Mirvac Group

11 February 2010

Sustainability Report

Former Hoxton Park Airport Lands

Sustainability Report

Former Hoxton Park Airport Lands

Prepared for

Mirvac Group

Prepared by

AECOM Australia Pty Ltd
Level 11, 44 Market Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia
T +61 2 8295 3600 F +61 2 9262 5060 www.aecom.com
ABN 20 093 846 925

11 February 2010

60147289

Quality Information

Document Sustainability Report

Ref 60147289

Date 11 February 2010

Prepared by Linda Soo

Reviewed by Samantha Coras

Revision History

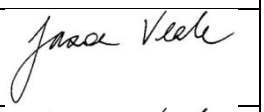
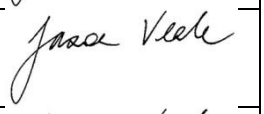
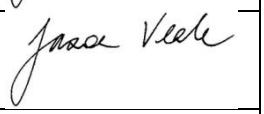
Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
01	13-Jan-2010	Draft for Client Comment	Jason Veale Associate Director	
1	22-Jan-2010	Updated Draft	Jason Veale Associate Director	
2	03-Feb-2010	For 3A Submission	Jason Veale Associate Director	
3	05-Feb-2010	For 3A Submission	Jason Veale Associate Director	
4	11-Feb-2010	For 3A Submission	Jason Veale Associate Director	

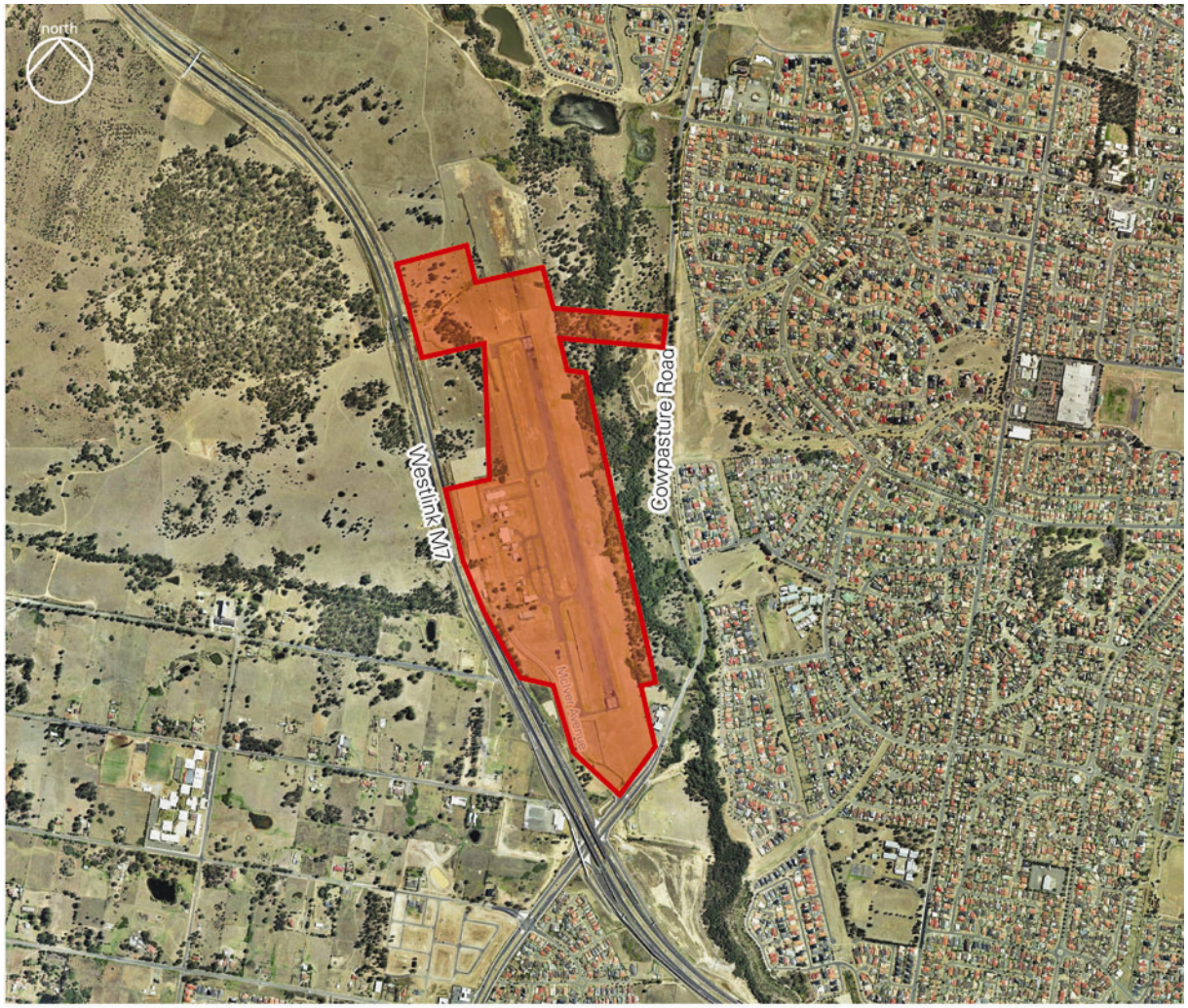
Table of Contents

1.0 Introduction

This report responds to the Director Generals Requirements for the former Hoxton Park Airport Lands site. It summarises sustainable design strategies incorporated in other documentation such as site-wide water management and specifically addresses the energy efficiency requirements of the DGRs and water efficiency measures incorporated in to the building.

The development site consists of two distribution warehouses with ancillary office areas, a residual lot and site infrastructure including Voluntary Planning Agreement (VPA) items. The site has been designed to avoid buildings or hard stand near Hinchinbrook Creek and it is proposed that stormwater flows be maintained to promote the health of the creek.

While no environmental rating framework exists for distribution centres, the strategies incorporated in this development draw on common sustainability principles. The design takes an holistic approach to site and context issues such as ecology and transport and introduces additional measures for the buildings beyond current practice for buildings of this nature.



2.0 Land Use and Ecology Strategies

2.1 Site Selection

The site selected for the proposed development is located on a former commercial airport. Due to the previous development, the selected site is of limited ecological value, however Hinchinbrook Creek runs along the east boundary. Previous reports indicate that the site was contaminated prior to redevelopment. Complete remediation of the site has been undertaken by an independent consultant and validated in accordance with the relevant regulatory guidelines.

Together with the proposed adjacent residential development to the north, redevelopment of the previously developed airport site reduces the burden on otherwise undeveloped sites and greenfield space and provides investment and regeneration in this previous industrial area. This in turn will create a socially and environmentally sustainable new community.

2.2 Change of Ecological Value

An independent ecological report has been undertaken for the site which identified that no unique flora or fauna will be removed due to development works for the site.

Consideration of the ecological impact of the proposed development has resulted in the specification of a minimum 30% of local native species to be used in any proposed landscape works, along with a tree retention program for the site, where appropriate trees exist in future landscape zones. Rehabilitation of adjacent biodiversity value areas has been allowed for in the cost plan and forms part of the VPA.

Mirvac is proposing to source a proportion of the cut and fill requirements for the site from the Mirvac owned development located adjacent to the proposed site. Further investigation in to programming and civil engineering design will confirm the amount available. If this strategy is confirmed, this strategy which effectively reduces the distance of transport for cut and fill. Minimising distance for travel not only reduces CO_2 emissions associated with vehicle transport, but also provides a sustainable option for the disposal of excess earth materials from the adjacent site which would otherwise be disposed to landfill or transported to other sites resulting in further greenhouse emissions.

3.0 Sustainable Design Strategies

3.1 Transport Options

Secure bicycle parking facilities are recommended for the site's tenants and employees in order to reduce the reliance on private vehicles where possible.

Mirvac will seek to discuss opportunities with the relevant authorities to extend existing bus routes to service the site. This could provide a regular bus service for site workers and the adjacent residential development and would promote the use of public transport as an alternative to private transport.

3.2 Energy Efficiency/Greenhouse Gas

The Director General's Requirements for the site include the following in relation to energy efficiency:

- **Energy efficiency** – including an assessment of the energy use on site, and demonstrate what measures would be implemented to ensure the proposal is energy efficient;

The energy/fuel uses on the site will be (generally in descending order of magnitude):

- Mechanical ventilation of the storage areas
- Air conditioning of the office areas
- Internal and external lighting (carpark and security)
- Plug in equipment such as office equipment
- Fuel use for equipment to move goods.

Distribution Centres, while large in floor area, have only small areas with air conditioning and are not highly lit like an office building due to their primary use of storing goods. They do not have high internal loads like other industrial buildings of a similar size as the equipment density is very low and there is no manufacturing within the building. Consequently, their energy use per m2 is very low compared to almost all other building types – residential, industrial, commercial etc.

Despite having a low baseline energy use, there are energy savings to be gained compared to both conventional practice and the current minimum standards in Section J of the BCA.

The key strategies demonstrating that the proposal is energy efficient are:

- Carefully designed natural ventilation in storage areas and a cavity roof system to ensure air conditioning is not needed, workers experience adequate comfort and goods are stored at required temperatures
- Energy efficient air conditioning equipment and fan selection with efficiencies superior to the minimum Section J requirement.
- Energy efficient lighting with a power density below the Part J6 maximum density and control systems to dim or turn off when not in use.

The design will be further refined in the subsequent stages including selection of mechanical and electrical services equipment. These selections will reduce the greenhouse gases compared to compliance with the requirements of Section J of the BCA.

3.2.1 Building Fabric and ventilation design for improved thermal performance

The warehouses will incorporate thermal insulation in excess of the BCA Section J requirements in accordance with a project specific Ambient Space Ventilation Analysis report prepared by AECOM. This report analyses the potential to improve internal temperatures for staff and stored goods through innovative roof construction and careful design of mechanical and natural ventilation.

In high density areas and areas where workers are elevated, the roof will incorporate a cavity to increase the R-value of the roof and reduce radiant discomfort. The opportunity to increase the wall and roof insulation beyond the BCA values will further reduce the consumption of energy associated with heating or cooling. Ventilation supply and exhaust will be designed to improve internal conditions. The combination of this roof design and ventilation strategy will reduce the need for air conditioning compared to conventional distribution centre building design.

3.2.2 Energy Efficient services design

The following energy efficient services will be incorporated in to the Distribution Centre design:

- High efficiency lighting to the warehouse areas with daylight and movement sensor controls that reduce unnecessary lighting in particular for low traffic areas. The energy use per square metre will be lower than the maximum requirements of the BCA Part J6 for lighting energy use.
- Dimming control on warehouse lights to reduce lighting by at least 35% during low occupancy or times when adequate daylight is provided.
- Office areas will be fitted with high efficiency T5 fluorescent lighting.
- Selection of highly efficient HVAC equipment with high performance levels not only minimises energy consumption, but also reduces operational energy costs. The energy rating for air condition systems and fan selection will be superior to the minimum requirements of the BCA.
- Minimising the mechanical cooling and heating requirements by servicing only the zones of the warehouses which require thermal control.
- The incorporation of mechanically operable louvres in the warehouse areas, in order to provide natural ventilation when the ambient conditions are appropriate. The implementation of natural ventilation design principles will generate air paths within the building and reduce the air-conditioning requirement. This strategy has been developed by AECOM in an Ambient Space Thermal Analysis report.

3.2.3 Passive Shading Design

The office components of the Distribution Centres have been designed to reduce heating and cooling requirements through passive design principles. Shading of glass reduces unwanted heat gain, summer temperatures and improves comfort and saves energy. The Dick Smith DC has offices facing north with adequate external shading and moderate glazed areas. The Big W DC has offices facing west due to site and logistical constraints, however the glazing is shaded by a deep overhang to reduce solar gain. A glazing type will be specified at the Construction Certificate stage to exceed the BCA Section J External Glazing requirements. Shading has been included in the design for all facades of the Distribution Centres that incorporate glazing.

3.3 Materials

A comparison of the embodied energy of various materials is provided within this section, which can indicate the benefits of using alternate materials: for example, those with some recycled content.

3.3.1 Materials Selection

Figure 1 provides comparison of the carbon dioxide equivalent (CO_2e) of 1kg of hardstand materials that may be used at industrial sites (bitumen, plain concrete mix and concrete mix with flyash). As indicated, replacement of concrete mix with flyash reduces the CO_2e by approximately fifteen percent. Materials with lower embodied carbon content will be considered during the design and construction of the proposed development.

1 kg	Bitumen, at consumer/AU U	0.66 kg CO_2e
1 kg	Concrete plain mix	0.25 kg CO_2e
1 kg	Concrete 30% flyash mix	0.21 kg CO_2e

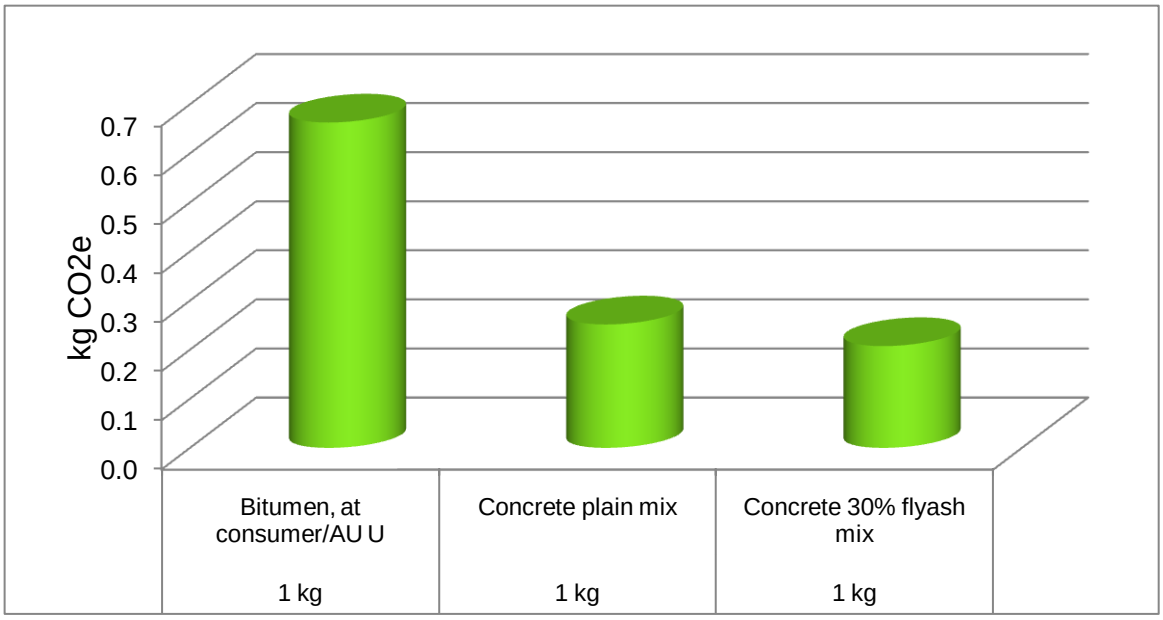


Figure 1: Carbon dioxide equivalent of generic hardstand materials, per kg of material

Building materials will inevitably contribute to a significant portion of the development's embodied energy. The CO_2e presented below, for a range of common building materials, indicates a significant variation between products, for example aluminium compared with eco-bricks. The proposed development will consider the more environmentally sustainable alternatives to building applications, where feasible.

Unit	Building Material	kg CO2e
1 kg	Aluminium, building applications	18.6
1 kg	Steel Bluescope port kembla	3.11
1 kg	Steel Bluescope port kembla 20% recycled	2.80
1 kg	Flat glass, uncoated, at plant	0.71
1 kg	Hardwood	0.45
1 kg	Structural Pine	0.39
1 kg	Bricks	0.25
1 kg	Eco-bricks	0.20

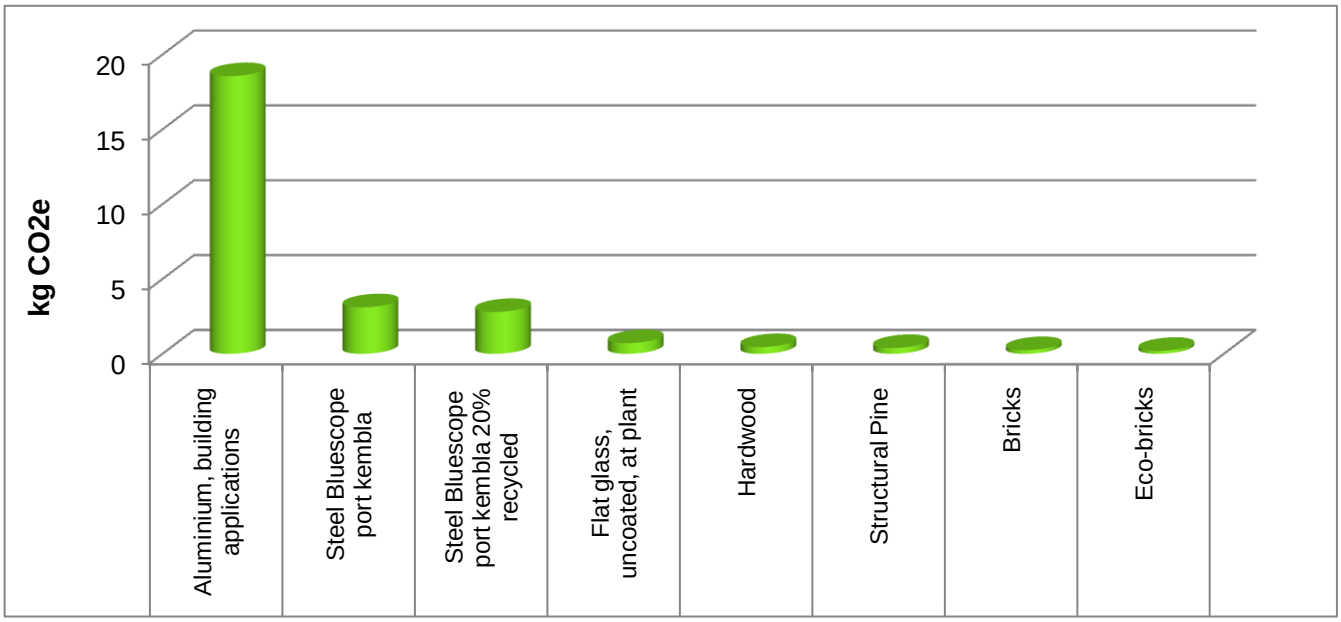


Figure 2: Comparison of carbon dioxide equivalent for building materials, per kg of material

In addition to the above, all timber products used at the site will be specified from certified sustainably harvested resources. No timber will be specified from rainforest or old growth forests.

3.4 Indoor Environment Quality

3.4.1 Volatile Organic Compounds (VOC)

Paints, carpets, adhesives and sealants are required to be low VOC where used in any office areas within the development. Stipulating and maintaining VOC limits below the recommended levels will assist in reducing any potential detrimental impacts on occupant health arising from products which may emit volatile pollutants.

3.4.2 Formaldehyde Minimisation

Where composite wood products are used within the development, including (but not limited to) cabinetry, stair frames and so on, this should be Low Emission Formaldehyde. Emission of formaldehyde from wood based materials must not exceed, in their raw state, the E1 emission limit according to standard EN 13986; or emission of formaldehyde from the final product will not exceed 0.05ppm after 28 days when tested and certified in accordance with EN717-1.

3.5 Water

The Director General's Requirements for the site include the following in relation to water efficiency and reuse:

- **Soils & Water**– including the proposed erosion and sediment controls (during construction); the proposed stormwater management system; water supply including consideration of the potential for rainwater harvesting; wastewater disposal.

3.5.1 Stormwater

An Integrated Water Sensitive Urban Design (WSUD) and stormwater management plant will be developed for the site to control water flow both from and through the site. The WSUD will incorporate filtering with the use of gross pollutant traps (GPTs) prior to discharge from within the site. The WSUD strategy seeks to maintain high stormwater flows to maintain the health of Hinchinbrook Creek.

3.5.2 Water Recycling and minimising potable water use

In accordance with a condition of the Sydney Water Section 73 consent conditions, a recycled water main is required within the site. This includes the provision for additional plumbing within the warehouse buildings to reticulate recycled water for non-potable uses, ready for future connection to the Sydney Water recycled water system.

This connection to the Sydney Water recycled system will provide a significant portion (if not all) of the non-potable demand for the site and that this supply will be more reliable than the use of on-site rainwater. Large scale recycled water systems have an advantage over rainwater tanks in that they are well designed and maintained by water utilities and their use of blackwater from a Sewage Treatment Plant means than there is a more constant supply available than an onsite rainwater tank system.

A further consideration is that the collection of rainwater will reduce any site water runoff, it is considered that stormwater is best diverted to the nearby Hinchinbrook Creek in order to maintain water flow conditions within the creek rather than retained on site.

As Hinchinbrook Creek experiences low flow conditions, especially during times of minimal rainfall, stormwater runoff and consequent water flow from the adjacent sites would be essential in maintaining the environmental diversity of the creek ecosystem.

This combination of recycled water supply and maximising stormwater runoff is considered to the optimal solution for reduction of potable water and maintenance of flows to the creek.

3.5.3 Efficient Fixtures

Water efficient fixtures (those with a higher WELS rating) reduce overall potable water consumption. All tapware for the development is required to be 4 star WELS rated, WC's are to be minimum 4 star WELS rated and urinals are to be minimum 5 star WELS rated.

4.0 Conclusion

This development encompasses a range of sustainability strategies at the site and building level. Watercourse health is enhanced and logistical efforts are being made to reuse local cut for fill on the site. The buildings are designed to improve occupant comfort with improved fabric design, shading to windows and natural ventilation. High efficiency lighting, fans and other equipment will be specified. Potable water is reduced by taking advantage of the local recycled water scheme and efficient fixtures. Materials and finishes will be specified for low environmental impact and indoor occupant health and amenity.