Level 6, 99 Mount Street,
North Sydney, NSW, Australia 2060
T: +61 (02) 8424 7000
www.cundall.com

Large Erecting Shed – ESD Targets

Project:	Large Erecting Shed (LES)	**Project No.**	1034862
Subject:	CoS ESD Targets	**Doc No.**	CAN-003
Author:	Richard Burton/Julian Bott	**Date:**	19/12/2022
		Revision:	C

1. Introduction

CoS has responded to the rezoning application for the site with updated ESD requirements outlined in **Table 2-1**.
This CAN advises the technical feasibility of those updated ESD requirements and also outlines any site-specific opportunities and challenges which may be associated with those targets.

2. Response to CoS revised targets.

Table 2-1: Current and Proposed ESD Targets

Category	Current	CoS	Proposed	Justification
NABERS Energy	5.5	5.5	5.5	Aligns with CoS targets.
NABERS Water	4.5	5	4.5	NABERS Water 4.0 Star is industry best practice for office buildings. 4.5 Star is already a stretch target and difficult to achieve. At this preliminary re-zoning stage, the mechanical system has not yet been fully designed or let to a subcontractor. The final system will have an impact on our water consumption.
Green Star Buildings v1	5	6	5 Star and Carbon Neutral	Green Star Buildings is a new tool with significant increase to Green Star Design & As Built and there are heritage and supply chain challenges with achieving 6 Star credits. Please refer to detailed response attached.
WELL	Gold (Shell & Core)	Silver (Shell & Core)	Gold (Shell & Core)	Exceeds CoS requirement
NABERS Waste	Not targeted	5	Not target	Project will ensure separation of organic waste streams and also target Zero Waste to landfill by 2030 and also. We note however that in FY22 in NSW no offices achieved a 5.5 or 6 Star NABERS Waste rating, and only 1 achieved a 5-star rating. 95% of all ratings were 3.5 star or below with the average NABERS waste rating nationally being 2.9 stars.
Other ratings	N/A	CoS 2026 Net Zero Energy CoS waste management guidelines	Net Zero Zero waste to landfill by 2030	The project is committed to net zero operational carbon
Electricity Type	All electric (No gas)	All electric (No gas)	All electric (No gas)	Current design CoS meets requirement
Renewables	100% renewable from either	100% renewable from either	100% renewable from	Aligns with CoS targets.

Category	Current	CoS	Proposed	Justification
	on-site or off-site electricity	on-site or off-site electricity	combination of both on-site and off-site electricity	
Capability for embedded generation and battery storage sized for equivalent performance to emergency generator requirements	No	Yes	No	Replacing the generator with batteries is not currently a feasible option, due to the following reasons: - To achieve the 12 Hour requirements of PCA Grade A, the cost per kWh of the battery system is almost 10 times the cost of the diesel generator - Batteries have an expected lifetime of 10 years, after which their performance degrades and warranties expire, as opposed to diesel generator which can be retained for 30 years with proper maintenance - The space required to accommodate these batteries and inverters is around 100m2, which is larger than the current generator room, additionally, these batteries weigh over 40 tonnes as opposed to 5-6 tonnes for the diesel generator - The currently proposed generator room is open to sky, however, if this is converted to a battery room, it will have to be fully sealed fire rated room. Further fire protection measures will likely be required - The above only allows for base building. Additional requirements would need to be allowed for tenant provision to achieve PCA A-grade.
EV Charging Provision	Yes	Yes	Yes	Aligns with CoS targets
Commit to innovative measures for the separation and recovery of food organics on-site and circular economy approach to design and construction	TBC	Yes	Yes	Aligns with CoS targets Repurposing the LES addresses the key principles of circularity. Further project is targeting 25% recycled content in major building materials. In combination with this project is committed to the selection of sustainable sourced materials and design for adaptability.

3. Green Star Buildings Target

The Green Building Council of Australia (GBCA) in 2020 released the Green Star Buildings v1 (GSB) tool as a significant update on the previous Green Star Design & As-Built v1.3 (D&AB). The updated tool represents an uplift in performance requirement from the previous tool to achieve an equivalent certified rating see **Figure 3-1**. A 5-Star rating has been made more challenging, with many points available under the previous tool now minimum requirements. The 6-Star rating has been made significantly more challenging under the updated tool and far exceeds the previous Design & As-Built v1.3 6-Star rating.

This LES is equivalent or higher performance than 6 Star Green Star D&AB, see **Table 3-1**, and goes beyond its performance however cannot achieve 6 Star Green Star Buildings v1 due to a combination of constraints related to the heritage and adaptive re-use as well as the limitation in current supply chain for materials that struggle to meet the new Green Star standards designed to drive change in the material supply chain over a period of time greater than the project's construction period.

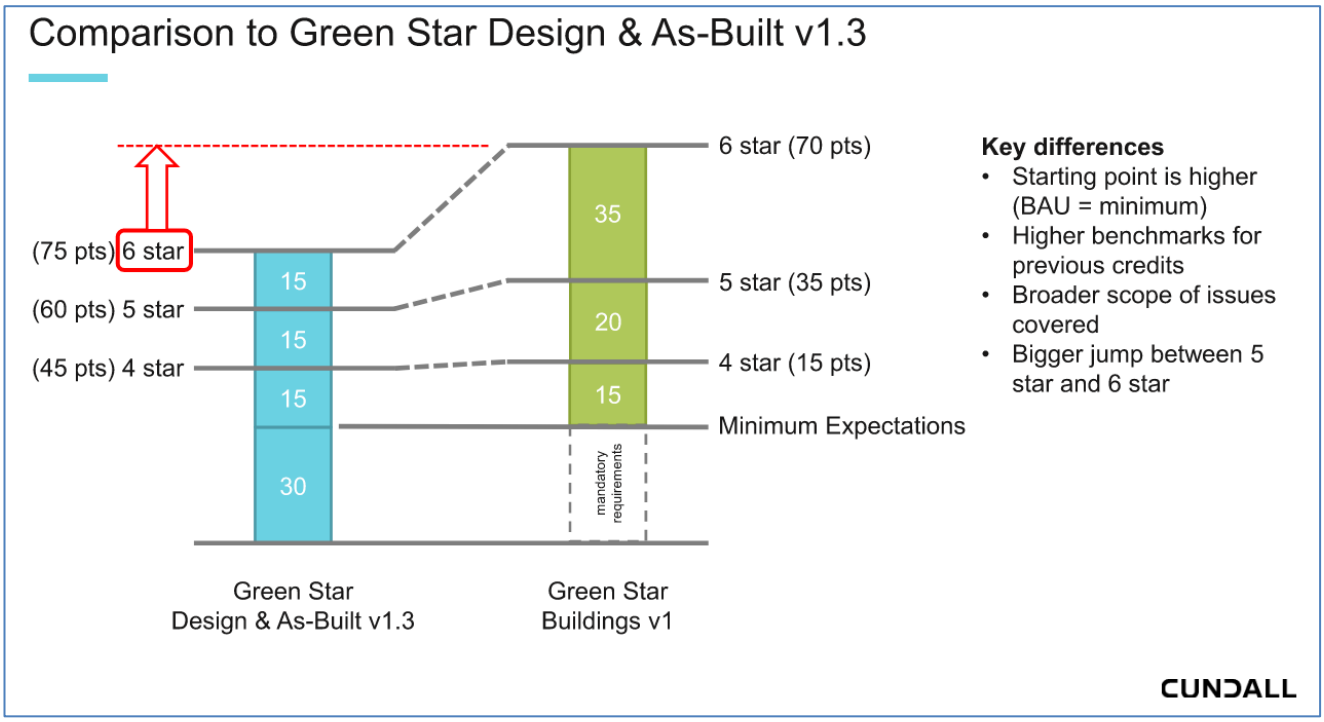

Figure 3-1: Comparison Between Buildings & D&AB

The current 5-Star Green Star Buildings strategy targets 45 points. A conservative comparison was performed with our current pathway assessing how it would score using the previous tool. Results are as follows.

Table 3-1: Score Equivalency Between Rating Tools

Rating Tool	Score (Points)	Rating
Green Star Buildings (Current)	45	5-Star (min 35)
Green Star D&AB v1.3 (Equivalent)	79	6-Star (min 75)

This conservative comparison resulted in a score of 79 points under D&AB exceeding the 6-Star requirements (75) under the previous tool. The point breakdown for the D&AB v1.3 equivalent pathway is as follows:

Table 3-2: Green Star D&AB Points Breakdown

Category	Points Achieved (D&AB)
Management	14 / 14
Indoor Environment Quality	11 / 17
Energy	14 / 22
Transport	6 / 10
Water	4 / 12
Materials	13 / 14
Land Use and Ecology	3 / 6
Emissions	4 / 5
Innovation	10 / 10
Total	79 / 110

4. Site Specific Limitations for Targeting 6-Star Green Star Buildings v1 Rating

The unique nature of the project and site limit the ability of the LES to target many credits in the updated Green Star tool. The project therefore cannot achieve a 6-Star Green Star Buildings rating due to a combination of constraints relating to; maintaining the heritage structure, adaptive re-use and other spatial limitations specific to the site's unique location. These constraints make many of the credits under the new tool unachievable. See **Table 4-1** for a summary of those unachievable credits

Table 4-1: Unfeasible Green Star Buildings Credits

Credit	Points Value	Requirements	Site specific Limitations
Enjoyable Places	2	375 m^2 of communal open space *(0.25 m2 / occupant or 2.5% of GFA whichever is greater)*	▪ Lot is bounded on North, West, and South by rail workshops, rail tracks, and a footpath along with locomotive street. The heritage structure covers the majority of the site area leaving only the eastern side. This space is being enhanced with trees and pedestrian space however this cannot reasonably accommodate the 375 m^2 credit requirement
Acoustic Comfort	2	Acoustic levels, noise separation, noise transfer, and reverberation components must all be met	▪ The project is designed with open floors and large voids which expose and display the heritage brickwork façade to occupants inside the building. This limits the ability of the project to meet the acoustic comfort credit requirements, specifically regarding noise separation and reverberation
Biodiversity Enhancement	4	Requires 1200 m^2 of horizontal or vertical landscaping *(15% of site area or 1:500 of GFA, whichever is greater)*	▪ Horizontal landscaping area cannot be provided since the lot does not have sufficient open area which could be planted. Green roof is not allowable due to heritage restrictions ▪ Sufficient vertical landscaping areas cannot be provided since heritage brickwork façade cannot be modified or covered
Connection to Nature	2	5% of building NLA is allocated to horizontal or vertical gardens easily accessible to occupants	▪ Similarly to Biodiversity enhancement horizontal and vertical landscape areas cannot be provided due to heritage and site limitations
Nature Connectivity	2	Facilitate wildlife movements within the site through landscaping or green infrastructure	▪ Similarly to Biodiversity Enhancement & Connection to Nature, the site cannot provide sufficient landscaping area to facilitate new habitat generation and connectivity requirements ▪ Heritage restrictions of the building prevent infrastructure solutions such as canopy bridges, green roofs and wildlife tunnels to adjacent natural areas from being implemented
Energy Use (Exceptional)	3	6-Star NABERS Energy commitment agreement	▪ The required 6-Star NABERS Energy commitment for this project would in turn require 400kW-500kW of photovoltaics which is greater than the available roof space.
Light Quality (Exceptional)	2	Building provides best practice artificial lighting & best practice daylighting	▪ Best practice artificial lighting is targeted ▪ A detailed daylighting study has been performed, results indicate that the project would not meet the thresholds to qualify for this credit point. This is due to void spaces against the façade (which are designed to expose and highlight the heritage structure) distancing lettable areas from windows and limiting light penetration, particularly in the middle floor.

Credit	Points Value	Requirements	Site specific Limitations
Responsible Structure	3	50% of all structural components meet a responsible products value of at least 10	▪ Limitations within the current supply chain for materials struggle to meet the new Green Star standards which are designed to drive change in the material supply chain over a period of time greater than the project's construction period.
Responsible Envelope	4	30% of building envelope components (by cost) meet a responsible products value of at least 10	▪ Limited products in the market due to supply chain limitations similarly to Responsible Envelope ▪ Existing heritage brickwork façade limits the ability of the site to meet responsible envelope to only the roof section.
Responsible Systems	2	35% of all products in the building's systems have a minimum responsible products value of at least 6	▪ Limited products in the marked due to supply chain limitations similarly to Responsible Envelope
Responsible Finishes	2	40% of all building finishes meet a responsible products value of at least 7	▪ Limited products in the market due to supply chain limitations similarly to Responsible Envelope
Procurement and Workforce Inclusion	3	6% of total contract value is directed to generate employment opportunities for disadvantaged and underrepresented groups	▪ Cost of these 2 credits alone would exceed the current entire sustainability budget
Total	**31**		