Australian Turf Club Limited

Leger Lawn Development

Ecologically Sustainable Development Assessment

October 2019

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1. Introduction

1.1 Overview

This report supports a State Significant Development (SSD) application submitted to the Department of Planning and Environment (DP&E) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

Australian Turn Club Limited (ATC) is seeking development consent for the Winx Stand ("the Proposal") at the existing ATC Royal Randwick Racecourse (RRR).

1.2 Purpose of this report

This report has been prepared to outline key Ecologically Sustainable Design (ESD) requirements and drivers and the proposed project specific Sustainability Framework which defines the principles that will be incorporated into the future design, construction and operation of the site and to specifically respond to the Secretary's Environmental Assessments Requirements (SEARs) for SSD10285 issued on 26th April 2019 which states in Section 11 that the Environmental Impact Statement (EIS) shall:

- detail how ESD principles (as defined in clause 7(4) Schedule 2 of the EP&A Regulation 2000) will be incorporated in the design, construction and ongoing operation of the development
- include a framework for how the proposed development will reflect leading national and international best practice sustainable building principles to improve environmental performance, including energy and water efficient design and technology and use of renewable energy
- incorporate green walls, green roof and/or cool roof into the design
- detail how climate change projections developed for the Sydney Metropolitan area are used to inform the building design and asset life of the project
- give preference to local native provenance tree, shrub and groundcover species.

1.3 Reliance

The report is based on:

- Cox Architecture - architectural drawings
- Advice from ADP Consulting regarding Mechanical, Electrical and Hydraulic Designs
- Advice from SCP regarding stormwater management
- GHD Waste Management Report

1.4 Scope and limitations

This report: has been prepared by GHD for Australian Turf Club Limited and may only be used and relied on by Australian Turf Club Limited for the purpose agreed between GHD and the Australian Turf Club Limited as set out in this report.

GHD otherwise disclaims responsibility to any person other than Australian Turf Club Limited arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

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2. Site and development description

2.1 Project description

Royal Randwick Racecourse is located in the eastern suburbs of Sydney NSW, approximately 6 km from Sydney's CBD. It consists of the course proper (2224 m circumference) and the inner Kensington track (2100 m circumference). The site is on Crown Land, zoned RE1 – Public Recreation, leased to The Australian Turf Club and is bounded by Alison Road, Wansey Road, High Street & Doncaster Ave. Along these boundaries are a diverse range of neighbouring properties of varying heights, including the UNSW Sydney campus along with several commercial and residential properties.

The Australian Turf Club proposes to undertake development for the Winx Stand ('the proposal') of the Royal Randwick Racecourse. The location of the proposal is shown in Figure 1.

Figure 1 Proposal location

The development will involve the construction of the two storey multi-purpose facility at the southern end of the existing QEII Grandstand, in the Royal Randwick Spectator Precinct. The proposed facility is designed to significantly enhance the amenity for patrons attending race day events at RRR and provide a flexible space for non-race day events. The Winx Stand will comprise an approximate 3,546 sqm footprint and a maximum building height of 18 m. The proposed development is summarised as follows:

Construction of a two storey multi-purpose facility comprising:

- Multi-purpose hall at ground level of approximately 3,255 sqm GFA.
- Multi-purpose hall at upper level of approximately 1,788 sqm.
- Food and beverage facilities.
- Entry foyer and ancillary facilities.
- Building Identification Signage.
- 'Eat Street' (The Laneway) located between the new facility and the existing multi-deck car park and day stables

2.2 Site Environment / Climate

The building form and location provide a number of opportunities and constraints which will influence the sustainable design features.

The proposed building is located in the National Construction Code (NCC) climate zone 5 – Warm / Temperate. This climate zone has periods of hot days in summer and moderate temperatures in winter. The air temperature and humidity are typically within comfort conditions for approximately 40% of the year meaning the building will be able to benefit from free cooling using natural ventilation or economy cycles in place of mechanical cooling during these times.

The site is relatively exposed to the sun for the majority of the year. The roof area receives largely unobstructed sunlight providing future opportunity for inclusion of Solar PV. The east and north eastern façade elevations are also exposed during early to mid-mornings which requires consideration for façade thermal performance to manage solar heat gains. The aspect ratio of the building means the area of north facing façade is limited and shaded by the existing grandstand winter months. The proposed roof providing shading in summer. The western and south western elevations are protected from exposure to the sun via the existing car park. Refer solar insolation plots in Figure 2 below.

Figure 2 Annual Solar Insolation

2.2.1 Climate Change

Climate change projections published by NSW Office of Environment and Heritage for the Sydney Metropolitan region indicates:

1. Projected warming in near future (2020-2039) projected to be on average 0.7°C and in far future 2060-2079) 1.9°C.
2. Maximum temperatures also expected to increase in both near and far future
3. Increase in days with temps > 35°C. An additional 1-5 days are estimated and in far future.
4. Rainfall is expected to decrease in spring and winter and increase in summer and autumn

Climate change projections should be considered as part of the project detailed design to ensure risks are assessed and addressed through features to increase resilience.

3. ESD Requirements and Drivers

The relevant regulations (incl. state planning requirements) and other drivers which collectively influence the ESD response for the proposed development are summarised as follows:

3.1 Building Code of Australia – Section J

The National Construction Code (NCC) Building Code of Australia (BCA) sets the mandatory minimum energy performance requirements for buildings in Section J. The objective is to reduce building greenhouse gas emissions by efficiently using operational energy. Section J is focussed on establishing minimum acceptable practice in the building industry.

The project is adopting the NCC 2019 which includes the revised and more stringent Part J Energy Efficiency provisions.

The building must meet the requirements as set out in the NCC BCA Section J building fabric, glazing, building sealing, HVAC and light and power provisions using either the Deemed to Satisfy or Performance provisions. A preliminary review of the building envelope performance has been completed to inform the design. Refer Table 3 and Appendix A.

3.2 Secretary's Environmental Assessment Requirements

The SEARs (SSD10285) require that the Environmental Impact Statement (EIS) shall:

- detail how ESD principles (as defined in clause 7(4) Schedule 2 of the EP&A Regulation 2000) will be incorporated in the design, construction and ongoing operation of the development
- include a framework for how the proposed development will reflect leading national and international best practice sustainable building principles to improve environmental performance, including energy and water efficient design and technology and use of renewable energy
- incorporate green walls, green roof and/or cool roof into the design
- detail how climate change projections developed for the Sydney Metropolitan area are used to inform the building design and asset life of the project
- give preference to local native provenance tree, shrub and groundcover species.

3.3 EP&A Regulation 2000 – ESD Principles

Schedule 2 of the EP&A Regulation, clause (1) subclause (f) requires that an EIS:

- *must include the reasons justifying the carrying out of the development in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development set out in subclause (4).*

The principles of ecologically sustainable development in sub clause (4) are as follows:

a. *the precautionary principle, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:*

   (a) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and

   (b) an assessment of the risk-weighted consequences of various options.

b. *inter-generational equity, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,*

c. *conservation of biological diversity and ecological integrity, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,*

d. *improved valuation, pricing and incentive mechanisms, namely, that environmental factors should be included in the valuation of assets and services, such as:*

   (c) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement, and

   (d) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste, cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

3.4 Randwick City Council

3.4.1 Randwick Comprehensive Development Control Plan 2013 – E3 Royal Randwick Race Course

The DCP contains a number of specific provisions relating to RRC. Section 3.7 includes the following controls to support Environmental Sustainability objectives:

2. Energy policies and practices that:

   (1) encourage the use of walking, public transport and bicycles (including provision of facilities such as secure bicycle parking and storage)

   (2) select building materials on the basis of thermal performance: use building mass, insulation,

   (3) natural ventilation and shading

   (4) optimise the use of solar energy

   (5) optimise the use of natural light

   (6) optimise the use of natural ventilation

   (7) appropriately zone mechanical ventilation according to usage patterns

   (8) introduce high efficiency lighting systems and layouts

   (9) select energy efficient appliances

   (10) use management systems to achieve energy efficiency

3. Water conservation policies and practices that:

   (1) select water use reduction systems (e.g. dual flush cisterns, aerated shower heads and taps)

   (2) utilise rainwater harvesting for use in irrigation of landscaping and open space

   (3) install dual water supply systems

   (4) utilise further aquifer recharge.

4. Material selection policies and practices that:

(1) minimise the use of chlorine based products

(2) use, where practical and viable, recycled and recyclable materials

(3) use timbers from a renewable and managed source (ie no rainforest timbers)

5. Clean and efficient operational practices that:

(4) ensure waste minimisation and recycling

(5) provide space for the separation and recycling of wastes

3.5 Sustainability Rating Tools

Whilst the project is not currently intending on seeking a formal certification under a sustainability rating, the project will seek to implement best practice ESD features. These features would otherwise support the several outcomes intended by categories and credits in tools such as Green Star.

3.6 Market drivers and other trending issues

3.6.1 Decarbonisation of the built environment

Like many other countries who are signatories to the Paris Climate Agreement, Australia has committed to becoming net zero by 2050. Buildings are a major contributor to resource depletion and carbon emissions and have a significant role to play in reducing the transition to net zero economies. There are growing policy platforms to encourage buildings to become net zero. Newly constructed buildings should consider adopting strategies to support the transition to achieving net zero emissions. Zero carbon ready buildings are energy efficient and set up so they are ready to achieve zero carbon usage when combined with renewable or decarbonised on or off site energy systems. This requires projects to:

- Maximise building energy efficiency
- Inclusion of onsite renewable energy systems where practical (or future provision for installation of renewable energy systems)
- Avoidance fossil fuel based building services such as gas fire boilers and heating hot water plant.

3.6.2 Electric Vehicles

Electric vehicles (EV) have rapidly developed from concept to market emergence, with prices forecast to continue declining every year. While currently only forming a small proportion of annual vehicle sales, this is anticipated to increase sharply in coming years as cost of production declines, along with the improvements in availability and range capacity of EVs, and developments in public charging infrastructure. Considerations should be made for the future provision of electric vehicle charging infrastructure in the future development.

4. Design Response

The design has addressed the project requirements through the following initiatives:

- Addressing the ESD Principles of the EP&A Regulation 2000 (refer section 4.1)
- Developed a project specific framework outlining mechanisms for guiding the integrating leading national and international best practice sustainable building principles throughout the remainder of the project design and delivery stages to improve environmental performance (Section 4.2)
- Proposed preliminary sustainability initiatives for incorporation into the design or measures requiring further consideration at the detailed design stage (Section 4.3).

4.1 ESD Principles of the EP&A Regulation 2000 (SEARS)

The EP&A Regulation ESD Principles will be met as follows:

Table 1 EP&A Regulation 2000

EP&A Regulation Requirement	Methodology/Approach
Precautionary Principle	The development will be designed to avoid where practicable damage to the environment. An ESD framework (Section 4.2) will guide the design, of the development through adoption of strategies that will reduce energy and water consumption, limit carbon emissions, encourage use of responsible materials, reduce waste and limit other forms of emissions from the site including light pollution.
Intergenerational equity	The development will seek to benefit present and future generations through increased health and environmental benefits associated with reductions in pollution, enhanced health through improved active transport facilities and creating a space that can be utilised and accessed by all ages, cultures and abilities. The development will also seek to integrate the best practice IEQ features to reduce internal air pollutant levels and enhance the internal building environment to the benefit of occupant health.
Conservation of biological diversity and ecological integrity	The development will actively seek to enhance environmental conditions on the site through restorative sustainability strategies that enhance the ecological and biological value of the site through introduction of landscaping including vertical landscaped elements. In addition to this, the stormwater management plan prepared by SCP nominates the return of water by means of absorption trenches around the facility.
Improved valuation, pricing and incentive mechanisms	The development is targeting high levels of sustainability performance which will impose additional upfront costs to the development but will ultimately result in increased asset value by through improved financial and environmental life cycle performance and features to support resilience to future climate change.

4.2 ESD Framework (SEARS)

The ESD framework for the development detailed in Table 2 below is intended to define the guiding principles to inform the future detailed design and construction of the development and enable the development to incorporate best practice sustainable principles that respond to site conditions, regulatory requirements, policies and emerging market trends and drivers.

Table 2 ESD Framework & Considerations

Theme	Objective
Leadership & Governance	Demonstrate leadership by embedding sustainability objectives into decision-making processes and committing to setting targets and having a measuring and monitoring system to track the environmental performance of the building.
Energy & Carbon Minimisation	Minimisation of carbon emissions and energy consumption through adoption of hierarchal energy design strategies using passive design, energy efficiency and sourcing of energy from low or zero carbon sources.
Water	Reduce potable water usage and maximise opportunities for rainwater / stormwater capture and reuse for non-potable purposes.
IEQ	Buildings and external areas support physical and mental wellbeing and enhance overall spectator experience.
Materials	Minimize construction and material waste generated throughout the project lifecycle by considering embodied lifecycle impacts of material selections for the project. Contractors, subcontractors and suppliers are to adopt sustainability as a key initiative in their work and procurement processes.
Operational waste	Reduce waste generation and encourage reuse or recycling to avoid waste going to landfill
Land Use, Ecology & Biodiversity	Natural ecosystems and local landscape habitat to be preserved and site ecological value enhanced through landscaped elements
Emissions and Discharges	Reduce sources of pollution and emissions to limit degree of environmental harm caused.
Climate Change Resilience	The site will be designed for resilience to the effects of climate change. Climate change risks and impacts to be assessed, with design strategies and plans in place to address them.

4.3 ESD Strategies and Design Features

Table 3 provides a summary of the ESD strategies that have:

- Been incorporated into the SSDA Design
- Recommended for future incorporation into the project during detailed.
- Additional opportunities requiring further investigation in project detail design stages.

Table 3 Proposed ESD Strategies

Theme	Incorporated into the SSDA Design	Recommended for inclusion	Recommended for further Investigation
Leadership & Governance	• DA design has used cost benefit analysis using simple payback to assess initial feasibility of major initiatives • Commitment to deliver the building with reduced reliance on gas which will enable the building to be delivered "net zero carbon ready"	• Set building specific environmental targets (energy, water and waste) and measure and report results • Align the project for "equivalency" to 5 Star rating under Green Star Design and As Built V1.3 • Final decisions taken during detailed design stages on major building systems such as envelope, plant equipment to be guided based on life-cycle costing and life cycle impacts • Construction contractor to implement a site specific responsible construction practices including ISO14001 Environmental Management Plan and Staff Wellness program • Implementation of comprehensive commissioning plan in accordance with best practice standards	• Consider adoption of formal rating under Green Star • Achieving "Net Zero Carbo within 12 Months of obtaining Occupancy Certificate • Consider engaging a contractor with internal policies and procedures to provide high quality staff support that exceed statutory occupational health and safety requirements and extend into promotion of wellbeing.
Energy & Carbon Minimisation	• Building form and orientation incorporates passive solar design principles: ○ Back of house / circulation spaces located to the north west with reduced glazing	• Envelope ○ JV3 performance solution to finalise optimal thermal performance for glazed elements ○ Minimise outside air infiltration via appropriate construction detailing.to reduce peak cooling/heating loads -	• Consider integration of ground based heat exchange system for improved heat rejection efficiency and potential to reduce plant room size • Consider shared central electric heat pump both heating and domestic hot water in lieu of spate plant.

- Deep roof overhangs providing shading to glazed elements

- Façade / Glazing performance:
  - A preliminary JV3 thermal / energy modelling was completed and confirmed the architectural design can meet more stringent NCC 2019 requirements. Nominal envelope and glazing system was recommended.
- Walls / Roof Fabric
  - Selection of light coloured roof with high solar reflectance and emissivity
- Ventilation systems
  - Architectural design and window operability supports natural ventilation used as part of a mixed mode system
  - Spatial allowance has been made where possible to allow for oversizing ducts and coils to reduce system pressure leading to reduced fan power thus Consider verification through air tightness testing
  - Potential for proportionally higher heat / gains losses due to extent of roof vs overall floor area – consider increasing thermal performance of roof system beyond minimum NCC 2019 code requirements
- HVAC
  - Complete HVAC design with oversized ducts and coils to reduce system pressure leading to reduced fan power thus fan energy consumption
  - Use of CO_2 Demand controlled ventilation with variable speed drives to all fans
  - Variable Speed pumps
  - HVAC system selections to based on highest in class Coefficient of Performance
- Hot Water
  - Consider adopting heat pumps for both heating and domestic hot water.

	fan energy consumption • Heat rejection / Chillers: ○ Spatial allowance made for using of low energy water based heat rejection system • Domestic Hot Water (DHW) / Heating Hot Water (HHW) plant ○ Electric systems for domestic ○ Efficient condensing gas boilers for heating hot water generation • Roof top solar PV for electrical energy generation was considered. However due to potential future expansion solar PV will be considered as part of for future development.	○ Efficient condensing gas boilers for heating hot water generation • Lighting ○ LED lighting throughout coupled with occupancy and daylight sensors • Energy Management / Building Controls ○ Building to include comprehensive metering and monitoring systems to enable ongoing monitoring and management ○ HVAC controls on time schedule and with smart starts (building optimisation system) to promote early starts ahead of very hold/cold days to reduce peak demands
Water	• Rainwater harvesting was considered however will not proceed due unfavourable cost benefit outcomes. • Water efficient fixtures and fittings will be specified. • Native landscaping is being proposed.	• Install water efficient fixtures and appliances • Select drought-tolerant native vegetation for landscaping • Install water meters and monitoring system
IEQ	• Building layout and orientation supports use of natural ventilation to maintain indoor air quality and thermal comfort	• Specify use of low formaldehyde and low volatile organic compounds (VOCs) materials to improve internal air quality

	• Design of façade and building form supports use of daylighting strategies for circulation spaces and spectator halls	• Lighting to be design to maximise visual comfort	
Material	• n/a	• Reduce Portland cement content through maximising use of supplementary cementitious materials • Where steel is used - maximise use of steel and timber sourced from certified environmentally responsible suppliers • Permanent formwork, pipes, flooring, blinds and cables to be free of PVC or PVC that meets the GBCA's Best Practice Guidelines for PVC • Sustainable timber procurement through GBCA approved Forest Certification Schemes or reused sources • Select products with verified third party certification such as Environmental Product Declarations	• Consider alternatives to use of concrete and steel structures such as structural timber which has a reduced embodied carbon impact, faster construction time, and can reduce requirement for building foundations.
Operational waste	• Waste room sizing based on storage required for separation of general waste and recyclables	• Project to investigate further opportunities for increasing waste stream separation including organic waste form general waste stream for compositing	• n/a
Land Use, Ecology & Biodiversity	• Vertical planting is proposed • Native plants proposed for landscaped elements	• n/a	• n/a

Emissions and Discharges	• Water sensitive urban design principles have been adopted to reduce stormwater flow and provide basic level of water treatment • The stormwater management plan prepared by SCP nominates the return of water by means of absorption trenches around the facility	• Seek to minimise use of insulants and refrigerants with high global warming potential and ozone depleting potential • Light spill to neighbouring properties to be controlled • Light pollution to night sky to be prevented	• Project to investigate stormwater reuse for irrigation and additional levels of treatment.
Climate Resilience	• Rainfall designed to cater for 1 in 100 year flood levels, with services zones covered or outside of flood zone	• Projected temperature changes when finalising design of façade and HVAC system. • HVAC design to consider climate change projections for impact on plant capacity • Consider any climate change induced flood risks and incorporate mitigation measures into design.	• Project to complete a formal climate change risk assessment in accordance with a recognised standard (e.g. AS 5334:2013 Climate Change Adaption for Settlements and Infrastructure) • Building to include features to address all extreme and high risks

5. Conclusion

GHD has reviewed the applicable sustainability requirements including statutory obligations defined by the Building Code of Australia Section J, EP&A Regulation, SEARS and Randwick City Council Development Control Policies.

A project specific ESD framework has been developed (refer to section 4.2) to address the statutory obligations and ensure the future stages incorporate best practice ESD features.

A number of sustainable design considerations have also been proposed and are summarised in Section 4.3. These include the following:

- Features incorporated into the SSDA Design:
    - Architectural features to support passive design
    - Spatial allowance for energy efficient building services
    - Separation and storage of separate waste streams
    - Implementation of responsible construction practices to environmental impacts
- Recommended initiatives for future incorporation into the project during detailed and construction.
    - Energy efficiency measures
    - Water efficiency measures
    - Enhancing ecological value through native landscape selections
    - Indoor environmental quality
    - Sustainable material selections
- Additional opportunities requiring further investigation in project detail design stages
    - Additional measures to reduce HVAC energy
    - Installation of Electric Vehicle recharging facilities
    - Considering timber over concrete / steel construction
    - Formal climate change risk assessment

On the basis of this review and assumption that that the sustainability framework will be followed for future stages of the development , the proposed development is capable of including best practice initiatives and complying with the applicable statutory obligations.

GHD

Suite 10 Zenith Building
6 Reliance Drive Tuggerah NSW 2259
T: 61 2 4350 4100 F: 61 2 4350 4101 E: centralcoastmail@ghd.com

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