ECOLOGICAL SUSTAINABILITY APPROACH REPORT

ISSUE 1 - 23 November 2016

HUNTER SPORTS HIGH SCHOOL
MAJOR CAPITAL WORKS
PACIFIC HIGHWAY
GATESHEAD NSW 2290

Prepared by EJE Architecture
23 November 2016

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EJE architecture

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1. INTRODUCTION

This report has been prepared by EJE Architecture, on behalf of NSW Public Works, to document the approach taken by the design consultant team to ecologically sustainable design (ESD) principles, with the hope that this will assist the full understanding of these design measures and principles as part of the assessment for determination by NSW Planning of the proposed redevelopment of Hunter Sports High School. This report is in response to the requirements outlined in Clause 6 of the SEARS.

1.1 OVERVIEW

The project involves the staged redevelopment of the Hunter Sports High School, located on the Pacific Highway at Gateshead, NSW. The proposal provides an opportunity for an improved ESD outcome for the existing school, through the replacement of aging built form and building services infrastructure at the end of its useful lifespan with new building and building systems, designed to an improved standard of environmental and ecological sustainability.

NSW Department of Education propose to replace existing buildings and facilities at the site. The buildings currently accommodate up to 850 students in a variety of educational settings that are nearing or have passed their economic life. The project proposes to demolish a number of aged school buildings, and the staged construction of three new building:

- Block S, accommodating a new Movement Complex/Hall and Canteen;
- Block T, accommodating specialist learning spaces such as Hospitality, Technological and Applied Studies, Science, General Learning Space, Administration, Senior Study Areas, Staff Study and Lounge, Staff Amenities and Student Amenities;
- Block U, accommodating Library, Creative and Performing Arts, General Learning Spaces, Big Picture Academy, Minimbah Room, Student Change Room and Amenities.

Existing buildings and structures to remain on site through the redevelopment include the relatively newly constructed Gym building (Block Q) and a number of secondary structures such as Ag shed, bus shed, cricket nets, and covered ball courts.

The school is a 5 stream high school designed to accommodate approximately 850 enrolments. Teaching and student numbers are not expected to change as a result of the proposed development.

2. SUSTAINABILITY FRAMEWORK

The following statutory framework considerations have been identified as applicable to the ESD principles of the project.

2.1 SEARS CONDITIONS

The SEARS note that the following assessment framework should be addressed in the EIS and supporting documentation:

Ecologically Sustainable Development (ESD)
• Detail how ESD principles (as defined in clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000) will be incorporated in the design and ongoing operation phases of the development.
• Demonstrate that the development has been assessed against a suitably accredited rating scheme to meet industry best practice.
• Include a description of the measures that would be implemented to minimise consumption of resources, water (including water sensitive urban design) and energy.

We believe that the detail provided in this report and elsewhere in the EIS, in conjunction with the Green Star 4 Star pathway set out for the project, provides evidence of the satisfaction of these specific SEARS conditions.

2.2 ENVIRONMENTAL PLANNING AND ASSESSMENT REGULATION 2000

The EP&A Act Regulation 2000, Schedule 2, Clause 7(4) notes the following considerations applicable to ESD principles:

The principles of ecologically sustainable development 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:*

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

(ii) 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:*

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

(ii) 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,

(iii) environmental goals, having been established, should be pursued in the most 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.

2.3 NATIONAL CONSTRUCTION CODE (BCA) SECTION J – ENERGY EFFICIENCY

Section J of the NCC imposes minimum statutory energy efficiency requirements relating to building design, including performance requirements relating to building envelope sealing and insulation, thermal

performance of building openings, and sustainability of building services components such as mechanical systems and lighting. A Section J Compliance Report has been prepared as part of the detailed design documentation, and has been referenced in the detailed technical documentation of the new buildings and systems.

2.4 NON-STATUTORY FRAMEWORK

A number of other ESD principle frameworks, although not of a mandatory statutory nature, apply to the design.

NSW GOVERNMENT RESOURCE EFFICIENCY POLICY

The aim of the GREP is to reduce Government's operating costs and lead by example in increasing resource productivity. The policy aims to drive resource efficiency by Government agencies in three main areas: energy, water and waste, and reduce harmful air emissions from government operations.

The policy will ensure Government agencies:

- meet the challenge of rising prices expected for energy, fuel, water and waste management
- use purchasing power to drive down cost of resource efficient technologies and services
- show leadership by incorporating resource efficiency in decision making.

A definition is given by the NSW Whole of Government Sustainability Principles which were published in 2006:

Sustainability in the NSW public sector means addressing the needs of current and future generations through the integration of social justice, economic prosperity and environmental protection in ways that are transparent, accountable and fiscally responsible.

NSW DoE EDUCATIONAL FACILITY STANDARDS AND GUIDELINES (EFSG)

The EFSG includes the following design policies which are applicable to DoE facilities:

Green Building Design and Green Star

- *The Green Building Council of Australia (GBCA) is an independent body whose key objective is to promote the integration and advancement of sustainable building technologies and design practices into the mainstream building design processes.*
- *To assist the building design industry the Green Building Council have developed Green Star rating tools to assess a building's sustainable design credentials.*
- *The Green Star - Education v1 Design & As Built rating tool would be the most appropriate for assessing new school sustainable design principles.*
- *The policies set out within this design guide incorporate many of these green building design principles.*

Green Star Requirements

- *It is expected that the policies set out within this design guide will lead to a Green Star - Education v1 Design & As Built 4 Star rating, which is considered to be best practice within the Australian building industry.*
- *DoE requires that any new school buildings on an existing or new site will be able to achieve a minimum 4 Star Green Star rating. DoE also aims to ensure Ecologically Sustainable Development principles will be included in any new school, to a level that the building could be benchmarked to achieve a 5 Star Green Star rating.*

Environmental Management Plan (EMP)

- ***All projects will require** the preparation of an appropriate site-specific **Environmental Management Plan (EMP)** prior to the commencement of the relevant site works.*
- *Contractors will be required to prepare an EMP as a condition of contract.*
- *All projects of $10m or more, and all projects under $10m if they are environmentally sensitive, contractors will need to have a corporate Environmental Management System (EMS) accredited by a NSW government construction agency.*

Timber

- *No Rainforest timbers to be used unless plantation grown*

- *No timbers from high conservation forests*
- *Use only recycled timber, engineered and glued timber composite products, timber from plantations or from sustainably managed regrowth forests.*

This policy contributes to Green Star Credit Mat -7

Ecologically Sustainable Development

- *Ensure the preservation, maintenance and sustainable use of the community's natural and material assets.*
- *Protect and support biological and ecological diversity*
- *Restrict the flow of pollutants into our natural environment.*

Environmentally Friendly Materials / Products

Encourage the use of materials and products which:

- *Adequately and economically perform their intended functions, and also have lower adverse environmental impacts throughout their life cycle.*
- *Contain reduced or no hazardous substances (Low VOC)*
- *Reduce the demand for rare or non-renewable resources*
- *Are made from or contain recycled materials or can be recycled at the end of their useful life.*

Conservation of Biological Diversity

- *Conserve for future generations, the biological diversity of genetic materials, species and ecosystems.*
- *Assess project and purchasing impacts on the natural environment during all project phases and adopt a precautionary approach where risk is high.*

Pesticide

- ***New Buildings**: no chemical pesticides and termiticide to be used. Preventive treatments to be by physical means and careful design to minimise risk.*
- ***Existing Buildings**: Chemicals to be used only as a last resort for the eradication of infestations, using chemicals approved by the National Registration Authority and applied by a Pest Control Operator licensed by Workcover.*

Waste

- *Eliminate unnecessary waste by better planning and more efficient use of natural and manufactured resources. This approach is often referred to as a Whole of Life approach to building.*

3. THE DESIGN

The design incorporates a number of detailed measures fully documented to full technical resolution for implementation, which will provide positive environmental and resource efficiency outcomes, and which embody best practice ESD principles. These measures include a suite of distinct but interconnected passive building design approaches, such as properly considered building orientation, the optimal arrangement of openings in the building, maximising the benefits of natural lighting and ventilation, all to improve occupant comfort and reduce the reliance on active building systems such as artificial lighting and space heating and cooling. Where active building systems are required, these are also carefully considered in the design to ensure the best outcome when assessed against a whole-of-life cost.

3.1 PASSIVE DESIGN

NATURAL LIGHT

The new buildings have been designed to achieve the design goal stated in the EFSG of achieving an operational outcome of lights seldom needing to be turned on during the day. Specific measures incorporated into the design include

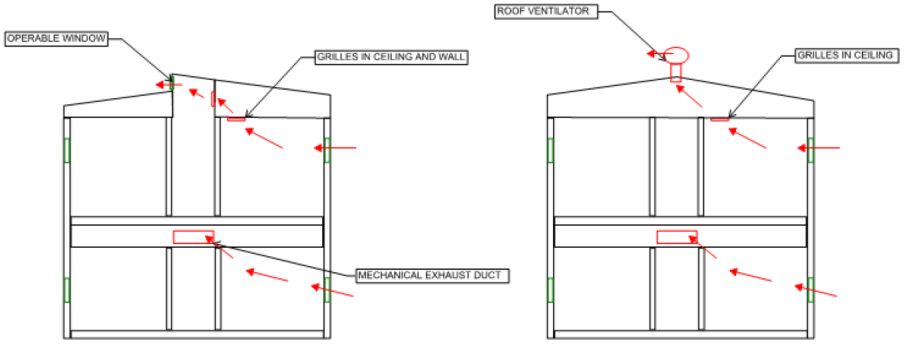
- The provision of daylight to all learning spaces.
- Augmentation of daylight to learning spaces via solatube type skylights in ceilings where the length of external wall in a particular learning spaces limits the potential for natural lighting via external windows.
- Modelling of daylight levels to all occupied areas as part of a specific Green Star credit being targeted within the 4 Star credit target, with additional solatube type skylights provided in spaces where the enhanced daylight lighting levels required by the Green Star 4 Star credit weren't otherwise met.

Occupant comfort and passive building performance are maintained through the careful design of louvres, overhangs and walkways to screen external windows from undesirable western sun, and filtering direct light so that it enters learning spaces as indirect light.

NATURAL & ASSISTED VENTILATION

Each space is provided with cross flow natural ventilation or mechanically assisted cross flow ventilation through the following means:

- Rooms on corners of building or spanning the width of buildings – Operable windows or openings on two sides to allow natural crossflow ventilation.
- Rooms located on the top floor TAS Workshops and Food tech area where there are high level operable windows – Cross flow ventilation is achieved with operable window on the external façade, with grilles allowing air to transfer from the occupied space to the ceiling space over and then into the high level atrium space and out the high level windows as per the below. N.B. grilles into the ceiling space will be offset to reduce acoustic transfer.
- Rooms located on the top floor other than those noted above – Cross flow ventilation is achieved with operable window on the external façade, with grilles allowing air to transfer from the occupied space to the ceiling space over and then to outside through roof mounted ventilators.
- Rooms with limited access to outside and no roof over – Mechanically assisted cross flow ventilation consisting of operable windows on the external face, with a mechanical exhaust system located on the internal side of the space.



Ceiling fans are provided in all learning areas to enhance occupant comfort through controlled movement of air within the spaces.

BUILDING INSULATION
Thermal insulation to building envelope elements such as roof, walls and exposed underside of floors has been designed not just to meet the R value required under the mandatory National Construction Code (BCA) Section J – Energy Efficiency values, but has been selected and design to a discretionary enhanced level with a 15% buffer over the mandatory required Section J levels, as a response to the credit requirements for the Green Star 4 Star credits relating to building insulation design. This increase in new building envelope insulation values above mandatory required levels is expected to provide a noticeable improvement in occupant comfort levels, and reduce the reliance on active mechanical comfort systems such as ceiling fans, air conditioning (where provided) and space heating.

3.2 SPACE HEATING

The design of the space heating system for the new buildings utilises a hydronic (heated water) panel heating system, in lieu of the more conventional flued gas heating or electric panel heating systems. This system has centralised gas fired boilers, which heats water which is then circulated around a piped ring main, attached to heater panels in learning spaces, where the heated water radiates controlled heat into the space.

The selection of a hydronic panel heating system was based on a whole of life economic analysis. Although the system is more expensive upfront than some other systems, over the life of the buildings the system will be more economical due to reduced refurbishment costs and longer economic life expectancy. The selected hydronic heater system also provides additional environmental benefit opportunities compared to the conventional school approach of distributed gas panel heaters, in that it will facilitate a future transition to a fully renewable energy source for the school's space heating. The hydronic heating boilers are currently designed to be gas fired, but this arrangement will allow a readily feasible transition to an electric boiler which could be fuelled by renewable power supply sources, allowing a move away from the current fossil fuel based heating.

3.3 AIR CONDITIONING

The design of general learning areas incorporating passive ESD principles, and other energy efficient active comfort systems, has allowed the design to not include air conditioning generally to these areas, while still maintaining adequate occupant comfort levels. A few specialist spaces in the redeveloped school are scoped to include new air conditioning systems. These include the Special Education Program area, the Canteen, Administration area, and Staff Study and Lounge. For each of these areas, the air conditioning system has been designed to be best practice in terms of energy efficiency. The National Construction Code (BCA) Section J – Energy Efficiency mandates minimum energy efficiency ratios for new mechanical air conditioning equipment. These minimum efficiency levels have been beaten by a buffer of 15% in the specific mechanical design for this redevelopment, as a response to the Green Star 4 Star credits being targeted related to greenhouse gas emissions.

Additionally, the sizing of the proposed PV Solar system incorporated additional solar panel capacity to offset the expected power consumption of the air conditioning plant.

3.4 ENERGY CONSERVATION

A number of measures have been implemented in the electrical system design as a response to direct requirements noted in the EFSG. These include renewable energy supply systems and intelligent control measures to minimise energy consumption.

GRID CONNECTED PV SOLAR SYSTEM
The detailed electrical scope includes the provision of a new 29.5kW grid connected PV solar system, with the panels to be mounted on Block T roof as shown on the Architectural Drawings. This system will provide on-site electricity generation capacity to supplement base load demand at the school.

ARTIFICIAL LIGHTING

The selection and design of the artificial lighting system in the proposed redevelopment incorporates a number of features designed to achieve energy conservation outcomes. These measures predominantly relate to the specific selection of luminaires, and the incorporation of flexible and adaptive control mechanisms.

All new light fittings proposed for the project are LED based luminaires, achieving a lower power consumption and longer lamp life than incandescent, fluorescent or halogen lamps. This approach to luminaire selection is driven partly by the objectives of the EFSG, but also as a reflection of an understanding of contemporary best practice in lighting design and selection by the design team.

Intelligent and adaptive control measures are incorporated into the design, including the provision of automatic switching in general learning areas linked to the period bell system, which will automatically turn-off general room lighting in two steps between three and five minutes after period end bell. If the lighting is required for the next period, occupants of that room can prevent the lights turning off by pressing the ON switch after the bell sounds. The luminaires in each room can be turned off at any time by pressing the OFF switch. The off signal is capable of transmission from the automated period bell system at the end of normal school hours or at other selected times without the bells sounding.

3.5 POTABLE WATER USAGE & CONSERVATION

The hydraulic design for the project includes specification of the most efficient sanitary fixtures and tapware based on the current Water Efficiency Labelling and Standards Scheme (WELS), exceeding both the minimum requirements of AS3600 and the Education Facilities Standards and Guidelines (EFSG).

The minimum WELS rating of both sanitary fixtures and tapware to comply with AS6400 requirements is 1 star, with a maximum star rating of 3 stars for showers and 6 star for tap outlets, urinals and toilets of which has been specified. The current EFSG minimum requirements for sanitary fixtures and tapware efficiency are as follows:

- Basins, sinks and bubblers - 5 Star
- Showers - 3 Star
- Toilets and urinals - 4 Star

Specified sanitary fixtures and tapware efficiency will be as follows:

- Basins, sinks, bubblers and urinals - 6 Star
- Showers - 3 Star
- Toilets - 5 Star

The hydraulic design for the redevelopment includes a comprehensive rainwater re-use system supplying non-potable water to the main amenity areas for toilet flushing and will also supply all new hose taps and irrigation systems to landscaped areas. The system includes two rain water tanks with a combined capacity of 75KL supplied by the existing Block M and Northern most Cola Roof catchments, this system is additional to any local authority requirements and has been included to reduce the demand on potable drinking water supplies.

4. COMPLIANCE WITH ESD FRAMEWORK REQUIREMENTS

4.1 SEARS CONDITIONS

The first requirement in the SEARs conditions in relation to ESD Principles is as follows:

> *Detail how ESD principles (as defined in clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000) will be incorporated in the design and ongoing operation phases of the development.*

We believe that the design response, as reflect in the detailed technical design documentation for the project, and as summarised in the EIS and this supplementary report, provide evidence of the whole-of-design approach to incorporating ESD Principles in the technical detailed design for the proposed redevelopment.

The second ESD requirement in the SEARs conditions notes:

> *Demonstrate that the development has been assessed against a suitably accredited rating scheme to meet industry best practice.*

The redevelopment has been designed to be constructed to an equivalent 4 Star Green Star standard (as required by the EFSG), indicating a 'best practice' standard when assessed against the accredited rating scheme of the GBCA Green Star - Education v1 Design & As Built 4 Star rating, as required to satisfy this condition of the SEARs.

The final condition related to ESD principles noted in the SEARs is:

> *Include a description of the measures that would be implemented to minimise consumption of resources, water (including water sensitive urban design) and energy.*

As noted in Section *3. THE DESIGN* of this report, and in the EIS more generally, the design for the redevelopment incorporates a number of measures that will satisfy the ESD principle of minimizing the consumption of resources such as water and energy. Primarily, these measures relate to the design of relevant building services systems and selection of services fixtures (such as water efficient tapware and energy efficient electrical fittings), and passive ESD principles in the architectural building design, to maximize opportunities for natural lighting and passive thermal comfort of internal spaces.

4.2 ENVIRONMENTAL PLANNING AND ASSESSMENT REGULATION 2000

We believe that the design approach outlines in Section *3. THE DESIGN* of this report provides evidence that the proposed redevelopment will appropriate respond to the ESD considerations noted in these EP&A Regulations. Namely:

PRECAUTIONARY PRINCIPLE
It is not anticipated that the proposed redevelopment will create any threats of serious or irreversible environmental damage.

INTER-GENERATIONAL EQUITY
The project will assist in ensuring that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations through improvements to the spatial quality of learning environments and the environmental efficiencies of these facilities, through the replacement of existing building fabric and services systems at the end of their useful life with new buildings and systems capturing efficiencies from technological advancement and responding to higher design standards than in previous times.

CONSERVATION OF BIOLOGICAL DIVERSITY AND ECOLOGICAL INTEGRITY

Evidence that this consideration has been fully considered and addressed in the proposal is provided by information provided previously with the EIS, notably Appendix 11 Biodiversity Assessment Report. This report noted a minor losses of highly modified native vegetation and potential fauna habitat, and noting that measures to avoid and minimise impacts to vegetation were considered during planning for the school redevelopment and in the arborist report, with additional impact minimisation and mitigation measures considered as a part of the assessment within that report. The report also set out a strategy to achieve retirement of biodiversity credits as an additional offset measure.

IMPROVED VALUATION, PRICING AND INCENTIVE MECHANISMS

We believe that environmental factors have been appropriately considered in the assessment of various design options relating to the building envelope and services systems, to ensure that a whole of life cost consideration is considered. The concept noted in this principle that *those who generate pollution and waste should bear the cost of containment, avoidance or abatement* is the basis for design decisions which have been made, including the increase in the capacity of the PV solar system to offset the energy consumption of the limited amount of air conditioning plant proposed in the project.

4.3 NATIONAL CONSTRUCTION CODE (BCA) SECTION J – ENERGY EFFICIENCY

Compliance with the mandatory requirements contained within Section J – Energy Efficiency has been led by the project's specialist technical Section J consultant, Northrop Engineers, and assessed by the project PCA, Newcert. Refer to attached Appendix A to this report, which is the Section J Compliance Report.

4.4 NSW DoE EDUCATIONAL FACILITY STANDARDS AND GUIDELINES (EFSG)

The NSW DoE Major Capital Works Process sets out a defined process to proceed with major schools developments, which is applicable to this process and has been followed to date. This process includes formal gateway review and approval by relevant stakeholders at milestone points in the design delivery. A key element of this gateway review and approval is assessment of compliance with design requirements from the EFSG by technical stakeholders with relevant experience and expertise in reviewing and approving technical design compliance with EFSG standards. These milestones reviews and approvals through all stages leading to complete tender documentation have been completed, with the defined gateway process providing evidence that technical requirements from the EFSG, including many measures relating to ESD principles and environmental efficiency and performance, have been appropriately considered and responded to by the design.

4.5 GBCA GREEN STAR 4 STAR RATING

Further to above, the EFSG requires that new school projects should be designed to a standard enabling it to achieve a 4 Star rating under the Green Star Education v1 Design & As Built 4 Star rating tool. The project was targeted from the inception of the design phase to meet this design standard as required by the EFSG, and Northrop Engineers were engaged on the basis that they were the formally accredited Green Star Professional as required for the project to achieve a Green Star rating. Attached to this report as Appendix B is the current Green Star Responsibility Matrix prepared by Northrop, indicating available credits being targeted and summarising the method these credits were being achieved in the design.

5. ESD PRINCIPLES & DESIGN RESPONSE SUMMARY

Section 6.15 Ecologically Sustainable Development of the EIS notes the following in relation to ESD principles applied to the design:

Ecologically Sustainable Development (ESD) is defined in Section 6(2) of the *Protection of the Environment Administration Act 1991*. ESD and how it has been considered in this EIS is presented in Table 6.17.

Table 6.17 Ecologically Sustainable Development Principles

Principle	Design Response
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: (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and (ii) an assessment of the risk-weighted consequences of various options	The proposed development has sought necessary information, including specialist advice, to have an understanding of potential environmental impacts. Environmental mitigation measures have been proposed to ameliorate potential impacts to the environment.
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	Positive impacts of a modern educational establishment through the redeveloped school will be a benefit to future generations. Environmental impacts of the development have been minimised through appropriate design and environmental mitigation measures.
conservation of biological diversity and ecological integrity — namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.	Specialist ecological advice has been sought on the proposed development. Native vegetation will be removed and two ecosystem credits will be retired by purchasing the credits required on the market.
improved valuation, pricing and incentive mechanisms — namely, that environmental factors should be included in the valuation of assets and services, such as: (i) polluter pays—that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement, (ii) 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 (iii) environmental goals, having been established, should be pursued in the most 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.	Environmental attributes of the site have been identified throughout this EIS. Impact to the environment has been avoided, where practicable, and environmental mitigation measures are identified to ameliorate environmental impact. Environmental factors form part of appropriate development of the site and ongoing management of those factors will occur in accordance with this EIS.

The requirements from the EP&A Regulations and National Construction Code (BCA) Section J are mandatory requirements which contain thresholds which the design must satisfy in relation to ESD principles and practical sustainability outcomes. Compliance with these mandatory requirements is ensured by review and approval of detailed technical documentation by the project Principal Certifying Authority (PCA) and relevant design certification provided by engineering consultants.

The design achieves a higher standard aligning to a 'best practice' outcome in relation to ESD principles, through the adoption of design standards above minimum statutory compliance requirements, such as the DoE EFSG and design to a level achieving a GBCA Green Star 4 Star rating. These higher standard design targets broadly require an enhancement of 15% above various levels set in the National Construction Code (BCA) Section J minimum compliance levels, across a number of design elements, such as building envelope insulation levels, glazing selection thermal performance, and mechanical plant efficiency.

The measures taken to satisfy the design and performance requirements noted above, and more broadly in this report and in other relevant documentation provided with the EIS, provides evidence that the conditions noted in the SEARs related to ESD principles have been addressed.

APPENDICES

APPENDIX A - SECTION J REPORT

SECTION J REPORT

for

Hunter Sports High School
Major Capital Works Upgrade

Contract No. WS692136689

Job No: NL151622
Revision: A – Issue for Tender
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	BY	DATE
Prepared	RB	18/04/2016
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1 INTRODUCTION

Northrop Consulting Engineers have been commissioned to conduct a Section J review of the Hunter Sports High School Major Capital Works Upgrade in accordance with the Building Code of Australia (BCA) 2015.

This report is based on the architectural drawings and supporting information, prepared by EJE Architecture. Referenced drawings include the pre tender estimate issue of the following drawings:

- A-S001 Block 2 Ground Floor Plan
- A-S101 Block S Roof Plan
- A-S601 Block T Elevations
- A-S602 Block T Elevations
- A-S701 Block S Sections
- A-S702 Block S Sections
- A-T001 Block T Ground Floor Plan 1
- A-T002 Block T Ground Floor Plan 2
- A-T011 Block T First Floor Plan 1
- A-T012 Block T First Floor Plan 2
- A-T021 Block T Second Floor Plan
- A-T101 Block T Roof Plan 1
- A-T102 Block T Roof Plan 2
- A-T103 Block T Roof Plan 3
- A-T601 Block T Elevations
- A-T602 Block T Elevations
- A-T603 Block T Elevations
- A-T604 Block T Elevations
- A-T605 Block T Elevations
- A-T701 Block T Sections
- A-T702 Block T Sections
- A-U001 Block U Lower Ground Floor Plan
- A-U011 Block U Ground Floor Plan 1
- A-U012 Block U Ground Floor Plan 2
- A-U013 Block U Ground Floor Plan 3
- A-U101 Block U Roof Plan 1
- A-U102 Block U Roof Plan 2
- A-U103 Block U Roof Plan 3
- A-U601 Block U Elevations
- A-U602 Block U Elevations
- A-U603 Block U Elevations
- A-U604 Block U Elevations

This report outlines the minimum Deemed-to-Satisfy requirements for the proposed development in accordance with Section J of the BCA 2015. It does not certify that the current design complies with these requirements.

2 BUILDING FABRIC

Parts J1 and J2 (building fabric) applies to elements forming part of the building envelope. Please refer to Appendix A for sketches showing the proposed building envelope for this project.

The building envelope is defined as the parts of a building's fabric that separate a conditioned space or habitable room from a non conditioned space.

All insulation must comply with AS 4859.1 and be installed in accordance with Section J1.2 of the BCA.

2.1 Roof and Ceiling Insulation

To comply with Section J1.3 of the BCA, the roof of a building forming part of the building envelope in climate zone 5 must achieve a total R value that is dependent on the roof upper surface solar absorptance value. For a solar absorptance of less than 0.4, the roof must achieve a total R value of 3.2 m^2.K/W (measure in a downwards direction). This can be achieved using roof colours such as Classic Cream or Surfmist. For colours such as Shale Gray, that have a surface solar absorptance from 0.4 to 0.6, the roof must achieve a total R-value of 3.7 m^2.K/W. All roof colours that have solar absorptance higher than 0.6, such as Woodland Grey, must have a total R-value of at least 4.2 m^2.K/W.

Provisions shall be made for any losses in ceiling insulation values due to exhaust fans, recessed lights and the like, in compliance with table J1.3b. As such we propose all required insulation from a section J compliance point of view be installed at the roof line (not at the ceiling line).

A roof that has sheet metal roofing fixed to metal purlins, metal rafters or metal battens; and does not have ceiling lining or has ceiling lining fixed directly to those metal purlins, metal rafters or metal battens, must have a thermal break consisting of a material with an R Value of not less than 0.2, installed between the metal sheet roofing and its supporting member.

An example of a roof construction that would achieve the minimum required thermal properties with an additional 15% inline with the targeted Green Star credit would be as follows (assuming a solar absorbance of less than 0.4).

Metal Deck Roof	
Item	**R value**
Outdoor air film	0.04
Metal cladding with solar abs. less than 0.4	0.00
Glasswool insulation 140mm	3.30
Ceiling Space	0.22
Ceiling Tiles	0.06
Indoor air film	0.16
Total	**3.78**

N.B. roof spacer system will be required to install 140mm glass wool insulation blanket

2.2 Roof Lights

There are no roof lights for the subject building.

2.3 External Walls

To comply with Section J1.5 of the BCA, the external walls for a building in climate zone 5 must achieve a Total R Value of 2.8 m^2.K/W. With concessions given to walls which meet the following criteria:

- Where a wall has a surface density of greater than 220kg/m^2, it must have a minimum R Value of 2.3 m^2.K/W
- Where a wall faces south or has an overhang with a shading angle in accordance with Figure J1.5 greater than 30°, it must have a minimum R Value of 2.3 m^2.K/W
- Where both of the above criteria are met, it must have a minimum R Value of 1.8 m^2.K/W

Some example of some typical wall constructions that would meet the required thermal properties including a 15% buffer as per the target Green Star credit would be as follows.

Walls – Brick Veneer	
Item	**R value**
Outdoor air film	0.04
110mm Clay Brick	0.14
Air gap	0.17
Glasswool Insulation (90mm/R2.7)	2.70
Plasterboard	0.06
Indoor air film	0.12
Total	**3.23**

Walls – Light Weight 1	
Item	**R value**
Outdoor air film	0.04
FC or similar	0.03
Glasswool Insulation (75mm/R1.5)	1.50
Glasswool Insulation (75mm/R1.5)	1.50
Plasterboard	0.06
Indoor air film	0.12
Total	**3.25**

Walls – Light Weight 2	
Item	**R value**
Outdoor air film	0.04
Metal Cladding	0.00
Glasswool Insulation (75mm/R1.5)	1.50
Glasswool Insulation (75mm/R1.5)	1.50
Plasterboard	0.06
Indoor air film	0.12
Total	**3.22**

Walls – Precast/concrete	
Item	**R value**
Outdoor air film	0.04
Precast panel – 150mm	0.10
Air gap	0.17
Glasswool Insulation (90mm/R2.2)	2.20
Plasterboard	0.06
Indoor air film	0.12
Total	**2.69**

N.B. The precast wall examples above have a surface density greater than 220kg/m^2.

2.4 An Envelope Wall Other Than an External Wall

To comply with Section J1.5 for climate zone 5, an internal wall forming part of the building envelope requires a total R value of 1.8 or greater. This can be reduced to R 1 where the adjoining space has a ventilation rate of not more than 1.5 air changes per hour.

An example of some typical internal wall constructions that would meet the required thermal properties would be as follows.

Walls – Plasterboard/Stud	
Item	**R value**
Indoor air film	0.12
Plasterboard	0.06
Glasswool Insulation (90mm/R2.0)	2.00
Plasterboard	0.06
Indoor air film	0.12
Total	**2.36**

Walls – Concrete/Stud/Plaster	
Item	**R value**
Indoor air film	0.12
150mm Concrete wall	0.10
Glasswool Insulation (90mm/R2.0)	2.00
Plasterboard	0.06
Indoor air film	0.12
Total	**2.40**

2.5 Floors

To comply with Section J1.6 for climate zone 5, a slab on ground (without in-slab heating or cooling) does not have any minimum thermal requirements. A suspended floor with an enclosed sub floor and not ventilated by more than 1.5 air changes per hour is required to achieve a minimum R value of 1.0 (measured in a downwards direction). While a suspended floor, without infloor heating or cooling such as where the suspended floor overhangs the floor plate below is required to achieve a minimum R value of 2.0 (measured in the downwards direction).

The above noted values can be reduced by R 0.5 if R 0.75 is added to the roof.

An example of a typical floor constructions that would meet the required thermal properties including a 15% allowance inline with Green Star credit being targeted would be as follows.

Suspended slab – exposed soffit	
Item	**R value**
Indoor air film	0.16
Concrete slab (200mm)	0.14
Insulation board 40mm	1.90
Air gap	0.22
FC lining	0.03
Indoor air film	0.16
Total	**2.61**

Suspended slab – exposed soffit	
Item	**R value**
Indoor air film	0.16
Concrete slab (200mm)	0.14
Insulation board 40mm	1.90
Indoor air film	0.16
Total	**2.36**

2.6 External Glazing

The glazing has been assessed using the 2014/15 glazing calculator in accordance with Part J2 of the NCC. The glazing calculators are attached in appendix B. In summary the minimum performance requirements are as follows:

- Typically a U-value of 6.0 and SHGC of 0.75 which can generally be achieved by standard clear glass in standard aluminum frames.
- Library entry doors (directly south facing) a U-value of 3.9 and SHGC of 0.75 which will generally require double glazing to achieve the U-value
- Block U North east orientation a U-value of 8.0 and SHGC of 0.67
- Block U North orientation (part of curved façade) a U-value of 8.0 and SHGC of 0.57

Coordinate glazing selections, colors and the like with Architect.

3 BUILDING SEALING

3.1 Chimney and Flues

There are no chimneys or flues in this project.

3.2 Roof Lights

There are no roof lights for in this project.

3.3 External Windows and Doors

To restrict air infiltration, a seal must be fitted to each edge of a door, operable window or the like, when serving a conditioned space or the external fabric of a habitable room or public area.

This requirement does not apply to windows complying with AS 2047, fire doors, louvered doors or windows, roller shutter doors used only for out-of-hours security.

The seals may be a foam or rubber compressible strip, fibrous seal or the like. While the seal for the bottom edge of an external swinging door should be a draft protection device.

An entrance to a building, if leading to a conditioned space must have an airlock, self-closing door, revolving door or the like, other than where the conditioned space has a floor area of not more than 50m^2.

3.4 Exhaust Fans

Miscellaneous exhaust fans, such as a toilet exhaust fans, must be fitted with a sealing device, such as a self closing damper when serving a conditioned space or a habitable room.

3.5 Construction of Roofs, Walls, and Floors

Roofs, ceilings, walls, floors and any opening such as a window, door or the like must be constructed to minimise air leakage when forming part of the envelope or external fabric of a habitable room or a public area.

The construction must be enclosed by internal lining systems that are close fitting at ceiling, wall, or floor junctions, or sealed by caulking, skirting, architraves, cornices, or the like.

The above requirements do not apply to openings required for smoke hazard management.

3.6 Evaporative Coolers

There are no evaporative coolers in this project

4 ACCESS FOR MAINTENANCE AND FACILITIES FOR MONITORING

Access must be provided to all plant, equipment and components that require maintenance.

As the building's floor area is over 2,500m^2, it must have the ability to separately record the energy use associated each of the following items:

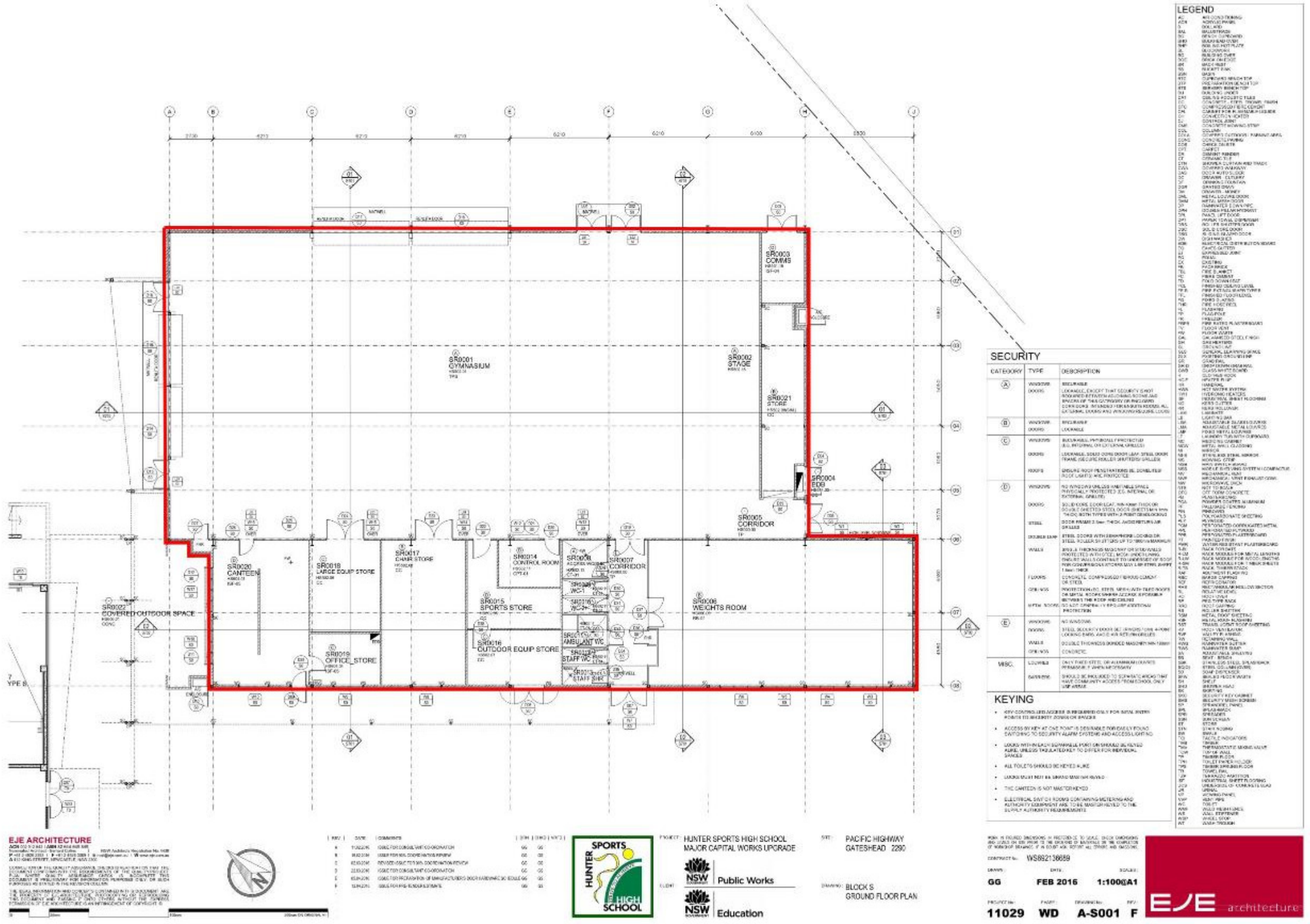
- Air conditioning and ventilation
- Artificial lighting
- Appliance power
- Central hot water supply
- Internal transport devices including lifts, etc
- Other ancillary plant

5 SUMMARY

Where the requirements and recommendations as specified in this report are implemented, the building envelope will achieve the minimum energy efficiency requirements required by Section J of the BCA 2015.

APPENDIX A – BUILDING ENVELOPE

N.B. Red is proposed building envelope. Blue hatch is proposed underfloor insulation



EJE ARCHITECTURE

HUNTER SPORTS HIGH SCHOOL
MAJOR CAPITAL WORKS UPGRADE

PACIFIC HIGHWAY
GATESHEAD 2290

BLOCK S
GROUND FLOOR PLAN

CONTRACT No. WS892136689

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SECURITY
CATEGORY
TYPE
DESCRIPTION
KEYING
LEGEND
OUTDOOR LEARNING SPACE
OUTDOOR LEARNING SPACE
TR0035 DESIGN & PLANNING ROOM
TR0037 GLS TYPE B
TR0026 DESIGN & PLANNING ROOM
TR0023 GLS TYPE B
TR0024 3D PRINTER
LIFT
TR0014 LIFT LOBBY
TR0031 GLS TYPE B
TR0030 GLS TYPE E
TR0036 METAL ENGINEERING WORKSHOP
TR0038 PROJECT STORE
TR0032 MATERIALS STORE
TR0015 STAIR 01
AMBULANT WC
TR0017 TYPE WC
TR0022 PLANT
TR0018 GIRLS TOILETS
TR0001 GLS TYPE B
TR0013 SHARED DE
TR0025 PROJECT STORE
TR0028 CONSTRUCTION WORKSHOP
TR0040 BULK/GARDEN STORE
TR0039 WAITING BAY
TR0033 COVERED OUTDOOR WORKSHOP
TR0034 DUST EXTRAC
TR0027 CAS
TR0026 ARCHIVE STORE
TR0021 STORE
TR0019 ACCESS WC
TR0020 BOYS TOILETS
OUTDOOR LEARNING SPACE
EJE ARCHITECTURE
HUNTER SPORTS HIGH SCHOOL
HUNTER SPORTS HIGH SCHOOL MAJOR CAPITAL WORKS UPGRADE
NSW Public Works
NSW Education
PACIFIC HIGHWAY GATESHEAD 2290
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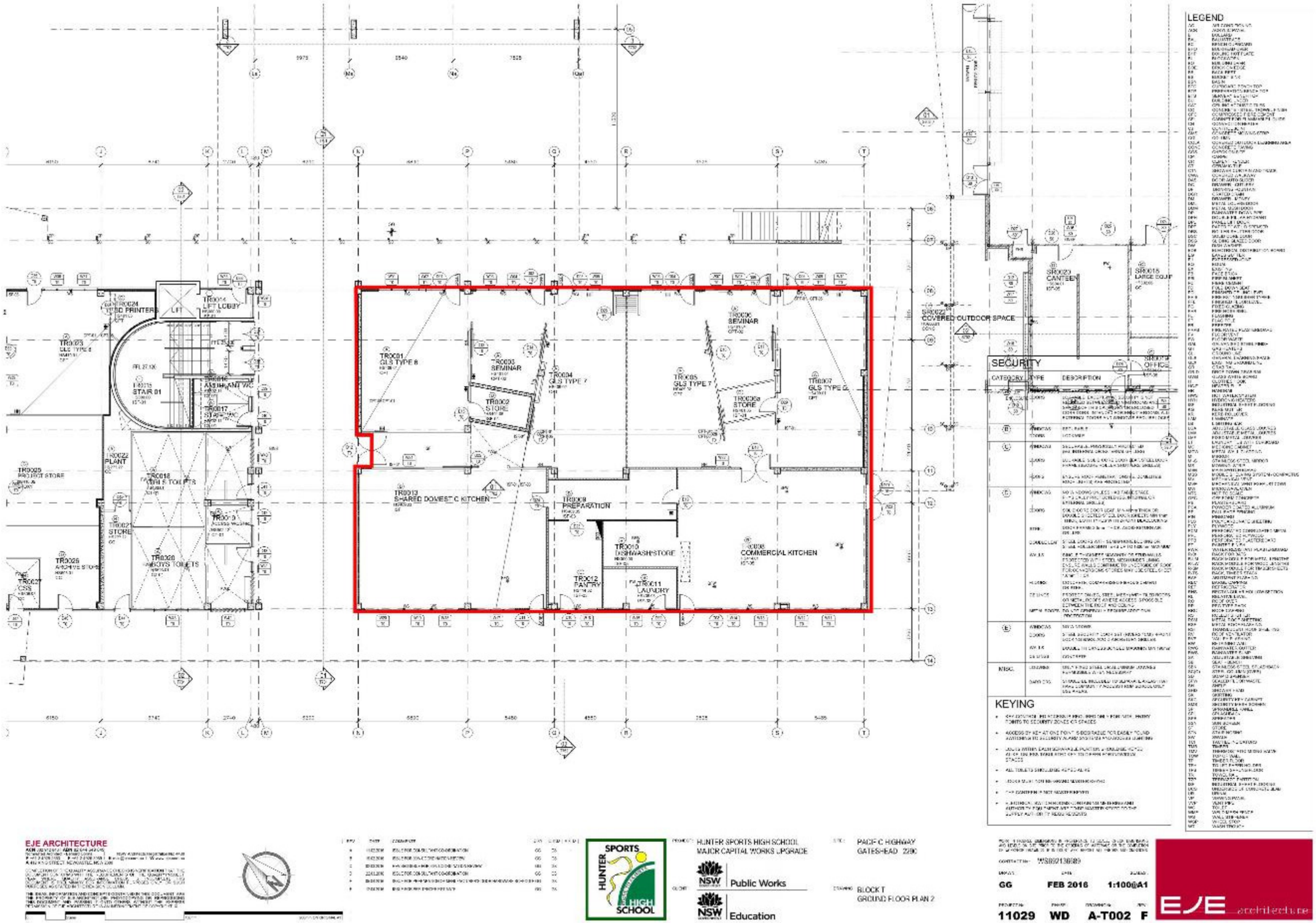
EJE architecture



EJE ARCHITECTURE

HUNTER SPORTS HIGH SCHOOL
MAJOR CAPITAL WORKS UPGRADE

NSW Public Works
NSW Education

PACIFIC HIGHWAY
GATESHEAD 2290

BLOCK T
GROUND FLOOR PLAN 2

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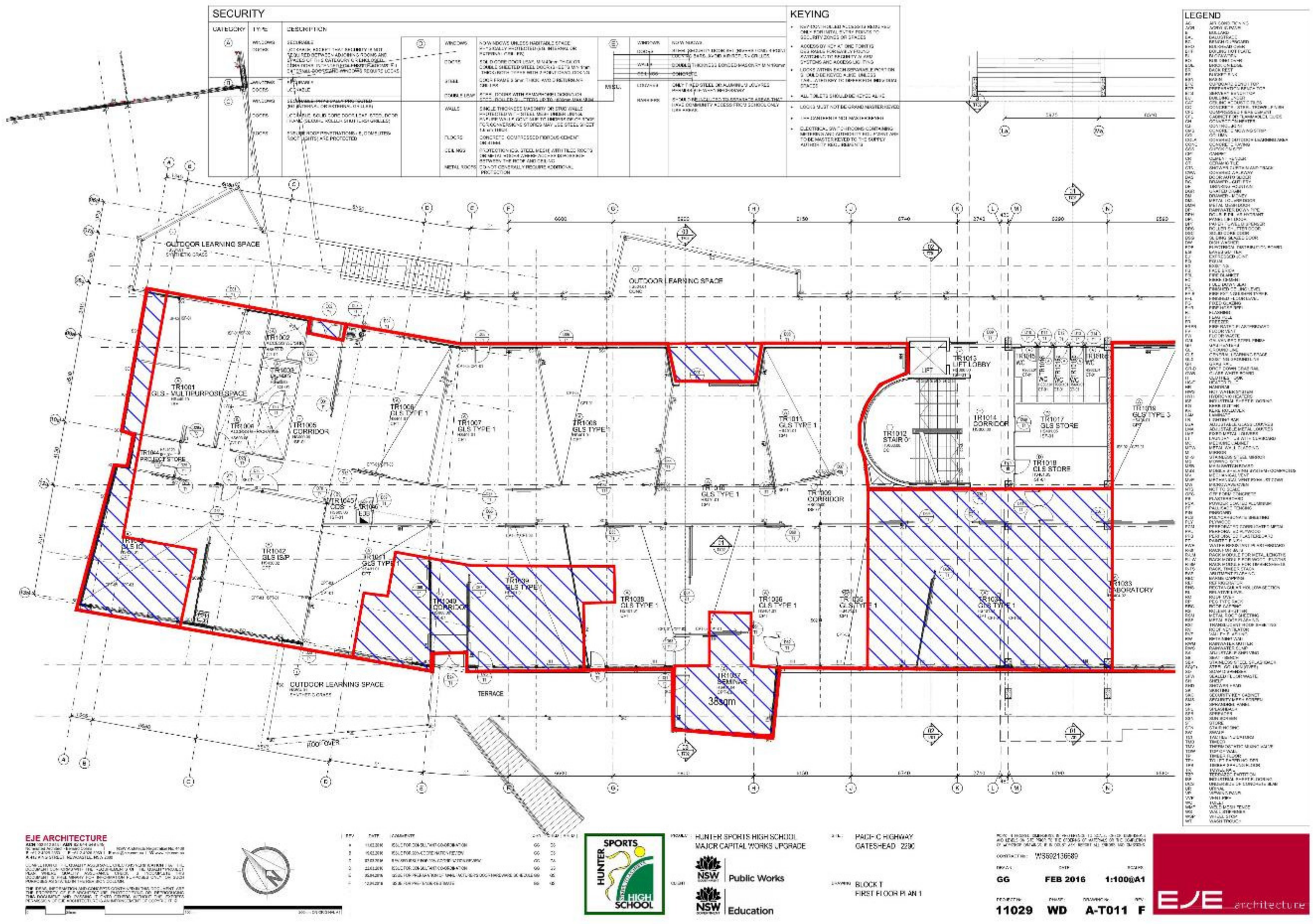
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TR1003
TR1004
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TR1006 GLS TYPE 1
TR1007 GLS TYPE 1
TR1008 GLS TYPE 1
TR1009 CORRIDOR
TR1010 GLS TYPE 1
TR1011 GLS TYPE 1
TR1012 STAIR 01
TR1013 LIFT LOBBY
LIFT
TR1014 CORRIDOR
TR1015 WC
TR1016 WC
TR1017 GLS STORE
TR1018 GLS TYPE 3
TR1019 GLS STORE
TR1031 GLS TYPE 1
TR1033 LABORATORY
TR1034 GLS TYPE 1
TR1035 GLS TYPE 1
TR1036 GLS TYPE 1
TR1037 SEMINAR
38sqm
TR1038 GLS TYPE 1
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TR1040 CORRIDOR
TR1041 GLS TYPE 1
TR1042 GLS ISP
TR1043 GLS IC
TR1044 PROJECT STORE
TR1045 COS
TR1046
OUTDOOR LEARNING SPACE
TERRACE
EJE ARCHITECTURE
HUNTER SPORTS HIGH SCHOOL
HUNTER SPORTS HIGH SCHOOL MAJOR CAPITAL WORKS UPGRADE
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NSW Public Works
NSW Education
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EJE architecture

TR1075
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SECURITY
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DESCRIPTION
KEYING
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PRINCIPAL/MEETING
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INTERVIEW MEETING
TR1049
INTERVIEW MEETING
TR1070
CORRIDOR
TR1069
ADMIN - EXEC
TR1052
PUBLIC RECEPTION
TR1053
INTERVIEW MEETING
TR1051
VISITORS OFFICE
TR1068
DEPUTY PRINCIPAL
TR1064
COMMS
TR1067
LIFT LOBBY
LIFT
TR1060
STAIR 02
TR1054
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INTERVIEW/OFFICE
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DEPUTY PRINCIPAL
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CLINIC- BOYS
TR1056
CLINIC-GIRLS
TR1074
STUDENT RECEPTION
STUDENT WAIT
TR1065
GLS TYPE 3
TR1019
GLS TYPE 3
TR1020
SEMINAR
TR1022
GLS TYPE 3
TR1023
GLS TYPE 3
TR1024
SEMINAR
TR1021
STORE
TR1017
GLS STORE
TR1018
GLS STORE
WALKWAY
TR1027
PREPARATION
TR1033
LABORATORY
TR1026
LABORATORY
TR1030
APPARATUS STORAGE
TR1029
APPARATUS STORE
TR1028
CHEM STORE
EJE ARCHITECTURE
PROJECT
HUNTER SPORTS HIGH SCHOOL
MAJOR CAPITAL WORKS UPGRADE
HUNTER SPORTS HIGH SCHOOL
NSW Public Works
CLIENT
NSW Education
SITE
PACIFIC HIGHWAY
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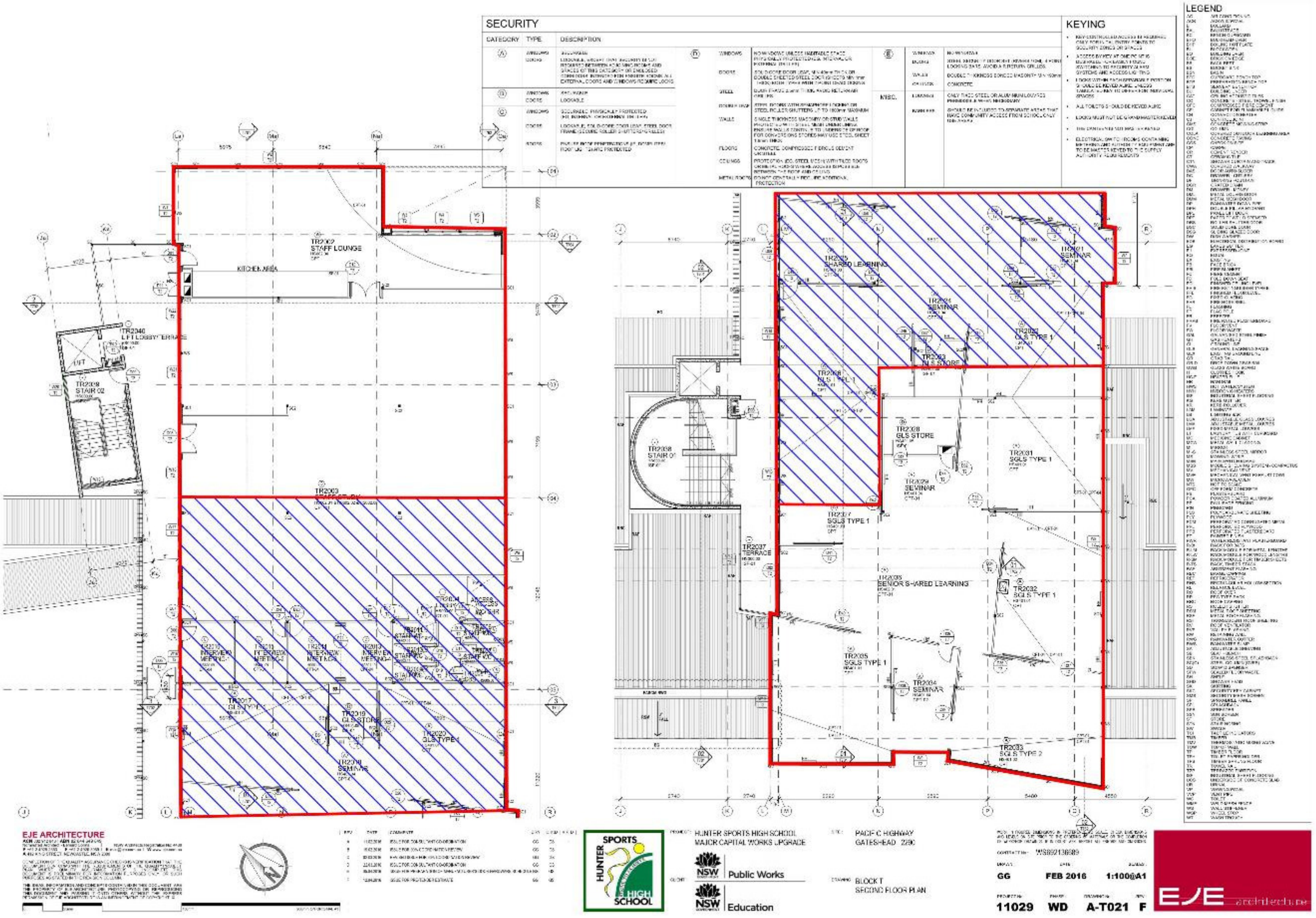

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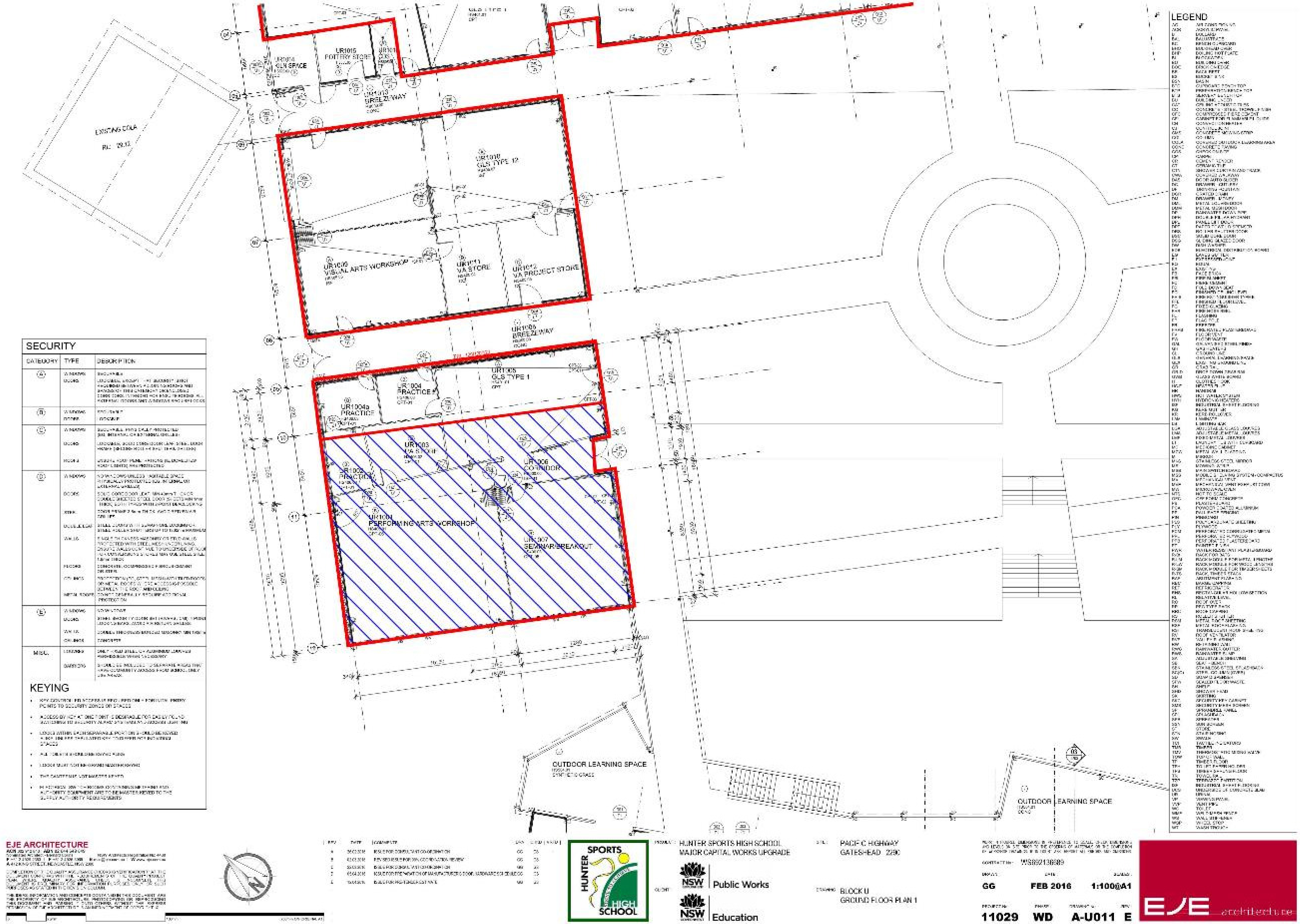
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UR1010 GLS TYPE 12
UR1009 VISUAL ARTS WORKSHOP
UR1011 VA STORE
UR1012 VA PROJECT STORE
UR1008 BREEZEWAY
UR1005 GLS TYPE 1
UR1004 PRACTICE
UR1004a PRACTICE
UR1003 PA STORE
UR1002 PRACTICE
UR1006 CORRIDOR
UR1001 PERFORMING ARTS WORKSHOP
UR1007 SEMINAR/BREAKOUT
OUTDOOR LEARNING SPACE
EJE ARCHITECTURE
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MAJOR CAPITAL WORKS UPGRADE
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SECURITY
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TYPE
DESCRIPTION
MISC.
KEYING
LEGEND
OUTDOOR LEARNING SPACE
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UR1019 HIGH PICTURE JUNIOR
UR1025 GLS PICTURE SENIOR
UR1026 CONNECTED GLS
UR1027 CONNECTED GLS
UR1028 YOUTH CENTRE
UR1029 MINIMBA ROOM
UR1038 COMPUTER STORE
UR1039 COMPUTER LEARNING SPACE
UR1036 TEA
UR1040 CORRIDOR
UR1041 SYSTEM ADMIN
UR1021 CORRIDOR
UR1022 GLS STORE
UR1023 SEMINAR
UR1024 GLS TYPE 1
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UR1020 GLS TYPE 1
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UR1015 POTTERY STORE
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UR1010 GLS TYPE 12
WORKSHOP
UR1011
EXISTING COLA
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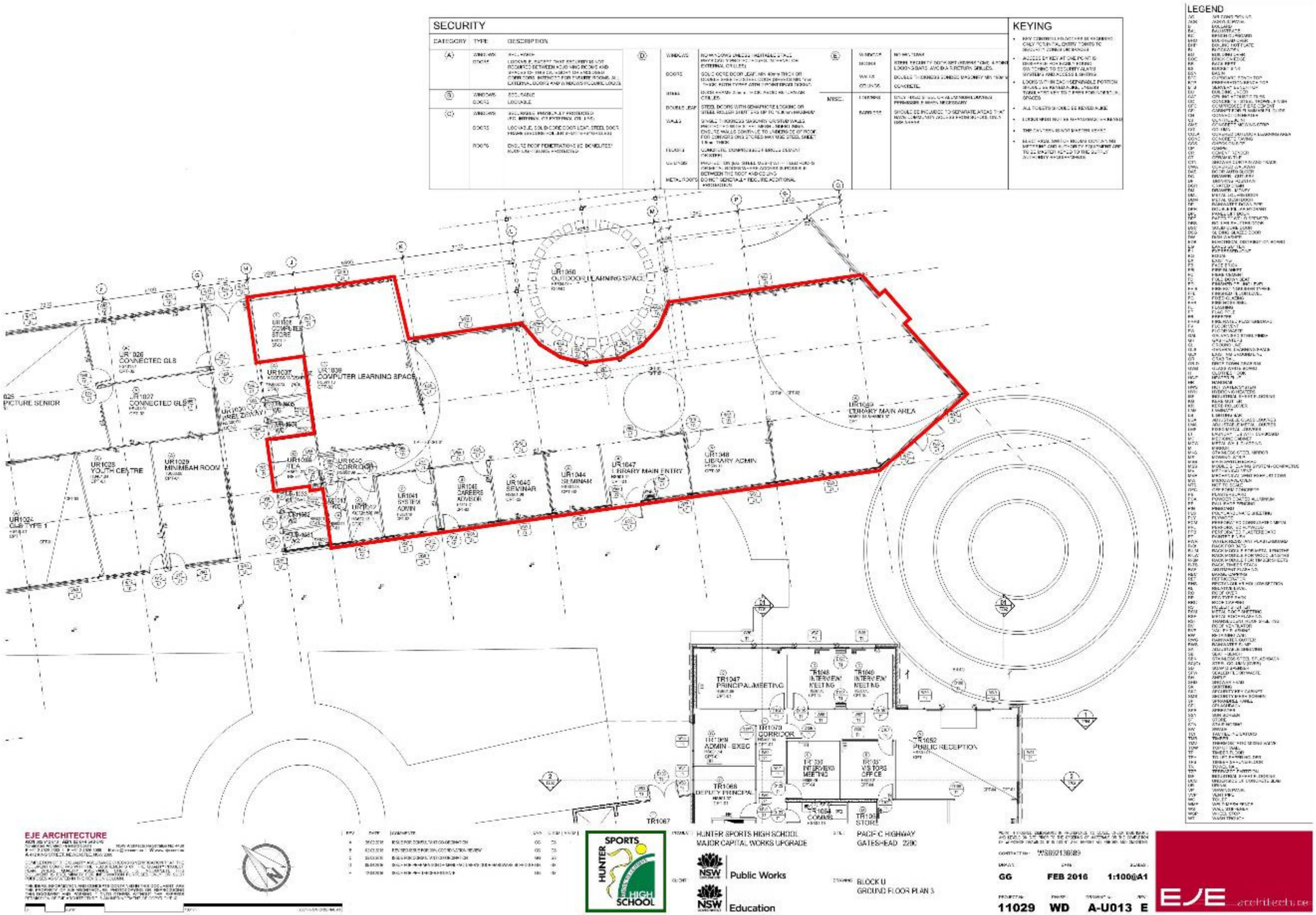

Report from HSHS MC Ground Rev 4 *printed 18/04/2016*

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description: **Hunter Sports High School - Block S Movement Centre**

Application: **other**

Climate zone: **5**

Storey: **G**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A		428m²				437m²		244m²	
Option B									n/a
Glazing area (A)		*6.71m²*				*49.3m²*		*17m²*	

Number of rows preferred in table below: **20** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS									SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	W01	NE		1.27	2.64		7.0	0.80	0.850	1.270	0.67	0.00	0.57	0.50	3.35	50% of 5%
2	W02	NE		1.27	2.64		7.0	0.80	0.850	1.270	0.67	0.00	0.57	0.50	3.35	50% of 5%
3	W03	SW		1.10	2.60		7.0	0.80				0.00	1.00	1.00	2.86	7% of 30%
4	W04	SW		1.10	2.60		7.0	0.80				0.00	1.00	1.00	2.86	7% of 30%
5	W05	SW		1.10	2.60		7.0	0.80				0.00	1.00	1.00	2.86	7% of 30%
6	W06	SW		1.10	2.60		7.0	0.80				0.00	1.00	1.00	2.86	7% of 30%
7	W07	SW		2.13	2.23		7.0	0.80	3.300	2.500	1.32	0.37	0.65	0.54	4.75	9% of 30%
8	W08	SW		1.10	1.75		7.0	0.80	2.000	1.800	1.11	0.70	0.83	0.73	1.93	4% of 30%
9	W09	SW		1.10	1.75		7.0	0.80	2.000	1.800	1.11	0.70	0.83	0.73	1.93	4% of 30%
10	W10	SW		1.10	1.72		7.0	0.80	2.000	1.800	1.11	0.70	0.83	0.73	1.89	4% of 30%
11	W13	SW		1.20	4.03		7.0	0.80	DEVICE		2.00	0.00	0.39	0.34	4.84	9% of 30%
12	W14	SW		1.20	4.03		7.0	0.80	DEVICE		2.00	0.00	0.39	0.34	4.84	9% of 30%
13	W15	SW		1.20	4.03		7.0	0.80	DEVICE		2.00	0.00	0.39	0.34	4.84	9% of 30%
14	W16	SW		1.20	4.03		7.0	0.80	DEVICE		2.00	0.00	0.39	0.34	4.84	9% of 30%
15	W17	NW		1.40	2.77		7.0	0.80				0.00	1.00	1.00	3.88	23% of 37%
16	W18	NW		1.40	2.77		7.0	0.80				0.00	1.00	1.00	3.88	23% of 37%
17	D07	SW		2.10	1.92		7.0	0.80	2.000	2.800	0.71	0.70	0.91	0.84	4.03	9% of 30%
18	D08	SW		2.10	1.92		7.0	0.80	2.000	2.800	0.71	0.70	0.91	0.84	4.03	9% of 30%
19	D13	NW		2.40	1.92		7.0	0.80	*2.400*	4.620	*0.00*	*2.22*	*1.00*	*1.00*	4.61	27% of 37%
20	D16	NW		2.40	1.92		7.0	0.80	*2.400*	5.600	*0.00*	*3.20*	*1.00*	*1.00*	4.61	27% of 37%

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

The Glazing Calculator has been developed by the ABCB to assist in developing a better understanding of glazing energy efficiency parameters.
While the ABCB believes that the Glazing Calculator, if used correctly, will produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all.
Your use of the Glazing Calculator is entirely at your own risk and the ABCB accepts no liability of any kind.

if inputs are valid

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description: **Hunter Sports High School - Block T**

Application: **other**

Climate zone: **5**

Storey: **G**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A		288m²				208m²			194m²
Option B									n/a
Glazing area (A)		*76m²*				*10m²*			*11m²*

Number of rows preferred in table below: **42** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS										SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance			P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)		P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	W01	NE		1.10	1.65		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	1.82	2% of 83%
2	W02	NE		1.10	2.35		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	2.59	3% of 83%
3	W03	NE		2.10	1.63		6.0	0.75		3.000	3.300	0.91	1.20	0.91	0.72	3.41	6% of 83%
4	W04	NE		1.10	1.58		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	1.73	2% of 83%
5	W05	NE		1.10	2.36		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	2.60	3% of 83%
6	W06	NE		1.10	2.33		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	2.56	3% of 83%
7	W07	NE		1.10	1.54		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	1.69	2% of 83%
8	W08	NE		1.10	1.50		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	1.65	2% of 83%
9	W09	NE		1.10	1.64		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	1.80	2% of 83%
10	W10	NE		1.10	1.64		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	1.80	2% of 83%
11	W11	NE		1.10	1.61		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	1.77	2% of 83%
12	W12	NE		1.10	1.61		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	1.77	2% of 83%
13	W13	NE		1.10	1.61		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	1.77	2% of 83%
14	W14	NE		1.10	1.61		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	1.77	2% of 83%
15	W15	NE		1.10	1.23		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	1.35	2% of 83%
16	W16	NE		1.10	1.29		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	1.42	2% of 83%
17	W17	NE		1.10	2.42		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	2.66	3% of 83%
18	W18	NE		1.10	1.65		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	1.82	2% of 83%
19	W19	NE		1.10	1.65		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	1.82	2% of 83%
20	W20	NE		1.10	2.45		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	2.70	3% of 83%
21	W24	NE		1.10	1.62		6.0	0.75		3.200	2.300	1.39	1.20	0.71	0.52	1.78	2% of 83%
22	W25	NE		1.10	2.43		6.0	0.75		3.200	2.300	1.39	1.20	0.71	0.52	2.67	3% of 83%
23	W26	NE		1.10	2.13		6.0	0.75		5.000	2.300	2.17	1.20	0.30	0.36	2.34	2% of 83%
24	W27	NE		1.10	2.13		6.0	0.75		5.000	2.300	2.17	1.20	0.30	0.36	2.34	2% of 83%
25	W28	NE		1.10	2.13		6.0	0.75		5.000	2.300	2.17	1.20	0.30	0.36	2.34	2% of 83%
26	W29	NE		2.10	1.61		6.0	0.75		3.000	3.300	0.91	1.20	0.91	0.72	3.38	6% of 83%
27	W30	NE		2.10	1.65		6.0	0.75		3.000	3.300	0.91	1.20	0.91	0.72	3.47	6% of 83%
28	W31	NE		2.10	1.65		6.0	0.75		3.000	3.300	0.91	1.20	0.91	0.72	3.47	6% of 83%
29	W32	NE		1.10	2.45		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	2.70	3% of 83%
30	W33	NE		1.10	2.26		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	2.48	3% of 83%
31	W34	NE		1.10	2.19		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	2.40	3% of 83%
32	W35	NE		1.10	2.26		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	2.48	3% of 83%
33	W36	NE		1.10	1.65		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	1.82	2% of 83%
34	W37	NE		1.10	1.65		6.0	0.75		3.000	2.300	1.30	1.20	0.76	0.56	1.82	2% of 83%
35	W44	SW		1.10	1.90		6.0	0.75		3.000	2.300	1.30	1.20	0.80	0.67	2.09	19% of 12%
36	W45	SW		1.10	1.90		6.0	0.75		3.000	2.300	1.30	1.20	0.80	0.67	2.09	19% of 12%
37	W46	SW		1.10	1.40		6.0	0.75		3.000	2.300	1.30	1.20	0.80	0.67	1.54	14% of 12%
38	W49 (W27 no.2)	SW		1.10	3.90		6.0	0.75					0.00	1.00	1.00	4.29	49% of 12%
39	TR033-WA	internal		1.10	4.00		6.0	0.75				2.00	0.00	0.64	0.54	4.40	41% of 12%
40	TR033-WA	internal		1.10	1.80		6.0	0.75				2.00	0.00	0.64	0.54	1.98	18% of 12%
41	TR033-WA	internal		1.10	1.40		6.0	0.75				2.00	0.00	0.64	0.54	1.54	14% of 12%
42	TR033-WA	internal		1.10	2.60		6.0	0.75				2.00	0.00	0.64	0.54	2.86	27% of 12%

if inputs are valid

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description: **Hunter Sports High School - Block T**

Application: **other**

Climate zone: **5**

Storey: **1**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A		344m²		146m²		432m²		142m²	
Option B									n/a
Glazing area (A)		*125m²*		*15.8m²*		*146m²*		*12.2m²*	

Number of rows preferred in table below: **67** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS									SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	W01	NE		2.10	1.90		6.0	0.75	3.200	2.500	1.28	0.40	0.38	0.38	3.99	3% of 84%
2	W02	NE		2.10	2.10		6.0	0.75	3.350	2.500	1.34	0.40	0.33	0.37	4.41	3% of 84%
3	W03	NE		1.10	2.70		6.0	0.75	3.350	1.500	2.23	0.40	0.00	0.25	2.97	1% of 84%
4	W04	NE		2.10	2.10		6.0	0.75	3.350	2.500	1.34	0.40	0.33	0.37	4.41	3% of 84%
5	W05	NE		2.10	2.10		6.0	0.75	3.350	2.500	1.34	0.40	0.33	0.37	4.41	3% of 84%
6	W06	NE		2.10	2.10		6.0	0.75	3.350	2.500	1.34	0.40	0.33	0.37	4.41	3% of 84%
7	W07	NE		2.10	1.77		6.0	0.75	3.350	2.500	1.34	0.40	0.33	0.37	3.72	3% of 84%
8	W08	NE		2.10	1.70		6.0	0.75	3.350	2.500	1.34	0.40	0.33	0.37	3.57	2% of 84%
9	W09	NE		2.10	1.70		6.0	0.75	3.350	2.500	1.34	0.40	0.33	0.37	3.57	2% of 84%
10	W10	NE		1.10	2.89		6.0	0.75	3.350	1.500	2.23	0.40	0.00	0.25	3.18	1% of 84%
11	W11	NE		1.10	2.90		6.0	0.75	3.350	1.500	2.23	0.40	0.00	0.25	3.19	1% of 84%
12	W12	NE		2.10	1.90		6.0	0.75	3.350	2.500	1.34	0.40	0.33	0.37	3.99	3% of 84%
13	W13	NE		1.10	1.75		6.0	0.75	3.350	1.500	2.23	0.40	0.00	0.25	1.93	1% of 84%
14	W14	NE		1.10	1.75		6.0	0.75	3.350	1.500	2.23	0.40	0.00	0.25	1.93	1% of 84%
15	W15	NE		2.10	1.90		6.0	0.75	3.350	2.500	1.34	0.40	0.33	0.37	3.99	3% of 84%
16	W16	NE		1.10	4.30		6.0	0.75	3.350	1.500	2.23	0.40	0.00	0.25	4.73	2% of 84%
17	W17	SW		1.10	3.50		6.0	0.75	0.330	2.500	0.13	1.40	1.00	0.99	3.85	3% of 87%
18	W18	SW		1.10	5.80		6.0	0.75				0.00	1.00	1.00	6.38	5% of 87%
19	W19	SW		1.10	1.75		6.0	0.75				0.00	1.00	1.00	1.93	1% of 87%
20	W20	SW		1.10	1.75		6.0	0.75				0.00	1.00	1.00	1.93	1% of 87%
21	W21	SW		1.10	1.75		6.0	0.75				0.00	1.00	1.00	1.93	1% of 87%
22	W22	SW		1.10	6.50		6.0	0.75	3.440	2.300	1.50	1.20	0.76	0.63	7.15	4% of 87%
23	W23	SW		1.10	6.00		6.0	0.75	7.000	2.300	3.04	1.20	0.67	0.54	6.60	4% of 87%
24	W24	SW		1.10	5.50		6.0	0.75	0.720	2.300	0.31	1.20	0.97	0.96	6.05	4% of 87%
25	W25	SW		1.10	6.10		6.0	0.75				0.00	1.00	1.00	6.71	5% of 87%
26	W26	SW		1.10	2.50		6.0	0.75				0.00	1.00	1.00	2.75	2% of 87%
27	W27	SW		2.70	6.00		6.0	0.75				0.00	1.00	1.00	16.20	12% of 87%
28	W28	SW		1.10	3.45		6.0	0.75				0.00	1.00	1.00	3.80	3% of 87%
29	W29	SW		1.10	1.00		6.0	0.75	3.000	1.500	2.00	0.40	0.51	0.42	1.10	1% of 87%
30	W30	SW		1.10	2.00		6.0	0.75	3.000	1.500	2.00	0.40	0.51	0.42	2.20	1% of 87%
31	W31	SW		1.10	2.70		6.0	0.75	3.000	1.500	2.00	0.40	0.51	0.42	2.97	2% of 87%
32	W32	SW		1.10	3.45		6.0	0.75	3.000	1.500	2.00	0.40	0.51	0.42	3.80	2% of 87%
33	W33	SW		1.10	5.00		6.0	0.75	3.650	1.500	2.43	0.40	0.51	0.42	5.50	3% of 87%
34	W34	SW		1.10	5.00		6.0	0.75				0.00	1.00	1.00	5.50	4% of 87%
35	W35	NW		1.10	3.39		6.0	0.75				0.00	1.00	1.00	3.73	38% of 35%
36	W36 (ADMIN)	NE		1.40	4.30		6.0	0.75	0.690	1.400	0.49	0.00	0.75	0.62	6.02	7% of 84%
37	W37	NE		1.40	2.60		6.0	0.75	0.690	1.400	0.49	0.00	0.75	0.62	3.64	4% of 84%
38	W38	NE		1.40	1.75		6.0	0.75	0.690	1.400	0.49	0.00	0.75	0.62	2.45	3% of 84%
39	W39	NE		2.40	2.30		6.0	0.75	1.660	3.550	0.47	1.15	0.98	0.91	5.52	10% of 84%
40	W40	NE		2.40	2.30		6.0	0.75	1.660	3.550	0.47	1.15	0.98	0.91	5.52	10% of 84%
41	W41	SE		1.40	3.45		6.0	0.75				0.00	1.00	1.00	4.83	31% of 35%
42	W42	SE		1.40	3.45		6.0	0.75				0.00	1.00	1.00	4.83	31% of 35%
43	W43	SE		1.40	2.60		6.0	0.75				0.00	1.00	1.00	3.64	23% of 35%
44	W44	SE		1.40	1.75		6.0	0.75				0.00	1.00	1.00	2.45	16% of 35%
45	W45	SW		1.40	3.45		6.0	0.75	0.850	2.700	0.31	1.30	0.99	0.97	4.83	4% of 87%
46	W46	SW		0.60	2.60		6.0	0.75	5.800	0.701	8.27	0.10	0.51	0.42	1.56	1% of 87%
47	W47	SW		0.60	1.75		6.0	0.75	9.015	0.701	####	0.10	0.51	0.42	1.05	1% of 87%
48	W48	SW		0.60	1.75		6.0	0.75	9.100	0.701	####	0.10	0.51	0.42	1.05	1% of 87%
49	W49	SW		1.40	2.60		6.0	0.75	2.900	2.100	1.38	0.70	0.78	0.65	3.64	2% of 87%
50	W50	NW		1.40	1.75		6.0	0.75	2.040	2.100	0.97	0.70	0.91	0.67	2.45	15% of 35%
51	W54	NW		1.40	1.75		6.0	0.75	2.900	2.100	1.38	0.70	0.76	0.51	2.45	11% of 35%
52	W55	NW		1.40	2.55		6.0	0.75	0.200	2.100	0.10	0.70	1.00	0.99	3.57	36% of 35%
53	HL1	SW		0.65	16.90		6.0	0.75				0.00	1.00	1.00	10.99	8% of 87%
54	HL2	SW		0.65	28.65		6.0	0.75				0.00	1.00	1.00	18.62	14% of 87%
55	HL3	SW		0.65	15.15		6.0	0.75				0.00	1.00	1.00	9.85	7% of 87%
56	D01	NE		2.10	2.10		6.0	0.75	3.350	2.500	1.34	0.40	0.33	0.37	4.41	3% of 84%
57	D02	NE		2.10	1.90		6.0	0.75	4.100	2.500	1.64	0.40	0.17	0.29	3.99	2% of 84%
58	D03	NE		2.10	2.10		6.0	0.75	3.350	2.500	1.34	0.40	0.33	0.37	4.41	3% of 84%
59	D05	NE		2.10	2.10		6.0	0.75	3.350	2.500	1.34	0.40	0.33	0.37	4.41	3% of 84%
60	D06	NE		2.10	2.10		6.0	0.75	7.900	2.500	3.16	0.40	0.00	0.25	4.41	2% of 84%
61	D07	NE		2.10	2.10		6.0	0.75	3.350	2.500	1.34	0.40	0.33	0.37	4.41	3% of 84%
62	D08	NE		2.10	2.10		6.0	0.75	3.350	2.500	1.34	0.40	0.33	0.37	4.41	3% of 84%
63	D12	NE		2.10	2.10		6.0	0.75	3.350	2.500	1.34	0.40	0.33	0.37	4.41	3% of 84%
64	D15	NE		2.10	2.10		6.0	0.75	3.350	2.500	1.34	0.40	0.33	0.37	4.41	3% of 84%
65	D20	SW		2.10	1.90		6.0	0.75	4.000	2.500	1.60	0.40	0.59	0.48	3.99	2% of 87%
66	D21	SW		2.10	2.10		6.0	0.75	1.500	2.500	0.60	0.40	0.85	0.77	4.41	3% of 87%
67	D100 (EQUIV)	NE		2.40	1.90		6.0	0.75	1.660	2.400	0.69	0.00	0.54	0.49	4.56	4% of 84%

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

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While the ABCB believes that the Glazing Calculator, if used correctly, will produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all.
Your use of the Glazing Calculator is entirely at your own risk and the ABCB accepts no liability of any kind.

if inputs are valid

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description: **Hunter Sports High School - Block U**

Application: **other**

Climate zone: **5**

Storey: **1**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	9.12m²	204m²	31.3m²	149m²	21m²	271m²		190m²	
Option B									n/a
Glazing area (A)	*7.05m²*	*88.7m²*	*9.14m²*	*23.8m²*	*16.1m²*	*78m²*	.....	*34.2m²*	

Number of rows preferred in table below: **53** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS									SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	W01	SW		1.10	6.00		8.0	0.75	1.150	1.700	0.68	0.60	0.91	0.85	6.60	9% of 83%
2	W02	NW		1.10	3.45		8.0	0.75	1.150	1.700	0.68	0.60	0.96	0.81	3.80	10% of 75%
3	W03	NW		1.10	2.60		8.0	0.75	1.150	1.700	0.68	0.60	0.96	0.81	2.86	8% of 75%
4	W06	NW		1.10	5.15		8.0	0.75	1.150	1.700	0.68	0.60	0.96	0.81	5.67	15% of 75%
5	W09	NW		1.10	5.15		8.0	0.75	1.150	1.700	0.68	0.60	0.96	0.81	5.67	15% of 75%
6	W10	NE		1.10	4.30		8.0	0.67	1.350	1.700	0.79	0.60	0.94	0.77	4.73	9% of 100%
7	W11	NW		1.10	12.80		8.0	0.75				0.00	1.00	1.00	14.08	48% of 75%
8	W12	NE		1.10	2.60		8.0	0.67	1.150	1.700	0.68	0.60	0.96	0.83	2.86	6% of 100%
9	W13	NE		1.10	2.60		8.0	0.67	1.150	1.700	0.68	0.60	0.96	0.83	2.86	6% of 100%
10	W14	NE		1.10	6.00		8.0	0.67	1.150	1.700	0.68	0.60	0.96	0.83	6.60	13% of 100%
11	W15	NE		1.10	3.00		8.0	0.67	1.150	1.700	0.68	0.60	0.96	0.83	3.30	7% of 100%
12	W16	NE		1.10	3.00		8.0	0.67	1.150	1.700	0.68	0.60	0.96	0.83	3.30	7% of 100%
13	W19	NE		1.10	5.15		8.0	0.67	1.150	1.700	0.68	0.60	0.96	0.83	5.67	11% of 100%
14	W20 EQUIV SHAD	NE		2.40	6.85		8.0	0.67	1.950	2.400	0.81	0.00	0.39	0.42	16.44	15% of 100%
15	W21 EQUIV SHAD	E		2.40	0.87		8.0	0.75	1.894	2.400	0.79	0.00	0.44	0.50	2.09	24% of 70%
16	W22 EQUIV SHAD	E		2.40	2.94		8.0	0.75	2.063	2.400	0.86	0.00	0.37	0.47	7.05	76% of 70%
17	W23 EQUIV SHAD	NE		2.40	0.38		8.0	0.67	1.650	2.400	0.69	0.00	0.55	0.49	0.90	1% of 100%
18	W24 EQUIV SHAD	NE		2.40	0.38		8.0	0.67	0.881	2.400	0.37	0.00	0.85	0.71	0.90	2% of 100%
19	W25 EQUIV SHAD	N		2.40	2.94		8.0	0.57	1.350	2.400	0.56	0.00	0.70	0.49	7.05	100% of 99%
20	W26 EQUIV SHAD	NW		2.40	0.87		8.0	0.75	1.030	2.400	0.43	0.00	0.83	0.65	2.09	4% of 75%
21	W27 EQUIV SHAD	NE		2.40	11.67		8.0	0.67	16.800	2.400	7.00	0.00	0.00	0.20	28.01	10% of 100%
22	W28	S		3.30	1.75		3.9	0.75				0.00	1.00	1.00	5.78	36% of 100%
23	W29	S		3.30	1.75		3.9	0.75				0.00	1.00	1.00	5.78	36% of 100%
24	W30	SW		1.40	5.15		8.0	0.75				0.00	1.00	1.00	7.21	11% of 83%
25	W31	SW		1.40	4.34		8.0	0.75				0.00	1.00	1.00	6.08	9% of 83%
26	W32	SW		1.40	1.75		8.0	0.75				0.00	1.00	1.00	2.45	4% of 83%
27	W33	SW		1.40	2.60		8.0	0.75	3.100	1.700	1.82	0.30	0.55	0.45	3.64	4% of 83%
28	W34	SW		1.40	2.60		8.0	0.75	3.100	1.700	1.82	0.30	0.55	0.45	3.64	4% of 83%
29	W35	SW		1.40	1.75		8.0	0.75	3.100	1.700	1.82	0.30	0.55	0.45	2.45	3% of 83%
30	W36	SW		0.60	0.80		8.0	0.75	3.100	1.700	1.82	1.10	0.71	0.57	0.48	1% of 83%
31	W37	SW		0.60	2.00		8.0	0.75	3.100	1.700	1.82	1.10	0.71	0.57	1.20	1% of 83%
32	W38	SW		0.60	3.40		8.0	0.75	3.100	1.700	1.82	1.10	0.71	0.57	2.04	2% of 83%
33	W41	SW		1.40	2.60		8.0	0.75	3.100	1.700	1.82	0.30	0.55	0.45	3.64	4% of 83%
34	W42	SW		1.40	1.75		8.0	0.75	3.100	1.700	1.82	0.30	0.55	0.45	2.45	3% of 83%
35	W43	SW		1.40	5.15		8.0	0.75	3.100	1.700	1.82	0.30	0.55	0.45	7.21	8% of 83%
36	W44	SW		1.40	2.60		8.0	0.75	3.100	1.700	1.82	0.30	0.55	0.45	3.64	4% of 83%
37	W45	SW		2.10	0.50		8.0	0.75	3.100	2.700	1.15	0.60	0.83	0.72	1.05	1% of 83%
38	W46	SE		2.40	0.90		8.0	0.75				0.00	1.00	1.00	2.16	11% of 48%
39	W47	SE		2.40	0.39		8.0	0.75				0.00	1.00	1.00	0.94	5% of 48%
40	W48	SE		1.10	5.15		8.0	0.75	3.050	1.700	1.79	0.60	0.66	0.54	5.67	23% of 48%
41	W52	SE		1.10	0.90		8.0	0.75	3.050	1.700	1.79	0.60	0.66	0.54	0.99	4% of 48%
42	W53	SE		1.10	2.60		8.0	0.75	3.050	1.700	1.79	0.60	0.66	0.54	2.86	12% of 48%
43	W54	SE		1.10	6.00		8.0	0.75	3.050	1.700	1.79	0.60	0.66	0.54	6.60	27% of 48%
44	W55	SW		1.10	6.00		8.0	0.75				0.00	1.00	1.00	6.60	10% of 83%
45	W57	NE		1.10	3.45		8.0	0.67	2.308	1.700	1.36	0.60	0.73	0.54	3.80	5% of 100%
46	W58	SW		1.10	3.45		8.0	0.75	4.280	1.700	2.52	0.60	0.67	0.54	3.80	4% of 83%
47	W59	NE		1.40	3.45		8.0	0.67	4.300	1.700	2.53	0.30	0.00	0.25	4.83	2% of 100%
48	W67	SW		1.10	4.30		8.0	0.75	2.100	1.700	1.24	0.60	0.81	0.69	4.73	6% of 83%
49	D07	NE		2.40	1.90		8.0	0.67	1.265	2.400	0.53	0.00	0.72	0.59	4.56	6% of 100%
50	D08	S		2.40	1.90		3.9	0.75				0.00	1.00	1.00	4.56	28% of 100%
51	D09	SW		2.40	1.90		8.0	0.75	1.945	2.700	0.72	0.30	0.81	0.72	4.56	6% of 83%
52	D14	SW		2.40	1.90		8.0	0.75	4.200	2.700	1.56	0.30	0.60	0.49	4.56	5% of 83%
53	D19	SE		2.40	1.90		8.0	0.75	4.200	2.700	1.56	0.30	0.57	0.46	4.56	18% of 48%

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While the ABCB believes that the Glazing Calculator, if used correctly, will produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all.
Your use of the Glazing Calculator is entirely at your own risk and the ABCB accepts no liability of any kind.

if inputs are valid

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description: **Hunter Sports High School - Block T**

Application: **other**

Climate zone: **5**

Storey: **2**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A		76.2m²		276m²		77.2m²		270m²	
Option B									n/a
Glazing area (A)		*19.7m²*		*81.6m²*		*3.96m²*		*68.1m²*	

Number of rows preferred in table below: **22** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS									SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	W1	NW		1.10	4.30		6.5	0.75				0.00	1.00	1.00	4.73	17% of 50%
2	W2	NE		1.10	11.10		6.5	0.75	0.570	1.100	0.52	0.00	0.72	0.60	12.21	85% of 63%
3	W3	NE		1.10	2.29		6.5	0.75	3.800	0.001	####	-1.10	0.00	0.20	2.52	5% of 63%
4	W4	NE		1.10	1.92		6.5	0.75	3.200	0.001	####	-1.10	0.00	0.20	2.11	4% of 63%
5	W5	NE		1.10	2.60		6.5	0.75	0.500	0.001	####	-1.10	0.00	0.20	2.86	6% of 63%
6	W6	SE		1.10	34.90		6.5	0.75				0.00	1.00	1.00	38.39	47% of 99%
7	W7	SE		3.74	3.30		6.5	0.75				0.00	1.00	1.00	12.33	15% of 99%
8	W8	SE		1.10	28.10		6.5	0.75				0.00	1.00	1.00	30.91	38% of 99%
9	W9	SW		1.10	3.60		6.5	0.75				0.00	1.00	1.00	3.96	100% of 16%
10	W10	NW		1.10	7.70		6.5	0.75				0.00	1.00	1.00	8.47	31% of 50%
11	W13	NW		1.10	7.70		6.5	0.75	2.300	1.400	1.64	0.30	0.19	0.29	8.47	8% of 50%
12	W14	NW		1.10	5.15		6.5	0.75	2.300	1.400	1.64	0.30	0.19	0.29	5.67	5% of 50%
13	W15	NW		2.10	5.15		6.5	0.75	2.300	1.400	1.64	-0.70	0.00	0.24	10.82	8% of 50%
14	W16	NW		1.10	1.75		6.5	0.75	2.300	1.400	1.64	0.30	0.19	0.29	1.93	2% of 50%
15	W17	NW		1.10	2.60		6.5	0.75	2.300	1.400	1.64	0.30	0.19	0.29	2.86	3% of 50%
16	W18	NW		1.10	2.60		6.5	0.75	2.300	1.400	1.64	0.30	0.19	0.29	2.86	3% of 50%
17	W21	NW		1.10	2.60		6.5	0.75	2.300	1.400	1.64	0.30	0.19	0.29	2.86	3% of 50%
18	W22	NW		1.10	2.60		6.5	0.75	2.300	1.400	1.64	0.30	0.19	0.29	2.86	3% of 50%
19	D01	NW		2.10	1.00		6.5	0.75	2.300	1.400	1.64	-0.70	0.00	0.24	2.10	2% of 50%
20	D03	NW		2.10	2.50		6.5	0.75	2.300	2.100	1.10	0.00	0.08	0.32	5.25	6% of 50%
21	D04	NW		2.10	2.50		6.5	0.75	2.300	2.100	1.10	0.00	0.08	0.32	5.25	6% of 50%
22	D08	NW		2.10	1.90		6.5	0.75	2.300	2.100	1.10	0.00	0.08	0.32	3.99	4% of 50%

if inputs are valid

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APPENDIX B – GREEN STAR TARGET CREDIT RESPONSIBILITY MATRIX

									Responsibility										
Credit No.	Section	Category	Credit	Brief Discription	Points Avaliable	Points Targeted	Submission Requirements (items marked with * required for design review submission)	Comments	Client	Architect	Structural	Civil	Mechanical	Electrical	Hydraulic	Acoustic	Other	Supporting docs	Items still required
1.0	Management	Green Star Accredited Professional	Accredited Professional	1 point is available where a Green Star Accredited Professional – Design & As Built (GSAP) has been contractually engaged to provide advice, support and information related to Green Star principles, structure, timing and processes, at all stages of the project, leading to certification.	1	1	**Submission Template*** - GSAP name(s), contact details and dates of appointment.* - Summary of the involvement of the GSAP in the project.* **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be submitted to demonstrate compliance: - Name and contact details of accredited GSAP* - Letter of appointment from the client or head contractor* confirming the appointment of a GSAP in the project. The letter must include a scope of works as per the Compliance Requirements section of the credit. The contract or letter should confirm that the GSAP is appointed from schematic design until practical completion. - Sample Meeting minutes demonstrating input from the GSAP. - Letter from the Client confirming that the GSAP satisfactorily fulfilled his/her engagement responsibilities as per the scope of works and requirements of this credit.		x	x						GSAP	- Engament Letters, meeting minutes, etc	
2.0	Management	Commissioning and Tuning	Environmental Performance Targets	In order for the minimum requirement to be met, documented targets for the environmental performance of the project must be set.	3	Complies	**Submission Template*** - Description of nominated systems to be included in the credit.* - Confirmation that environmental performance targets for the nominated systems have been set.* - Confirmation that the services and maintainability review has taken place. - The person/s responsible for the services and maintainability review. - A summary of the services and maintainability review. - Summary of the building commissioning plan.* - Confirmation that the building commissioning has taken place according to the plan. - Description of the building tuning commitment that has been agreed.* - Details of the independent commissioning agent and the services they will provide to the project. **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Evidence of Targets for Environmental Performance where the environmental performance targets are documented as outlined in the Compliance Requirements. The relevant sections must be highlighted.			x			x	x	x				
2.1	Management	Commissioning and Tuning	Services and Maintainability Review	1 point is available where a comprehensive services and maintainability review of the project is performed.	1	1	**Submission Template*** - Description of nominated systems to be included in the credit.* - Confirmation that environmental performance targets for the nominated systems have been set.* - Confirmation that the services and maintainability review has taken place. - The person/s responsible for the services and maintainability review. - A summary of the services and maintainability review. - Summary of the building commissioning plan.* - Confirmation that the building commissioning has taken place according to the plan. - Description of the building tuning commitment that has been agreed.* - Details of the independent commissioning agent and the services they will provide to the project. **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Service and Maintainability Report where the service and maintainability review is summarised as outlined in 2.2. The relevant sections must be highlighted.			x			x	x	x			- Buildability review meeting minutes	- Additional meeting on services and maintainability review required
2.2	Management	Commissioning and Tuning	Building Commissioning	1 point is available where comprehensive pre-commissioning and commissioning activities are performed for all nominated building systems.	1	1	**Submission Template*** - Description of nominated systems to be included in the credit.* - Confirmation that environmental performance targets for the nominated systems have been set.* - Confirmation that the services and maintainability review has taken place. - The person/s responsible for the services and maintainability review. - A summary of the services and maintainability review. - Summary of the building commissioning plan.* - Confirmation that the building commissioning has taken place according to the plan. - Description of the building tuning commitment that has been agreed.* - Details of the independent commissioning agent and the services they will provide to the project. **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Extract(s) from the Commissioning Report demonstrating that comprehensive precommissioning activities and commissioning activities have been performed as outlined in 2.2. The relevant sections must be highlighted.						x	x	x			- Services specifications - Mech section 22 Testing and commissioining	
2.3	Management	Commissioning and Tuning	Building Systems Tuning	1 point is available where a tuning process is in place that addresses all nominated building systems.	1	1	**Submission Template*** - Description of nominated systems to be included in the credit.* - Confirmation that environmental performance targets for the nominated systems have been set.* - Confirmation that the services and maintainability review has taken place. - The person/s responsible for the services and maintainability review. - A summary of the services and maintainability review. - Summary of the building commissioning plan.* - Confirmation that the building commissioning has taken place according to the plan. - Description of the building tuning commitment that has been agreed.* - Details of the independent commissioning agent and the services they will provide to the project. **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Building Tuning Commitment or contract demonstrating that there is a requirement for a building tuning process as outlined in the 2.3. The relevant sections must be highlighted.						x	x	x				- Commitment from DEC to engage/complete ongoing building tuning
2.4	Management	Commissioning and Tuning	Independent Commissioning Agent	1 additional point is available for utilisation of an Independent Commissioning Agent (ICA) to advise, monitor, and verify the commissioning and tuning of the nominated building systems throughout the design, tender, construction, commissioning and tuning phases.	1	0	**Submission Template*** - Description of nominated systems to be included in the credit.* - Confirmation that environmental performance targets for the nominated systems have been set.* - Confirmation that the services and maintainability review has taken place. - The person/s responsible for the services and maintainability review. - A summary of the services and maintainability review. - Summary of the building commissioning plan.* - Confirmation that the building commissioning has taken place according to the plan. - Description of the building tuning commitment that has been agreed.* - Details of the independent commissioning agent and the services they will provide to the project. **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - CV of the Independent Commissioning Agent detailing the qualifications and experience relevant to the project.		x				x	x	x		ICA		
3.1	Management	Adaptation and Resilience	Implementation of a Climate Adaptation Plan	2 points are available where: - A project specific Climate Adaptation Alan has been developed in accordance with a recognised standard; and - Solutions have been included into the building design and construction that specifically address the risk assessment component of the adaptation plan.	2	0	**Submission Template*** - Details of the qualified professional who developed the Climate Adaptation Plan* - Confirmation that a Climate Adaptation Plan has been developed* - Details of the two risk items that have been addressed by a specific design response - Details of any 'high' or 'extreme' risks - Details of design responses to the Climate Adaptation Plan **Supporting documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance:: - Extracts from the Climate Adaptation Plan - CV of the professional that developed the Climate Adaptation Plan. - Drawings and specifications demonstrating design responses to the Climate Adaptation Plan. - Commissioning report or other technical document demonstrating design responses to the Climate Adaptation Plan.		x	x							Enviromental engineer		
4.1	Management	Building Information	Building Operations and Maintenance Information	1 point is available where it is demonstrated that comprehensive Operations and Maintenance information is developed and made available to the facilities management team.	1	1	**Submission Template*** - List of all nominated building systems.* - Confirmation that O&M information has been delivered to the building owner (or for design review, will be delivered by practical completion of the project*) for all nominated building systems noted. - Confirmation that a building log book has been provided to the building owner (or for design review, will be delivered by practical completion of the project*). **Supporting Documentation** Project teams shall provide documentation supporting credit compliance.The following documents may be used to demonstrate compliance: - The owner's project requirements (OPR) document or an equivalent document defining the nominated building systems. - Documentation confirming that the operations and maintenance information provided complies. - Building log book in compliance with 4.1.2.			x	x	x	x	x	x			O&M manuals called for in spec: - Hyd spec clause 6.3 Operation and Maitenance manuals - Mech sepc clause 23 Operation and Maintenance manuals - Clause 3.21 of arch spec	- Head contractor to develop building log book in conjuction with subbies and O&M creation
4.2	Management	Building Information	Building User Information	1 point is available where relevant and current building user information is developed and made available to all relevant stakeholders.	1	1	**Submission Template*** - List of all nominated building systems. - Confirmation that Building User Information has been delivered for the building and is available to all users (or for design review, will be delivered by practical completion of the project*). - Confirmation that the format and content of Building User Information complies with 4.2.1 and its delivery complies with 4.2.1. **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - The owner's project requirements (OPR) document or an equivalent document defining the nominated building systems. - Building user information and (if required) supporting user documents or other supporting information demonstrating that building user information initiatives have been installed, are accessible to all users, and whose format and content complies with 4.2. This information may be presented through a combination of screenshots, print outs, or links to online information accessible to GBCA Certified Assessors. - Confirmation from the building owner that building user information has been provided to the relevant parties and, if appropriate, is installed and is operational.			x	x	x	x	x	x				- To be provided by contractors
5.1	Management	Commitment to Performance	Environmental Building Performance	1 point is available where there is a commitment to set targets and measure results for the environmental performance of the building.	1	1	**Submission Template* which includes the following:** - Summary of how the project meets the credit criteria.* **Supporting Documentation** Project teams shall submit documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Area Schedule listing the areas of each of the relevant formal commitments entered into. - Formal Agreements that describe the stakeholders, targets and duration of agreements or copies of other formal commitment devices. - Green Star – Performance credit documentation where applicable. - NABERS rating documentation where applicable.		x										DEC to determine desired rating scheme and put inplace formal commitment
5.2	Management	Commitment to Performance	End of Life Waste Performance	1 point is available where there is a commitment to set targets and measure results for the construction waste from end-of-life of interior fitouts or other building attributes.	1	0	**Submission Template* which includes the following:** - Summary of how the project meets the credit criteria.* **Supporting Documentation** Project teams shall submit documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Area Schedule listing the areas of each of the relevant formal commitments entered into. - Formal Agreements that describe the stakeholders, targets and duration of agreements or copies of other formal commitment devices. - Green Star – Performance credit documentation where applicable.	Possible extra credit	x										

									Responsibility											
Credit No.	Section	Category	Credit	Brief Discription	Points Avaliable	Points Targeted	Submission Requirements (items marked with * required for design review submission)	Comments	Client	Architect	Structural	Civil	Mechanical	Electrical	Hydraulic	Acoustic	Other	Supporting docs	Items still required
6.0	Management	Metering and Monitoring	Metering	To qualify for this credit, it is a minimum requirement that accessible metering be provided to monitor building energy and water consumption, including all energy and water common uses and major uses, and sources.	-	Complies	**Submission Template*** - Selection of which criteria the project meets* - Summary of how the project meets the credit criteria* Project teams shall provide documentation supporting credit compliance. **Supporting Documentation** The following documents may be used to demonstrate compliance, depending on the approach taken by project teams: - Drawings showing the location of all energy and water meters in the project and the associated energy and water uses; showing how the system is easily accessible to the residents; and confirming the requirements for utility and non-utility meters. - Extracts from Commissioning Report where relevant, showing the automatic monitoring system is operating and has the ability to provide the information required in the Compliance Requirements. - Copy of Monitoring Strategy document specific to the building and including detail described in the Compliance Requirements section of the credit. - Automatic monitoring system data sheet describing the systems features and capabilities. In particular, it must describe the system's ability to analyse metering information at regular intervals, i.e. on a daily, weekly, and monthly basis.				x		x	x	x			mech, elec and hydraulic documents	
6.1	Management	Metering and Monitoring	Monitoring Systems	1 point is available where a monitoring strategy is addressed through a monitoring system, capable of capturing and processing the data produced by the installed energy and water meters, and accurately and clearly presenting data consumption trends.	1	1	**Submission Template*** - Selection of which criteria the project meets* - Summary of how the project meets the credit criteria* Project teams shall provide documentation supporting credit compliance. **Supporting Documentation** The following documents may be used to demonstrate compliance, depending on the approach taken by project teams: - Drawings showing the location of all energy and water meters in the project and the associated energy and water uses; showing how the system is easily accessible to the residents; and confirming the requirements for utility and non-utility meters. - Extracts from Commissioning Report where relevant, showing the automatic monitoring system is operating and has the ability to provide the information required in the Compliance Requirements. - Copy of Monitoring Strategy document specific to the building and including detail described in the Compliance Requirements section of the credit. - Automatic monitoring system data sheet describing the systems features and capabilities. In particular, it must describe the system's ability to analyse metering information at regular intervals, i.e. on a daily, weekly, and monthly basis.					x	x	x	x			- mech spec, EMS	
7.0	Management	Construction Environmental Management	Environmental Management Plan	To qualify for this credit, it is a minimum requirement that a comprehensive project-specific Environmental Management Plan (EMP) must be in place for construction.	-	Complies	**Submission Template*:** - Description of Environmental Management Plan scope. - Compliance matrix showing how the requirements of the NSW Environmental Management System Guidelines are fulfilled. **Supporting Documents** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Environmental Management Plan (EMP), clearly demonstrating compliance with the requirements of the NSW Environmental Management System Guidelines. - Confirmation of subcontractor adherence to the EMP requirements that any subcontractors relevant to the project adhered to the EMP provisions at the time of construction works. This may be through a confirmation from the Principal/Head Contractor, or through a policy document stating the process undertaken to ensure compliance. - Contractor Formalised Management System (EMS) External Auditor's report confirming formalised management system was in place and operational at the time of construction works. - Contractor ISO 14001 certificate showing the date of issue prior to the commencement of construction works. - Inspection Reports from EMS showing that site audits took place as per the EMS and that conformity was verified. Where nonconformity is found, audit records need to show corrective or preventive actions taken.											GC21 contract requirements	
7.1	Management	Construction Environmental Management	Formalised Environmental Management System	1 point is available where a formalised, systematic and methodical approach to planning, implementing and auditing is in place during construction, to ensure conformance with the EMP.	1	1	**Submission Template*:** - Description of Environmental Management Plan scope. - Compliance matrix showing how the requirements of the NSW Environmental Management System Guidelines are fulfilled. **Supporting Documents** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Environmental Management Plan (EMP), clearly demonstrating compliance with the requirements of the NSW Environmental Management System Guidelines. - Confirmation of subcontractor adherence to the EMP requirements that any subcontractors relevant to the project adhered to the EMP provisions at the time of construction works. This may be through a confirmation from the Principal/Head Contractor, or through a policy document stating the process undertaken to ensure compliance. - Contractor Formalised Management System (EMS) External Auditor's report confirming formalised management system was in place and operational at the time of construction works. - Contractor ISO 14001 certificate showing the date of issue prior to the commencement of construction works. - Inspection Reports from EMS showing that site audits took place as per the EMS and that conformity was verified. Where nonconformity is found, audit records need to show corrective or preventive actions taken.										Contactor	GC21 contract requirements	
8A	Management	Operational Waste	Performance Pathway - Specialist Plan	1 point is available where a waste professional specialist, prepares and implements an Operational Waste Management Plan (OWMP) for the project in accordance with best practice approaches and this is reflected in the building's design.	1	n/a poss target 8b	**Submission Template*** - Summary of how the project meets the credit criteria **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance, depending on the approach taken by project teams: - Operational Waste Management Plan including all relevant compliance requirements as outlined in the Submission Template. - Evidence of Waste Auditor qualifications - CV or project list outlining previous experience and qualifications. - Site Plan and/or Architectural Plans highlighting all relevant areas as referenced by the WMP.		x								Waste specialist		
8B	Management	Operational Waste	Prescriptive Pathway - Facilities	1 point is available where facilities are in place to collect and separate distinct waste streams, and where these facilities meet best practice access requirements for collection by the relevant waste contractor.	-	0	**Submission Template*** - Summary of how the project meets the credit criteria **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance, depending on the approach taken by project teams: - Operational Waste Management Plan including all relevant compliance requirements as outlined in the Submission Template. - Evidence of Waste Auditor qualifications - CV or project list outlining previous experience and qualifications. - Site Plan and/or Architectural Plans highlighting all relevant areas as referenced by the WMP.	Possible extra credit would require adjustment of bins									Waste specialist		
9_1	Indoor Enviroment Quality	Indoor Air Quality	Ventilation System Attributes	1 point is available where: - The entry of outdoor pollutants is mitigated; - The system is designed for ease of maintenance and cleaning; and - The system has been cleaned prior to occupation and use.	1	0	**Submission Template*** - A description of the building's ventilation systems* - Description of nominated areas * - A description of how air intakes are located away from specific potential outdoor contaminants and are designed to minimise the entry of pollutants to occupied spaces in accordance with ASHRAE 62.1:2013. - A description of how the system was designed for ease of maintenance and cleaning. **Supporting Documentation** Project Teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Mechanical drawings for each ventilated space. - Extract from the ventilation system specification for each system, the project's commissioning requirements are stated in accordance with the relevant codes/guideline. The relevant sections must be highlighted. - Extracts from the Environmental Management Plan that specify ventilation cleaning. - Extract from the Commissioning Report demonstrating that the HVAC and CO2 monitoring systems are operating as intended. For naturally ventilated areas, this is only relevant where automation systems and the like are included. - Extract from the printing and photocopy specification outlining the product certification criteria for all printing or photocopy equipment located throughout the project. - Certificates for printing equipment to ACMA 328, RAL-UZ 122 or GGPS.003 for all printing equipment which is included in the fitout.						x						
9_2	Indoor Enviroment Quality	Indoor Air Quality	Provision of Outdoor Air	2 points are available where the nominated area is provided with sufficient outdoor air to ensure levels of indoor pollutants are maintained at acceptable levels. Options are available for mechanically and naturally ventilated buildings and for outdoor air provision or contaminant monitoring.	2	0	**Submission Template*** - A description of the building's ventilation systems* - Description of nominated areas * - A description of how air intakes are located away from specific potential outdoor contaminants and are designed to minimise the entry of pollutants to occupied spaces in accordance with ASHRAE 62.1:2013. - A description of how the system was designed for ease of maintenance and cleaning. - Description of the system in place, occupancy rates, and how each space is provided with sufficient outdoor air; * - Description of any modelling (if relevant) to ensure the CO2 level threshold is maintained. * **Supporting Documentation** Project Teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Mechanical drawings for each ventilated space. - Extract from the ventilation system specification for each system, the project's commissioning requirements are stated in accordance with the relevant codes/guideline. The relevant sections must be highlighted. - Extracts from the Environmental Management Plan that specify ventilation cleaning. - Extract from the Commissioning Report demonstrating that the HVAC and CO2 monitoring systems are operating as intended. For naturally ventilated areas, this is only relevant where automation systems and the like are included. - Extract from the printing and photocopy specification outlining the product certification criteria for all printing or photocopy equipment located throughout the project. - Certificates for printing equipment to ACMA 328, RAL-UZ 122 or GGPS.003 for all printing equipment which is included in the fitout.	AC areas wont comply		x			x						
9_3	Indoor Enviroment Quality	Indoor Air Quality	Exhaust or Elimination of Pollutants	1 point is available where nominated pollutants, such as those arising from printing equipment, cooking processes and equipment, and vehicle exhaust, are limited by either removing the source of pollutants from the nominated area, or exhausting the pollutants directly to the outside while limiting their entry into other areas of the project.	1	1	**Submission Template*** - A description of the building's ventilation systems* - Description of nominated areas * - A description of how air intakes are located away from specific potential outdoor contaminants and are designed to minimise the entry of pollutants to occupied spaces in accordance with ASHRAE 62.1:2013. - A description of how the system was designed for ease of maintenance and cleaning. - Describing the attributes of the ventilation system or other methods to ensure compliance which are designed to exhaust relevant pollutant sources. * **Supporting Documentation** Project Teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Mechanical drawings for each ventilated space. - Extract from the ventilation system specification for each system, the project's commissioning requirements are stated in accordance with the relevant codes/guideline. The relevant sections must be highlighted. - Extracts from the Environmental Management Plan that specify ventilation cleaning. - Extract from the Commissioning Report demonstrating that the HVAC and CO2 monitoring systems are operating as intended. For naturally ventilated areas, this is only relevant where automation systems and the like are included. - Extract from the printing and photocopy specification outlining the product certification criteria for all printing or photocopy equipment located throughout the project. - Certificates for printing equipment to ACMA 328, RAL-UZ 122 or GGPS.003 for all printing equipment which is included in the fitout.			x			x					Mechanical design docs	

									Responsibility											
Credit No.	Section	Category	Credit	Brief Discription	Points Available	Points Targeted	Submission Requirements (items marked with * required for design review submission)	Comments	Client	Architect	Structural	Civil	Mechanical	Electrical	Hydraulic	Acoustic	Other	Supporting docs	Items still required
10.1	Indoor Enviroment Quality	Acoustic Comfort	Internal Noise Levels	1 point is available where internal ambient noise levels in the nominated area are suitable and relevant to the activity type in the room. This includes all sound generated by the building systems and any external noise ingress.	1	0	**Submission Template*** - Description of all relevant internal and external noise sources.* - Description of the design features that ensure the credit criteria have been met.* - Measured noise levels in all relevant spaces and the noise levels required to meet the credit criteria. - If the building is mechanically ventilated, confirmation that the plant was fully in operation when the tests were carried out. **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Detailed Drawings detailing the acoustic design features relevant to this credit. - Report by a qualified acoustics consultant confirming credit compliance. - Extracts from the commissioning report detailing relevant measured noise levels and target noise levels.			x			x			x			
10.2	Indoor Enviroment Quality	Acoustic Comfort	Reverberation	1 point is available where the nominated area has been built to reduce the persistence of sound to a level suitable to the activities in the space.	1	0	**Submission Template*** - Description of all relevant internal and external noise sources.* - Description of the design features that ensure the credit criteria have been met.* - Measured noise levels in all relevant spaces and the noise levels required to meet the credit criteria. - If the building is mechanically ventilated, confirmation that the plant was fully in operation when the tests were carried out. **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Detailed Drawings detailing the acoustic design features relevant to this credit. - Report by a qualified acoustics consultant confirming credit compliance. - Extracts from the commissioning report detailing relevant measured noise levels and target noise levels.	Possible extra credit pending acoustic engineer input		x						x			
10.3	Indoor Enviroment Quality	Acoustic Comfort	Acoustic Separation	1 point is available where the nominated enclosed spaces have been built to minimise crosstalk between rooms and between rooms and open areas.	1	0	**Submission Template*** - Description of all relevant internal and external noise sources.* - Description of the design features that ensure the credit criteria have been met.* - Measured noise levels in all relevant spaces and the noise levels required to meet the credit criteria. - If the building is mechanically ventilated, confirmation that the plant was fully in operation when the tests were carried out. **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Detailed Drawings detailing the acoustic design features relevant to this credit. - Report by a qualified acoustics consultant confirming credit compliance. - Extracts from the commissioning report detailing relevant measured noise levels and target noise levels.			x						x			
11	Indoor Enviroment Quality	Lighting Comfort	Minimum Lighting Comfort	The minimum requirement is met where lights are flicker-free and accurately address the perception of colour in the space.	-	Complies	**Submission Template*** - Description of nominated areas* - A description of how the following criteria have been met* - Flicker-free lighting - Accurate Colour - General Illuminance - General Glare Reduction - Individual Control - Surface Illuminance **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance. - Lighting Drawings - Architectural Drawings - Lighting Specifications/Schedules - Product Data Sheets - Isolux Plot Drawings - Evidence of transmittal of a Tenant Fitout Design Guide - Signed lease agreement referring to the conditions set by the Tenant Fitout Design Guide			x				x				Lighitng selectoins/data sheets
11.1	Indoor Enviroment Quality	Lighting Comfort	General Illuminance and Glare Reduction	1 point is available where, in the nominated area: - Lighting levels and quality comply with best practice guidelines; and - Glare is eliminated.	1	1	**Submission Template*** - Description of nominated areas* - A description of how the following criteria have been met* - Flicker-free lighting - Accurate Colour - General Illuminance - General Glare Reduction - Individual Control - Surface Illuminance **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance. - Lighting Drawings - Architectural Drawings - Lighting Specifications/Schedules - Product Data Sheets - Isolux Plot Drawings - Evidence of transmittal of a Tenant Fitout Design Guide - Signed lease agreement referring to the conditions set by the Tenant Fitout Design Guide			x				x				Lighitng selectoins/data sheets
11.2	Indoor Enviroment Quality	Lighting Comfort	Surface Illuminance	1 point is available where, in the nominated area, a combination of lighting and surfaces improve uniformity of lighting to give visual interest.	1	0	**Submission Template*** - Description of nominated areas* - A description of how the following criteria have been met* - Flicker-free lighting - Accurate Colour - General Illuminance - General Glare Reduction - Individual Control - Surface Illuminance **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance. - Lighting Drawings - Architectural Drawings - Lighting Specifications/Schedules - Product Data Sheets - Isolux Plot Drawings - Evidence of transmittal of a Tenant Fitout Design Guide - Signed lease agreement referring to the conditions set by the Tenant Fitout Design Guide			x				x				
11.3	Indoor Enviroment Quality	Lighting Comfort	Localised Lighting Control	1 point is available where, in the nominated area, occupants have the ability to control the lighting in their immediate environment.	1	1	**Submission Template*** - Description of nominated areas* - A description of how the following criteria have been met* - Flicker-free lighting - Accurate Colour - General Illuminance - General Glare Reduction - Individual Control - Surface Illuminance **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance. - Lighting Drawings - Architectural Drawings - Lighting Specifications/Schedules - Product Data Sheets - Isolux Plot Drawings - Evidence of transmittal of a Tenant Fitout Design Guide - Signed lease agreement referring to the conditions set by the Tenant Fitout Design Guide			x				x				window schedule
12	Indoor Enviroment Quality	Visual Comfort	Glare Reduction	The minimum requirement is met where the glare in the nominated area from sunlight through all viewing façades is reduced through a combination of blinds, screens, fixed devices, or other means.	-	Complies	**Submission Template*** - Description of nominated areas* - Description of nominated hours* - Description of how the project meets the requirement for glare reduction* - Description of how the project meets the requirements for daylight* - Description of how the project meets the credit requirements for views* **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Drawings showing: - The location of all blinds / shutters. - Any glare control devices. - Access to views.			x								
12.1	Indoor Enviroment Quality	Visual Comfort	Daylight	Up to 2 points are available where a percentage of the nominated area receives high levels of daylight: - For 40% of the nominated area – 1 point; - For 60% of the nominated area – 2 points.	2	1	**Submission Template*** - Description of nominated areas* - Description of nominated hours* - Description of how the project meets the requirement for glare reduction* - Description of how the project meets the requirements for daylight* - Description of how the project meets the credit requirements for views* **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Daylight modelling report showing the daylight factor or daylight illuminance for the claimed spaces and including the following information: - A summary table showing each space or floor, their nominated area, and the compliant area in both square meters and as a percentage basis. - The daylight model showing the amount of floor area that is compliant, and the daylight values. - Drawings showing: - The location of all blinds / shutters. - Any glare control devices. - Access to views. - Manual calculations showing: - The amount of floor area that is compliant for daylight. - The amount of compliant area for views. - The height and length of windows and any area of any skylights. - The lines-of-sight showing that no obstructions exist. - Any internal features or showing that no obstructions exist externally.			x			x	x			daylight model	architectural drawings + daylight model	

									Responsibility										
Credit No.	Section	Category	Credit	Brief Discription	Points Available	Points Targeted	Submission Requirements (items marked with * required for design review submission)	Comments	Client	Architect	Structural	Civil	Mechanical	Electrical	Hydraulic	Acoustic	Other	Supporting docs	Items still required
12.2	Indoor Enviroment Quality	Visual Comfort	Views	1 point is available where 60% of the nominated area has a clear line-ofsightto a high quality internal or external view.	1	1	**Submission Template*** - Description of nominated areas* - Description of nominated hours* - Description of how the project meets the requirement for glare reduction* - Description of how the project meets the requirements for daylight* - Description of how the project meets the credit requirements for views* **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Drawings showing: - The location of all blinds / shutters. - Any glare control devices. - Access to views.			x								architectural drawings	line of sight drawings
13.1	Indoor Enviroment Quality	Indoor Pollutants	Paints, Adhesives, Sealants and Carpets	1 point is available where at least 95% of all internally applied paints, adhesives, sealants and carpets meet stipulated 'Total VOC Limits', or, where no paints, adhesives, sealants or carpets are used in the building.	1	1	**Submission Template*** - Summary of how credit compliance has been achieved* - List of all products relevant and how they comply with the credit criteria. **Supporting Documentation** Project teams shall submit documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Specifications that demonstrate emission levels or formaldehyde contents. - Material Safety Data Sheets that demonstrate the compliant emission levels or formaldehyde content - Product certificates that demonstrate emission levels or formaldehyde contents. - Product certificates that demonstrate certification under a recognised product certification scheme or recognised standard - Product data sheets that demonstrate emission levels or formaldehyde contents. - Invoices and proof of purchase to demonstrate costs of compliant materials. - Bill of Quantities from Quantity Surveyor or Cost planner, demonstrating material costs.			x			x	x	x			refer to specification: -mech spec clause - 11.1, 18.3, 19.2 - hyd spec caluse - - Elec spec clause - - Arch spec clauses 0171 3.16, 0181 2.1, 0182 2.1, 0345 4.1, 0551 1.5 - Structural docs -	
13.2	Indoor Enviroment Quality	Indoor Pollutants	Engineered Wood Products	1 point is available where at least 95% of all engineered wood products meet stipulated formaldehyde limits or no new engineered wood products are used in the building.	1	1	**Submission Template*** - Summary of how credit compliance has been achieved* - List of all products relevant and how they comply with the credit criteria. **Supporting Documentation** Project teams shall submit documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Specifications that demonstrate emission levels or formaldehyde contents. - Material Safety Data Sheets that demonstrate the compliant emission levels or formaldehyde content - Product certificates that demonstrate emission levels or formaldehyde contents. - Product certificates that demonstrate certification under a recognised product certification scheme or recognised standard - Product data sheets that demonstrate emission levels or formaldehyde contents. - Invoices and proof of purchase to demonstrate costs of compliant materials. - Bill of Quantities from Quantity Surveyor or Cost planner, demonstrating material costs.			x	x							Architectural spec - clauses 0185 2, 0.383 2, 0655 2	
14.1	Indoor Enviroment Quality	Thermal Comfort	Thermal Comfort	1 point is available where a high degree of thermal comfort is provided to occupants in the space, equivalent to 80% of all occupants being satisfied in the space.	1	0	**Submission Template*** - A summary of the thermal comfort modelling report or calculations for the building. - A description of: - How the space meets the acceptability limits*; and / or - A summary of the thermal comfort calculations for the project design and demonstrating that the PMV targets are achieved*; and / or - A summary of NATHERS modelling outputs and confirmation that modelling was undertaken by a HERS accredited assessor*; and /or - Details of all of the HVAC Design and Building Fabric Performance criteria of the Deemed-to-Satisfy approach.* - A summary of how each of the above criteria has been met, referencing supporting information, such as: - A description of the methodology, weather data, and software package used for determining the thermal comfort levels. - A description of the HVAC system, and including details of temperature, humidity, air rates, infiltration rates, control and zoning strategy. - The internal loads used, the usage profiles, the clothing, metabolic rate, and air movement values used, and relevant characteristics of building materials (including Uvalues). **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate credit compliance: - Drawings showing thermal properties of roof, windows, and façade. - Mechanical drawings showing details of the HVAC system and zones. - Modelling reports showing the results of the relevant criterion. - Confirmation from the relevant sub-contractors that all services have been installed and commissioned in line with the listed DTS criteria. - Extract(s) from the Commissioning Report demonstrating via commissioning results that the building has been commissioned and the installed systems operate as intended by the design.	Not likely as no AC		x			x						
14.2	Indoor Enviroment Quality	Thermal Comfort	Advanced Thermal Comfort	1 additional point is available where a high degree of thermal comfort is provided to occupants in the space, equivalent to 90% of all occupants being satisfied in the space.	1	0	**Submission Template*** - A summary of the thermal comfort modelling report or calculations for the building. - A description of: - How the space meets the acceptability limits*; and / or - A summary of the thermal comfort calculations for the project design and demonstrating that the PMV targets are achieved*; and / or - A summary of NATHERS modelling outputs and confirmation that modelling was undertaken by a HERS accredited assessor*; and /or - Details of all of the HVAC Design and Building Fabric Performance criteria of the Deemed-to-Satisfy approach.* - A summary of how each of the above criteria has been met, referencing supporting information, such as: - A description of the methodology, weather data, and software package used for determining the thermal comfort levels. - A description of the HVAC system, and including details of temperature, humidity, air rates, infiltration rates, control and zoning strategy. - The internal loads used, the usage profiles, the clothing, metabolic rate, and air movement values used, and relevant characteristics of building materials (including Uvalues). **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate credit compliance: - Drawings showing thermal properties of roof, windows, and façade. - Mechanical drawings showing details of the HVAC system and zones. - Modelling reports showing the results of the relevant criterion. - Confirmation from the relevant sub-contractors that all services have been installed and commissioned in line with the listed DTS criteria. - Extract(s) from the Commissioning Report demonstrating via commissioning results that the building has been commissioned and the installed systems operate as intended by the design.	Not likely as no AC		x			x						
15A.0	Energy	Greenhouse Gas Emissions	Conditional Requirement: Prescriptive Pathway	Up to 5 out of 20 points are available where it is demonstrated that the predicted building GHG emissions have been reduced by employing 'best practice' attributes. This pathway may be applied to NCC Class 3 to Class 9 buildings. The Conditional Requirement must be met as outlined within this pathway.	-	Complies	**Submission Template*** - Summary of how the project meets the credit criteria.* - Details about how each criteria has been achieved. - Supporting Documentation, which will vary depending on the pathway chosen as outlined below. **Completed Green Star – Design & As Built: GHG Emissions Calculator*** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance, depending on the compliance pathway used for the project: - Documentation showing compliance with all of the applicable Deemed-to-Satisfy requirements of Section J of the NCC*. - Documentation showing the performance of applicable components (building envelope, glazing, lighting and HVAC) exceeding the minimum NCC requirements by the specified amount. This includes evidence of fabric elements being installed with the specified requirements, including but not limited to: o Window Energy Rating Scheme (WERS) certificates; and o Calculations of wall, roof and floor R-values. - Drawing(s) identifying the control zone sizes and the luminaire switch and control sensor locations. - Extract(s) from the Commissioning Report demonstrating (through supporting evidence) that the lighting system has been commissioned and operates as intended by the design. - Building sealing test report including details of test methodology and air flow rates, and statement of the building air permeability achieved. -Power Purchase Agreement (PPA) identifying the duration of the power supply contract, supply availability (including proportion of GreenPower) and guaranteed GHG emission factor.		x	x			x	x	x			
15A.1	Energy	Greenhouse Gas Emissions	Building Envelope	1 point is awarded where the roof and ceiling, walls, and flooring construction achieves a 15% increase on the minimum required R-values specified in J1.3, J1.5 and J1.6.	1	1	**Submission Template*** - Summary of how the project meets the credit criteria.* - Details about how each criteria has been achieved. - Supporting Documentation, which will vary depending on the pathway chosen as outlined below. **Completed Green Star – Design & As Built: GHG Emissions Calculator*** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance, depending on the compliance pathway used for the project: - Documentation showing compliance with all of the applicable Deemed-to-Satisfy requirements of Section J of the NCC*. - Documentation showing the performance of applicable components (building envelope, glazing, lighting and HVAC) exceeding the minimum NCC requirements by the specified amount. This includes evidence of fabric elements being installed with the specified requirements, including but not limited to: o Window Energy Rating Scheme (WERS) certificates; and o Calculations of wall, roof and floor R-values.			x								Section J report and arch docs	
15A.2	Energy	Greenhouse Gas Emissions	Glazing	1 point is awarded where the glazing complies with the following conditions: - For vertical glazing, the total energy used for each orientation and each storey is not greater than 85% of the total allowance according to the Australian Building Codes Board glazing calculator or the calculated aggregated air-conditioning energy value as defined in part J2.4 of the NCC; and - Where there are roof lights, the SHGC and total U-Value of these roof lights exceed the requirements of section J1.4 by 15%.	1	0	**Submission Template*** - Summary of how the project meets the credit criteria.* - Details about how each criteria has been achieved. - Supporting Documentation, which will vary depending on the pathway chosen as outlined below. **Completed Green Star – Design & As Built: GHG Emissions Calculator*** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance, depending on the compliance pathway used for the project: - Documentation showing compliance with all of the applicable Deemed-to-Satisfy requirements of Section J of the NCC*. - Documentation showing the performance of applicable components (building envelope, glazing, lighting and HVAC) exceeding the minimum NCC requirements by the specified amount. This includes evidence of fabric elements being installed with the specified requirements, including but not limited to: o Window Energy Rating Scheme (WERS) certificates; and o Calculations of wall, roof and floor R-values.	Possible point though could be hard to achieve		x									

									Responsibility										
Credit No.	Section	Category	Credit	Brief Discription	Points Available	Points Targeted	Submission Requirements (items marked with * required for design review submission)	Comments	Client	Architect	Structural	Civil	Mechanical	Electrical	Hydraulic	Acoustic	Other	Supporting docs	Items still required
15A.3	Energy	Greenhouse Gas Emissions	Lighting	1 point is awarded where the lighting complies with the following conditions: - The actual installed aggregate illumination power density is 30% less than the maximum illumination power densities defined in Table J6.2a; - Automated lighting control systems, such as occupant detection and daylight adjustment, are provided to 95% of the nominated area; and - For Class 5 and 9a buildings only, the size of individually switched lighting zones does not exceed 100m2 for 95% of the nominated area.	1	1	**Submission Template*** - Summary of how the project meets the credit criteria.* - Details about how each criteria has been achieved. - Supporting Documentation, which will vary depending on the pathway chosen as outlined below. **Completed Green Star – Design & As Built: GHG Emissions Calculator*** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance, depending on the compliance pathway used for the project: - Documentation showing compliance with all of the applicable Deemed-to-Satisfy requirements of Section J of the NCC*. - Documentation showing the performance of applicable components (building envelope, glazing, lighting and HVAC) exceeding the minimum NCC requirements by the specified amount. This includes evidence of fabric elements being installed with the specified requirements, including but not limited to: o Window Energy Rating Scheme (WERS) certificates; and o Calculations of wall, roof and floor R-values. - Drawing(s) identifying the control zone sizes and the luminaire switch and control sensor locations. - Extract(s) from the Commissioning Report demonstrating (through supporting evidence) that the lighting system has been commissioned and operates as intended by the design.						x			Electrical docs	
15A.4	Energy	Greenhouse Gas Emissions	Ventilation and Air-conditioning	1 point is awarded where all spaces comply with the following conditions: **Mechanically ventilated spaces** The HVAC systems comply with the following conditions: - The installed fan motor power and pump power, is at least 15% less that the maximum fan motor powers and pump powers defined in Tables J5.2 and J5.4a; - The thermal efficiency of the installed water heater is 15% more than the required minimum as defined in Table J5.4b; and - The required minimum energy efficiency ratio for packaged air conditioning equipment and refrigerant chillers – as defined in Tables J5.4d and J5.4e. OR, MEPS, where Section J does not apply to the equipment capacity – is increased by at least 15%. **Naturally Ventilated Spaces** The building is naturally ventilated in accordance with the Indoor Air Quality credit.	1	1	**Submission Template*** - Summary of how the project meets the credit criteria.* - Details about how each criteria has been achieved. - Supporting Documentation, which will vary depending on the pathway chosen as outlined below. **Completed Green Star – Design & As Built: GHG Emissions Calculator*** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance, depending on the compliance pathway used for the project: - Documentation showing compliance with all of the applicable Deemed-to-Satisfy requirements of Section J of the NCC*. - Documentation showing the performance of applicable components (building envelope, glazing, lighting and HVAC) exceeding the minimum NCC requirements by the specified amount. This includes evidence of fabric elements being installed with the specified requirements						x			Mechanical documents	
15A.5	Energy	Greenhouse Gas Emissions	Domestic Hot Water Systems	1 point is awarded where domestic hot water systems are powered by one of the following heat sources: - Renewable Energy; - Natural Gas; - Electric heat pump (minimum COP 3.5 under design conditions); or - Waste heat or heat recovered from another process.	1	1	**Submission Template*** - Summary of how the project meets the credit criteria.* - Details about how each criteria has been achieved. - Supporting Documentation, which will vary depending on the pathway chosen as outlined below. **Completed Green Star – Design & As Built: GHG Emissions Calculator*** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance, depending on the compliance pathway used for the project: - Documentation showing compliance with all of the applicable Deemed-to-Satisfy requirements of Section J of the NCC*. - Documentation showing the performance of applicable components (building envelope, glazing, lighting and HVAC) exceeding the minimum NCC requirements by the specified amount. This includes evidence of fabric elements being installed with the specified requirements.							x			
15A.6	Energy	Greenhouse Gas Emissions	Building Sealing	Mechanically and Mixed Mode Ventilated Spaces 1 point is awarded where a pressurised building air leakage test (refer to guidance section) is carried out on the completed building in accordance with one of the following standards: - ASTM E779-10; or - ATTMA TSL2.	1	0	**Submission Template*** - Summary of how the project meets the credit criteria.* - Details about how each criteria has been achieved. - Supporting Documentation, which will vary depending on the pathway chosen as outlined below. **Completed Green Star – Design & As Built: GHG Emissions Calculator*** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance, depending on the compliance pathway used for the project: - Documentation showing compliance with all of the applicable Deemed-to-Satisfy requirements of Section J of the NCC*. - Building sealing test report including details of test methodology and air flow rates, and statement of the building air permeability achieved.			x			x				
15A.7	Energy	Greenhouse Gas Emissions	Accredited GreenPower	Projects which have committed to procure GreenPower can be rewarded for supporting grid-connected renewable energy supply infrastructure. - 1 point is awarded where a supply contract is in place to procure at lease 50% of the building's electricity consumption through accredited GreenPower. - 2 points are awarded where a supply contract is in place to procure at lease 100% of the building's electricity consumption through accredited GreenPower. The length of time of the commitment is for a minimum period of ten years after Practical Completion.	2	0	**Submission Template*** - Summary of how the project meets the credit criteria.* - Details about how each criteria has been achieved. - Supporting Documentation, which will vary depending on the pathway chosen as outlined below. **Completed Green Star – Design & As Built: GHG Emissions Calculator*** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance, depending on the compliance pathway used for the project: -Power Purchase Agreement (PPA) identifying the duration of the power supply contract, supply availability (including proportion of GreenPower) and guaranteed GHG emission factor.		x								
15B.0	Energy	Greenhouse Gas Emissions	Conditional Requirement: NatHERS Pathway	Up to 12 out of 20 points are available where a NatHERS rating and 'best practice' building attributes demonstrate that the predicted building GHG emissions have been reduced compared to a typical dwelling or residence. This pathway may be applied to residential projects located in all states and territories, except New South Wales. The Conditional Requirement must be met as outlined within this pathway.	-	n/a targing 15A													
15B.1	Energy	Greenhouse Gas Emissions	NatHERS Pathway		-	n/a targing 15A													
15C.0	Energy	Greenhouse Gas Emissions	Conditional Requirement: BASIX Pathway	Up to 16 out of 20 points are available where a BASIX certificate is used to demonstrate that the predicted building GHG emissions have been reduced compared to a dwelling or residence. This pathway may only be applied to residential projects located in New South Wales. The Conditional Requirement must be met as outlined within this pathway.	-	n/a targing 15A													
15C.1	Energy	Greenhouse Gas Emissions	BASIX Pathway		-	n/a targing 15A													
15D.0	Energy	Greenhouse Gas Emissions	Conditional Requirement: NABERS Pathway	Up to 16 out of 20 points are available where a NABERS Energy Commitment Agreement is used to demonstrate that the predicted building GHG emissions have been reduced compared to an average building. The Conditional Requirement must be met as outlined within this pathway.	-	n/a targing 15A													
15D.1	Energy	Greenhouse Gas Emissions	NABERS Energy Commitment Agreement Pathway		-	n/a targing 15A													
15E.0	Energy	Greenhouse Gas Emissions	Conditional Requirement: Reference Building Pathway	Up to 20 out of 20 points are available where it is demonstrated that there is a specified reduction in the predicted energy consumption and GHG emissions of the proposed building. Points are awarded based both on improvements to the building's façade, and on the project's predicted ability to reduce its energy consumption and emissions towards 'net zero operating emissions'. The Conditional Requirement must be met as outlined within this pathway.	-	n/a targing 15A	**Submission Template*** - Summary of how the project meets the credit criteria.* - Details about how each criteria has been achieved. - Supporting Documentation, which will vary depending on the pathway chosen as outlined below. **Completed Green Star – Design & As Built: GHG Emissions Calculator*** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance, depending on the compliance pathway used for the project: - Energy modelling report* in accordance with the Building Energy Consumption and Greenhouse Gas Emissions Calculation Guidelines following the structure of the guide and: - Clearly identifying all default values used (e.g. occupant density). - Clearly identifying all of t he assumptions made, design-driven inputs and referencing drawings; whenever assumptions are used, they must be justified and conservative. - Clearly corresponding to the design. - Extract(s) from the specification(s)* demonstrating that all the inputs used in the energy simulation are reflected in the current design. - Extract(s) from the Commissioning Report demonstrating (through supporting evidence) that the building has been commissioned and operates as intended by the design (i.e. as described in the energy modelling report). - For naturally ventilated spaces, demonstrating that the building operates as a naturally ventilated space in accordance with AS 1668.4-2012 and requires no mechanical airconditioningfor occupancy. - As built drawings demonstrating that the facade details and materials are the same as described in the energy modelling report. - For naturally ventilated spaces, drawings for each space clearly showing openings and dimensions of ventilation inlets and outlets.	Proposed to target 15E.0 in place of 15A credits as it will result in more credits being achieved (able to take into accound large solar array)		x			x	x	x			
15E.1	Energy	Greenhouse Gas Emissions	Comparison to a Reference Building Pathway		-	n/a targing 15A	**Submission Template*** - Summary of how the project meets the credit criteria.* - Details about how each criteria has been achieved. - Supporting Documentation, which will vary depending on the pathway chosen as outlined below. **Completed Green Star – Design & As Built: GHG Emissions Calculator*** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance, depending on the compliance pathway used for the project: - Energy modelling report* in accordance with the Building Energy Consumption and Greenhouse Gas Emissions Calculation Guidelines following the structure of the guide and: - Clearly identifying all default values used (e.g. occupant density). - Clearly identifying all of t he assumptions made, design-driven inputs and referencing drawings; whenever assumptions are used, they must be justified and conservative. - Clearly corresponding to the design. - Extract(s) from the specification(s)* demonstrating that all the inputs used in the energy simulation are reflected in the current design. - Extract(s) from the Commissioning Report demonstrating (through supporting evidence) that the building has been commissioned and operates as intended by the design (i.e. as described in the energy modelling report). - For naturally ventilated spaces, demonstrating that the building operates as a naturally ventilated space in accordance with AS 1668.4-2012 and requires no mechanical airconditioningfor occupancy. - As built drawings demonstrating that the facade details and materials are the same as described in the energy modelling report. - For naturally ventilated spaces, drawings for each space clearly showing openings and dimensions of ventilation inlets and outlets.			x			x	x	x			
16A	Energy	Peak Electricity Demand Reduction	Prescriptive Pathway - On-site Energy Generation	1 out of 2 points are available where it is demonstrated that the use of on-site electricity generation systems reduces the total peak electricity demand by at least 15%	-		**Submission Template*** - Summary of how the project meets the credit criteria.* - Details about how each criterion has been achieved. - Supporting Documentation, which will vary depending on the pathway chosen as outlined below. **Completed Green Star – Design & As Built Energy Calculator*** **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance, depending on the pathway taken: - Extract(s) from the specification(s)* where the proposed solution(s) are described. - Calculation of the peak electricity demand referencing as-installed drawings and AS/NZS 3000, detailing (with supporting calculations) the design, operation and justifying the capacity of the intended system. - Schematic electrical drawings clearly indicating the type, l ocation and details of the proposed solution(s).	potential extra points with solar to offset peak		x			x	x				

									Responsibility											
Credit No.	Section	Category	Credit	Brief Discription	Points Available	Points Targeted	Submission Requirements (items marked with * required for design review submission)	Comments	Client	Architect	Structural	Civil	Mechanical	Electrical	Hydraulic	Acoustic	Other	Supporting docs	Items still required
16B	Energy	Peak Electricity Demand Reduction	Performance Pathway - Reference Building	Up to 2 points are available where it is demonstrated that the project's predicted peak electricity demand has been reduced below that of a Reference Building: - 0-10%: 0 point - 20% : 1 point - 30%: 2 points	2	0	**Submission Template*** - Summary of how the project meets the credit criteria.* - Details about how each criterion has been achieved. - Supporting Documentation, which will vary depending on the pathway chosen as outlined below. **Completed Green Star – Design & As Built Energy Calculator*** **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance, depending on the pathway taken: - Energy modelling report* containing a section specifically on pea k electricity demand reduction, with information provided as per the requirements of the Building Energy Consumption and Greenhouse Gas Emissions Calculation Guidelines. - Extract(s) from the Commissioning Report that specifically highlight the systems which contribute towards the peak electricity demand reduction, and demonstrate that they have been commissioned and operate as intended by the design (i.e. as described in the energy modelling report).			x			x	x				
17A.1	Transport	Sustainable Transport	Performance Pathway	Up to 10 points are available where projects provide access to sustainable transport infrastructure which decreases greenhouse gas emissions from transport, decreases mental and social impacts of commuting, and encourages the uptake of healthier transport options by building occupants.	10	n/a	**Submission Template*** - Description of the timing and process of developing the site-specific transport assessment and the Travel Plan.* - Summary of how the recommendations of the Travel Plan were included in the project's design. - Summary of how improvements in carbon emissions from transport and the inputs into the Transport Calculator. Refer to the Sustainable Transport Calculator for details on justifying improvements in carbon emissions. **Green Star – Design & As Built Sustainable Transport Calculator** **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Travel Plan including a site-specific transport assessment and transport improvements as outlined in the Compliance Requirements. - Transport Drawings showing the provision and location of transport facilities as recommended by the Travel Plan, and justifying inputs into the Sustainable Transport Calculator.			x							GSAP		
17B.1	Transport	Sustainable Transport	Access by Public Transport	Up to 3 points are available based on the accessibility of the site by public transport.	3	1	**Submission template*** - The number of regular occupants expected for the project* - Results from the Green Star – Design & As Built Access by Public Transport Calculator* - A summary table of the maximum car park spaces allowed and the proposed car park spaces* - The number of proposed car park spaces and the number of car park spaces for low-emission vehicles, electric vehicles or car sharing schemes* - The number of bicycle parking spaces that have been provided and the number that are required for credit compliance* - A description of the secure bicycle spaces and end of trip facilities (i.e. showers and lockers)* - The WalkScore or the project or a summary of the number of amenities within the relevant distance to the site* **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Green Star – Design & As Built Access by Public Transport Calculator* - Project Drawings* showing the proposed car parking spaces, bicycle parking spaces, and end-of trip facilities. - WalkScore Report* - Site Plan* showing the amenities nearby.	Clarifcatoin to be raised to incuide private buses in calculator		x							GSAP		
17B.2	Transport	Sustainable Transport	Reduced Car Parking Provision	1 point is available where there is a reduction in the number of car parking spaces in the proposed building when compared to a standard-practice building.	1	1	**Submission template*** - The number of regular occupants expected for the project* - Results from the Green Star – Design & As Built Access by Public Transport Calculator* - A summary table of the maximum car park spaces allowed and the proposed car park spaces* - The number of proposed car park spaces and the number of car park spaces for low-emission vehicles, electric vehicles or car sharing schemes* - The number of bicycle parking spaces that have been provided and the number that are required for credit compliance* - A description of the secure bicycle spaces and end of trip facilities (i.e. showers and lockers)* - The WalkScore or the project or a summary of the number of amenities within the relevant distance to the site* **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Green Star – Design & As Built Access by Public Transport Calculator* - Project Drawings* showing the proposed car parking spaces, bicycle parking spaces, and end-of trip facilities. - WalkScore Report* - Site Plan* showing the amenities nearby.			x							GSAP		
17B.3	Transport	Sustainable Transport	Low Emission Vehicle Infrastructure	1 point is available where parking spaces and/or dedicated infrastructure is provided to support the uptake of low-emission vehicles.	1	0	**Submission template*** - The number of regular occupants expected for the project* - Results from the Green Star – Design & As Built Access by Public Transport Calculator* - A summary table of the maximum car park spaces allowed and the proposed car park spaces* - The number of proposed car park spaces and the number of car park spaces for low-emission vehicles, electric vehicles or car sharing schemes* - The number of bicycle parking spaces that have been provided and the number that are required for credit compliance* - A description of the secure bicycle spaces and end of trip facilities (i.e. showers and lockers)* - The WalkScore or the project or a summary of the number of amenities within the relevant distance to the site* **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Green Star – Design & As Built Access by Public Transport Calculator* - Project Drawings* showing the proposed car parking spaces, bicycle parking spaces, and end-of trip facilities. - WalkScore Report* - Site Plan* showing the amenities nearby.			x							GSAP		
17B.4	Transport	Sustainable Transport	Active Transport Facilities	1 point is available where bicycle parking and associated facilities are provided to regular building occupants and visitors.	1	0	**Submission template*** - The number of regular occupants expected for the project* - Results from the Green Star – Design & As Built Access by Public Transport Calculator* - A summary table of the maximum car park spaces allowed and the proposed car park spaces* - The number of proposed car park spaces and the number of car park spaces for low-emission vehicles, electric vehicles or car sharing schemes* - The number of bicycle parking spaces that have been provided and the number that are required for credit compliance* - A description of the secure bicycle spaces and end of trip facilities (i.e. showers and lockers)* - The WalkScore or the project or a summary of the number of amenities within the relevant distance to the site* **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Green Star – Design & As Built Access by Public Transport Calculator* - Project Drawings* showing the proposed car parking spaces, bicycle parking spaces, and end-of trip facilities. - WalkScore Report* - Site Plan* showing the amenities nearby.			x							GSAP		
17B.5	Transport	Sustainable Transport	Walkable Neighbourhoods	1 point is available where the project is located conveniently to amenities or the project achieves a specified walk score.	1	0	**Submission template*** - The number of regular occupants expected for the project* - Results from the Green Star – Design & As Built Access by Public Transport Calculator* - A summary table of the maximum car park spaces allowed and the proposed car park spaces* - The number of proposed car park spaces and the number of car park spaces for low-emission vehicles, electric vehicles or car sharing schemes* - The number of bicycle parking spaces that have been provided and the number that are required for credit compliance* - A description of the secure bicycle spaces and end of trip facilities (i.e. showers and lockers)* - The WalkScore or the project or a summary of the number of amenities within the relevant distance to the site* **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Green Star – Design & As Built Access by Public Transport Calculator* - Project Drawings* showing the proposed car parking spaces, bicycle parking spaces, and end-of trip facilities. - WalkScore Report* - Site Plan* showing the amenities nearby.			x							GSAP		
18A.1	Water	Potable Water	Potable Water - Performance Pathway	Up to 12 points are available based on the magnitude of the predicted reduction in potable water Consumption, when the project is compared against a Reference Building.	0	n/a targeting 148b	**Submission Template*** - Summary of how the project meets the credit criteria.* - Details about how each criteria has been achieved. - Supporting Documentation, which will vary depending on the pathway chosen as outlined below*. **Supporting documentation** Project teams shall provide documentation supporting credit compliance and the entries in the Green Star – Design & As Built Potable Water Calculator. The following docume nts may be used to demonstrate compliance: - Completed Green Star – Design & As Built Potable Water Calculator - WELS certificates for all toilets, urinals, taps, showers, dishwashers, and residential-scale laundry equipment. - Manufacturer's data for commercial-scale laundry equipment, should be submitted in lieu of WELS certificates. - Drawing(s) clearly showing the location of all heat rejection equipment installed on the project. - Drawings showing the landscape design and the irrigation system, listing the name, location, and plant species zone as it appears in the Calculator. - Drawing(s) for each typical floor showing isolation valves for floor-by-floor testing of the fire sprinkler system, and drawings of the water storage and re-use system(s). - Manufacturer's information showing that the application efficiency for the landscape irrigation system. - Manufacturers information including backwash volume and frequency of filter cleaning. - Drawing(s) of process cooling water usage loops. - Contract from off-site water supplier stating the volume to be supplied and date of commencement of delivery where off-site reclaimed water supply is included in the design.	Credit 18A to be target inplace o 18B, estimate of points at 8 instead of 6 without the need to upsize tank		x			x		x				
18B.1	Water	Potable Water	Sanitary Fixture Efficiency	One (1) point is awarded where all fixtures are within one star of the WELS rating stated below: Fixture / Equipment Type WELS Rating Taps 6 Star Urinals 6 Star Toilet 5 Star Showers 3 Star (> 4.5 but <= 6.0) Clothes Washing Machines 5 Star Dishwashers 6 Star	1	1	Submission Template* - Summary of how the project meets the credit criteria.* - Details about how each criteria has been achieved. - Supporting Documentation, which will vary depending on the pathway chosen as outlined below*. **Supporting documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - WELS certificates for all toilets, urinals, taps, showers, dishwashers, and residential-scale laundry equipment clearly showing the flow rates of each item. - Manufacturer's data for commercial-scale laundry equipment shall be submitted in lieu of WELS certificates. - Tank specification indicating size and location of the rainwater system and the connections to the water end uses. - Landscape/Hydraulics drawings showing either the drip irrigation system, or showing the location of the xeriscape garden. - Extracts from the Fire Engineering Report where it states that the building's fire suppression system has no sprinklers. - Drawing(s) for each typical floor showing isolation valves for floor-by-floor testing of the fire sprinkler system, and drawings of the water storage and re-use system(s).			x					x			Fixture schedule	

									Responsibility										
Credit No.	Section	Category	Credit	Brief Discription	Points Avaliable	Points Targeted	Submission Requirements (items marked with * required for design review submission)	Comments	Client	Architect	Structural	Civil	Mechanical	Electrical	Hydraulic	Acoustic	Other	Supporting docs	Items still required
18B.2	Water	Potable Water	Rainwater Reuse	One (1) point is awarded when a rainwater tank is installed to collect and reuse rainwater, within the project's site boundary, and the rainwater tank size meets the following criteria: Gross Floor Area (GFA in m2) / Rainwater Tank Volume (kL) 2,500 / 25 5,000 / 50 10,000 / 100 20,000 / 200	1	1	Submission Template* - Summary of how the project meets the credit criteria.* - Details about how each criteria has been achieved. - Supporting Documentation, which will vary depending on the pathway chosen as outlined below*. **Supporting documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - WELS certificates for all toilets, urinals, taps, showers, dishwashers, and residential-scale laundry equipment clearly showing the flow rates of each item. - Manufacturer's data for commercial-scale laundry equipment shall be submitted in lieu of WELS certificates. - Tank specification indicating size and location of the rainwater system and the connections to the water end uses. - Landscape/Hydraulics drawings showing either the drip irrigation system, or showing the location of the xeriscape garden. - Extracts from the Fire Engineering Report where it states that the building's fire suppression system has no sprinklers. - Drawing(s) for each typical floor showing isolation valves for floor-by-floor testing of the fire sprinkler system, and drawings of the water storage and re-use system(s).			x		x			x			civil docs	currently on 60kL doc, need 90 alt credit calculator proposed (credit 18A)
18B.3	Water	Potable Water	Heat Rejection	Two (2) points are awarded where no water is used for heat rejection. To comply, the project must be either naturally ventilated (allowing for the use of ceiling fans or similar) or the HVAC system must not use water for heat rejection. To claim that the project is naturally ventilated, it must be demonstrated that the building is naturally ventilated in accordance with AS1668.4-2012 The use of ventilation and air-conditioning in buildings – Part 4: Natural Ventilation of buildings. To claim that no water based heat rejection system is used it must be demonstrated that the air conditioning needs of the project are met by means other than water based heat rejection.	2	2	**Submission Template*** - Summary of how the project meets the credit criteria.* - Details about how each criteria has been achieved. - Supporting Documentation, which will vary depending on the pathway chosen as outlined below*. **Supporting documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - WELS certificates for all toilets, urinals, taps, showers, dishwashers, and residential-scale laundry equipment clearly showing the flow rates of each item. - Manufacturer's data for commercial-scale laundry equipment shall be submitted in lieu of WELS certificates. - Tank specification indicating size and location of the rainwater system and the connections to the water end uses. - Landscape/Hydraulics drawings showing either the drip irrigation system, or showing the location of the xeriscape garden. - Extracts from the Fire Engineering Report where it states that the building's fire suppression system has no sprinklers. - Drawing(s) for each typical floor showing isolation valves for floor-by-floor testing of the fire sprinkler system, and drawings of the water storage and re-use system(s).						x						mechanical design docs	
18B.4	Water	Potable Water	Landscape Irrigation	One (1) point is awarded where either drip irrigation with moisture sensor override is installed, or where no potable water is used for irrigation. The landscaping and associated systems must be designed to reduce the consumption of potable water required for irrigation through the installation of subsoil drip irrigation and moisture sensor controls. In the case of a xeriscape garden, the provision of irrigation systems must be able to be removed within three months of landscaping installation and the landscaping must not require watering after this time.	1	1	**Submission Template*** - Summary of how the project meets the credit criteria.* - Details about how each criteria has been achieved. - Supporting Documentation, which will vary depending on the pathway chosen as outlined below*. **Supporting documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - WELS certificates for all toilets, urinals, taps, showers, dishwashers, and residential-scale laundry equipment clearly showing the flow rates of each item. - Manufacturer's data for commercial-scale laundry equipment shall be submitted in lieu of WELS certificates. - Tank specification indicating size and location of the rainwater system and the connections to the water end uses. - Landscape/Hydraulics drawings showing either the drip irrigation system, or showing the location of the xeriscape garden. - Extracts from the Fire Engineering Report where it states that the building's fire suppression system has no sprinklers. - Drawing(s) for each typical floor showing isolation valves for floor-by-floor testing of the fire sprinkler system, and drawings of the water storage and re-use system(s).			x					x			Landscape docs	
18B.5	Water	Potable Water	Fire System Test Water	One (1) point is awarded when one of the following conditions is met: - The fire protection system does not expel water for testing; or - The fire protection system includes temporary storage for 80% of the routine fire protection system test water and maintenance drain-downs for reuse on-site. If sprinkler systems are installed, each floor must be fitted with isolation valves or shut-off points for floor-by-floor testing.	0	1	Submission Template* - Summary of how the project meets the credit criteria.* - Details about how each criteria has been achieved. - Supporting Documentation, which will vary depending on the pathway chosen as outlined below*. **Supporting documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - WELS certificates for all toilets, urinals, taps, showers, dishwashers, and residential-scale laundry equipment clearly showing the flow rates of each item. - Manufacturer's data for commercial-scale laundry equipment shall be submitted in lieu of WELS certificates. - Tank specification indicating size and location of the rainwater system and the connections to the water end uses. - Landscape/Hydraulics drawings showing either the drip irrigation system, or showing the location of the xeriscape garden. - Extracts from the Fire Engineering Report where it states that the building's fire suppression system has no sprinklers. - Drawing(s) for each typical floor showing isolation valves for floor-by-floor testing of the fire sprinkler system, and drawings of the water storage and re-use system(s).								x				
19A.1	Materials	Life Cycle Impacts	Comparative Life Cycle Assessment	Up to 6 points are available where a whole-of-building, whole-of-life (cradle-to-grave) life cycle assessment (LCA) is conducted for the project and a reference building. Points are awarded based on the extent of environmental impact reduction achieved against environmental impacts categories, when compared to a reference building.	0	n/a target 19b	**Submission Template*** - Points claimed.* - Description of the building.* - Indicating whether an Actual Reference building or Standard Practice reference building has been used.* - Description of the reference building.* - Summary of the impact reducing initiatives that have been included in project design.* - LCA results for the reference building and the project, reporting on all impact categories. LCA results shall be reported per m2 of GFA, and, per expected occupancy hour. - Where the Additional Life Cycle Impact Reporting criterion is claimed, the results for the additional five categories. **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - LCA Report - The LCA report is to be presented in accordance with ISO 14044. The LCA report must confirm the LCA methodology of the credit has been followed and that no impact increases by more than 10% when compared to the reference building score. The peer review statement, comments of the practitioner and any response to recommendations made by the reviewer shall be included in the LCA report. - Peer Review Statement - A peer review statement is a summary of the peer review findings signed by the peer reviewer, it must be clear that the peer reviewer statement refers to the final LCA report for the project, the same report which is submitted for this credit, by reference to specific document versions, dates or other means. - LCA practitioner competencies statement for practitioner and peer reviewer. - Standard Practice Reference Building Documentation - Signed declarations from the principal architect and engineer for the project, confirming that the reference building was constructed in accordance with the specific requirements and guidance of this credit. Also confirming the reference building design, technologies and construction are true representation of contemporary practice for the type and function of the project. - Actual Reference Building Documentation - Signed declarations from the principal architect and engineer for the project, confirming and demonstrating how the reference building meets the specific guidance above.												
19A.2	Materials	Life Cycle Impacts	Additional Life Cycle Impact Reporting	1 additional point is available where the LCA conducted by the project includes reporting of five impact categories in addition to those required under the 'Comparative Life Cycle Assessment' credit element.	0	n/a target 19b	**Submission Template*** - Points claimed.* - Description of the building.* - Indicating whether an Actual Reference building or Standard Practice reference building has been used.* - Description of the reference building.* - Summary of the impact reducing initiatives that have been included in project design.* - LCA results for the reference building and the project, reporting on all impact categories. LCA results shall be reported per m2 of GFA, and, per expected occupancy hour. - Where the Additional Life Cycle Impact Reporting criterion is claimed, the results for the additional five categories. **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - LCA Report - The LCA report is to be presented in accordance with ISO 14044. The LCA report must confirm the LCA methodology of the credit has been followed and that no impact increases by more than 10% when compared to the reference building score. The peer review statement, comments of the practitioner and any response to recommendations made by the reviewer shall be included in the LCA report. - Peer Review Statement - A peer review statement is a summary of the peer review findings signed by the peer reviewer, it must be clear that the peer reviewer statement refers to the final LCA report for the project, the same report which is submitted for this credit, by reference to specific document versions, dates or other means. - LCA practitioner competencies statement for practitioner and peer reviewer. - Standard Practice Reference Building Documentation - Signed declarations from the principal architect and engineer for the project, confirming that the reference building was constructed in accordance with the specific requirements and guidance of this credit. Also confirming the reference building design, technologies and construction are true representation of contemporary practice for the type and function of the project. - Actual Reference Building Documentation - Signed declarations from the principal architect and engineer for the project, confirming and demonstrating how the reference building meets the specific guidance above.												
19B.1	Materials	Life Cycle Impacts	Concrete	**Portland Cement Reduction** Up to 2 points are available where the Portland cement content in all concrete used in the project has been reduced by replacing it with supplementary cementitious materials. 1 point is available where the Portland cement content is reduced by 30%, measured by mass across all concrete used in the project compared to the reference case; OR 2 points are available where the Portland cement content is reduced by 40%, measured by mass across all concrete used in the project compared to the reference case. **Water Reduction** 0.5 point is available where the mix water for all concrete used in the project contains at least 50% captured or reclaimed water (measured across all concrete mixes in the project). **Aggregates Reduction** 0.5 point is available where either: At least 40% of coarse aggregate in the concrete is crushed slag aggregate or another alternative materials (measured by mass across all concrete mixes in the project), provided that use of such materials does not increase the use of Portland cement by over five kilograms per cubic meter of concrete; OR At least 25% of fine aggregate (sand) inputs in the concrete are manufactured sand or other alternative materials (measured by mass across all concrete mixes in the project), provided that use of such materials does not increase the use of Portland cement by over five kilograms	3	2	**Submission Template*** - Description of the uses of concrete in the building*. - Summary of the concrete mixes used in the building and the volume used* - Summary of the amounts of recycled aggregates and recycled water included in the concrete mix* **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Structural Specifications - Structural Drawings - Structural Engineer's report, including: - Summary calculation of the Portland cement content in the project based on the reference case and the actual case as well as showing the percentage reduction of Portland cement. - Identifying all water or coarse or fine aggregate uses in the project and demonstrating how the Credit Criteria is met. - Concrete suppliers submission detailing target mix designs for each product supplied to the project identifying strength grade of the concrete, any special properties associated with each product, quantities and types of Cement, supplementary cementitious materials, water, coarse aggregates and fine aggregates. - Confirmation from the Architect, Quantity Surveyor or Head Contractor that no new concrete is specified in the project; or comparing the cost of concrete specified in the project against the project's total contract value.			x	x						QS	civil and structural notes sheet	

Credit No.	Section	Category	Credit	Brief Discription	Points Available	Points Targeted	Submission Requirements (items marked with * required for design review submission)	Comments	Responsibility: Client	Architect	Structural	Civil	Mechanical	Electrical	Hydraulic	Acoustic	Other	Supporting docs	Items still required
19B.2	Materials	Life Cycle Impacts	Steel	Up to 1 point is available when there is a reduction in the mass of steel framing used when compared to standard practice. Up to 1 point is available when there is a reduction in the mass of steel reinforcement used when compared to standard practice.	1	1	**Submission Template*** - Confirmation of whether the project is targeting Steel Framed Criteria or Reinforcement Criteria* - Summary and percentages of high-strength steel used* - Summary of reduction of mass of structural steel* - Summary of reduction of mass of reinforcing steel* - Details of the qualified professionals that prepared the reference case and mass reduction calculations. **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Steel Quantity Summary produced by the Quantity Surveyor or other qualified professional tabulating uses of steel in the project, its source, specification and mass. - Structural Engineer's or Quantity Surveyors Report demonstrating the reduction in mass of structural steel framing or reinforcing steel in the building. - Summary of steel quantities produced by BIM model. - Drawings supporting claims of optimal fabrication techniques. - Quantities (by mass) of structural and reinforcing steel as percentages of the total steel products installed in the building (structural steel and reinforcing steel only). - Total cost of new steel specified in the project against the project's total contract value and the percentage (by mass) of structural steel framing and steel reinforcement summarised in a report by the Quantity Survey, Project Manager, Cost Planner or other qualified professional.			x	x						QS	Structural design (PT)	
19B.3	Materials	Life Cycle Impacts	Building Reuse	**Facade Reuse** 1 point is available where at least 50% (by area) of the building façade is retained; OR 2 points are available where the proportion retained is 80%. **Structure Reuse** 1 point is available where at least 30% (by mass) of the existing major structure is retained; OR 2 points are available where the proportion retained is 60%.	4	0	**Submission Template*** Description of any structures on the site at time of purchase, or confirmation that the site contained no structures at time of purchase - Description of the façade or major structure that is to be retained* - Statement of percent of façade or major structure that is to be retained* Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Demolition or Site Drawings* Indicating the structures on site at time of purchase, extent of demolition and retained structure and façade.			x									
20.1	Materials	Responsible Building Materials	Structural and Reinforcing Steel	1 point is available where 95% of the building's steel (by mass) is sourced from a Responsible Steel Maker; and A. For steel framed buildings, at least 60% of the fabricated structural steelwork is supplied by a steel fabricator/steel contractor accredited to the Environmental Sustainability Charter of the Australian Steel Institute (ASI); OR B. For concrete framed buildings, at least 60% (by mass) of all reinforcing bar and mesh is produced using energy-reducing processed in its manufacture (measured by average mass by steel maker annually).	1	1	**Submission Template*** - Total mass of steel used in the building - Details of steel that has been sourced from a responsible steel maker* - Details of steel that have been supplied by a responsible steel fabricator* - Percentage of steel reinforcement that has been produced by energy-reducing rocesses* **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Structural drawings - Structural Specifications - Steel Producer's ISO14001 certificate - Details of Steel Fabricators membership of ASI Environmental Sustainability Charter - Product data sheets - Bill of Quantities / Report from Quantity Surveyor / Cost Planner / Project Manager or other qualified professional - Energy-Reducing Processes Report from every reinforcing steel maker, explaining the energy-reducing processes used in their steel making process and confirming that it is used in the production of at least 60% of the reinforcement products they produce on an annual basis. (See Polymer Injection Technology and Equivalency Protocol explanations in Guidance). The report must contain a summary of the life cycle assessment result for this technology in accordance with the Equivalency Protocol. - Confirmation from the Supplier stating, where relevant based on the credit criteria claimed: o That they are a responsible steel maker, and listing their compliance documentation. o The total quantities (by mass) of structural and/or reinforcing steel supplied to the building.				x							Structural notes sheet	
20.2	Materials	Responsible Building Materials	Timber Products	1 point is available where at least 95% (by cost) of all timber used in the building and construction works is either: A. Certified by a forest certification scheme that meets the GBCA's 'Essential' criteria for forest certification; OR B. Is from a reused source.	1	1	**Submission Template*** - Completed timber schedule* - Completed PVC schedule* **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Structural drawings - Structural Specifications - Product data sheets - Invoices confirming types of timber products - Bill of Quantities / Report from Quantity Surveyor / Cost Planner / Project Manager or other qualified professional			x	x							Architectural spec	
20.3	Materials	Responsible Building Materials	Permanent Formwork, Pipes, Flooring, Blinds and Cables	1 point is available where 90% (by cost) of all permanent formwork, pipes, flooring, blinds and cables in a project either; A. Do not contain PVC and have an Environmental Product Declaration (EPD); OR B. Meet Best Practice Guidelines for PVC.	1	1	**Submission Template*** - Completed PVC schedule* **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Drawings - Specifications - Details of Steel Fabricators membership of ASI Environmental Sustainability Charter - Product data sheets - Invoices confirming types of PVC products - Bill of Quantities / Report from Quantity Surveyor / Cost Planner / Project Manager or other qualified professional			x	x	x	x	x	x	x		Arch spec section 0171 clause 4 mech spec clauses 2.1, 11.4, 16.10 hyd spec elec spec	
21.1	Materials	Sustainable Products	Product Transparency and Sustainability	Up to 3 points are available when a proportion of all materials used in the project meet transparency and sustainability requirements under one of the following initiatives: A. Reused Products; B. Recycled Content Products; C. Environmental Product Declarations; D. Third-Party Certification; or E. Stewardship Programs. Points are calculated based on specified benchmarks for the percentage of compliant products used in the project.	3	1	**Submission Template*** - Description of the sustainable products that are specified for the project* - Project Cost* - Value of compliant products as calculated in the Sustainable Products Calculator - Description of the sustainable products that are included in project **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance. - Confirmation of Project Cost from quantity surveyor or other qualified professional - Confirmation from supplier that products supplied are recycled, recycled content and cost - Product Certification Certificate outlining the environmental credentials of the product - Quantity Surveyors Report or other evidence of cost of certified products - Environmental Product Declarations certificates - Completed Sustainable Products Calculator*			x	x	x	x	x	x	x		head contract	
22A	Materials	Construction and Demolition Waste	Fixed Benchmark	1 point is available where the construction waste going to landfill is reduced by either: A. Minimising the total amount of waste sent to landfill when compared against a typical building; OR B. Diverting a significant amount of waste from going to landfill as a proportion of waste generated.	-	n/a targeting 22b	**Submission Template*** - Summary of waste management plan for the construction works* - Details of the Waste Contractor - Weight of waste generated from construction and demolition works - Weight of waste sent to landfill - Where volume to weight conversion is applicable, provide confirmation that the prescribed conversion factors have been used or details of the calculations Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Demolition or Site Drawings* - Indicating the structures on site at time of purchase, extent of demolition and retained structure and façade. - Waste Report - The cumulative waste report must be generated from the monthly waste reports provided by the waste contractor over the entire duration of construction and demolition works. The monthly reports and supporting waste disposal dockets do not need to be included in the credit submission. - Compliance Verification - Summary Compliance verification summaries from waste contractor(s) and waste processing facilities as detailed in the Green Star Construction and Demolition Waste Management Operational and Reporting Criteria - Auditor Verification Guidance document. - Disclosure Statement – from waste contractor(s) outlining how much of the reporting criteria (from the Green Star Construction and Demolition Waste Management Operational and Reporting Criteria - Auditor Verification Guidance document) has been implemented by the Waste Contractor. This statement must also indicate the expected timeline fro implementation of at least Part 1 of the Waste Contractors section of the reporting criteria.												
22B	Materials	Construction and Demolition Waste	Percentage Benchmark	1 point is available where the construction waste going to landfill is reduced by either: A. Minimising the total amount of waste sent to landfill when compared against a typical building; OR B. Diverting a significant amount of waste from going to landfill as a proportion of waste generated.	1	1	**Submission Template*** - Summary of waste management plan for the construction works* - Details of the Waste Contractor - Weight of waste generated from construction and demolition works - Weight of waste sent to landfill - Where volume to weight conversion is applicable, provide confirmation that the prescribed conversion factors have been used or details of the calculations Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Demolition or Site Drawings* - Indicating the structures on site at time of purchase, extent of demolition and retained structure and façade. - Waste Report - The cumulative waste report must be generated from the monthly waste reports provided by the waste contractor over the entire duration of construction and demolition works. The monthly reports and supporting waste disposal dockets do not need to be included in the credit submission. - Compliance Verification - Summary Compliance verification summaries from waste contractor(s) and waste processing facilities as detailed in the Green Star Construction and Demolition Waste Management Operational and Reporting Criteria - Auditor Verification Guidance document. - Disclosure Statement – from waste contractor(s) outlining how much of the reporting criteria (from the Green Star Construction and Demolition Waste Management Operational and Reporting Criteria - Auditor Verification Guidance document) has been implemented by the Waste Contractor. This statement must also indicate the expected timeline fro implementation of at least Part 1 of the Waste Contractors section of the reporting criteria.			x		x							arch spec	
23	Land Use & Ecology	Ecological Value	Endangered, Threatened or Vulnerable Species	To meet the minimum requirement for this credit, the project must demonstrate that no critically endangered, endangered, or vulnerable species, or ecological communities were present on the site at time of purchase.	-	Complies	**Submission Template** - Date of site purchase* - Confirmation that no critically endangered, endangered, or vulnerable species or ecological communities were present on the site at time of purchase* - Description of the site at purchase and as built* - Description of how the ecological value of the site has been improved* **Ecological Value Calculator*** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Proof of Date of Purchase* - DA Approval Report confirming that no vulnerable or endangered species or ecological communities are present on the site - Ecologist's Report confirming that no vulnerable or endangered species or ecological communities are present on the site, or confirming the Land Types found on site - Site Plans marked up with land type regions - Aerial Site Photographs marked up with land type regions - Landscape Drawings and Specifications showing types of planting, hard-standing, waterbodies, etc.		x										

									Responsibility											
Credit No.	Section	Category	Credit	Brief Discription	Points Avaliable	Points Targeted	Submission Requirements (items marked with * required for design review submission)	Comments	Client	Architect	Structural	Civil	Mechanical	Electrical	Hydraulic	Acoustic	Other	Supporting docs	Items still required
23.1	Land Use & Ecology	Ecological Value	Ecological Value	Up to 3 points are awarded where the ecological value of the site is improved by the project. The number of points awarded is determined by the Ecological Value Calculator based on a comparison of the condition of the site before and after design/construction.	3	1	**Submission Template** - Date of site purchase* - Confirmation that no critically endangered, endangered, or vulnerable species or ecological communities were present on the site at time of purchase* - Description of the site at purchase and as built* - Description of how the ecological value of the site has been improved* **Ecological Value Calculator*** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Proof of Date of Purchase* - DA Approval Report confirming that no vulnerable or endangered species or ecological communities are present on the site - Ecologist's Report confirming that no vulnerable or endangered species or ecological communities are present on the site, or confirming the Land Types found on site - Site Plans marked up with land type regions - Aerial Site Photographs marked up with land type regions - Landscape Drawings and Specifications showing types of planting, hard-standing, waterbodies, etc.		x									ecological value calculator	
24	Land Use & Ecology	Sustainable Sites	Conditional Requirement	The Conditional Requirement is met where, at the date of site purchase or date of option contract, the project site did not include old growth forest or wetland of 'High National Importance', or did not impact on 'Matters of National Significance'.	-	Complies	**Submission Template*** - Date of purchase* - Description of the site at the time of purchase or date of option contract* - Statement of confirmation that the site meets the conditional requirements* - Percentage of the site that was Previously Developed Land at the time of purchase or time of Green Star Registration* - Description of the contamination found on site* - Details of the types of development that were precluded from the site due to the contamination* - Description of the decontamination procedures and how this demonstrates best practice* - Confirmation that the site has been decontaminated - Description of hazardous materials that have been found on site - Description of the hazardous materials management plan - Description of stabilisation and/or removal and disposal methods used for the hazardous materials found. Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Extracts from the Development Application - Zoning Plans - Wetland Management Plan - CV of Ecologist - As Built Drawings showing the areas that were Previously Developed Land at the time of purchase or Green Star Registration - Aerial Photographs showing the areas that were Previously Developed Land at the time of purchase or Green Star Registration - Contamination Report OR Site Assessment - Completed in line with National Environment Protection Measure (NEPM) guidelines; - Current at the time of site purchase or otherwise reflective of the site condition at the time of purchase; and - Clearly documenting the contamination present on the site and confirming this contamination precludes the development. - Certificate from the environmental auditor or relevant authority confirming that the site has been correctly and appropriately decontaminated in accordance with the relevant state and federal legislation, dated prior to the commencement of the construction phase of the project.		x	x									
24.1	Land Use & Ecology	Sustainable Sites	Reuse of Land	1 point is available where 75% of the site was Previously Developed Land at the date of site purchase or (for previously owned land) at the project's Green Star registration date.	1	1	**Submission Template*** - Date of purchase* - Description of the site at the time of purchase or date of option contract* - Statement of confirmation that the site meets the conditional requirements* - Percentage of the site that was Previously Developed Land at the time of purchase or time of Green Star Registration* - Description of the contamination found on site* - Details of the types of development that were precluded from the site due to the contamination* - Description of the decontamination procedures and how this demonstrates best practice* - Confirmation that the site has been decontaminated - Description of hazardous materials that have been found on site - Description of the hazardous materials management plan - Description of stabilisation and/or removal and disposal methods used for the hazardous materials found. Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Extracts from the Development Application - Zoning Plans - Wetland Management Plan - CV of Ecologist - As Built Drawings showing the areas that were Previously Developed Land at the time of purchase or Green Star Registration - Aerial Photographs showing the areas that were Previously Developed Land at the time of purchase or Green Star Registration - Contamination Report OR Site Assessment - Completed in line with National Environment Protection Measure (NEPM) guidelines; - Current at the time of site purchase or otherwise reflective of the site condition at the time of purchase; and - Clearly documenting the contamination present on the site and confirming this contamination precludes the development. - Certificate from the environmental auditor or relevant authority confirming that the site has been correctly and appropriately decontaminated in accordance with the relevant state and federal legislation, dated prior to the commencement of the construction phase of the project.		x	x								Arch site plans	
24.2	Land Use & Ecology	Sustainable Sites	Contamination and Hazardous Materials	1 point is available where the site, or an existing building, was previously contaminated and the site has been remediated in accordance with a best practice remediation strategy.	1	1	**Submission Template*** - Date of purchase* - Description of the site at the time of purchase or date of option contract* - Statement of confirmation that the site meets the conditional requirements* - Percentage of the site that was Previously Developed Land at the time of purchase or time of Green Star Registration* - Description of the contamination found on site* - Details of the types of development that were precluded from the site due to the contamination* - Description of the decontamination procedures and how this demonstrates best practice* - Confirmation that the site has been decontaminated - Description of hazardous materials that have been found on site - Description of the hazardous materials management plan - Description of stabilisation and/or removal and disposal methods used for the hazardous materials found. Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Extracts from the Development Application - Zoning Plans - Wetland Management Plan - CV of Ecologist - As Built Drawings showing the areas that were Previously Developed Land at the time of purchase or Green Star Registration - Aerial Photographs showing the areas that were Previously Developed Land at the time of purchase or Green Star Registration - Contamination Report OR Site Assessment - Completed in line with National Environment Protection Measure (NEPM) guidelines; - Current at the time of site purchase or otherwise reflective of the site condition at the time of purchase; and - Clearly documenting the contamination present on the site and confirming this contamination precludes the development. - Certificate from the environmental auditor or relevant authority confirming that the site has been correctly and appropriately decontaminated in accordance with the relevant state and federal legislation, dated prior to the commencement of the construction phase of the project.	asbestos in existing buildings	x	x								GC21 contract requirement	
25	Land Use & Ecology	Heat Island Effect	Heat Island Effect Reduction	1 point is available where at least 75% of the total project site area comprises building or landscaping elements that reduce the impact of the heat island effect.	1	0	**Submission Template*** - Summary of how the project meets the credit criteria* - Percentage of the site area that meets the requirements of the credit* Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Site Plan highlighting all relevant areas as referenced within the area schedule*. - Area Schedule listing the areas of each of the relevant site elements and where relevant, the SRI values and referencing plan drawings for the site (highlighting relevant areas) and supplier documentation*. - Supplier Documentation. Material data sheet for compliant roofing and hardscape materials highlighting the three year or initial SRI for the product, as applicable.			x								arch plans	possible credit, Rating extents also to be determined as part of registration process
26.1	Emissions	Stormwater	Reduced Peak Discharge	1 point is available where the post-development peak event discharge from the site does not exceed the pre-development peak event discharge.	1	1	**Submission Template*** - Description of the site before development.* - Summary of the initiatives in place to reduce peak flows and reduce pollution.* - Pre- and post-development peak ARI. - Pollution reduction achieved. Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate credit compliance. - Calculation/Modelling Report by a civil engineer, hydraulic engineer or other qualified professional. The report should describe: - Software or calculation methods used. - Data sets and tables that were applied. - Sizing of all stormwater treatment systems installed. - Quantity of stormwater discharge to be addressed by each stormwater treatment system (annually). - Comparing the results of the pollutant export modelling/calculations with the Pollution Reduction Targets in the relevant column of Table 26.2. - If relevant, summarising how hydrocarbons and free oils have been addressed. - Civil/Hydraulics drawings showing the stormwater collection, storage and treatment facilities and detailing their functional elements - Hydraulics drawings showing all the capture, storage, piping and discharge route. - Site plans showing the total areas of uncovered areas where vehicles are likely to transit and/or park (e.g. roads, loading docks, refuelling bays, and car parking, etc). - Independently verified performance certification for each manufactured stormwater treatment device, proving its ability to achieve the Pollution Reduction Targets nominated in Table 26.2 Column A.					x			x			civil plans	
26.2	Emissions	Stormwater	Reduced Pollution Targets	1 additional point is available, where the first point has been achieved and all stormwater discharged from site meets specified Pollution Reduction Targets.	1	0	**Submission Template*** - Description of the site before development.* - Summary of the initiatives in place to reduce peak flows and reduce pollution.* - Pre- and post-development peak ARI. - Pollution reduction achieved. Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate credit compliance. - Calculation/Modelling Report by a civil engineer, hydraulic engineer or other qualified professional. The report should describe: - Software or calculation methods used. - Data sets and tables that were applied. - Sizing of all stormwater treatment systems installed. - Quantity of stormwater discharge to be addressed by each stormwater treatment system (annually). - Comparing the results of the pollutant export modelling/calculations with the Pollution Reduction Targets in the relevant column of Table 26.2. - If relevant, summarising how hydrocarbons and free oils have been addressed. - Civil/Hydraulics drawings showing the stormwater collection, storage and treatment facilities and detailing their functional elements - Hydraulics drawings showing all the capture, storage, piping and discharge route. - Site plans showing the total areas of uncovered areas where vehicles are likely to transit and/or park (e.g. roads, loading docks, refuelling bays, and car parking, etc). - Independently verified performance certification for each manufactured stormwater treatment device, proving its ability to achieve the Pollution Reduction Targets nominated in Table 26.2 Column A.	Possible point, will require additional modelling				x			x				

									Responsibility											
Credit No.	Section	Category	Credit	Brief Discription	Points Avaliable	Points Targeted	Submission Requirements (items marked with * required for design review submission)	Comments	Client	Architect	Structural	Civil	Mechanical	Electrical	Hydraulic	Acoustic	Other	Supporting docs	Items still required
27	Emissions	Light Pollution	Light Pollution to Neighbouring Bodies	For the project to be awarded a point for this credit, the project must comply with AS 4282:1997 Control of the Obtrusive Effects of Outdoor Lighting.	-	Complies	**Submission Template*** - Description of how the credit criteria have been met* - Confirmation that the lighting has been designed in accordance with AS 4282 - Confirmation that the no external luminaire has an Upward Light Output Ratio that exceeds 5%; or - Confirmation that Direct illuminance from external luminaries produces a maximum initial point illuminance value no greater than 0.5 Lux to the site boundary and no greater than 0.1 Lux to 4.5 metres beyond the site into the night sky **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - As Built drawings indicating the location of all external luminaires and showing the aiming point and mounting orientation of all external luminaires. - Luminaire schedule for all external lighting, nominating the type, lighting distribution and quantity of each luminaire and including the relevant photometric data showing that the luminaires do not have an upward light output ratio that exceeds 5%. - Calculation Plots for all external lighting, showing that all grid points on the calculation plane return a maximum reading of 0.5 Lux to the site boundary and no greater than 0.1 Lux to 4.5m beyond the site into the night sky.			x				x					
27.1	Emissions	Light Pollution	Light Pollution to Night Sky	1 point is available where it can be demonstrated that a specified reduction in light pollution has been achieved by the project. Two options are available for demonstrating a reduction in light pollution.	1	1	**Submission Template*** - Description of how the credit criteria have been met* - Confirmation that the lighting has been designed in accordance with AS 4282 - Confirmation that the no external luminaire has an Upward Light Output Ratio that exceeds 5%; or - Confirmation that Direct illuminance from external luminaries produces a maximum initial point illuminance value no greater than 0.5 Lux to the site boundary and no greater than 0.1 Lux to 4.5 metres beyond the site into the night sky **Supporting Documentation** Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - As Built drawings indicating the location of all external luminaires and showing the aiming point and mounting orientation of all external luminaires. - Luminaire schedule for all external lighting, nominating the type, lighting distribution and quantity of each luminaire and including the relevant photometric data showing that the luminaires do not have an upward light output ratio that exceeds 5%. - Calculation Plots for all external lighting, showing that all grid points on the calculation plane return a maximum reading of 0.5 Lux to the site boundary and no greater than 0.1 Lux to 4.5m beyond the site into the night sky.			x				x				electrical lighting layouts and fixture schedule	
28	Emissions	Microbial Control	Legionella Impacts from Cooling Systems	1 point is available where: - The building is naturally ventilated; or - The building has waterless heat-rejection systems; or - The building has water-based heat rejection systems that includes measures for Legionella control and Risk Management.	1	1	**Submission Template*** - Description of the building's cooling systems* - For water based heat rejection systems a description of Legionella mitigation measures, including system design, system maintenance program and the following issues*; - The operating temperature range of the system - How the system avoids creating an aerosol spray - A summary of how the system prevents water stagnation - Description of the maintenance process for the system Project teams shall provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Drawings indicating the type and location of all components containing refrigerants and their heat rejection methods. - Legionella Risk Management Plan demonstrating compliance with AS/NZS 3666.2:2011 or AS/NZ 3666.3:2011 and the Victorian Public Health and Wellbeing Act 2008; showing the inspection and maintenance periods; and outlining the requirements for flushing and cleaning when the system(s) are not in operation. - Extract(s) from the Commissioning Report demonstrating that the air-conditioning system(s) has been commissioned and found to operate as intended by the design. Where the refrigeration equipment does not use a water based heat rejection system to demonstrate compliance with the Legionella criterion.						x					Mechanical design	
29	Emissions	Refrigerant Impacts	Refrigerants Impacts	1 point is awarded where one of the following criteria is achieved: - The combined Total System Direct Environmental Impact (TSDEI) of the refrigerant systems in the building is less than 15; or - The combined TSDEI of the refrigerant systems is between 15 and 35, AND a leak detection system [with automated refrigerant recovery is in place][R1.29.01; or - All refrigerants in the project have an ozone depletion potential of zero, and a global warming potential of 10 or less; or - Where there are no refrigerants employed by nominated building systems, this point is awarded.	1	0	**Submission Template*** - List of nominated systems to be included in the credit clearly outlining refrigeration equipment.* - Summary of the building commissioning plan, clearly outlining refrigeration equipment. - Confirmation that the building commissioning has taken place according to the plan. Completed Impacts from Refrigerants Calculator Project teams are required to provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance: - Extract(s) from the Commissioning Report demonstrating that comprehensive precommissioningactivities and commissioning activities have been performed as outlined in the Compliance Requirements. The relevant sections must be highlighted. - Refrigeration System Data Sheets outlining system attributes including refrigeration type, capacity, charge rate and other data required for the Impacts from Refrigerants Calculator.						x						
30A	Innovation	Innovative Technology or Process	Innovative Technology or Process	The project meets the aims of an existing credit using a technology or process that is considered innovative in Australia or the world.	10 for all innovation	0	**Submission Template*** - Nominating which innovation categories are being targeted by the project * - A description of the initiatives that are to be considered under the innovation category* Project teams shall provide documentation supporting their innovation claims. This may be in the form of any of the GBCA's accepted list of evidence and must demonstrate the benefits of the initiative and how it can be deemed innovative.		x	x	x	x	x	x	x	x				
30B	Innovation	Market Transformation	Market Transformation	The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in Australia or in the world.	10 for all innovation	0	**Submission Template*** - Nominating which innovation categories are being targeted by the project * - A description of the initiatives that are to be considered under the innovation category* Project teams shall provide documentation supporting their innovation claims. This may be in the form of any of the GBCA's accepted list of evidence and must demonstrate the benefits of the initiative and how it can be deemed innovative.		x	x	x	x	x	x	x	x				
30C	Innovation	Improving on Green Star Benchmarks	Improving on Green Star Benchmarks	The project has achieved full points in a Green Star credit and demonstrates a substantial improvement on the benchmark required to achieve full points. For credits where this innovation credit criterion is applicable, improved benchmarks are included in the 'Guidance' section of the credit.	10 for all innovation	0	**Submission Template*** - Nominating which innovation categories are being targeted by the project * - A description of the initiatives that are to be considered under the innovation category* Project teams shall provide documentation supporting their innovation claims. This may be in the form of any of the GBCA's accepted list of evidence and must demonstrate the benefits of the initiative and how it can be deemed innovative.		x	x	x	x	x	x	x	x				
30D	Innovation	Innovation Challenge	Innovation Challenge	Where the project addresses a sustainability issue not included within any of the Credits in the existing Green Star rating tools, projects may propose a new Innovation Challenge. Alternatively, the project can use an existing Innovation Challenge that is published on the GBCA website	10 for all innovation	4	**Submission Template*** - Nominating which innovation categories are being targeted by the project * - A description of the initiatives that are to be considered under the innovation category* Project teams shall provide documentation supporting their innovation claims. This may be in the form of any of the GBCA's accepted list of evidence and must demonstrate the benefits of the initiative and how it can be deemed innovative.	Current Challenges inculdes: - Local procurement (2 points) - Cultural significant design elements - Inovative learning elements incorperated in design	x	x	x	x	x	x	x	x		head contract and arch docs	
30E	Innovation	Global Sustainability	Global Sustainability	Project teams may adopt an approved credit from a Global Green Building Rating tool that addresses a sustainability issue that is currently outside the scope of this Green Star rating tools. A list of approved credits is published on the GBCA website.	10 for all innovation	0	**Submission Template*** - Nominating which innovation categories are being targeted by the project * - A description of the initiatives that are to be considered under the innovation category* Project teams shall provide documentation supporting their innovation claims. This may be in the form of any of the GBCA's accepted list of evidence and must demonstrate the benefits of the initiative and how it can be deemed innovative.		x	x	x	x	x	x	x	x				