Housing Diversity and Adaptability Report for 621 Burwood Highway, Knoxfield

Prepared by Development Victoria

15 December 2020

1. Executive Summary

Development Victoria (DV) has prepared this report in relation to 621 Burwood Highway, Knoxfield ('the Site').

The purpose of this report is to provide detailed research and analysis to demonstrate how DV's development of its Knoxfield development project can deliver diverse and affordable housing that meets the needs of the City of Knox community.

Diverse housing options, including a mix of typologies, tenures, sizes and prices, provides households with greater access, choice and the flexibility to respond to lifestyle needs and preferences. Affordable Housing provides more Victorians with the opportunity to access a stable, secure home in a location that meets their needs. This has a range of economic and social benefits, including improved participation in employment and education, improved physical and mental health outcomes, and better connections with essential support services.

The report outlines an analysis of current and forecast population characteristics and housing market activity, which has informed recommendations on the delivery of housing diversity and affordability on the Site.

This assessment found that the primary targets for DV's affordable housing initiatives at the site should be couples with or without children and to satisfy this market by providing affordable 2 and 3-bedroom homes.

These couple households are likely to be moderate income households comprising a spread of first home buyers seeking to get into the housing market and the growing population of downsizers in the area seeking a low maintenance living/lock-up and leave lifestyle.

In order to provide greater housing diversity on the site, this assessment also suggested that DV could deliver a proportion of smaller, higher density dwellings (1 and 2-bedroom) for singles, retirees and couples without children, to meet the ageing demographics and changing needs of the area.

In response to these findings, DV proposes to deliver more diversity through the provision of 1 and 2-bedroom townhouses, and up to 10 per cent of dwellings as affordable housing, consistent with the planning requirement. DV will implement a system to validate that buyers are eligible for the affordable homes and ensure they have exclusive access to designated dwellings.

The project could also help contribute towards the City of Knox's aspiration for 5% social housing in new development sites, subject to securing currently available State funding for construction of social housing and attraction of interest from community housing sector operators.

Finally, this report outlines how DV's proposed development will address the list of matters that must be considered when assessing the appropriateness of a proposed built form for affordable housing.

This report should be read in in conjunction with the subdivision planning permit applications for the Site, which provide the detail of the proposed development.

1. Introduction

Development Victoria (DV) has prepared this Report in relation to the proposed development of its 621 Burwood Highway, Knoxfield land ('the Site').

The report has been prepared to outline DV's intended approach to affordable housing and diversity. Under the Knox Planning Scheme comprehensive development zone schedule 2 (CDZ2), such a report is only required where a town planning permit application is made for buildings and works. Houses for the Site to be developed under the Small Lot Housing Code (SLHC) do not require a planning permit for buildings and works.

CDZ2 specifies that where a housing diversity and adaptability report is required to accompany a town planning permit for buildings and works, it must provide information on:

- the mix of dwelling sizes to be provided for a diversity of housing;
- a range of dwelling types to cater for a variety of housing needs including the provision of up to 10 per cent of dwellings as affordable housing (as defined in section 3AA of the *Planning and Environment Act 1987*) (the P&E Act).

The purpose of the report is to address this CDZ3 provision and provide findings on research and analysis to demonstrate how the Site development will deliver diverse and affordable housing that meets the need of the City of Knox community.

The report comprises three sections:

1. **Policy Context** - summarising the key Government policy and planning frameworks that influence the delivery of affordable and diverse housing at the Site.
2. **Demand for diverse and affordable housing** - describing the key population and general housing market characteristics and the forecast demand [based on ABS figures and Victoria in Future, population and household projections to 2056 (VIF)] for diverse and affordable housing in Knoxfield.
3. **Proposed delivery of diverse and affordable housing at the Site** - indicates the targets for diverse and affordable housing to be delivered by DV and how they respond to the Act.

A more detailed overview of the population and housing characteristics of the City of Knox in 2016 compared to the Greater Melbourne Statistical Area is attached in Appendix 1.

Key Terms

Affordable Housing is defined in the P&E Act as 'housing including social housing, that is appropriate for the housing needs of very low income, low income or moderate income households'. Income bands updated annually by the Minister for Planning and gazetted each year by Governor in Council Order on July 1 provide clear benchmarks for the incomes of households that may require affordable housing.

Social housing is an umbrella term that includes both public housing and community housing. Its provision usually involves some degree of subsidy.

Moderate Income Earner (MIE) is a person or household earning within the moderate income range as gazetted each year. . DV has determined the likely purchase and rental capacity of MIEs based on these income ranges, prevailing lending conditions and the assumption that no more than 30 per cent of a household income will be applied to mortgage and rental payments (refer Figure 1).

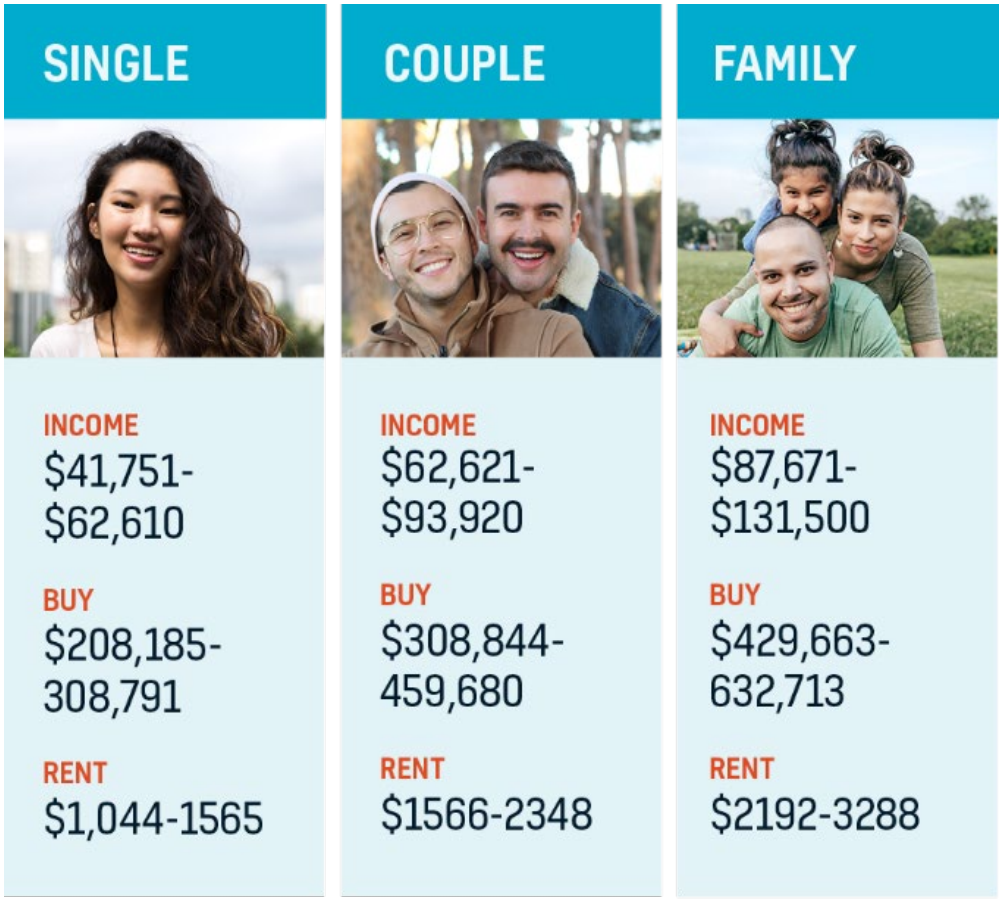


Figure 1 Moderate Income Earner Income Ranges, Indicative Purchase and Rental Capacity

2. Policy Context

State Housing and Planning Policy

The P&E Act objectives include 'to facilitate the provision of affordable housing in Victoria'.

State policy documents such as *Homes for Victorians* (2017) and *Plan Melbourne 2017 – 2050* reflect the State Government's priority focus on increased supply of housing in already established areas, and the need to deliver greater volume and a wider range of affordable housing options.

As the primary property developer of the Government, DV has a legislative requirement to deliver Government policies on affordable and diverse housing and urban renewal, and to demonstrate best practice. Promoting and delivering affordable and diverse housing is one of the DV 'policy pillars' and to guide the development of projects that deliver on this policy pillar, DV has put in place an Affordable and Diverse Communities (ADC) framework, which aims to deliver a range of market-based affordable housing options without the need for government subsidy.

The vision of the ADC Framework is the "Cr*eation of vibrant and resilient communities through delivery of diverse and affordable housing at scale*". The DV aim is to keep the purchase price of its housing as affordable as possible, while maintaining good quality and sustainable built form outcomes and meeting market sector expectations and needs.

In addition, Government has identified a significant shortfall (more than 30,000 units across Victoria) in the supply of social housing. To address this issue, in November 2020, the Government announced funding of $5.3 billion to build 9300 new social-housing homes – including replacing 1100 old public housing units. The investment will encompass both public housing and community housing, including awarding capital grants for new social housing construction projects led by Community Housing Agencies (CHA), or turnkey projects acquired by CHAs, which are 'shovel ready'.

DV aims to deliver a mix of market, affordable and (subject to funding) social housing in its masterplanned communities, with a diversity of product meeting the needs of a wide. a range of households

City of Knox Housing and Planning Policy

The *Knox Community and Council Plan 2017-2021* highlights Council's goal to have a greater diversity of housing to meet the changing needs of the community. Key challenges highlighted in the Plan that are relevant to this project include:

- minimal diversity (type and size) in available housing options provides limited choice to respond to changing needs;
- housing affordability (renting and purchasing) and affordable living (that is, managing ongoing operational costs of home occupation / ownership).

In response to these challenges, the *Knox Affordable Housing Action Plan 2015-2020* contains concrete actions and outcomes targeted at delivering a diversity of housing choice in appropriate locations that meet the accessibility, sustainability and affordability needs of the community.

The key focus of the *Knox Affordable Housing Action Plan* is to increase the supply of social housing as social housing provides for the most vulnerable and disadvantaged households in Knox.

The City of Knox has estimated the need for 860 additional social housing dwellings in the Municipality by 2036 in order to meet the needs of low-income, non-home-owning households. While it is not included in the planning controls for the Site, the Council has expressed an aspiration for the provision of a minimum social housing allocation of 5 per cent of the overall number of dwellings on the Site.[1]

[1] *Minimum supply of social housing, Knox* (2014-2036), City of Knox

3. Demand for diverse and affordable housing

Demographic profile - Knoxfield

'Couple family with children' is the dominant household type in Knoxfield[2], representing 42 per cent of all households and is forecast to remain so until at least 2036. This group is estimated to see the greatest total increase in households over the period from 2016 to 2036, followed by 'Couple Family without Children' (forecast to comprise 26 per cent of the population in 2036) and 'Lone Person' household (18 per cent in 2036).

In 2016, the largest age group in Knoxfield was Homebuilders (aged 35-44 years; 14 per cent of the population) and that group is forecast to remain so until at least 2036. This is followed very closely by Young Workers (25-34 years), Older Workers and Pre-Retirees (45-54 years) and Seniors (65-84 years), which all comprise a similar proportion of the population, 13-14 per cent.

Over the 2016-2036 period, the greatest increase in age groups is forecast to be among 'Homebuilders', followed by the same groups as above: 'Older Workers and Pre-Retirees' (aged 45-54 years), 'Young Workers' (aged 25-34 years), and Seniors (65-84); all forecast to comprise 13-14 per cent of the population by 2036.

These statistics suggest that Couples with or without children that are 'Homebuilders' are the dominant current and future need in this location, however single young and retirees are also large cohorts.

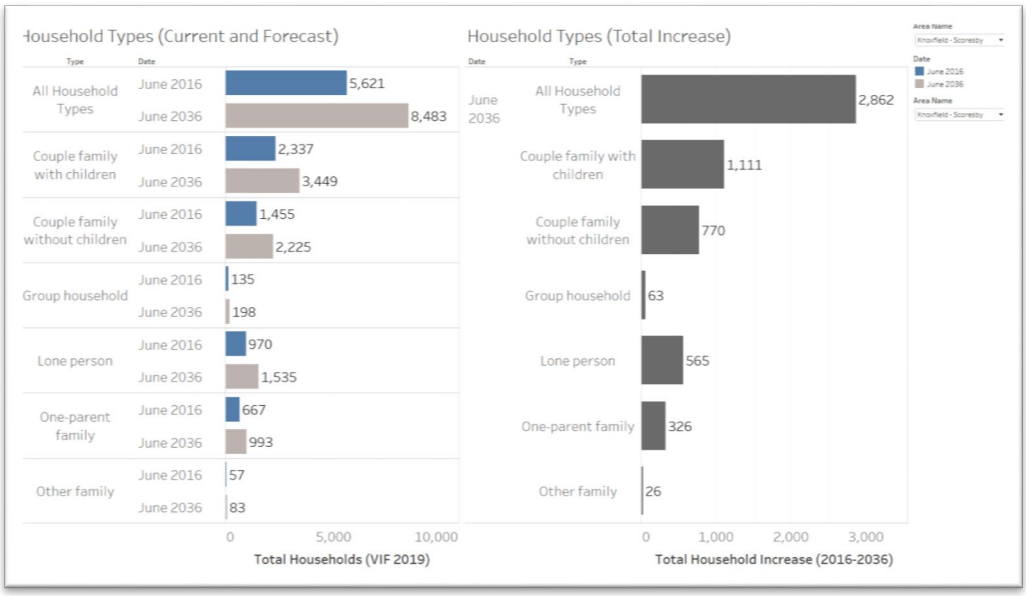


Figure 2 Knoxfield – Current and Future forecast Household Growth (2016-2036)

[2] VIF (2019) classifies the suburbs of Knoxfield and Scoresby as a single area for the purposes of the population projections.

Income profile – City of Knox

Figure 3 shows that in the City of Knox in 2016, 17 per cent of households were (earning less than $650 per week), which is comparable to Greater Melbourne. Fifty per cent of households in 2016 earned a median income.

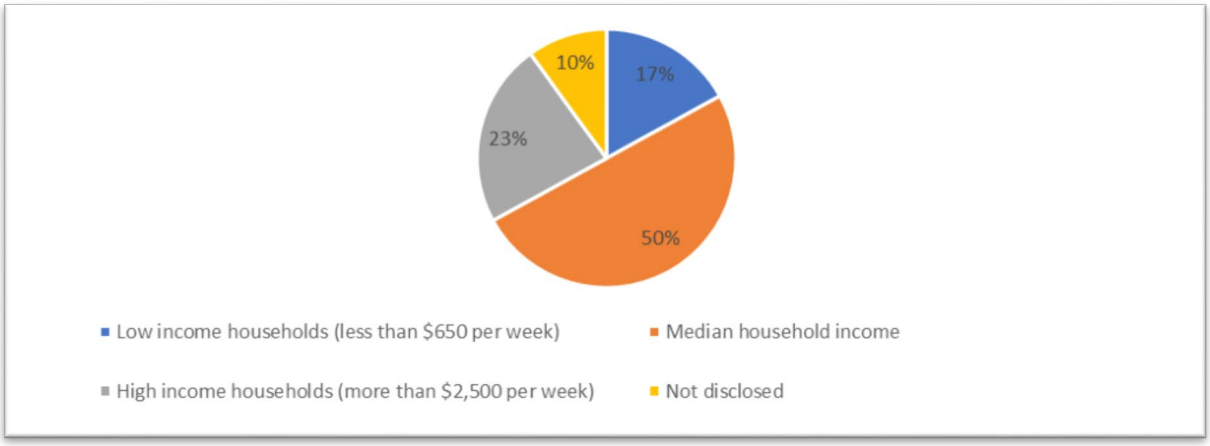


Figure 3 City of Knox, Weekly household income, 2016

Of those households in the City of Knox earning a low income in 2016:

- 38 per cent were lone person households and 25 per cent were couples without children;
- 49 per cent owned their dwelling outright while a further 21 per cent owned with a mortgage;
- 16 per cent rented in the private rental market.

Migration trends – City of Knox

The historical household movement into the City of Knox between 2011 and 2016 demonstrated a prevalence of overseas arrivals and people moving from the Cities of Monash and Whitehorse (Figure 4).

The main migration flows out of the municipality between 2011 and 2016 were to areas with lower median house prices, Cardinia and Casey,[3] which may reflect couples and small families moving to improve their housing choice and affordability options particularly as household size grows.

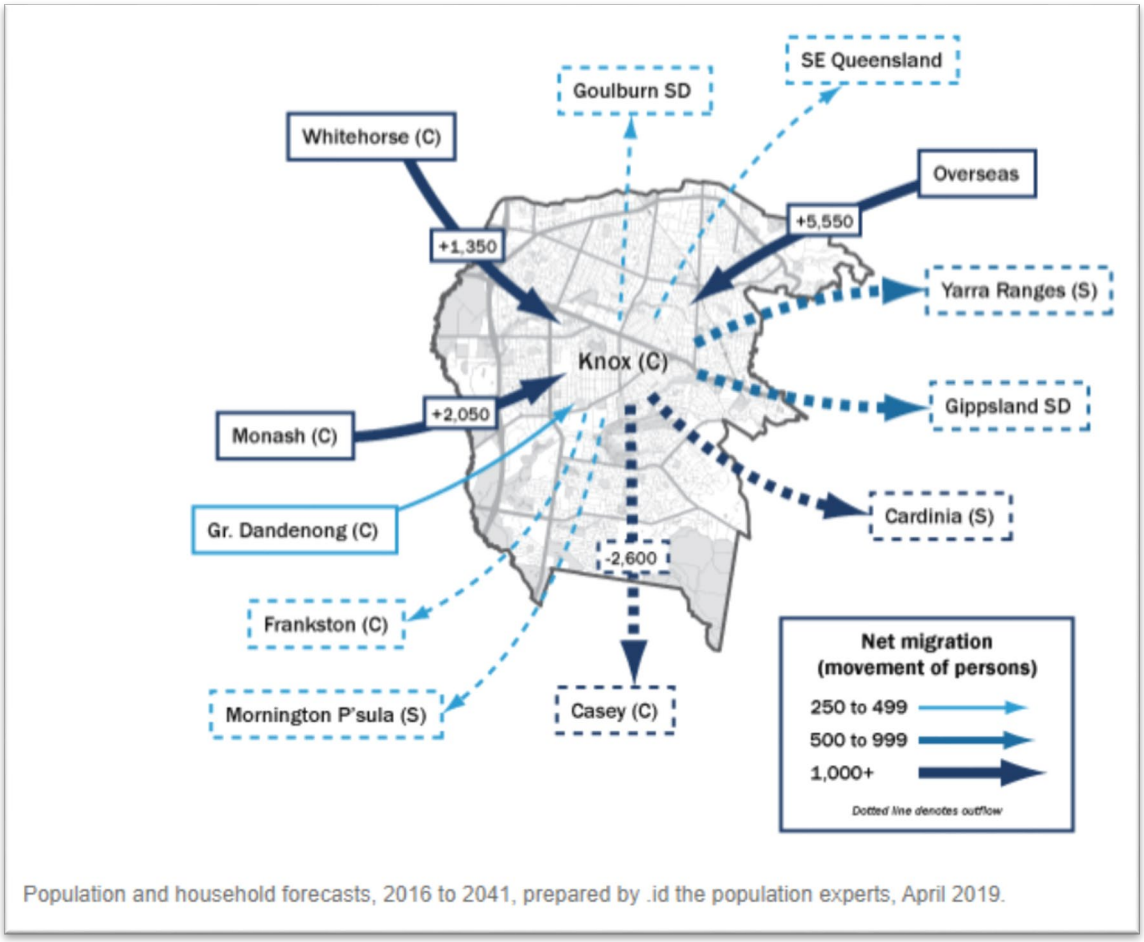


Figure 4 Historical migration flows, City of Knox, 2011-2016

The predominant age group of people moving out of the City of Knox was 25-34 year olds. While the main age group of people moving in was this same cohort, 25-34 year olds.

This further supports the statement above that Couples with or without children that are 'Homebuilders' are the dominant current and future need in this location.

A more detailed overview of the population characteristics of the City of Knox in 2016 compared to the Greater Melbourne Statistical Area is in Appendix 1.

[3] Source: id. Community demographic resources, https://economy.id.com.au/

Current general housing profile – Knoxfield & the City of Knox

There is lack of diversity in Knoxfield and the City of Knox more broadly, with a disproportionately high number of detached houses with three or more bedrooms, and a high percentage of entrenched home ownership

Figure 5, for instance, shows the number of bedrooms per dwelling in the City of Knox compared to Greater Melbourne. This lack of diversity reduces the ability of older residents to downsize and age in place, which is a significant challenge for the area given its age profile noted above, but can also make it challenging for younger residents to afford to buy in the area, forcing them to leave.

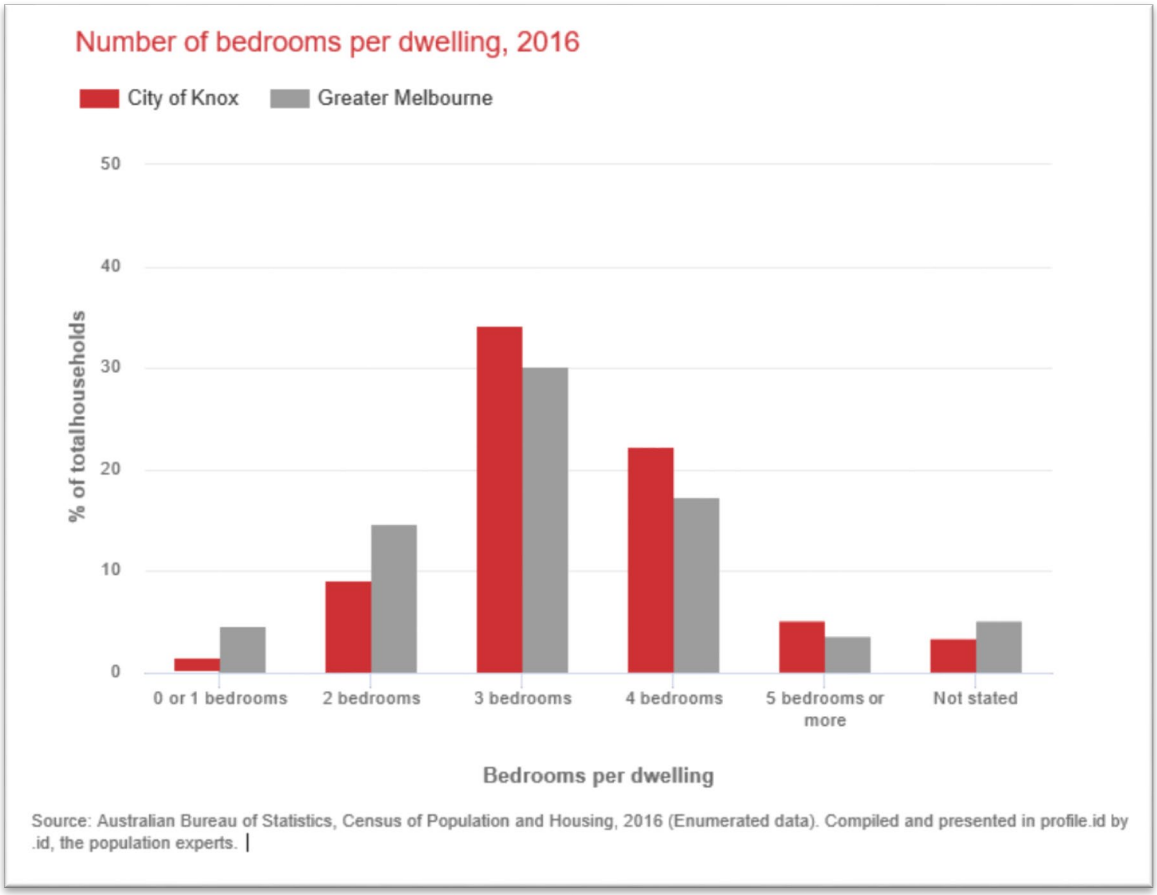


Figure 5 Number of bedrooms per dwelling, City of Knox, 2016 (ID Consulting)

Knoxfield is a transitioning area with medium density product beginning to become accepted in the area. This transition is reflective of a shift in the City of Knox more broadly, as suburbs further west and further east are ahead in this transition, due to higher median prices (west) and closer proximity to public transport (east – Ferntree Gully and Boronia are both serviced by train stations, whereas Knoxfield is not).

This suggests that there is likely to be an increasing appetite for medium density dwellings of one and two bedrooms in the Knoxfield area.

A more detailed overview of the housing characteristics of the private housing market in the City of Knox in 2016 compared to the Greater Melbourne Statistical Area is in Appendix 1.

As the City of Knox comprises a population of more than 160,000 over an area of 114 square km, this section focusses more specifically on Knoxfield and a targeted catchment area within the City of Knox. The study area comprises the suburbs of Ferntree Gully, Boronia, Wantirna, Wantirna South and Scoresby. These suburbs have been selected due to similarities in terms of price, demographics and access to amenity.

Current MIE housing profile - Knoxfield and the 'catchment area'

DV has undertaken a more specific analysis of all MIEs (outright owners, owners with a mortgage and renters) currently living in Knoxfield and the 'catchment area' and the types of dwellings they are living in, to better understand the living choices of current MIEs.

This analysis found that 1 and 2- bedroom townhouses and apartments are popular for single and couple MIE households and while families are occupying 3 and 4 bedroom houses in Knoxfield and the catchment area, some are trading into townhouses or apartments, as well as into dwellings with fewer bedrooms. This is likely to be driven by affordability constraints.

Affordable housing for rent - Knoxfield and the 'catchment area'

DV has undertaken a more specific analysis of all those currently renting in Knoxfield and the catchment area and the types of dwellings they are living in to better understand their income ranges and living choices.

While many renters choose to rent rather than buy a home in order to live close to jobs and family, renters have been selected in this analysis as it may be assumed that some are living in a location where they would like to live, but are unable to afford to buy in. For this reason, renters are likely to be among the target market for DV's affordable homes.

At the 2016 Census, Knoxfield had just over 400 affordable rental properties, which comprises just 10 per cent of the affordable rental dwellings in the catchment area. These Knoxfield renters are primarily occupying detached houses with 3 bedrooms, which is reflective of the dwelling stock available in the area.

Notably, the suburbs that have substantially more affordable housing (Ferntree Gully, Wantirna and Wantirna South) have a greater housing diversity, in terms of dwelling type, bedroom number and at greater density. This may be how they have accommodated greater numbers of low and moderate income earners.

This suggests that there is an opportunity at Knoxfield to provide more diversity of dwellings to accommodate households in the moderate income range.

Social housing – Knoxfield

At the 2016 Census, there were 23 households in Knoxfield that were classified as social housing, which is the lowest in the catchment area. These social housing tenants were primarily living in 2 and 3 bedroom houses, reflective perhaps of the current dwelling stock in Knoxfield. This represents 5 per cent of all affordable rentals in Knoxfield.

As at September 2020, there were 2076 social housing applicants on the Victorian Housing Register for the Outer Eastern Melbourne area, and 873 were categorised as 'Priority Access', people who are homeless and receiving support; are escaping or have escaped family violence; with a disability or significant support needs; or with special housing needs.[4] There were a further 276 transfer applicants on the Victorian Housing Register for the area.

Affordable housing for purchase - Knoxfield and the 'catchment area'

In the last 12 months there have been 119 sales of dwellings in Knoxfield. An analysis of these sales found that very few dwellings could meet the affordable definition and thus be appropriate to meet the needs of very low, low and moderate income households.[5]

There is a portion of the supply that was notionally affordable to Family MIE, a nominal amount affordable to Couple MIE and nothing available to Single MIE. There was effectively no dwellings available to purchase by very low and low income households.

When the same analysis was carried out for the wider catchment area, it was evident that where more diverse and compact forms of dwellings (such as townhouses and apartments) have been supplied, households that are normally priced out of the area are able to purchase, by accessing a more affordable product compared to the dominant product type, detached houses.

Recommended target market and their housing needs

Based on this assessment of market supply and demand for diverse and affordable housing, it is recommended that the target market for the affordable housing components of DV's Knoxfield project be couples with or without children with affordable 2 and 3-bedroom homes.

The couple MIE households are likely to comprise a spread of First Home Buyers seeking to get into the housing market and Downsizers seeking low maintenance living/lock-up and leave lifestyle.

To deliver greater housing diversity, there may also be a market for a proportion of 1 and 2-bedroom dwellings for singles, retirees and couples without children that meets the ageing demographics and changing needs of the City of Knox.

Given that the City of Knox has an aspiration for 5 per cent social housing at the Site, the relatively small amount of social housing currently in Knoxfield, and the number of social housing applicants for the area on the Victorian Housing Register, social housing is a gap that this project could contribute to filling, subject to securing funding from the State.

[4] Victorian Housing Register, https://www.housing.vic.gov.au/victorian-housing-register, as at September 2020

[5] This assumes that Families would purchase 3 or more bedroom homes, Couples would purchase two bedrooms and Singles would purchase one bedrooms, based on the current expressed living preferences of Knoxfield residents.

4. Proposed delivery of diverse and affordable housing at Knoxfield

Affordable housing

Development Victoria proposes to deliver up to 10 per cent of dwellings as affordable housing, consistent with the planning requirement. This will be delivered in the form of 2- and 3-bedroom townhouses for sale at affordable price points for MIEs - to meet the needs of the identified target market for the affordable housing components this project – predominantly couples with or without children.

To ensure these homes are purchased by buyers who are 'eligible' for affordable housing, that is, households earning within the income bands published by the Government DV will implement its Eligibility and Validation process to ensure that buyers qualify as MIEs, residents of Australia and will live in the home as their primary pace of residence. Validated purchasers will be given exclusive access to purchased designated affordable dwellings.

DV proposes to offer at least 5 per cent of stock for purchase by Community Housing Agencies (CHA) for use as social housing for very low and low-income earners. Purchase by CHAs is likely to be dependent on them making successful bids for funding from the Social Housing Growth Fund Capital Program. and support the Government's recent $5.4billion commitment to build 9300 new social-housing homes across Victoria.

The affordable housing will be incorporated throughout the site and will be tenure blind and integrated with the surrounding development, meaning that private housing and social housing should not be able to be readily differentiated through either their appearance, quality or amenity and will have equal access to all public outdoor spaces.

The Government has set out the following list of 'Matters' that must be considered when assessing appropriateness of a proposed built form as affordable housing, Figure 6.

Figure 6 Matters to be considered when determining appropriateness

The following outlines how DV will address each of these Matters to deliver affordable housing at the Site.

Government listed matter	DV proposed development response
Allocation	Allocation of affordable housing must be to households that earn within the Government-defined income bands. DV will predominantly allocate affordable housing to MIE households (refer *Key Terms*). These households are likely to have the financial capacity to buy the most affordable market-priced stock that DV can deliver, without requiring access to government housing support or subsidy. Additionally, DV is intending to allocate dwellings for purchase by CHAs for use as social housing for very low and low-income earners. The Victorian Housing Register has two categories and CHA are required to allocate homes to a mix of these categories in their portfolio. • Priority Access - for people who are homeless and receiving support; are escaping or have escaped family violence; with a disability or significant support needs; with special housing needs. • Register of Interest - for all eligible applicants to register their interest in social housing. In practice, these organisations manage their tenancies to ensure an appropriate balance for the location and to cater for the demand in that area.
Affordability	Through efficient subdivision layout and high-quality, efficient and compact townhouse design, DV has developed townhouse products at price-points that are affordable to purchase by MIE households. These price-points are determined using income bands prescribed within the Act, prevailing lending conditions and a requirement that no more than 30% of household income is required to service mortgage payments (refer Figure 1 for these price points).
Longevity of benefit	By virtue of their smaller land footprint than the dominant product in the surrounding area, DV's affordable housing will cost less to purchase compared to dwellings in the local market and metropolitan Melbourne and will continue to cost less over time. Any social housing delivered in the project is likely to be operated for a period of at least 20 years by the purchasing CHA.
Tenure (Term)	DV's affordable housing offering at Knoxfield will be achieved predominately through ownership, either by sale to individual purchasers or CHAs. To help ensure that affordable dwellings are in fact purchased by MIE households, it is proposed that a portion of the affordable dwellings will be held in reserve for sale only to validated MIE. DV has an established procedure for validating MIE for this purpose. As there is likely to be product within the Knoxfield project that is nearly (but not quite) affordable to MIEs, DV may seek to reduce the barrier to MIE entry by participating in the State Government's recently expanded shared equity scheme,

Government listed matter	DV proposed development response
	HomesVic. This initiative helps eligible buyers purchase a home with as little as 5% deposit and reduces the purchaser's share of the sale price. This opportunity will be investigated further as the Government's plans for the continuation of the HomesVic Shared Equity Scheme are finalised. Beyond the proposed allocation of social housing detailed above, affordable rental for MIE is not proposed at the Site. While the Site has positive amenity, such as its proximity to educational facilities, Westfield Knox Shopping Centre and open space, it lacks the genuine train and/or tram infrastructure required to support build-to-rent at this time. There may be an opportunity to reconsider build-to-rent in future as the build-to-rent sector matures in Victoria with the support of the Government's recent commitment to provide a 50 per cent land tax discount for eligible new build-to-rent developments until 2040.
Type (Built Form)	DV proposes to deliver affordable housing in the form of townhouses comprising a mix of 2- and 3-bedroom homes. The 4-bedroom homes are unlikely to be affordable to MIE. The 1-bedroom townhouses are likely to be affordable to MIE families, however based on the living preferences of family households currently living in the City of Knox, DV does not expect MIE families to take up 1-bedroom homes. DV's masterplan for the Site also includes one 1.x hectare mixed-use superlot on the corner of Burwood Highway and Scoresby Road, which is being considered for an apartment development partially for additional affordable housing.
Location	The affordable housing is expected to be located throughout the development.
Integration	Affordable housing is expected to be integrated with market housing and not be externally distinguishable from market housing.

Table 2 How DV proposes to deliver affordable housing at the Site, with reference to the Government listed matters

Diverse housing to cater to a variety of housing needs

As detailed above, there is currently an unbalanced housing hierarchy in Knoxfield and the City of Knox more broadly, with very few 1- and 2-bedroom dwellings and a disproportionate number of detached houses. DV's proposed development will deliver a greater proportion of 2- bedroom homes than the City of Knox LGA current dwelling mix. Eighty-five homes, or about 20 per cent of the townhouse development will have 2-bedrooms, compared with City of Knox LGA, which had about 12 per cent two bedroom homes at the last census.[6] This will help to meet the demographic need identified in earlier sections to provide housing for singles, retirees and couples without children.

While DV proposes to deliver ten 1-bedroom townhouses, or about 2% in this initial townhouse development, diversity is likely be further enhanced by any future apartment development on the Mixed Use area, as this is likely to deliver greater numbers of 1 and 2-bedroom apartments and possibly studios, to increase the share of smaller houses across the development.

[6] This refers to the proposed dwelling mix of all townhouses to be delivered in the development, not only affordable dwellings.

Appendix 1

Table 1 Population Characteristics, City of Knox, 2016, ID consulting and ABS

Description (2016)	City of Knox LGA	Greater Melbourne Average	Analysis
Estimated Resident Population	154,113	4,485,211	
Median age	39 yrs	36 yrs	Greater proportion of the population in the City of Knox is older than Greater Melbourne.
Average household size	2.7 persons	2.6 persons	Comparable
Aboriginal and Torres Strait Islander	0.5%	0.5%	Comparable
Need of assistance	4.8%	4.9%	Comparable
Household composition (non- family households)	One person 20% Group households 2.3%	One person 21.9% Group households 4.7%	Comparable
Family household composition	Couple no children 24.1% Couple with children 38.7% One parent with children 11.1%	Couple no children 22.9% Couple with children 33.4% One parent with children 10.1%	Couples with children are the dominant households in the City of Knox. Greater proportion of couples with and without children living in the City of Knox compared to Greater Melbourne.
Employment Status	94.4% 58% full-time	93.2% 58% full-time	Greater proportion of people are employed and of those employed a comparable number are employed full-time.
Median weekly household income	$1,558 per week	$1,539 per week	Comparable household income in City of Knox compared to Greater Melbourne.
Low income households (less than $650 per week)	14.6% 7913 households	16.7% 264,804 households	Lower proportion of people in the City of Knox are low income households compared to Greater Melbourne.

Motor vehicles by dwelling	No vehicle 3.7% 1 vehicle 28% 2 vehicles 40.6% 3 or more vehicles 22.4%	No vehicle 8.5% 1 vehicle 33.2% 2 vehicles 34.8% 3 or more vehicles 15.9%	Lower rates of car ownership in the City of Knox.
Level of Education	Bachelor degree or higher 22% Vocational 19% No qualification 40.5%	Bachelor degree or higher 27.5% Vocational 15.3% No qualification 38.6%	While households on average have a lower level of education, this is not reflected in lower median household incomes.

Table 2 Housing Characteristics, City of Knox, 2016, ID consulting and ABS

Housing Characteristics (2016)	**City of Knox LGA**	**Greater Melbourne**	**Analysis**
Dwelling Type	Separate House: 83.7% Medium density: 14.6% High density: 0.8%	Separate House: 66.1% Medium density: 22.9% High density: 10.1%	Significantly greater percentage of separate houses in City of Knox compared to Greater Melbourne.
Number of Bedrooms	1 BR: 1.9% 2 BR: 12% 3 BR: 45.3% 4 BR: 29.4% 5+ BR: 6.9%	1 BR: 6% 2 BR: 19.5% 3 BR: 40.1% 4 BR: 23% 5+ BR: 4.8%	Significantly more three- and four-bedroom dwellings in City of Knox compared to Greater Melbourne. 1- and 2-bedroom dwellings comprise just 13.9% of all dwellings.
Unoccupied Private Dwellings	3,645 (6.2% of total dwellings)	9.1% of total dwellings	Fewer unoccupied dwellings in City of Knox compared to Greater Melbourne
Housing tenure	Own outright 33.2% Mortgage 41.3% Rent 19.2%	Own outright 29.0% Mortgage 34.4% Rent 28.8%	Fewer renters in City of Knox compared to Greater Melbourne.

aurecon

Bringing ideas to life

Knoxfield Residential Development

Sustainability Management Plan

Development Victoria

Reference: 510039
Revision: 2
2020-12-14

Executive Summary

The Knoxfield Residential Development ('The Site') is a proposed residential development located on the 19-hectare former Department of Environment Land, Water and Planning (DELWP) site at 621 Burwood Highway. The site is being developed by Development Victoria (DV). The redevelopment will deliver a vibrant new community with a diverse range of housing, a mixed-use precinct, a significant new wetland area, public open spaces and recreational facilities. The vision is to provide the community with diverse and affordable housing, well located to key amenities, and holistic sustainability measures that maximise financial, environmental and social outcomes.

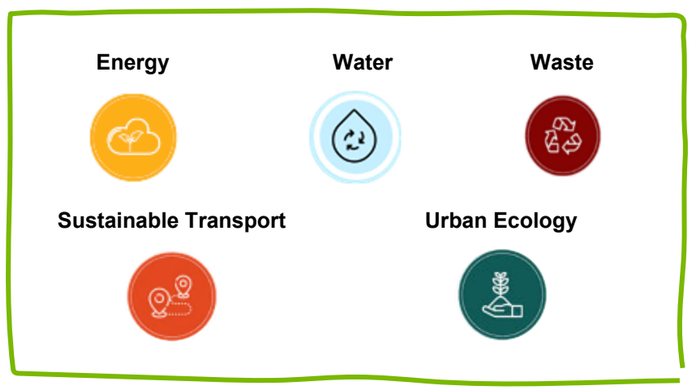
This report summarises the sustainability strategy for The Site which has been developed during the planning phase of the project.

Sustainability Strategy

DV aims to create long lasting positive impacts and the implementation of holistic sustainability is central to the long-term vision for the Knoxfield redevelopment. This will play a pivotal role in aligning and achieving social, economic and environmental values of all project stakeholders.

The holistic sustainability vision for Knoxfield, has been built on the specific context of the project, site and region, and the associated stakeholders to optimise sustainability outcomes.

Five key sustainability themes have been identified, based on the context and desired outcomes.



Sustainability Integration

Sustainability opportunities have been identified and selected based on the impact areas and the most effective strategies for the precinct. Sustainability will be embedded into masterplan and project control mechanism / delivery documents, to ensure that the sustainability strategy and vision is achieved long term.

Climate Change Resilience

Climate change has significant implications for the Knoxfield project with respect to building design and operation, occupant health and economic activity. Aurecon is working with the design team and DV to integrate appropriate project specific mitigation measures to reduce the impacts of the changing climate on the community.

Benchmarking

Preliminary energy, water and waste benchmarking of the development has been undertaken to identify opportunities to reduce greenhouse gas emissions, potable water demand and divert waste from being sent to landfill. This process has explored the potential for improving performance in order to achieve the ambitious targets set for the seven key sustainability themes. Early results indicate that by implementing emerging technologies alongside best practice design and construction, the development can enable carbon neutrality, circular economies and significant reductions in potable water demand.

Sustainability Delivery

Verification

The Site is targeting a 6 Star Green Star – Communities v1.1 rating, representing 'World Leadership' in sustainable precinct planning.

This aligns to the Development Victoria Best Practice standard, which calls for the Communities target as a means for benchmarking and verifying the sustainability of the Site. Aurecon have prepared a Communities pathway to identify appropriate credits, key implementation considerations, timing and next steps.

Sustainability Strategy – Overview

The sustainability themes for the project have been developed, and each lead by a vision that reflects the ambition of the project and the Site Context.

Energy & Emissions

Vision: The precinct is zero carbon emissions by 2030

Targets

- Homes: 30% reduction in energy demand and 56% reduction in GHG emissions
- Mixed Use: 25% reduction in energy demand and 32% reduction in GHG emissions
- Public Realm: 50% reduction in energy demand and 50% reduction in GHG emissions

Key Strategies

- On Site Solar PV
- 7 Star NatHERS ratings for homes, 5 Star NABERS Energy and 5 Star Green Star ratings for mixed use
- Smart / sensor enabled street lighting
- EV charging 'ready' for homes and 'operational' for mixed use / public realm
- Natural ventilation LED street lighting

Waste

Vision: Waste is managed to support minimisation of material sent to landfill and promote recycling and reuse of materials

Targets

- C&D Waste: 90% diversion rate from landfill
- Operational Waste: 50% diversion rate from landfill

Key Strategies

Construction and Demolition

- Manage and plan the delivery and storage of materials efficiently
- Reduce waste from packaging of materials
- Detail waste minimisation measures in site inductions
- Divert 100% of usable spoil from landfill

Operations

- Spatial allowance for future 4 bin waste collection
- Community education
- Sustainable approach to retail waste

Water

Vision: Water is conserved and managed sustainably, in a way that enhances the natural ecology of Knoxfield

Targets

- 30% Reduction in Potable Water demand
- Re-use of all rainwater falling on roofs
- Minimise potable water use in public realm or open space

Key Strategies

- 4 Star NABERS water rating for mixed use
- Efficient fixtures & fittings
- Drought tolerant landscaping & efficient irrigation
- On site rainwater storage

Sustainable Transport

Vision: Promote affordable, green, and active transport for all ages and abilities

Targets

- Provide options for future residents to reduce personal fossil-fuelled car use by 20%

Key Strategies

- EV charging 'ready' for homes and 'operational' for mixed use / public realm
- Fast and reliable internet
- Commercial on-demand services
- Allowance for future active transport upgrades on frontage
- Wayfinding and signage
- Crime Prevention through Environmental Design
- Amenities and facilities for walking, running, and cycling
- Allowance for future upgrades for public transport

Urban Ecology

Vision: Existing biodiversity is conserved, and opportunities taken to increase ecological and social value

Targets

- Greening and biodiversity: Meet council green canopy requirements, and indigenous tree proportions including wetlands area
- Manage impact of Urban Heat Island caused by development of site
- Stormwater management: Meet council requirements using wetlands treatment and retention capacity
- Education and engagement: Provide opportunities for the residents to engage with nature in the public realm

Key Strategies

- Home planting guidelines
- Cool roofs, facades and pavements
- Maximise existing trees retained
- Public realm vegetation selection to prioritise indigenous and native species
- Wetland design for habitat
- Wetland design for stormwater management
- Green turfs and permeable pavements
- Nature observation opportunities

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1 – Introduction

1 Introduction

1.1 Background

The site is 19.2 ha and located at the corner of Burwood Highway and Scoresby Road in Knoxfield and was formerly a DELWP horticultural research facility. Interfaces include Blind Creek to the north; Fairhills High School and residential properties to the east; Burwood Highway and the remaining DELWP offices to the south; and a light industrial estate to the west.

Development Victoria acquired the Site, and had it rezoned to a Comprehensive Development Zone (CDZ) to support residential and mixed-use development. The initial stage of the project has seen due diligence and project investigations undertaken, with some early stakeholder and key community engagement carried out. Early investigations have considered the development of a wetland located in the northern portion of the site, to provide habitat for local bird species, and provide stormwater treatment and detention services.

1.2 About Development Victoria

Development Victoria (DV) is a unique developer owned by the Victorian Government. DV works in accordance with Victorian State Government policy objectives, to seek out opportunities to increase housing diversity near employment centres, transport and services. DV aims to manage projects to create cultural, recreational and civic facilities that enrich Victoria's communities.

DV's purpose is to create lasting positive impacts. The sustainability of these communities is key to achieving long lasting, affordable and high-quality developments.

1.3 Purpose

The Sustainability Management Plan is written in support of the proposed development and details the alignment of the planning proposal with Knox City Council's Sustainable Design Principles which are outlined in Ecologically Sustainable Development Policy 22.04 of the Knox Planning Scheme.

The plan details the sustainability strategies and initiatives developed by Aurecon and DV in collaboration with the wider design team, which form a key component of the vision for the new subdivision.

Key sustainability themes have been identified, and a vision statement developed for each (refer Section 5).

The sustainability strategy addresses resilience and diversity in an integrated way through each of the themes.

1.4 Report Outline

The outline of this report is as follows:

Section 2: Policy Context

Information on relevant legislative frameworks, DV Policies and Commitments.

Section 3: Climate Change Projections and Adaptation

Description of the key climate change risks and adaptation measures This section clarifies the future climate context relevant to the site.

Section 4: Sustainability Vision and Context

An overview of the high-level themes and visions which provide the framework for the sustainability strategy

Section 5: Energy

Preliminary assessment of the energy consumption of the precinct and the proposed initiatives for meeting energy targets

Section 6: Water Resources

Preliminary assessment of the water consumption of the precinct and the proposed initiatives for meeting water conservation targets.

Section 5: Waste Management

Preliminary assessment of the waste generation of the precinct and the proposed initiatives for meeting the waste diversion targets

Section 10: Sustainable Transport

Preliminary assessment of the transport needs for the precinct and the proposed initiatives for meeting the sustainable transport targets

Section 11: Urban Ecology

Preliminary assessment of the performance of the precinct with respect to heat island effect and ecology, and the proposed initiatives for meeting the project targets

Section 13: Green Star Communities

Targeted ratings and preliminary roadmaps for certification.

1.5 Definitions

Acronyms

AFCS	The Australian Forest Certification Scheme
C&D	Construction & Demolition
CCAP	Climate Change Adaptation Plan
CLT	Cross-Laminated Timber
CSC	Concrete Sustainability Council
CRP	Community Resilience Plan
DV	Development Victoria
EV	Electric Vehicle
FCAS	Frequency Control Ancillary Services
FoGo	Composting Food Organics with Garden Organics
FSC	Forest Stewardship Council
GBCA	Green Building Council of Australia
GHG	Greenhouse Gas
HDPE	High-Density Polyethylene
HVAC	Heating, Ventilation and Airconditioning
KCC	Knox City Council
Knoxfield	Knoxfield Residential Development project
LBC	Living Building Challenge
MWRRG	Metropolitan Waste and Resource Recovery Group
NABERS	National Australian Built Environment Rating System
NatHERS	National House Energy Rating Scheme
P2P	Peer to Peer
PEFC	Programme for Endorsement of Forest Certification
PIT	Polymer Injection Technology
PV	Photovoltaic
PVC	Polyvinyl Chloride
RAP	Recycled Asphalt Pavement
UHIE	Urban heat island effect
WSA's CAP	World Steel Association's Climate Action Programme
WtE	Waste to Energy

Common Terminology

Homes	Refers to the residential portion of the Site.
Mixed use	Refers to the mixed-use portion of Knoxfield. The nature of this component is still under development at the time of this report. For the purposes of sustainability analysis some assumed spatial allocations have been adopted, however these are indicative only and do not represent the final option.
Public Ream / Infrastructure	The external places in Knoxfield that are accessible to all for movement, exercise and play; and the infrastructure within these places.

1.6 Reference Documents

GBCA – Future Homes Pilot

GBCA – Green Star – Communities v1.1

GBCA PVC Best Practice Guidelines

DV Modern Slavery Policy

Knox Planning Scheme

Plan Melbourne (2017-2050)

2 – Policy Context

2 Policy Context

There are several documents that have informed the site's sustainability strategy, as outlined below.

2.1 Planning and Policy Context

2.1.1 Knox City Council Environmentally Sustainable Development Policy (SDA)

The Knoxfield project will meet and, in some cases, exceed the minimum expectations for sustainable design performance outlines in the policy.

This Sustainability Management Plan (SMP) summarises sustainability initiatives that will be implemented, which align to this policy.

Noting that Council has provided requirements to verify sustainability outcomes via a third party tool, the Site will meet this expectation and be rated under the Green Star Communities framework, which is considered as robust and more applicable to the development than the BESS tool.

2.1.2 Knox City Council Climate Change Response Plan (2012-2022)

Knox City Council Climate Change Response Plan sets council goals to reduce greenhouse emissions, improve air quality and be well prepared for climate change. These goals are achieved through the following approaches as detailed in the Strategy:

- Achieve community and Council greenhouse gas reduction goals
- Offset greenhouse gas emissions
- Plan for adaptation to climate change
- Develop partnerships to address climate change mitigation and adaptation, and
- Improve air quality.

The Site will support the Plan through implementing design for existing and future climate conditions including energy efficient street lighting, incorporating recycled materials, reducing urban heat island impacts through strategies such as public shading through planting/tree cover and hardscape material selection.

2.1.3 Knox City Council Green Street Policy

Sets out Council's current strategic priorities in relation to the management of street trees and nature strips. Canopy cover targets are set, greening of nature strips by residents is enabled, and the intent to develop an edible trees street is identified.

The Knoxfield sustainability strategy will support the policies identified in the Knox City Council Green Street Policy.

2.2 State Legislative framework

Key Acts and Policies that have specific requirements of targets that the project must meet are described below:

2.2.1 Climate Change Act 2017

The *Climate Change Act 2017* introduces pledges, targets and a reporting framework that this project will need to review in order to determine compliance requirements when ratified. The Act sets a net-zero emission target for Victoria for 2050 and requires that five yearly interim targets are set. The first interim targets will be set for the 2021 - 2025 period in August 2020. The Act sits alongside other key Victorian Government energy and climate change initiatives including Victoria's Climate Change Framework, Victoria's Climate Change Adaptation Plan 2017-2020 and the Victoria's Renewable Energy Action Plan.

Victoria's Climate Change Adaptation Plan 2017-2020 includes requirements to build resilience and start the transition to net zero emissions and long-term transformative action.

DV is Victorian Government body and has adopted a target of net zero by 2030. The Site's sustainability strategy will seek to support this target, and may act as a test case for strategies to achieve this target.

Additionally, the Site is developing a formal Climate Change Adaptation Plan to drive resilience where required to continue to be a liveable community under a changing climate.

2.2.2 Plan Melbourne, 2017-2050

Plan Melbourne and its addendum is a metropolitan planning strategy that defines the future shape of the city and state over the next 30 years. It sets out the strategy for supporting jobs and growth, while building on Melbourne's legacy of distinctiveness, liveability and sustainability.

This Plan has informed the choice of this site for development and will support the application of sustainability initiatives.

2.2.3 Recycling Victoria

Recycling Victoria sets out Victoria's circular economy goals with a focus for the next 10 years transitioning to a circular economy. Waste reduction, re-use, recycling and governance are all considered.

Buildings on the site will include spatial provisions for the future four-bin system proposed as part of Recycling Victoria, and opportunities to utilise recycled materials will be explored to support the circular economy.

2.3 DV Policies and Guidance

The sustainability strategy will seek to support the below DV documentation to enable DV to achieve its targets.

2.3.1 Modern Slavery Policy

The Modern Slavery policy and procedure sets DV's position on modern slavery, and the responsibilities of DV and those it works with in upholding DV's position on Modern Slavery, including meeting DV's obligations under the Modern Slavery Act 2018.

2.3.2 Sustainability Best Practice Definition

The best practice definition outlines the best practice sustainability inclusions DV strives to include as a minimum in every development, unless there is demonstrated reason to exclude a best practice inclusion.

2.3.3 Affordable and Diverse Housing Framework

This framework defines how DV will contribute to providing affordable and diverse housing to meet the market needs of Victoria. DV targets the moderate-income market, whilst aiming to maintain good quality outcomes and meet market expectation and needs. The key pillars of its framework are providing affordable ownership, affordable rental, affordable living (costs), diverse communities (provide housing options), and affordable by design (efficient land use to enable affordability).

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3 – Climate Change Projections and Adaptation

3 Climate Change Projections and Adaptation

A Climate Change Adaptation Plan (CCAP) has been developed for the Site. An assessment has identified the climate projections included below.

An initial project team workshop has identified the risks and proposed adaptation strategies included herein. Both have informed the sustainability strategy as to the likely future climate context and will be used to drive the design process to incorporate greater resilience to future climate conditions.

Climate projection data for the site was sourced from the Victorian Climate Projections (VCP) 2019. Projections are available for scenarios where carbon emissions remain high, or where they are reduced. High emissions scenarios (RCP8.5) have been used for the projections (Table 1), as these are both conservative, and representative of the current most likely future scenario.

Table 1 – Climate projections for Greater Melbourne from VCP 2019, RCP8.5

TEMPERATURE	**Increase in Average Temperature:** The annually averaged warming is projected to be 0.8 to 1.6°C (1.2°C median) by 2030, and 1.6°C median by 2050. **Extreme Temperatures:** Substantial increase in the temperature reached on hot days and the frequency of hot days and the duration of warm spells 13 - 21 days over 35°C by 2050 (compared to 8.3 days per year in 1981 to 2010). Fewer frosts are projected.
RAINFALL	**Precipitation:** Decreases in winter and spring rainfall are projected (20% median reductions by 2090) **Extreme Rainfall:** Increased intensity of extreme rainfall events; occurring more regularly **Drought:** Time spent in drought is projected to increase **Evaporation:** Evaporation rates are projected to increase
STORMS	**Lightning:** Favourable conditions for thunderstorm formation is anticipated to increase **Wind:** Existing research is limited, and inconclusive
BUSHFIRE	**Bushfires:** More high-risk fire days are expected in the future across Victoria with a projected increase of 7.7 days, or a 42% increase by 2050. The fire season is projected to start earlier in Spring. (This considers weather conditions, but not fuel loads)

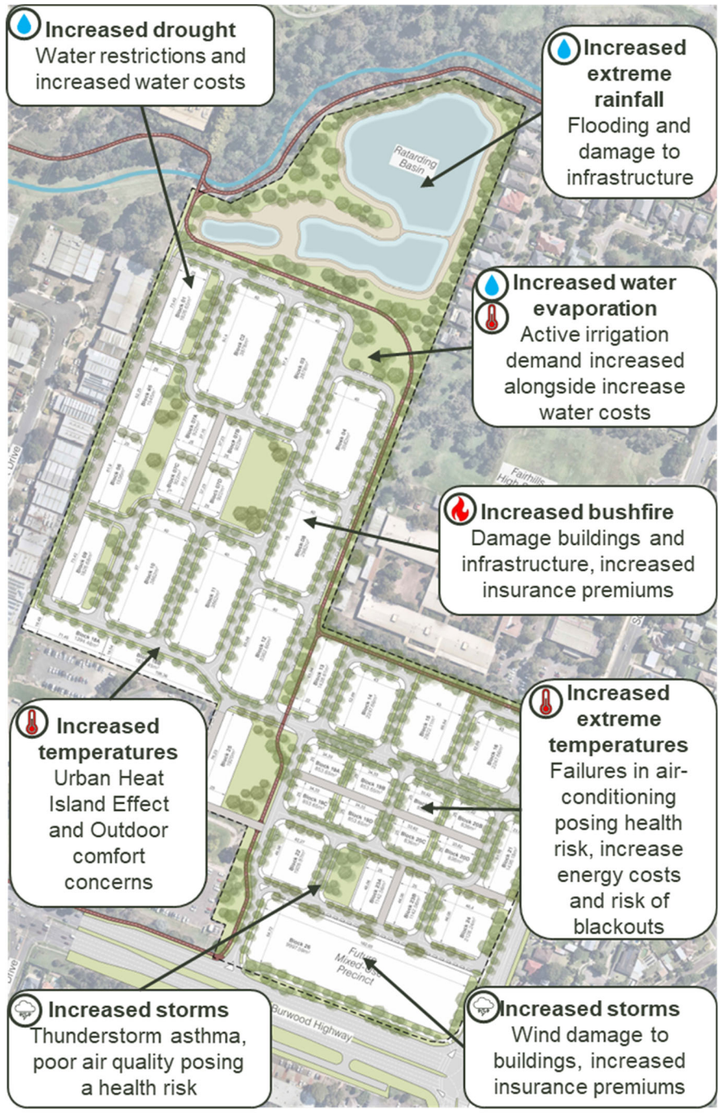


Figure 1 – Key climate change risks and impacts identified for the Site

Table 2 – Proposed adaptation strategies for key climate risks to project

Climate Change Risk	Adaptation Strategy
Urban Heat Island Effect and Outdoor comfort concerns during hotter average temperatures and more extreme heat days	Implement urban cooling strategies for the Site and enable better night-time (cooler time) use of public realm. Consider designing the mixed-use building as a refuge for extreme heat events. Include possible guidance in CRP.
More extreme heat causes more HVAC failures resulting in increased health impacts and HVAC repairs	Choose equipment appropriate for projected climate and design life. Apply urban cooling strategies to precinct. Apply energy conservation (7 Star NatHERS) requirements to prevent exposure to extreme daily temperatures indoors during failure.
Local bushfire damages buildings and infrastructure	Firebreak to protect properties closest to heavy bushland. Fire protection systems in mixed use buildings. Community education (including via CRP).
Increased cost of water, and requirement for active irrigation	Conserve water through efficient fixtures and irrigation systems, drought tolerant species selection, onsite rainwater and stormwater capture and storage for irrigation. Urban cooling to reduce water demand of plants.
Water restrictions become more common and water costs increase	Apply wholistic water sustainability strategy to conserve, reuse and recycle water.
More regular extreme storms impact outdoor air quality posing a health risk (i.e. asthma)	Apply performance requirements for airtightness and higher performance air-filters on HVAC to homes and the mixed-use building.
More regular, extreme windstorms cause building damage	Create CRP to consider this and how residents can prepare their homes for high wind events.

4 –Sustainability Vision and Context

4 Sustainability Vision and Context

Energy Performance

Vision: To prioritise the use of energy efficient design strategies and low-carbon energy

Context: Victoria's energy market historically relies on centralised fossil fuel energy generated by large providers, much like a one-way street. Currently the energy grid is undertaking a transition towards a more distributed network, with a greater number of large-scale variable solar and wind generators, and small-scale generators (homes and businesses) requiring more flexible two-way operation. As the grid evolves there is increased pressure on reliability. In combination with the additional electrical demands from high demand hot days climate change has caused more frequent bushfires, and storm events, which will increase in frequency as climate change progresses.

Opportunity: This development by DV offers the opportunity to drive transformation in the housing market towards a lower impact, energy efficient and resilient future.

Urban Ecology

Vision: Existing biodiversity is conserved, and opportunities taken to increase ecological and social value

Context: The site's location adjacent to Blind Creek, existing dam and associated wildlife, and established trees contribute positively to local biodiversity, and is of significant value to the local community.

Negative impacts to stormwater quality and run-off will be increased post-development due to increases in impermeable pavements and roofs. Additionally, urban heat island effect will be increased locally by the development works through the introduction of the same surfaces and removal of vegetation. UHIE is a significant challenge faced by human and natural communities of urban areas and will only become more critical as the climate changes impact result in higher average and extreme temperatures.

Opportunity: Improvements to ecological value, stormwater management and urban heat island effect can all be achieved through appropriately design greening of the development, which also provide other social and cultural benefits for residents and visitors

Water resources

Vision: Water is conserved and managed sustainably, in a way that enhances the natural ecology of the Site

Context: Water is a limited resource in Australia and Victoria. The variable supply is dependent on rainfall and is captured in several centralised reservoirs which provide water to large areas of Victoria and Melbourne.

While Melbourne's water storage supply is currently secure, due to substantial rainfall during recent times, climate change projections indicate that storage may decline over the next few years (Melbourne Water, 2019). Additionally, population projections indicate an increasing demand for water in the future.

In the context of a lower supply and a growing population, it is likely that Knoxfield residents will be subject to future water shortages and restrictions, as many other parts of Victoria currently are.

Opportunity: The Site is unique in providing the opportunity for substantial development-wide onsite water capture for reuse. Additionally, given the Site typically receives higher than average Melbourne rainfall, there is favourable conditions for the capture of water from dwelling rooftops to provide a more reliable alternative water source.

Sustainable Transport

Vision: Enabling low carbon, affordable, and safe active transport

Context: Transport is Australia's third largest emitter of greenhouse gas, with cars contributing to 50% of it. Knoxfield historically has a high reliance on private vehicles with car travel accounting for approximately 70% of typical journeys. As greenhouse gas regulations drive fuel prices to increase and traffic congestion makes driving less attractive, the ability to travel to where residents need to be without private cars will be valuable.

The changes in lifestyle and working during the 2020 COVID-19 pandemic has seen a significant reduction in personal car usage and an increased use of local public spaces and walking / cycling paths.

Opportunity: The Site's location close to key amenities and active transport networks, make it an ideal location to implement initiatives to encourage active transport modes, enable working from home, apply 20-minute city principles, and improve access to public transport.

Waste Management

Vision: Waste is managed to support minimisation of material sent to landfill and promote recycling and reuse of materials

Context: Waste management is becoming more expensive, with increasing landfill levies, and international recycling reducing acceptance of Australian products, meaning diversion of waste from landfill is more difficult (and expensive). There is a move to start viewing waste as a resource.

The Victorian Government has set targets to divert 80% of waste from landfill by 2030. Knox City Council's waste diversion rate was 52% for the year 2017/18.

To achieve this target, councils across Victoria including Knox City Council will be rolling out a four-bin system to separate glass from other recyclables, and to compost food organics with garden organics (FoGo). The Metropolitan Waste and Resource Recovery Group (MWRRG) and 16 councils including Knox City Council are also exploring a WtE facility for residual waste.

Opportunity: The design, construction and operation of the development has an opportunity to drive transformation in the construction industry and residential sector towards a circular economy. By introducing innovative solutions to waste reduction, re-use, recycling and governance, the Site can provide a test case for government in achieving a circular economy.

Diversity

A diverse community supports people of all ages, abilities, cultural backgrounds, and socio-economic backgrounds to an equal quality of life and supports their pursuit of differing activities and lifestyles.

For a community to support diversity, it should:

- provide a diversity of residences to meet the range of socio-economic needs of the residents and visitors
- provide safe spaces through good design
- provide diverse and inclusive environments for all ages, abilities and socio-economic backgrounds of the community, and create opportunity for a diversity of uses and activities.

It also needs to continue to meet these needs into the future.

The Site's strategies support diversity through:

- achieving ongoing affordability for residents and council (i.e. energy and water)
- supporting equal access to healthy indoor environments by providing them as a standard inclusion in homes (healthy and affordable living)
- providing cooling outdoor environments with good facilities to support active transport and access to public transport, outdoor activity and ready access to natural places (transport, ecology and ecosystems),
- encouraging a sharing culture which values shared goods and spaces to enable ready access to a variety of goods and spaces (waste).

Resilience

Building resilience of the community at Knoxfield will support the liveability of the community well into the future.

There will be changes influenced by the economy, environment, culture and other circumstances which require the community to adapt either temporarily or forever. Key changes considered in this report include climate change, increasing utilities and landfill costs, the impacts on lifestyle from pandemic events such as COVID-19, increasing population pressures on utility supplies and transport, the move toward a circular economy.

Resilient Melbourne also notes that the ability of a community to survive and thrive in the face of change is the strength of the residents themselves to work together as a community to adapt. Increasing opportunities for residents and visitors to engage in community settings has also been encouraged through the strategies proposed

Below is a summary of how each theme supports community resilience:

- Energy – energy resilience is provided through reduced on-site demand, and on-site generation, which enables the community to continue to function despite changes in availability or affordability of energy.
- Water – Similar to energy, water resilience is provided through reduced on-site demand, and increased on-site capture and reuse to further reduce potable water demands. – enabling the community to continue to function and thrive.
- Waste and resource strategies, support Victoria's move to a circular economy by implementing strategies to support the change to recycled materials, as well as locally by enabling waste separation on site.
- Transport – resilience is strengthened by supporting transport modes which don't require private car ownership, which may become less attractive in increased traffic congestion and greenhouse gas regulations. Active transport and public transport also provide greater opportunity for community engagement and activation which will support community resilience
- Designing the ecological features of the site to support resilience and be resilient themselves will provide a better-quality outdoor environment to enjoy regardless of hot spells, drought or other weather events. Additionally, the urban cooling provided by greening reduces the UHIE experienced to reduce the impact on human health and natural systems and reduce energy demand further.

5 – Energy Performance

5 Energy Performance

Vision: *To prioritise the use of energy efficient design strategies and low-carbon energy*

Targets

Homes: 30% reduction in energy demand and 56% reduction in GHG emissions

Mixed Use: 25% reduction in energy demand and 32% reduction in GHG emissions

Public Realm: 50% reduction in energy demand and 50% reduction in GHG emissions

Energy Initiatives focus on enabling *low* carbon operations by targeting energy conservation, efficiency, and on-site generation. Some developing technologies are allowed for which will enable battery integration and carbon reductions beyond the built form (EVs).

Approach: The approach to energy has considered a holistic view of the Site, addressing energy within residential dwellings, mixed used developments, public realm, and the community.

By implementing best practice sustainability through the application of higher standards, the project can achieve improved build quality, comfort, and affordability; contributing a market transition towards high quality, low impact homes for residents in the face of rising energy costs and a warming climate. This will both improve comfort and reduce ongoing expenses for residents. Additional energy efficiency measures applied in the public realm will extend efficiencies for Council

Providing clean and affordable energy to residents while reducing demand though energy conservation and efficiency provides resilience to future changes in energy costs, and reliability.

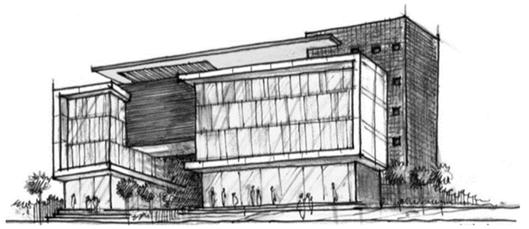
Rooftop PV

7 Star NatHERS rating

Natural ventilation

Large scale PV

5 NABERS energy rating



5 Star Green Star rating

LED street lighting

Smart / sensor enabled street lighting

Homes	Mixed Use	Public Realm	Strategy	Description	Benefits
✓	✓		 Rooftop PV	Provision of 3-5kW of rooftop PV to homes with the intent of offsetting 40% of the home's energy demand. Inclusion of smart inverters within system to future proof for battery integration at a later phase	Provide onsite renewable energy generation. ■ ↓ 40% Carbon emissions. ■ ↓ 40% Energy savings. ■ Zero carbon energy source. ■ Potential revenue stream through exporting energy or trading with neighbours. ■ Future ready.
		✓	 LED street lighting	Use of LED lighting in place of fluorescent systems as a more energy efficient alternative capable of providing more direct light.	■ ↓ 40% Energy Savings. ■ Reduced maintenance costs. ■ More precise distribution of light resulting in less light pollution. ■ Reduced Glare.
		✓	 Smart/sensor enabled street lighting	The use of sensors on lighting to ensure that lights are not being used when natural light is sufficient, or the space is unoccupied.	■ Lower operational costs. ■ Lower levels of light pollution. ■ Longer lifespan of lights.
✓			 7 Star NatHERS	Homes are targeting a minimum NatHERS build standard of 7 Stars	■ Improves energy conservation, and efficiency via higher design targets. ■ ↓ 30% energy. ■ Provides a more comfortable environment for greater portion of year (without A/C).
	✓			Building of new mixed-use developments to a 5 Star NABERS Energy rating	■ Provides specific energy performance targets which may drive high performance design.
	✓		 5 Star Green Star rating	Building of new mixed-use developments to a 5 Star Rating	■ Provides specific targets and recommendations for energy demand and operational emission reductions which may be utilised to inform design. ■ Provides specific targets for peak electricity load reduction which reduces demand on electrical infrastructure.

6 – Water resources

6 Water

Vision: Water is conserved and managed sustainably, in a way that enhances the natural ecology of the Site

Targets

30% Reduction in Potable Water demand from a reference scenario

Re-use of all rainwater falling on roofs

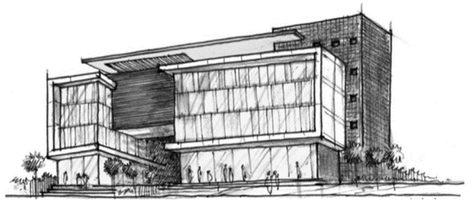
Water initiatives focus on enabling a reduction in potable water demand through efficiency in design and best practice on site storage opportunities

Reference scenario: *The reference scenario represents the predicted water use of the 'business as usual' approach to water use calculated for the precinct with industry standard flow rates for water use applied and no alternate water supply.*

Approach: The Site's alignment with local and regional strategic initiatives to drive state-wide water conservation, will help Victoria to manage water supply.

Effective planning of infrastructure, landscaping and buildings has the ability to maintain sustainable water usage, through water conservation and efficient use to reduce demand alongside onsite water capture, storage and reuse of rainwater and stormwater as the quality allows.

Considerate and responsible management of how water is supplied and utilised within the project will contribute to the overall lifestyle and amenity of the residents and improve the ability of the development to be resilient to a changing climate.

Efficient design		
On site rainwater storage		
Green Star rating and NABERS water rating		
Efficient design		
On site rainwater storage		
Drought tolerant landscaping & efficient irrigation		

Homes	Mixed Use	Public Realm	Strategy	Description	Benefits
✓	✓		 Efficient design	▪ Toilets: 4 Star WELS ▪ Taps- bathroom/kitchen: 4 Star WELS ▪ Taps – laundry - 4 Star WELS ▪ Showers: 3 Star WELS ▪ Dishwasher: 5 Star WELS	↓ Reduce demand by 26%
✓	✓		 On site rainwater storage	Initial calculations have indicated that 10-15% of household water demand is from flushing and irrigation, which can be substituted with rainwater	↓ Reduce Potable water usage by 10-15% ✓ Capture all roof rainwater
encouraged through guidelines	✓	✓	 Drought tolerant landscaping & **e**fficient **i**rrigation	Select drought tolerant species where a reliable water source is not available. Use irrigation systems that maintain health of landscaping whilst minimising water use, including the use of passive irrigation for street trees. Where	↓ Reduce Potable water usage by 0-17%

7 – Waste Management

7 Waste Management

Vision: *Waste is managed to support minimisation of material sent to landfill and promote recycling and reuse of materials*

Targets

C&D Waste:

95% diversion rate from landfill

Operational Waste:

50% diversion rate from landfill

Waste reduction initiatives focus on enabling best practice diversion from landfill during construction, demolition and operations by maximising opportunities for recycling and integrating waste management and collection with council to create elements of a circular economy within the local area.

Approach: The sustainability in waste approach has focused on minimising construction phase waste and operational waste, as well as enabling waste diversion from landfill during operations with reuse and recycling. Strategies have been raised based on a waste hierarchy: first reducing waste generated, then reusing items, then recycling waste into new items, and finally converting waste to energy. Disposal is the last resort and intended to be avoided in the context of developing a circular economy.

For construction phase, best practice waste strategies are proposed. Noting that while builder partners will have established construction processes, initiatives have been proposed to educate and enable them to maximise reduction and diversion waste.

For operations, waste strategies are aligned to support the planned changes to waste management delivered by Knox City Council. This is an important focus for the precinct to be future-ready as Recycling Victoria policies are implemented throughout the State, and will have spatial impacts for bin storage, waste collection and street layout. Strategies have been proposed to educate and promote behavioural change in residents, the local community and users of the mixed-use development to reduce waste. These initiatives will support a circular economy – meeting residents' expectations to live in a clean, litter-free and sustainable community.

Construction and Demolition

Manage and plan the delivery and storage of materials efficiently

Reduce waste from packaging of materials

Detail waste minimisation measures in site inductions

Operations

Allow for the collection of several different waste streams

Provide education to minimise waste

Construction and Demolition

Manage and plan the delivery and storage of materials efficiently

Reduce waste from packaging of materials

Detail waste minimisation measures in site inductions

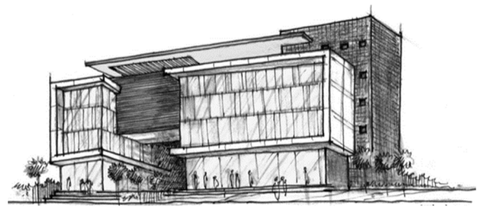
Operations

Allow for the collection of a number of different waste streams

Provide education to minimise waste

Investigate Compost food organics from supermarkets, cafes and restaurants off-site

Reduce retail waste



Construction and Demolition

Manage and plan the delivery and storage of materials efficiently

Reduce waste from packaging of materials

Detail waste minimisation measures in site inductions

Divert usable spoil from landfill

Operations

Allow for the collection of a number of different waste streams

Provide education to minimise waste

Homes	Mixed Use	Public Realm	Strategy	Description	Benefits
✓	✓	✓	Best Practice Construction and Demolition Waste Management	Examples to achieve this include: ■ Manage and plan the delivery and storage of materials efficiently – Ensuring materials are stored with waterproof protection on site – Coordinating deliveries so that there is sufficient storage space on-site before materials are ready to be used ■ Reduce waste from packaging of materials – Engaging with suppliers to limit the use of non-recyclable packaging materials in procured building supplies – Engaging with suppliers to adopt reusable packaging and take-back programs Detail waste minimisation and reuse management measures in site inductions to all staff and subcontractors. Critical to achieving the C&D waste diversion target, everyone who comes onto site must be aware of the target and how to contribute to achieving it. This education could take the form of: ■ Site induction presentations ■ Email reminders	■ Reduces waste from spoiled materials ■ Reduces disposal and re-ordering costs ■ Reduces single use waste on site ■ Reduces disposal costs and site cleaning costs ■ Reduces potential for waste and maximises potential for landfill diversion
		✓	Divert usable spoil from landfill	Divert usable spoil from landfill, prioritising reuse of spoil where possible on-site. Spoil is produced in high amounts during construction, which makes it a priority material to divert from landfill. Examples to achieve this include: ■ Balancing cut and fill as far as practical ■ Reusing spoil for on-site vegetation and landscaping ■ Reusing spoil for backfill of services excavations ■ Mulching vegetation for reuse on-site or sending to an offsite composting facility	■ Reduces waste and landfill demand as well as landfill disposal costs ■ Soil profile / characteristics on-site are retained
✓	✓	✓	Allow for the collection of several different waste streams	Buildings will allow for the collection of several different waste streams in line with the future waste strategy of the Council / Victoria. This is based on the understanding that Knox City Council will be rolling out a four-bin system by 2030 to separate glass from other recyclables, and to compost FoGo, along with continuing to collect general waste and recyclables. Therefore, spatial allowances will cater to the four-bin system, including bins for the following: glass recycling, commingled recycling, food and garden waste, and general waste.	■ Reduces landfill waste and maximises recycling rates in line with council objectives
✓	✓	✓	Provide education to minimise waste	Provide education to all precinct users, visitors and tenancies in the mixed-use development to educate and encourage behavioural change to ensure waste minimisation and correct recycling. This education would come from the council as the precinct integrates with the rest of the council area, and could include educational signage, information sessions and emails.	■ Reduces landfill waste and maximises recycling rates in line with council objectives

Homes	Mixed Use	Public Realm	Strategy	Description	Benefits
	✓		Reduce retail plastic and polystyrene waste	Reduce single use plastics and polystyrene in retail tenancies as much as practicable (noting that for some vendors this will not be possible). Ways to achieve this could include requiring retailers to: ▪ Preference biodegradable or readily recyclable plastics where plastics cannot be avoided ▪ Preference suppliers that use minimal packaging and/or have deliveries shipped in returnable containers ▪ Actively participate in reusable food container programs, potentially with incentives for customers to participate ▪ Participate in the Australian Packaging Covenant ▪ Target single use food waste products include but are not limited to the following: straws, bags, takeaway food and beverage containers and utensils, water bottles In addition to the above, water bottle refill stations should be provided within the mixed-use area to reduce the need to purchase plastic bottles.	▪ Reduces single use waste ▪ Promotes reusable items
	✓		Reduce food retail waste	Opportunities to donate edible food instead of sending it to landfill will be explored. Ways to achieve this could include: ▪ Cafes/restaurants/grocery stores partnering with organisations such as OzHarvest or SecondBite to donate edible food not sold at the end of the day or close to expiry	▪ Reduces food waste to landfill ▪ Benefits local community in need of food ▪ Reduces food waste held in bins on site prior to collection

8 – Sustainable Transport

8 Sustainable Transport

Vision: *Promote affordable, green, and active transport for all ages and abilities*

Targets

Provide options for future residents to reduce personal fossil-fuelled car use by 20%

Sustainable Transport initiatives emphasise providing infrastructure for active and public transport. Mostly focussed on the public realm, the strategies combine design with existing services provided by Knox City Council and commercial entities. Internet connectivity boosts people working from home.

Approach: The transport strategies seek to shift dependence on private cars to alternative modes of transport for everyday trips by providing quality active transport routes that link to key destinations; better access to existing public and active transport facilities and services, more amenities within walking distance; and adaptability for future changes in transport needs as the shift from traditional cars to EVs progresses.

The strategies are aligned with the (Victorian) Department of Travel Strategic Plan 2019-2023, Knox Urban Design Framework 2020, Knox Integrated Transport Plan 2015, and Development Victoria Sustainability Update July 2020.

Commercial on-demand services		
Allowance for future active transport upgrades on frontage		
Allowance for future active transport upgrades on frontage		
EV charging stations		
Allowance for future upgrades for public transport		
Amenities and facilities for walking, running, and cycling		

Homes	Mixed Use	Public Realm	Strategy	Description	Benefits
	✓		 EV Charging	EV charging to be provided where feasible to certain house and land packages while allowance for future connection is included for homes without. Mixed use developments to include EV charging if parking is provided	▪ Promotes green travel by switching from fossil fuel to electrification ▪ Future-ready ▪ Residents will save on operational costs and have the potential to access carbon neutral transport (with an initial capital cost of the charging port and EV).
✓			 Car Share	Promote and support (in collaboration with existing Council policies) Car Share services (e.g. GoGet, Uber and Lime), catering to the needs of the residents right up to the chosen doorstep	▪ On-demand transportation service may reduce the ownership of personal cars ▪ Operated and maintained by separate commercial entities (not DV) ▪ Caters to a wide range of needs and income levels
✓	✓	✓	 Allowance for future active transport upgrades	Allowance for future upgrades to paths along site frontage of Burwood Highway and Scoresby Rd and easy connections to the Blind Creek regional path	▪ Enables adaptability for the short-, medium-, and long-term changes to the frontage for various commercial use. ▪ Future-ready
		✓	 Provide amenities and facilities for walking, running, and cycling	Provide amenities and facilities for walking, running, and cycling such as (drinking) water fountains, public toilets, bike repair stations, secure bicycle parking, etc.	▪ Promote people of all abilities and ages to engage in active transport for leisure or travel ▪ Promotes a healthy lifestyle in the community ▪ Reduces car dependence as a mode of travelling ▪ Increases utility of public realm, simultaneously increasing natural surveillance for CPTED

9 – Urban Ecology

9 Urban Ecology

Vision: *Existing biodiversity is conserved, and opportunities taken to increase ecological and social value*

Targets

Greening and biodiversity: Meet council green canopy requirements, and indigenous tree proportions *including* wetlands area

UHIE: Mitigate Urban Heat Island effect

Stormwater management: Meet Council requirements using wetlands treatment and retention capacity

Education and engagement: Provide opportunities for the residents to engage with nature in the public realm

Urban Ecology initiatives focus on *offsetting* the UHIE created by the development and providing opportunities for education and engagement with nature for residents and visitors to increase appreciation. Stormwater management via the wetlands provides appropriate stormwater management.

Approach: DV has the opportunity to conserve the existing value of the site, and to build additional value in localised areas of the development.

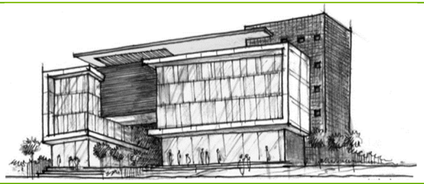
Planning and design will enable improvement of existing ecological value by enhancing particular parts of the site to provide better quality habitat, and a more natural ecological system (i.e. the wetlands) and provide linkages to extend habitat through street trees to other green areas.

Tree canopy coverage provided both in the streets, wetland area and open space will also mitigate the effect of urban heat island due to development. Additionally, the wetlands provide the opportunity to create centralised stormwater treatment and detention which will reduce the wider potential ecological impacts of the site's development on Blind Creek and further downstream.

Cool roofs

Home planting guidelines

Cool roof and façade.



Minimum of 30% street and public realm canopy cover (including wetland area)

Maximise existing trees retained

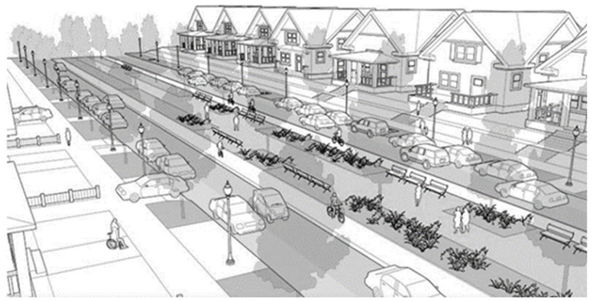
Public realm vegetation selection to prioritise indigenous and native species

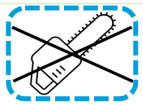
Wetland design for habitat

Cool pavements

Green turfs and permeable pavements

Nature observation opportunities



Homes	Mixed Use	Public Realm	Strategy	Description	Benefits
✓	✓		 Cool roofs (and facades)	Require minimum building surface reflectance index (SRI) of 64	▪ Reduced urban heat island effects – 20-40°C surface cooling in comparison to a standard Weathered Zincalume or Galvanised Iron roof. ▪ Improve building energy conservation – Reduces heat gain internally (1.2-4.7°C)
✓			 Home planting guidelines	Provide guidance for homes on best species selection, placement, care, and value provided by selected specific plants. Build on existing Gardens for Wildlife programme by council	Opportunity to educate residents about locating and choosing the best plants to achieve ▪ Improved biodiversity ▪ Reduce water demand ▪ Improve urban cooling benefits ▪ Improve shading to reduce heat gain ▪ Reduced water bills for residents, while maintaining outdoor environment quality
		✓	 Maximise street and public realm canopy cover (including wetland area)	Canopy cover to be measured across entire site, excluding house blocks to achieve an aspirational target of 30%	▪ Maximise canopy cover in public spaces for private developments ▪ Greening benefits including interception of stormwater runoff and improved water management; lower cooling demand for electricity; carbon sequestration; wildlife habitat; increased property value; improved amenity; improved health and wellbeing; Improved air quality ▪ Reduced urban heat island effect – 1.5 – 9.5°C reductions possible (and a surface reduction of 15°C in shade). – Ambient temperature reductions will be experienced across the development.
		✓	 Maximise existing trees retained	Optimise within masterplan opportunities to retain existing, especially high value trees	▪ Existing trees provide greening benefits without having to wait for trees to grow to effective size ▪ Provide continuity of habitat for local fauna ▪ Reduced cost to DV for planting and maintenance of new trees
		✓	 Prioritise indigenous and native species	Public realm vegetation selection to prioritise indigenous and native species	▪ Acknowledged that Council typical requires vegetation diversity to meet a minimum of 40% indigenous plantings, then 40% native plantings in public spaces for private developments ▪ Improve biodiversity outcomes to enhance and extend habitat connectivity across site
		✓	 Wetland design for habitat	*This strategy presents the benefits of the existing design.*	▪ Habitat for native fauna species to improve biodiversity and ecological value ▪ Greening benefits (as per Minimum Canopy Cover) ▪ Also provides urban cooling benefits – 2.0 – 6.0°C reductions possible – Urban cooling effect experienced in the wetland reserve, and potentially downwind

Homes	Mixed Use	Public Realm	Strategy	Description	Benefits
		✓	 Cool pavements	Apply sealants to all bitumen pavements and specify cool colours for concrete pavements, to achieve a minimum pavement SRI of 34.	▪ Provides urban cooling benefits ▪ ~3°C surface cooling[4] ▪ Provide improve comfort for active transport modes ▪ Cool pavement sealants can also improve longevity of road pavements
		✓	 Green turfs and permeable pavements	Maximise green turfs and permeable pavements to enable stormwater to drain to ground	▪ Also provide urban cooling benefits – Up to 12°C surface cooling (dependent on soil moisture) – Improve outdoor environment quality resulting in higher use
		✓	 Nature observation opportunities:	Nature observation opportunities: - Bird and other fauna watching - Stormwater treatment - Self-guided nature walks for creek, wetland, streets, public spaces.	▪ Improve community engagement with, and understanding of ecological systems and value ▪ Improve community personal care for outdoor environment ▪ Increase diversity of outdoor activity enabled on site ▪ Potential for visitor attraction

10 – Green Star Communities

10 Green Star Communities

The Site is targeting a 6 Star Green Star rating under the Green Star - Communities framework developed and administered by the Green Building Council of Australia (GBCA). The purpose of using this tool is to benchmark and verify the sustainability of the Site

10.1 Green Star Pathway

Green Star Communities v1.1 is currently being applied to the Site. Aurecon has translated the sustainability strategies into the Green Star verification pathway. The pathway is intended to verify performance against the project's sustainability targets rather than drive it. The pathway will be distributed to all members of the master planning team following finalisation of the sustainability targets proposed in this report.

Please refer to Appendix 13 for the pathway. This document includes key considerations for credits considered beyond Business as Usual and next steps for implementation.

10.2 Eligibility

To be eligible for assessment under the Green Star – Communities rating tool, projects must meet all four of the eligibility criteria detailed below:

1. Space Use

There are no specific size requirements for the rating. The types of projects that are intended to be rated are residential and/or mixed use precincts that make use of adjacent areas of public realm for occupants and visitors and includes dwellings that will require the provision of new, or additional capacity in existing infrastructure/services.

✓ The Site is considered to meet this requirement.

2. Spatial Differentiation

A project must be clearly distinct. The project must have a clear site boundary or study area that is subject to a 'plan of development'.

✓ It is proposed that the rating boundary be the extent of the Site

3. Conditional Requirement – Sustainable Sites

A project must not have a significant impact on any matter protected by the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act).

✓ Aurecon understands that the site does not contain 'matters of national environmental significance' (MNES).

4. Timing of Certification

Initial project certification must be achieved within three years of registration.

✓ The project has initiative the registration process and intends to submit within 3 years

5. Point Scoring

The following point scores are required to be achieved for a 6 Star rating:

- Minimum Total Point Score (including innovation) 75+
- Minimum Individual Category Score:
  - Governance: 8+
  - Liveability: 7+
  - Economic Prosperity: 6+
  - Environment: 9+

✓ The pathway developed for the Site achieves the above scores

10.3 Project Boundary

The Green Star Communities project boundary will follow the extent of the Site, encompassing the wetland retarding basin as well as the mixed-use development. This boundary also includes all residential homes and public realm area throughout the Site

Figure 2 - Green Star Project Boundary

This project boundary will capture the environmental and wellbeing benefits of the wetland, and the economic and social benefits of the mixed-use development. The wetland will contribute significantly to the overall ecological value and biodiversity of the site, while also being a scenic place of respite for the local community. Despite the mixed-use development tenancies being unconfirmed, it will house a range of easily accessible and diverse facilities to serve the community and increase local jobs.

While the delivery of the residential homes is largely in the control of the builder partners, Green Star Communities does not focus heavily on individual buildings. Credits involving universal design and materials will be applied to the homes to encourage best practice design and construction. Additionally, energy credits with precinct-wide greenhouse gas emissions calculations will include homes and their solar renewables.

10.4 Important things to know about Green Star Communities

Rating Scale

The GBCA only recognises and rewards market leaders, so the scope of a certification is limited to the achievement of Four, Five or Six Star ratings. The Site has a 6 Star target which when certified will indicates a 'World Leadership' level of certification.

A 4 Star rating indicates "Australian Best Practice" and 5 Stars indicates "Australian Excellence".

Sustainable Building Ratings

Green Star – Communities assesses the planning, design and construction of large-scale development projects at a precinct, neighbourhood and/or community scale. This rating tool does not rate individual buildings but rather the spaces around buildings which form the community. The Communities tool acknowledges that best practice buildings can contribute to making a community healthier and more sustainable through Credit 11 'Sustainable Buildings' by recognising projects that deliver sustainable buildings and energy efficient homes, designed and constructed to meet the changing needs of occupants across their lifetime.

Staged Certification

The Green Star – Communities rating tool awards only one type of rating and does not distinguish between projects that are within a design phase, partially built, or fully built.

Green Star – Communities avoids the necessity of such distinctions by requiring projects to maintain a valid rating throughout their lifetime, until the plan for development is fully built out. The certification process for Green Star – Communities requires an **Initial Certification**, and subsequent **Recertification** at specified intervals, to maintain the Green Star certificate. Depending on the outcome of recertification, the rating of a project may increase, decrease, or stay the same. A project that does not achieve a minimum of 45 points at the time of recertification and achieve the eligibility requirement will lose its rating.

Initial Certification

The initial certification can be undertaken at any time, provided there is enough documentation available to demonstrate how the requirements of credit requirements have been or will be embedded into the development. As such, it is recommended that that initial certification is undertaken when the following types of documents have been developed / delivered:

- Design Guidelines
- Development Agreements or Deeds
- Development Approval
- Principal's Project Requirements
- Master Plan – also referred to as a structure plan, precinct plan, neighbourhood plan, local area plan or the like.
- Tender Documentation – for example, but not limited to, specifications and drawings
- Reports and Plans – for example, but not limited to: Climate Change Adaptation Plan, Community Resilience Plan, Biodiversity Management Plan, Travel Assessment & Travel Plan, Operational Management Plan, Construction & Demolition Waste Management Plan,

Recertification

Precinct and land development projects are complex and can take a long time to deliver. For this reason, Green Star – Communities certification lasts a maximum of five years, after which the project can be re-certified. This allows projects to re-assess their approach, improve on their approach, and be recognised for progress made in delivering on the ground.

While Green Star will continue to be updated, projects are recertified with the version of the rating tool under which they achieved their previous certification. As such, project teams are not subject to clarifications or amendments made as part of later revisions.

11 – Conclusion

11 Conclusion

This report supports the proposed Knoxfield Residential Development and provides details on how the sustainability strategy established by the design team achieves the outcomes included in the Knox City Planning Scheme, specifically the Environmentally Sustainable Development Policy (22.04)

Council's policy does not prescribe specific solutions rather it encourages holistic sustainability to be considered early in the planning phase, aligning to best practice outcomes that promote positive environmental impacts across a range of areas including energy, water, waste, transport and urban ecology.

Accordingly, the planning of the Site is aligned to these sustainability outcomes, driven by the desire by DV to achieve best practice sustainability by selecting the initiative that will have the greatest impact for people and the environment.

The strategy focuses on practical initiatives that vary between the various components of the Site (residential, mixed use, public realm)

Green Star Communities is a nationally recognised certification scheme that scores projects based on sustainability outcomes across social, environmental and economic aspects of planning, design and construction. The rating is independent assessed by the Green Building Council (GBCA) to verify the claims made, ensuring the process is robust and transparent.

The Site will target a 6 Star rating under the current v1.1 tool which equates to the highest rating awarded (World Leading).

Furthermore, DV has committed to participating in a trial program for Green Star Homes which delivers third party verified sustainability for homes, also administered by the GBCA. This will be applied to 10 individual houses in the subdivision.

As such, it is proposed that sustainability outcomes delivered will adhere to and exceed all sustainability policies within Knox City Council's planning framework.

Appendices


Retarding Basin
Fairhills High School
DELWP
Future Mixed-Use Precinct
Burwood Highway

Appendix A – Green Star Pathway

Appendix A – Green Star

Green Star Communities v1.1 Pathway

Knoxfield Residential Development
Green Star Communities Pathway

Document control record

Document prepared by:
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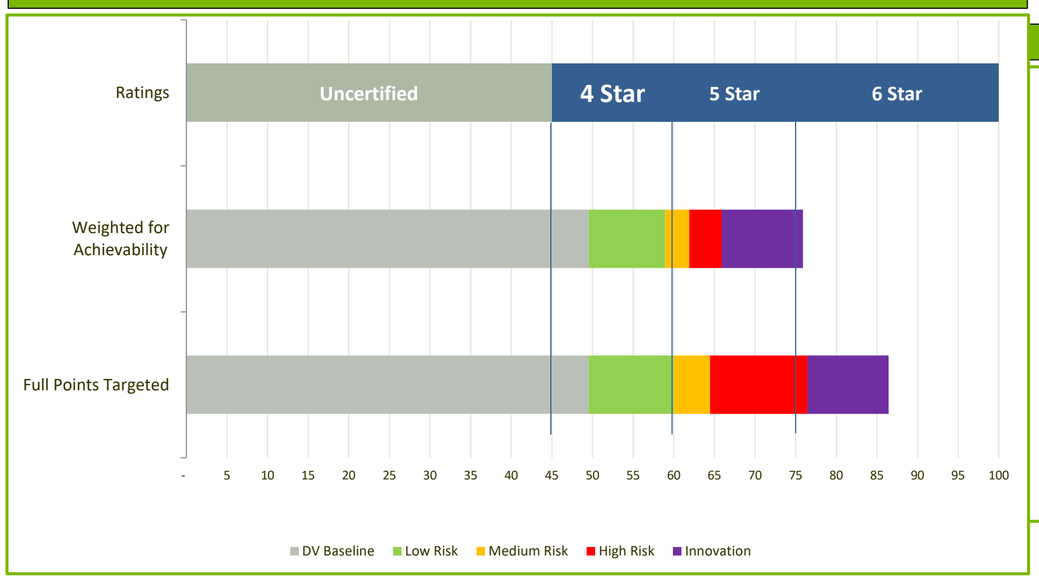
Document control	aurecon
Report title	Green Star Communities Pathway
[redacted]	
Current revision	**1**

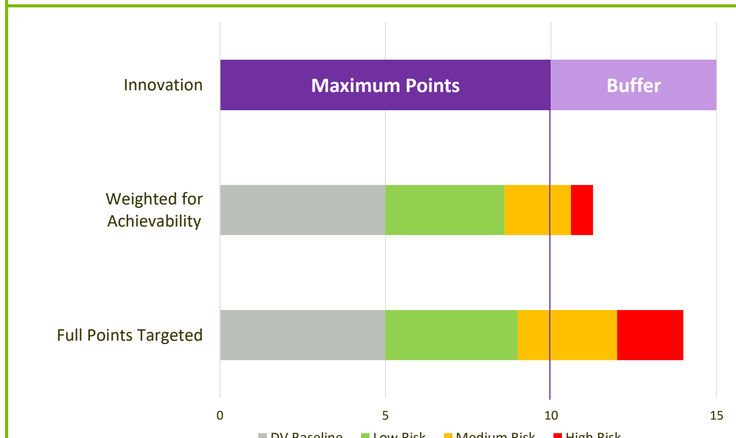
[redacted]

Project:	**Knoxfield**
Tool:	**Green Star Communities v1.1**
Document:	Green Star Pathway Summary - Graphs
Author:	Aurecon
Revision:	0
Date:	16-Oct-20
GSAP:	**Aurecon**

Pathway Summary



Innovation Summary



Project:	**Knoxfield Residential Development**
Tool:	**Green Star Communities v1.1**
Document:	Green Star Pathway Summary
Author:	Aurecon
Revision:	0
Date:	16-Oct-20
GSAP:	**Aurecon**

Credit No.		Credit	#	Sub-Credit	Points Available	DV Baseline	Low Risk	Medium Risk	High Risk	TOTAL TARGETED	Credit Criteria	Comments & Considerations	Next Steps	CAPEX / OPEX	Responsibility	Chain of Custody
GOV	1	Green Star Accredited Professional	1.1	Green Star Accredited Professional	1	1				1	1 point is available where a Green Star Accredited Professional (GSAP) has been contractually engaged to provide advice, support, and information related to Green Star principles, structure, timing and processes, throughout the relevant certification period.	DV baseline: 1 point GSAPs: Jeff Robinson, Jess Bennett, Maeve Molins, Melanie Danatzis, Sarah Magner	- Aurecon to prepare Project Inception Checklist - Aurecon to facilitation initial and final workshops	Low CAPEX	Aurecon	Implemented by: Aurecon Implemented through: Scope of works bid documentation
	2	Design Review	2.1	Site Planning and Layout	4	2			1	3	Up to 4 points are available where the project's site planning and layout is subject to a design review process: □ 2 point is awarded for an in-house design review process. □ 3 points are awarded for a mixed design review process. □ 4 points are awarded for a fully independent design review process.	DV baseline: 2 points In-house review can include panel members from an entity involved in the project in a meaningful way, but cannot be part of the design team. This panel will likely include members from Architectus, Aurecon and DV. At least one design review meeting must be held prior to submission of a Development Application. Could be high cost / high difficulty to have a fully independent design review process.	- To be further discussed with DV - Design review strategy to be prepared and implemented	Low CAPEX for in-house review	DV, Architectus, Aurecon	Implemented by: DV Collaborated with: Architectus, Aurecon Implemented through: Project requirements
			2.2	Urban Design	4	2			1	3	Up to 4 points are available where the project's urban design is subject to a design review process: □ 2 point is awarded for an in-house design review process. □ 3 points are awarded for a mixed design review process. □ 4 points are awarded for a fully independent design review process.	DV baseline: 2 points In-house review can include panel members from an entity involved in the project in a meaningful way, but cannot be part of the design team. This panel will likely include members from Architectus, Aurecon and DV. At least one design review meeting must be held prior to submission of a Development Application. Could be high cost / high difficulty to have a fully independent design review process.	- To be further discussed with DV - Design review strategy to be prepared and implemented	Low CAPEX for in-house review	DV, Architectus, Aurecon	Implemented by: DV Collaborated with: Architectus, Aurecon Implemented through: Project requirements
	3	Engagement	3.1	Stakeholder Engagement Strategy	3	3				3	3 points are available where the project has a Stakeholder Engagement Strategy prepared in accordance with the specified requirements.	DV baseline: 3 points https://engage.vic.gov.au/new-community-knoxfield-feedback-draft-master-plan	- DV to develop Stakeholder Engagement strategy	Low CAPEX	DV	Implemented by: DV
			3.2	Strategy Implementation	3	3				3	3 additional points are available where 3.1 has been achieved and there is evidence that the Stakeholder Engagement Strategy is being implemented and formal monitoring, evaluation and corrective action is being undertaken.	DV baseline: 3 points https://engage.vic.gov.au/new-community-knoxfield-feedback-draft-master-plan	- DV to implement Stakeholder Engagement strategy	Low CAPEX	DV	Implemented by: DV
	4	Adaptation and Resilience	4.1	Climate Adaptation	2	2				2	2 points are available where: □ a project-specific Climate Adaptation Plan (CAP) has been developed in accordance with a recognised standard; and □ Solutions have been included into the plan for development that specifically address the risk assessment component of the adaptation plan.	DV baseline: 2 points CAP being prepared	- Refinement of masterplan concept with design team to ensure targets are achieved - Review of builder products inform strategy on residential lots - Development of design guidelines / Development Agreements / Specifications to enable targets in public realm and mixed use	Low CAPEX	Aurecon	Implemented by: Aurecon Implemented through: Scope of works bid documentation
			4.2	Community Resilience	2	2				2	2 points are available where, prior to the occupation of any habitable building on the project site, a project-specific Community Resilience Plan (CRP) has been developed that addresses preparation, during- and post-disaster communication, safety, and response.	DV baseline: 2 points CAP being prepared	- Refinement of masterplan concept with design team to ensure targets are achieved - Review of builder products inform strategy on residential lots - Development of design guidelines / Development Agreements / Specifications to enable targets in public realm and mixed use	Low CAPEX	Aurecon	Implemented by: Aurecon Implemented through: Scope of works bid documentation
	5	Corporate Responsibility	5.1	Corporate Responsibility	1					Not Targeted	1 point is available where the project applicant has a corporate responsibility policy and reports publicly against it annually.	Not targeted as is not DV baseline and therefore unlikely to be a DV policy	-	-	-	-
			5.2	Sustainability Reporting	2					Not Targeted	Up to 2 points are available where the project applicant undertakes sustainability reporting annually in accordance with the GRI Sustainability Reporting Guidelines, for either the core (1 point) or comprehensive (2 points) options.	Not targeted as is not DV baseline and therefore unlikely to be a DV policy	-	-	-	-
	6	Sustainability Awareness	6.1	Community Users' Guide	1	1				1	1 point is available where a Community Users' Guide is developed for, and provided to all project occupants. The Community Users' Guide must also be publicly available.	DV baseline: 1 point Community Users' Guide to be developed	- DV to develop Community Information Pack	Low CAPEX	DV	Implemented by: DV (DV to either complete or engage consultant to complete) Implemented through: Project requirements
			6.2	Sustainability Education Facilities	1		1			1	1 point is available for the provision of physical sustainability education facilities on the project site.	Can include a permanent sustainability-learning trail around the project site. Potentially this is already happening or can be implemented for trails around the development including the wetlands.	- Refinement of masterplan concept with design team to ensure targets are achieved - Development of design guidelines / Development Agreements / Specifications to enable targets in public realm and mixed use	Low CAPEX	Architectus, Aurecon	Implemented by: Architectus Collaborated with: Aurecon Implemented through: Project requirements
	7	Community Participation and Governance	7.1	Community Facility Management	1				1	1	1 point is available where a community led entity is responsible for the management and/or coordination of at least one community facility.	High risk as is highly dependent on council	- To be further discussed with DV	Low OPEX	DV	Implemented by: DV Operated by: Council Implemented through: Development agreement for inclusion of community facility
			7.2	Community Program Management	1				1	1	1 point is available where a community led entity is responsible for the management and/or coordination of at least one community program or service.	High risk as is highly dependent on council	- To be further discussed with DV	Low OPEX	DV	Implemented by: DV Operated by: Council
	8	Environmental Management	8.1	Environmental Management System	1	1				1	1 point is available where all Contractors with a contract value of > $5 million have a valid ISO 14001 Environmental Management System (EMS) accreditation prior to and throughout the duration of the contract(s).	DV baseline: 1 point Business as usual	- Review of builder products inform strategy on residential lots - Development of design guidelines / Development Agreements / Specifications to enable targets in public realm and mixed use	-	Builder Partners	Homes Implemented by: Builder Partners Implemented through: Development deeds Mixed use Implemented by: Contractor TBC Implemented through: Development agreement Public realm Implemented by: Contractor TBC Imolemented through: Tender documentation
			8.2	Environmental Management Plan	1	1				1	1 point is available where the developer requires the development and implementation of a comprehensive, project-specific Environmental Management Plan (EMP) for construction works.	DV baseline: 1 point Business as usual	- Review of builder products inform strategy on residential lots - Development of design guidelines / Development Agreements / Specifications to enable targets in public realm and mixed use	Low CAPEX	Builder Partners	Homes Implemented by: Builder Partners Implemented through: Development deeds Mixed use Implemented by: Contractor TBC Implemented through: Development agreement Public realm Implemented by: Contractor TBC Implemented through: Tender documentation
Governance Total					**28**	**18**				**23**						
Minimum Points Required for 6 Star					**8**											
LIV	9	Healthy and Active Living	9.0	Credit Minimum Requirement - Footpaths	0		Anticipated			Anticipated	To be eligible for points in this credit, projects must provide footpaths in line with the project's street hierarchy.	Provide footpaths in accordance with AMCORD, provide safe and convenient movement of pedestrians.	- Refinement of masterplan concept with design team to ensure targets are achieved - Development of design guidelines / Development Agreements / Specifications to enable targets in public realm and mixed use	Low CAPEX	Architectus, MDG, OMG	Implemented by: Architectus Collaborated with: MDG, OMG Implemented through: Project requirements
			9.1	Active Lifestyle	2		2			2	2 points are available where the project site has been designed and built to promote an active lifestyle, through well designed walking paths and cyclist facilities.	A project can use the Bicycle Network Victoria checklist and will be deemed to comply where 75% of all items within the checklist have been met.	- Refinement of masterplan concept with design team to ensure targets are achieved - Development of design guidelines / Development Agreements / Specifications to enable targets in public realm and mixed use	Low CAPEX	Architectus, MDG, OMG	Implemented by: Architectus Collaborated with: MDG, OMG Implemented through: Project requirements
			9.2	Recreational Facilities	2					Not Targeted	2 points are available where all habitable buildings have easy access to both a local park and at least one publicly accessible sports facility.	Local park >0.5ha within 400m of all habitable buildings: none of green spaces within development meet the size requirement. External local parks do not meet the distance requirement. Publicly accessible sports facility within 800m of all habitable buildings: nearby gyms are not within 800m walking distance of all homes as there are physical barriers (areas not publicly accessible). Sports facility would need to be provided as part of mixed use development. Open space 2.83ha per 1000 project occupants: wetlands area is 3.3ha and within 2km of all homes. Could potentially count as a district park. Other open spaces within development could potentially add up to space requirements.	-	-	-	-
			9.3	Healthy Places	1					Not Targeted	1 point is available where 9.1 and 9.2 have both been achieved, and the development has been designed and built in line with holistic active and healthy living principles.	There are two checklists available that address holistic design for active and healthy living principles. These are: • The NSW Government's 'Development & Active Living'. • The Heart Foundation of Australia's 'ACT Active Living Impact Checklist'.	-	Low CAPEX	Architectus, MDG, OMG	Implemented by: Architectus Collaborated with: MDG, OMG Implemented through: Project requirements
	10	Community Development	10.0	Credit Minimum Requirement - Community Development Plan	0	Anticipated				Anticipated	To be eligible for points in this credit, a Community Development Plan for the project community must be developed and implemented.	DV baseline: credit requirement	- DV to develop Community Development Plan	Low CAPEX	DV	Implemented by: DV
			10.1	Community Development Officer	1				1	1	1 point is available where a Community Development Officer is employed to implement the Community Development Plan for the project.	Need to check with DV if this is done for Knoxfield even though not baseline Either this or 10.3 must be achieved to get point for 10.4 which is DV baseline	- To be further discussed with DV	Low CAPEX	DV	Implemented by: DV
			10.2	Community Group	1	1				1	1 point is available where a community group is established and contributes to the implementation of the Community Development Plan.	DV baseline: 1 point	- DV to establish Community Group	Low CAPEX and OPEX	DV	Implemented by: DV
			10.3	Community Events	1				1	1	1 point is available where free community events are facilitated and supported.	High risk as is highly dependent on council Either this or 10.1 must be achieved to get point for 10.4 which is DV baseline	- To be further discussed with DV	Low OPEX	DV	Implemented by: DV Operated by: Council
			10.4	Community Information	1	1				1	1 additional point is available where at least two of the first three initiatives are undertaken and 'community information' is made directly available and distributed to the community.	DV baseline: 1 point	- DV to develop Community Information Pack	Low OPEX	DV	Implemented by: DV Operated by: Council
	11	Sustainable Buildings	11.1	Certified Non-residential Buildings	0.52		0.52			0.52	Up to 4 points are available based on the percentage of all buildings in the project site, which are eligible to be certified using the Green Star suite of building rating tools or another compliant environmental rating tool, that achieve a certified rating.	DV baseline: 1 point for credit (including residential) Alternative compliance method allows for mixed developments to achieve points based on percentage of residential and non-residential. Approx. 13% of total buildings to be non-residential 5 Star GS D&AB for non-residential	- Refinement of masterplan concept with design team to ensure targets are achieved - Development of design guidelines / Development Agreements / Specifications to enable targets in public realm and mixed use	High CAPEX	DV	Implemented by: Mixed use developer TBC Implemented through: Development agreement
			11.2	NatHERS and Livable Housing Australia	3.48	1		2.48		3.48	Up to 4 points are available based on the percentage of dwellings in the project site that: a. Have achieved a NatHERS rating of 7 stars or more; and b. Have achieved certification in accordance with the guidelines for Livable Housing Design published by Livable Housing Australia.	DV baseline: 1 point for credit (including non-residential) Approx. 450 homes will be built Approx. 87% of total buildings to be residential Livable Housing Design being aimed for NatHERS 7 Star is approx. 30% above code - DV best practice GS for Homes potentially to be piloted for 10 homes. Not currently included in submission guidelines but would likely be approved by GS with a CIR.	- Refinement of masterplan concept with design team to ensure targets are achieved - Review of builder products inform strategy on residential lots - Development of design guidelines / Development Agreements / Specifications to enable targets in public realm and mixed use	High CAPEX	DV, Builder Partners	Implemented by: Builder Partners Implemented through: Development deeds

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	12	Culture, Heritage and Identity	12.1	Understanding Culture, Heritage and Identity	1	1			1	1 point is available where the culture, heritage, and identity of the project site has been researched and interpreted as part of the master planning process.	DV baseline: 1 point	- Refinement of masterplan concept with design team to ensure targets are achieved - DV to engage indigenous architect to work with design team on concepts for masterplan - Development of design guidelines / Development Agreements / Specifications to enable targets in public realm and mixed use	Low CAPEX	DV, Architectus, MDG	Implemented by: Architectus Collaborated with: DV, MDG Implemented through: Project requirements
			12.2	Enhancing Community Culture, Heritage and Identity	2	2			2	2 additional points are available where the interpretation of the culture, heritage, and identity of the project site informs the design of the project in a way that strengthens cultural and heritage connections, and contributes to building a strong local identity.	DV baseline: 2 points	- Refinement of masterplan concept with design team to ensure targets are achieved - DV to engage indigenous architect to work with design team on concepts for masterplan - Development of design guidelines / Development Agreements / Specifications to enable targets in public realm and mixed use	Low CAPEX	DV, Architectus, MDG	Implemented by: Architectus Collaborated with: DV, MDG Implemented through: Project requirements
	13	Walkable Access to Amenities	13.1	Walkable Access to Amenities	2		2		2	2 points are available where all habitable buildings on the project site have walkable access to a diverse number of amenities.	At least two of the following must be provided: food retail, community serving retail and other services, civic and community facilities, commercial or business spaces Primary services and facilities (food, newsagent, post office, bank, GP) within 400m - 400m not enough for all homes Secondary services and facilities (Fairhills High School, Chemist Warehouse Knoxfield - just over 800m for furthest houses) within 800m, and other services and facilities expected to be provided within mixed use development To achieve this two services will need to be included within the mixed use lot.	- DV to confirm mixed-use lot make up	-	DV	Implemented by: Mixed use developer TBC Implemented through: Development agreement
	14	Access to Fresh Food	14.1	Access to Fresh Food	1		1		1	1 point is available where all habitable buildings are within a walkable distance to a source of fresh food.	Fresh food source within 800m - needs to be provided within mixed use development to be within walking distance of all homes	'- DV to confirm mixed-use lot make up	-	DV	Implemented by: Mixed use developer TBC Implemented through: Development agreement
			14.2	Local Food Production	1			1	1	1 point is available where the project has a strategy to integrate productive landscape within the landscape objectives for the project site.	Community food garden(s) must be within an 800m radius of all residential dwellings, and be no less than 100 sqm per 1000 residential occupants.	- DV to confirm mixed-use lot make up	Mid CAPEX and Low OPEX	Architectus, MDG	Implemented by: MDG Collaborated with: Architectus Implemented through: Project requirements
	15	Safe Places	15.0	Credit Minimum Requirement - Visibility	0	Anticipated			Anticipated	To be eligible for this credit: ☐ All tunnels and underpasses within the project site must have end-to-end visibility; and ☐ All public areas, such as playgrounds, skate parks and community food gardens, must be visible from at least one street.	DV baseline: credit requirement	- Refinement of masterplan with design team to ensure targets are achieved	Low CAPEX	Architectus	Implemented by: Architectus Implemented through: Project requirements
			15.1	Design for Safety	2	2			2	2 points are available where the Minimum Requirement has been met and: ☐ A crime risk assessment process is undertaken; and ☐ A design strategy has been adopted that incorporates designing out crime principles.	DV baseline: 2 points Crime risk assessment study required	- Refinement of masterplan strategy with design team to ensure CPTED targets are achieved - Review of builder products inform strategy on residential lots - Development of design guidelines / Development Agreements / Specifications to enable CPTED targets in public realm and mixed use	Mid CAPEX	DV, Architectus	Implemented by: Architectus Collaborated with: DV Implemented through: Project requirements
	Liveability Total				**22**	**8**			**19**							
	Minimum Points Required for 6 Star				**7**											
ECON	16	Community Investment	16.1	Community Infrastructure Investment	4				Not Targeted	4 points are available based on the level of investment in community infrastructure, demonstrated in accordance with one of the following compliance pathways: a. The infrastructure investment provided is at least $4000 per residential dwelling	Pathway (a) must be followed as the greater proportion of the development. If $4000 per dwelling that would be a cost of $1.8m. Eligible investments include but are not limited to: Community centres; Child care facilities; Indoor recreation centres; Public buildings; Public transport infrastructure (including overpasses and bridges); Public art installations; etc. Currently not targeted however to be discussed further with DV - there maybe aspects of the mixed use precinct which could comply	-	-	-	-
ECON	17	Affordability	17.1	Residential Affordability Strategies	4	4			4	4 points are awarded where at least two residential affordability strategies are implemented for a proportion of the total residential area delivered as part of the project.	DV baseline: 4 points Pathway 17.1 must be followed as the greater proportion of the development. Where Local Government Authorities have adopted Affordable Housing Policy that is applicable to the project site these are acknowledged as predetermined residential affordability targets 2 strategies must be implemented. These could be: - Providing a diversity of lot sizes to support housing diversity, and a mix of densities with increased density near activity centres; - Providing a proportion of housing lots and dwellings to the market at an affordable purchase price for low to moderate income households; - Providing a program for guaranteeing the supply of shared equity and/or social housing within the development; and - Establishing partnerships between organizations to ensure allocation and delivery of affordable housing stock.	- DV to review affordability strategies to confirm appropriate strategies to be included within credit	High CAPEX	DV	Implemented by: DV
ECON	18	Employment and Economic Resilience	18.1	Increase in Local Jobs	1			1	1	1 point is available where projects can demonstrate that the plan for development will result in a net percentage increase in the number of jobs generated in the local area.	Economic study required	- DV to engage economist to undertake study	Low CAPEX	DV	Implemented by: DV
ECON			18.2A	Diverse Local Employment - Performance Pathway	1			1	1	Up to 1 point is available where; a. The proportion of the job demand from the project that is serviced locally at the time of the project's completion is 80% or more; and b. There is a diverse offering of employment available with at least 15% of jobs in the local area from Type A industry sectors and with no more than 50% of all jobs in the local area from a Type B industry.	Development is not within 5km of the CBD, and includes dwellings. Therefore pathway 18.2A must be followed. Study required, may not meet requirements	- DV to engage economist to undertake study	Low CAPEX	DV	Implemented by: DV
ECON	19	Education and Skills Development	19.1	Higher Education Facilities	1		1		1	1 point is available where at least two qualifying higher education facilities are located within 10km of the geographic centre of the project site or located so that they can be reached within a 45 minute commute by public transport.	Eastern College Australia and Holmesglen Glen Waverley campus are within 10km of the project site and each offer more than 4 areas of study and more than 5 qualification levels.	-	-	DV	Based on location
ECON			19.2	Skills Development Programs	1				Not Targeted	1 point is available where the project delivers skills development program(s) throughout the relevant certification period for at least two nominated stakeholder groups in accordance with one of the following pathways: A: within a school, university, TAFE or Registered Training Organization (RTO); or B. Where the skills development is directly linked to the planning design and delivery of the project site, by the project applicant organisation.	Currently not targeted however to be discussed further with DV - there maybe aspects of the development which could comply - dependent on builder partners and developers	-	-	-	-
ECON			19.3	Industry Capacity Development	1				Not Targeted	1 point is awarded for investment in Industry Capacity Development in built-environment sustainability issues.	Currently not targeted however to be discussed further with DV - potentially a circular economy strategy may contribute	-	-	-	-
ECON	20	Return on Investment	20.1	Analysis of Direct Costs and Benefits	1	1			1	1 point is available where projects apply cost and benefit analysis methods in assessing return on investment from optional investment items.	DV baseline: 1 point	- Direct cost and benefit analysis to be undertaken alongside DV and cost consultant	Mid CAPEX	DV	Implemented by: DV
ECON			20.2	Analysis of Indirect Costs and Benefits	1	1			1	1 additional point is available where: a. Criterion 20.1 is achieved; and b. Where the analysis of costs and benefits includes indirect costs and benefits.	DV baseline: 1 point	- Indirect cost and benefit analysis to be undertaken alongside DV and cost consultant	Mid CAPEX	DV	Implemented by: DV
ECON	21	Incentive Programs	21.1	Residential Incentives	2			1	1	2	Up to 2 points are available based on the provision of incentives provided to encourage sustainable practices that reduce the ongoing cost of living and working, where the dollar value of incentives provided is ≥ $750 per residential dwelling.	Pathway 21.1 must be followed as the greater proportion of the development. This is being considered. Incentives would have to total $337k and be available for 12 months after occupation	- Aurecon & DV to engage with Volume Builder Partners to review home products and where incentives can be offered	High CAPEX	DV	Implemented by: DV
ECON	22	Digital Infrastructure	22.1	High-Speed Broadband	1	1			1	1 point is available where habitable buildings are provided with one of the following; A. Fibre-to-the-Premises (FTTP); or B. Fixed wireless connectivity with minimum speeds of 25-50Mbps/5-20Mbps.	DV baseline: 1 point Projects that comply with the 'Infrastructure' point in the Innovation Challenge 'Smart Precincts' are automatically awarded all points under 'Digital Infrastructure'.	- Refinement of utilities strategy with design team to ensure targets are achieved - Review of builder products inform strategy on residential lots - Development of design guidelines / Development Agreements / Specifications to enable targets in public realm and mixed use	Mid CAPEX	Key Consult, Builder Partners	Implemented by: Key Consult Collaborated with: Builder Partners Implemented through: Project requirements and development deeds
ECON			22.2	Wireless Local Area Network	1	1			1	1 point is available where a free Wireless Local Area Network is provided at every activity centre in the project.	DV baseline: 1 point Projects that comply with the 'Infrastructure' point in the Innovation Challenge 'Smart Precincts' are automatically awarded all points under 'Digital Infrastructure'.	- Refinement of utilities strategy with design team to ensure targets are achieved - Review of builder products inform strategy on residential lots - Development of design guidelines / Development Agreements / Specifications to enable targets in public realm and mixed use	Low CAPEX and Low OPEX	Key Consult	Implemented by: Key Consult Implemented through: Project requirements and development agreement (for mixed use development)
ECON	23	Peak Electricity Demand Reduction	23B	On-Site Generation – Prescriptive Pathway	2	2			2	2 points are available where at least 30% of the annual electrical energy needs of the project are met through on-site power generation systems.	DV baseline: 2 points Design to be driven by 40% renewables on-site - this is 40% of annual electrical energy needs	- Refinement of utilities strategy with design team to ensure targets are achieved - Review of builder products inform strategy on residential lots - Development of design guidelines / Development Agreements / Specifications to enable targets in public realm and mixed use	High CAPEX	Builder Partners	Implemented by: Builder Partners (purchasing and installing of PV) Implemented through: Development deeds
Economic Prosperity Total					**21**	**10**			**15**							
Minimum Points Required for 6 Star					**6**											

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ENV	24	Integrated Water Cycle	24B	Water Management – Prescriptive Pathway	4	4				4	1 point is available where all water used in public open spaces and public realm areas is sourced from alternative water sources. 1 point is available where all building in the project site have access to alternative water sources. 1 point is available where the post-development peak Average Recurrence Interval (ARI) event discharge from the project site does not exceed the pre-development peak ARI event discharge. 1 point is available where receiving water quality is protected by limiting the quantity of key pollutants discharged in stormwater. This is based on a percentage reduction of sediment, phosphorus, nitrogen, and litter compared to untreated runoff.	DV baseline: 4 points under pathway B	- Refinement of WSUD and Water collection strategy with design team to ensure Water targets are achieved - Review of builder products inform water strategy on residential lots - Development of design guidelines / Development Agreements / Specifications to enable Water targets in public realm and mixed use	High CAPEX	PGA, Architectus	Implemented by: PGA Coordinated with: Architectus Implemented through: Project requirements
	25	Greenhouse Gas Strategy	25A	Greenhouse Gas Strategy – Performance Pathway	6	3			1	4	Up to 6 points are available based on the magnitude of the proposed project's predicted reduction in GHG emissions, when compared against a reference project.	DV baseline: 3 points Base case scenario estimates = 51% GHG reduction = 2.9 points Optimum case scenario without PPA estimates = 72% GHG reduction = 4.2 points Optimum case scenario with PPA = 100% GHG reduction = 6 points	- Refinement of energy & emissions strategy with design team to ensure energy targets are achieved - Review of builder products inform energy strategy on residential lots - Development of design guidelines / Development Agreements / Specifications to enable energy targets in public realm and mixed use	High CAPEX	Aurecon, Builder Partners, Architectus	Implemented by: Aurecon Collaborated with: Builder Partners, Architectus Implemented through: Development deeds and project requirements based on GHG modelling
	26	Materials	26B	Life Cycle Impacts – Prescriptive Pathway	3		1.5	1	0.5	3	To be eligible for points in this compliance pathway: □ At least 80% (by mass) of all reinforcing steel, asphalt, and concrete used in site-wide works must be sourced from facilities that have ISO 14001 accreditation and the company manufacturing the reinforcing steel must be a member of, and comply with the requirements of, the World Steel Association's Climate Action Programme; and □ At least 95% (by cost) of all timber used in the construction works must be certified by a forest certification scheme that meets the GBCA's 'Essential' criteria for forest certification; or be from a reused source. Up to 3 points are available where the requirements of 26B.0 are met and the project addresses the sustainability of the following primary construction materials: □ Concrete; □ Steel; □ Asphalt; and □ PVC. Points are awarded on a sliding scale based on the percentage (by cost) of primary construction materials that are used in the project which meet the Compliance Requirements.	Pathway 26B - unless an LCA is undertaken	- Refinement of resources strategy with design team to ensure materials targets are achieved - Review of builder products inform materials strategy on residential lots - Development of design guidelines / Development Agreements / Specifications to enable materials targets in public realm and mixed use	High CAPEX (to construction)	Builder Partners, PGA, Architectus	Homes Implemented by: Builder partners Implemented through: Development deeds Mixed use Installed by: Contractor TBC Implemented through: Development agreement Public realm Implemented by: Contractor TBC Collaborated with: PGA, Architectus Implemented through: Project requirements and tender documentation
	27	Sustainable Transport and Movement	27A	Sustainable Transport and Movement: Performance Pathway	3	3				3	3 points are available for the design and implementation of integrated responses to transport and movement that encourage a people-focused hierarchy.	DV baseline: 3 points under pathway A Sustainable Transport Plan to be completed, so pathway 27A chosen.	- Refinement of transport strategy with design team to ensure transport targets are achieved - Review of builder products inform transport strategy on residential lots - Development of design guidelines / Development Agreements / Specifications to enable transport targets in public realm and mixed use - Development of Travel Assessment and Travel Plan	Mid CAPEX	Architectus, OMG	Implemented by: OMG Collaborated with: Architectus Implemented through: Project requirements
	28	Sustainable Sites	28.0	Project Conditional Requirement	0		Anticipated			Anticipated	It is a Conditional Requirement for obtaining a Green Star – Communities certified rating that a project, that needs approval from the Australian Government environment minister under the EPBC Act for any proposed action, be granted an approval under that act. Where a project site is not subject to EPBC Act approval, the project is deemed to comply with this Conditional Requirement.	Aurecon understands that the Knoxfield site does not contain 'matters of national environmental significance' (MNES) and therefore is not subject to approval under the EPBC Act. The relevant MNES which could feasibly be located at this site have been considered, however deemed not applicable are: - Wetlands of international importance ('Ramsar' wetlands) – while there is a wetland on the site this is not listed under the Ramsar treaty. - Nationally threatened species and ecological communities or migratory species – while the Blue Billed Duck is a threatened species in Victoria it is not listed on any national registers.	- Green Star registration	-	DV	
			28.1	Previously Developed Land	1					Not Targeted	1 point is available where 75% of the project site comprises previously developed land.	Not previously developed land	-	-	-	-
			28.2	Best Practice Site Decontamination	1					Not Targeted	1 point is available where the site contains significant contamination, such that the uses in the proposed development would have been precluded, and the developer has adopted best practice remediation strategies as detailed to secure development permission for the project.	An assessment of the site was completed in early 2016 due to the concerns that the development may contain contamination within the upper soil profile as it is common for land which has been used for agricultural/ horticultural purposes to have been exposed to imported chemicals (i.e. pesticides). The assessment included soil testing, groundwater testing, testing of the dam and an asbestos audit. The environmental assessment indicated that the site is characterised as having a low contamination risk and is suitable for residential development. Therefore, as it can not be demonstrated that the site contained significant contamination that would otherwise have precluded development, the project is unable to achieving points in this credit.	-	High CAPEX	Ecocentric	Implemented by: Contractor TBC Collaborated with: Ecocentric Implemented through: Project requirements and tender documentation
	29	Ecological Value	29.1	Change of Ecological Value	1				0.5	0.5	Up to 1 point is available where the ecological value of the site is enhanced, based on a comparison of the ecological value of the combination of land types in the project site at the date of site purchase (or option contract) to the value after project completion. Partial points are available, with full points awarded where an improvement of 20% or more is achieved.	Preliminary calculations in the ecological calculator show that 0.5 points are achievable based on the current masterplan and landscaping design targets. Change in ecological value points are limited at Knoxfield due to: - 'BEFORE' state: minimal built area or 'bare ground', majority of site is covered with pastures, vegetation and an artificial water body, giving the current state a relatively good ecological value score to begin with. - 'AFTER' state: development of roads and buildings on approx. 60% of the site - this means that any vegetation, landscaping and wetland areas have to achieve very high 'value' targets in the calculator to achieve points	- Review of builder products to identify ratio of built form on residential lots - Refinement of landscaping strategy with design team to ensure native/exotic planting targets are achieved - Development of design guidelines / Development Agreements / Specifications to enable native/exotic planting targets in public realm and mixed use	Mid CAPEX	Architectus, MDG, Ecocentric	Implemented by: MDG Collaborated with: Architectus, Ecocentric Implemented through: Project requirements
			29.2	Biodiversity Enhancement	1	1				1	1 point is available where: a. A Biodiversity Management Plan has been prepared by a suitably qualified professional and is implemented demonstrating the management of the long term biodiversity values of the project site (and off site values, where offsets are established); and b. It is demonstrated that the Biodiversity Management Plan for the project site will create a net biodiversity gain representing an enhancement over the project's biodiversity at the date of site purchase (or option contract). Partial points are available in this criterion, with full points awarded where an improvement of 20% or more is achieved.	DV baseline: 1 point Biodiversity Management Plan to be completed. Can achieve 1 point if creating a net biodiversity gain of at least 20% (sliding scale).	- Refinement of landscaping strategy with design team to ensure biodiversity targets are achieved - Development of design guidelines / Development Agreements / Specifications to enable biodiversity targets in public realm and mixed use - Development of BMP	Mid-High CAPEX	Architectus, MDG, Ecocentric	Implemented by: MDG Collaborated with: Architectus, Ecocentric Implemented through: Project requirements
	30	Waste Management	30.1	Construction and Demolition Waste	1	0.5	0.45			0.95	Up to 1 point is available where; □ The project develops and implements a Waste Management Plan for the project site's construction and demolition waste; and □ ≥ 60% of the construction and demolition waste associated with project site has been recycled or reused. Partial points are awarded based on the percentage of waste recycled over 60% and up to 100%.	DV baseline: 0.5 points DV best practice: 95% diversion	- Development of C&D WMP	High CAPEX (to construction)	Aurecon, Builder Partners	Homes Implemented by: Aurecon to develop WMP and Builder Partners to follow Implemented through: Development deeds Mixed use Implemented by: Aurecon to develop WMP and mixed use contractor to follow Implemented through: Development agreement Public realm Implemented by: Aurecon to develop WMP and public realm contractor to follow Implemented through: Project requirements and tender documentation
			30.2	Operational Waste	1	1				1	1 point is available where measures are implemented to reduce the overall environmental impacts associated with operational waste. Points are awarded based on the initiatives implemented in the project from the following list: A. Public place recycling scheme; B. Residential recycling scheme; C. Hazardous waste collection or disposal services; D. Pay as you throw (PAYT) scheme; or E. Composting or Green Waste scheme. Three initiatives are required to achieve 1 point.	DV baseline: 1 point Must implement 3 initiatives: - PPR / RotG - this should already be included and collected by local council for the public spaces - Residential Recycling Scheme - Knox City Council recycling is collected fortnightly, 240L bin, accepts paper, cardboard glass, plastic bottles and containers, and household metals - Hazardous waste collection or disposal services - Knox Transfer Station is within 5km and they take paint, solvents, oil and batteries but it costs money - unclear whether it has to be free of charge for GS or not	- Development of OWMP	Mid CAPEX and Mid OPEX	DV, Architectus, Builder Partners	Homes Implemented by: Builder Partners Implemented through: Development deeds to ensure appropriate space requirements for council waste management Mixed use Implemented by: Contractor TBC Implemented through: Development agreement to ensure appropriate space requirements for council waste management Public realm Implemented by: Architectus and contractor TBC Implemented through: Project requirements and tender documentation to ensure appropriate space requirements for council waste management
	31	Heat Island Effect	31.1	Heat Island Effect	1	1				1	1 point is available if at least 50% of the total project site area, in plan view, comprises building or landscaping elements that reduce the impact of heat island effect.	DV baseline: 1 point DV best practice: indicates light coloured roofs for homes with a specified SRI 25% canopy coverage target	- Refinement of landscaping strategy with design team to ensure canopy cover & SRI targets are achieved - Development of design guidelines / Development Agreements / Specifications to enable canopy cover & SRI targets in public realm and mixed use	Mid CAPEX	Aurecon, Architectus, MDG, PGA, Builder Partners	Homes Implemented by: Builder Partners Implemented through: Development deeds Mixed use Implemented by: Contractor TBC Implemented through: Development agreement Public realm Implemented by: Architectus and contractor TBC Collaborated with: MDG, PGA Implemented through: Project requirements and tender documentation
	32	Light Pollution	32.1	Light Pollution	1		1			1	1 point is available where, relative to their particular mounting orientation, 95% by number of all external public lighting luminaries within the project site boundary have an Upward Light Output Ratio less than 5%.	Simple to implement - check that there aren't any special requirements for external lighting that cannot meet this	- Development of site wide lighting strategy by electrical / lighting consultant	Low CAPEX	Architectus	Implemented by: Architectus Implemented through: Project requirements
Environment Total					**24**	**13.5**				**19.45**		.				
Minimum Points Required for 6 Star					**9**							.				

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INN

30A	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.											
30B	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.											
30C	Improving on or Exceeding 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.											
30D	Innovation Challenges	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											
		DV baseline	5	5				5		DV baseline: 5 points				
	30D-1	Financial Transparency	1		1			1	To claim this Innovation Challenge your project team must: ☐ Agree to complete the 'Financial Transparency Disclosure Template' that comprehensively itemises design, construction, documentation and project costs. In the case of building operations, the information provided will relate to the cost of collecting documentation, building operations and any building upgrades. ☐ Provide Disclosure Template in Excel format at the time of the project's Green Star submission. ☐ Agree to participate in the yearly GBCA report, using anonymized data provided by project teams.	DV baseline: high https://gbca-web.s3.amazonaws.com/media/documents/financial-transparency-innovation-challenge.pdf	- Design team & DV to log implementation & documentation costs to be collated for initial certification - Development of design guidelines / Development Agreements / Specifications to enable financial transparency data to be collated for recertification.	Low CAPEX	DV	Implemented by: DV
	30D-2	High Performance Site Offices	1				1	1	To claim this Innovation Challenge your project team must: ☐ Review the 'High Performance Site Office Checklist' to understand the Innovation Challenge requirements. ☐ Demonstrate that a site shed(s) that complies with at least 75% of the requirements in the Checklist has been procured and has been used by the majority of construction workers on site. ☐ Demonstrate that an assessment of the satisfaction of the occupants of the site office was done during its use, and where issues were found, they have been addressed, ideally using BOSSA.	DV baseline: low https://gbca-web.s3.amazonaws.com/media/documents/high-performance-site-offices-fact-sheet-r2.pdf	- Development of design guidelines / Development Agreements / Specifications to enable HPSO across the development	Low CAPEX	Builder Partners	Homes Implemented by: Builder Partners Implemented through: Development deeds Mixed use Implemented by: Contractor TBC Implemented through: Development agreement Public realm Implemented by: Contractor TBC Implemented through: Project requirements and tender documentation
	30D-3	Homes for Homes - Social and Affordable Housing	2		2			2	A. Commercial Property(ies): ☐ One point is awarded when the commercial property (or all commercial properties) that make up the Green Star project are registered as Homes for Homes participating property(ies) with a caveat registered on Title. The property owner agrees to donate 0.1% of the sale price to Homes for Homes at the time the property is sold; or ☐ One point is awarded when the property owner enters into a Homes for Homes Participation Agreement agreeing to donate to Homes for Homes, 0.1% of all participating property(ies)' lease income during the term and extended term(s), payable at the start of each term or extended term. B. Residential Wholesale Property(ies): ☐ One point is awarded when a wholesaler (developer, or urban renewal authority) sells all its residential properties that make up a Green Star project as Homes for Homes Participating Properties and ☐ One additional point is awarded if the wholesaler also makes a donation to Homes for Homes of an amount equal to, or exceeding, 0.1% of the total of the sale prices of all1 properties that make up the Green Star project.	DV baseline: high Pathway B - responsibility of DV or Builder Partners? https://gbca-web.s3.amazonaws.com/media/documents/homes-for-homes---creating-social-and-affordable-housing-fact-sheet-r1.pdf	- Aurecon & DV to engage with Volume Builder Partners - Development of Development Agreements to enable innovation challenge in practice.	High CAPEX	DV, Builder Partners	
	30D-4	Incorporation of Indigenous Design	1		1			1	At a minimum, the following four principles from the Australian Indigenous Design Charter are to be addressed: • Indigenous Led: Ensure Aboriginal and Torres Strait Islander representation in the creation of the design. • Community Specific: Ensure respect for the diversity of Aboriginal and Torres Strait Islander culture by following community specific cultural protocols • Impact of Design: Always consider the reception and implications of all designs so that they are respectful to Indigenous culture. • Shared Knowledge (collaboration, co-creation, procurement): Develop and implement respectful methods for all levels of engagement and sharing of Indigenous knowledge (collaboration, co-creation, procurement). The project team must demonstrate engagement has happened from concept design and continues through to operational handover.	DV baseline: high https://gbca-web.s3.amazonaws.com/media/documents/incorporation-of-indigenous-design-fact-sheet-r1.pdf	- DV to engage indigenous architect to work with design team on concepts for masterplan	Low CAPEX	DV, Architectus	Implemented by: DV (ensuring Indigenous Led) and Architectus (design) Implemented through: Project requirements
	30D-5	Integrating Healthy Environments	1			1		1	To claim this Innovation Challenge your project team must: ☐ Conduct an analysis of community health needs and outline the distribution of health issues among impacted communities. ☐ Prioritize strategies to address identified needs. Identify actions that could be taken to enhance health supportive features of the project and those that could minimize potential risks. Identify actions that can be taken within the project's design, construction or operation that will promote health equity. ☐ Intentionally implement selected strategies to address identified community and occupant health needs. ☐ Develop a monitoring plan with performance metrics to evaluate the project's impact on occupant and community health throughout the project life cycle (design, construction and operations).	DV baseline: medium https://gbca-web.s3.amazonaws.com/media/documents/integrating-healthy-environments-fact-sheet-r1.pdf	- DV (or KCC?) to prepare analysis of community health needs in order to enable appropriate concepts for masterplan	Low CAPEX	DV, Architectus	Implemented by: DV (analysis) and Architectus (design) and mixed use developer (if analysis impacts mixed use tenants) Implemented through: Project requirements and development agreement
	30D-6	Local Procurement	2		2			2	1 point is awarded where the project team demonstrates that a percentage of the products and materials used in the project were produced or manufactured in Australia. 1 point is awarded where the project team demonstrates that a percentage of the services and skilled labour employed by the project come from the local area surrounding the site.	DV baseline: high https://gbca-web.s3.amazonaws.com/media/documents/local-procurement-20180906.pdf	- Aurecon & DV to engage with Volume Builder Partners - Development of design guidelines / Development Agreements / Specifications to enable innovation challenge in practice.	Mid-High CAPEX	DV, Builder Partners	Implemented by: DV (design team) and Builder Partners (construction workers and products and materials) Implemented through: Scope of works bid documentation, tender documentation, development deeds
	30D-7	Marketing Excellence	1		1			1	To claim this Innovation Challenge your project team must: ☐ Develop methodology and perform market research on the investment drivers of end-users of the building, fitout or community e.g. likely investors, occupants or staff. Note that this is not intended to be generic market research based on published reports. Rather, it is market research that involves the project itself and potential likely end users. ☐ Develop a marketing strategy that addresses these drivers in relation to the sustainability measures implemented. ☐ Implement this marketing strategy and provide developed samples at the time of the project's Green Star submission. ☐ Provide information on the benefits of sustainability in a public and prominent way within your building (or sales office). ☐ Provide the information required to create a case study at the time of the project's Green Star submission.	DV baseline: high https://gbca-web.s3.amazonaws.com/media/documents/marketing-excellence-fact-sheet-r1.pdf	- DV to prepare market research on the investment drivers of end-users of the building, fitout or community in order to enable appropriate concepts for masterplan	Low CAPEX	DV, Builder Partners	Implemented by: DV and Builder Partners Implemented through: Development deeds
	30D-8	Reconciliation Action Plan	1			1		1	To claim this Innovation Challenge your project team must: 1. Develop a Reconciliation Action Plan (RAP), as defined and endorsed by Reconciliation Australia. The RAP must be endorsed by Reconciliation Australia. The Green Star project being rated must play a central role in the delivery of the Reconciliation Action Plan. 2. Demonstrate evidence that relevant Indigenous organisations have been consulted in the development of the RAP. 3. A structure is in place to deliver the plan including a RAP Working Group, with a RAP Coordinator as part of the Working Group, comprising Indigenous and non-Indigenous staff members from all business areas. 4. Public reporting is undertaken to Reconciliation Australia (or equivalent body) and in the organisation's Annual Report, or project website, to report on tangible achievements towards reconciliation goals. 5. At least 80% of the RAP targets have been met in the first reporting cycle.	DV baseline: medium https://gbca-web.s3.amazonaws.com/media/documents/reconciliation-action-plan-20171215.pdf	- DV to prepare RAP to enable innovation challenge	Low-Mid CAPEX	DV	Implemented by: DV
	30D-9	Smart Precincts	3		1	1	1	3	Minimum Requirement To achieve this challenge, the project must: • Follow the 'Code for Smart Communities' • Demonstrate that the outcomes and metrics for the 'Strategic' section have been met. • Publicly disclose how these outcomes have been met on the project's website Infrastructure One point is available where the project: • Achieves the minimum requirement. • Demonstrates the outcomes and metrics for the 'Connected' section have been met. • Provides an analysis of how the provided or available infrastructure compares to and exceeds a typical development built in the past 5 years. Data One additional point is available where the project: • Achieves the minimum requirement and the point for 'Infrastructure'. • Demonstrates the outcomes for the 'Aware' section have been met. • Provides an example of how each of the metrics in the 'Aware' section is being achieved • Provides examples of how these are being communicated to stakeholders in plain English. In particular, the privacy provisions must be explained to the people living in the community in plain English language. Governance One additional point is available where the project: • Achieves the minimum requirement and the point for 'Data'. • Demonstrates the outcomes and metrics for the 'Responsive' section have been met. • Provides an analysis of what the expected targets will be for the first three metrics. o Percentage of population engaged through digital channels. o Number of or potential realised value of improvement initiatives driven by data. o Decrease in spend on maintenance and operational costs	DV baseline: medium https://gbca-web.s3.amazonaws.com/media/documents/innovation-challenge---smart-precincts.pdf https://anz.smartcitiescouncil.com/system/tdf/anz_smartcitiescouncil_com/public_resources/code_for_smart_communities_final.pdf?file=1&type=node&id=6462&force=	- Aurecon, DV and design team to review Smart Cities Code and integrate into masterplan concept design as applicable - Development of Development Agreements to enable innovation challenge in practice.	Low-Mid CAPEX	DV, Key Consult	Implemented by: DV Collaborated with: Key Consult Implemented through: Project requirements
	30D-10	Universal Design	1		1			1	To claim this Innovation Challenge your project team must: ☐ Review the Design for Dignity Guidelines, or similar guidelines for inclusive design and dignified access. ☐ Perform a 'needs analysis' identifying the project's accessibility issues. See the Guidance section for additional detail. ☐ Develop an 'accessibility plan' (or similar) that provides strategies to address the needs determined and identifies actions for how the project will incorporate inclusive design. ☐ Implement the 'accessibility plan' and demonstrate that accessibility initiatives have been carried out for the project.	DV baseline: high https://gbca-web.s3.amazonaws.com/media/documents/universal-design.pdf	- Coordinate with the Urban Designer to refine the Universal Design approach - Development of design guidelines / Development Agreements / Specifications to enable innovation challenge in practice.	Low-Mid CAPEX	DV, Builder Partners, Architectus	Homes Implemented by: Builder Partners Implemented through: Development deeds Public realm Implemented by: Architectus Implemented through: Project requirements and tender documentation
30E	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.											
Innovation Total			**10**	**5**				**10**					

Total Credits	**95**	**50**	**76.5**
Total Credits with Innovation	**105**	**55**	**86.5**

Green Star Design & As Built Rating **Six Star**

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