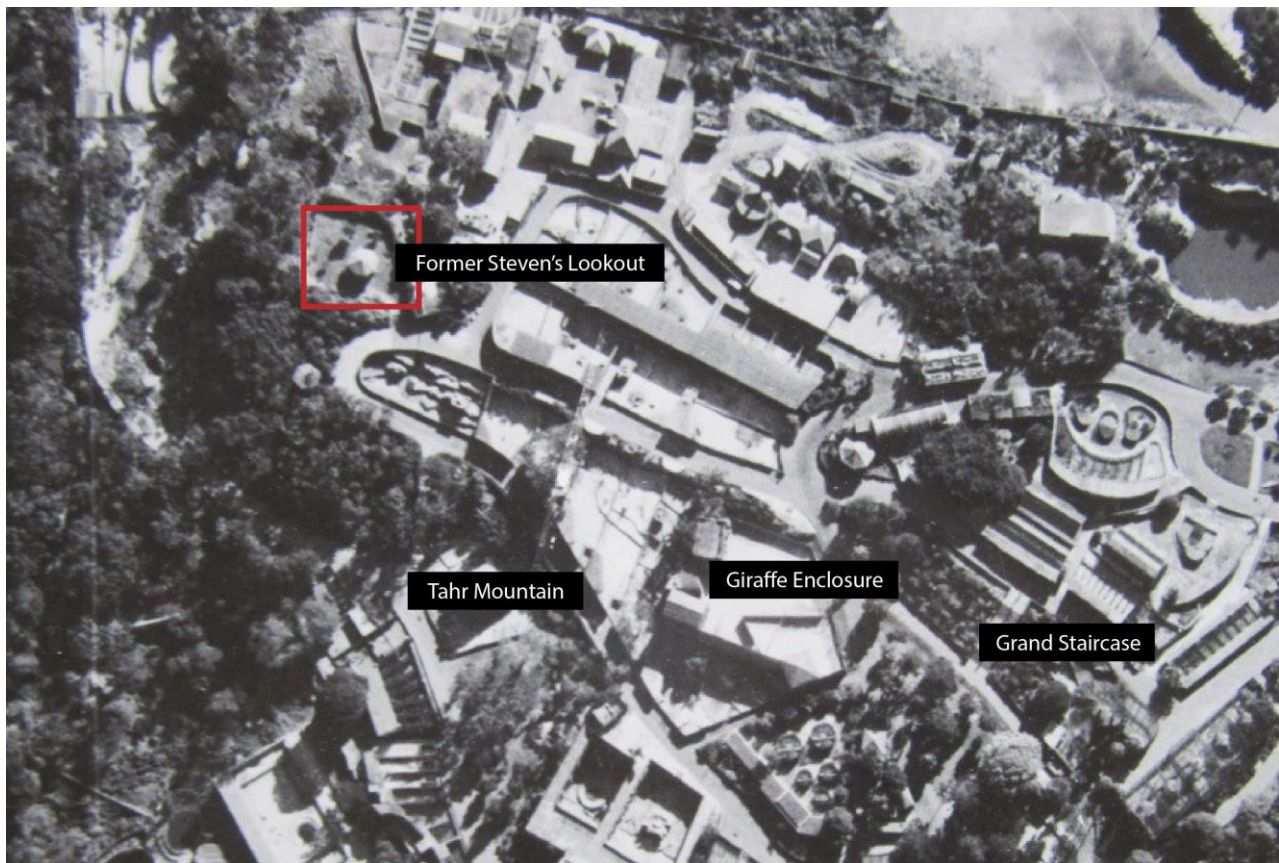


Figure 7 – Location the former Steven's Lookout impact by the proposal

Source: TCSA



Figure 8 – Current state of the former Steven's Lookout

Source: TCSA

The Taronga Zoo Archaeological Management Plan (AMP) 2004 prepared by Godden Mackay Logan considers the original path layout has high archaeological sensitivity but medium research potential. The AMP policies recommend that if new development proposals require the removal of the old path that an archaeological investigation (monitoring, test or full excavation) should be undertaken prior to the commencement of work.

Prior to construction the HAA recommends the pathway be test excavated to identify and record the form, fabric and possible phasing of the archaeological evidence that may be present. Additionally, the HAA recommends monitoring the machine-clearance works (required for the construction of the Lion Exhibit) at the site of the former Steven's Lookout to identify and record any physical evidence of this former shelter if present.

Furthermore, the HAA recommends the implementation of dual heritage inductions for site contractors, use of quick stop-work measures where archaeological items are exposed during ground excavation/ breaking works and implementation of the due diligence procedures and protocols of the Heritage Act and *National Parks and Wildlife Act 1974* (NPW Act). In the event that unexpected historical archaeological 'relics' are encountered during future construction phases in general, those works are required to cease and the NSW Heritage Office notified, pursuant to Section 146 of the Act.

The above recommendations have been incorporated within the Revised Mitigation Measures at **Section 7.0**.

4.4 Environment Protection Authority

The Environmental Protection Authority (EPA) provided a detailed submission, which addressed key issues relating to construction and operational impacts of the proposal.

4.4.1 Construction

The key issues regarding construction of the proposed exhibits included concerns and recommendations around the following:

- Site contamination and hazardous materials;
- Noise and vibration;
- Dust control and management;
- Sediment control; and
- Waste control and management.

TCSA can confirm that a Construction Environmental Management Plan (CEMP) will be developed in conjunction with the appointed contractor to ensure the above issues are managed appropriately, in line with the recommendations provided by the EPA in their submission. The CEMP will require sign off by the certifier as part of the construction certification process.

Noise and vibration

It is noted that the proponent does not propose to undertake works outside the standard construction hours. Further, TCSA advise that Saturday works are not permitted under their general contracts and that Saturday work is only permitted by the zoo on a case-by-case basis, if circumstances require Saturday work.

Acoustic Studio (refer to **Appendix F**) have undertaken an assessment of construction vehicle noise impacts on surrounding residential streets. Construction vehicles are to use Whiting Beach Road access gate, near residential receivers, during zoo opening hours. TCSA traffic management policy restricts heavy vehicles moving spoil or waste to between 7:30am to 4:30pm Monday to Fridays, and 7:30am to 1pm on Saturdays (if required). The Transport Impact Assessment (TIA) submitted as part of the EIS states that approximately two construction vehicles are expected per hour and concludes that adverse traffic impacts from these arrivals would be unlikely. During a typical weekday this constitutes a very small proportion of peak hour traffic and therefore it is concluded that construction traffic would not result in an adverse noise impact.

Further, as far as practically possible, all works relating to demolition, site preparation, bulk excavation, construction and construction related work likely to be audible at any sensitive noise receiver; will be undertaken during the

standard construction hours. Should works be required to be undertaken outside the standard construction hours approval will be sought from the Secretary.

The proposed mitigation measures raised by the EPA have been incorporated into the Revised Mitigation Measures at **Section 7.0**.

Dust control and management

The EPA's recommendation to minimise dust emissions of the site and prevent dust emissions from the site has been incorporated within the Revised Mitigation Measures at **Section 7.0**.

Sediment management

Mitigation measures relating to sediment management as recommended by the EPA have been included in the Revised Mitigation Measures included at **Section 7.0**.

Waste control and management

Mitigation measures relating to waste control and management as recommended by the EPA have been included in the Revised Mitigation Measures included at **Section 7.0**.

4.4.2 Operation

The key issues regarding operation of the proposed exhibits included concerns and recommendations around the following:

- Noise impacts;
- Waste management;
- Water sensitive urban design; and
- Energy conservation and efficiency.

TCSA can confirm that the recommendations provided by the EPA, will be incorporated where feasible, during the detailed design and operation of the proposed exhibits, including the adoption of water sensitive urban design principles and passive and active energy conservation and efficiency measures.

Noise impacts

The EPA submission outlined the requirement for *“a quantitative assessment of predicted operational noise on surrounding sensitive receivers from mechanical plant and equipment and ‘roar and snore’/ patron activities undertaken after the general zoo opening hours”*.

The Addendum Acoustic Statement prepared by Acoustic Studio (refer to **Appendix F**) confirms that the 'Roar and Snore' and other patron activities which currently take place outside general zoo operating hours will not be altered in any way due to the proposal. Current operations for Roar and Snore commence the sessions at 7:30pm. Visitors will have the opportunity to visit the lion enclosure during the tour, however during a limited time period only as the lions remain in their dens following sunset.

The operational noise impact predictions for out of general zoo operating hours relates only to mechanical plant and equipment. It is noted that final plant equipment has not been selected. However, TCSA advise that the mechanical plant to be used in the proposed exhibit is a split system cooling unit located at the rear (northern side) or the lion's den. This cooling unit is to serve a secondary office and secondary food storage area (the main offices and food storage areas are located in existing buildings to the south of the zoo premises).

The night-time NSW Industrial Noise Policy (INP) Intrusiveness criterion at the nearest residential receiver is 42dBLAeq(15min,Night) and the Amenity criterion is 40dBLAeq(Night). With distance attenuation and assuming a minimal 5dB shielding from topography and buildings (although 10-15dB is more likely in this location), this equates to an allowable plant noise level of 74 dB(A) at 3m. This level would be easily met by a single standard outdoor cooling unit which Acoustic Studio consider to be typically less than 65 dB(A) at 3m. The selection of the outdoor unit would consider the environmental noise requirements and ensure that this limiting noise level is met at 3m from the unit, in accordance with the EPA's recommendations.

4.5 Transport for NSW

The Transport for NSW (TfNSW) submission recommended that “prior to commencement of any works on the site, a Construction Traffic and Pedestrian Management Plan (CTPMP) is prepared in consultation with RMS and Mosman Council”. The preparation of a CTPMP has been included in the Revised Mitigation Measures (refer to **Section 7.0**) and will be undertaken by the proponent should it be included as a condition of consent.

4.6 Roads and Maritime Services

Roads and Maritime Services (RMS) raised no objections to or issues with the proposal.

4.7 Foreshores and Waterways Planning and Development Advisory Committee

The Foreshores and Waterways Planning and Development Advisory Committee (the Committee) did not raise any issues in their submission. It is noted that in referring the proposal to the Committee, RMS, as the approval authority, has satisfied their obligation as required under the SHSREP.

The Committee’s suggestion that the consent authority have regard to clauses 13-15, 21, 25, 26, 41, 59 and 63 of the Sydney Harbour Catchment SREP 2005 (SHSREP 2005) and the relevant clauses of the Sydney Harbour Foreshore and Waterways Area DCP 2005, particularly clauses 5.4, 5.6 and 5.11 and the relevant Landscape Character Type(s) is noted by the proponent. The EIS assessed the proposal against the relevant requirements of SHSREP 2005 and the DCP and found the proposal was generally consistent with the requirements.

4.8 Mosman Council

The Mosman Council (Council) submission raised issues relating to traffic and parking and construction staging. Specifically, Council “recommended that the traffic and parking assessment take into account the recently approved projects at the zoo, including car parking required for the “Wildlife Retreat” and that “construction works for the African Savannah and Congo Exhibits be appropriately staged to minimise overlap with other major construction projects at the zoo in order to minimise both demand for limited car parking spaces and construction traffic volumes as well as construction noise impacts”.

Traffic and parking

The Traffic Impact Assessment (July 2017) prepared by GTA provided an assessment of the traffic and transport implications of the proposal as well as the cumulative traffic and parking demands, acknowledging that the construction and operation of the proposed exhibits will occur alongside the construction and operation of other Taronga Zoo redevelopment projects.

The assessment determined that the zoo’s peak operating periods on Saturdays are between 11am and 3pm. Construction activities are typically carried out from 7am to 1pm on Saturdays with peak vehicle movements generally occurring an hour before construction activities start at 7am as well as an hour after construction activities ends at 1pm, as workers enter and leave the site. As such, the report assessed the overlap between the zoo’s peak operation and the Saturday construction peak periods, i.e. between 1pm and 2pm to determine the cumulative impact of construction. **Table 3** below outlines the expected cumulative traffic generation and parking demand during the peak period.

Table 3 – Saturday peak (1pm-2pm) cumulative traffic generation and parking demand

Project		Construction		Operation	
		Workers (Cars) ^[1]	Trucks	Staff ^[2]	Visitor
African Savannah	Traffic	Up to +6 vph	Up to +2 vph	No additional staff or parking demand	Up to +35 vph and up to 35 parking spaces required for the initial weeks of opening only, before returning to existing demand
	Parking	Up to 12 required	No parking demand		
Congo Forest	Traffic	Up to +6 vph	Up to +2 vph		
	Parking	Up to 12 required	No parking demand		
Sumatran Tiger	Traffic	Up to +5 vph	Up to +2 vph	No additional staff	Up to +30 vph
	Parking	Up to 12 required	No parking demand	No parking demand	Up to 30 required

Project	Construction		Operation		
TISL	Traffic	Up to +25 vph	Up to +2 vph	Up to +5 vph	Up to +2 vph ^[3]
	Parking	Up to 25 required	No parking demand	Up to 5 more occupied	Not applicable (coach parking)
Retreat	Traffic	Up to +25 vph	Up to +2 vph	Guest check in starts from 2pm therefore no/minimal overlap	
	Parking	Up to 25 required	No parking demand	Up to 9 parking spaces, accommodated within the staff car park	Up to 62 parking spaces. Parking demand expected to occur outside of peak period (1pm-2pm) therefore minimal impact/overlap

[1] Construction workers are assumed with a vehicle occupancy rate of 2:1

[2] Staff volumes are included in 'Visitor' volumes for the African Savannah, Congo, Sumatran Tiger and Retreat projects

[3] TISL (Taronga Institute of Science and Learning) is only opened for school students and only comprised of arrivals/departures by coaches

[4] Construction traffic volumes have been estimated by the Zoo based on observations of existing condition

Source: GTA Consultants (July 2017)

Based on the above, the following observations can be made:

- The peak operational traffic occurs between 10am and 11am, and as such does not coincide with the peak construction period which is envisaged to occur between 1pm-2pm.
- Peak construction traffic (1pm-2pm), including an overlap with zoo operations will generate peak traffic flows of 322vph (i.e. existing 230vph plus 92vph cumulative traffic).
- This peak construction traffic generation is lower than the peak traffic generation of general operations of the zoo (10am-11am) being 388vph. As such, it is considered that the site and adjacent roads can accommodate the peak cumulative construction traffic from the site of 92vph.
- The extensive parking survey revealed an 85th percentile spare capacity of 216 spaces. The peak overlapping parking demand during construction, which totals 92 spaces, can be accommodated within the existing car parking capacity.

Having consideration to the above, it is considered that the cumulative traffic and parking impacts have been sufficiently addressed and can be managed to ensure impacts are minimised. The Revised Mitigation Measures (refer to **Section 7.0**) and the Revised Preliminary Construction Management Plan (refer to **Appendix K**) provide management measures to mitigate impacts.

Construction staging

Taronga Zoo is undertaking a number of development projects as part of the capital works program over the coming years. As shown in **Figure 9** below, some of these projects will occur simultaneously.

To minimise the cumulative impacts of concurrent works TSCA intends to:

- Stage work programmes so that the minimum overlap of concurrent works occurs;
- Conduct weekly construction impacts meetings that will foresee possible construction impacts and develop programme strategies to mitigate the effects of these conflicts; and
- Provide information to interested community groups where appropriate and early notifications to neighbours if upcoming construction impacts anticipated.

Figure 6.3: Project timeline

Source: Taronga Zoo

Figure 9 – Proposed works program (July 2017)

Source: TCSA

As discussed above, the cumulative construction impacts with regard to traffic and parking demand have been addressed in the Traffic Impact Assessment (July 2017). It is concluded that potential impacts can be managed accordingly.

The Acoustic Report (May 2017) prepared by Acoustic Studio, as part of the EIS, provided an assessment of the potential construction noise impacts of the proposed exhibits. In addition, a full construction noise and vibration impact assessment and management plan will be prepared by the contractor once the structure and likely construction methods are developed. The Contractor will be responsible for preparing a detailed Works Plan and Schedule, including updated noise and vibration impact assessments for proposed methods and timing of each stage of work. The Works Schedule will be used to manage cumulative construction noise from the zoo,

5.0 Proposal Amendment

Pursuant to clause 55 of the EPA&A Reg 2000, the proposal has been amended in response to the submissions and key issues raised by the DPE and government agencies. Approval is sought for the proposal, as amended by this RtS, in accordance with Part 4, Division 4.1 of the EP&A Act.

The amendments relate primarily to exhibit size, layout and built form elements within the African Savannah and African Waterhole precincts and can be summarised as follows:

- Reduction of Giraffe back of house and viewing area footprint including:
 - Consolidation of Giraffe house and indoor yard;
 - Reduction of Giraffe House roof canopy in size and height; and
 - Separation of proposed Giraffe House from existing heritage Giraffe House.
- Relocation of Ostrich shelter.
- Minor reduction of the number of African Savannah huts and entry structures.
- Relocation of and internal consolidation of Lion back of house including the reduction of lion dens from 10 to 6.
- Reconfiguration of Lion viewing area and introduction of Lion keeper talk area.
- Reduction in Lion Exhibit from 2 to 1 area.
- Revised visitor circulation through Lion Exhibit including removal of existing pathway and proposed canopy structure.
- Removal of Cliff Village structures.
- Minor design modifications to Zebra viewing structure.
- Design modifications to Meerkat back of house structure.
- Minor internal modifications to Meerkat back of house.
- Minor internal modifications to Fennec Fox back of house.
- Consolidation of Africa Place viewing structures.
- Reconfiguration of public amenities.
- Revised exhibit landscaping.

It is considered that the proposed amendments result in a substantial reduction in the scale and bulk of the proposed exhibits and cumulatively result in a reduction of overall environmental impacts.

This section should be read as an addendum to **Section 3.0** of the EIS. Where no alteration has been made to the proposal there has been no further discussions provided within this RtS.

The following technical specialist documentation has been provided to support the amended Sydney Zoo proposal:

- Revised Architectural Drawings (refer to **Appendix A**);
- Revised Landscape Drawings (refer to **Appendix B**);
- Visual Impact Statement (refer to **Appendix C**);
- Addendum Heritage Impact Statement (refer to **Appendix D**);
- Historical Archaeological Assessment (refer to **Appendix E**);
- Addendum Acoustic Statement (refer to **Appendix F**);
- Revised BCA Report and Statement (refer to **Appendix G**);
- Access Statement (refer to **Appendix H**); and
- Revised Preliminary Construction Management Plan (refer to **Appendix K**).

5.1 Description of the Proposal

The development, as amended, seeks approval for the construction of the African Savannah and Congo Forest exhibits. A description of the amended development is provided below.

The DA, as amended as part of this RtS, seeks approval for:

- Partial demolition of the existing African Safari exhibit, including the removal of:
 - Giraffe House (1940) and back-of-house;
 - Zebra back-of-house;
 - Meerkat exhibit, back-of-house and yards;
 - Octagonal Shelter (northern);
 - Public amenities; and
 - Paths, steps, ramps, fencing, garden beds and kerbs.
- Partial demolition of the existing Orangutan Rainforest exhibit and aviaries; including the removal of:
 - Orangutan exhibit, enclosure and back-of-house;
 - Turner House; and
 - Paths, bitumen road, steps, ramps, fencing, garden beds and kerbs.
- Construction of a new African Savannah exhibit for Giraffe, Zebra, Lion, Ostrich Meerkat and Fennec Fox species. The new exhibit will include:
 - 2447m² Giraffe and Zebra exhibit;
 - 2413m² Lion exhibit;
 - 342m² Meerkat/ Fennec Fox exhibit;
 - Holding dens and back-of-house facilities;
 - Animal food preparation area / equipment store;
 - Animal management infrastructure;
 - Containment fences;
 - Themed landscaping;
 - Public viewing, milling and seating areas; and
 - Visitor and staff circulation and access paths.
- Construction of a new Congo Forest exhibit for, Eastern Lowland Gorillas and Okapi. The new exhibit will include:
 - 2,726m² Gorilla exhibit;
 - 880m² Okapi exhibit;
 - Holding dens and back-of-house facilities;
 - Animal food preparation area / equipment store;
 - Animal management infrastructure;
 - Containment fences;
 - Themed landscaping;
 - Public viewing, milling and seating areas;
 - Visitor and staff circulation and access paths.
- Interpretative and directional signage; and
- Relocation, upgrade and augmentation of services as required.

The Proposed Landscape Plan (as amended) is shown at **Figure 10**.



Figure 10 – Proposed Landscape Plan (as amended)

Source: GDA

5.2 Demolition and Tree Removal

5.2.1 Demolition

The proposed design amendments to the Lion Exhibit including the relocation of the lion back of house and revised pedestrian circulation will result in additional demolition of the existing raised pedestrian pathway. In addition, the revised proposal no longer necessitates the removal of the pedestrian pathway behind Tahr Mountain adjacent the exhibit boundary due to the removal of the Cliff Village structures. It is noted that partial demolition of the 1924 Giraffe House is required to facilitate structural works.

5.2.2 Tree Removal

To facilitate the expansion and reconfiguration of the existing exhibits, the proposal, as amended, seeks the removal of 189 native and non-native tree species of varying sizes, heights and retention value and the transplantation of a further eight trees. A revised Tree Removal and Transplant Plan (A-600) and Schedule (A-601) are provided at **Appendix B**.

5.3 Exhibit Design

5.3.1 Exhibit Layout and Size

The proposed layout of the exhibits is designed to follow a linear sequence, passing through five different zones. These zones are:

- Zone 1: Savannah – Giraffe, Zebra and Ostrich
- Zone 2: Kopje Country – Lions.
- Zone 3: Cliff Edge Village – Public amenities, education and viewing opportunities.
- Zone 4: The African Waterhole – Meerkat, Fennec Fox and Okapi.
- Zone 5: The Congo Forest – Gorillas.

The Savannah zone acts as a gateway to the new exhibits. The proposed reduction in the new Giraffe House will assist in maintain the iconic views across the giraffe enclosure towards Sydney Harbour. The proposed amendments will result in the reconfiguration of visitor circulation through the proposed Lion Exhibit and the introduction of a lion viewing and keeper talk area. This will result in one primary viewing location of the lion enclosure with the path detouring around the boundary as opposed to through the middle of two enclosures. The proposed layout and treatment of these exhibits will be as previously described.

Cliff Village, which is situated on the southern side of the zebra and giraffe enclosure, has been modified to remove the smaller viewing and interpretative structures; however the visitor pathway is retained connecting the lion enclosure with the African Waterhole.

A comparison of the existing and proposed exhibit areas are provided in **Table 4** below.

Table 4 – Exhibit comparison – existing, proposed (as exhibited), proposed (as amended)

Exhibit	Existing	Proposed (as exhibited)	Proposed (as amended)	Outcome
Zebra	742m ²	1,248m ²	1,101m ²	Decrease in proposed exhibit area however increase in area from existing.
Giraffe	773m ²	1,633m ²	1,346m ²	Decrease in proposed exhibit area however increase in area from existing.
Ostrich back of house yard	-	127m ²	117m ²	Minor decrease in proposed exhibit area.
Fennec Fox	107m ²	130m ²	101m ²	Minor decrease in existing exhibit area due to consolidation of facilities.
Meerkat	99m ²	264m ²	241m ²	Decrease in proposed exhibit area however increase in area from existing.

Exhibit	Existing	Proposed (as exhibited)	Proposed (as amended)	Outcome
Lion (including back of house yard)	-	3,078m ²	2,413m ²	Decrease in exhibition area due to consolidation of lions from 2 to 1 area. However, proposal will re-introduce lions to zoo.
Barbary Sheep	474m ²	-	-	Removal of exhibit. Opportunities to house the Barbary Sheep in alternative exhibit areas away from construction disruption to continue their breeding and increase diversity have been found and will be utilised to ensure Taronga continue to practice the highest level of animal welfare.
Gorilla	926m ²	2,726m ²	2,726m ²	No amendments proposed. Increase in exhibit area.
Squirrel Monkey	427m ²	-	-	Removal of exhibit. The Squirrel Monkey was moved into its current exhibit location temporarily during the construction of the Institute building. It was always planned to return the Squirrel Monkey to its original exhibit location.
Bongo	489m ²	-	-	Removal of exhibit. Opportunities to house the Bongo in alternative exhibit areas away from the proposed exhibits to reduce disruption to breeding programs and to continue advocacy of conservation and animal welfare.
Okapi	-	929m ²	880m ²	Introduction of exhibit.
Total	4,037m²	10,135m²	8,925m²	The proposal results in a significant increase in exhibit area through the consolidation of existing exhibit areas, circulation pathways and zoo facilities.

5.3.2 Exhibit Landscaping

The overall landscape design seeks to integrate realistic landscape and architecture which depicts the natural habitats of the Serengeti, Kenya and the eastern zone of the Congo, Central Africa.

Vegetation

The proposal has been developed around 11 distinct planting zones. These zones are characterised by various vegetation, from tall grasses of the Savannah, low dense shrubland and succulents within the Cliff Edge Village and Rocky Hillside, to dense forest canopy made up of existing ficus species and other evergreen species in the Congo Forest. The Lion exhibit maintains a natural escarpment of existing sandstone which provides an interesting contrast to the flat Savannah (Giraffe and Zebra exhibits) to the east. The exhibit is surrounded by an existing open eucalypt woodland edge to the west and southern edges. This vegetation will be retained and enhanced as part of the lion exhibit.

In total, the proposal (as amended) seeks to revegetate the exhibits with more than 28,000 plants, including 203 trees. The revised figures reflect the modifications to exhibit and public domain areas.

Table 5 – Proposed planting quantities

Type	Quantity (as exhibited)	Quantity (as amended)
Trees	226	203
Shrubs	6,559	6,244
Transplanted trees and shrubs	8	8
Grasses	18,653	3,702

Type	Quantity (as exhibited)	Quantity (as amended)
Native turf	-	15,348
Succulents	2,220	2,260
Aquatics	251	251
Vines	364	364
Epiphytes	80	80
Total site plants	28,341	28,460
Total site planting area	7,365m²	7,320m²

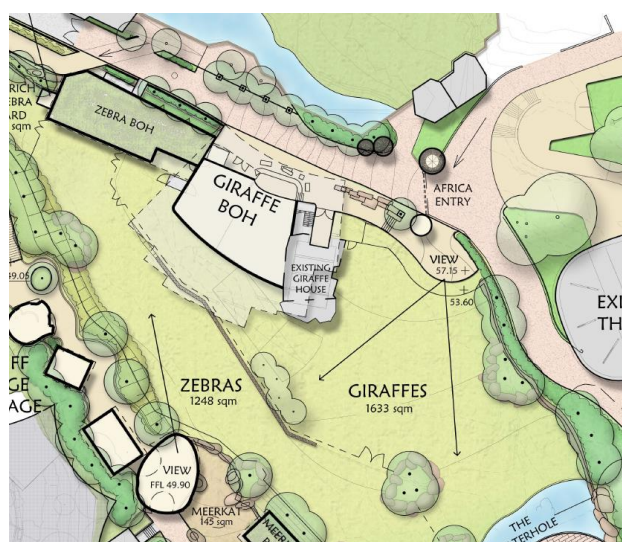
5.3.3 Exhibit Built Form

Giraffe House

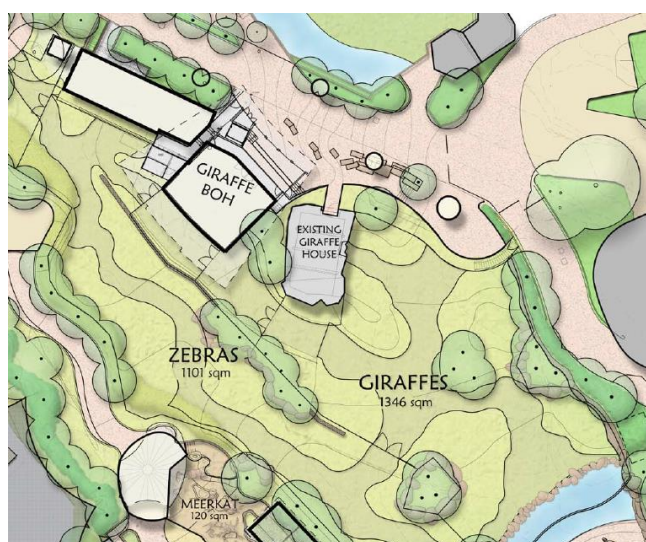
The proposed design amendments have resulted in substantial modifications to the proposed Giraffe House and back of house area. Notably:

- The Giraffe House footprint has been reduced by approximately 34% (approximately 238m²) (upper and lower ground areas combined). This reduction includes the consolidation of two to one indoor yard;
- The Giraffe House roof area has been reduced by approximately 49% (325m²) and lowered in height by approximately two metres to RL 62.755 AHD. The roof remains vaulted, consisting of multiple segments to provide good cross ventilation and reduce the bulk of the building; and
- The Giraffe House has been relocated further west to provide separation distance between the existing heritage 1924 Giraffe House.

These changes have occurred in response to issues of scale, bulk, visual impact and heritage impact raised by DPE and other agencies.



Giraffe and Zebra Exhibits (as exhibited)



Giraffe and Zebra Exhibits (as amended)

Figure 11 – Giraffe and Zebra Exhibits comparison

Lion Viewing Area and Back of House

The proposed design amendments result in substantial modifications to the proposed Lion Exhibit including:

- Relocation of and internal consolidation of Lion back of house including the reduction of lion dens from ten to six;
- Reduction in Lion Exhibit from two to one area;

- Reconfiguration of the lion viewing area and introduction of Lion keeper talk area; and
- Revised visitor circulation through Lion Exhibit including removal of existing pathway and proposed canopy structure. The visitor pathway will now follow the boundary of the exhibit as opposed to through the two previously proposed enclosures.

These changes have occurred in response to animal management and life sciences preferences. Notably, the relocation of the lion back of house will provide further separation to public visitor areas and assist with the reduction of noise by having a solid wall fronting sensitive receivers to the north.



Lion Exhibit (as exhibited)

Lion Exhibit (as amended)

Figure 12 – Lion Exhibit comparison

Source: GDA

Cliff Village

The proposed amendments result in the removal of three re-interpreted African Huts. The primary visitor pathway will remain. These changes have occurred in response to issues of visual impact. The reconfigured Cliff Village will allow for viewing opportunities over Sydney Harbour and CBD.

Meerkats and Fennec Fox Back of House

The Meerkat and Fennec Fox back of house areas have been slightly modified with regard to layout and built form. These changes result from animal management and life sciences input into the detailed design of the enclosures. Most prominently, the meerkat back of house no longer features a green roof mound, rather and flat roof. The Fennec Fox back of house area has been relocated to the exhibit level as one consolidated footprint, reducing the overall scale of the exhibit structure.

African Waterhole

The African Waterhole remains the central point of the exhibits, connecting the African Savannah and the Congo. Minor reconfiguration of the proposed public amenities is proposed which are now located adjacent the Okapi Exhibit and as part of the Taronga Food Market.

6.0 Further Environmental Assessment

This section provides an additional assessment for each of the key technical areas to identify any impacts that differ between the original design proposal and the amended design proposal. This environmental assessment provides an addendum to Section 6 of the EIS report. Additional technical specialist studies (as relevant) have been provided).

6.1 Key Issues

The key issues arising from the proposed amendments to the African Savannah and Congo Forest Exhibits relate to:

- European Heritage;
- Visual Impact;
- Flora and Fauna;
- BCA and Access; and
- Construction Management.

6.1.1 European Heritage

An Addendum Heritage Impact Assessment (refer to **Appendix D**) has been prepared to assess the proposal as amended, in particular the proposal's impact on items of significance identified within the Taronga Zoo s170 Heritage and Conservation Register (not publicly accessible).

Notably, proposed amendments will result in:

- The retention of the rustic stone seats (Item 76L and 55L) in situ;
- The 1924 Giraffe House (Item 61B(a)) will remain a freestanding structure, no longer encumbered by the proposed Giraffe House roof;
- The retention of views out to the harbour and Tahr Mountain (Item 70B);
- The Octagonal Shelter (Item 144B) will no longer be enveloped in a large mesh structure as part of the lion exhibit circulation, however it will no longer be publicly accessible; and
- The Grand Staircase (Item 59L) will be integrated further with the proposed visitor circulation route through the Congo Forest Exhibit.

As such, the Addendum HIA concludes that the proposed amendments have resulted in a substantial contraction in the extent of the proposed works and positive outcomes through the retention of listed heritage items. As a result almost half of the earlier assessed heritage impacts for the proposal have been either reduced or eliminated.

Further, Table 27 of the EIS has been updated (refer to **Table 6**) to reflect the proposed amendments. It is noted that key views assessed within the HIA have been incorporated within the Visual Impact Statement (refer to **Appendix C**).

Table 6 – Revised Heritage Impact Assessment

Item of Significance	Significance	Existing Policy Status	Proposed Works	Likely Heritage Impacts	Additional Comments
African Savannah Exhibit					
Hoop Pines x 6 (Item 53L)	State/Exceptional	Conserve and replace if lost	Retention	None.	

Item of Significance	Significance	Existing Policy Status	Proposed Works	Likely Heritage Impacts	Additional Comments
1924 Giraffe House (Item 61B(a))	State/Exceptional	Structure is State level listed outlined for conservation.	Partial demolition. Southern bay proposed to be removed and a new structure to be built adjacent.	Giraffe House would be compromised by the partial removal of southern bay.	The partial demolition of the 1924 Giraffe House is considered to result in a significant heritage impact both to the existing built form and fabric but also the surrounding area. Whilst some of the form will be retained to be appreciated, removal of the structure will result in the loss of its completeness as a house. However, the proposed modifications are considered necessary, from an animal management perspective, to adequately house and care for the giraffes into the future. Under the EAP Act `986, species like giraffes have no standards. New exhibits are approved by the Department of Primary Industries in accordance with contemporary understandings of best practice. Best practice has changed significantly since the current Taronga Zoo giraffe exhibit was constructed and as such the exhibit needs to be updated to meet contemporary standards.
1940 Giraffe House (Item 61B(b))	State/Exceptional	Structure is State level listed, outlined for conservation.	Demolition of imitation log structure.	Severe heritage impact for the 1940s building.	The demolition of the existing 1940 Giraffe House is considered to result in a significant heritage impact. The Giraffe House is identified as an iconic reference point within the Zoo, framing views over Sydney Harbour. The removal of the structure will result in the loss of historic significance as part of a post war phase of buildings constructed within the zoo. However, it is considered a necessary requirement in order to facilitate the development of improved animal welfare. As discussed above, from an animal management perspective the enclosure no longer serves its required purpose.
Tahr Mountain (Item 70B)	State/Exceptional	State level listed feature that should be conserved.	Tahr Mountain is not included within the proposal boundary.	Potential impact if note subject to appropriate conservation actions as its setting is already compromised.	Whilst it is noted that Tahr Mountain is not located within the proposals boundary TCSA has given commitment to ensuring the short-term stabilisation of the structure as part of its regular maintenance program with the intention of formulating a longer-term conservation approach.
Buttressed retaining wall (Item 74L)	Local/ Some	An element of early zoo planning outlined for conservation.	Removal of majority of existing wall.	Some impact likely.	The removal of majority of this wall is considered to result in an adverse heritage impact. However, removal of the retaining wall is considered necessary to facilitate the redevelopment of the exhibits and expansion of the current animal enclosures. This will have a positive impact on animal welfare and ongoing animal management, which is the primary driver for the project and as such is considered necessary for the longevity of the zoo.

Item of Significance	Significance	Existing Policy Status	Proposed Works	Likely Heritage Impacts	Additional Comments
Rustic stone seats (Item 76L)	State/ High-Exceptional	Conserve	Retain in situ	The proposed modifications have resulted in the retention of the stone seats in situ. No impact likely/	
Taronga Zoo (Item 82A)	State/ NA	State level listed site that should be managed to conserve key assets.	As described in Section 3.0 of EIS and Section 5.0 of RtS.	New precincts would result in a substantial area of the zoo site being modified with the loss of early layout and some key structures.	However, the proposed works will facilitate the ongoing operation of the zoo including the continued use of original enclosures e.g. Giraffe and Zebra exhibit. The addition of the waterhole is considered to have a positive heritage impact, improving the waterhole focus through coordinated design.
Pygmy Hippo (Fennec Fox) Enclosure (Item 98B)	Local/ some	A (hitherto) little appreciated structure with excellent pedigree and should be conserved.	Retained.	Little impact though lack of proposed use by either animals or public reduces its effectiveness as a comic device.	-
Octagonal shelter (Item 144B)	Local/ High	As an element of the early zoo period (1930s) it should be conserved.	Retained however publicly inaccessible.	Positive as far as retention is concerned though negative that it is no longer publicly accessible.	Owing to the revised contraction of the overall lion exhibit, it is now no longer possible to include the Octagonal Shelter along the intended public circulation route and will now no longer be publicly accessible. However, the structure would remain intact with the potential to be 'reactivated' as a public shelter/ lookout in the future.
Pathways (Item 99L)	State/ Exceptional	State level listing outlined for conservation.	Partial retention and removal.	Negative impact likely where original alignment removed.	The proposal will result in the realignment of many of the existing original pathways throughout the exhibit areas. Whilst this will have an adverse heritage impact expansion of the existing exhibits to meet contemporary best practice in animal management.
Steel pipe fence (Item 128L)	Local/ Exceptional	An element of the original/early zoo plan outlined for conservation.	Removal.	Negative due to removal. The fence and gate will be purposefully relocated, restored and incorporated in an appropriate location within the zoo where an established Edwardian-period landscape character is evident.	-
African Tulip Tree (Item 251L)	Local/ TBC	Probably moderate significance at a local level – conservation advised	Removal (Refer to Drawing A-600 Tree Removal & Transplant Plan).	Negative impact.	The removal of this tree is required for a new accessible pathway within the exhibit. Removing the tree will have a minor adverse impact on the significance of the area immediately surrounding the tree. The tree species however, is identified within the Landscape Report Plant Schedule for replacement planting. The HIA recommends replacement planting to occur.

Item of Significance	Significance	Existing Policy Status	Proposed Works	Likely Heritage Impacts	Additional Comments
Date Palms Hybrids (Item 255L/ Item 256L)	Local/ High	An item of individual significance but not necessarily present location – conservation through relocation and reuse essential.	Removal. (Refer to Drawing A-600 Tree Removal & Transplant Plan).	Negative impact as relocation and reuse is plausible.	The removal of these trees is required for a new accessible pathway within the exhibit. Removing the trees will individually is considered to result in a minor heritage impact. The species is identified within the Landscape Report Plant Schedule. The HIA recommends relocation and reuse of the existing palms.
Floss Tree (Item 271L)	Local/ High	Item of high significance at a local level. Conservation required.	Removal (Refer to Drawing A-600 Tree Removal & Transplant Plan).	Negative impact.	The removal of this tree is required for a new accessible pathway within the exhibit.
Sweet Acacia (Item 273L)	Local/ High	High significance at a local level – conservation required – however replacement with a similar fast-growing woodland species would be acceptable.	Removal (Refer to Drawing A-600 Tree Removal & Transplant Plan).	Negative impact until replacement.	The removal of this line of trees is required to facilitate a new pathway through the exhibit and reconfiguration of the existing exhibit footprint to allow more space for animal habitat. The species is identified within the Landscape Report Plant Schedule.
Pygmy Date Palm (Item 277L)	Local/ High	An item of individual significance but not necessarily in present location - Conservation through relocation and reuse essential.	Removal (Refer to Drawing A-600 Tree Removal & Transplant Plan).	Adverse impact – could be reused elsewhere.	-
Congo Forest Exhibit					
Turner House (Item 54B)	Local/ Some	Conserve/ restore and interpret	Demolition.	Major adverse impact.	Whilst the original purpose of Turner House is unknown, demolition will result in minor heritage impact as it will result in the loss of historic associations with various uses in the zoo. There will be an adverse impact from the loss of the building and its landscape setting that can be described as the Mosman vernacular that once typified the zoo and linking the zoo with its local urban context. However, demolition is considered necessary for the proposed redevelopment and expansion of the animal exhibit.
Orang-utan Rainforest (Item 103B)	Local/ Some-High	Conserve/ Adaptive reuse	Removal.	Adverse impact.	This enclosure represents an example of more recent approaches to designing minimal animal enclosures, where the structure is a secondary function to providing a natural environment. As such, the demolition of this structure will result in the loss of a more recent example of this 'non-architecture' or 'quiet architecture' and will have result in an adverse heritage impact. However, the redevelopment

Item of Significance	Significance	Existing Policy Status	Proposed Works	Likely Heritage Impacts	Additional Comments
					of the exhibit is required from an animal welfare perspective, with the new exhibit reflecting a natural habitat and passive form of enclosure.
Serpentine path (Item 126L)	Local/ Exceptional	Conserve.	Half removed (narrowed)	Adverse impact (loss of original width and loss of access to public after 100 years of use; also loss of view prospects from the area).	The proposal will result in the reconfiguration of Serpentine Path, halving it in width and providing no public access. However, the realignment is considered necessary for the ongoing operation of the zoo, provision of larger enclosures and accessible access throughout exhibit area. The proposed treatment of the pathway will allow for its potential reinstatement as a public access way in the future should the master plan for the zoo be amended. Further, the proposal will not alter the views from these locations however it is noted they will no longer be publicly accessible.
Bush bird aviaries (Item 97B)	Local/ High	Conservation/ adaptive reuse.	Removal.	Adverse impact.	The proposed removal of the original bush bird aviaries is considered to have an adverse heritage impact. The original exhibit area was associated with the exhibit of birds. The redevelopment for the Congo Forest exhibit would result in the removal of bird enclosures from this area. However, the proposal seeks to facilitate larger enclosures improving animal welfare and maintaining current standards.
Small aviary (Item 159B)	Local/ High	Conservation/ adaptive reuse.	Removal.	Adverse impact.	The proposed removal of the original bush bird aviaries is considered to have an adverse heritage impact. The original exhibit area was associated with the exhibit of birds. The redevelopment for the Congo Forest exhibit would result in the removal of bird enclosures from this area. However, the proposal seeks to facilitate larger enclosures improving animal welfare and maintaining current standards.
Pathways (Item 99L)	State/ Exceptional	Refer above.	Refer above.	Refer above.	Refer above.
Silver Date Palms (Item 183L/ Item 184L)	Local/ High	Items of individual significance but considered valuable as part of stair/seal ensemble. Conservation through relocation and reuse essential.	(Refer to Drawing A-600 Tree Removal & Transplant Plan.	Negative impact as relocation and reuse is plausible.	The removal of these trees is required for new accessible pathways within the precinct. Removal will result in a minor heritage impact. The species is identified within the Landscape Report Plant Schedule. It is noted that item 184L is to be relocated within the site.
Pygmy Date Palm (Item 278L)	Local/ High	Refer above.	Refer above.	Refer above.	Refer above.

6.1.2 Visual Impact

A Visual Impact Statement (VIS) (refer to **Appendix C**) has been prepared to assess potential impacts of the proposed development (as amended) on significant views to, from and within the zoo, Sydney Harbour and key harbour vantage points. The VIS has been prepared with reference to the following:

- Taronga Zoo Landscape Management Plan 2006 (LMP 2006);
- Taronga Zoo Conservation Strategy 2002 (CS 2002);
- Taronga Zoo Master Plan Urban Design Principles and Visual Analysis 2001 (Master Plan); and
- *Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005* (SHREP 2005).

These documents informed the identification of significant views to, from and within the proposed exhibit areas. The objectives, guidelines and principles of these documents subsequently formed part of the assessment criteria against which a determination of the appropriateness of the visual impact of the proposal was undertaken.

The following methodology was adopted in the preparation of the VIS:

- Describe the existing zoo landscape and visual setting;
- Review existing information relevant to the visual environment, including existing landform, vegetation, landscape character and significant views;
- Identify the significant views and view corridors to, from and within the proposed exhibit areas internally and externally of the zoo;
- Outline method of visual assessment;
- Identify affected views, their significance grading and sensitivity and evaluate the magnitude of change on the significant view, to assess visual impact;
- Consider the overall visual impacts and whether the proposal will result in an acceptable visual impact outcome; and
- Propose mitigation strategies.

Twenty-six (26) significant internal views were identified and assessed within the VIS. The VIS concludes that, cumulatively, the proposal will result in a minor visual impact on internal views to, from and within the proposed exhibit areas. It is considered that the identified impacts are acceptable in that:

- The proposal seeks to balance the protection of views with key project objectives being:
 - Maintain a high standard of animal welfare and care;
 - Provide an enhanced visitor experience;
 - Ensure DDA compliant site access for all throughout new exhibit areas;
 - Protect items of heritage and cultural significance;
 - Capitalise on existing topography, vegetation landscape features within the proposal; and
 - Address operational and attendance issues to ensure ongoing viability of the zoo.
- The integration of iconic views with animal exhibits is a major attraction of the zoo, and has been retained as a key design principle;
- The proposal is consistent with the objectives and guidelines of the UDAS Guidelines in that:
 - The proposal aims to protect views to the harbour from the zoo and retain the important cultural views of animals, specifically the giraffes, with the unique harbour and city backdrops;
 - No works are proposed within the key view corridors and sensitive areas, with views being protected across these gullies from Cliff Village above Tahr Mountain;
 - The proposal minimises built form intrusions within significant views providing low vegetation and low built form elements such as fencing;

- The proposal will maintain views at key public open spaces, and contribute to the creation of new viewing opportunities at the proposed lion viewing and keeper talk area; and
- Development will be staged to manage the impact on the visual appearance of the zoo.

It is therefore concluded that the cumulative visual impact of the proposal in relation to internal views to, from and within the proposed exhibit areas is acceptable.

Further, significant external views to the zoo were identified and assessed within the VIS. The VIS concludes that, the proposal will result in the addition of minor built form elements into the existing landscape, resulting in a low visual effect on view to the zoo from Sydney Harbour and key vantage points. In relation to external views towards the zoo, it is considered that the proposal remains consistent with the objectives and guidelines of the UDAS Guidelines, SREP 2005 and Sydney Harbour Foreshores and Waterways Area DCP 2005 in that it:

- The proposal seeks to protect views to the zoo from the harbour, integrating built form within the landscape and includes substantial landscaping to minimise visual intrusions on and contribute to the “well vegetated view”;
- The proposed built form is consistent with the locality and existing built form within the zoo complementing the scenic character of the area;
- The proposed built form does not protrude above the existing tree canopy or prominent ridgelines of Bradleys Head and the zoo; and
- The proposal seeks to reduce the cumulative impact of built form on views to the zoo.

It is therefore concluded, that the proposal will have an acceptable cumulative visual impact when viewed from Sydney Harbour and key surrounding vantage points.

6.1.3 Flora and Fauna

Tree Removal

The amended proposal will result in the:

- Removal of 189 trees, consisting of:
 - 38 trees of ‘high value’
 - 67 trees of ‘moderate value’
 - 84 trees of ‘low value’
- Transplantation of 7 trees (‘high value’) and 1 shrub;
- Retention of 359 trees.

This results in an overall reduction in the number of trees being removed as part of the amended proposal. However, it is noted that the amended proposal will result in the removal of two additional trees identified as ‘high value’. Tree T336 a *Eucalyptus Robusta* (Swamp Mahogany) is proposed to be removed due to its location within the lion back of house building footprint. Tree T387 a *Eucalyptus Maidenii* (Maiden Gum) is proposed to be removed due to it presenting as a lion containment risk being located adjacent the lion containment fence on a downward slope. Should the tree or tree limb to fall onto the fence line it may lead to a lion escape resulting in a major safety risk to zoo visitors and staff.

6.1.4 BCA and Access

BCA

The amended proposal has been reviewed by Blackett Maguire + Goldsmith (BM+G). A revised BCA Compliance Statement and Report are included at **Appendix G**. The statement concludes that the proposed development (as amended) can satisfy the requirements of the relevant Deemed-to-Satisfy (DtS) provisions of the BCA, subject to the inclusion of the report’s recommendations as part of detailed design development and prior to issue of the

Section 109R Crown Certificate. It is considered that minor non-compliances can be addressed without giving rise to any inconsistencies with the SSD Application.

Access and Accessibility

A key project driver is the consolidation and improvement of visitor circulation and staff access. The Premises Standards 2010 set performance requirements and provides references to technical specifications to ensure dignified access to, and use of, buildings for people with a disability. They clarify the general non-discrimination provisions of the *Disability Discrimination Act 1992* (DD Act) in relation to the design construction and management of buildings. The requirements of the Premises Standards 2010 mirror the requirements of Building Code of Australia compliance, and under that Code the buildings are required to be accessible to and within all areas normally used by occupants. Compliance with these requirements is a key driver for the proposal.

Access has been considered with regard to providing compliant access throughout the new exhibits. The existing visitor pathways have been rationalised to provide a single circulation route. Access within the exhibit areas and back-of-house has been considered to ensure safe egress for staff. The existing small caves and animal dens do not provide a safe working space in accordance with modern workplace practices.

The amended proposal has been reviewed by Accessibility Solutions (refer to **Appendix H**). The Access Statement considers the proposed works and their compliance with the relevant access provisions of the Disability (Access to Premises) Standard 2010, BCA 2016, Accessibility Standards identified within the Australian Standards and MLEP 2012. It is concluded that based on the initial architectural drawings, the proposal complies or is capable of compliance with the relevant requirements subject to implementation of the recommendations and notations contained in the report prior to be addressed prior to the issue of a Section 109R Crown Certificate. As such, the proposal will provide equitable and inclusive access for people with disabilities.

6.1.5 Construction Management

The Preliminary Construction Management Plan (PCMP), prepared by TCSA, has been updated to address the proposed amendments. The PCMP outlines site management principles and measures to mitigate impacts during the construction period. These measures are outlined below in relation to potential construction impacts. A final CMP will be prepared once a Head Contractor is appointed.

7.0 Revised Mitigation Measures

The collective measures required to mitigate the impacts associated with the proposal, as amended are detailed in **Table 7** below. These measures have been derived from the previous assessment in Section 6.0, the exhibited EIS and those detailed in appended consultants' reports. Measures proposed to be deleted are shown in ~~**bold**~~ ~~strikethrough~~. Measures proposed to be added are shown in ***bold italics***.

Table 7 – Summary of collective mitigation and management measures

Impact	Environmental Safeguard	Responsibility	Timing
Noise			
The potential for exceedance of the NMLs across the proposal footprint	<p>Prepare a construction noise and vibration management plan (CNVMP). It would be a sub-plan of the CEMP. As a minimum, the plan would:</p> <ul style="list-style-type: none"> • Map the sensitive receiver locations including residential properties • Specific strategies for reducing construction noise including: <ul style="list-style-type: none"> – Quieter plant and equipment – Quieter work methods – Strategically locating equipment and plant, waste deposits, vehicle entries – Maximising shielding in the form of existing structures or temporary barriers – Respite periods – Specify the avoidance of activities that would generate impulsive noise • Provide information for consultation, notification and complaints handling • Ensure any potentially impacted receivers are informed ahead of any planned works taking place outside of the recommended standard hours for construction works • Provide information about work scheduling • Include safeguards and management measures to manage out of hours working if required • Include an assessment to determine potential risk for activities likely to affect receivers, including for activities undertaken during and outside of standard working hours • Include a process for assessing the performance of the implemented safeguards and management measures • Specify the equipment restrictions that would be implemented at night if night works required • Undertake noise monitoring and reporting throughout the construction period. • Implement intra-day respite periods where appropriate • Manage idling and queuing of construction vehicles. <p><i>Note: The CNVMP would be routinely updated in response to any changes in noise and vibration. Tool box talks would be used to communicate constructor obligations and responsibilities under the plan.</i></p>	Construction contractor	Pre-construction
The potential for exceedance of the NMLs across the proposal footprint	<ul style="list-style-type: none"> • Selection of equipment and plant to minimise impacts. • Where possible, reduce the number of noise sources/activities running simultaneously at the same location. • Screen or enclose plant and equipment. • Plan truck access routes and times to minimise impacts. If truck routes are well managed it is considered that compliance at residential receivers can be achieved. • Vehicle pathways around the site should be arranged to minimise the need for reversing. Where reversing is necessary, the contractor should consider whether non-tonal reversing alarms are an acceptable safety alternative to tonal “beeper” alarms. 	Taronga Zoo/ Construction contractors	Detailed design/ Construction

	<ul style="list-style-type: none"> For zoo receivers, use local enclosures around generator, hammer and hand tools when within 30-40m of animal receivers. Consider quieter methods and scheduling least sensitive times for cutting/ breaking rock or masonry, compacting and for collecting and removing waste. Consider quieter methods for compacting and tipping fill. If generators are required for the site set-up, petrol generators should be used instead of diesel. The piling method needs to be selected to minimise both noise and vibration impacts and therefore bored or screw type piling methods should be implemented. 		
Construction noise impacts	<p>Working hours are to be restricted in accordance with the EPA Interim Construction Noise Guideline. Working hours are to be in accordance with:</p> <ul style="list-style-type: none"> Between 7.00am and 6.00pm, Monday to Friday. Between 8.00am and 1.00pm Saturdays. No work or deliveries on Sunday and/or public holidays. <p>If work is required to be undertaken outside normal work hours, the Contractor will need approval from the Principal. The Contractor is to provide enough information for the Principal to evaluate any potential noise impact from the proposed works.</p>	Construction contractor	Construction
Construction noise impacts	Community and business notification would be done prior to works commencing outlining the nature of the works, work hours and contact number. Additional community and business notification would be done at least five days before works outside standard hours that has a potential to cause any noise impact.	Construction contractor / Taronga Zoo	Pre-construction/ construction
Construction noise impacts	<i>Consider undertaking a safety risk assessment of the site preparation, bulk earthworks, construction and construction-related activities to determine whether it is practical to use audible movement alarms of a type that would minimise the noise impact on surrounding noise sensitive receivers, without compromising safety.</i>	Construction contractor / Taronga Zoo	Pre-construction
Construction noise impacts	Any required night time work predicted to exceed the noise management level should aim to not affect residences for more than two consecutive nights or where possible, more than six nights over a one month period.	Construction contractor / Taronga Zoo	Construction
Construction vibration impacts	<ul style="list-style-type: none"> Undertake a preliminary vibration assessment. Undertake a dilapidation survey up to 50m from the work site prior to high vibration works. Undertake vibration monitoring inside the Zoo. 	Construction contractor/ Taronga Zoo	Pre-construction/ construction
Night time sleep disturbance from roaring lions.	Detailed design of lion dens and back-of-house areas should include appropriate sound absorptive materials, solid walls and/ or fences to act as sound barriers.	Taronga Zoo	Pre-construction
Night time sleep disturbance from roaring lions.	An appropriate operational management plan will be introduced for lion care including noise compliance monitoring.	Taronga Zoo	Operation
Traffic			
Construction traffic impacts	A construction traffic management plan (CTMP) Construction Traffic and Pedestrian Management Plan	Construction contractor	Pre-construction/

	<p>(CTPMP) would be prepared as a sub-plan of the CEMP. As a minimum, the plan would include the following controls:</p> <ul style="list-style-type: none"> • Minimise use of heavy vehicles on local roads. • Restrict deliveries to outside of peak traffic periods where possible. • Ensure emergency vehicle access is maintained, including consultation with • Emergency services. • Identify haulage routes and minimise impacts on local routes. • Provide warning and advisory signage. • Providing safe access points to work areas from the adjacent road network. • Safety barriers where necessary. • Maintaining adequate sight distance. • Displaying prominent warning signage. • Covering truck loads. • Avoiding vehicle idling. • Deliveries planned to minimise the number of trucks arriving at site at one time. • Materials delivered and spoil removed from the site during standard construction hours. • Use of Traffic Controllers to ensure safe vehicle and pedestrian movements for example when trucks enter or leave the site. • A Driver Code of Conduct plan. • Provide for local community consultation and notification of local road network and traffic impacts. 		Construction
Management of on-street parking demand	<p>The following initiatives are encouraged:</p> <ul style="list-style-type: none"> • Promote the avoidance of on street parking with Taronga Zoo employees and contractors. • Promote the use of public transport. 		
Vegetation and Biodiversity			
Vegetation and Tree Removal	<ul style="list-style-type: none"> • Tree removal work shall be carried out by an experienced tree surgeon in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998). Care shall be taken to avoid damage to other trees during the felling operation. • Stumps located within the TPZs of trees to be retained shall be grubbed-out where required using a mechanical stump grinder (or by hand where less than 150mm in diameter) without damage to the root system of other trees. • Where trees to be removed are within the SRZ of any trees to be retained, consideration should be given to cutting the stump close to ground level and retaining the root crown intact. • Stumps within the Tree Protection Zone of other trees to be retained shall not be pulled out using excavation equipment or similar. • Implement replacement planting with at a minimum the equivalent number of trees should be planted within 	Taronga Zoo/ Construction Contractor	Pre-construction/ Construction

	<p>the site. Replacement trees should preferably include some locally indigenous species.</p> <ul style="list-style-type: none"> Where hollow-bearing trees are to be removal, suitable replacement hollow augmentation or next box installation will take place. <p>A qualified Project Ecologist with experience in handling wildlife should be on site during all vegetation removal/ clearing to capture and relocate any displaced, healthy animals, or care for / rehabilitate any injured or orphaned animals.</p>		
Preservation of trees to be retained	<p>Prepare and implement a Tree Protection Plan (TTP) which documents proposed tree protection devices including:</p> <ul style="list-style-type: none"> Tree protection fencing; Trunk Protection; Ground Protection; A list of prohibited activities within the TPZ; and <p>Other recommended measures to ensure the protection of TPZ of trees to be retained as part of the proposal.</p>	Taronga Zoo/ Arborist/ Construction Contractor	Detailed design/ Pre-construction/ Construction
Removal of fauna habitat	<p>Prior to removal of man-made structures that provide suitable roosting habitat for microbats, a pre-clearing ecological assessment should be undertaken by a suitably qualified ecologist to determine the presence or suitability of the artificial habitat for roosting microbats. An ecologist should then be on site during demolition works to capture and relocate any displaced fauna including bats.</p>	Taronga Zoo/ Ecologist	Pre-construction
Predation by Captive Fauna	<p>Prior to construction one or more qualified Ecologists with wildlife handling experience should be engaged to capture and relocate any fauna from within the area of the proposed enclosure. This will include checking of all caves, crevices, tree hollows, nests, shrubs, pipelines and culverts for fauna hiding in situ. It is also advised that up to a week of targeted fauna trapping is undertaking to capture any native fauna (e.g. possums) traversing the site of the proposed enclosure. This effort should be repeated prior to the final release of any predatory fauna within a new exhibit.</p>	Taronga Zoo/ Ecologist	Pre-construction/ Pre-operation
Targeted survey for Southern Myotis (Myotis macropus)	<p>Detailed surveying including Harp-trapping and acoustic detection to determine the presence of this vulnerable species within the site and potential impacts.</p>	Taronga Zoo	Pre-construction
Noxious weeds	<p>Implement a noxious weeds management plan with bushland restoration (weed removal) strategies.</p>	Taronga Zoo	On-going
Bushfire Management			
Building design	<p>Design and construction of any proposed buildings to comply with the construction requirements for BAL-12.5 as per <i>AS 3959-2009 Construction of buildings in bushfire-prone area</i>.</p>	Taronga Zoo	Design/ construction
Maintenance of vegetation	<p>Maintain access roads and tracks within the site and consider the following ongoing management of any buildings and landscaped areas:</p> <ul style="list-style-type: none"> Removal of combustible material, particularly litter in gutters, near buildings. Removing excess amounts of fuel from garden areas (including organic mulch). Ensuring garden plantings do not overhang any buildings, tree canopies are discontinuous, and shrubs are 	Taronga Zoo	Operation

	not positioned within two metres of buildings.		
Bushfire Emergency Plan	Taronga Zoo operates in accordance with the TCSA Emergency Management Plan (TERP). The TERP outlines response guidelines in the event of a bushfire, including alert, evacuation and shelter procedures.	Taronga Zoo	Operation
Landscape Character and Visual Impact			
Management of the construction works to minimise their visual impacts internally and externally to the zoo	<ul style="list-style-type: none"> Consider non-reflective materials and equipment Consider screening methods to reduce the visual impact of the work site 	Taronga Zoo/ Construction contractor	Pre-construction/ Construction
Design exhibits to prevent intrusive built form	<ul style="list-style-type: none"> Consider non-reflective materials Location of vegetation and screening 	Taronga Zoo	Detailed design/ pre-construction
Light spill impacts during construction across the proposal footprint	<ul style="list-style-type: none"> Screen, shield and cut-off all temporary site lighting to prevent light spill where possible. Use directional light sources where possible to reduce lateral light spill. Use low luminescence lighting lights where feasible to reduce the lateral light spill. Shield the top of all site lighting to prevent any upward light glare 	Construction contractor	Construction
Operational light spill impacts on adjacent properties	<ul style="list-style-type: none"> Follow the lighting design specification that aims to ensure any the height and direction of any lighting pole would not introduce sky glow or impacts on neighbouring residential properties or road users of the Great Western Highway. Use directional lighting fixtures with cut-offs and filters as required 	Construction contractor/ Taronga Zoo	Detailed design/ Pre-construction
Stormwater and Waste Water Management			
General water cycle management	<ul style="list-style-type: none"> The operational, monitoring and recording, reporting and general conditions identified within the existing EPL 1677 will continue to be implemented. 	Taronga Zoo	Pre-construction/ Construction/ Operation
Sediment-laden run off and associated water quality impacts management	<p>Prepare a Soil and Water Management Plan as part of the CEMP and address the following:</p> <ul style="list-style-type: none"> The NSW Soils and Construction – Managing Urban Stormwater Volume 1 ‘the Blue Book’ (Landcom, 2004) and Volume 2 (DECC, 2008) <p>Detail the following as a minimum:</p> <ul style="list-style-type: none"> Identification of catchment and sub-catchment areas, high risk areas and sensitive areas Sizing of each of the above areas and catchment The likely volume of run-off from each road sub-catchment Direction of flow of on-site and off-site water Separation of on-site and off-site water The direction of run-off and drainage points during each stage of construction 	Construction contractor	Pre-construction/ construction

	<ul style="list-style-type: none"> Dewatering plan which includes process for monitoring, flocculating and dewatering water from site (i.e. formation or excavations) A mapped plan identifying the above Include progressive site-specific Erosion and Sedimentation Control Plans (ESCPs). The ESCP is to be updated at least fortnightly A process to routinely monitor the Bureau of Meteorology weather forecast Preparation of a wet weather (rain event) plan which includes a process for monitoring potential wet weather and identification of controls to be implemented in the event of wet weather. These controls are to be shown on the ESCPs Provision of an inspection and maintenance schedule for ongoing maintenance of temporary and permanent erosion and sedimentation controls. 		
On-site sediment and waste laden run off and associated water quality impacts during construction	<ul style="list-style-type: none"> Erosion and sediment control measures would be implemented to ensure no sediment leaves the site. Daily inspection of sediment controls to ensure they are properly maintained. All waste materials (such as demolition materials including concrete and concrete rinse water) would be contained to prevent possible run off prior to removal from the site. 	Construction contractor	Construction
Erosion risk	<ul style="list-style-type: none"> Disturbed surfaces would be reinstated as soon as possible. Erosion and sedimentation control measures would not be removed until disturbed areas have stabilised. Any damage from construction to the ground surface shall be restored to pre-construction condition on completion of works. 	Construction contractor	Construction
Ecologically Sustainable Development			
Energy efficiency measures during operation	<ul style="list-style-type: none"> Implement solar thermal energy collection measures Implement LED lighting fixtures Implement automated controls and metering Utilise energy saving furniture, fixtures and equipment Investigate opportunities for alternate energy provision after an initial review period of operation 	Taronga Zoo	Operation
Building performance during operation	<ul style="list-style-type: none"> Design for passive thermal and ventilation control Utilise building fabric and insulation to improve building performance Incorporate sustainable timbers Prepare a Section J energy efficiency assessment of the main buildings during the detailed design stage to determine possible energy saving measures 	Taronga Zoo	Detailed design
Water usage	<ul style="list-style-type: none"> Implement water efficient fittings and fixtures into building design Capture rainwater runoff and direct to existing stormwater and re-use plant 	Taronga Zoo	Detailed design/ operation

Transport during operation	<ul style="list-style-type: none"> Promote the use of public transport for patrons and staff 	Taronga Zoo	Operation
Aboriginal Heritage and Archaeology			
Construction induction training to cover all works across the site	<ul style="list-style-type: none"> Briefing site contractors about the nature of archaeological sites and issues of potential sensitivity when sandstone surfaces previously obscured by vegetation for example are to be exposed. 	Construction contractor	Construction
Limit areas of excavation	<ul style="list-style-type: none"> All efforts should be made to define <i>specific</i> and <i>limited</i> zones of impact within the study area where excavation is used only where crucial to design, and should be strictly adhered to throughout the course of future construction periods to limit impacts to existing vegetation and landforms. 	Construction contractor	Construction
Avoidance and protection of sandstone elements	<ul style="list-style-type: none"> Avoidance and protection during future construction of the main sandstone elements on the site, and careful hand clearance of vegetation and rock where required. 	Construction contractor	Construction
Unexpected finds discovery across the site	<p>In the (largely) unexpected circumstance that any Aboriginal objects are unearthed during construction of the proposal, it is recommended that:</p> <ul style="list-style-type: none"> Activities should immediately cease within the vicinity of the find locality. Consider use of quick stop-work measures where archaeological items are exposed during construction. Activities be relocated to other areas of the subject site (allowing for a curtilage of at least 50m). The Office of Environment and Heritage be contacted to advise on the appropriate course of action to allow the MLALC to record and collect the identified item(s). 	Construction contractor	Construction
Human remains discovery across the site	<ul style="list-style-type: none"> Handle human remains under the same process as an unexpected finds discovery; however, prior to the archaeologist recording the find contact the NSW Police, the OEH environment line and the OEH anthropologist. 	Construction contractor	Construction
European Heritage and Archaeology			
General	<ul style="list-style-type: none"> Implement recommendations of Heritage Impact Assessment as required. 	Construction contractor	Pre-construction
Archival Recording	<ul style="list-style-type: none"> Undertake full measured drawing and photographic archival recording of items proposed to be removed. Complete a comprehensive heritage package for Turner House. 	Taronga Zoo	Pre-construction
Relocated Items	<ul style="list-style-type: none"> Ensure location of relocated and reused heritage items are appropriate in size, geometry and condition to support the ongoing heritage significance of these items. 	Taronga Zoo	Pre-construction Construction

Replacement of lost vegetation	<ul style="list-style-type: none"> • Consider replacement planting of Bull Bay (<i>Magnolia grandiflora</i>) planting in the general area of the removed trees 	Taronga Zoo	Pre-construction/ Construction
Interpretation and memorialisation	<ul style="list-style-type: none"> • Include items of heritage significance within ongoing interpretation and education strategy for the zoo to enable visitors to understand these retained components and elements of zoo history. • Consider memorialisation of significant people involved in the planning of the zoo. 	Taronga Zoo	Pre-construction/ post-construction
Heritage induction training to cover all works across the site	<ul style="list-style-type: none"> • Provide non-Aboriginal heritage awareness training to the construction workforce prior to starting on site which would include: <ul style="list-style-type: none"> - the location of heritage items outside the study area, including the extant gate entrance for the former OTC transmission station - guidelines to follow if unanticipated heritage items or deposits are located during works - the procedure for managing any unexpected find, discovering human remains, or unearthing other archaeological remains. - Provide the non-Aboriginal heritage awareness training to any person or visitor to the site during construction 	Construction contractor	Construction
Unexpected finds discovery across the site	<ul style="list-style-type: none"> • If unexpected archaeological finds are discovered during the proposed works, immediately cease all works within 10 metres of discovering an unexpected find (e.g. archaeological remains, heritage item, and potential relic). • Engage a heritage consultant to assess the find and the NSW Heritage Division would be notified of the discovery of a relic in accordance with Section 146 of the NSW <i>Heritage Act 1977</i> 	Construction contractor	Construction
Human remains discovery across the site	<ul style="list-style-type: none"> • Handle human remains under the same process as an unexpected finds discovery; however, prior to the archaeologist recording the find contact the NSW Police, the OEH environment line and the OEH anthropologist. 	Construction contractor	Construction
Conservation works program	<ul style="list-style-type: none"> • Consider implementation of a conservation works program for Tahr Mountain 	Taronga Zoo	Post-construction
Social Value Research	<ul style="list-style-type: none"> • Consider undertaking a visitor and community research project to capture the social values associated with significant elements including the 1940s Giraffe House 	Taronga Zoo	Post-construction
Waste Management			
Waste generation during construction	<ul style="list-style-type: none"> • Classify, handle and store all removed waste in the construction compounds/laydown areas in accordance with the NSW Waste Classification Guidelines 2009: Part 1 Classifying Waste (DECCW) and Storing and Handling liquids, Environmental Protection (DECC, 2007). 	Construction contractor	Construction/ operation

Waste and resource management during construction across the proposal	<ul style="list-style-type: none"> Prepare a waste and resource management plan (WRMP) as a sub-plan of the CEMP. As a minimum describe the measures for handling, storing and classifying waste when 'onsite' and its subsequent disposal offsite to the relevant licenced facility. 	Construction contractor	Construction/operation
Waste disposal during construction across the proposal	<ul style="list-style-type: none"> Send all disposed materials to a suitably licenced waste management/landfill facility. 	Construction contractor	Construction/operation
Waste handling and storage during construction across the proposal	<ul style="list-style-type: none"> Store and segregate all waste at source (e.g. the construction compounds/laydown areas) in accordance with its classification. This includes recycled and reusable materials. 	Construction contractor	Construction/operation
Littering and site tidiness during construction and operation	<ul style="list-style-type: none"> Monitor for waste accumulation, littering and general tidiness to ensure operating standards of the zoo are maintained. 	Taronga Zoo/ Construction contractor	Construction/operation
Resource recovery during construction across the proposal	<p>Apply resource recovery principles:</p> <ul style="list-style-type: none"> Reuse proposal-generated waste materials onsite (e.g. topsoil, recycled aggregate) providing it meets with exemption and classification requirements Failing that, transfer the materials for use elsewhere on another site under a resource recovery exemption Employ waste segregation to allow paper, plastic, glass, metal and other material recycling. These materials could be either reused onsite or transferred to a recycling facility Consider composting general putrescible waste to allow recovery. Transfer these materials offsite to a composting facility. 	Construction contractor	Construction/operation
Reducing primary resource demand during construction across the proposal	<ul style="list-style-type: none"> Use recycled and low embodied energy products to reduce primary resource demand in instances where the materials are cost and performance competitive (e.g. where quality control specifications allow). 	Construction contractor	Construction/operation
Waste disposal in landfill	<ul style="list-style-type: none"> Implement targets for reduction and diversion following an initial waste audit of the exhibits once operational. Taronga employees are to be allocated responsibility for regular monitoring of the content of waste and recyclable materials being placed in bins. This will assist with target and KPI management and minimise the potential for contamination and inappropriate disposal activities. Based on the collected data reduced waste to landfill targets will be further reviewed every twelve-month period. 	Taronga Zoo	Operation
Waste disposal in landfill	<ul style="list-style-type: none"> The service provider must if available and if it is financially viable propose lawful disposal alternatives that will offer additional diversion opportunities of waste materials to either re-use, processing and/or recycling, including food waste. 	Waste Contractor	Operation

Dust Management

Dust emissions	<ul style="list-style-type: none">Minimise dust emissions on the site and prevent dust emissions from the site.	Contractor	Construction
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8.0 Conclusion

This proposal seeks approval for the construction and operation of the African Savannah and Congo Forest Exhibits at Taronga Zoo, Sydney (SSD 8008).

This RtS have been prepared to satisfy the provisions of Section 89G of the EP&A Act and Section 85A of the Environmental Planning and Assessment Regulation 2000. Each of the submissions received during the public exhibition period between 4 August 2017 and 4 September 2017 have been collated, analysed and addressed through the provision of additional information and design amendments to the proposed exhibits.

In particular, this RtS has described and assessed the proposed design amendments. The amendments relate primarily to exhibit size, layout and built form elements including:

- Reduction of the Giraffe back of house and viewing area footprint and Giraffe House;
- Relocation of the lion back of house and reconfiguration of the exhibit area and visitor viewing areas;
- Revised circulation through the Lion Exhibit;
- Removal of Cliff Village structures;
- Minor internal modifications to the meerkat and fennec fox back of house; and
- Reconfiguration of public amenities.

The proposed amendments will substantially reduce the bulk and scale of the proposed built form. Overall it is considered that the amended proposal results in a consistent, or improved environmental outcome, when compared to the original proposal as described in the EIS (refer to **Section 6.0** and **Section 7.0** of this RtS).

The mitigation measures provided within the EIS have been updated where necessary to respond to the submissions received, and these updated measures will further reduce the overall environmental impacts during both the construction and operation of the proposal.

Having regards to biophysical, economic and social considerations, including the principles of ecologically sustainable development, the carrying out of the project is justified for the following reasons:

- The proposed exhibits will replace exhibits which no longer meet best practice regarding animal conditions, access and circulation and visitor experience;
- The proposed works will resolve current maintenance, access, fire safety, Building Code of Australia (BCA), and Workplace Health and Safety (WH&S) issues that are required to be resolved for both animals and staff;
- The proposed purpose-built facilities will provide modern enclosures, which allow for functional, best-practice and safer day-to-day operations and management;
- The exhibits will maintain high standards of animal welfare as required under the EAP Act and participate within existing conservation programs to ensure the intergenerational wellbeing of native and exotic flora and fauna species;
- The proposal will facilitate education and immersion experiences currently offered by the zoo;
- The proposals design and construction seeks to protect, retain or incorporate items of heritage and cultural significance;
- The proposal will capitalise on existing topography and landscape features maximising and protecting iconic views and vistas without substantially impacting on viewings from Sydney Harbour towards the zoo; and
- The proposal will facilitate the ongoing operation of Taronga Zoo as a vibrant tourist destination in Sydney, contributing to the NSW economy.

Given the merits described above it is requested that the application be approved.