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# Knutsford

One Planet Living<sup>®</sup> Peer Review  
November 2019

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## Project information

Project Name	East Village, Knutsford, Fremantle, Western Australia
Project Type	Infill Residential Development
Developer	Development WA (previously LandCorp)
Project contact	Greg Ryan, Development WA (previously LandCorp)
Brief Description	<p>East Village at Knutsford is a medium density development located in the City of Fremantle, comprising 36 townhouses and two apartment sites estimated to include 30-40 apartments per site. A number of townhouses (12) include have rear studios / accommodation with a separate entry.</p> <p>A communal hub, food forest and native landscaping throughout the lanes, streets and Knutsford St verge provide vegetation.</p> <p>A community energy structure with strata ownership of townhouses will be provided with onsite renewable energy and shared battery back-up for the 36 townhouses.</p> <p>A Living Laboratory will be established in the onsite demonstration home with the living laboratory with desk space for up to 17 researchers as well as the sales office / café.</p> <p>Research projects are underway with support from the City of Fremantle, CRC for Low Carbon Living with Curtin University and CRC for Water Sensitive Cities with Murdoch University.</p>
One Planet Living Integrator	Mark Taylor
Peer Reviewer	<a href="#">Suzette Jackson, Bioregional Australia Foundation</a>
Date of review	September 2019
Performance	One Planet Community – Global Leadership

## Peer-Review Summary

East Village at Knutsford's One Planet Living® (OPL) Action Plan contains strong leadership initiatives for creating low-carbon homes and small water footprint in operation, community and research engagement, pilot initiatives in sustainable materials and construction fabrication pilots, increased biodiversity and multigenerational living.

### Highlights

- The townhouse design will achieve a small water footprint through a high level of water efficiency, rainwater tanks, underground storage for the community garden, water bore irrigation and rain gardens.
- A range of communal features on Knutsford Street and on the private street including covered communal seating and native food forest.
- Demonstration strata-owned townhouses enabling community-owned solar microgrid, onsite bulk battery storage and peer-to-peer sales.
- Demonstration housing providing flexible ground floor spaces. A third of townhouses will have separate studios and all will have a flexible outdoor space instead of a garage.

There is also provision for onsite electric vehicle charge point for scooters, bikes or vehicles.

- High level of landscaping and trees for native food forest (edible) due to creative approach to verge planting on Knutsford Street, private laneway and streetscaping
- Significant research programs with funding and university partnerships established early, including the onsite research living laboratory, hemp-panelled mini demonstration house, electric vehicle charge stations and community micro-grid.

### **Rationale**

East Village Knutsford (EVK) is an ambitious residential development bordering Booyeembara Park, set in the inner Perth City of Fremantle - just 10 minutes ride from the Fremantle activity centre. When occupied, the community will to create zero-carbon, 'One Planet' lifestyles for residents. The strata-owned community micro grid is a key initiative and well on its way to establishment, alongside innovative approaches taken to minimise energy demand, potable water demand and non-renewable fuel use in housing, food production and transport.

The research partnerships developed with Curtin University and Murdoch University will enable testing and shared learning on the operations, community engagement, and behaviour change, ultimately benefiting the broader community and future developments globally.

Housing diversity will be provided through the [strata-titled townhouses](#) and two apartment developments, provided by independent developers that are required to work to the One Planet Living vision and Action Plan established by DevelopmentWA and consultants.

Site infrastructure in place for townhouses includes recycled concrete boundary walls, private street and laneway, townhouse rainwater tanks underground, shared battery storage, and three public electric vehicle (EV) charge stations onsite. Townhouse construction is underway with prefabricated units in place for the Living Lab demonstration house, and a hemp-panelled mini demonstration house.

The apartment developments will commence with Lot 2, which fronts Knutsford Street, and the Request For Proposal integrates the OPL principles and project targets.

We recommend further efforts with potential buyers and residents on the:

- Transition to low-carbon personal transport options to enable low carbon living
- Affordable housing target of 20% or more in the overall development
- Low embodied carbon material used in construction

Items for management in construction phase through to occupancy:

Communicate to residents the benefits of minimising vehicle ownership and using rear courtyards as living spaces.

Communicate alternate personal transport modes, including the use of EV scooters and bicycles, charged at home to reduce carbon emissions. We note transport emissions from residents could be high if homeowners do not install EV charge points or own bicycles, scooters and vehicles.

Communicate to developers and residents' requirements for low embodied energy materials and circular economy.

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## Outcome of Peer-Review

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### ***Project Sponsor: DevelopmentWA***

DevelopmentWA (formerly LandCorp) was an early adopter of One Planet Living in WA and the first developer in the state to achieve endorsement from Bioregional for a One Planet Action Plan for a residential development; WGV by LandCorp. We remain very proud of that achievement and have selected One Planet Living again as the framework to guide the project that we see as the natural successor to WGV, East Village at Knutsford.

East Village is a different model of development, with most of the site being the subject of a survey strata – a governance mechanism that enables management of some commonly owned elements between a group of dwellings. The design team has taken full advantage of this structure to bring innovations to energy and water services, landscape elements, and a sophisticated monitoring system that otherwise simply wouldn't be possible.

DevelopmentWA understood the value of partnerships in the growth of WGV into a leadership project. From day one at East Village we have involved partners such as the City of Fremantle, Curtin University, Murdoch University, CRC for Water Sensitive Cities, among many others. The project timeline was accelerated to enable it to become the centrepiece of a major Smart Cities & Suburbs project, which was partially responsible for the project now housing an industry leading shared battery system governed by a blockchain based online tool.

All of these elements are not hidden from future residents, they are celebrated and form the core of the identity of East Village. People who visit, consider buying, and eventually live at East Village will understand that they are enabled by decisions made at the design stage of the project to live highly sustainable lifestyles and be part of demonstrating that a resilient, sustainable development in WA is possible and is desirable.

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### ***One Planet Living Integrator: Mark Taylor, Josh Byrne & Associates***

The process of developing a One Planet Action Plan for East Village was different than at WGV. The project design developed at a faster pace, so One Planet workshops happened more frequently, and the process was more intense. This had the interesting effect of improving the integration of ideas into the design and less problems with corporate memory. Once a direction was agreed on, it was incorporated into the design, mitigating the need for constant revision sessions to retrace the agreed approach, as can be the case.

The team has a big cross-over with WGV, with the same Development Manager from DevelopmentWA (formerly LandCorp), Warren Phillips; the same civil engineers, Tabec; and JBA providing landscape architecture, urban water and sustainability services. The fact that these key parts of the team had so recently worked within the OPL framework made the process more straightforward and immediate, moving quickly to resolved responses to the principles.

The project site is in a light industrial part of Fremantle that is transitioning to residential and mixed use. The site will be divided into 3 main zones: two multi-res sites at the eastern end along Montreal St and one survey strata of 36 town homes. The final development will feature a private street and two laneways running north-south and a pedestrian access way (PAW) running approximately east-west. The PAW and other greenspaces are ample, and the road is conceived as primarily a landscape feature. The common areas - laneways, pedestrian access ways and private street - are envisaged as part of a wider network of green spaces linking to Booyeembara Park and other proposed green spaces within the local structure plan.

The apartment sites will be developed by third-party developers selected via an EOI process. This process will include asking developers to respond the One Planet Living principles, with responses forming an important part of the assessment. The City of Fremantle will require that these buildings adopt a sustainability framework, with OPL being the obvious choice given the location in East Village and in the City of Fremantle, a One Planet Council.

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DevelopmentWA has shown an unwavering commitment to leadership with this project, which has flowed through to the draft Action Plan.

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***Peer Reviewer: Suzette Jackson, One Planet Lead Australia***

East Village at Knutsford is an innovative project that challenges our perception of low-carbon living, low water footprint and one planet lifestyles in an urban Australian context. It will enable future residents to live happy, healthy lives within a like-minded community. East Village at Knutsford demonstrates leadership across each of the ten One Planet Living principles.

Key areas to follow up on as the townhouse and apartment development commences include:

- engagement with the construction sector on building material selection
- monitoring compliance to performance guidelines, particularly those critical for low-carbon living
- communicating the potential benefits to potential buyers, including welcome packs
- embedding low carbon living in occupancy through reduced personal vehicle usage and onsite food production.

The team's commitment to leadership demonstration projects combined with the research partnerships is to be congratulated. I encourage the team to continue to drive behaviour change, document and communicate the benefits to the community and monitor the performance in operation.

This second implementation of the One Planet Living framework by LandCorp (now DevelopmentWA) continues to test low-carbon living initiatives. I look forward to the project being fulfilled as designed, driving positive change and delivering improved impacts for the resident community and shared learning globally.

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***Bioregional International Technical Manager: Ben Gill***

The East Village project location, just 15-20 minutes on foot to the Fremantle town centre and train station, is the ideal location for a medium-density, low-car, sustainable community. The current plans show how the townhouses at East Village will meet exceptional zero carbon and water efficient standards, with particular innovation in delivering these goals in a multi-lot development. The Request for Proposals for the adjacent 50+ unit apartment site demands a similar level of sustainability performance from the responding developers, while providing much-needed affordable one and two-bed accommodation.

The project aims to overcome the local planning requirement that all houses have two parking spaces by designing and marketing the townhouse parking space as multifunctional and encouraging purchasers to use the space for garden, outdoor seating, play areas or EV charge points for bikes, scooters or vehicles, connected to the onsite solar energy. This is a positive innovation that will need ongoing management to ensure it really does reduce vehicle ownership.

The project has also taken significant steps in demonstrating low embodied energy solutions, though 'reverse brick' construction (as opposed to double brick). Timber frame is still being considered and we recommend that this option is pursued. The Living Lab and sales centre site will also demonstrate the use of the carbon-positive, hemp-panelled mini demonstration house.

We commend East Village for its exceptional work in terms of energy, water and biodiversity and recognise that the One Planet Action Plan is a Global Leader in One Planet Living. Ensuring that the apartment development meets the same standards as the housing, and that the site meets its transport and affordability objectives will be challenging. But we believe that the team has the skill and passion to rise to the challenge and look forward to following their achievements in their progress reports.

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## Peer Review

### Scope and impact

Review	Overall Outcome in transformation to One Planet Living			
	Comment	Highlights	Opportunities	Rating 1-5
Impact	Increase liveability and affordability by decreasing car ownership, energy demand, and increasing access to onsite food production and onsite community engagement Apartments to match low carbon living in townhouses	Good quality lifestyle with low operational cost for townhouses with potential very low energy & potable water use in operation;	Share learnings on high thermal efficiency in all homes (blower door testing) in construction reports; Drive OPL impact in apartments as well as townhouses	4
Ambition	The commitment to achieve low carbon living and low water demand in operation is ambitious. Allowance for EV charge points for bike/scooter/car per townhouse and 3no. Public EV charge stations onsite. Housing affordability for townhouse is I Density and housing diversity is low	Community microgrid renewable energy with 5kw on all townhouses, and 1-3kw renewable energy per apartment on apartment block/s Lot 1 & 2; communal onsite meeting areas; accessible living	Drive low carbon living targets with residents across all EVK housing in operational energy, equipment and transport	5
Transformation	Townhouse design has potential to support low carbon living; More transparent screening of gardens to communal spaces / laneway/street would benefit community interaction and safety in private streets, laneways and PAW	Potential transformation of lifestyle across most aspects of One Planet Living, supported by onsite living lab and research teams to engage, change behaviour, measure and share learnings	Onsite community facilitator for groups such as share transport, food production and swap meet to build community support and embed in resident lifestyles; communicate shared value with residents	4

## Action Plan - Implementation

Implementation	Overall review			
	Comment	Highlights	Opportunities	Rating 1-5
Health and Happiness	A range of community initiatives are provided with the online community noticeboard and in urban / communal spaces and private accessways, supporting connectivity.	Onsite community spaces planned for private street and Knutsford St verge; public exercise equipment and running track and bicycle parking,	Utilise the online community hub to support active lifestyles, physical and mental health, support food gardening/food swap club for the Knutsford verge	4
		Advice on materials toxicity for builders and creating a healthy and fulfilling home for residents	Support healthy building and materials choices by residents	
		welcome pack, online community platform and connection to community groups; One Planet Living Fact Sheet	Promote onsite community activities and neighbour get together to all residents via online community portal and facilitator in first 12months of operation	
Equity and Local Economy	The townhouse development provides flexible spaces and NBN for home office and a portion of light commercial activity on side streets. This supports capacity to grow local economy. Where provided accessibility and affordability increase diversity and inclusion. Affordable housing' will be delivered through 2 x Apartment sites as per RFP and client spec.	Low cost of living est. to save residents more than \$1200 per year in reduced utility bills; further savings possible in transportation and food costs, with behaviour change	Provide affordability target /mix of social housing for apartment purchase and rental.	4
		Townhouses provide accessibility and flexible, spaces; regional based consultants and contractors	Create awareness of local economy with local SME, local council support for small business etc. via online community portal	
		Onsite Living Laboratory & research collaborations with CRC for Water Sensitive Cities & Low Carbon Living, City of Fremantle 'Smart Cities Smart Suburbs. Living Lab Fact Sheet on public website	Promote benefits of spending and localised resources to construction team, buyers and tenants. Look at ways to incentivise local spending.	
Culture and Community	A mix of private townhouses, and apartment developments with communal seating areas and onsite public access ways, laneways and streets for pedestrians, cyclists and vehicles. Greater transparency between the zones would provide increased safety through eyes on the street particularly in the verge and streets.	Dedicated online resident portal established - the OnCoNoBo; Community Fact Sheets	Facilitate initial use of the online community portal for the first 6-12 months with group activities	3
		Shaded seating areas throughout public areas and street verges for community conversations and neighbourliness	Use screening or transparent/mesh front fence rather than solid to private street/s for safety & connectedness in community. Increase transparency of garage doors to private laneway for safety	
		Shelters to be provided by artists to private street and public access way	Include art elements in public spaces to Knutsford Street verge and food garden	

<b>Land and Nature</b>	The density of the two storey townhouses and apartments, leave little open space for biodiversity, however the verge to the development south, private streets and laneways have been utilised to maximise density and a moderate target of 20% tree canopy set for the overall site target with a higher % met in the streetscape and verge areas.	A green, heat resilient landscape with canopy above 20% of site coverage across public and private zones	Increase canopy target in Knutsford St verge/ food garden (target > 40%) to promote cooling & bio-link	<b>4</b>
		Range of natives and productive (edible food) trees to create habitat and biodiversity; Biodiversity Fact Sheet; gardens in townhouses completed by builder	Utilise demonstration house as a demonstration garden and propagation space for native and edible planting	
		Landscape design to support management of stormwater incl. swales & raingardens combined with under road infiltration chambers	Encourage residents to grow plants native and edible from locally sourced /propagated seeds	
<b>Sustainable Water</b>	A near closed loop water cycle for townhouses drawing from rainwater, bore water and potable water, with stormwater retained onsite and filtered to aquifer. Provide similar provisions for apartments. Sustainably managed bore water for all irrigation on townhouses and apartments. The challenge will be to deliver the mechanisms across the apartment developments.	Rainwater supply connected to the hot water system (+ toilets & washing machines) 1st in WA; Water Wise Living Fact Sheet	Share learnings and promote research outcomes in community news as well as academic papers	<b>5</b>
		Sustainably managed bore use for private lot hand watering via a hose, WA 1st	Ensure community food garden and edible fruiting trees are accessible to bore water use.	
		80% reduction in mains water consumption, with systems powered by renewable energy; with online ledger system to monitor water systems via 3 meters	Support occupant understanding of water saving initiatives and monitoring, reporting and feedback loops	
<b>Local and Sustainable Food</b>	The implementation of an onsite community food garden / food forest will encourage community interaction, learning and sharing	Community food garden /food forest planned for Knutsford St verge to support 36 – 140 homes onsite when complete	Facilitate food gardening, permaculture, seed propagation and compost training for residents in early occupancy	<b>4</b>
		Productive fruit trees and edible native species throughout the public walkways and private streets	Establish a community harvest group to capture harvest for community sauce / jam / oil production	
		Information on local sustainable food sourcing and food groups provided on community platform and in welcome pack	Community platform to connect and encourage access to regional food grown by regenerative practices	
<b>Travel and Transport</b>	Electric transport charging infrastructure provided to all townhouses supporting up to 2 vehicles at each house, bikes & scooters. More support will be required for behaviour change with uptake of active transport, public transport and less car ownership.	Local pedestrian and cycling paths; close to amenities & Public Transport	Promote active transport and public Transport options; Promote active transport, cycling groups, carshare,	<b>4</b>
		Townhouses are EV ready with - 3 phase 15-amp power in all off-street car spaces to allow for overnight / day fast charge; 10-amp points available to areas where bicycles stored; most homes with undercover areas adjacent to rear living space	Market alternative use for rear of townhouses (i.e. outdoor dining / BBQ) & encourage max 0-1 car per townhouse and alternative transport	
		EV charge stations onsite with 1 permanent and 3 additional at Living Laboratory (for 3 years)	Monitor and report resident usage and cost saving regularly in onsite community news & more broadly	
<b>Materials and products</b>	Material requirements set out under guidelines with preferred building methods and materials	Building Performance Guideline for Townhouses, includes thermal performance and VOC avoidance	Adopt Building Performance Guideline for apartment developments	<b>4</b>



	and based on EOI process. Monitoring and reporting by builder on selections will be needed to determine as built performance coupled with thermal envelope testing. Product assumptions listed in energy modelling but not in guidelines - needs to be provided to selected builder.	Legacy Living Lab (temp.12months) and mini demonstration house with hemp panels and solar panel windows	Engage selected builder in demonstration, with aim to incorporate in permanent buildings.	
		List of materials to be avoided (red list) provided to builder	Provide product energy ratings / guidance to developer /builder - based on energy modelling / efficient product selection	
Zero Waste	Ensure builder is inducted into the waste management program and takes material size and ordering into account to minimise waste.	Online service to facilitate sharing of tools / unwanted items between residents	Online community platform to reduce resident waste through swap, share and sell	4
		Construction waste recycled and repurposed where possible with waste manager target 100%; and regular waste reporting; Construction phase 'laydown' area onsite to facilitate reuse of construction materials	Guidance on low waste from materials in construction through practices such as offsite prebuilt components; and design to suit material selection.	
		Free composting and worm farm system provided to residents	Waste management report on all aspects including demonstration house, marketing, construction incl. packaging.	
Zero carbon energy	Promotion of low carbon living, with high thermal envelope performance and air leakage testing, with potential to drive high thermal performance with educated buyers. challenge to achieve (min 7.5 stars) up to 10 stars across all apartments as well.	Energy efficient homes min. 7.5-star homes, online ledger system to monitor energy and water systems; with 1 x energy meter and 3 x water meters per townhouse; Building Performance Guideline	Share outcomes from energy demand / generation in construction, incl. transport emissions, and material embodied energy	5
		Zero Energy Home (ZEH) strategy for townhouses producing more energy than consumed on av. annual basis. 100% electric / no gas onsite. Modelling allows for high penetration of EV vehicles/bikes	Model energy usage in occupancy to determine how close to net zero energy for townhouses, incl. transport emissions and share lessons learnt	
		Community microgrid with shared lithium battery onsite storage (670kWh) - 5kw solar per townhouse; Energy Fact Sheet on townhouse microgrid; Apartments to target min. 1kw per bedroom.	Develop approach for apartments to operate on a community grid with shared battery storage, to match townhouse community grid	