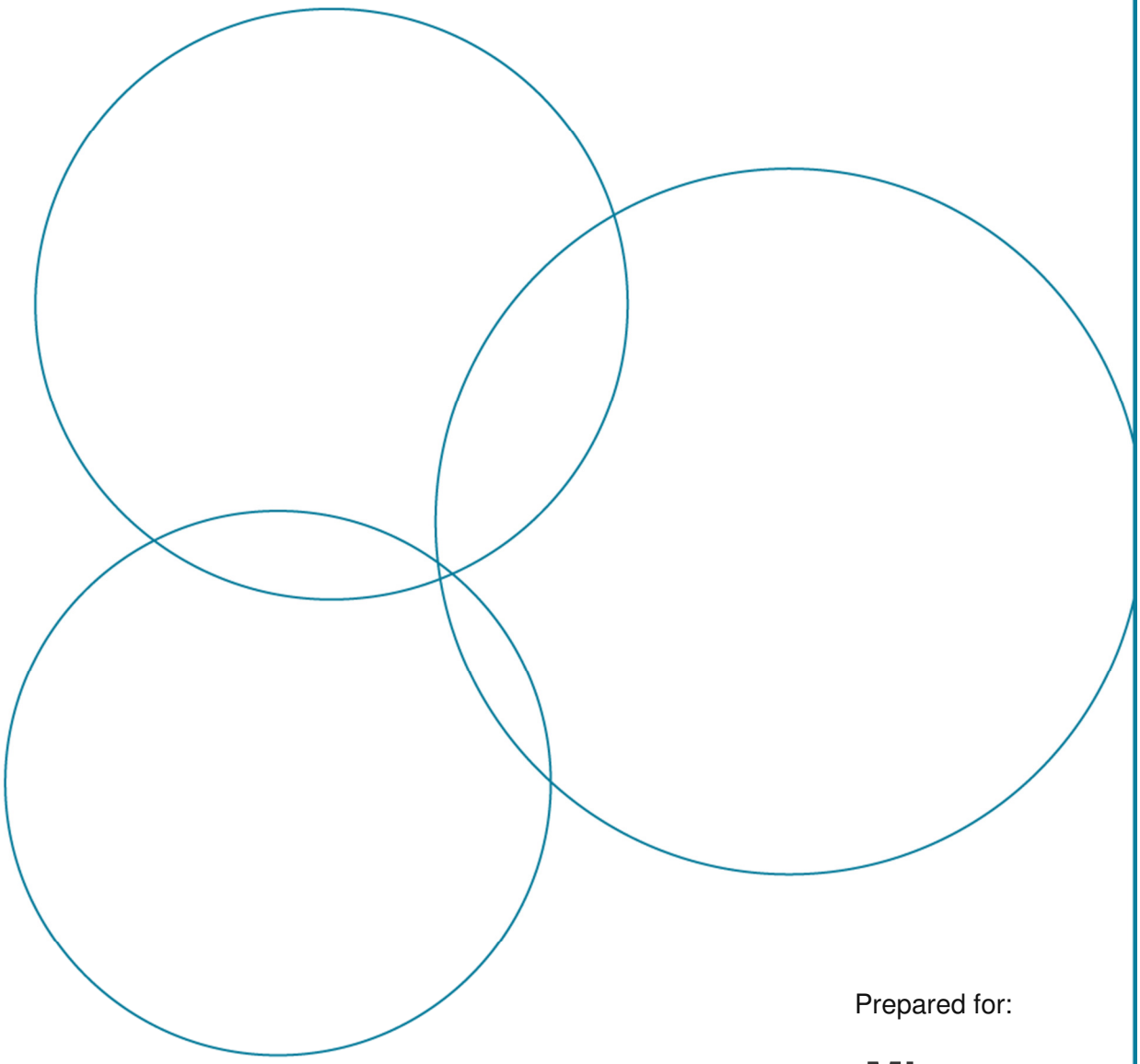
9/06/2015

ESD Report

1011356 60 Wallgrove Road, Eastern Creek



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Revision	**Description**	**Date**
A	Draft report	08/04/2015
B	Revised layout	17/04/2015
C	BCA J1 and J2 added	30/05/2015
D	Dock offices added to BCA J1 and J2	9/06/2015

The success and realisation of the proposed initiatives will be dependent upon the commitment of the design team, the development of the initiatives through the life of the design and also the implementation into the operation of the building. Without this undertaking the proposed targets may not be achieved.

Contents

Executive Summary

This report provides a summary of the Environmentally Sustainable Design (ESD) initiatives proposed for Lots 1 to 5 of the 60 Wallgrove Road light industrial development in Eastern Creek.

Each lot comprises warehouse space with ancillary spaces such as offices and other facilities required for operations. The space types within each lot are identified below;

Lot 1

- Site area 34,835m^2
- Industrial warehouse 18,020m^2
- Office space 1,305m^2

Lot 2

- Site area 30,168m^2
- Industrial warehouse 16,065m^2
- Office space 915m^2

Lot 3

- Site area 35,964m^2
- Industrial warehouse 21,615m^2
- Office space 1,020m^2

Lot 4

- Site area 64,928m^2
- Industrial warehouse 40,660m^2
- Office space 1,540m^2

Lot 5

- Site area 42,998m^2
- Industrial warehouse 21,575m^2
- Office space 1,150m^2

Sustainability has been considered in the design, major initiatives include:

- Consider passive design to minimise energy use such as orientation, ventilation, shading and floor plate design
- Implement energy saving initiatives with a payback of less than 5 years including high efficiency lighting and HVAC
- Appropriate sizing of building services plant and equipment
- Rainwater harvesting for toilet flushing, irrigation and washdown
- 80% construction waste recycling target
- Consider reducing concrete and steel through use of a jointless fibre reinforced slab and precast concrete panels in places
- Addressing minimum compliance in the form of BCA Section J

1 Introduction

This ESD report presents the proposed ecologically sustainable development (ESD) initiatives for the light industrial development at 60 Wallgrove Road, Eastern Creek.

Each lot comprises warehouse space with ancillary spaces such as offices and other facilities required for operations. The space types within each lot are identified below;

Lot 1

- Site area 34,835m^2
- Industrial warehouse 18,020m^2
- Office space 1,305m^2

Lot 2

- Site area 30,168m^2
- Industrial warehouse 16,065m^2
- Office space 915m^2

Lot 3

- Site area 35,964m^2
- Industrial warehouse 21,615m^2
- Office space 1,020m^2

Lot 4

- Site area 64,928m^2
- Industrial warehouse 40,660m^2
- Office space 1,540m^2

Lot 5

- Site area 42,998m^2
- Industrial warehouse 21,575m^2
- Office space 1,150m^2

It is intended that the ESD initiatives facilitate the achievement of the Secretary's Environmental Assessment in the State Significant Development Application (SSDA):

- Reduce potable water consumption
- Reduce greenhouse gas emissions

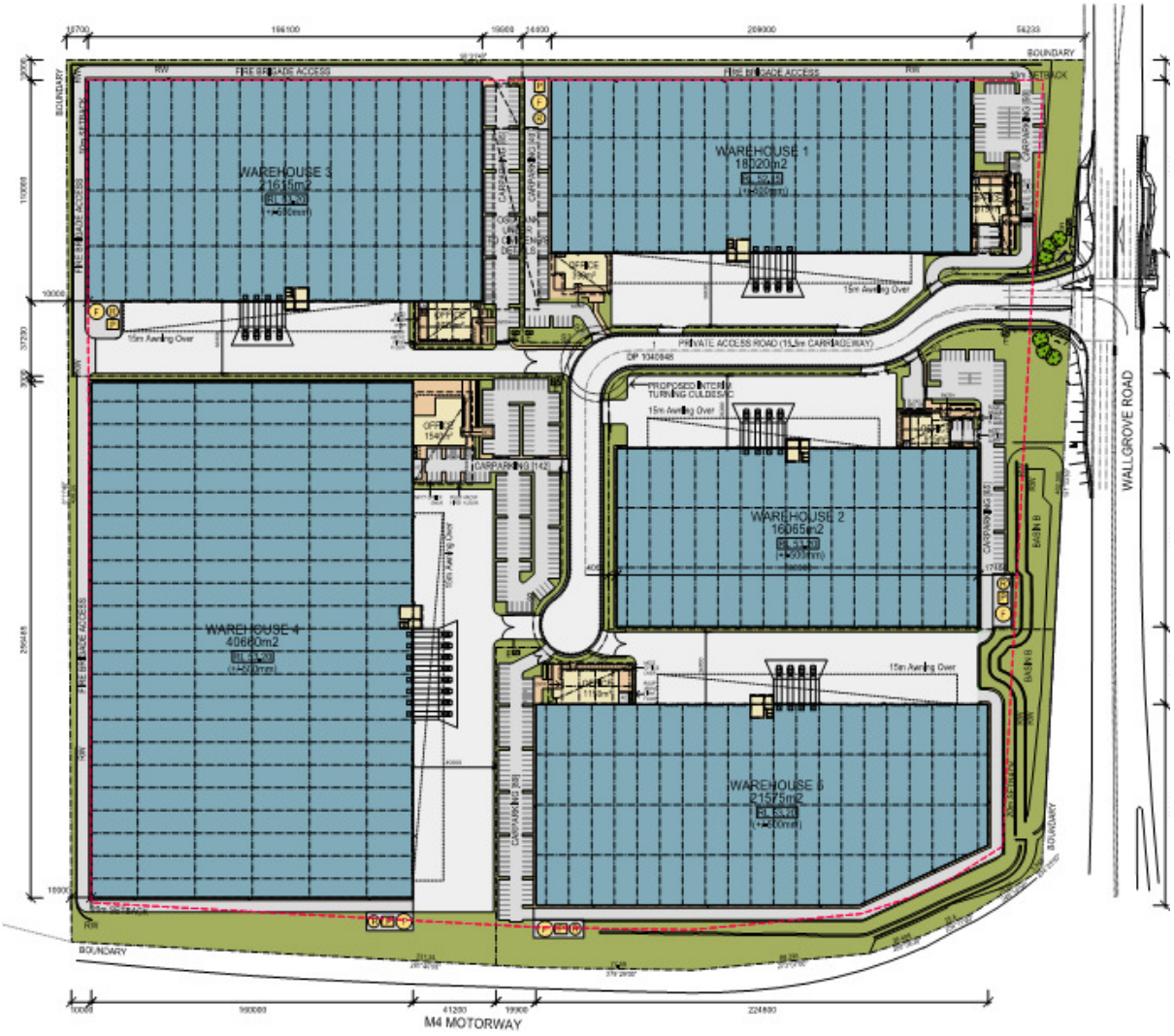


Figure 1 - 60 Wallgrove Road, Eastern Creek site plan

1 Environmentally Sustainable Design (ESD)

1.1 Proposed Facility

Sustainability has been considered during design of the project and it is intended that the facility will employ best practice design for sustainable industrial facilities.

The development is located within close proximity by car to both the M7 and M4 motorways, enabling excellent access to transport hubs reducing traffic congestion, and associated local air pollution on local roads.

As well as reducing energy and carbon emissions, the project identifies a number of ESD initiatives that are proposed to be addressed in the design. These include indoor environmental quality (IEQ), materials, waste, water, transport, ecology and social sustainability.

These initiatives allow the environmental impact of the development to be reduced, as well as improved occupant amenity, reduced indirect impacts through materials extraction, manufacture and transport.

Through the proposed ESD initiatives the project will achieve the sustainability objectives. Additionally, measures are to be considered and implemented to reduce resources, energy and water consumption.

This report identifies ways in which the proposed development addresses the ecological sustainability and the Secretary's Requirements.

2 ESD Initiatives and Strategies

The following section identifies ESD objectives, proposed targets related to the objective and strategies that are being considered or being implemented in order to meet these targets:

Objective	Proposed Target	Proposed Strategy
Design and management • Documentation of design intent and expected outcomes • Appropriate commissioning	• Communicate sustainability initiatives and operation to building users • Commissioning and building tuning required by contractors and reviewed for 12 months after completion	• Provision of a building users guide • Investigate costs and viability of commissioning and building tuning requirements and appointing an independent commissioning agent • Independent consultant to perform quarterly tuning of fire, mechanical, electrical, hydraulic services
Facade Performance • Optimised facade performance	• Achieve minimum performance requirements under NCC Section J1 and J2 • Reduce heat gain through the warehouse facade	• Meet or exceed NCC Section J1 and J2 facade performance for conditioned spaces • Light coloured roofing with high reflectivity and appropriate insulation to reduce solar heat gain into the warehouse • Performance glazing in office spaces appropriate to the window size and orientation
Social sustainability • Consider design with due regard to occupant satisfaction in accessibility, usability, Indoor air quality and public space utility	• High level of occupant satisfaction • Provide external as well as internal comfort	• High level of indoor environmental quality (see following section) • Flexibility of space for potential future configurations • Consider occupant surveys to track user satisfaction • Provide shading to the outdoor courtyard areas • Lots 3 and 4 - Consider using dense planting to screen the outdoor areas from the docks to increase visual and acoustic amenity. • Consider occupant user control eg A/C systems, glare reducing strategies, lighting etc

Objective	Proposed Target	Proposed Strategy
Minimising Transport Impact • Consider location with links to public transport and employee services • Consider location to reduce operational transport • Consider the impact of industrial trucks on local traffic	• Reward drivers of fuel efficient vehicles by providing spaces for small cars and or motorbikes • Provide alternatives to single-occupancy vehicles • Reduce operational fuel consumption through close proximity to major arterial roads. • Reduce the impact of operational traffic on local communities	• Consider providing up to 10% of total parking spaces for small cars and 5% for motorbikes situated near the office entrance • Lot 1 - Cars 5, motorcycles 3 • Lot 2 - Cars 7, motorcycles 4 • Lot 3 - Cars 9, motorcycles 5 • Lot 4 - Cars 14, motorcycles 7 • Lot 5 - Cars 9, motorcycles 5 • Transport management plan based on staff surveys; implement car pooling, car-share etc • Due to the location of the site, it is considered that staff bicycle riding will be unlikely, although if staff surveys indicate a preference for cycling, consider appropriate amenities • The site is located within close proximity (<5km) to both the M7 and M4 motorways • The site is serviced by bus routes 728 and 738 linking Rooty Hill and Mount Druitt train stations. • The roads linking the site to the motorways are predominantly used for industrial traffic, as such the traffic is unlikely to impact on local areas

Objective	Proposed Target	Proposed Strategy
Optimising IEQ • Optimise natural light to work environment • Optimise fresh air ventilation • Consider Thermal Comfort of occupants • Consideration of noise transference in space planning • Minimise use of materials that emit volatile organic compounds • Create a pleasant working environment	• Daylight: Daylight Factor (DF) of at least 2% at finished floor level under a uniform sky for at least 60% of the GLA. • Thermal comfort: 95% of office areas have PMV levels between -1 and +1 for 98% of the year; Warehouse spaces include passive thermal comfort strategies • Finishes: 95% of all paints, adhesives & sealants and all carpet and flooring to be low-VOC finishes; use low-formaldehyde wood products • Electric lighting levels: 95% of GLA has a lighting system that is flicker free and has a maintained illuminance of no more than 25% above those recommended in AS1680.2.4, 2.1 and 0.1 • Reduce visual glare	• Daylight: rationalised glazing to offices; high performance glass where required • Daylight: evenly spaced translucent roof sheeting to warehouses areas • Thermal comfort: Office envelope and HVAC system designed to meet thermal comfort requirements; for warehouse areas consider whirly birds and fans for heat reduction • Provide R1.5 roof insulation to the warehouse and consider insulation to the inside face of the warehouse walls • Finishes: Specify and track correct finishes and wood products • Provide pleasant indoor and outdoor breakout spaces with sufficient daylight and plants • Lighting: Good light fixtures and well-designed layout • Ventilation: Consider increased fan and duct sizing Additionally: • Install eco-certified workstations (eg GECA or Ecospecifier) • Provide sufficient shading and blinds with rationalised glazing for visual and thermal comfort

Objective	Proposed Target	Proposed Strategy
Minimising Energy Use • Consider passive design to minimise energy use such as orientation, ventilation, shading and floor plate design. • Appropriate sizing of plant and equipment in heating and cooling, lighting, control systems, • Building management systems and renewable energy sources • Reduce reliance on connection to grid electricity and gas	• Target a 20% reduction in Greenhouse gas emissions over base case energy as calculated in section 2.1 • Energy sub-metering for all major uses greater than 100kVa; linked to monitoring system • High efficiency warehouse lighting and controls • Reduce energy for water heating • Integrated building management • Consider renewable energy generation for a portion of energy consumption and/or consider future-proofing the building for future installation • Reduce urban heat island effect and heat load through the roof by providing a highly reflective roof • Optimise insulation for energy and thermal comfort	• North and east facing offices - Consider additional shading or solar controlled glazing to reduce heat transfer into the office space • For predominantly south facing office space consider insulated spandrel panels to reduce the glazing area and associated heat loss in winter • Allow high-level ventilation openings to warehouse spaces • Consider office air conditioning temperature set-points for an increased comfort band • Provide energy efficient T5 lighting, with zoning and automatic controls where reasonable • Consider LED lighting strategies and advanced controls • Consider a solar water system with gas boost • Consider solar photovoltaic panels or allow upgraded roof structure for potential future installation • Install appropriate metering; develop metering and tracking strategy to allow for self-assessment, problem solving and ongoing improvements • BMS linked to metering, operations and ongoing tracking • Use roofing material that has a high Solar Reflective Index

Objective	Proposed Target	Proposed Strategy
Choosing Materials • With consideration to energy inputs in manufacture • Toxicity • Consequential impacts – rain forest timbers • Regional or local manufacturer employment support	• Reduce steel and cement in internal slab (10% reduction in embodied energy) • Reduce embodied energy in concrete and plasterboard elements • Consider 95% of timber to be AFS or FSC certified • Reduce emissions associated with insulation and refrigerant • Reduce environmental impact of materials for tiling, awning, cladding, roller shutters etc	• Consider jointless fibre reinforced slabs • Use pre-cast concrete panels with recycled content • Use plasterboard with recycled content or eco-certification • Joinery to be FSC certified timber • Use only insulation with zero ODP (Ozone Depleting Potential) associated with manufacture and composition; use only refrigerants with zero ODP • Use products with recycled content and/or eco certified (eg Almaxco, Wintec)
Minimising Waste • By clever design • Contracted to builder as a requirement on site for construction waste • During the life of the building • And in dealing with building end of life options	• 80% of all construction waste is re-used or recycled • Reduce operational waste going to landfill • Consider a design that can be disassembled at the end of the building's life	• Contractor is to develop and implement a Waste Management Plan and track all waste going offsite to show that 80% of all construction waste is re-used or recycled • Waste storage and recycling facilities to be provided for different operational recycling streams such as paper, glass, plastics, metals, food waste etc. Consider operational waste plans and training for staff to provide incentive to reduce waste • Specify mechanical joining mechanisms and components that can be demounted; document procedure for disassembly
Water Conservation • In monitoring of meters to track use • Timely maintenance of fixtures and fittings • Water sensitive landscape design • Source potable water alternatives such as rain water harvesting, grey and black water treatment.	• Reduce potable water in internal fixtures • Reduce potable water for irrigation • Water efficient operation of appliances • Utilise rainwater and/or recycled water	• Water efficient sanitary taps and toilets • Water efficient and drought tolerant landscaping • Water and energy efficient dishwasher • Rainwater collection for toilets, irrigation and truck wash down • Provide excess rain and storm water to Pinegrove Memorial Park nearby

Objective	Proposed Target	Proposed Strategy
Land Use and Ecology Impact • Consider local biodiversity impacts of flora and fauna • Look to specialist advice on land impact in development.	• Encourage biodiversity • Reduce light pollution from the site • Consider reducing impact of stormwater flows off the site	• Install indigenous planting appropriate to the area and the adjacent biodiversity lots. • Design external lighting to avoid emitting light into the night sky or beyond the site boundary • Consider integrated stormwater management to minimise the impact on receiving waters of flow volumes and pollution content. Eg. bioswales, bio retention, OSD tanks and treatment. • Consider permeable concrete /paving for staff car parking areas and footpaths etc.

2 Secretary's Requirements

It is intended that the ESD initiatives facilitate the achievement of the Secretary's Requirements in the State Significant Development Application (SSDA):

- Reduce potable water consumption
- Reduce greenhouse gas emissions

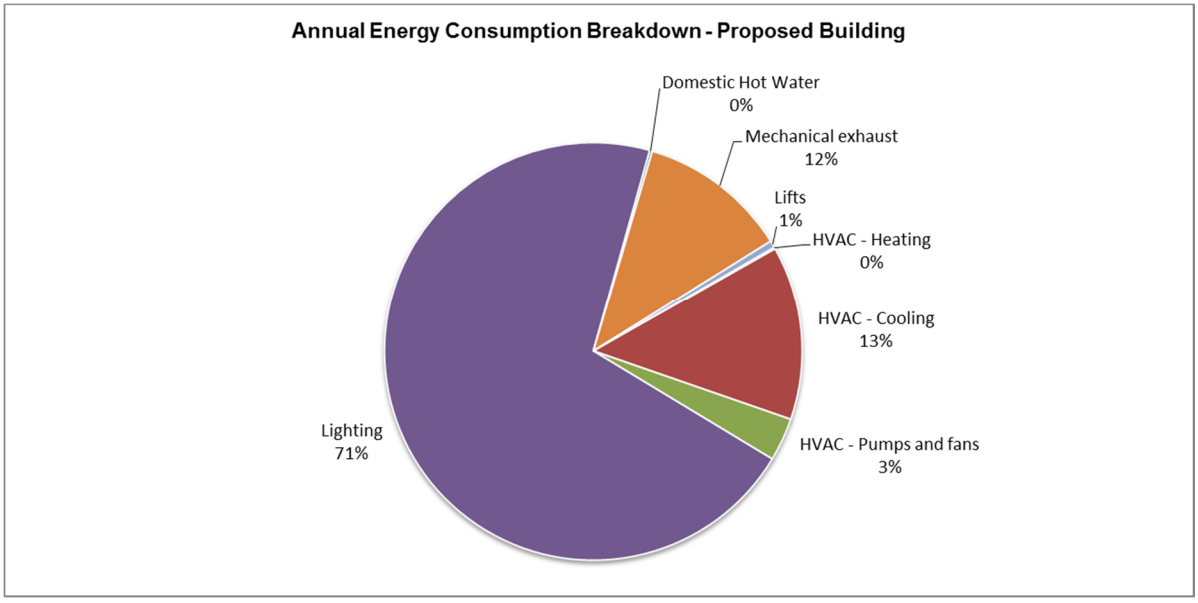
Water and energy initiatives have been presented in the previous tables. An estimate of the proposed project's greenhouse gas emissions follows.

2.1 Green House Gas (GHG) Quantification and Qualification

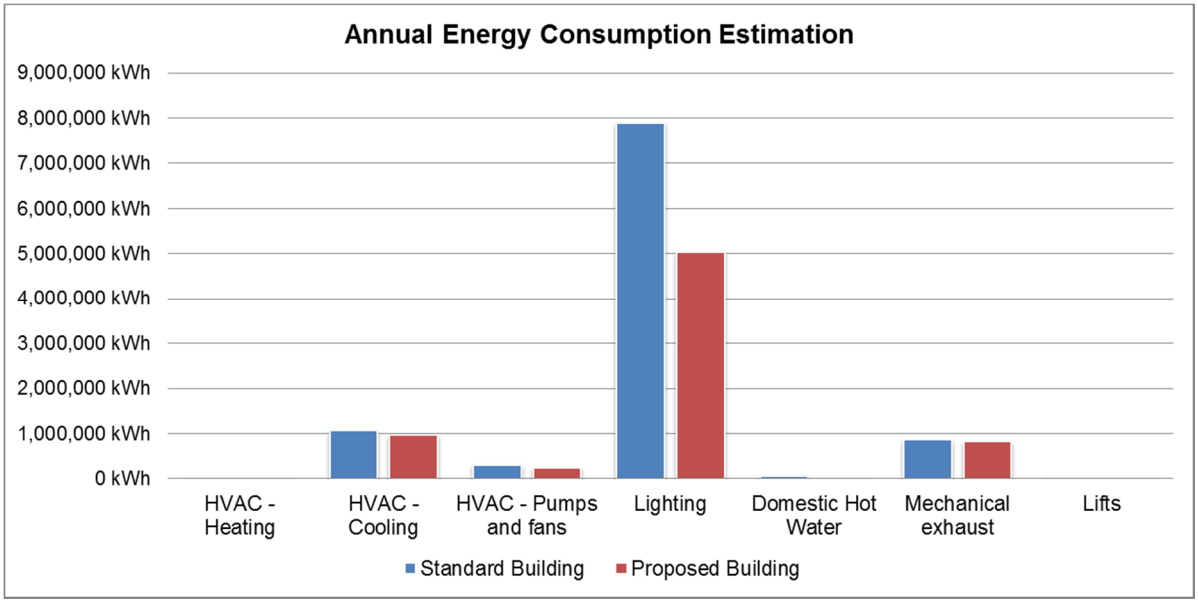
Based on the DA documentation a high level analysis of the energy related greenhouse gas emissions has been conducted. This analysis has been developed for a base case development and also a proposed development.

The base case analysis utilised the Building Codes of Australia Section J minimum compliance requirements. The proposed development utilised the design data where known or assumed improvements. The proposed case takes into account higher performing heating and cooling plant, more efficient pumps and fans, efficient domestic water heating and daylight sensing and controls for warehouse lighting.

A breakdown of the energy consumption is shown below. It is noted that a large portion of the energy is related to lighting of the warehouse.



A comparison of the base case energy and the proposed building energy is shown on the following page. A significant improvement in the lighting efficiency through design optimisation, energy efficiency and daylight linking could achieve a 40% energy saving in this initiative alone.



A summary of the total electricity, gas and greenhouse gas emissions is shown below.

Scenario	Electricity	Gas	GHG Emissions
Total - Base Case	10,183,788 kWh	53,370.0 MJ	10,900,268 kg CO2
Total - Proposed	7,116,830 kWh	0.0 MJ	7,615,008 kg CO2
Saving	3,066,959 kWh	53,370.0 MJ	3,285,261 kWh
Change	30.1%	100.0%	30.1%

This analysis indicates that an overall greenhouse gas saving of 30% could be achievable in comparison to a base case development.

3 BCA Section J Compliance

The development is required to comply with Section J (Energy Efficiency) of the BCA, 2015. Based on the DA Design, Section J Assessment has been carried out to determine the compliance of the design.

The building site is located in BCA Climate Zone 6 and the study below assumes that the warehouse spaces are un-conditioned spaces and the office spaces are each conditioned.

Detailed strategies to comply with sections J1 and J2 are outlined in the following sections.

3.1 Part J1 – Building Fabric

In relation to part J1 Building Fabric, the Deemed-to-Satisfy (DTS) requirements specify minimum insulation levels required for all air-conditioned habitable spaces. Conditioned spaces are to meet the insulation requirements outlined below. The figures quoted are for whole constructions.

Part	Minimum R-Value
Roof and Ceiling	R3.2 Note: A roof that has metal sheet roofing fixed to metal purlins, rafters or battens and does not have a ceiling lining (or has ceiling lining fixed to the purlins, rafters or battens) must have a thermal break installed between the sheet roofing and purlins, rafters or battens with thermal resistance of no less than R0.2.
External Walls	R2.8 (eg external office walls)
Internal Walls	R1.0 for internal walls forming the building envelope separating conditioned space from non-conditioned space. Providing the non-conditioned space is enclosed, with mechanical ventilation of not more than 1.5 air changes per hour of outside air. (Eg walls between office and warehouse) R1.8 for all other internal walls separating conditioned space from non-conditioned space.
Floors	No additional insulation required for slab on ground R1.0 for a suspended floor above a mechanically ventilated (<1.5 ac/h) non-conditioned space R2.0 for all other floors separating conditioned space from non-conditioned space
Roof lights	Roof lights serving conditioned spaces must not have area greater than **5%** of the area they serve, and must have the following properties: U value of 3.4 W/m²K and SHGC of 0.34.

Table 1: BCA DTS Building Fabric Insulation Requirements

3.2 Section J2 – Glazing

BCA Glazing Assessment has been carried out for the conditioned office spaces. At this stage the assessment has been carried out to determine the glazing performance required for the current design to meet the Deemed-to-Satisfy (DTS) requirements.

The properties quoted in this report are shown to demonstrate that the design is compliant with BCA Section J. This report does not act as a specification for glazing to be used in the final design.

It is likely that JV3 alternate verification modelling will be undertaken for the office areas. During the detailed design phase of the project where specific glazing types are preferred, whole building modelling may be carried out in accordance with Section J, Verification Method 3 (JV3). JV3 modelling involves comparing the annual energy consumption of the 'reference building' – i.e. the proposed building geometry with BCA Deemed-to-Satisfy (DTS) building fabric, glazing and services – to the proposed building, with the proposed fabric, glazing and services. The design is verified compliant if the annual energy consumption of the proposed building is lower than the annual energy consumption of the reference building. This exercise may be required to be undertaken during detailed design to ensure that the design is compliant with the preferred glazing types.

The following pages present the DTS glazing properties required for each section of the buildings where conditioned spaces have been noted. Final Section J compliance will be achieved following detailed design. Additional solid panels to be included as required by further modelling.

Glazing properties quoted are whole system values, inclusive of both frame and glazing.

Lot 1

Glazing to the office has been assumed as 2.7m high with a full height opaque spandrel panels interspersed along the facade. Total slab to ceiling height assumed as 3.4m.

Glazing to the Dock Office is assumed to be 1.8m high with a total slab to slab height of 2.7m.

The following pages present the glazing properties required for DTS compliance. Glazing properties quoted are whole system values, inclusive of both frame and glazing.

A summary of the DTS glazing requirements is shown below:

Location	Level	Facade	U-value	SHGC	Example Window Type
Office 1	Ground	N	3.0	0.5	Double glazing with low e and thermally broken frame
	Ground	E	3.0	0.15	Double glazing with low e and thermally broken frame
	Ground	S	3.5	0.7	Clear double glazing
	L1	N	3.0	0.4	Double glazing with low e and thermally broken frame
	L1	E	3.0	0.17	Double glazing with low e and thermally broken frame
	L1	S	3.0	0.7	Clear double glazing
Office 2	Ground	E	3.0	0.19	Double glazing with low e and thermally broken frame
	Ground	S	2.9	0.7	Double glazed with thermally broken aluminium frame
	Ground	W	3.5	0.26	Double glazed low-e
Dock Office	Ground	Internal	4.0	0.9	Clear double glazing
	Ground	E	3.0	0.21	Double glazing with low e and thermally broken frame
	Ground	S	3.5	0.7	Clear double glazing
	Ground	W	3.0	0.21	Double glazing with low e and thermally broken frame
	Level 1	Internal	4.0	0.9	Clear double glazing
	Level 1	E	4.0	0.7	Clear double glazing
	Level 1	S	4.0	0.7	Clear double glazing
	Level 1	W	4.5	0.7	Single glazed low-e

Lot 2

Glazing to the office has been assumed as 2.7m high with a full height opaque spandrel panels interspersed along the facade. Total slab to ceiling height assumed as 3.4m.

Glazing to the Dock Office is assumed to be 1.8m high with a total slab to slab height of 2.7m.

The following pages present the glazing properties required for DTS compliance. Glazing properties quoted are whole system values, inclusive of both frame and glazing.

A summary of the DTS glazing requirements is shown below:

Location	Level	Facade	U-value	SHGC	Example Window Type
Office	Ground	W	2.5	0.10	Double glazed tinted low-e with thermally broken aluminium frame
	Ground	N	3.5	0.25	Double glazed tinted low-e
	Ground	E	3.5	0.44	Double glazed tinted low-e
	Level 1	W	3.0	0.35	Double glazed tinted low-e with thermally broken aluminium frame
	Level 1	N	3.0	0.3	Double glazed tinted low-e with thermally broken aluminium frame
	Level 1	E	2.0	0.23	Double glazed tinted low-e with thermally broken aluminium frame
Dock Office	Ground	Internal	4.0	0.9	Clear double glazing
	Ground	N	5.5	0.21	Tinted single glazing
	Ground	E	3.0	0.21	Double glazing with low e and thermally broken frame
	Ground	W	2.6	0.21	Double glazing with low e and thermally broken frame
	Level 1	Internal	4.0	0.9	Clear double glazing
	Level 1	N	5.5	0.79	Neutral tinted single glazing
	Level 1	E	4.0	0.7	Clear double glazing
	Level 1	W	4.0	0.65	Neutral tinted double glazing

Lot 3

Glazing to the office has been assumed as 2.7m high with a full height opaque spandrel panels interspersed along the facade. Total slab to ceiling height assumed as 3.4m.

Glazing to the Dock Office is assumed to be 1.8m high with a total slab to slab height of 2.7m.

The following pages present the glazing properties required for DTS compliance. Glazing properties quoted are whole system values, inclusive of both frame and glazing.

A summary of the DTS glazing requirements is shown below:

Location	Level	Facade	U-value	SHGC	Example Window Type
Office	Ground	W	1.8	0.1	Double glazed tinted low-e with thermally broken aluminium frame
	Ground	N	3.5	0.26	Double glazed tinted low-e
	Ground	E	3.5	0.34	Double glazed tinted low-e
	Level 1	W	2.5	0.12	Double glazed tinted low-e with thermally broken aluminium frame
	Level 1	N	2.5	0.18	Double glazed tinted low-e with thermally broken aluminium frame
	Level 1	E	2.5	0.18	Double glazed tinted low-e with thermally broken aluminium frame
Dock Office	Ground	Internal	4.0	0.9	Clear double glazing
	Ground	E	3.0	0.21	Double glazing with low e and thermally broken frame
	Ground	S	3.5	0.7	Clear double glazing
	Ground	W	3.0	0.21	Double glazing with low e and thermally broken frame
	Level 1	Internal	4.0	0.9	Clear double glazing
	Level 1	E	4.0	0.7	Clear double glazing
	Level 1	S	4.0	0.7	Clear double glazing
	Level 1	W	4.5	0.7	Single glazed low-e

Lot 4

Glazing to the office has been assumed as 2.7m high with a full height opaque spandrel panels interspersed along the facade. Total slab to ceiling height assumed as 3.4m.

Glazing to the Dock Office is assumed to be 1.8m high with a total slab to slab height of 2.7m.

The following pages present the glazing properties required for DTS compliance. Glazing properties quoted are whole system values, inclusive of both frame and glazing.

A summary of the DTS glazing requirements is shown below:

Location	Level	Facade	U-value	SHGC	Example Window Type
Office	Ground	W	2.6	0.18	Double glazed tinted low-e with thermally broken aluminium frame
	Ground	S	3.5	0.7	Clear double glazing
	Ground	E	2.6	0.13	Double glazed tinted low-e with thermally broken aluminium frame
	Level 1	W	3.5	0.3	Double glazed tinted low-e with thermally broken aluminium frame
	Level 1	S	3.0	0.7	Clear double glazing with thermally broken aluminium frame
	Level 1	E	3.0	0.24	Double glazed tinted low-e with thermally broken aluminium frame
	Level 1	N	3.5	0.35	Double glazed tinted low-e
Dock Office	Ground	Internal	4.0	0.9	Clear double glazing
	Ground	N	5.5	0.27	Tinted single glazing
	Ground	E	2.6	0.13	Double glazing with low e and thermally broken frame
	Ground	S	4.2	0.7	Single glazed low-e
	Level 1	Internal	4.0	0.9	Clear double glazing
	Level 1	N	5.5	0.9	Clear single glazing
	Level 1	E	3.5	0.6	Neutral tinted double glazing
	Level 1	S	4.6	0.7	Single glazed low-e

Lot 5

Glazing to the office has been assumed as 2.7m high with a full height opaque spandrel panels interspersed along the facade. Total slab to ceiling height assumed as 3.4m.

Glazing to the Dock Office is assumed to be 1.8m high with a total slab to slab height of 2.7m.

The following pages present the glazing properties required for DTS compliance. Glazing properties quoted are whole system values, inclusive of both frame and glazing.

A summary of the DTS glazing requirements is shown below:

Location	Level	Facade	U-value	SHGC	Example Window Type
Office	Ground	W	3.5	0.25	Double glazed tinted low-e
	Ground	N	3.5	0.25	Clear double glazing with thermally broken aluminium frame
	Ground	E	3.5	0.11	Double glazed tinted low-e
	Ground	S	3.5	0.7	Double Glazed clear
	Level 1	N	3.5	0.23	Double glazed tinted low-e
	Level 1	E	3.0	0.16	Double glazed tinted low-e with thermally broken aluminium frame
	Level 1	S	3.5	0.7	Double Glazed clear
Dock Office	Ground	Internal	4.0	0.9	Clear double glazing
	Ground	N	5.5	0.21	Tinted single glazing
	Ground	E	3.0	0.21	Double glazing with low e and thermally broken frame
	Ground	W	2.6	0.21	Double glazing with low e and thermally broken frame
	Level 1	Internal	4.0	0.9	Clear double glazing
	Level 1	N	5.5	0.79	Neutral tinted single glazing
	Level 1	E	4.0	0.7	Clear double glazing
	Level 1	W	4.0	0.65	Neutral tinted double glazing

4 Appendices

Appendix A : BCA Glazing Calculator Outputs

Lot 1 Office GND

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

Building name/description: Lot 1 Office | Application: other | Climate zone: 6

Storey: Gnd

Facade areas (Glazing area (A))

	N	NE	E	SE	S	SW	W	NW	internal
Option A	59.5m²		66.6m²		59.5m²				
Option B									n/a

Number of rows preferred in table below: 10 (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_w)	Cooling (S_c)	Area used (m²)	Element share of % of allowance used
1	W1	N		2.70	12.20	32.94	3.0	0.50	5.500	3.400	1.62	0.70	0.46	0.42	32.94	100% of 97%
2	E1 Lunch	E		2.70	5.20		3.0	0.15	1.150	3.400	0.34	0.70	0.98	0.95	14.04	37% of 100%
3	E2 Reception	E		2.70	8.50		3.0	0.15				0.00	1.00	1.00	22.95	63% of 100%
4	S1 Reception	S		2.70	5.10		3.5	0.70				0.00	1.00	1.00	13.77	100% of 37%
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IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

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if inputs are valid

Lot 1 Office L1

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

Building name/description: Lot 1 Office | Application: other | Climate zone: 6

Storey: L1

Facade areas (Glazing area (A))

	N	NE	E	SE	S	SW	W	NW	internal
Option A	59.8m²		131m²		59.5m²				
Option B									n/a

Number of rows preferred in table below: 10 (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_w)	Cooling (S_c)	Area used (m²)	Element share of % of allowance used
1	W1 Office North	N		2.70	14.50		3.0	0.40	1.100	3.400	0.32	0.70	0.47	0.42	39.15	100% of 89%
2	E1 Office North	E		2.70	12.10		3.0	0.17	2.100	3.400	0.62	0.70	0.92	0.86	32.67	43% of 100%
3	E2 Office Centre	E		2.70	4.20		3.0	0.17	2.100	3.400	0.62	0.70	0.93	0.87	11.34	15% of 100%
4	E3 Office Centre	E		2.70	4.40		3.0	0.17	4.600	3.400	1.35	0.70	0.71	0.63	11.88	13% of 100%
5	E4 Office South	E		2.70	9.40		3.0	0.17	4.600	3.400	1.35	0.70	0.71	0.63	25.38	28% of 100%
6	S1 Office South	S		2.70	7.90		3.0	0.70				0.00	1.00	1.00	21.33	31% of 41%
7	S2 Cellular office	S		2.70	1.80		3.0	0.70				0.00	1.00	1.00	4.86	10% of 41%
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if inputs are valid ✓

Lot 1 Office 2 GND

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

Building name/description: Lot 1 Office 2 | Application: other | Climate zone: 6

Storey: Gnd

Facade areas (Glazing area (A))

	N	NE	E	SE	S	SW	W	NW	internal
Option A			55.4m²		59.5m²		62.2m²		
Option B									n/a

Number of rows preferred in table below: 10 (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_w)	Cooling (S_c)	Area used (m²)	Element share of % of allowance used
1	E1 Office	E		2.70	10.20		3.0	0.19	1.100	3.400	0.32	0.70	0.98	0.96	27.54	100% of 100%
2	S1 Office	S		2.70	10.20		2.9	0.70	4.200	3.400	1.24	0.70	0.84	0.76	27.54	50% of 89%
3	S2 Reception	S		2.70	8.10		2.9	0.70	3.400	3.400	1.00	0.70	0.87	0.81	21.87	39% of 89%
4	S3 Lunch	S		2.70	3.00		2.9	0.70	1.100	3.400	0.32	0.70	0.98	0.96	8.10	11% of 89%
5	W Lunch	W		2.70	8.25		3.5	0.26	1.800	3.400	0.53	0.70	0.93	0.89	22.28	100% of 100%
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if inputs are valid ✓

Lot 1 Dock Office GND

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

Building name/description: Lot 1 Dock Office | Application: other | Climate zone: 6

Storey: Gnd

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A			14.3m²		39.1m²		14.3m²		53m²
Option B									n/a

Glazing area (A)

Number of rows preferred in table below: 10 *(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	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 g (S_C)	Area used (m²)	Element share of % of allowance used
1	Window	E		1.80	3.60		3.0	0.21	10.800	5.400	0.00	3.60	1.00	1.00	6.48	100% of 100%
2	Window	S		1.80	6.80		3.5	0.70	10.800	5.400	0.00	3.60	1.00	1.00	12.24	50% of 99%
3	Door	S		2.70	4.60		3.5	0.70	10.800	6.300	0.00	3.60	1.00	1.00	12.42	50% of 99%
4	Window	W		1.80	3.20		3.0	0.21	10.800	5.400	0.00	3.60	1.00	1.00	5.76	100% of 100%
5	Window 1	internal		1.80	4.50		4.0	0.90			2.00	0.00	0.55	0.55	8.10	46% of 99%
6	Window 2	internal		1.80	5.20		4.0	0.90			2.00	0.00	0.55	0.55	9.36	54% of 99%
7													0.00	0.00		
8													0.00	0.00		
9													0.00	0.00		
10													0.00	0.00		

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if inputs are valid

Lot 1 Dock Office L1

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

Building name/description: Lot 1 Dock Office | Application: other | Climate zone: 6

Storey: L1

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A			14.3m²		39.1m²		14.3m²		53m²
Option B									n/a

Glazing area (A)

Number of rows preferred in table below: 10 *(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	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 g (S_C)	Area used (m²)	Element share of % of allowance used
1	Window	E		1.20	3.60		4.0	0.70	10.800	1.800	6.00	0.60	0.47	0.47	4.32	100% of 100%
2	Window	S		1.20	11.40		4.0	0.70	10.800	1.800	6.00	0.60	0.74	0.67	13.68	100% of 99%
3	Window	W		1.20	3.20		4.5	0.70	10.800	1.800	6.00	0.60	0.48	0.47	3.84	100% of 99%
4	Window 1	internal		1.80	4.50		4.0	0.90			2.00	0.00	0.55	0.55	8.10	46% of 99%
5	Window 2	internal		1.80	5.20		4.0	0.90			2.00	0.00	0.55	0.55	9.36	54% of 99%
6													0.00	0.00		
7													0.00	0.00		
8													0.00	0.00		
9													0.00	0.00		
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if inputs are valid

Lot 2 Office GND

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

Building name/description: Lot 2 Office | Application: other | Climate zone: 6

Storey: Gnd

Facade areas (Glazing area (A))

	N	NE	E	SE	S	SW	W	NW	internal
Option A	78.2m²		60m²				60m²		
Option B									n/a

Number of rows preferred in table below: 10 (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_w)	Cooling (S_c)	Area used (m²)	Element share of % of allowance used
1	W1 Lunch	W		2.70	12.83		2.5	0.10	5.500	3.400	1.62	0.70	0.00	0.00	34.63	100% of 100%
2	N1 Lunch	N		2.70	5.20		3.5	0.25	1.150	3.400	0.34	0.70	0.99	0.92	14.04	35% of 100%
3	N2 Reception	N		2.70	8.50		3.5	0.25				0.70	0.00	1.00	1.00	22.95	55% of 100%
4	E1 Reception	E		2.70	5.10		3.5	0.44	13.800	3.400	4.06	0.70	0.47	0.47	13.77	55% of 86%
5	E2 Reception	E		2.70	2.50		3.5	0.44				0.70	0.00	1.00	1.00	6.75	45% of 86%
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if inputs are valid ✓

Lot 2 Office L1

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

Building name/description: Lot 2 Office | Application: other | Climate zone: 6

Storey: L1

Facade areas (Glazing area (A))

	N	NE	E	SE	S	SW	W	NW	internal
Option A	131m²		60m²				60m²		
Option B									n/a

Number of rows preferred in table below: 10 (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_w)	Cooling (S_c)	Area used (m²)	Element share of % of allowance used
1	W1 Office	W		2.70	10.00		3.0	0.35	1.100	3.400	0.32	0.70	0.47	0.42	27.00	100% of 100%
2	N1 Office	N		2.70	12.10		3.0	0.30	2.200	3.400	0.65	0.70	0.96	0.78	32.67	50% of 86%
3	N2 reception	N		2.70	4.20		3.0	0.30	2.200	3.400	0.65	0.70	0.96	0.80	11.34	16% of 86%
4	N3 Reception	N		2.70	4.40		3.0	0.30	4.200	3.400	1.24	0.70	0.77	0.52	11.88	10% of 86%
5	N4 Office East	N		2.70	9.40		3.0	0.30	4.200	3.400	1.24	0.70	0.77	0.52	25.38	22% of 86%
6	E1 Office	E		2.70	8.00		3.0	0.23	1.200	3.400	0.35	0.70	0.97	0.95	21.60	32% of 100%
7	E2 Cellular office	E		2.70	1.80		3.0	0.23	1.200	3.400	0.35	0.70	0.97	0.95	4.86	18% of 100%
8																
9																
10																

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if inputs are valid ✓

Lot 2 Dock Office GND

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

Building name/description: Lot 2 Dock Office | Application: other | Climate zone: 6

Storey: Gnd

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	39.1m²		14.3m²				14.3m²		53m²
Option B									n/a

Glazing area (A)

Number of rows preferred in table below: 10 *(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	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 g (S_C)	Area used (m²)	Element share of % of allowance used
1	Window	E		1.80	3.20		3.0	0.21	10.800	5.400	0.00	3.60	1.00	1.00	5.76	100% of 89%
2	Window	N		1.80	6.80		5.5	0.21	10.800	5.400	0.00	3.60	1.00	1.00	12.24	50% of 100%
3	Door	N		2.70	4.60		5.5	0.21	10.800	6.300	0.00	3.60	1.00	1.00	12.42	50% of 100%
4	Window	W		1.80	3.60		2.6	0.21	10.800	5.400	0.00	3.60	1.00	1.00	6.48	100% of 100%
5	Window 1	internal		1.80	4.50		4.0	0.90			2.00	0.00	0.55	0.55	8.10	46% of 99%
6	Window 2	internal		1.80	5.20		4.0	0.90			2.00	0.00	0.55	0.55	9.36	54% of 99%
7													0.00	0.00		
8													0.00	0.00		
9													0.00	0.00		
10													0.00	0.00		

Lot 2 Dock Office L1

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

Building name/description: Lot 2 Dock Office | Application: other | Climate zone: 6

Storey: L1

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	39.1m²		14.3m²				14.3m²		53m²
Option B									n/a

Glazing area (A)

Number of rows preferred in table below: 10 *(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	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 g (S_C)	Area used (m²)	Element share of % of allowance used
1	Window	E		1.20	3.20		4.0	0.70	10.800	1.800	6.00	0.60	0.47	0.47	3.84	100% of 89%
2	Window	N		1.20	11.40		5.5	0.79	10.800	1.800	6.00	0.60	0.13	0.35	13.68	100% of 100%
3	Window	W		1.20	3.60		4.0	0.65	10.800	1.800	6.00	0.60	0.48	0.47	4.32	100% of 100%
4	Window 1	internal		1.80	4.50		4.0	0.90			2.00	0.00	0.55	0.55	8.10	46% of 99%
5	Window 2	internal		1.80	5.20		4.0	0.90			2.00	0.00	0.55	0.55	9.36	54% of 99%
6													0.00	0.00		
7													0.00	0.00		
8													0.00	0.00		
9													0.00	0.00		
10													0.00	0.00		

Lot 3 Office GND

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

Building name/description: Lot 3 Office | Application: other | Climate zone: 6

Storey: Gnd

Facade areas (Glazing area (A))

	N	NE	E	SE	S	SW	W	NW	internal
Option A	112m²		59.4m²				59.4m²		
Option B									n/a

Number of rows preferred in table below: 10 (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_w)	Cooling (S_c)	Area used (m²)	Element share of % of allowance used
1	W1 Office	W		2.70	6.00		1.8	0.10				0.00	0.00	0.00	16.20	35% of 86%
2	W2 Reception	W		2.70	4.90		1.8	0.10				0.00	1.00	1.00	13.23	33% of 86%
3	W3 Conference	W		2.70	5.00		1.8	0.10	1.100	3.400	0.32	0.70	0.97	0.96	13.50	33% of 86%
4	N1 Conference	N		2.70	19.80		3.5	0.26	1.100	3.400	0.32	0.70	0.99	0.93	53.46	100% of 100%
5	E1 Office	E		2.70	10.80		3.5	0.34	7.000	3.400	2.06	0.70	0.47	0.47	29.16	100% of 86%
6													0.00	0.00		
7													0.00	0.00		
8													0.00	0.00		
9													0.00	0.00		
10													0.00	0.00		

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if inputs are valid

Lot 3 Office L1

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

Building name/description: Lot 3 Office | Application: other | Climate zone: 6

Storey: L1

Facade areas (Glazing area (A))

	N	NE	E	SE	S	SW	W	NW	internal
Option A	112m²		63.4m²		5.44m²		63.4m²		
Option B									n/a

Number of rows preferred in table below: 10 (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_w)	Cooling (S_c)	Area used (m²)	Element share of % of allowance used
1	W1 Office	W		2.70	4.20		2.5	0.12	2.100	3.400	0.62	0.70	0.48	0.42	11.34	33% of 86%
2	W2 Office	W		2.70	4.80		2.5	0.12	5.000	3.400	1.47	0.70	0.65	0.60	12.96	33% of 86%
3	W3 Office	W		2.70	3.70		2.5	0.12	5.400	3.400	1.59	0.70	0.61	0.56	9.99	49% of 86%
4	N3 Office	N		2.70	29.00		2.5	0.18	2.100	3.400	0.62	0.70	0.97	0.81	78.30	86% of 94%
5	N4 Office East	N		2.70	9.40		2.5	0.18	4.200	3.400	1.24	0.70	0.77	0.52	25.38	14% of 94%
6	E1 Office	E		2.70	10.90		2.5	0.18	1.200	3.400	0.35	0.70	0.97	0.95	29.43	35% of 86%
7	E2 Cellular office	E		2.70	1.80		2.5	0.18	1.200	3.400	0.35	0.70	0.97	0.95	4.86	14% of 86%
8	S Office	S		2.70	1.60		3.0	0.70				0.00	1.00	1.00	4.32	100% of 74%
9													0.00	0.00		
10													0.00	0.00		

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

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if inputs are valid

Lot 3 Dock Office GND

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

Building name/description: Lot 3 Dock Office | Application: other | Climate zone: 6

Storey: Gnd

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A			14.3m²		39.1m²		14.3m²		53m²
Option B									n/a

Glazing area (A)

Number of rows preferred in table below: 10 *(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	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	Window	E		1.80	3.60		3.0	0.21	10.800	5.400	0.00	3.60	1.00	1.00	6.48	100% of 100%
2	Window	S		1.80	6.80		3.5	0.70	10.800	5.400	0.00	3.60	1.00	1.00	12.24	50% of 99%
3	Door	S		2.70	4.60		3.5	0.70	10.800	6.300	0.00	3.60	1.00	1.00	12.42	50% of 99%
4	Window	W		1.80	3.20		3.0	0.21	10.800	5.400	0.00	3.60	1.00	1.00	5.76	100% of 100%
5	Window 1	internal		1.80	4.50		4.0	0.90			2.00	0.00	0.55	0.55	8.10	46% of 99%
6	Window 2	internal		1.80	5.20		4.0	0.90			2.00	0.00	0.55	0.55	9.36	54% of 99%
7													0.00	0.00		
8													0.00	0.00		
9													0.00	0.00		
10													0.00	0.00		

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if inputs are valid

Lot 3 Dock Office L1

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

Building name/description: Lot 3 Dock Office | Application: other | Climate zone: 6

Storey: L1

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A			14.3m²		39.1m²		14.3m²		53m²
Option B									n/a

Glazing area (A)

Number of rows preferred in table below: 10 *(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	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	Window	E		1.20	3.60		4.0	0.70	10.800	1.800	6.00	0.60	0.47	0.47	4.32	100% of 100%
2	Window	S		1.20	11.40		4.0	0.70	10.800	1.800	6.00	0.60	0.74	0.67	13.68	100% of 99%
3	Window	W		1.20	3.20		4.5	0.70	10.800	1.800	6.00	0.60	0.48	0.47	3.84	100% of 99%
4	Window 1	internal		1.80	4.50		4.0	0.90			2.00	0.00	0.55	0.55	8.10	46% of 99%
5	Window 2	internal		1.80	5.20		4.0	0.90			2.00	0.00	0.55	0.55	9.36	54% of 99%
6													0.00	0.00		
7													0.00	0.00		
8													0.00	0.00		
9													0.00	0.00		
10													0.00	0.00		

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if inputs are valid

Lot 4 Office GND

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

Building name/description: Lot 4 Office | Application: other | Climate zone: 6

Storey: GND

Facade areas (Glazing area (A))

	N	NE	E	SE	S	SW	W	NW	internal
Option A			67.4m²		85.8m²		67.4m²		
Option B									n/a

Number of rows preferred in table below: 10 (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_w)	Cooling (S_c)	Area used (m²)	Element share of % of allowance used
1	W1 Lunch	W		2.70	11.80		2.6	0.17	6.100	3.400	1.79	0.70	0.31	0.38	31.86	100% of 36%
2	S1 Lunch	S		2.70	3.50		3.5	0.70	1.100	3.400	0.32	0.70	0.98	0.96	9.45	24% of 72%
3	S2 Office	S		2.70	10.80		3.5	0.70	1.100	3.400	0.32	0.70	0.98	0.96	29.16	76% of 72%
4	E1 Office	E		2.70	7.10		2.6	0.13	1.100	3.400	0.32	0.70	0.98	0.96	19.17	44% of 86%
5	E2 Entrance	E		2.70	4.40		2.6	0.13				0.00	1.00	1.00	11.88	28% of 86%
6	E1 Office	E		2.70	4.30		2.6	0.13				0.00	1.00	1.00	11.61	28% of 86%
7													0.00	0.00		
8													0.00	0.00		
9													0.00	0.00		
10													0.00	0.00		

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if inputs are valid

Lot 4 Office L1

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

Building name/description: Lot 4 Office | Application: other | Climate zone: 6

Storey: L1

Facade areas (Glazing area (A))

	N	NE	E	SE	S	SW	W	NW	internal
Option A	5.44m²		71.1m²		99.8m²		71.1m²		
Option B									n/a

Number of rows preferred in table below: 10 (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_w)	Cooling (S_c)	Area used (m²)	Element share of % of allowance used
1	W1 Office	W		2.70	9.60		3.5	0.30	1.150	3.400	0.34	0.70	0.00	0.00	25.92	100% of 99%
2	S1 Office	S		2.70	23.20		3.0	0.70	2.100	3.400	0.62	0.70	0.93	0.88	62.64	100% of 65%
3	E1 Office	E		2.70	5.80		3.0	0.24	4.000	3.400	1.18	0.70	0.78	0.68	15.66	38% of 100%
4	E2 Entrance	E		2.70	4.30		3.0	0.24	5.600	3.400	1.65	0.70	0.60	0.55	11.61	28% of 100%
5	E3 Office	E		2.70	4.20		3.0	0.24	2.100	3.400	0.62	0.70	0.93	0.87	11.34	34% of 100%
6	N Entrance	N		2.70	1.60		3.5	0.35	4.300	3.400	1.26	0.70	0.75	0.51	4.32	100% of 97%
7													0.00	0.00		
8													0.00	0.00		
9													0.00	0.00		
10													0.00	0.00		

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if inputs are valid

Lot 4 Dock Office GND

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

Building name/description: Lot 4 Dock Office | Application: other | Climate zone: 6

Storey: Gnd

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	14.3m²		39.1m²		14.3m²				53m²
Option B									n/a

Glazing area (A)

Number of rows preferred in table below: 10 *(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	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	Window	N		1.80	3.60		5.5	0.27	10.800	5.400	0.00	3.60	1.00	1.00	6.48	100% of 99%
2	Window	E		1.80	6.80		2.6	0.13	10.800	5.400	0.00	3.60	1.00	1.00	12.24	50% of 99%
3	Door	E		2.70	4.60		2.6	0.13	10.800	6.300	0.00	3.60	1.00	1.00	12.42	50% of 99%
4	Window	S		1.80	3.20		4.2	0.70	10.800	5.400	0.00	3.60	1.00	1.00	5.76	100% of 100%
5	Window 1	internal		1.80	4.50		4.0	0.90			2.00	0.00	0.55	0.55	8.10	46% of 99%
6	Window 2	internal		1.80	5.20		4.0	0.90			2.00	0.00	0.55	0.55	9.36	54% of 99%
7													0.00	0.00		
8													0.00	0.00		
9													0.00	0.00		
10													0.00	0.00		

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if inputs are valid

Lot 4 Dock Office L1

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

Building name/description: Lot 4 Dock Office | Application: other | Climate zone: 6

Storey: L1

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	14.3m²		39.1m²		14.3m²				53m²
Option B									n/a

Glazing area (A)

Number of rows preferred in table below: 10 *(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	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	Window	N		1.20	3.60		5.5	0.90	10.800	1.800	6.00	0.60	0.13	0.35	4.32	100% of 100%
2	Window	E		1.20	11.40		3.5	0.60	10.800	1.800	6.00	0.60	0.47	0.47	13.68	100% of 100%
3	Window	S		1.20	3.20		4.6	0.70	10.800	1.800	6.00	0.60	0.74	0.67	3.84	100% of 97%
4	Window 1	internal		1.80	4.50		4.0	0.90			2.00	0.00	0.55	0.55	8.10	46% of 99%
5	Window 2	internal		1.80	5.20		4.0	0.90			2.00	0.00	0.55	0.55	9.36	54% of 99%
6													0.00	0.00		
7													0.00	0.00		
8													0.00	0.00		
9													0.00	0.00		
10													0.00	0.00		

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if inputs are valid

Lot 5 Office GND

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

Building name/description: Lot 5 Office | Application: other | Climate zone: 6

Storey: GND

Facade areas (Glazing area (A))

	N	NE	E	SE	S	SW	W	NW	internal
Option A	90.1m²		81.3m²		90.1m²		31.3m²		
Option B									n/a

Number of rows preferred in table below: 10 (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_w)	Cooling (S_c)	Area used (m²)	Element share of % of allowance used
1	W1 Lunch	W		2.70	9.20		3.5	0.25	11.100	3.400	3.26	0.70	1.62	0.67	24.84	100% of 80%
2	N Lunch	N		2.70	13.38		3.5	0.25	1.150	3.400	0.34	0.70	0.99	0.93	36.11	92% of 97%
3	E1 Lunch	E		2.70	5.40		3.5	0.11	1.150	3.400	0.34	0.70	0.98	0.95	14.58	30% of 97%
4	E1 Office	E		2.70	3.60		3.5	0.11	1.150	3.400	0.34	0.70	0.98	0.95	9.72	20% of 97%
5	E2 Entrance	E		2.70	4.40		3.5	0.11				0.00	1.00	1.00	11.88	25% of 97%
6	E1 Reception	E		2.70	4.30		3.5	0.11				0.00	1.00	1.00	11.61	25% of 97%
7	N2 reception	N		2.70	2.60		3.5	0.25				0.00	1.00	1.00	7.02	15% of 97%
8	S1 Reception	S		2.70	2.00		3.5	0.70	16.500	3.400	4.85	0.70	0.74	0.67	5.40	33% of 34%
9	S2 Reception	S		2.70	3.20		3.5	0.70	16.500	3.400	4.85	0.70	0.74	0.67	8.64	52% of 34%
10																

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if inputs are valid

Lot 5 Office L1

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

Building name/description: Lot 5 Office | Application: other | Climate zone: 6

Storey: L1

Facade areas (Glazing area (A))

	N	NE	E	SE	S	SW	W	NW	internal
Option A	86.7m²		146m²		90.1m²				
Option B									n/a

Number of rows preferred in table below: 10 (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_w)	Cooling (S_c)	Area used (m²)	Element share of % of allowance used
1	N1 Office	N		2.70	17.80		3.5	0.23	1.500	3.400	0.44	0.70	0.99	0.89	48.06	94% of 99%
2	E1 Office	E		2.70	12.40		3.0	0.16	4.000	3.400	1.18	0.70	0.78	0.68	33.48	33% of 100%
3	S1 Office	S		2.70	1.60		3.3	0.24	4.300	3.400	1.26	0.70	0.84	0.76	4.32	17% of 99%
4	E2 Entrance	E		2.70	4.30		3.0	0.16	5.600	3.400	1.65	0.70	0.60	0.55	11.61	11% of 100%
5	E3 Office	E		2.70	4.60		3.0	0.23	3.000	3.400	0.88	0.70	0.87	0.78	12.42	15% of 100%
6	N Entrance	N		2.70	2.60		3.5	0.23	4.300	3.400	1.26	0.70	0.75	0.51	7.02	5% of 99%
7	E4 Office south	E		2.70	13.70		3.0	0.16	3.000	3.400	0.88	0.70	0.87	0.78	36.99	40% of 100%
8	S2 Office South	S		2.70	18.80		3.3	0.70	1.600	3.400	0.47	0.70	0.96	0.93	50.76	53% of 99%
9																
10																

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if inputs are valid

Lot 5 Dock Office GND

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

Building name/description: Lot 5 Dock Office | Application: other | Climate zone: 6

Storey: Gnd

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	39.1m²		14.3m²				14.3m²		53m²
Option B									n/a

Glazing area (A)

Number of rows preferred in table below: 10 *(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	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_w)	Cooling g (S_c)	Area used (m²)	Element share of % of allowance used
1	Window	E		1.80	3.20		3.0	0.21	10.800	5.400	0.00	3.60	1.00	1.00	5.76	100% of 89%
2	Window	N		1.80	6.80		5.5	0.21	10.800	5.400	0.00	3.60	1.00	1.00	12.24	50% of 100%
3	Door	N		2.70	4.60		5.5	0.21	10.800	6.300	0.00	3.60	1.00	1.00	12.42	50% of 100%
4	Window	W		1.80	3.60		2.6	0.21	10.800	5.400	0.00	3.60	1.00	1.00	6.48	100% of 100%
5	Window 1	internal		1.80	4.50		4.0	0.90			2.00	0.00	0.55	0.55	8.10	46% of 99%
6	Window 2	internal		1.80	5.20		4.0	0.90			2.00	0.00	0.55	0.55	9.36	54% of 99%
7													0.00	0.00		
8													0.00	0.00		
9													0.00	0.00		
10													0.00	0.00		

Lot 5 Dock Office L1

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

Building name/description: Lot 5 Dock Office | Application: other | Climate zone: 6

Storey: L1

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	39.1m²		14.3m²				14.3m²		53m²
Option B									n/a

Glazing area (A)

Number of rows preferred in table below: 10 *(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	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_w)	Cooling g (S_c)	Area used (m²)	Element share of % of allowance used
1	Window	E		1.20	3.20		4.0	0.70	10.800	1.800	6.00	0.60	0.47	0.47	3.84	100% of 89%
2	Window	N		1.20	11.40		5.5	0.79	10.800	1.800	6.00	0.60	0.13	0.35	13.68	100% of 100%
3	Window	W		1.20	3.60		4.0	0.65	10.800	1.800	6.00	0.60	0.48	0.47	4.32	100% of 100%
4	Window 1	internal		1.80	4.50		4.0	0.90			2.00	0.00	0.55	0.55	8.10	46% of 99%
5	Window 2	internal		1.80	5.20		4.0	0.90			2.00	0.00	0.55	0.55	9.36	54% of 99%
6													0.00	0.00		
7													0.00	0.00		
8													0.00	0.00		
9													0.00	0.00		
10													0.00	0.00		