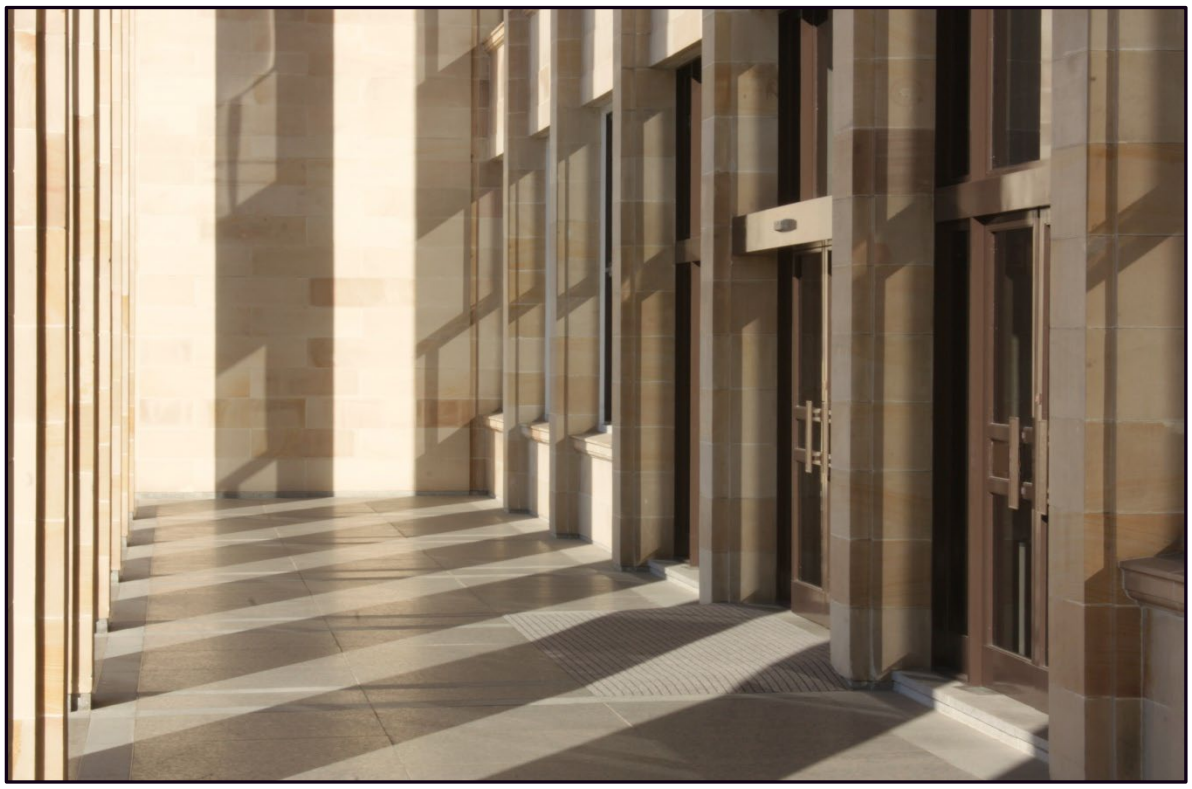
Government of **Western Australia**
Department of **Housing and Works**



DHW Technical Guideline (TG 040)

Environmentally Sustainable Design Guideline for Non-Residential Government Buildings

Version 2.2

November 2025

Document Control

Revision History

Version	Date	Author/Editor	Summary of changes
1.0	Jul 2023	Graham McDonald	First Published
2.0	Sep 2024	Graham McDonald	a) The small project threshold for use of the ESD Worksheet (Appendix 1) has increased from $2m to $5m. b) A Climate Change Resilience Assessment has been added to the ESD Worksheet. c) Minimum Energy Performance Standards (MEPS) for equipment has been referenced. d) Change to Water Usage estimating and reporting requirements. e) Noted that a Green Building Council of Australia (GBCA) certified project is preferred to an uncertified project.
2.1	April 2025	Graham McDonald	Updated links
2.2	October 2025	BTS	Update to DHW

Approvals

Version	Date	Name	Title
1.0	Jul 2023	Dean Wood	Principal Architect
2.0	Sep 2024	Dean Wood	Principal Architect
2.1	April 2025	Dean Wood	Principal Architect
2.2	Nov 2026	Dean Wood	Principal Architect

Contents

1. Purpose

This technical guideline (Guideline) provides instruction and advice to the project design team, on the application of environmentally sustainable design (ESD) for non-residential government buildings.

The intent of this Guideline is to:

- provide practical and achievable standards, using empirical evidence and market-based rating tools to reduce environmental impact during the construction and operation of the facility,
- demonstrate leadership in the non-residential building sector to reduce greenhouse gas (GHG) emissions, and build resilience to climate change through appropriate design and construction methodologies,
- assist in moving towards a fully electric building model in support of the Government's commitment to an 80% reduction in greenhouse gas emissions from government operations by 2030 (from a 2020 baseline), and achieving net zero GHG emissions by no later than 2050,
- ensure the State Government's Electric Vehicle Strategy is considered in the facility's design; and
- deliver on the State Government's commitments for effective waste management (Waste Avoidance and Resource Recovery Strategy) and water management practices (Waterwise Action Plan).

The project design must comply with all relevant legislation, the National Construction Code, Australian Standards, and project specific Customer Agency briefs provided by the Department of Housing and Works (DHW). Note, Customer Agency briefs may be tailored on a project-by-project basis by the Customer Agency to meet their service delivery requirements.

Fundamental to each project, to ensure emission reduction is targeted, is the need to:

- concentrate our efforts to reduce emissions form Scope 1 (direct) and Scope 2 (electricity use) up to 2030, while building knowledge and industries that will assist in targeting reductions in Scope 3 (all other indirect emissions) thereafter,

- wherever possible; build less, dematerialise projects, provide passive solutions, and design to allow for adaptive reuse,
- consider the hierarchy of emission reduction to prioritise investment in the asset and hence avoid purchasing carbon credits to offset “hard to abate” GHG emissions unless the project is Green Star Certified by the Green Building Council of Australia (GBCA).

2. Responsibilities

Customer Agencies are responsible for launching and obtaining Government approval of each project, including establishing an appropriate scope to meet their service delivery requirements, securing sufficient budget, and setting achievable timelines for delivery, in accordance with the Western Australian Public Sector's Strategic Asset Management Framework (SAMF).

When undertaking the Business Case and Project Definition Plan[1] for the project it is incumbent on each Customer Agency to ensure high-quality cost estimates are prepared, including commitments to ESD principles, and to champion the highest ESD standards that will be supported during the Expenditure Review process.

It is also incumbent on Customer Agencies to ensure best value for money ESD outcomes are set during Business Case development. A key action in this regard is to brief decarbonised projects. For example, to ensure a value-for-money approach, no new fossil fuel fired appliances should be added to a Customer Agency's building portfolio to avoid replacing the new asset before it reaches the end of its service life, and to avoid locking in a long-term requirement for a fossil fuel supply to the facility.

DHW is responsible for delivering capital works projects for its Customer Agencies within appropriate time-cost-quality parameters, in accordance with Government priorities and procurement requirements, including the imperative to achieve value for money outcomes. Government also expects DHW, as a central agency independent of its Customer Agencies, to review and at times challenge the appropriateness of design and its alignment to Government's policies and priorities.

DHW, and by extension the design team engaged by DHW, is committed to collaborating with its Customer Agencies and being responsive to Customer Agency requirements, in the context of its primary responsibilities to, and the priorities of Government.

Design teams shall be fully engaged and responsible for the building achieving the required ESD performance, within the project budget and throughout the duration of the project. Refer to the State Government's Architectural Services Brief for Non-Residential Government Buildings that outlines consultants' responsibilities within the project context.

[1] Strategic Asset Management Framework, Project Definition Plan, Appendix A Purpose Rigour and Detail SAMF – Project Definition Plan Guidelines

Following approval of the Business Case, typical project stages referred to throughout this Guideline, are defined in Figure 1 below.

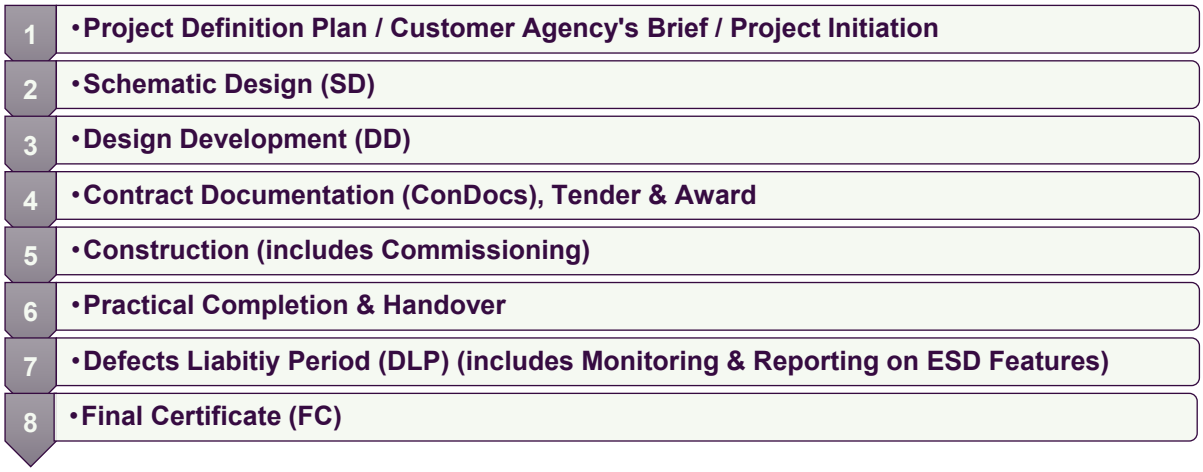


Figure 1: Typical Stages in Project Delivery

3. Guideline Application

This Guideline is only applicable to non-residential facilities, with the following exceptions.

- Class 3 buildings, as defined in the National Construction Code, covers residential buildings that provide a social, educational or health related function and are included in DHW's non-residential government building category.
- For the purpose of this Guideline only, designs for new external swimming pools and separate central energy plant facilities, are required to comply with the requirements of this Guideline.

Specifically excluded from this Guideline are:

- Classes 1, 2, & 4 dwellings,
- Class 6 retail outlets, and
- Class 10 non-habitable shed type structures, where energy consumption is insignificant.

Excluded, unless specifically requested by the Customer Agency, is the application of this Guideline for projects valued at $100m or greater.

Legislation at the state and federal level, and government emissions reduction requirements will continue to evolve in response to the latest scientific advice, and the need for urgent action on climate change. Consequently, there is a need to ensure that any guideline is sufficiently adaptable to enable realignment with new, or interim government targets or requirements. Therefore, the targets provided in this Guideline may be more frequently updated.

The design for all non-residential government building projects, whether new works or significant upgrades to existing, will need to comply with the version of this Guideline current at the commencement of the project design phase, unless otherwise instructed by DHW's Project Manager.

4. ESD Principles

4.1 Foundations

The guiding principle behind sustainability is balancing the needs of the present without compromising the ability of future generations to meet their own needs. This is achieved through an integration of environmental protection, social advancement, and economic prosperity.

Hence, due to the complexity of the task, interconnected activities, and requirement for auditable outcomes, a robust multifaceted approach is needed to address ESD.

The Green Building Council of Australia (GBCA) provides project specific rating tools which offer a robust framework for applying ESD principles.

DHW, through the application of this Guideline, will continue to apply the GBCA's rating tools to projects with a construction value of $5m or greater and less than $100m.

For projects with a construction value less than $5m, or where no relevant rating tool exists, it is a requirement that the design team must consider incorporating ESD features into the project design and demonstrate the project's ESD credentials by completing DHW's **ESD Worksheet** in Appendix 1.

4.2 Rating Tools

There are currently two building rating tools provided by GBCA for new building projects:

- Green Star Buildings - applies to new buildings and major refurbishments to existing.
- Green Star Interiors (soon to become Green Star Fitouts)- applies to new fitout projects and is generally relevant to office type interior fitout projects.

DHW's Government Office Accommodation Standards should be referenced for ESD targets on new fitout projects and buildings with a significant office component.

Only the Green Star Buildings (GSB) rating tool is applicable to the application of this Guideline, whichever version of the rating tool that is current at project commencement, i.e., Stage 1 - Project Initiation and Definition/Customer Agency's Brief.

To obtain a GSB rating, the sustainability attributes of a project are evaluated across eight categories, titled: Responsible, Healthy, Resilient, Positive, Places, People, Nature, and Leadership. For a full description of each category refer to GBCA's Green Star Buildings Submission Guidelines.

Star rating values particular to the GSB rating tool, are provided in Table 1 and are representative of the completed building at Practical Completion/Handover stage. Hence, where a Star rating is required on a project, as well as embedded in the design, it shall be incorporated throughout all aspects of the construction.

Table 1: Green Star Buildings Rating Values

Assessed Point Score	Related Rating Value	ESD Classification
15-34	4 Star	Australian Best Practice
35-69	5 Star	Australian Excellence
70-100	6 Star	World Leader

It is important to note that GBCA's approach to delivering net zero greenhouse gas emissions is known as the Climate Positive Pathway. For organisations applying the GSB rating tool, this approach has the effect of increasing the ESD performance of each Green Star rating over time. As an example, a 4 Star building registered with GBCA in 2026 will have a higher ESD performance requirement than one registered in 2025. Currently by 2026, registering a new building project for 4 Star certification, will require a commitment to have the building supplied with 100% renewable electricity and energy. GBCA are considering extending this registration deadline to 2030 for 4 Star rated projects. Hence, projects teams should check for the latest revisions to GBCA's Green Star Buildings rating tool and consider early registration of projects that require Green Star certification, unless 100% renewable electricity and energy is available to the project.

4.3 Setting Sustainability Rating Requirements

The appropriate sustainability rating, reporting and certification requirements for each project are to be determined on a project-by-project basis. The decision as to which Green Star rating to apply will be made by the Customer Agency no later than the Project Definition Plan/Briefing stage, to align with their policy commitments and consistent with this Guideline.

Table 2 of this Guideline establishes expectations as to the minimum rating that projects should achieve. A project design brief that fails to meet these expectations will require approval from the Customer Agency's Representative.

The Western Australian Climate Policy requires government agencies to lead by example. Therefore, Customer Agencies are encouraged to pursue higher design standards, where it aligns with their asset portfolio obligations and business objectives.

Table 2: Minimum Compliance Requirements

Project Construction Values (Note 1)	**DHW's ESD Worksheet Required** (Note 2)	**Non-Certified Rating** (Note 3)	**Green Star Certified Rating (Certification)** (Note 4)	**Green Star Accredited Professional required** (Note 5)	**All new services to be All Electric** (Note 6)
< $5 million	Yes	-	-	No	Yes
$5m to < $20m	No	4 Star	-	Yes	Yes
$20m to < $100m	No	-	4 Star	Yes	Yes

Notes

1. Project construction value excluding FF&E, fees, design contingencies and GST.
2. For projects less than $5 million or where no relevant rating tool exists for the type of project.
3. For non-certified ratings, Minimum Expectations and Credits deemed impracticable on the project, need to be agreed and signed off by the Customer Agency.
4. For projects to be certified by GBCA. Consultants must allow for Registering the project with the GBCA prior to Practical Completion, and for making formal submissions for Certification one year after Practical Completion. Consultants must allow for both Round 1 and Round 2 submissions in the Green Star Certification Process.
5. Where projects have a construction value of $5 million or greater (i.e. those requiring a Business Case under the Government's Strategic Asset Management Framework), a GBCA Accredited Professional is required to deliver appropriate and timely advice, from inception to final certificate, or in the case of projects where a construction value is $20 million or greater, from inception to completion of the GBCA Certification process.
6. Exceptions to an 'all electric' design are to be agreed and signed off by the Customer Agency.

DHW's Project Manager, in consultation with the Customer Agency's representative is responsible for ensuring that:

- an appropriate ESD budget is available from the Customer Agency to align with the performance requirements,
- the consultancy contracts for consultants and sub-consultants include the nominated targeted ratings and reporting requirements (including where relevant, Round 1 and Round 2 submissions for GBCA's Green Star Certification Process) as a condition of the project,
- under this Guideline, an integrated design process is conducted, where the Customer Agency's Representative and relevant stakeholders meet to decide on the integration of appropriate sustainability initiatives to achieve the specified rating before schematic design is commenced, and
- refinement of the sustainability initiatives occurs throughout the design phase, and inclusion of these initiatives in the contract documentation.

Where the project should seek to obtain a formal certified rating, the documentation will be assessed by GBCA for compliance and hence registration of the project and submission of the documentation by the design team, needs to align with GBCA's certification process. Before committing to this process, it should be noted that to register a new building project for certification, may require a substantial commitment to purchase renewable energy and carbon credits, especially if the Customer Agency intends to seek a higher than 4 Star certification, (see Section 9. Anticipated Revision Trajectory).

Where either the Customer Agency has chosen not to have the project certified, or certification is not practicable due to constraints beyond the Customer Agency's control, a non-certified rating is permitted. In this instance it is important to note that the quality of the ESD component will not be equivalent to a project certified by GBCA and hence, though the project may strive to achieve a 4 Star rating or higher, no claim to the uncertified project achieving a Star rating can be made.

In addition, all Minimum Expectations and Credits deemed impracticable on the uncertified project, need to be agreed and signed off by the Customer Agency and all materials normally submitted to GBCA to demonstrate compliance, shall be submitted to the DHW's Project Manager instead.

All documentation is to be submitted to DHW's Project Manager at each stage of the project, (refer to Section 6. Project Deliverables).

4.4 Targeted Design Features

As noted above, there are eight categories included in the Green Star Building assessment, titled: Responsible, Healthy, Resilient, Positive, Places, People, Nature, and Leadership. Within the GSB rating tool all categories with exception of the Leadership category, have a set of Minimum Expectations. The Minimum Expectations aim to, "*ensure all Green Star rated buildings meet a basic definition of a green building (energy efficient, water efficient, good healthy spaces, built responsibly, and on sites that are not critical natural areas)".*

Points are awarded within the eight categories for initiatives that meet the criteria of the rating tool's Credits (including Exceptional Credits). Credits are then totalled, and an overall score is assessed. The quality of the ESD solution is established by the overall project score obtained, aligning with the values set out in Table 1. There are no points awarded for the Minimum Expectations requirements.

As set out in Table 2 above, all projects with a construction value of $5m or greater unless otherwise approved by the Customer Agency's Representative and instructed by DHW's Project Manager, should achieve all Minimum Expectation criteria. Projects where the construction value is $20m or greater should achieve all Minimum Expectations and in addition should be certified under the GBCA Green Star Program.

To deliver on the State Government's Climate Policy, Waste Avoidance and Resource Recovery Strategy, and Waterwise Action Plans, certain Credits & Exceptional Credits, shall be incorporated into the project design, as detailed in Appendix 2 - Tables A2A to A2H. The primary aim of this approach, in addition to compliance with Government directives, is to target features that address direct and indirect greenhouse gas emissions, waste minimisation, and water efficiency.

Provided that the targets for net zero GHG emissions are satisfied, the design team have flexibility in selecting Credits and Exceptional Credits to achieve the Green Star rating specified in Table 2, the selection of which is a collaborative assessment between the Customer Agency's Representative, design team and DHW.

5. Electrification

To facilitate achieving net zero emissions, buildings that currently use fossil fuels will need to progressively transition to renewable-energy powered electrification. All new buildings and upgrades to existing should therefore be fully electrified to avoid costly decarbonising in the future.

Fully electrified means - fossil fuels cannot be used on site. Hence alternatives are required to deliver services such as cooking or production of domestic hot water or space heating. This requirement includes base building and tenant services. As per the GSB submission guidelines, fossil fuels for industrial processes are excluded from the assessment.

Where the buildings and systems cannot be fully electrified, they must be designed to be easily converted at a later date. As an example, where new gas fired boiler plant is installed it should not be designed to parameters that would preclude the gas fired plant being easily substituted by electric heat pumps that operate at lower supply and return water temperatures. In this example, the additional space and weight requirements of heat pumps would need to also be considered in the plantroom design, and spare capacity built into the electrical distribution system to avoid major disruption to the building when full decarbonisation eventually occurs.

Where fossil fuel fired plant or equipment has failed and needs to be replaced on existing projects, they should be replaced with efficient all-electric plant and equipment, where possible. Only in exceptional circumstances should the project deviate from this requirement. The exceptional circumstances must be recorded and endorsed by the Customer Agency's Representative and may include circumstances such as:

- technical challenges to electrify that are deemed insurmountable, such as unavailable plant to meet tight project programmes,
- lack of project funds due to the business case for electrification not being endorsed,
- electrical infrastructure incapable of taking the additional load, or
- new fossil fuel fired equipment is deemed a component (i.e. child asset) within a larger parent asset or system, such as gas fired components in existing absorption chillers.

Any fossil fuels used for emergency power or laboratory equipment must be less than 1% of the total building energy consumption and where the project requires GBCA certification, may need to be offset for the first five years of operation, (refer to the GSB Submission Guidelines).

Where projects are unable to meet the electrification requirements, the proposed activities and trajectory for the project to achieve net zero by 2050, is captured in a Net Zero Carbon Action Plan (NZCAP). Note, development of the NZCAP is a Minimum Expectation requirement under Criteria 23 - Energy Source, (refer to the GSB Submission Guidelines).

The NZCAP should align with the State Government's Strategic Asset Management Framework, be developed in collaboration with the Customer Agency's Representative, and be submitted for their approval and endorsement at Contract Documentation stage, to demonstrate how the new works can be decarbonised by 2050.

6. Project's ESD Deliverables

ESD design principles must be reported on, either separately, or as a distinct section in the Lead Consultant's main report at each stage of the design and construction process. This shall specifically focus on how the design team is meeting the requirements of this Guideline and the National Construction Code (NCC) Section J.

Deliverables for each phase of the project are defined below in Table 3.

The Lead Consultant is to ensure that all relevant data is provided at the completion of each project stage and either submit:

- DHW's ESD Worksheet (Appendix 1), or
- GBCA's Green Star Submission Planner.

Table 3: ESD Reporting Deliverables

Project Stage	Description of ESD Reporting Content
Project Definition Plan, Customer Agency's Brief, and Project Initiation	The ESD component of the Brief must acknowledge the ESD targets to be achieved relevant to the project type and scale. The Brief is to provide an overview of the intent of the project with respect to how it will achieve the ESD targets. The Brief must also define the stakeholders and their responsibilities for delivering key components of the project's ESD strategy.
Schematic Design (SD)	Submit the level of documentation appropriate to the project value as detailed in Table 2 above, i.e.: DHW's ESD Worksheet (Appendix 1), for projects with a construction value below $5m, provide the completed ESD worksheet, including an update to the information provided at the briefing stage. For projects with a construction value of $5m or greater, provide a draft GBCA Green Star Buildings Submission Planner and a descriptive ESD Assessment Report. ESD Assessment Report must include: • an update to the information provided at the briefing stage, • proposed design features and strategies relevant to the 41 categories detailed in Appendix 2, Tables A2A to A2H, • estimated costs for each of the ESD strategies (where there are competing options to deliver the ESD target an assessment of the options, including cost, is to be provided

	for the Project Manager to assess in consultation with the Customer Agency's Representative), • an assessment of the project's likely Green Star rating outcome (and risk of not achieving that outcome), including a brief synopsis of GHG emission reduction strategies, and • a GBCA Climate Change Pre-screening Checklist as a minimum.
Design Development (DD)	Update and submit all documents provided at SD stage, including: DHW's ESD Worksheet, or the Green Star Submission Planner & ESD Assessment Report where relevant, (refer to Table 2).
Contract Documentation (Con Docs)	Update and submit all documents provided at DD stage, including: DHW's ESD Worksheet, or the Green Star Submission Planner & ESD Assessment Report where relevant, (refer to Table 2). In addition, for projects valued at $5m and above submit the following: Estimate of Water Usage An estimate of annual water usage for the facility. NCC Section J, Provisions Reporting Checklist A detailed NCC Section J, Provisions Reporting Checklist, including anticipated energy usage. For details of the report content refer to Section 7 and associated template provided in Appendix 3. Estimate of Energy Usage An estimate of annual energy usage for the facility. Energy Modelling Data Energy Modelling data provided in *.epw format, (see Section 8. Energy Modelling). NATSPEC Embed detailed ESD specifications for the project, as outlined in GBCA's Specifying for Green Star Buildings using NATSPEC. The specification will also cover all requirements outlined in this Guideline that the contractor needs to execute during the currency of their contract. An outline of the requirements is provided below: 1. General

	1.1 Overview (Details of the project including intended ESD outcomes and details of each GBCA Green Star Buildings Rating Tool category targeted, where relevant). 1.2 Responsibilities (Obligations on each party for the submission of documentation to demonstrate compliance and/or support the GBCA Certification process). 1.3 Cross Reference (Include all work sections that the Contractor needs to reference, for example: 0164 Commissioning, 0171 General Requirements, 0172 Environmental Management, 0201 Demolition, etc). 1.4 Interpretations, (explaining relevant technical terminology). 2. Section J Compliance Requirement Identify the minimum standards to be achieved, i.e., for thermal properties, building sealing, etc. 3. Submission Documentation (identifying the documentation required from the Contractor to show compliance with this Guideline and NCC, and where necessary include reference to the documentation required to support the submission to GBCA for Certification). Where there are additional specification requirements relevant to the project that are deemed necessary to convey the intent of the design and obligation on the contractor, it is acceptable to create a separate specification referenced, 0168 ESD Requirements and Reporting.
Construction	Testing and Commissioning Plan. Implement BSRIA Soft Landings Framework (Australian version) to all projects where the construction value is $5m or greater. For projects with a construction value of $20m and greater, engage an Independent Commissioning Agent, fulfilling the role required by GBCA's Verification and Handover credit. For projects requiring GBCA certification, register the project with GBCA prior to Practical Completion.
Handover / Practical Completion	Ensure building managers and users are trained on both passive and active ESD features and control configurations and processes required to achieve the energy efficiency, water efficiency and waste minimisation targets. NCC Section J Provisions Reporting Checklist For projects valued at $5m and above, at Practical Completion, the Building Surveyor must provide an updated NCC Section J Provisions Reporting Checklist supported by the Engineering

	Consultant's calculations (refer to Section 7 and Appendix 3), to demonstrate compliance with the design. This will form part of the Technical Documents referred to in BA17 - Certificate of Construction Compliance. Waste Management Report The Contractor is required to submit DHW's Waste Management Report indicating the project's compliance with DHW's C&D waste targets. Refer to Appendix 2 - Table A2.A Responsible Construction. https://www.wa.gov.au/government/document-collections/consultant-guidance-and-forms
Defects Liability Period (From Practical Completion and prior to Final Certificate)	For projects valued at $5m and above provide: Water Usage Report At the end of the Defects Liability Period (DLP) and before a Final Certificate is issued, the Consultant is to submit to DHW's Project Manager, the actual water used during the DLP, compared to the anticipated use and provide narrative on the potential causes of any discrepancies. Energy Usage Report The consultant will report the Energy used at the end of each month, between Practical Completion and Final Certificate, to DHW's Project Manager, relevant consultants, and Customer Agency's Representative. Energy must be reported using the Department of DHW's Energy Use Report Form. The actual energy used monthly must be compared to the anticipated use and major differences highlighted, to ensure any potential discrepancies are dealt with in a timely manner. https://www.wa.gov.au/government/publications/energy-use-report-department-of-finance-projects At the end of the Defects Liability Period and before a Final Certificate is issued, the Consultant is to submit a completed Energy Report Form to DHW's Project Manager, with discrepancies between design and actual usage reconciled, and costed remedial measures provided where relevant. Submission for GBCA Certification For projects requiring GBCA certification, submit required data to GBCA for first-round assessment. Update the data to resolve issues identified by GBCA in the first-round assessment and resubmit to GBCA for second-round assessment.

7. NCC Compliance & Reporting

All government buildings must comply with the requirements of the National Construction Code (NCC) and meet the Minimum Energy Performance Standards (MEPS) for equipment.

Section J of the NCC sets minimum energy efficiency standards for new buildings. These standards relate to all facets of the building project including building fabric, glazing, sealing of the building, air quality, power and artificial lighting, hot water supply, commissioning, and access for maintenance.

Where the requirements of this Guideline provide a higher standard than the NCC for sustainability, this Guideline should be applied provided the building approvals process is not compromised.

For the purposes of this Guideline only, buildings will be designed to comply fully with Section J of the National Construction Code 2022. However, if the building approvals process is subject to a later NCC version than the above, the building designers must use that version. The Consultants are obligated to certify compliance with the applicable NCC version that applies to the building approvals process. It must be demonstrated that, for the proposed project, building attributes achieve or exceed the minimum requirements of NCC 2022 Section J, or later applicable version.

The report on compliance with Section J of the NCC, shall be sufficiently detailed to enable an independent assessor to ascertain that the design achieves compliance. For instance, NCC 2022 J1P4 requires a building to "*have features that facilitate the future installation of on-site renewable energy generation and storage and electric vehicle charging*".

In addition, NCC 2022 J9D4 provides specific requirements for car park charging requirements based on building class. How the designer has accommodated these requirements in their design needs to be demonstrated and they are strongly encouraged to review the adequacy of the vehicle charging requirements in line with the Customer Agency's electric vehicle transition plans.

The checklist in Appendix 3 can be used as a reporting tool for Energy Efficiency. **Note: this reporting requirement is only relevant to this Guideline and does not form part of the building approvals process.**

NCC's Verification Method J1V3 - Verification Using a Reference Building is required for all projects with a construction value of $5m or greater.

At Practical Completion, the Contractor must provide an updated NCC Section J Provisions Reporting Checklist to demonstrate compliance with the design.

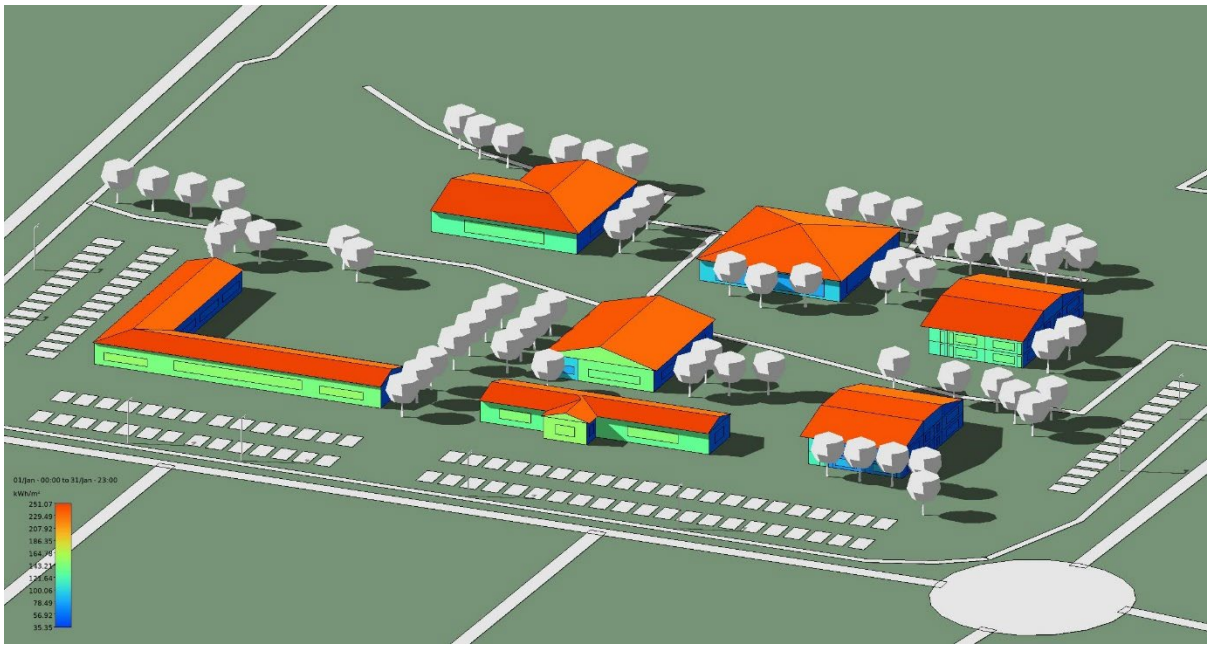
8. Energy Modelling

The consultant is required to deliver to the Project Manager, an Energy Report at the Contract Documentation stage of the project, showing modelled outcomes and supporting text to explain anticipated energy use for projects valued at $5m and above.

It is imperative that the Consultant has in writing from the Customer Agency's Representative, the anticipated occupancy patterns, and hours of operation in order that the results can be reconciled with actual consumption, post occupation.

Therefore, the report should include the anticipated user patterns and any assumptions, such as specific actions that would need to be undertaken by the building managers and users to utilise the passive design features (e.g., lowering blinds to reduce solar gain).

Modelling shall conform to the requirements of the NCC Section J, (i.e., ASHRAE Standard 140-2017 Addendum A).



Example of Typical Primary School Energy Model

9. Anticipated Revision Trajectory

As noted previously, it is anticipated that this document will be updated frequently to align with future government legislation and decarbonisation targets.

In due course, the government owned non-residential buildings will become fossil fuel free, highly efficient buildings, powered by renewables, and built with low embodied carbon materials.

However, the following should be factored in when master planning projects. The Green Building Council of Australia's Climate Positive Pathway has the effect of increasing the ESD performance of each Green Star rating over time. As previously noted, a 4 Star building registered after 2026 will have a higher ESD performance requirement than one registered prior to this. By 2026, registering a new building project with a construction value of $20m and greater for 4 Star certification, (or otherwise seeking certification for lower valued projects), will require a commitment to the Climate Positive Pathway, comprising:

- 100% renewable electricity.
- 100% renewable energy.
- 20% less energy use than those of a reference building.
- 20% less upfront carbon emissions than those of a reference building.
- Eliminating or offsetting Scope 1 emissions, including fossil fuels and refrigerants.

The requirements for 5 & 6 Star buildings are currently more onerous than the above.

It is important to note that the above requirements and timelines for registration are currently under review by the GBCA. Hence, projects teams should check for the latest revisions to TG040 and GBCA's Green Star Buildings rating tool and consider early registration of projects that require Green Star certification.

10. Glossary

Terminology and abbreviations used throughout this document.

Reference	Definition
BSRIA Soft Landings	Requirements as defined in GBCA's Green Star Buildings Rating Tool.
Carbon Neutral	Buildings that address all their emissions so that the carbon account is zero.
Customer Agency	The Customer Agency engaging the Department of DHW to deliver their non-residential buildings program.
Customer Agency's Representative	A person engaged by the Customer Agency to act on behalf of the agency.
DHW	Department of Housing and Works (typically represented by DHW's Buildings & Contracts Division).
GBCA	Green Building Council of Australia.
GSB Rating Tool	GBCA's Green Star Buildings Rating Tool.
Lead Consultant	A person or practice/business engaged by the Department of Housing and Works to provide specialist advice or services to a project. Typically performed by an architect.
MEPS	Minimum Energy Performance Standards for equipment and appliances established through the Greenhouse and Energy Minimum Standards Act 2012.
NABERS	National Australian Built Environment Rating System.
NCC	National Construction Code.
Net Zero Carbon	Balance between the amount of greenhouse gas produced and the amount removed from the atmosphere on a net annual basis.

11. Referenced Documents

The following documents are referenced:

- **National Construction Code 2022 Volume 1**

  (https://ncc.abcb.gov.au/editions/ncc-2022)

- **WA Government's Architectural Services Brief for Non-Residential Government Buildings**

  (https://www.wa.gov.au/government/publications/architectural-services-brief-non-residential-buildings)

- **WA Government's Waste Avoidance and Resource Recovery Strategy 2030**

  (https://www.wasteauthority.wa.gov.au/images/resources/files/Strategic_Direction_Waste_Avoidance_and_Resource_Recovery_Strategy_2030.pdf)

- **Kep Katitjin– Gabi Kaadadjan – Waterwise Perth Action Plan 3**

  (https://www.wa.gov.au/service/natural-resources/water-resources/program-kep-katitjin-gabi-kaadadjan-waterwise-action-plan-3)

- **Government Office Accommodation Standards,**

  (https://www.wa.gov.au/government/publications/government-office-accommodation-standards)

- **GBCA's Green Star Buildings Submission Guidelines**

  (https://www.gbca.au/product/green-star-buildings-v1-submission-guidelines)

- **GBCA's Specifying for Green Star Buildings using NATSPEC**

  (https://www.google.com/search?q=Specifying+for+Green+Star+Buildings+using+NATSPEC&rlz=1C1GCEA_enAU990AU990&oq=Specifying+for+Green+Star++Buildings+using+NATSPEC+&gs_lcrp=EgZjaHJvbWUyBggAEEUYOTIKCAEQABiiBBiJBTIHCAIQABiiBDIHCAMQABiiBDIHCAQQABiiBNIBDTMxMzU3MDY1ajBqMTWoAgCwAgA&sourceid=chrome&ie=UTF-8&safe=active&ssui=on)

- **DHW's Energy Use Reporting**
  (https://www.wa.gov.au/government/publications/energy-use-report-department-of-finance-projects)

- **State Electric Vehicle Strategy for Western Australia**

  (https://www.wa.gov.au/system/files/2020-11/State_Electric_Vehicle_Strategy_for_Western_Australia_0.pdf)

- **ASHRAE Standard 140-2017 Addendum A**

  (https://www.ashrae.org/file%20library/technical%20resources/standards%20and%20guidelines/standards%20errata/standards/140_2017_a_20200901.pdf)

Appendices

Appendix 1: DHW's ESD Worksheet

Introduction to DHW's ESD Worksheet

DHW's ESD Worksheet has been designed as a guide to prompt the design team on possible sustainability initiatives. The design team must complete the checklist for projects with a construction value less than $5m, as specified in Table 2, and ascertain what sustainability improvements measures, over the NCC requirements, are employed on the project.

The NCC requirements are considered minimum acceptable standards rather than 'best practice.' Therefore, it is incumbent on the Consultant to improve on the NCC requirements where possible.

The worksheet promotes a holistic approach with considerations for energy and water efficiency, waste minimisation, materials, durability, universal access, indoor environment quality, etc.

Note, the first section of the worksheet includes a Climate Change Resilience Assessment that should be completed by the Lead Consultant. Four tasks are suggested, as a prompt only. The design team are not limited to these tasks and should consider the project design in the context of the existing infrastructure and potential future environment.

Appendix 1: DHW's ESD WORKSHEET

Project:

Buildings & Contracts Project Manager:	**Updated On:**	**Consultant:**
Project Number:	**By:**	**Signature:**

Climate Change Resilience Assessment	Minimum Categories to be Considered (not exhaustive)	Design Team to Confirm Adaptation Measures Required
Task 1	Potential for component failure in extreme weather events, i.e. photovoltaic panel fixings on roof structure, shading elements fixed to façade, etc.	
Task 2	Accelerated structural material fatigue and degradation due to extreme weather, i.e. expansion and contraction causing structural distortion and shearing of bolts, cracks forming in caulking leading to infiltration of wind and rain, etc.	
Task 3	Undersized systems leading to poor performance impacting service delivery, i.e. size of roof drainage systems to manage intense rainfall, capacity of air conditioning systems to cope with excessive heat and humidity, etc.	
Task 4	Potential for exterior element to become air borne in a storm, i.e. tree branches are too close to the facility, lightweight sheds, etc.	

Sustainability Provision	Design Features Incorporated	Yes	No	Anticipated Capital Cost	Comments: advantages, disadvantages, alternative solutions
Re-use of Existing Building Assets	Adaptive Re-use				
Energy Efficiency	Passive solar design				
	Optimise daylighting penetration				
	Maximise passive cooling, heating and ventilation opportunities (consider including security screens and filters for night venting)				
	Minimise active heating and cooling requirements through energy efficient design				
	Provide energy efficient plant and equipment, compliant to mandatory MEPS requirements.				
	Provide energy efficient lighting systems				
	Provide efficient control and effective maintenance systems, including monitoring of energy consumption				

	Optimised opportunities to use renewable energy sources and incorporate renewable energy technologies and as a minimum provide for future installation of renewable energy systems (consider wiring and metering facilities, roof orientation and structure, access for cleaning and maintenance, etc)				
	Where specifically for office accommodation, meeting the Government Office Accommodation Standards for specific energy rating criteria.				
Water Efficiency	Provide water efficient appliances and fixtures Taps: 5 Star Toilet Cisterns: 4 Star Urinal Cisterns: 5 Star Showers: 3 Star				
	Ensure system design enables effective monitoring and maintenance of systems				
	Consider grey water reuse system (not recommended for schools)				

	Consider rainwater and stormwater collection tanks				
	Manage stormwater runoff on site to recharge aquifers				
Waste Minimisation	Consider opportunities to recycle materials such as green waste and excavated material on site within the works.				
	Consider recycling all construction waste (minimum of 80% C&D waste to be diverted from landfill if the project is in the metropolitan area or within 50km of a regional recycling facility).				
	Design buildings for disassembly, to maximise the opportunities to recycle materials in future				
	Design buildings to maximise longevity through the quality of materials and creation of flexible and readily adaptable designs.				
Building Materials	Design for resource conservation (using the minimum amount of material required for the function)				

	Maximise the use of recycled material				
	Use of materials, as much as possible, that can be sourced from suppliers close to the site				
	Minimise life cycle costs through using materials and equipment requiring minimal maintenance and with maximised expected useful life				
	Minimise or avoid the use of materials made from toxic or hazardous substances or which may result in off-gassing of emissions				
	Minimise the use of building materials with high embodied energy				
	Minimise building materials that have damaging ecological effects during harvesting, manufacturing and/or construction				
	Minimise building materials produced from limited or non-renewable natural resources				
Building Durability	Design elements that contribute to durability				

	Attach a schedule of manufacturers' recommended maintenance including frequency and anticipated costs derived through research				
	Minimisation of wilful and accidental damage opportunities				
Requirement for electric vehicle charging, and end of trip facilities in government buildings	Incorporate electric vehicle charging to Customer Agency requirements and at least to NCC standard, with power points for bicycle/scooter charging and appropriate end of trip facilities				
Universal Access	Compliance with Commonwealth Disability Discrimination Act 1992				
	Compliance with the NCC for Access for People with Disabilities				
Furniture Services	Choose materials with low volatile organic compound (VOC) emissions in: Floor coverings Furniture components Blinds				

	Give preference to bio plastics over synthetic plastics				
	Natural fabrics with high flame resistance and low toxicity qualities				
	Materials which can be cleaned with organic products				
	Indoor plants that filter toxins from internal environments				
	Handover manual which specifies organic cleaning products and desired frequency of maintenance				

Note: the above requirements do not negate the obligations on consultants and contractors to comply with legislation, National Construction Code, Australian Standards, Codes of Practice, and Government directives and policy objectives.

Appendix 2: Green Star Rating Tool Targets

Introduction to Green Star Rating Tool Targets

As stated previously, provided that the targets for net zero GHG emissions are satisfied, the design team have flexibility in selecting Credits and Exceptional Credits to achieve the Green Star rating specified in Table 2, the selection of which is a collaborative assessment between the Customer Agency's Representative, design team and DHW.

The following tables provide guidance to the design team on specific areas of the GBCA's Buildings Rating Tool to be targeted (i.e., specifically required) on non-residential government building projects, for projects valued at $5m and above.

Where the action includes a statement to the effect "consider all optional criteria," this requires the design team to review all other criteria in the Credit and Exceptional categories that are not specifically required, and incorporating the requirements where viable to do so, in addition to achieving the Minimum Expectations.

Table A2.A: Responsible Design Categories

Ref	Category	Description	Actions
1	Industry Development	General	Consider all optional criteria.
		Appointment of ESD Consultant	Projects with the construction value $5m and greater, require a Green Star Accredited Professional.
		Green Star Certification	Projects with the construction value $20m and greater need to be formally certified by GBCA.
		ESD Consultant's Scope of Work.	Defined in the DHW's Architectural Services Brief or as otherwise instructed in the ESD Consultant's contract.
2	Responsible Construction	General	Achieve Minimum Expectations, noting that achieving 80% diversion of construction and demolition (C&D) waste from landfill for regional projects is a requirement that the design team should pursue, mindful of avoiding excessive transport costs and GHG emissions. As defined within the project Preliminaries, the Contractor will be required to divert 80% of C&D waste from landfill on metropolitan projects. Outside of the metropolitan area, a minimum of 80% of construction and demolition waste must be recycled/diverted from landfill unless the Contractor is unable to recycle the material within a 50km radius of the site's
	Responsible Construction		

			location. The project team should address this issue early in the project's design phase. Consider all optional criteria, and note that experience has shown, 90% waste diversion from landfill is achievable, especially in the metropolitan sites.
3	Verification and Handover	General	Achieve Minimum Expectations, including air tightness requirements. Consider all optional criteria.
		Note: Soft Landings & Independent Commissioning Agent	Implement BSRIA Soft Landings approach to all projects where the construction value is $5m and greater. For projects where the building services engineering component is greater than $20m, engage an Independent Commissioning Agent and employ BSRIA's Soft Landings approach.
4	Responsible Resource Management	General	Achieve Minimum Expectations.
		Note on Responsible Resource Management	In addition to achieving the Minimum Expectations, the project must provide a (Soft Landings) smooth transition into use of the waste-management. This must include on-site demonstration to the building manager and users, on how to minimise waste to landfill.
5	Responsible Procurement	General	The building's design and construction procurement processes should follow AS ISO 20400:2018 Sustainable Procurement – Guidance by undertaking a risk and opportunities assessment. A responsible procurement plan should be developed to mitigate risks and implement opportunities identified in the assessment.
6	Responsible Structure	General	Consider all optional criteria.
7	Responsible Envelope	General	Consider all optional criteria.
8	Responsible Systems	General	Consider all optional criteria.

9	Responsible Finishes	General	Consider all optional criteria.
Table A2.B: Healthy Design Categories			
Ref	**Category**	**Description**	**Actions**
10	Clean Air	General	Achieve Minimum Expectations. For projects requiring GBCA Certification a 50% improvement of outdoor air required by AS 1668.2:2012 is required for all regularly occupied areas. For uncertified projects, the minimum requirements when using appropriate particulate filters, as referenced in AS 1668.2:2012 Appendix D, is acceptable. In addition to the Minimum Expectation, the building's ventilation systems allow for easy maintenance. Consider all optional criteria.
11	Light Quality	General	Achieve Minimum Expectations. Consider all optional criteria.
12	Acoustic Comfort	General	Achieve Minimum Expectations. Consider all optional criteria.
13	Exposure to Toxins	General	Achieve Minimum Expectations. Consider all optional criteria.
14	Amenity and Comfort	General	Consider all optional criteria.
15	Connection to Nature	General	Consider all optional criteria.
Table A2.C: Resilient Design Categories			
Ref	**Category**	**Description**	**Actions**
16	Climate Change Resilience	General	Achieve Minimum Expectations Complete the Climate Change Pre-screening Checklist.

		Climate Change Risk & Adaptation Assessment	Achieve the Credit criteria on all projects where the construction value is $5m and greater and the Climate Change Pre-Screen Checklist has identified adaptation measure are necessary. Conduct the assessment using Shared Socio-economic Pathway SSP3-7.0 unless unavailable at the time of the assessment, then use Representative Concentration Pathways RCP 8.5.
17	Operations Resilience	General	Consider all optional criteria.
18	Community Resilience	Community Resilience Plan	For projects with a construction value of $5m and greater, achieve the Credit criteria where community social cohesion, health and wellbeing are part of the customer agency's service delivery model, and these factors are specifically supported by the facility.
19	Heat Resilience	Heat Island Reduction	Achieve the Credit criteria on all projects where the construction value is $5m and greater. Where trees are being introduced, it is incumbent on the landscape designer to use native varieties and only use exotics where they are guaranteed to enhance the environmental outcome. Where possible consult with local communities for selection of appropriate species.
20	Grid Resilience	General	Consider all optional criteria. Grid resilience is a key component in the transition to fully electrified buildings and hence, methods to reduce peak electrical demand shall be considered for all projects.
		Passive Design Solutions	Passive design solutions should be considered on all projects.

Table A2.D: Positive Design Categories			
Ref	**Category**	**Description**	**Actions**
21	Upfront Carbon Emissions	General	Achieve Minimum Expectations.
		Reducing Upfront Carbon Emissions - Credit	**Climate Positive Pathway** – The design team should achieve this Credit criteria where practical. Where it is not practical, such as the market is unable to meet the requirements, the design team must provide justification.
		Reducing Upfront Carbon Emissions - Exceptional	Exceptional criteria is optional but should be considered.
22	Energy Use	General	Achieve Minimum Expectations. Consideration of passive design solutions should be given – refer to Grid Resilience criteria.
		Reducing Energy Use - Credit	**Climate Positive Pathway** – Credit criteria must be achieved. The **Reference Building Pathway** is required for all projects where the construction value is $5m and greater, unless the Customer Agency's Representative confirms in writing that they will be signing a NABERS Energy Commitment Agreement, whereby the Energy Use will be evaluated based on the NABERS Energy Commitment Agreement Pathway.
		Reducing Energy Use - Exceptional	Exceptional criteria is optional but should be considered.
23	Energy Source	General	Achieve Minimum Expectations, this includes the development of a **net Zero Carbon Action Plan.**
		Note on Renewable Electricity - Credit	While having the project achieve the Credit criteria is ideal, it is recognised that having 100% of the electricity supplied by

			renewables, may be currently unattainable for some projects.
		Note on Renewable Energy - Exceptional	While having the project achieve the Exceptional criteria is a requirement under the **Climate Positive Pathway** and noting that an Exceptional criteria can only be targeted if the Credit criteria is achieved, it is recognised that having 100% of the energy supplied by renewables, may be currently unattainable for some projects.
24	Other Carbon Emissions	Other Carbon Emissions - Credit	**Climate Positive Pathway:** Projects registering after 2026 where the construction value is $5m and greater must comply with one of the following criteria: • Eliminating Refrigerants • Offsetting Refrigerants
		Note on Refrigerants	Refrigerants with a Global Warming Potential (GWP) of < 10 comply. While having the project achieve the Credit criteria is a requirement, it is recognised that the refrigerant market in Australia is in a transition period and offsetting may be the only viable option currently available for most projects. As noted previously Offsetting is a last resort on the GHG emission hierarchy.
		Other Carbon Emissions - Exceptional	Exceptional criteria is optional but should be considered.
25	Water Use	General	Achieve Minimum Expectations and in particular the building must install water fixtures complying with the following WELS rating efficiency: Taps: 5 Star Toilet Cisterns: 4 Star Urinal Cisterns: 5 Star Showers: 3 Star

			Toilet cisterns shall be dual flush. Cisterns for urinals shall not be set-cycled or activated by any method other than manual or use activation. This requirement does not apply to a programmed solenoid operated flushing system if programmed to shut down during extended periods of non-occupancy of a building. Where sensor control is used for urinal flushing, sensors should be located to avoid unnecessary 'nuisance' flushing triggered by pedestrian traffic. On completion of the contract documentation, an estimate of the likely annual water consumption should be provided to the Project Manager. At the end of the DLP the estimate should be compared with actual usage and the difference reconciled by the ESD consultant and reported to the Project Manager.
		Water Use - Credit	Ideally the building should use 45% less water compared to a reference building. Therefore, exploring opportunities for recycling water is encouraged. However, only proposals that have a positive reduction on energy and water use in operation, should be promoted.
		Water Use - Exceptional	Exceptional criteria is optional but should be considered.
26	Life Cycle Impacts	General	Ideally the design specification should result in a 30% reduction in life cycle impacts when compared to standard practice. Therefore, exploring opportunities to achieve this is encouraged.

Table A2.E: Places Design Categories			
Ref	**Category**	**Description**	**Actions**

27	Movement and Place	General	Achieve Minimum Expectations. Consider all optional criteria. Consult with the Customer Agency's Representative to ascertain the EV charging requirements and ideally meet the credit achievement.
28	Enjoyable Places	General	Consider all optional criteria.
29	Contribution to Place	General	Consider all optional criteria.
30	Culture Heritage and Identity	General	Consider all optional criteria.
Table A2.F: People Design Categories			
Ref	**Category**	**Description**	**Actions**
31	Inclusive Construction Practices	General	Achieve Minimum Expectations. Consider all optional criteria.
32	Indigenous Inclusion	General	Consider all optional criteria.
33	Procurement and Workforce Inclusion	General	Consider all optional criteria.
34	Design for Inclusion	General	Consider all optional criteria.
Table A2.G: Nature Design Categories			
Ref	**Category**	**Description**	**Actions**
35	Impacts to Nature	General	Achieve Minimum Expectations. Consider all optional criteria.
36	Biodiversity Enhancement	General	Consider all optional criteria.
37	Nature Connectivity	General	Consider all optional criteria.

38	Nature Stewardship	General	Consider all optional criteria.
39	Waterway Protection	General	Consider all optional criteria.

Table A2.H: Leadership Design Categories

Ref	Category	Description	Actions
40	Market Transformation	General	Consider the potential to use products with higher quality and efficiency especially those that may encourage local manufacturing and can minimise embodied carbon and waste. Consider all optional criteria.
41	Leadership Challenges	General	Consider all optional criteria.

Appendix 3: NCC Section J Provisions Reporting Checklist

Appendix 3: NCC SECTION J PROVISIONS REPORTING CHECKLIST

Project:

Buildings & Contracts Project Manager:	**Updated On:**	**Consultant:**
Project Number:	**By:**	**Signature:**

Description	Details of How the Standard is achieved
J1 Energy Efficiency Performance Requirements	
J1P1 Energy use	
J1P4 Renewable energy and electric vehicle charging	
Verification Methods	
J1V3 Verification using a reference building	
J1V4 Verification of building envelope sealing	
J4 Building fabric	
J4D3 Thermal construction — general	
J4D4 Roof and ceiling construction	
J4D5 Roof lights	
J4D6 Walls and glazing	

J4D7 Floors	
Part J5 Building sealing	
J5D3 Chimneys and flues	
J5D4 Roof lights	
J5D5 Windows and doors	
J5D6 Exhaust fans	
J5D7 Construction of ceilings, walls and floors	
J5D8 Evaporative coolers	
Part J6 Air-conditioning and ventilation	
J6D3 Air-conditioning system control	
J6D4 Mechanical ventilation system control	
J6D5 Fans and duct systems	
J6D6 Ductwork insulation	
J6D7 Ductwork sealing	
J6D8 Pump systems	
J6D9 Pipework insulation	

J6D10 Space heating	
J6D11 Refrigerant chillers	
J6D12 Unitary air-conditioning equipment	
J6D13 Heat rejection equipment	
Part J7 Artificial lighting and power	
J7D3 Artificial lighting	
J7D4 Interior artificial lighting and power control	
J7D5 Interior decorative and display lighting	
J7D6 Exterior artificial lighting	
J7D7 Boiling water and chilled water storage units	
J7D8 Lifts	
J7D9 Escalators and moving walkways	
Part J8 Heated water supply and swimming pool and spa pool plant	
J8D2 Heated water supply	
J8D3 Swimming pool heating and pumping	
J8D4 Spa pool heating and pumping	

Part J9 Energy monitoring and on-site distributed energy resources	
J9D3 Facilities for energy monitoring	
J9D4 Facilities for electric vehicle charging equipment	
J9D5 Facilities for solar photovoltaic and battery systems	