60 WALLGROVE ROAD, MINCHINBURY

PREPARED FOR AFTERON PTY LTD | MARCH 2010

URBAN DESIGN REPORT & DESIGN GUIDELINES

AECOM

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1.0

Introduction

1.0 Introduction

AECOM has been engaged by Afteron Pty Ltd to prepare an Urban Design Report and Design Guidelines for their property at 60 Wallgrove Road, Minchinbury. The site, currently known as the Eastern Creek Quarantine Station is owned by Afteron Pty Ltd and is leased by the Australian Quarantine and Inspection Service (AQIS).

1.1 Project Background

The subject site is a regular shaped, 22 hectare parcel of land located in Minchinbury, within the Blacktown Local Government Area. The site is bounded by the M4 Motorway to the south, Wallgrove Road to the east and the Pinegrove Memorial Park Cemetery & Crematorium to the north and west.

The subject site has operated as part of the Commonwealth Quarantine Service since 1979, when it was opened as the Australian Quarantine Inspection Service (AQIS) Eastern Creek Plant and Animal Quarantine Station. The Quarantine Station currently has facilities for housing dogs, cats, bees and horses, as well as greenhouses and open areas for plants.

The site has recently become subject to the State Environmental Planning Policy (Western Sydney Employment Area) 2009, gazetted in August 2009, which zone the site as IN1 and allows the site to be developed for employment generating uses. Under the policy, permitted development within land zoned as IN1 seeks to:

> ***"Facilitate a wide range of employment generating industrial or manufacturing, warehouse, storage or research facilities such as freight transport facilities, Industrial retail outlets, light industry, transport depots, warehouse and distribution centres and associated roads."***

This report provides the urban design framework and controls that would guide the development of the site under the IN1 zoning.

The concept plan proposes a master plan with GFA between 87,000sqm to 95,800sqm for the purposes of a light industrial, warehouse and business park, with access to and from Wallgrove Road, and Design Guidelines which detail development controls for the site.

1.2 Report Aims and Purpose

The purpose of this report is to present the site analysis, planning and urban design framework, and review the opportunities and constraints for development. Based upon this analysis and review, a master plan scenario for development controls and integrated site design will be generated to demonstrate the capacity of the site for employment development and thus meet the objectives of the SEPP. To further analyse its development potential, 2 alternative scenarios will be developed based upon best practice urban design, stormwater management, landscape design and sustainability initiatives within a master planning context. Guidelines and development controls to support and inform future development of the land provide a clear and integrated resolution for the site.

In doing this the report aims to achieve the following:

» Provide urban design advice that supports the new use of the site for employment purposes.

» Present economically feasible options for the future development of the site for major employment and particular warehousing and distributions uses, whilst maintaining the ability to provide flexibility in the range of lot sizes to meet market demand.

» Provide design guidelines for the co-ordinated planning and development of the site that ensure future development is visually and environmentally consistent with the surrounding environment.

» Integration of sustainable design principles are integrated into the development structure.

» Integrated of Water Sensitive Urban Design (WSUD) principles into future development of the site.

To accomplish these aims, this report is divided into several sections as follows:

Section 1 – provides background to the proposed development and site, as well as outlining the development vision for the subject site.

Section 2 - identifies the key existing site and planning issues for the land, and the opportunities and constraints that inform the principles on which the future development of the site will be based.

Section 3 – identifies the options for dealing with stormwater management in the site, and the potential manipulation of catchment area in order to maximize prime development area.

Section 4 – builds on outcomes of Section 2 to present a master plan scenario for the future development of the site and set up the development control that will shape subdivision and development.

Section 5 - comprises further illustrative demonstrating the capacity of the site to support diverse subdivision scenarios and typical sections that aim to illustrate typical road reserves, set backs and landscape treatments. This section also discusses landscape design of the site.

Section 6 - comprises of a series of Design Guidelines and Controls that seek to guide the development of the scenarios in a manner that is sympathetic to site constraints and consistent with surrounding development and environments.

1.3 Development Vision

The overall development vision for the site is to develop a well planned employment park that takes advantage of its strategic potential and high quality urban design outcomes; and

» Ensure an integrated urban design approach that considers and resolves site planning issues including subdivision layout, building configuration, built form and appearance, internal road network, site access and manoeuvring and parking.

» Encourage an approach that incorporates high quality landscape design elements, that is mindful of site topography and level changes.

» Propose a WSUD approach that reduces demand for potable water, manages stormwater quality and protects waterway stability.

» Ensure urban design, landscape and building design considers environmentally sustainable elements, including the incorporation of sustainable building design solutions and use of sustainable building materials.

1.4 Development Controls

Along with local council controls, the sites' development is guided by the Principal Development Standards in the State Environmental Planning Policy (SEPP) (Western Sydney Employment Area) 2009.

The subject site will be developed in a manner that is generally consistent with the Blacktown City Council Development Control Plan 2006, specifically Part E Development in the Industrial Zones and Council's SEPP 59 - Eastern Creek Precinct Plan (Stage 3) controls.

Development controls to be applied to the Master Plan consider:

» the principal development standard of SEPP (WSEA) 2009;

» the Blacktown City Council DCP 2006, Part E (Development in Industrial Zone 2005);

» the Eastern Creek (Stage 3) Precinct Plan (Dec 2005); and

» the Urban Design analysis of the site.

2.0

Site Analysis

Legend

- Site boundary
- Motorway
- Railway track
- Railway station
- Western Sydney Parklands
- Existing Industrial Site
- Creek

1 Former Wonderland Site

2 Eastern Creek

3 Huntingwood

4 The Raceway

6 Ropes Creek

7 Erskine Park Employment Lands

8 South of Sydney Water Pipeline (West)

9 Quarantine Station (Project site)

10 Greystanes Northern Employment Lands

Source: State Environmental Planning Policy (Western Syndey Employment Area 2009)

Figure 2.1.1 Site Location and Regional Context


To Richmond
Doonside
Western Line
Blacktown
Rooty Hill
Seven Hills
BLACKTOWN
M7 Motoway
Motoway
Pine Grove
Cemetery
9
Huntingwood
West
1
2
3
4
To City of
Sydney
(35km)
10
Eastern Creek
Prospect
Reservior
To Canberra

2.0 Site Analysis

Detailed site analysis has been undertaken in order to identify the key urban design, landscape and planning issues for the site and the opportunities and constraints that should inform the principles on which the future development of the site will be based.

2.1 Site Location and Context

The site is a regular shaped, 22 hectare parcel of land bounded by the M4 Motorway to the south, Wallgrove Road and M7 Motorway to the east and the Pinegrove Memorial Park Cemetery & Crematorium to the north and west. Site access is currently gained via an existing entrance along the eastern property boundary along Wallgrove Road. The site is exceptionally well located with respect to road infrastructure.

The site is one of ten industrial precincts identified as part of the WSEA SEPP (refer to Figure 2.1.1). It is however, separated from these precincts by the M4 and M7 Motorways. The site is also separated from other industrial development to the east by the Western Sydney Parklands which extend 27 kilometres from Quakers Hill to Leppington in Sydney's west. In that respect, the site is effectively isolated within the larger employment precinct, but it also serves as a 'gateway' from the north into the precinct.

The 738 bus route runs past the site along Wallrove Road, connecting Rooty Hill to the Eastern Creek Business Park and Horsely Park. The M7 Westlink Cycle path, which runs 40 kilometres through Sydney's west runs directly adjacent to Wallgrove Road and could easily connect into the site.

The Eastern Creek Quarantine Station is made up of five distinct sections:

» Plant Quarantine Station – comprising an administrative office including a laboratory, staff amenities, work shed, shade houses and greenhouses. This area functions as a secure plant containment facility for high-risk plant introductions.

» Horse Stable Blocks – seven rows of metal clad prefabricated stables with a number of metal fenced exercise yards and corrals located between and around the stables.

» Dog and Cat Kennels – purpose designed and built brick and wire mesh cat cages and rabbit proof dog kennels.

» 'Back Paddock' – various species of trees, two small dams/ponds and water courses, a disused sand dressage area and rounded hillock.

» Residential Area – comprising three face brick houses originally built for staff of the Quarantine Station in 1980.

Figure 2.1.2 Site Location and Local Context

2.2 Topography

A ridge line dissects the site diagonally, running from the high point in the south-west of the site to the north-eastern corner of the site, causing the site to effectively fall in two directions. The land in the south-western corner (RL 60) is elevated 12 metres above the lowest point of the site (RL48), which lies within the 'back paddock' to the north-west of the site.

The majority of the developed site is characterised by gently sloping or benched grassed areas, forming the grounds to the various types of low buildings, kennels, stables and glasshouses. There are some significant stands of Cumberland Plain Woodland, notably around the bee houses, adjacent to the entrance to the north, along the south-eastern edges and within the 'back paddock' area. These will be discussed in more detail within Section 2.5.

The 'back paddock' is an underdeveloped area of the site which provides a natural buffer to the adjoining Pine Grove Cemetery. It is characterised as a generally grassed area with fragmented remnant stands of Cumberland Plain Woodland tree species.

The 'back paddock' contains two dams – a settling pond in the upper elevated south-eastern portion and a smaller dam midway down the slope. These are connected by small drainage creeks.

The area immediately to the south of the Wallgrove Road entrance is characterised by uneven grassed land, drainage ditches and culverts.

While the site is at grade with the neighbouring cemetery along the northern and western boundaries, it is situated above an embankment adjoining M4 to the south and below an embankment adjoining Wallgrove Road to the east. Due to these constraints, the only at grade access to the site is the existing entrance from Wallgrove Road towards the northern corner of the site.

Figure 2.2 Existing Site Topography

2.3 Climate

The site, located in Western Sydney and 35 kilometres from the coast, is subject to the following typical weather conditions:

» Summer mornings dominated by south-westerly winds – likely to be hot and dry.

» Summer afternoons – predominant north-easterly/south-easterly winds which may provide a cooling breeze but are not as strong or reliable as coastal breezes. Quite often some westerly breezes during summer afternoons which will be hot and dry.

» Winter mornings and afternoons dominated by cool/cold south-westerly winds.

Sites in Western Sydney are typically subject to extremes of temperature, with typical hot dry summer conditions and colder temperatures in winter due to winds straight off the Blue Mountains.

The elevated south-west of the site will be subject to hot dry winds and setting sun in summer and cold winds in winter. The vegetation of the 'back paddock' provides some shelter and buffer against winter and summer westerlys, and the more open nature of the eastern edge of the site allows for cooler easterly breezes to infiltrate the site in summer, although generally the cooling effect of the easterlies is lost by the time they have reached this far west.

The hot summers experienced in Western Sydney are exacerbated by 'urban heat sink' – a phenomenon created through the extent of development taking place and the amount of hardstand, roofs and car-parking which absorb the heat and in turn increase the temperatures through slow release.

Specific sustainable initiatives to help deal with climatic conditions on this site and potential ways of creating environmental comfort throughout the site through building orientation, landscape design and materials selection are dealt with in detail within the sustainability report.

Figure 2.3 Climate

2.4 Drainage

The site is effectively divided up into two catchments of roughly equal size, with stormwater generally following the natural contours of the site and shedding toward the lower discharge points at the east and north of the site.

Run off from the catteries and dog kennels containing effluent is channelled along the eastern and western edges of the buildings and drains underground to a sewer treatment unit. Effluent is pumped to the settling pond on the upper slopes in the south western corner of the property. This is the primary treatment site for the effluent; secondary treatment is provided in the dam lower down the slopes before entering a creek and leaving the site.

Stormwater and other run-off on the eastern slope finds its' way to two creek lines draining north-east and south-east towards a culvert which takes water from the site toward Eastern Creek – 650 metres east of the property.

Surface water from the machinery sheds, cattle yards and horse complex on the north-westerly drain into an ephemeral creek line which leaves the site on the northern boundary via a culvert beneath Melville Road and diverts runoff to the dam in the neighbouring cemetery.

The majority of the rainfall on the site infiltrates the silty clay soil in unsealed areas and the ephemeral creek is generally dry. It is only full after heavy rainfall, and at these times the cemetery sometimes use the water for irrigation of their memorial gardens.

Source: Phase 1 Environmental Site Assessment, JBS Environmental, 2009.

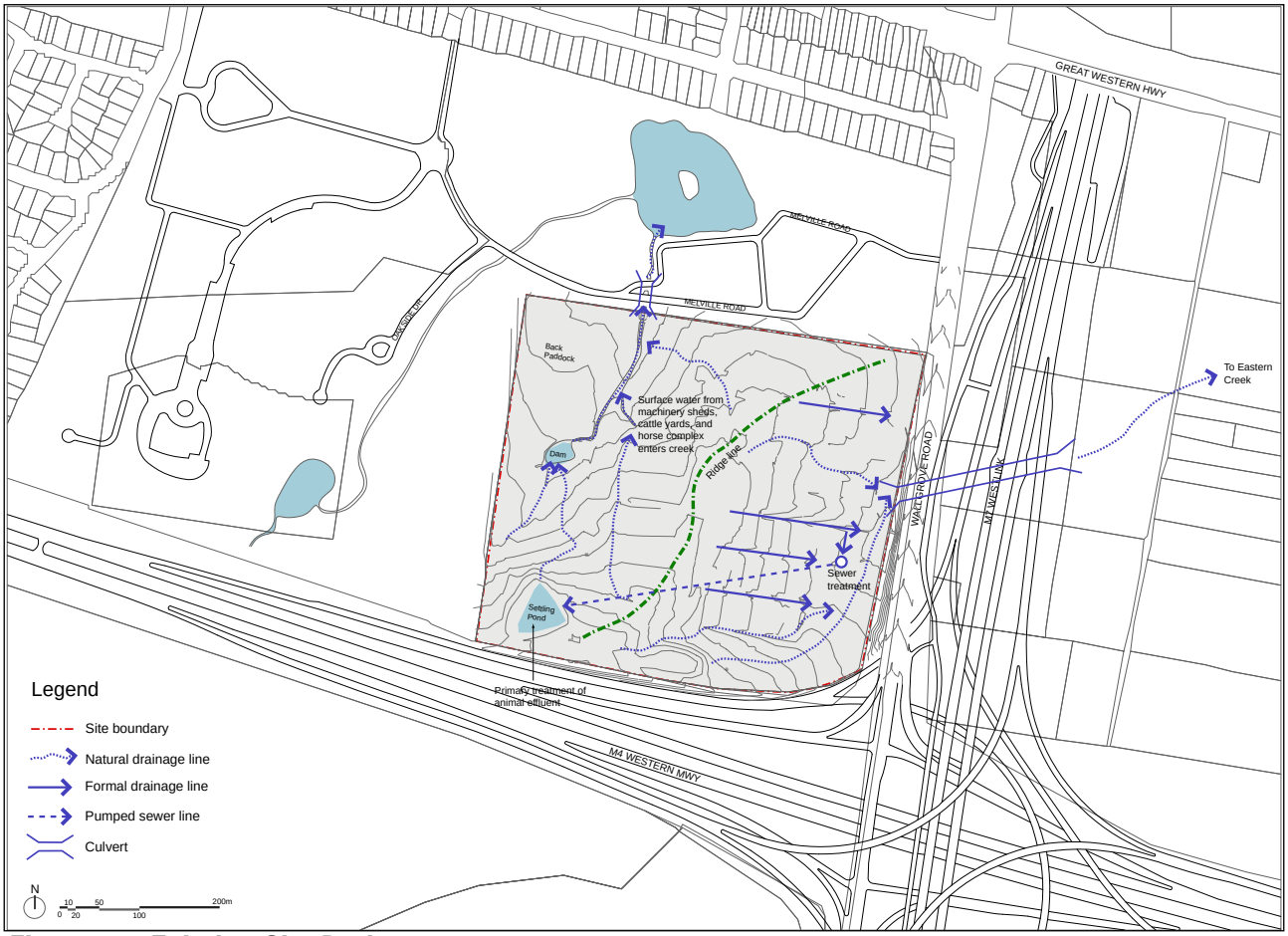


Figure 2.4 Existing Site Drainage

2.5 Vegetation

The majority of the remnant woodland on the site is Cumberland Plain Woodland (CPW), but there are also smaller patches of Shale gravel transition forest and Swamp oak floodplain forest. Cut off from the Western Sydney Parklands by the Westlink M7 motorway and surrounded to the north and west by memorial gardens, the remaining vegetation on the property forms no connection to other remnant pockets of woodland and in that sense has no real ecological value from the perspective of flora or fauna 'corridors'.

CPW and the other low prevalent communities are listed as endangered ecological communities under Schedule 1 of the *Threatened Species Conservation Acts 1995*, and are also listed as endangered under the *Environment Protection and Biodiversity Conservation Act 1999*. The composite ecological community of CPW, made up of Shale plains woodland and Shale hills woodland, and is distinguished by three species: grey box (*Eucalyptus moluccana*), forest red gum (*Eucalyptus tereticornis*) and ironbark (*Eucalyptus crebra*) which typically make up 70% of the community.

There are five areas of vegetation which are spread across the site, the largest of which is in the 'back paddock'. The tree cover here is sparse but represents a significant undeveloped pocket of CPW with Swamp oak floodplain forest around the creek line. However, due to the context of the site and its strategic position within designated employment land, a bio-banking assessment has been carried out in order to access the qualities and biodiversity value of the vegetation and put forward recommendations for off-setting the loss of this value 'through biodiversity credits' which can be used in more regionally appropriate sites. In order to make more efficient use of the site and take advantage of the infrastructure, it is not advantageous to tie up parcels of land through the conservation of remnant woodland.

Retention or removal of vegetation from the site will need to be submitted to the Department of Environment, Climate Change and Water (DECCW) for commonwealth approval. The options for off setting or 'bio-banking' the woodland that would be removed are explored within the Bio Banking Assessment Report prepared by Cumberland Ecology.

From a landscape perspective, the vegetation of the 'back paddock' area provides a visual backdrop, a buffer to westerly winds, and a screen to development from the cemetery. Retention of some key groups of trees as part of a designated landscape reserve along this western edge would be highly desirable.

The second area which could potentially retain key groups of trees is the more densely vegetated strip of woodland wrapping around the south eastern corner of the site, providing a buffer to the traffic and north of the M4/M7 intersection. A balance needs to be struck which allows strategic development to take place; taking full advantage of visual exposure and access to existing infrastructure, whilst endeavouring to retain and enhance remnant pockets of woodland.

Figure 2.5 Vegetation

No endangered fauna has been identified on the site.

A list of vegetation species found within the site is contained in the Cumberland Ecology Report and will form the basis for landscape design/ special selection for the site.

CPW is an endangered and important native vegetation community; however, the biodiversity value of this woodland has been assessed as being better offset within more regionally appropriate sites.

Source: Draft Flora and Fauna Report, Cumberland Ecology, July 2009. The Environment Protection and Biodiversity Conservation Act 1999. Bio Banking Assessment Report, Cumberland Ecology, November 2009.

2.6 Aboriginal Heritage

The Aboriginal cultural and archaeological heritage of the site has been assessed by Jo McDonald Cultural Heritage Management Pty Ltd. The purpose of their report was to establish whether there are any constraints to development of the site due to Aboriginal Heritage such as archaeological sites and sites of cultural significance. Below is a summary of their findings:

Six (6) new Aboriginal archaeological sites were located and recorded across the site; one being an open scatter of broken flake and quartz flake, exposed by ground disturbance, and the others being isolated artefacts.

The report makes an assessment of the land use impact to the site, evaluating the likely disturbance to the soil over time through vegetation clearance, agriculture, people and buildings. As almost half of the site (46%) has been highly disturbed over the last 40-50 years, the likely conservation value of that area, in terms of intact sub surface archaeology, is low. 42% of the site is considered to have suffered moderate disturbance, and only 12% of the site low disturbance. Based upon this assessment, the report concludes that there is only a small proportion of land with the potential to contain intact archaeological deposit and potential conservation value.

This land lies within the area of intact tree cover in the east and south eastern areas of the site. The potential archaeology within these areas, however, is not assessed as having overall conservation value.

Within its final recommendations, the report concludes that the whole site be considered developable on archaeological and indigenous heritage grounds, but that the areas with potential archaeological value be developed subject to an Aboriginal Heritage Management Plan (AHMP) which will develop a salvage programme to excavate any artefacts located within that vicinity.

Figure 2.6 illustrates the areas for which the AHMP has been recommended.

Source: Assessment of Aboriginal Heritage at 60 Wallgrove Road, Minchinbury. Jo Mcdonald Cultural Heritage Management Pty Ltd. 2009.

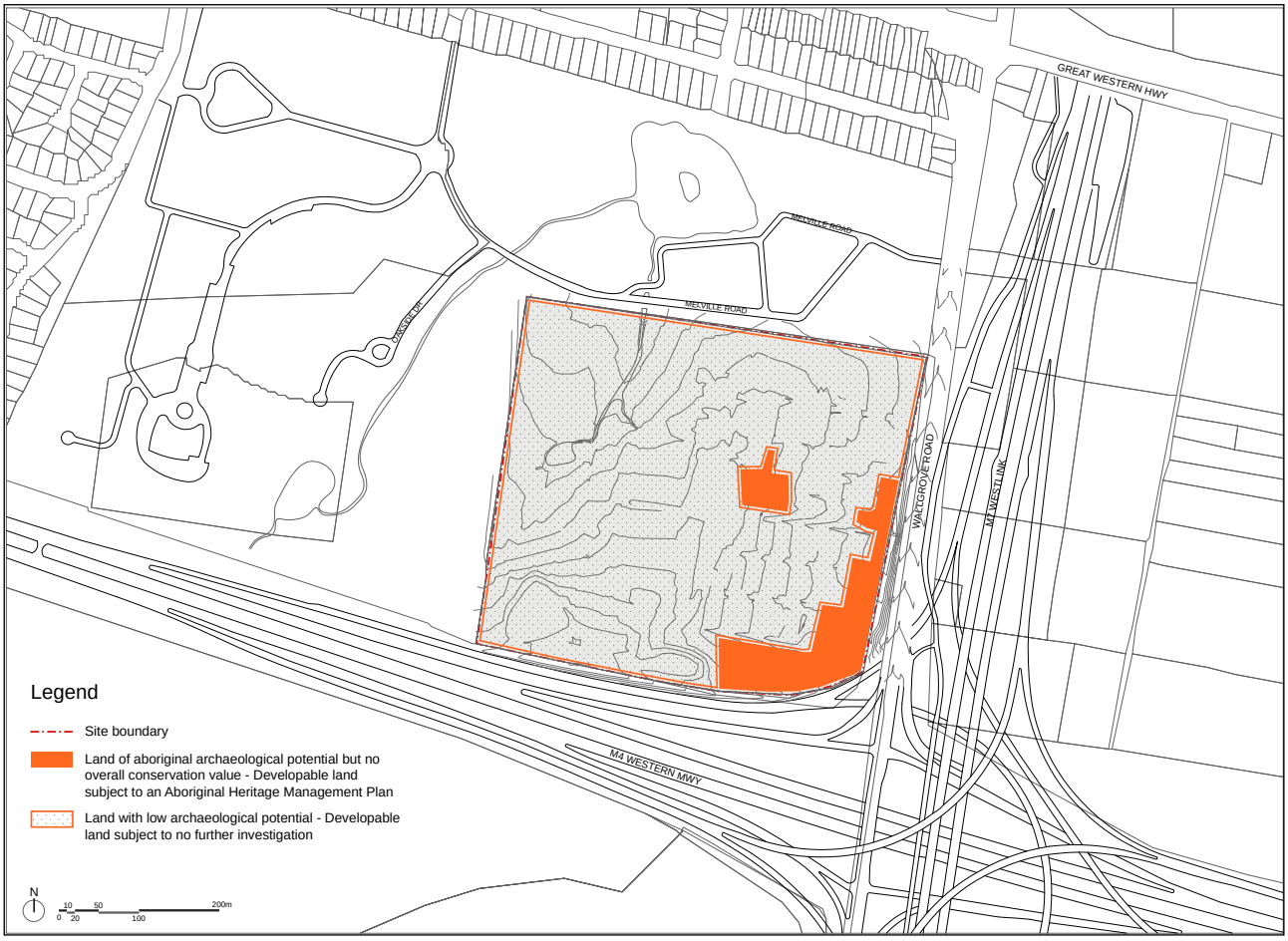


Figure 2.6 Aboriginal Heritage

2.7 European Heritage

A Heritage and European Archaeological Assessment has been undertaken for the site by City Plan Heritage. Details of this assessment are outlined in full within their report with a brief summary provided below.

Prior to the establishment of the Quarantine Station in the late 1970s, the site was part of the north-western section of the Wallgrove Army Camp, which was established as a staging and training area in 1941. Following WWII, the camp was maintained as an army wireless chain and then amended for use as a migrant hostel during the 1950s. In the 1960s and early 1970s the camp continued to be used as a training area for cadets as part of the Commonwealth Military Force Exercises.

Prior to the establishment of the Army Depot, the site was owned by a number of landholders following its release by Governor Phillip in 1791. Known activities on the site during this time were restricted to grazing.

As a result of the establishment of the Quarantine Station within the former Wallgrove Army Camp, most of the relics or remains connected with the former use have either been destroyed or removed. Some pieces of fencing wire, broken slabs and cement posts were located within the 'back paddock' were derived but upon further review were found to possess no archaeological importance or heritage value as the relics cannot be accurately dated.

City Plan concludes that while the site does contain social and heritage values relating to its former use as the Wallgrove Army Camp, the site has been so altered that it can no longer provide evidence of association. The Quarantine Station site does not meet the threshold for heritage listing under the NSW Heritage Significance Assessment Criteria. The buildings of the Quarantine Station do not demonstrate any architectural value.

Source: Eastern Creek Quarantine Station. Heritage and European Archaeological Assessment, City Plan Heritage. 2009.

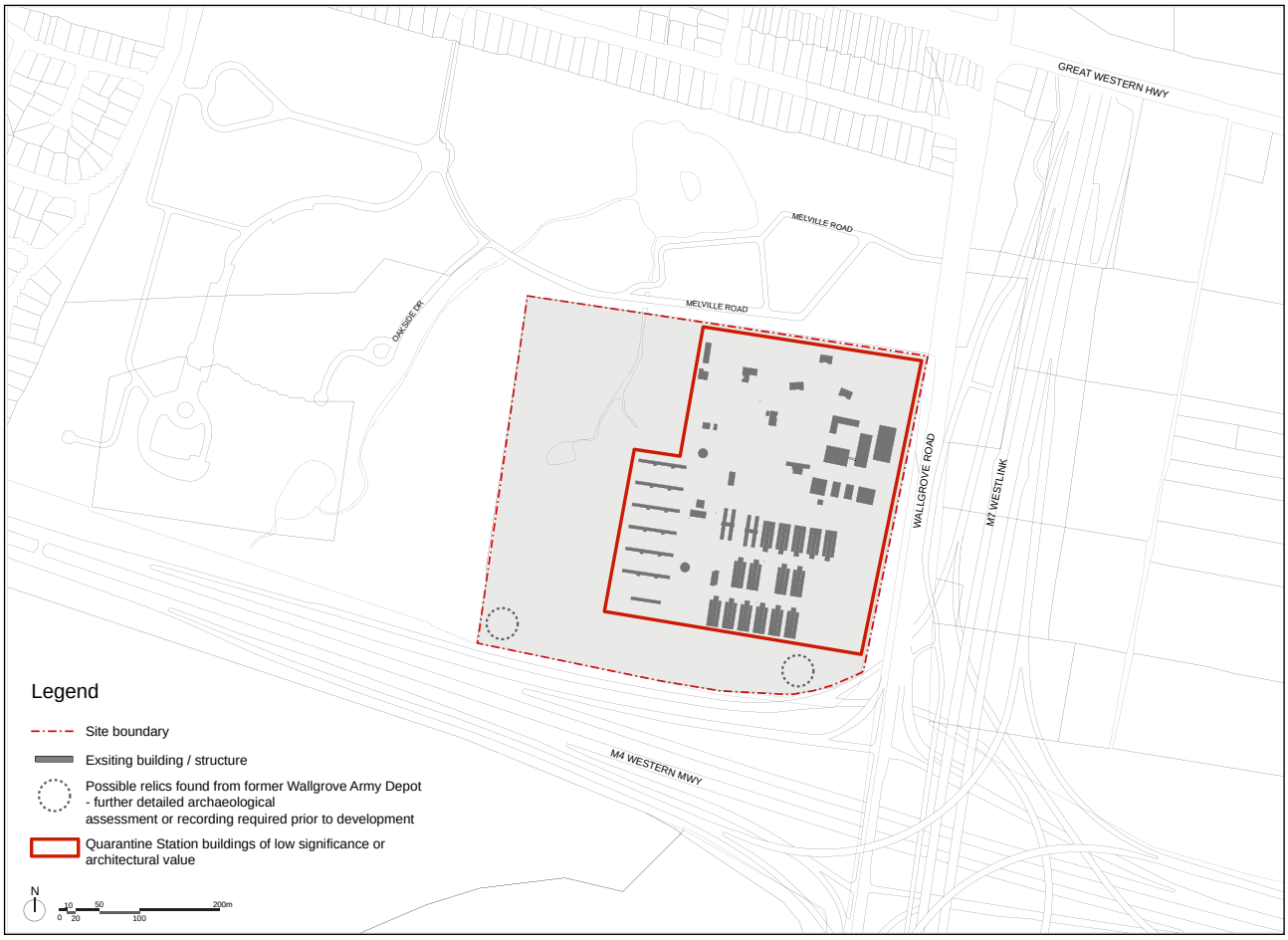


Figure 2.7 European Heritage

2.8 Views

The site is located immediately north west of the M7/M4 Interchange flyover which is elevated approximately 10 metres above Wallgrove Road. The views into the site from the flyover are clear and unimpeded but would generally be from vehicles travelling at high speed on a busy intersection. Figure 2.8 demonstrates the zone of high visibility based on a development scenario assuming that there would be built form in the order of 20m high. This zone of high visibility from the flyover is across the south eastern corner of the site, where the land slopes gently east toward Wallgrove Road. On the approach from the M4 onto Wallgrove Road, the site lies above a steep motorway embankment, and drivers will be aware of built form close to the southern boundary. although the tree cover around the south eastern corner does buffer views.

Wallgrove Road runs adjacent to the eastern boundary of the site above a steep engineered embankment, allowing direct views into the land. Again views are filtered through the stands of existing trees within this area.

The neighbouring cemetery adjacent to the northern boundary is at grade with the site, and there is little in the way of vegetation to help screen it from the adjoining land. Along the western boundary, the site is partially screened from the cemetery by the existing stands of trees within the 'back paddock' area.

The site is located at a strategic intersection of 2 metropolitan motorways, and thus on strategic planning grounds, warrants a more intense level of development and taller built form, essentially a reflection of the complex infrastructure and activity around this intersection.

Figure 2.8 Views

2.9 Infrastructure Services

AT&L and Associates Pty Limited have undertaken a review of existing site infrastructure, and infrastructure required for future development of the site.

Sewer - Sydney Water

Infrastructure within the vicinity of the site consist of a 150mm diameter spur at the northern property boundary and Eastern Creek sewer submain Section 3-5 draining north along Pikes Lane and ultimately to Quakers Hill Sewer Treatment Plant (STP).

Options for the upgrade of sewer infrastructure include the installation of approximately 780m of 225mm diameter sewer pipe between the site and the SPS (provided the SPS has capacity). This option would require boring under the Great Western Highway. Alternately, installation of approximately 320m of 225mm diameter sewer pipe between the site and the Eastern Creek sewer submain. This option would require boring under Wallgrove Road and the M7 and is the preferred option.

Water - Sydney Water

A 250mm diameter main runs adjacent the site along the eastern boundary. Sydney Water has advised that this main is not suitable for supply, however there is a second surface reservoir in operation at Minchinbury that will supply the site. A link main (approx. 200mm diameter) will be required between the site and reservoir (Approximately 1km south).

Gas - Agility

A secondary main running along Archbold Street , 2.5km from the western boundary of the site has been identified as being suitable for connection to the site.

Telecommunications - Telstra

A major optic fibre currently runs along the western side of Wallgrove road adjacent the site. Optic fibre feeders currently service the site via the access off Wallgrove Road. Telstra is obliged to supply new developments under a shared cost arrangement.

Electrical – Integral Energy

Integral Energy has assessed the anticipated load required for the site to be in the order of 4MVA. Supply to the site will be via 1 or possibly 2, 11kV feeders from the proposed North Eastern Creek Zone Substation, which is expected to be commissioned in 2011.

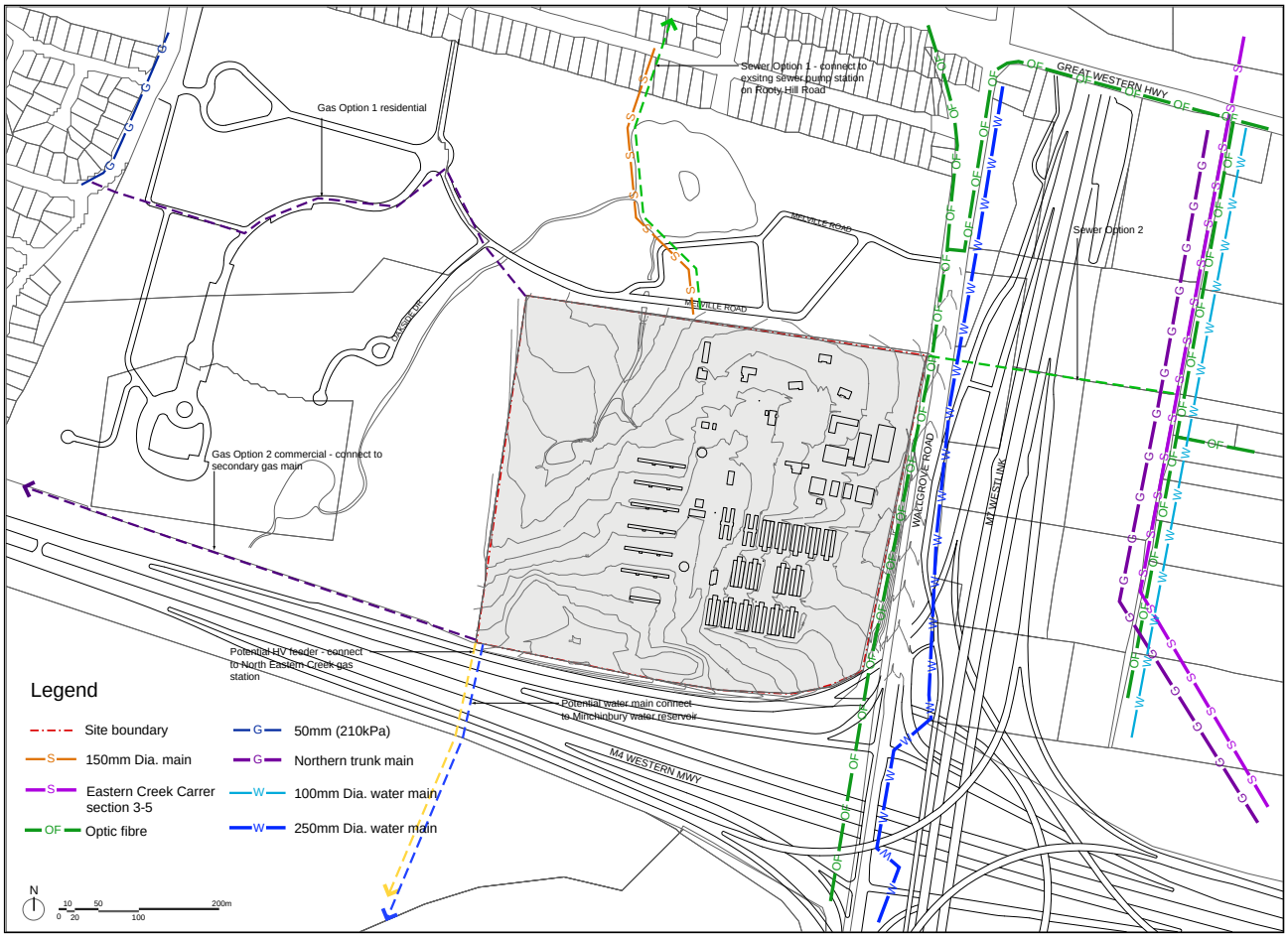


Figure 2.9 Existing and potential Infrastructure Services

2.10 Opportunities and Constraints

The following key issues and factors arising from the site analysis determine the sites' division into developable and non-developable land, and hence guide the structure of the re- zoning application. These issues will influence the detail of future site development, and consideration of these factors is imperative in successful master planning of the site. Future development applications will need to provide detailed responses to these influencing factors and demonstrate how they have managed site constraints and maximised opportunities.

Vegetation

Areas of existing vegetation within potential landscape reserves and setbacks should be conserved for the following reasons:

» To retain a natural landscape buffer to the Cemetery and outlying residential areas to the north and west of the site.

» To build upon existing structure and biodiversity of an ecologically important endemic vegetation community through the use of endemic CPW species.

» To retain significant groups of trees in the western edges setting and provide 'borrowed landscape' backdrop to development

» To provide a soft but visually permeable frontage to development along the highly visible south east corner of the site

» To provide a suitable landscape setting for on site detention and treatment of the stormwater run off from development.

» To provide shade and shelter to the west of the site, protecting the development from harsh westerly low sun and westerly winds.

Existing significant trees could be retained where feasible within the development of the site (eg. in road medians, setbacks and frontages) where the levels and master plan layout allows. Healthy native canopy trees in well formed groups will provide the site with landscape character and help to provide well needed shade in areas such as streets and car parks.

Stormwater Management

Potential management of stormwater within the development of the site is described in detail in the WSUD report, and should take the following issues and constraints into consideration:

» The natural topography and drainage systems of the site – draining north west and north east to existing drainage outlets.

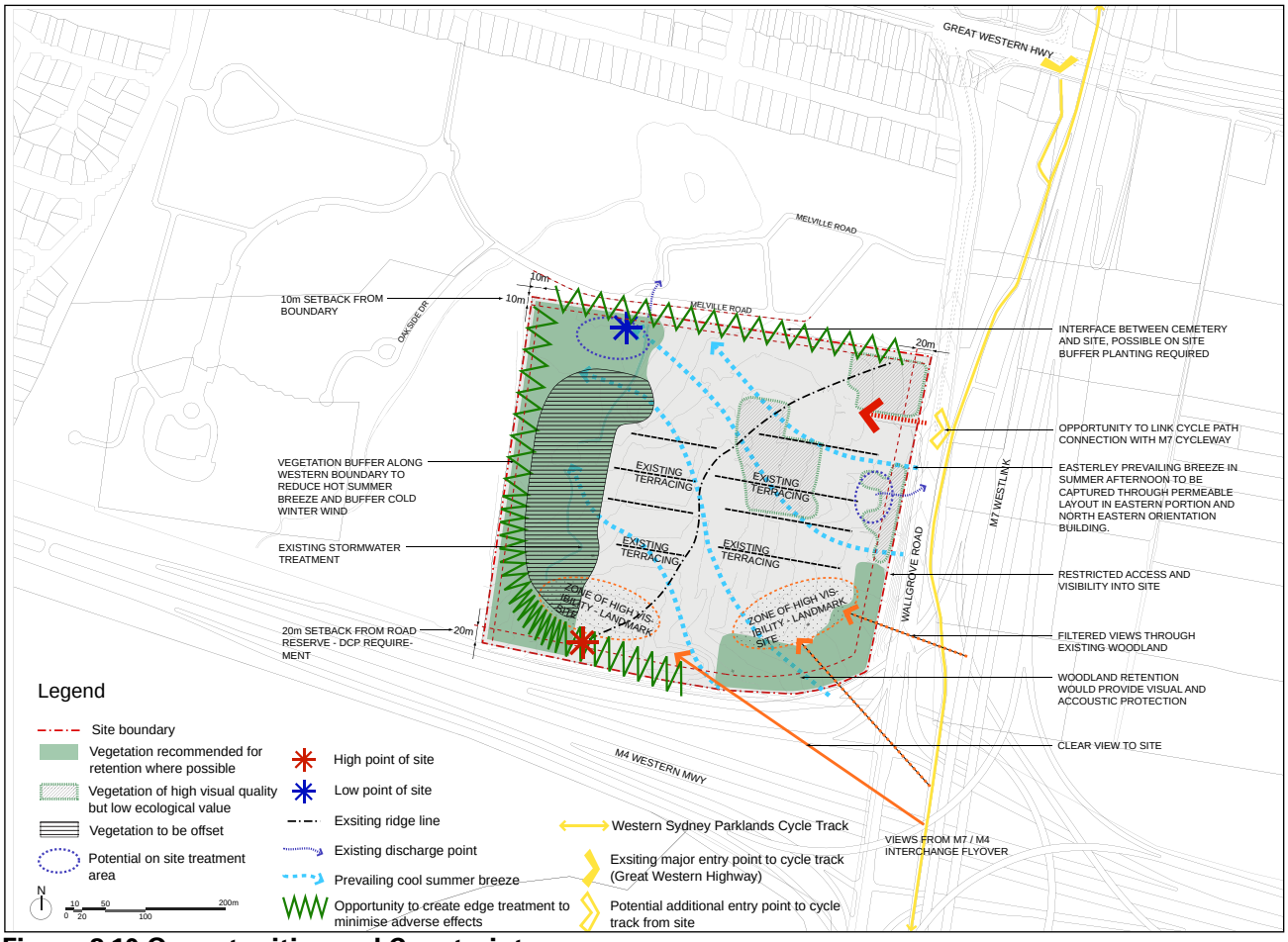


Figure 2.10 Opportunities and Constraints

» Stormwater management areas should minimise their land footprint by co-locating On Site Detention (OSD) and treatment and be as close as possible to existing outlets.

» The existing vegetated area around the low point of the north west outlet a makes a more preferable site for containing on site detention and treatment requirements than the eastern outlet which will potentially be prime development land near the entrance to the site.

» Runoff from the stormwater treatment in the north west will be fed into the dam within Pine Grove Cemetery for their use for irrigation.

» Stormwater treatment wetlands are not appropriate directly alongside roads in industrial zones as they are at risk of being damaged by vehicular traffic or industrial activities - these will need to be separated from the carriageway by landscaped areas.

Topography and views

The topography of the site as described in section 2.2 presents constraints and opportunities of the following nature:

» Lots and road access will need to be structured with regard to slope; the existing quarantine station buildings are sited upon benched terraces, either side of the central ridge line. Future development will need to follow a similar benching arrangement on the western side in order to minimise disturbance to existing vegetation that may be retained along that edge.

» Cut and fill of the site should be minimised, and lots will need to be oriented and levelled with regard to the natural fall of the land.

» Buildings should be designed to minimise the requirement for tall exposed retaining walls, ie. through the use of terracing/split floor levels.

» The highly visible south and south easterly edges of the site lend themselves to 'landmark' sites – with good views into the upper slopes of the south west from the M4 and the M7 interchange, plus good views of the land from the Wallgrove Road approach.

» The site is exposed at its northern boundary adjacent to the cemetery and will need sensitive treatment to ensure privacy to cemetery users.

Access and circulation

The proximity to major highways and accessibility of the site from a number of key destinations is a primary factor in the potential success of the site as an employment generating development, but the following restrictions and opportunities should be considered:

» RTA restrictions on new access to the site from the M4 and the nature of the embankments along the road edges mean that site access is restricted to the existing entry from Wallgrove Road and there is no opportunity to create a new entry.

» There is an opportunity to create a bus stop along Wallgrove Road to access the site from the existing bus route No 738.

» There is an opportunity to connect the site to the Westlink cycle path that runs 40km along the M7. This would require an on grade connection across Wallgrove Road. Because of the proximity of this cycle path, every opportunity should be made to provide for cyclists within the future development to ensure that workers can cycle directly to their workplace.

» Entry into the stormwater detention/treatment area will be required for long term maintenance.

Boundary restrictions and treatments

The four boundaries of the site have different constraints and opportunities as follows:

» Landscape treatments within the future setbacks adjacent to the M4 and Wallgrove Road will need to ensure visual permeability and allow views to the development, a minimum 20m setback is required along such boundaries consistent with Blacktown DCP.

» There is the opportunity to create a 10m setback from the site boundary along the northern and western edge to provide an area of landscape buffer to the Cemetery.

» The landscape of the 10m setback should aim to provide privacy to the Cemetery and a unified landscape treatment along this edge should be an important objective of the landscape guidelines.

» Existing vegetation along the western edge, and a 10m wide setback is necessary to provide a planted buffer against harsh westerly winds and western sun, and afford privacy to the cemetery.

Climatic considerations

The climatic conditions of the site are described in Section 2.3 and in more detail within the sustainability report. At a site master planning level, the layout of the site should address the following issues:

» Development along the eastern edges of the site should be more permeable to allow for easterly cooler breezes to infiltrate the site

» Development in the west of the site should be designed to buffer the south westerly hot and dry summer winds and the cold south westerly winter winds

» Lot orientation should aim to maximise northern/ north easterly exposure to capture winter sunlight to glazed office areas and locate extensive hardstand areas within the shaded southerly portion of the lot to reduce heat absorption

» Low westerly afternoon sun should be screened through vegetation/ built form wherever possible.

Stormwater Management

03

3.0 Stormwater Management

The options for dealing with stormwater within the developed site are dealt with in detail within the WSUD report. The following is a summary of the three catchment options that have been explored as methods of dealing with stormwater runoff from a typical industrial development.

The three catchment options each have a different catchment size depending on the treatment of bulk earthworks. In essence, by retaining the existing ridge line and siting development (assumed to be impervious) within the existing contours, the eastern catchment would contain slightly more impervious area (82%) than the western catchment (72%) and will therefore require a larger on site flood detention (OSD) and storm water treatment footprint.

It will be far preferable to reduce the eastern catchment and divert water to the west in order to minimize the stormwater management footprint within prime developable land with direct frontage to Wallgrove Road. The low point in the north west corner of the site is also a preferable location for stormwater detention and wetland. By benching the site at the ridge line or directly piping stormwater to the lower area of the western catchment, the OSD footprint within the western catchment will obviously increase.

Within all options, the area required for treatment, which will essentially take the form of a wetland can be further reduced by accommodating bio-retention systems within the road reserve. This will not decrease the areas required for flood detention but will free up that space to become landscaped open space where any significant existing trees might be retained.

3.1 Stormwater Management Option One - 'Natural' Drainage

Option One demonstrates the catchment size, the flood detention area requirements and stormwater treatment footprint of development based upon the existing catchment split of the site, ie. no further benching or diversion of stormwater from east to west. The on- site detention needs of the eastern catchment are significant and would essentially take up a large area of prime land. These areas are based upon a 0.6m deep detention area therefore this surface area could be reduced though increasing the depth to 1.2m for example. If detention areas were to be deeper than 0.6m and engineered with steep sides, safety fencing would be required which is an undesirable outcome for visual amenity.

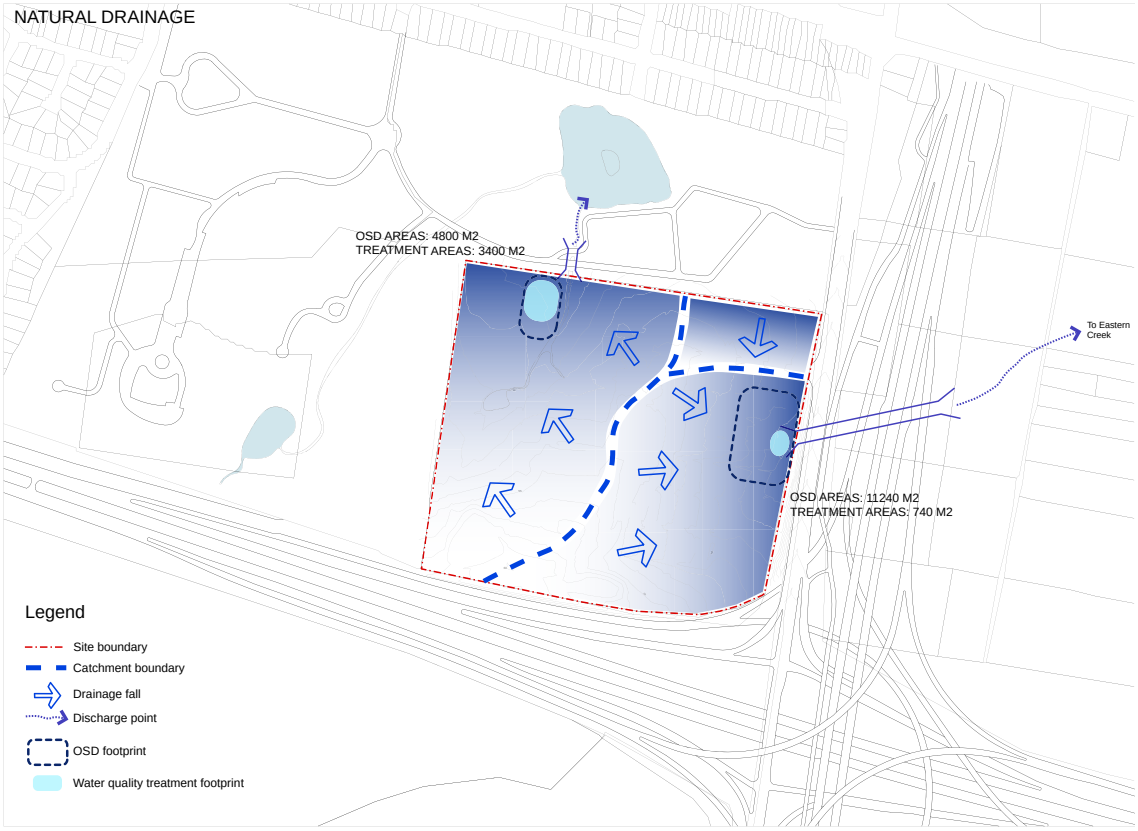


Figure 3.1 Option One - Natural Drainage

3.2 Stormwater Management Option Two - 'Benching'

Option Two demonstrates benching across the middle of the site to 'push' the eastern catchment area further east, diverting (without pipes) water to the western catchment. This is advantageous for the development because it permits a reduction in the size of the flood detention basin in the eastern catchment, thus increasing the area of developable land where it is most desired. The flood detention footprint is reduced significantly and can be accommodated within a combination of public road reserve and private setbacks. This option has been incorporated into Development Scenario One for illustrative purposes.

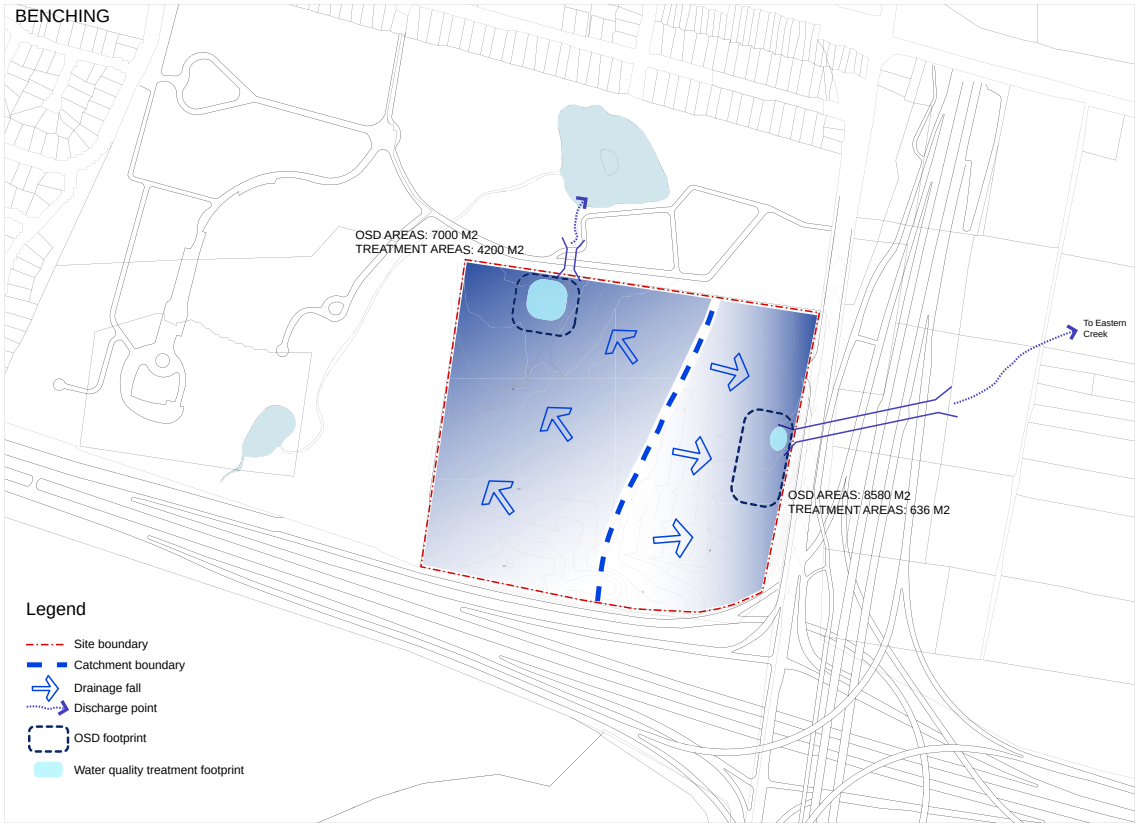


Figure 3.2 Option Two - Benching

3.3 Stormwater Management Option Three - 'Diversion'

Option Three demonstrates benching and direct piping of stormwater runoff from the eastern catchment area to the western catchment, thereby reducing even further the size of the eastern on site detention zone. Based upon a 0.6m deep basin, the detention area could be accommodated within a small section of the road reserve, leaving the frontage to Wallgrove Road free for subdivision development. This is clearly the most expensive option for dealing with stormwater but the advantages of freeing up prime land need to be weighed against the costs of diverting the water. This option has been incorporated into Development Scenario Three for illustrative purposes.

The advantages of diverting stormwater to the west can be summarized as follows:

» It makes sense for stormwater management systems to be located within the lower areas to the rear of the site, away from prime developable and highly exposed land.

» There is a natural low point and riparian system within the north- west corner of the site that provides an ideal setting for a wetland.

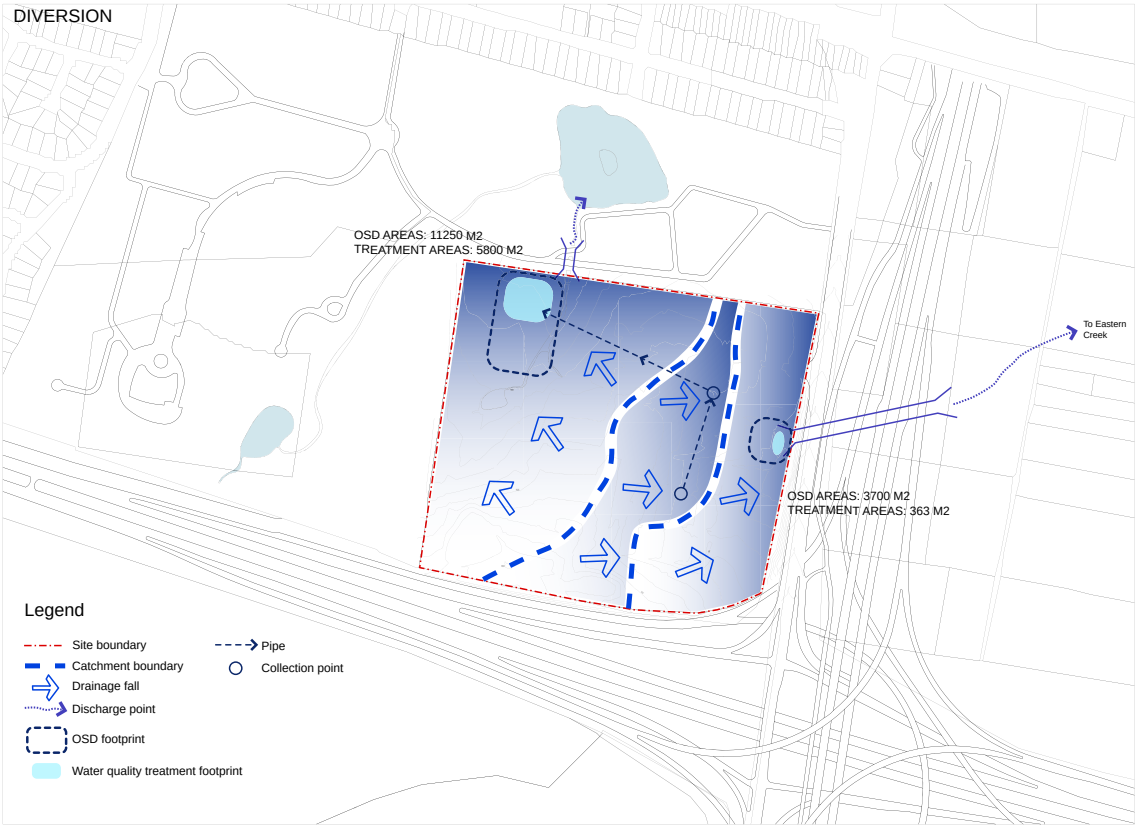


Figure 3.3 Option Three - Diversion

» The existing discharge from the eastern catchment is located close to the entrance on Wallgrove Road and the land used for stormwater management will need to be of high visual quality and well landscaped. Highly engineered deep basins are not desirable.

» Through the use of bunding to create detention areas, the loss of existing trees will be minimized and the basin should not have an adverse affect on the health of any existing remnant vegetation.

» Increasing treated runoff from the western catchment is advantageous to the adjacent cemetery who have expressed their desire to utilise this runoff for irrigation purposes.

» Decreasing runoff from the eastern catchment is advantageous for the Eastern Creek downstream by further attenuating flows and reducing nutrient loads.

Base upon the site analysis, stormwater management options and the above urban design principles, the three Development Scenarios have been developed and will be described in the following sections.

4.0 Urban Design and The Master Plan

4.0 Urban Design and The Master Plan

4.1 Developing Master Plan Options and Urban Design Principles

Within this section, one master plan scenario is put forward to demonstrate how the site might be developed. The urban design principles and the empirical controls for this master plan are outlined and graphically illustrated within this report section. Alternative masterplan scenarios based upon consistent empirical controls and urban design principles are illustrated in Section 6. These are included to demonstrate the adaptability of the site to accommodate various 'typologies' of Industrial development within various lot size configurations, essentially building upon a consistent framework.

The masterplan scenarios are the ultimate outcome from a design process in which AECOM has explored an extensive range of potential development options.

Through examination of the opportunities and constraints, a series of guiding principles have been developed in order to define the key elements or 'building blocks" for the vision and concept for the redevelopment of 60 Wallgrove Road, and from these, development controls have been established. Following is a brief description of the methodology behind the refinement of the three options.

The critical objectives of the exercise were to develop design outcomes that:

» Take advantage of the sites' preeminent and strategically significant location within the broader employment zone.

» Create a layered, yet fully integrated land use composition, which provides economic viability and "flexible" development implementation.

» Take advantage of the surrounding established road hierarchy; the M4 and M7 Motorways and Wallgrove Road, which provide exceptional accessibility and exposure.

» Retain and enhance important remnant environmental features and attributes, through significant tree retention and sensitive stormwater detention regime.

» Safeguard and improve boundary interfaces, and minimise any off site impacts

» Consider best practice WSUD and Environmentally Sustainable Design (ESD) initiatives.

Over 15 concepts were explored which facilitated a diversity of building forms, road layouts and land use compositions, reflective of general industrial uses.

In refining this work, a number of critical elements and features remained consistent, namely:

» Maximising the stormwater detention footprint in the north west corner of the site, and retention of vegetation where feasible around this area.

» Notional cemetery interfaces, setbacks from major roads and buffers.

» The existing entrance point from Wallgrove Road

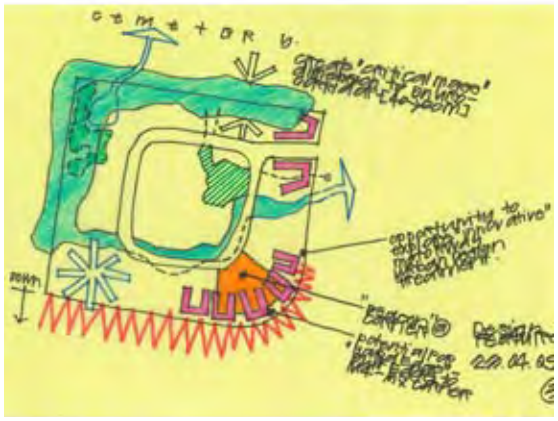
Typically, the types of industrial development considered appropriate for this size of development were:

1. **Traditional Industrial:** where lot configuration is uniform, with minimum lot sizes in the order of 5000sqm. [generally a 15% office-85% warehouse split]
2. **Mixed Industrial:** a diversity of lot sizes, ranging from 3500sqm to over 1.5 hectares.
3. **SME:** [small medium enterprise], Research and Trade HQ: explored an even greater diversity and variety of lot sizes, aspect and siting.
4. **Corporate HQ:** large format lot sizes, approximately 3-5 in total, in the order of 2.5-4.0 hectares site area each.
5. **Enterprise-Incubator:** provided a larger office/administration/commercial component of gross floor area; in the order of 40-50%, for small scale uses.
6. **Hybrid Corporate- SME-Reseach:** utilised the Corporate HQ, [3-4Ha] to "anchor" the entire site, to provide the opportunity for small scale-"boutique" sunrise enterprises access to the precinct.

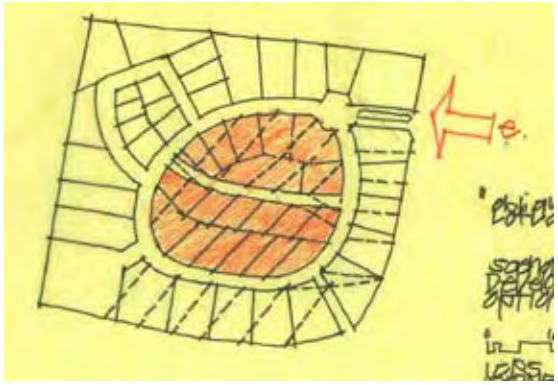
Through design workshops and client review, the key urban design principles that guide site design were clearly established, and the options for the site composition and density were refined. In their simplest form, the 3 scenarios as tabled in this report focus on the provision of small, medium and large lot subdivisions, however they incorporate aspects from the wide variety of site design options that were tested in the early stages of the urban design process. Figure 4.1 provides a snapshot of some of the urban design work carried out and developed within the early stages of the project.

While the refined scenarios represent a potential master plan for the future development of the site, they are essentially flexible with regard to lot size, configuration and general layout. The suggested empirical controls and guidelines are tools by which the key urban design principles might be achieved.

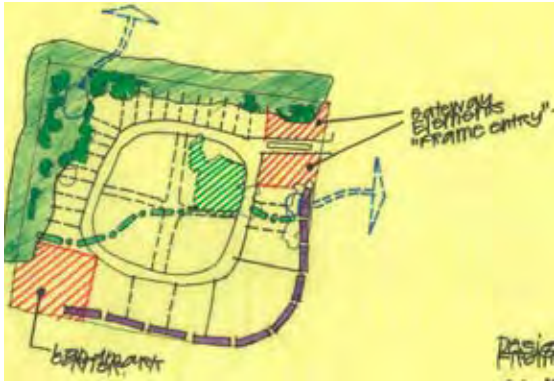
Early site development option



Draft Scenario - design principles

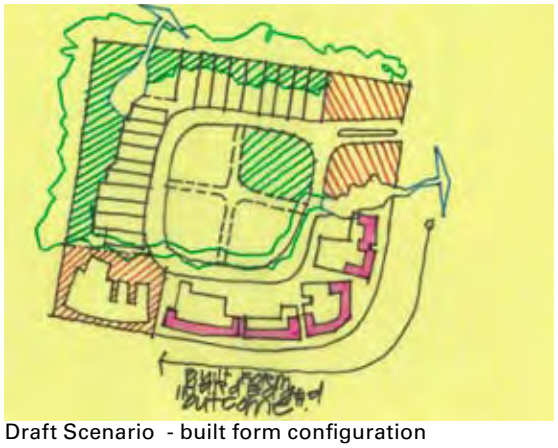


Early site development option



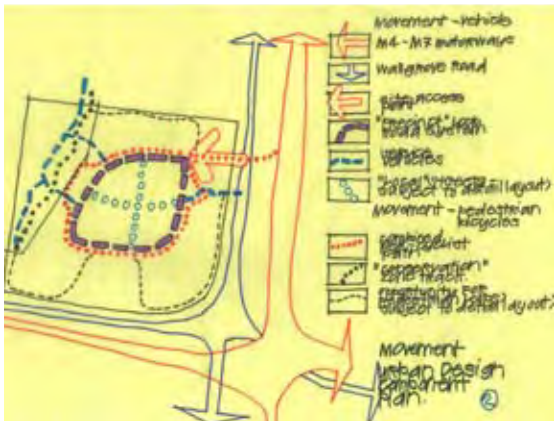
Draft Scenario - subdivision and connection

Early site development option



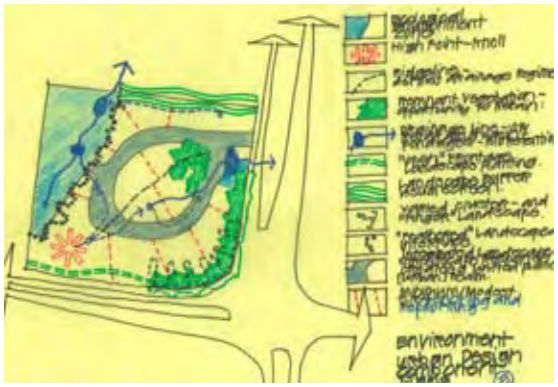
Draft Scenario - built form configuration

Figure 4.1 Early urban design work and sketches.



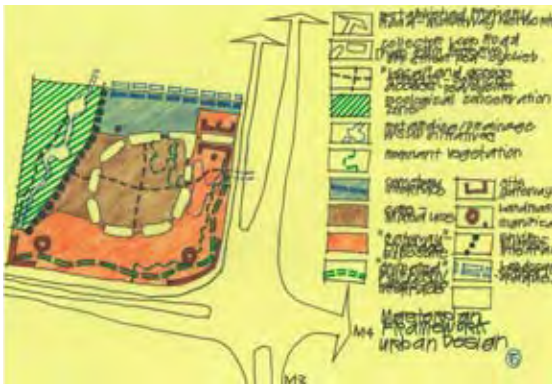
Draft Scenario - circulation

Draft Scenario - illustrative master plan



Draft Scenario - design principles

Draft Scenario - illustrative master plan



Draft Scenario - urban design framework

4.2 Key Urban Design Principles

The key urban design principles inform the development of the site and comprise:

» Function and Land Use Composition

» Movement and Mobility

» Environment, Sustainability, and Open Spaces.

» Urban Form and Architectural Expression.

The design principles create the 'skeleton' and strategic intent for the site redevelopment. The objective of this exercise is to create a concept with the potential to accommodate a diverse range of general industrial uses, capable of responding to changing market trends, responding to the site and its context, and capable of supporting fully integrated sustainability initiatives.

Function and Land Use Composition

The preeminent feature of a high quality industrial development is a functional, "convenient", highly accessible and adaptable master plan. The site, at approximately 22 hectares site area provides the opportunity to create a "boutique" though strategically significant employment precinct gateway. Good urban design principles and outcomes will ensure that through an innovative site planning and fiscally responsive approach this will be delivered.

Common to all masterplan scenario outcomes are the following features:

» The retention and augmentation of visually and ecologically significant vegetation in setbacks, buffers and around site drainage and retardation systems.

» The creation of a cell- based, and layered land-use hierarchy.

» Development flexibility within each "cell" to respond to market forces and evolving development criteria.

» A range of development site sizes and "profiles" that respond the site opportunities and constraints - creating new precinct gateways, "landmarks" and "beacons".

Movement and Mobility

A well designed industrial site should provide an efficient and functional multimodal movement network, capable of accommodating a variety of industry vehicles, with the potential for staged implementation. The development should also ensure a safe and convenient mobility network for pedestrians, cyclists and smaller vehicles.

The strategically positioned site location at the intersection of the nationally significant M4 and M7 Motorways offers an unprecedented opportunity to develop a notable logistics -based industrial estate.

Common to the three masterplan scenarios within this report re the following opportunities for a "simple" yet fully integrated movement system, and include:

» Maintaining and improving the main entry point off Wallgrove Road.

» Upgrading the intersection alignment and traffic management at this location.

» Creating a defined and discrete "precinct" loop road directly servicing the individual development "cells".

» Minimising potential conflict by segregating vehicle and pedestrian movement.

» Adopting generous road reservations, in the order of 20-25 metres, which accommodate a range of users, including heavy and light service, commercial and cartage vehicle types, with the capacity to be landscaped to emphasise entrances and vistas.

» To provide shared pedestrian and cyclist movement within the precinct, and encourage connectivity to the M7 Westlink Cycle Path.

» Ensuring slopes and gradients to all roadways enable ease of use and convenient accessibility for heavy vehicles, and potentially B-Triples.

Environment, Sustainability and Open Spaces

The master plan for development should adopt an environmentally sustainable urban design outlook which enhances the sites' existing notable characteristics, whilst introducing new initiatives for water management and energy use reductions. The open space arrangement of the development should provide a platform for an integrated master plan where the landscape and built form provide a balanced and cohesive outcome.

Common to the three masterplan scenarios presented in this report are the following opportunities to create an environmentally sensitive, sustainable and visually integrated development plan:

» Embracing the existing site drainage system and remnant vegetation at the north western boundary to establish a wetland treatment zone and stormwater detention area for the site that makes use of the existing depression and stormwater outlet.

» Maintaining important perimeter vegetation particularly at the motorway interchange.

» Ensuring the creation of a landscape buffer and visual screen to the existing cemetery interface.

» Minimising site excavation and re-profiling, by responding to the established topography and working with the site slope rather than against it.

» Adopting a layered landscape response, with varying vegetation types and densities which ameliorate harsh climatic affects, whilst creating an innovative and visually cohesive master plan.

» Incorporating Water Sensitive Urban Design practices for management and retardation of stormwater and to eliminate adverse off-site impacts.

» Exploring the potential to retain other "pockets" of existing vegetation within the site.

» Creating a unified streetscape and public realm through the integration of on-street, frontage setback and more naturalised "cluster" landscaping that "associate' the industrial land with remnant woodland trees.

» Creating an arrangement of development "cells" suitable for flexible building orientation responding to the climatic conditions of the site such as aspect and prevailing winds.

Urban Form and Architectural Expression

The master plan should introduce a development model that creates a distinctive character in response to site context and attributes, taking advantage of the excellent visual exposure of the site to major national highways. The site has no neighbouring development or immediate built form, and therefore has the opportunity to employ robust and contemporary architectural form within a high quality landscape setting. The site essentially forms the 'gateway' from the north to the employment precinct defined in the SEPP (WSEH) 2009. This, combined with the small 'boutique' size of the development site allows for the inclusion of some diverse and visually dynamic buildings within the constraints of the guidelines.

The common elements to the three scenarios include:

» The creation of a development reflective of its outstanding context, site attributes and features, and its location as the 'gateway' site to the Employment Hub precinct.

» A "central" or loop type road, which immediately establishes and defines the "feel" and character of the public realm throughout the development.

» An articulated and modulated, landscape dominant streetscape/public domain composition, with the ability to vary frontage setbacks, whilst ensuring "activated" frontages.

» Building heights in the order of 15-20 metres that respond to and reflect the sloping nature of the site and respond to the immediate surrounds and visual exposure.

» Specific and site responsive interface treatments to all boundaries ranging from the creation of suitable setbacks, appropriate building siting / facades/ heights and a unified landscape treatment.

» The creation of a site gateway, at the point of entry, with visually dynamic architectural expression and composition.

» The response to the site characteristics and substantial exposure to the motorways, in particular, to create a variety of building form outcomes, some highly 'animated" and of visual interest along the southern and eastern edges.

» The potential (where appropriate) to provide an articulated and potentially "sculptured" roofscape.

4.3 The Master Plan

4.3.1 Urban Design Principles

As well as incorporating the common principles as described in Section 4.2, the specific urban design features that establish the master plan for the site are:

» A precinct loop road that directly provides access to the stormwater detention area, hence promoting passive surveillance, and allowing maintenance access. The loop road should be oriented to generally follow the contours of the site, minimising the requirement for cut+fill, whilst providing a structure that allows regular shaped lots with easy access

» An ordered articulation of lots around the loop road

» A range of lot sizes – predominantly small to medium size (4,000-10,000sqm), and flexible in their division, generally pertaining to the Mixed Industrial development typology but with more generous lots organised around the south and south east boundaries; (identified as gateways, landmark and prime development sites).

» An inner 'core' of smaller lots (4,000-6,500sqm) serviced from the main loop road

» A 'diversion' scenario for stormwater management to maximize the development of high value land along Wallgrove Road in the eastern catchment. The detention basin/ treatment area in the eastern edge could potentially be contained within a public reserve between two lots, adjacent to the existing stromwater outlet. The alternative is for the detention to be located within the private 20m setback fronting Wallgrove Road.

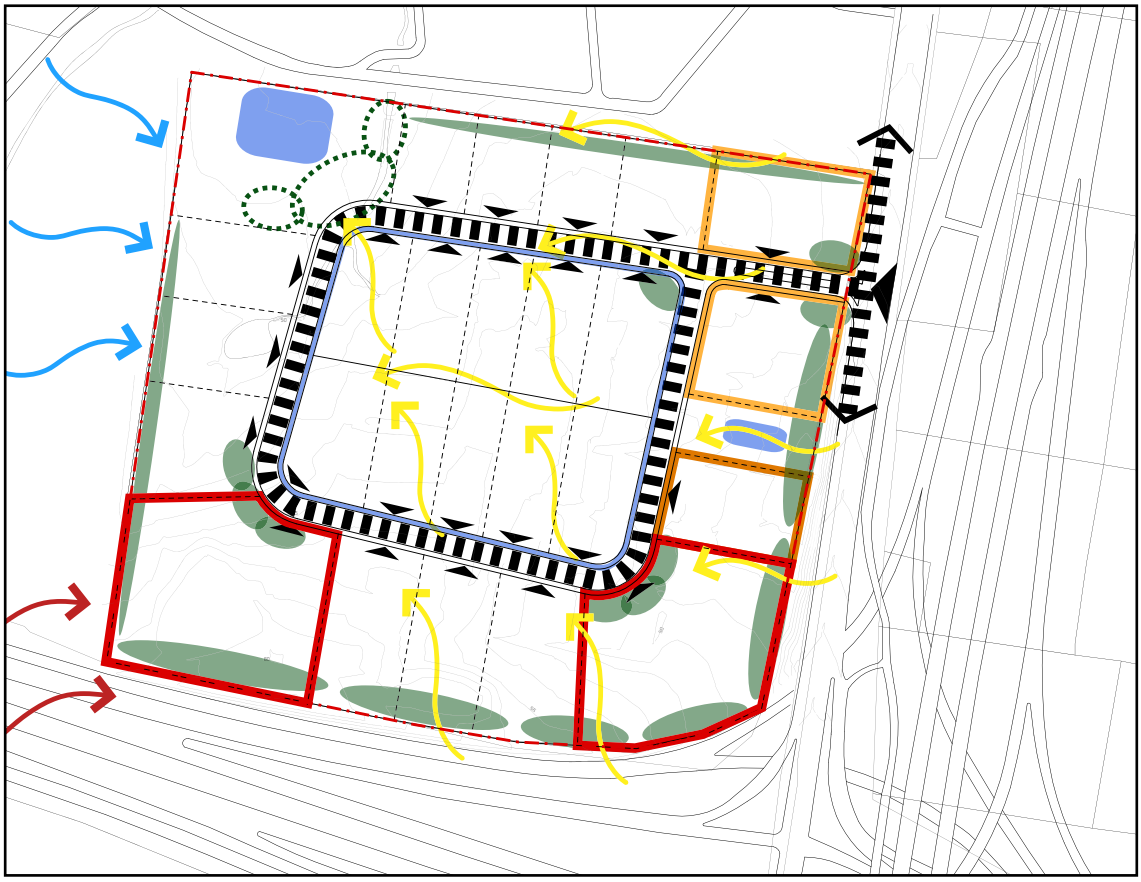


Figure 4.3.1 The Masterplan - Urban Design Principles

Legend

- Site boundary
- Shared pedestrian/ cycle route
- Site entrance
- Individual lot entrance
- Landmark site
- Site subject to high visual exposure
- Entry gateway site
- Corner/copse planting
- Landscape reserve
- Open Space
- Detention basin
- Bioretention within road reserve
- Hot summer wind
- Cool summer breeze
- Cold winter wind

0 10 20 50 100 200m

N

4.3.2 Empirical Controls

To achieve the urban design aims and principles, specific empirical controls have been identified. These are based upon both the development vision identified in this report and controls already adopted by Blacktown Council within their DCP and Urban Design Guidelines. This ensures that the development of 60 Wallgrove Road is in-keeping with both local and regional planning guidelines.

In masterplanning the site, the appropriate empirical controls are as follows:

Public Road reserves:

Loop Road (Industrial Collector)

» Main Loop Road (Industrial Collector): 23m road reserve, in accordance with Part E - Blacktown Council DCP 2006 and the engineering guidelines for development.

» Entry gateway roads to incorporate central median.

» 23m wide reserve incorporates 15.5m wide carriageway with on street parking either side, with 3.75m verge/footpath zone to either side of the carriageway. Where the entry road incorporates a central median, there should be no on street parking to ensure a consistent road reserve width.

» Shared 2.5m footpath / cycleway on one side of road, with 1.25m planted area, and 3.75m soft planted area for verge on opposite side.

(Refer to Section 6, Figure 6.4)

Private Setbacks:

» A 20m building setback from M4 Motorway.

» A 20-30m development setback along the eastern boundary with Wallgrove Road with the objective of retaining good groups of existing canopy trees and the ability to incorporate stormwater detention and treatment close to the existing outlet if preferred.

» A 10 m building and hard surface setback from the northern and western boundary adjacent to Pine Grove Cemetery, for the creation of a landscaped screen or buffer to development.

» A 10m building and hard surface setback from collector road reserve within lots. This has been varied to 20m in some key areas across the site to allow for a greater depth and diversity of landscape structure throughout the site.

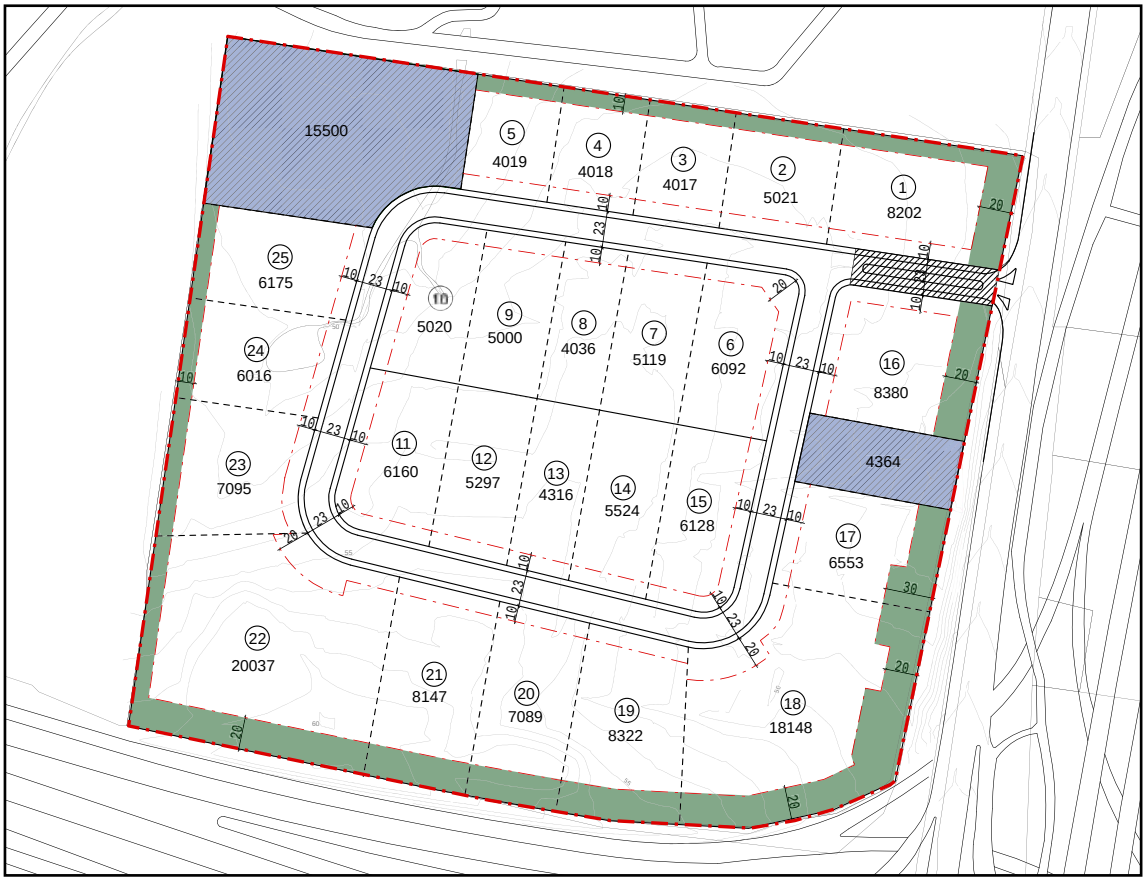


Figure 4.3.2 Masterplan - Empirical Controls

Area Breakdown		
Land use	**Area (ha)**	**Per (%)**
Total	21.87	100
Developable area	17.39	79.5
Roads reserve	2.49	11.4
Public reserve (detention)	1.99	9.1
Yield		
Lot type	**No. of lots**	**Area (ha)**
Small lots (0.4-0.65 ha)	16	8.20
Medium lots (0.65-1.0ha)	7	5.38
Large lots (>1.0 ha)	2	3.82
TOTAL	**25 lots**	

4.3.3 Illustrative Masterplan

Endemic Woodland Planting

OSD / Stormwater Treatment Area for western catchment

Open space area with visual surveillance to OSD area

20m landscape setback at corners to allow greater landscape integration

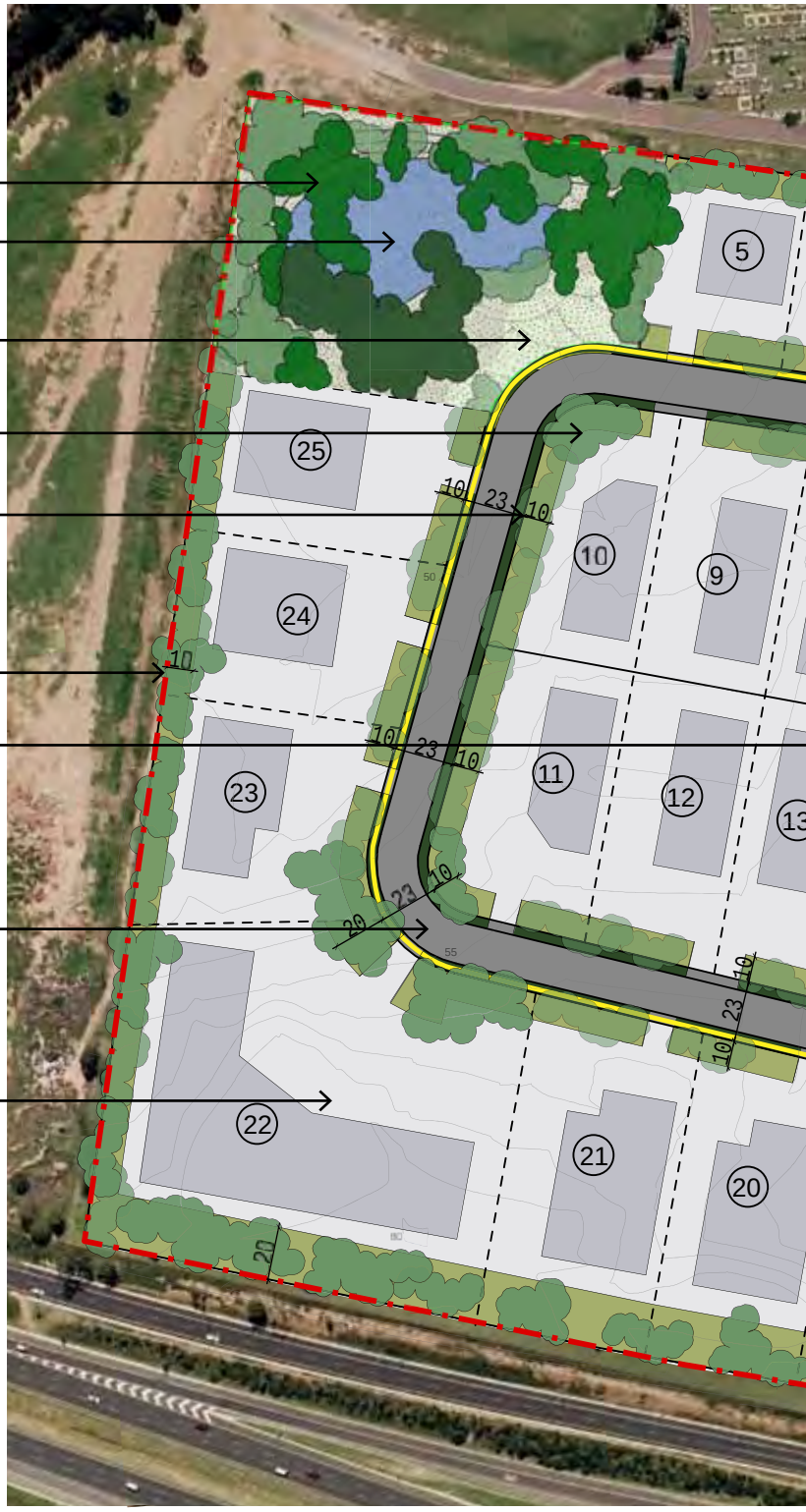
10m private landscape setback

10m screen planting edge to cemetery

'Inner core' of smaller lots (4,000-6,500sqm)

Road alignment to consider change in level across site and minimise cut and fill

'Landmark' corner lot, buildings to address both major highway and internal road, minimum lot size 15,000sqm.



Legend

- Site boundary
- Existing copses of trees to be retained
- Proposed copses of cumberland plain gum trees
- Riparian planting
- Stormwater treatment area
- Shared path
- Landscaped set back
- Streetscape
- Dense buffer or screen planting
- Building perimeter landscape
- Open space
- Bush regeneration
- Indicative building footprint

N

0 10 20 50 100 200m

10m screen planting edge to Cemetery

Internal cycle path to connect to M7 cycleway

'Gateway' lot, minimum lot size 8,000sqm.

'Gateway' entrance landscape

'Gateway' lot, minimum lot size 8,000sqm.

OSD / Stormwater Treatment Area for eastern catchment

Permeability between built form and landscape to facilitate easterly breezes

Groups of existing healthy trees to be retained

Permeability between built form and landscape to facilitate easterly breezes

20m setbacks at landmark corner sites to reinforce and strengthen landscape

'Landmark' corner lot, buildings to address both major highway and internal road, minimum lot size 15,000sqm.

Canopy tree planting in groups within 20m setback along M4 to allow views through to landmark buildings

05 Landscape Design Objectives

5.0 Landscape Design Objectives

5.1 Landscape Design Vision & Objectives

The vision and objectives for the landscape design of the master planned development is:

» To strengthen the urban design framework, by reinforcing entry or landmark sites through the structure and design of the planting.

» To draw upon the natural characteristics of the site and create a visual relationship with remnant canopy cover.

» To create a legible yet layered streetscape that responds to the road arrangement and development typology.

» To increase the biodiversity of the site through the selection of endemic and native planting appropriate to the site and the Cumberland Plain ecology.

» To provide the appropriate interface at boundaries such as screen and buffer planting

» To assist with sustainability initiatives such as windbreaks and sun screens, and reducing water runoff.

» To visually integrate wetlands and detention basins.

The landscape 'types' that illustrate the potential design for each scenario are:

» Existing trees to be retained

» Group tree planting

» Streetscape planting

» Screen/ buffer planting

» Landscape setbacks

» Stormwater treatment planting

» Open space

» Interface planting

These typologies are described below. Suitable plant species that would be appropriate for use within these typologies are listed in Figure 7.5, following the Landscape guidelines. Plant lists have been based upon recommended species for the site as provided by Cumberland Ecology and include many species that are endemic to the CPW.

5.2 Landscape Types

Existing groups of trees to be retained

Healthy native trees within reserves and set backs should be retained where feasible. Impediments to retaining trees within these areas of the site will be the size and form of the stormwater detention basin, and management of site levels. It should be possible to achieve the required detention through bunding rather than excavating, thus optimizing tree retention. This is illustrated indicatively within the WSUD report.

Within the 20m setback of the south eastern corner, significant groups of trees should be retained in clusters to allow a visually permeable buffer to development at this edge of the site.

The groups of Cumberland Plain Eucalypts, with the native grass understorey, provide a theme that can be repeated throughout the site as a feature of the landscape design.

Group tree planting

Introducing groupings of single or mixed species of endemic Cumberland Plain trees, planted at relatively tight centres with a simple monoculture understorey of native grasses, is a simple way to achieve the following aims:

» To reinforce corners, entries, landmark sites and other visual 'nodes' within the development.

» To provide visual 'reference' to the adjoining conservation area and provide a continuity of theme.

» To introduce a natural, yet considered element of landscape design into what could otherwise be rigid and formal road side planting.

» To ensure that in the long term, there is a layer of tree canopy throughput the development, visible from the surrounding roads.

The integrated master plans demonstrate the use of these groups to provide continuity and strength to existing fragmented tree coverage, as features at the site entry and within setbacks at corners and junctions of lots.

Steetscape planting

The landscape of the internal road is illustrated within the road reserve sections that follow the masterplan scenarios. Essentially, the 'streetscape' will typically be made up of:

» Verge planting: lawn or groundcover planting with single rows of tall canopy street trees

» Median Planting: swathes of mass planted native grasses with staggered or copse planting of tall canopy street trees

» Bio-retention swales; swales planted with sedges, grasses and lilies to treat runoff from adjoining lots prior to entering the stromwater system.

Sight lines and visibility for pedestrians, cyclists and vehicles need to be maintained within the streetscape planting, hence the use of clear stem trees and low understorey is recommended.

Screen/buffer planting

At the northern and western boundaries with the Cemetery, it will be desirable to create a screen to the development. In other areas, such as the south – western corner setback, dense buffer planting will be necessary to protect the site from harsh westerly winds.

Screen planting at the northern boundary should be a dense layered composition, typically grading up from native grasses at the edges to tall canopy trees at the centre (trees with a mature height of 20-25m). Mid storey planting should be composed of smaller trees (with a mature height of 10-15m) and shrubs (with a mature height of 3-5m). Refer to typical section 5.2.1.

The composition of buffer planting will vary according to its desired effect, be it screening western sun, providing a wind break or a visual foil between development. A vegetated wind break designed to provide maximum shelter from the westerly winds will need to be dense and of low porosity, being composed of rows of tall trees with a low to mid height (1-4m) shrub understorey. Visual foils and shade screens can be more open in structure ranging from single trees to double rows as space allows. The design of car parks should incorporate as many trees as possible in order to provide shade and reduce heat absorption.

Figure 5.2.1 Typical northern boundary buffer planting section

Landscape Setbacks

The building setbacks to the front of each lot allow a transition from public streetscape to private frontage, and need to fulfil the following objectives:

» To enhance and respond to the public landscape, employing a similar style of planting, utilising the 'naturalised' copses of trees and simple swathes of native grasses and ground covers.

» To 'frame' the built frontage of the lot, and to provide visual integration of car park areas and lot entries.

» To allow for the creation of 'identity' through landscape design – through driveway planting, boundary hedges, feature planting around entry signage etc.

Stormwater treatment planting

The treatment wetlands within both catchments can take different forms according to their location. It is likely that the wetland within the western catchment will take on a more natural form than the treatment wetland within the eastern catchment, which will be confined to regular shaped blocks of land, either in private setbacks, lot frontages or road reserve.

The treatment wetlands should incorporate a series of planted areas and water depths, ranging from ephemeral zones on the embankments, to deep marsh. The suggested species for these are included within the planting schedule, Figure 7.5. Where they are located within the road reserve, the treatment areas will be more linear in nature and there is the opportunity for them to be designed in a more contemporary form. The wetland will need to be set back from the road and separated by a more open area of tree/ low shrub planting (within the detention area) in order to protect the wetland from truck and other vehicular movement. An illustrative perspective, figure 5.2.2 shows how these combined detention basins and wetlands might be integrated within the site entry or the landscape set back of the lots.

Figure 5.2.2 Typical perspective illustrating integration of stormwater detention and treatment within road reserves

Open space

Open space is indicated at the interface of the stormwater detention area and the loop road. It is envisaged that this would provide a small 'parkland' area for employees within the development. The shared cycle path/walkway could be carried through from the street through this open space area and provide an informal space for workers to take their lunch or get some exercise during the day. The space would need to be well defined and separated from the detention basin but could possible allow controlled access to the wetlands. This open space area would most likely take the form of open lawn with groups of shade trees, and a native grass understorey.

A break in the street tree planting to a more relaxed and permeable planted edge will allow good visibility into the site and encourage people to take advantage of the open space.

Illustrated Master Plan and Street Design

03

6.0 Illustrative Master Plan & Street Design

6.1 Illustrative Master Plan Principles

The purpose of the Illustrative master plans demonstrate how the development might meet the urban design objectives through a well integrated and cohesive approach to site design, building upon the urban design principles and stormwater management guidelines and demonstrating sustainable initiatives through building orientation and landscape design.

Typical road reserve sections for each scenario communicate the potential composition of the road reserve to support pedestrians, cyclists and vehicles. They also illustrate the potential landscape character of the streetscape and any associated stormwater treatment that might be located within the site, be it in a private reserve or within setbacks/private lot frontage.

Two further alternative master plan scenarios are presented within this section in order to demonstrate the flexibility of the site to accommodate a range of lot sizes and potential Industrial typologies. A consistent approach to setbacks, public road reserves, general controls and guidelines would apply across all scenarios.

The building footprints are indicative only and demonstrate a typical 50-65% site coverage within lots and generally illustrate the following principles:

» Building orientation that addresses the internal collector road, with allocated space for car parking to the front of the building. This provides activation of the street frontage, buffered visually by the landscape setback to each lot.

» Office orientation toward the north east aspect wherever possible.

» Large areas of hardstand (other than car parking) located to the southern side of buildings to reduce surface heat absorption.

» Opportunities for large landmark buildings in Key sites within Minchinbury Employment Park.

» Opportunities for ‘gateway’ buildings either side of Wallgrove Road entrance.

6.2 Small to Medium Lot Subdivision - Integrated Master Plan

The integrated master plan for the development illustrates the combined landscape design typologies as described in section 5.2 within an indicative small to medium sized lot subdivision.

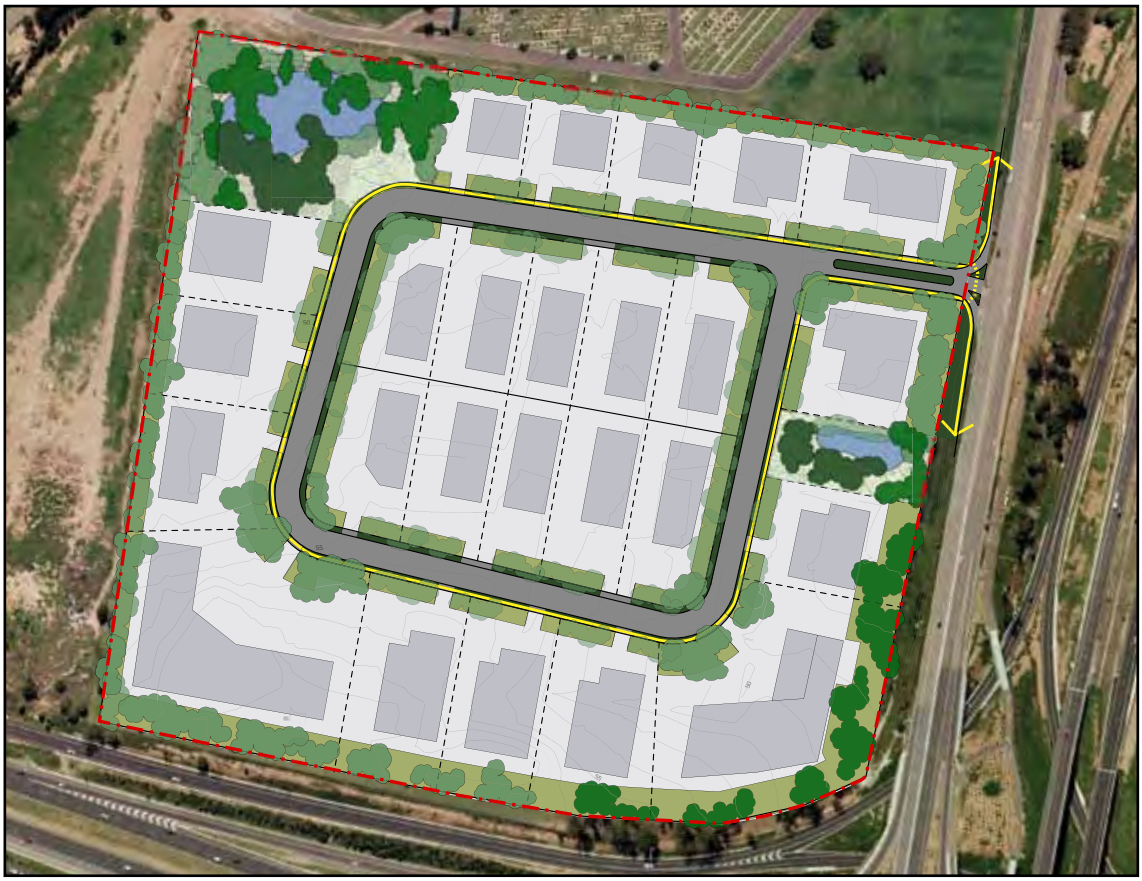


Figure 6.2 Plan 1 Small to Medium Lot Subdivision- Illustrative Master Plan

Legend

- Site boundary
- Existing copses of trees to be retained
- Proposed copses of cumberland plain gum trees
- Riparian planting
- Stormwater treatment area
- Shared path
- Landscaped set back
- Streetscape
- Dense buffer or screen planting
- Building perimeter landscape
- Open space
- Bush regeneration
- Indicative building footprint

N

0 10 20 50 100 200m

Area Breakdown		
Land use	**Area (ha)**	**Per (%)**
Total	21.87	100
Developable area	17.39	79.5
Roads reserve	2.49	11.4
Public reserve (detention)	1.99	9.1
Yield		
Lot type	**No. of lots**	**Area (ha)**
Small lots (0.4-0.65 ha)	16	8.20
Medium lots (0.65-1.0ha)	7	5.38
Large lots (>1.0 ha)	2	3.82

6.3 Alternative Scenario - Medium to Large Lot Subdivision - Integrated Master Plan

The integrated master plan for this alternative Scenario (Figure 6.3) illustrates the combined landscape design typologies as described in section 5.2 within an indicative medium sized lot subdivision, it features an internal loop road that is responsive to site contours and gradients. The site design principles and controls discussed in the previous section are relevant and applicable within this scenario. A site breakdown and yield summary has been provided to demonstrate the development potential for this scenario. It is important to note that the eastern stormwater OSD area has been indicatively shown as being located within a private set back as oppose to public reserve which increase the developable area of the site.

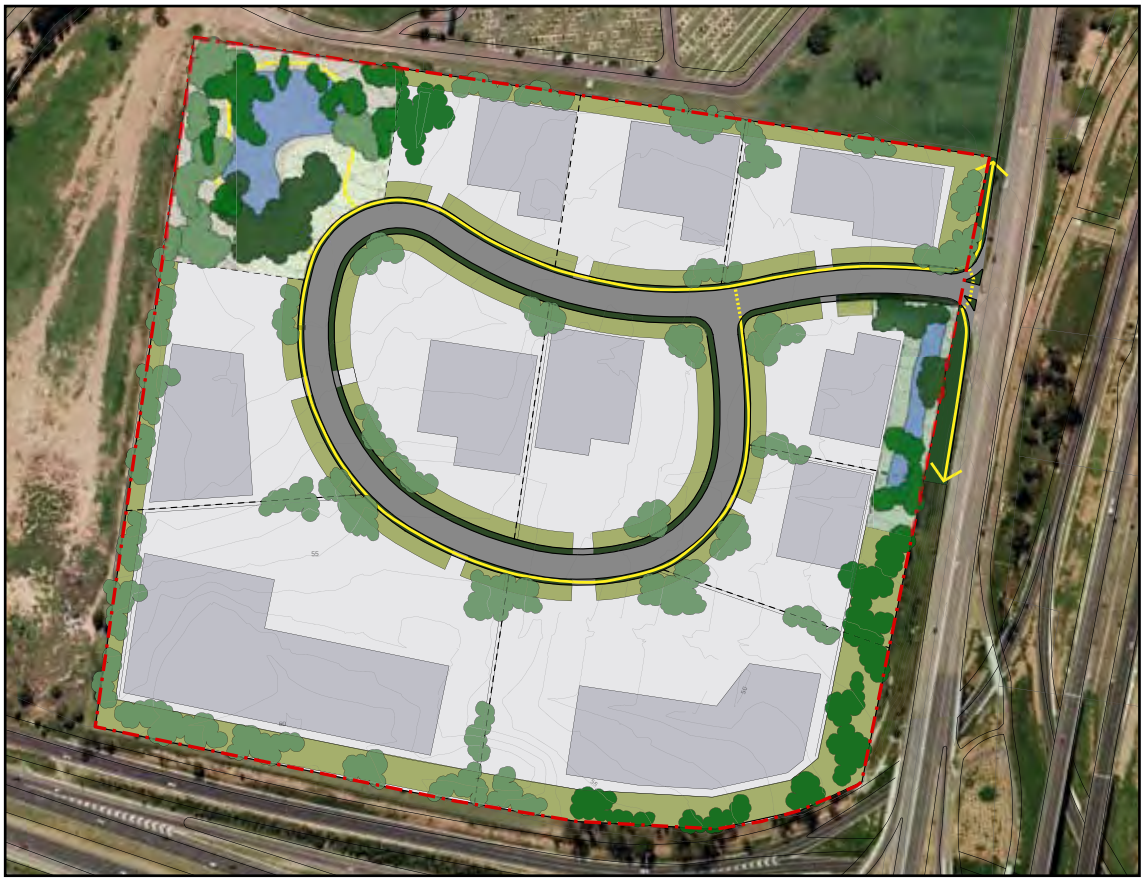


Figure 6.3 Plan 2 Medium to Large Lot Subdivision - Illustrative Master Plan

Area Breakdown		
Land use	**Area (ha)**	**Per (%)**
Total	21.87	100
Developable area	18.02	82.4
Roads reserve	2.16	9.9
Public reserve (detention)	1.69	7.7
Yield		
Lot type	**No. of lots**	**Area (ha)**
Large lots (1.0-2.0 ha)	8	10.83
Super lots (>2.0 ha)	2	7.19

6.4 Alternative Scenario - Super Lot Subdivision - Integrated Master Plan

This alternative integrated master plan (Figure 6.4) illustrates the combined landscape design typologies as described in section 5.2 within an indicative Private super lot subdivision. The central internal road and cul de sac arrangement, combined with location of stormwater OSD in private lots maximises the developable area in this scenario. Generally, the site design principles and controls are applicable to this scenario but with more emphasis on the use of landscape to create entry gateway and to break up the bulk of large lots and built form. This is illustrated in the form of a central landscape setbacks between lots.

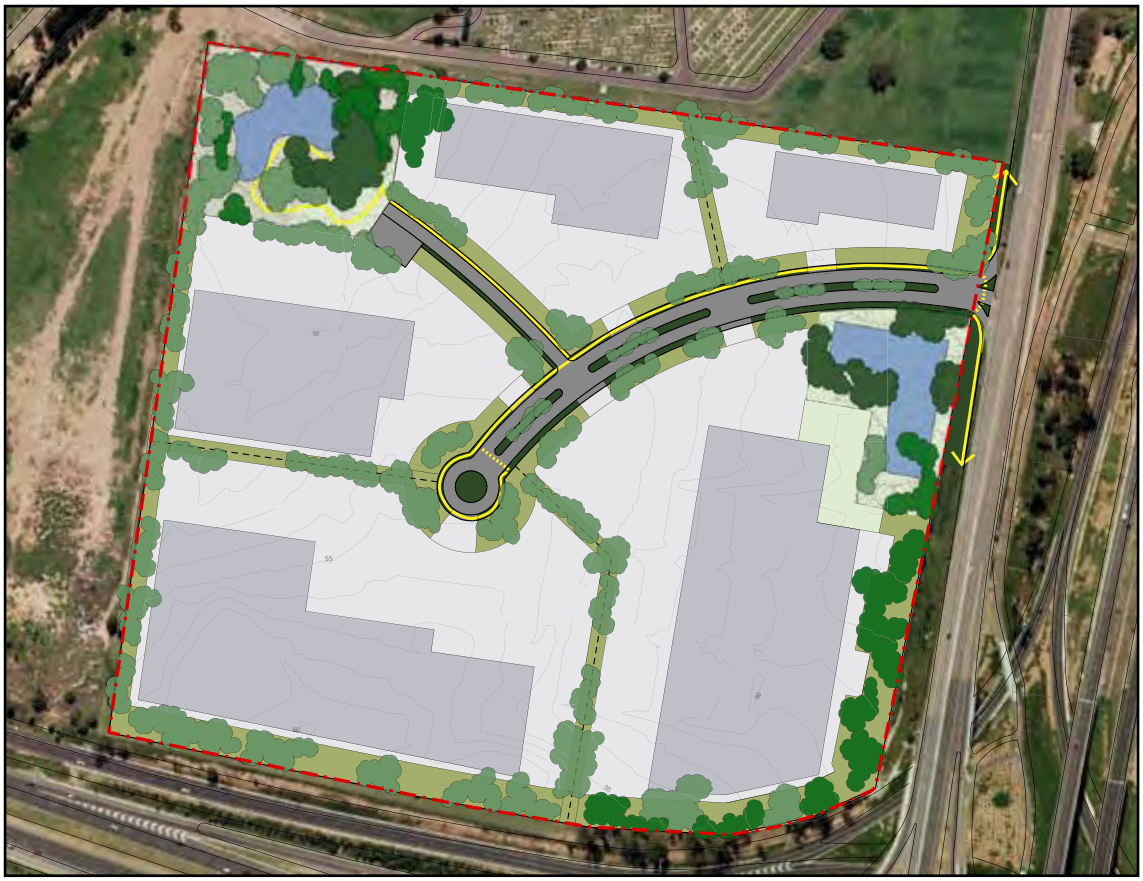


Figure 6.4 Plan 3 Super Lot Subdivision- Illustrative Master Plan

Legend

- Site boundary
- Existing copses of trees to be retained
- Proposed copses of cumberland plain gum trees
- Riparian planting
- Stormwater treatment area
- Shared path
- Landscaped set back
- Streetscape
- Dense buffer or screen planting
- Building perimeter landscape
- Open space
- Bush regeneration
- Indicative building footprint

N

0 10 20 50 100 200m

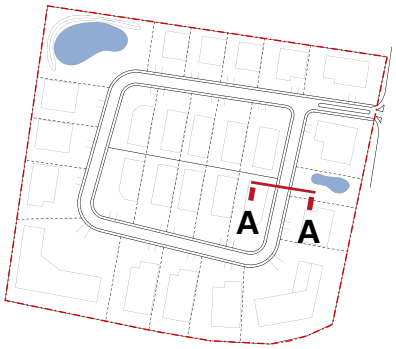
Area Breakdown		
Land use	**Area (ha)**	**Per (%)**
Total	21.87	100
Developable area	19.16	87.6
Roads reserve	1.35	6.2
Public reserve (detention)	1.36	6.2
Yield		
Lot type	**No. of lots**	**Area (ha)**
Large lots (1.0-2.0 ha)	1	1.47
Super lots (>2.0 ha)	4	17.69

6.5 Typical Road Reserve Section

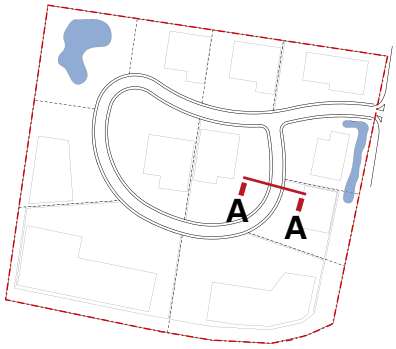
The following sections illustrate the typical arrangement of landscape, stormwater management and circulation within the road reserves.

Section AA- 23m wide Road Reserve (Collector road with optional one side Bio-retention swale in verge - alternatively this verge would be landscaped in accordance with the landscape guidelines)

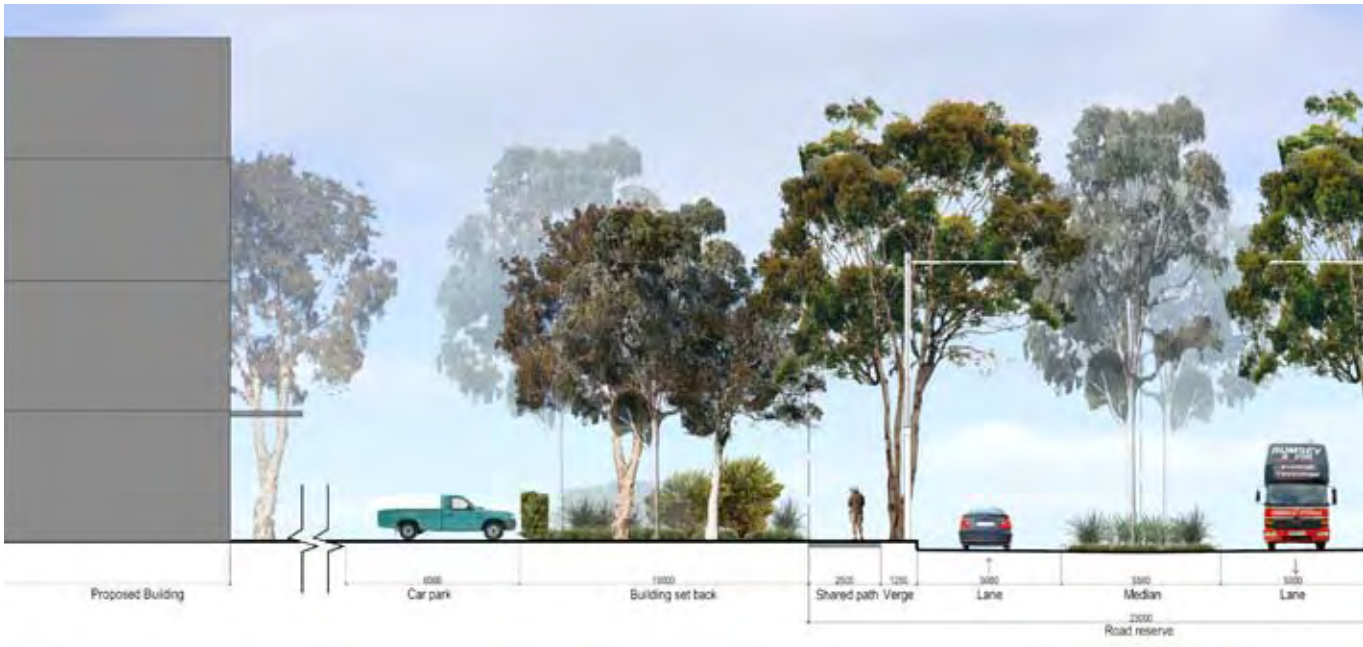
Key Plan



Plan 1



Plan 2

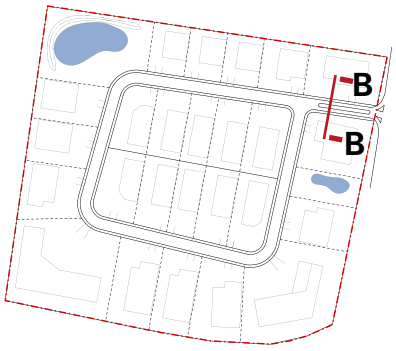


Section BB- 23m wide Road Reserve (Collector road incorporating central median at entry point)

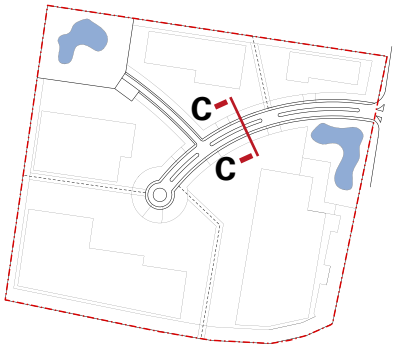
Section CC - 28m wide 'Private' Road Reserve (Collector road with 5m central median)

Figure 6.5 Typical Road Reserve Sections

Key Plan



Plan 1



Plan 3

7.0 Design Guidelines

7.0 Urban Design Guidelines

The following design guidelines have been produced to guide the development of the site scenarios in a manner that is sympathetic to site constraints and consistent with surrounding development and environments.

These guidelines are to be read in conjunction with Part E of Blacktown DCP 2006, and where a conflict causes these guidelines prevail.

7.1 Site Planning

7.1.1 Subdivision Layout

Part 1 - Design Objectives

1) Provide for flexibility to end users and economically sound development of the site through the incorporation of a variety of lot sizes.

2) Protect and enhance conservation areas and provide appropriate interface of conservation areas with development.

3) Ensure meaningful integration of Water Sensitive Urban Design within the subdivision layout.

4) Ensure the provision of sufficient space for parking, loading and unloading of vehicles and landscaping.

Part 2 -Design Requirements

a) Lots are to have a minimum area of 4,000sqm.

b) Lots are to have a minimum frontage of 40m.

c) Minimum lot size for lots identified as 'gateway' sites is 8000sqm.

d) Minimum lot size for lots identified as 'landmark' site is 15,000sqm.

e) Lots are to be sized and orientated with regard to slope and site aspect in order to maximise opportunities for solar access and prevailing winds.

f) Minimise cut and fill and maximise capture of prevailing cooling summer breezes and opportunities for solar gain in winter.

7.1.2 Internal Road Network

Part 1 - Design Objectives

1) Provide legible, convenient and safe roads for all vehicle, bicycle and pedestrian users.

Part 2 - Design Requirements

a) New industrial collector roads should have a minimum 23m reserve and 15.5m carriageway.

b) Encourage the use of sustainable transport modes including public transport and cycling through the integration of safe pedestrian pathways from transport stops, cycle paths and bike storage facilities with within development.

7.1.3 Site Coverage

Part 1 - Design Objectives

1) Ensure that adequate area is available to accommodate landscaping, open space for employees and screening of loading and storage areas.

2) Ensure that adequate area is available for driveways and access, onsite parking and manoeuvring of vehicles.

3) Ensure the provision of appropriate buffers to the M4 Motorway and Wallgrove Road that soften the visual impact of development whilst allowing visibility to appropriate development.

4) Achieve appropriate building setbacks that are landscaped to ensure integration with streetscape and road tree plantings.

Part 2 - Design Requirements

a) Maximum site coverage permitted is 65% of the lot area (inclusive of awning area).

b) A minimum 20m setback is to be provided to the M4 Motorway and Wallgrove Road. Significant trees and copses of trees within this setback and beyond of the Cumberland Plain Woodland community are to be retaining and enhanced through new planting, with a consideration to allowing visibility to key landmark sites.

c) Building setbacks to collector roads is to be a minimum of 10m.

d) Building setbacks to local roads is to be a minimum of 10m.

e) A minimum 10m buffer is to be provided to lots adjoining the northern site boundary adjacent to the Cemetery. This buffer is to be landscaped as screen planting.

f) Nil setbacks to side and rear boundaries where adjoining lots are zoned for industrial uses.

g) For lots with an area greater than 15,000sqm, a minimum 5m setback along the western property boundary is required (for the planting of landscaping which will reduce the impacts of the western sun).

h) Each lot is to be provided with an outdoor staff lunch area of a minimum 50sqm on either ground level or in a balcony or terrace. At least 50% of the area should be shaded, the area shall include seating, and be partially or fully enclosed by landscaping or screening (1.8m in height) to enhance the amenity of the area and separate it from other uses on-site.

i) Front setbacks are sufficient to enable landscaping to screen large footprint buildings and create an integrated and coherent public / private interface.

j) Car parking, water tanks, pump rooms, structures and storage areas are not permitted within front setback areas.

k) Water tanks and/or pump rooms are not permitted within the 20m setback to M4 Motorway and Wallgrove Road. These structures are to be painted in a matt nonreflective colour which blends in with the colour(s) of the main building for which they serve.

l) Open style palisade fencing in a dark colour finish to a maximum of 1.8 metres in height is permitted forward of the building line.

7.1.4 Building Height and Built Form

Part 1 - Design Objectives

1) To ensure that buildings are of architectural merit, diversity, scale and high quality built form.

2) To ensure that built form contributes to the visual amenity of the area and reinforce the design principles for the site.

3) To allow for innovative logistic and employment buildings that provide for vertical operating efficiencies.

4) To ensure that buildings follow and respond to the natural gradient of the site.

5) To allow for landmark building form.

6) To encourage business park led higher technology uses of the site

Part 2 - Design Requirements

a) Building heights are to be in keeping with the scale and land use type of adjoining land i.e. a 20m height is considered appropriate adjacent to the M4 Motorway, while a 15m height is more appropriate adjacent to the Cemetery. Refer Figure 7.1.

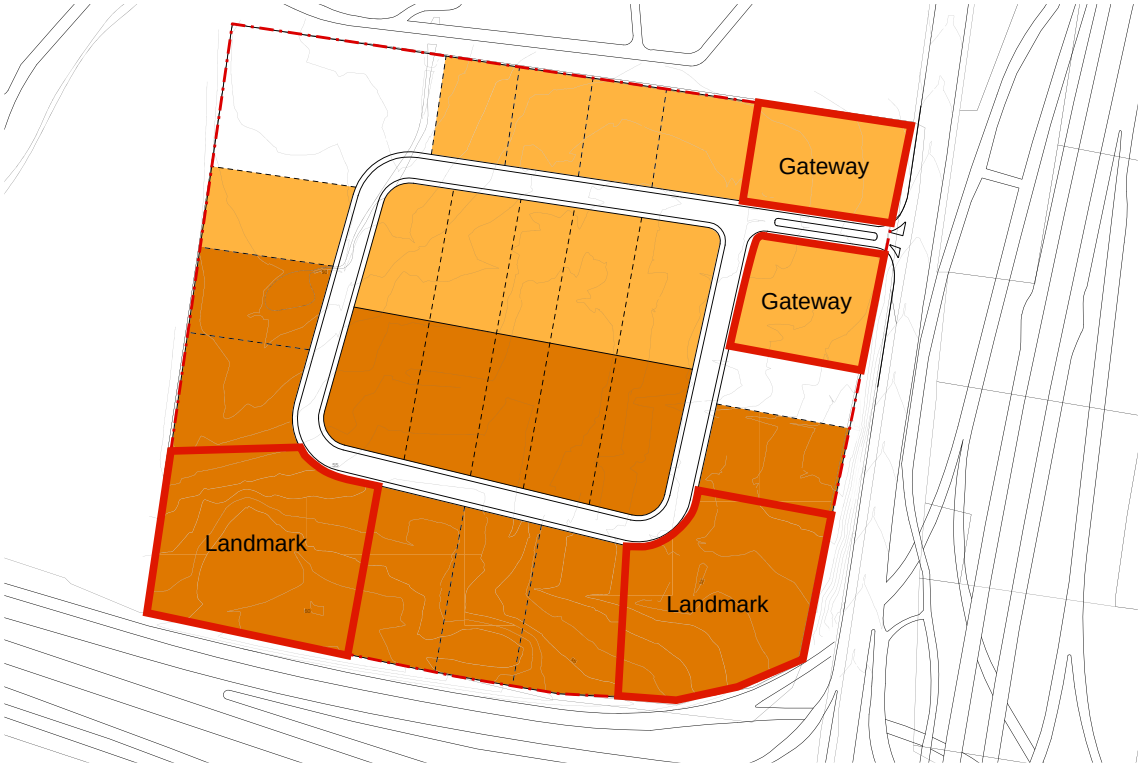
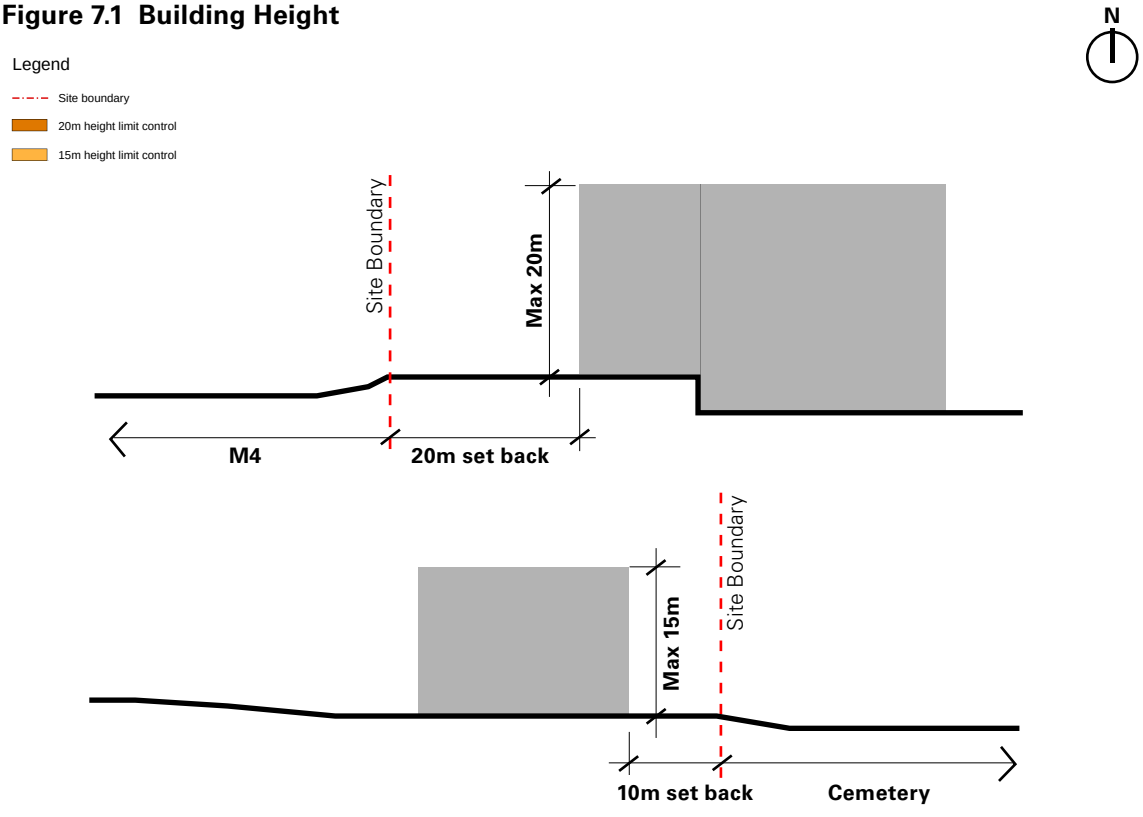


Figure 7.1 Building Height



b) The height of buildings and works should take into account the proximity of the structure to roads, conservation areas and adjoining sensitive land uses.

c) Warehouse buildings are not to exceed the building height limits.

d) Office / commercial components are permitted to exceed the maximum building height by 50% in order to provide visual interest and articulation of heights.

e) Variation to the maximum height may be permitted in gateway and landmark lots provided proposed building height is compatible with the scale, bulk and height of surrounding buildings and will not generate excessive overshadowing of adjacent properties.

7.2 Access, Movement and Car Parking

7.2.1 Site Access and Manoeuvring

Part 1 - Design Objectives

1) Ensure that access and manoeuvring arrangements to/from and within the site cater for large vehicles, are safe and do not cause detriment to other road users.

Part 2 - Design Requirements

a) Truck access, manoeuvring and loading areas are to be separated from car parking areas.

b) Consider separating truck and small vehicle access points to reduce vehicle conflicts.

c) All vehicles must be able to enter and leave the site in a forward direction.

d) Pedestrian access through car parking areas should be clearly marked, and where possible emphasised by the use of raised and textured surfaces and articulated through landscaping where feasible.

e) As far as possible, pedestrian access through car parks should be kept separate from vehicle access ways.

f) Buildings shall be designed to allow loading / unloading of vehicles within the building.

g) Loading docks should be situated to the side or rear of buildings.

h) Where not subdivided, all driveways re to satisfy AS2890.1 and AS2890.2.

7.2.2 Car Parking

Part 1 - Design Objectives

1) Ensure that on-site car parking is adequate, safe and convenient.

2) Ensure that the layout of parking areas are visually attractive and integrated.

3) Provide for bicycle parking areas.

Part 2 - Design Requirements

a) Sufficient car parking is provided on each lot to satisfy the likely peak parking demands of the development.

b) Minimum car parking rates are as follows:

- Warehouse: 1 space per 300sqm
- Industry: 1.3 spaces per 100sqm
- Ancillary: 1 space per 40sqm (only for the portion that exceeds 20% of an associated warehouse area, or if the office is separate).

c) Required car parking shall be located behind the required minimum front setback area, however visitor car parking may be permitted forward of the building line where it can be demonstrated that the landscape quality of the streetscape can be maintained.

d) Access routes to car parking areas for each lot are to be clearly signposted.

e) All car parking spaces are to be constructed of hard-stand, all weather material, adequately drained, marked and designated.

f) Sufficient spaces are to be provided for disabled car parking.

g) A dedicated area for bicycle parking shall be provided within the car park and shall include bicycle racks or similar.

h) Landscape shall be integrated into the design of car parks and hardstand areas to allow for canopy and shade planting to reduce the 'heat island effect'.

7.3 Building Configuration

7.3.1 Sustainable Building Design

Part 1 - Design Objectives

1) Reduce greenhouse emissions through appropriately designed buildings and best practice energy management.

2) Adopt economically viable energy efficient design initiatives.

3) To ensure consistency with the sustainability report.

Part 2 - Design Requirements

a) Building orientation and design should be such that they maximise northern exposure and shade east and west facing windows and openings.

b) Windows and openings should be positioned to maximise natural cross ventilation.

c) Minimise winter heat loads through the arrangement of glazed parts of buildings to face north and east.

d) Use light coloured materials in hardstand areas to minimise heat absorption.

e) External shading devices (e.g. awnings, shutters, canopy trees) are to be used to protect east, north and west facing windows from summer heat.

f) Use skylights and light wells to capture natural light for internal building areas.

g) Maximise insulation and thermal mass and minimise air building leakages, where appropriate.

h) Capture and store rainwater from roofs and other impervious surfaces within tanks for reuse. Drain hardstand / car park areas to an appropriate stormwater treatment devices prior to discharge from the site.

i) Place trees and buildings along the south western fringes of the site to reduce the effects of hot westerley summer breezes.

7.3.2 Sustainable Building Materials

Part 1 - Design Objectives

1) Minimise the total material resources used.

2) Minimise the environmental impacts of material used.

3) Encourage the use of environmentally sustainable materials, with low embodied energy content.

4) Encourage high quality architect designed buildings within the area of high visibility along Wallgrove Road and at the exposed southern corner of the site.

Part 2 - Design Requirements

a) Consider materials with recycled content. Examples include: recycled concrete, brick, timber, steel etc.

b) Consider using certified plantation (Forest Stewardship Council) or engineered timber materials, and avoid unsustainable imported timber from old growth forests.

c) Choose low Volatile Organic Compound (VOC) materials, including low/no VOC paints and coatings, floor coverings and underlays.

d) Source local materials to reduce transportation impacts.

7.3.3 Building Appearance

Part 1 - Design Objectives

1) Encourage building forms, materials and finishes that add visual interest to the neighbourhood.

2) Encourage building typologies that add visual interest to the neighbourhood.

3) Promote industrial development that is both functional and attractive in the context of its local environment through appropriate design.

Part 2 - Design Requirements

a) Built form and facades visible from the street including Wallgrove Road and the M4 Motorway, public open space, or the Cemetery should be modulated and articulated to provide visual interest. Long blank walls will not generally be supported. Articulation of walls can be achieved by variations in setback, use of glazing and differing architectural materials, finishes and colours.

b) Buildings should be designed with regard to site topography to step back and step down to help break up masses and 'box' style development. Consider breaking large buildings into sub-units or modules to reduce perceived scale.

Figure 7.3 Typical Built Form Images

District frontage and visible ESD initiatives built in to architectural form, Brookvale Business Zone

Use of photo voltaic cells to facade of industrial built form

Distinctive corporate architecture, Brinda Bella Business Park, Canberra

Use of overhanging eaves and distinct detailing, Brinda Bella Business Park, Canberra

High quality 'landmark' office buildings, Parramatta Justice Precinct

Distinctive signage and car parking, QCL-Darra

Solar photo voltaic cells

Modulated facade and use of colour to warehouses

c) Office areas sited in front of buildings can be designed to help reduce building mass and increase visual interest. Setbacks may be reduced to improve building articulation.

d) Locating the office components to the front reduces building bulk and presents an attractive frontage.

e) Buildings located on development lots adjacent to the OSD/open space area should have offices and window openings orientated towards that area for passive surveillance.

f) Buildings are to address the street and provide surveillance to streetscape.

g) Entries and building bases should be articulated through the use of colour, material change and texture, and strengthened through landscape design.

h) Built form within lots which lend themselves to 'landmark' or 'gateway' treatment should have a contemporary style and incorporate high quality architectural detail and visibility.

i) Large areas of smooth finish concrete wall panels should be enhanced with some form of texture. Consider using heavy textured paint or forming textures into selected areas of wall panels to avoid a glossy/high glare building surface.

j) Hardstand, loading, storage, rubbish disposal, plant and equipment areas are to be softened from the front, side and rear through landscaping or integrated building form.

7.3.4 Signage

Part 1 - Design Objectives

1) Adopt an integrated, site-wide signage strategy.

Part 2 - Design Requirements

a) Signage should be well designed and conform to an integrated signage strategy for the Minchinbury Employment Precinct.

b) Large scale advertising and monument signage is not to exceed the maximum building height for built form.

c) Signage is to be designed to reduce visual clutter within the front setback and encourage well integrated site language that is in keeping with scale and visual quality of the development.

d) Signage is to be limited to business identification signage only, and not comprise product promotional or advertising signage.

7.4 Landscaping

7.4.1 Landscape Design

Part 1 - Design Objectives

1) Encourage a well designed, legible and cohesive landscape framework for development.

2) Encourage a relationship between public and private landscape through a language of plant material and planting styles.

3) Enhance and build upon the existing 'borrowed' landscape of the remnant Cumberland Plain Woodland conservation area.

4) Encourage the use of species that will improve the biodiversity of the site.

5) Provide a visual buffer between neighbouring land uses and the industrial development.

6) Encourage the design of both hard and soft landscape to assist in creating comfortable micro climatic conditions and minimise the 'heat Island effect' of development.

Part 2 - Design Requirements

a) Landscape plans should be submitted with all development application.

b) Retain significant existing trees or groups of trees wherever feasible in setbacks, medians, reserves and stormwater detention areas.

c) Create a legible, clearly defined streetscape that provides the structure within which a more naturalised planting style can be contained.

d) Utilise high canopy trees and low grasses generally within verge and median planting to ensure sightlines are maintained.

e) Strengthen the biodiversity of the site through naturalised group planting of endemic Cumberland Plain Woodland trees and native grass understorey using species from the suggested planting lists where space permits.

f) Provide private landscape setbacks frontages that are distinctive but well integrated with, and contributing positively to the public streetscape character.

g) Utilise the various heights, form and structure of planting from the suggested planting list to provide screening, formality, buffer, interface and visual foil as required and suggested within the integrated master plans.

h) Use native grasses and groundcovers as lawn alternatives where possible to reduce irrigation demands.

i) Create well integrated stormwater detention and treatment areas which provide open space amenity and visual interest.

Figure 7.4 Typical Landscape Images

Central median with endemic group tree planting

Native streetscape planting

Interface planting

Landscape setbacks and pedestrian pathways

Endemic planting used in streetscapes and medians at entry

Endemic planting used creatively to building frontage

j) Integrate stormwater treatment into the road reserve where possible to reduce the footprint of treatment areas within on site detention areas in order to maximise amenity/ open space landscape.

k) Promote passive irrigation of landscapes by directing nearby hardstand areas to vegetated areas.

l) Use side and front boundary landscape setbacks to create windbreaks and provide shade to westerly sun and winter winds as appropriate.

m) Design well integrated shade planting within car park areas to ensure a minimum 50% shaded area of car parking.

n) Use endemic species suited to the environment that have low water requirements and low maintenance.

o) Use light coloured paving materials and surfaces and non impervious surfaces where practical to reduce heat absorption.

p) Locate hard stand areas within the southerly side of lots to reduce their heat absorption.

q) Interface planting between lots and conservation area should provide a naturalistic backdrop to development and be designed to prevent encroachment of human activity such as dumping, storage or parking.

Central median with endemic tree planting and grass understorey

Informal tree planting in setbacks

7.4.2 Site Topography and Management of Level Change

Part 1 - Design Objectives

1) To encourage design that minimises cut and fill requirements.

2) To encourage well considered interfaces between lots and roads/setbacks/conservation areas.

3) To ensure that cut and fill requirements do not adversely impact upon adjoining land uses.

Part 2 - Design Requirements

a) Retaining wall heights should be minimised. Where walls need to be greater than 3m in height, the retaining wall should be terraced or staggered with screen planting at the base and on intermittent levels.

b) Landscaped batters are preferable to retaining walls and should be considered where space permits. Slopes should be no greater than 1 in 3 and suitably planted to provide screening or buffer as required by its location.

c) Retaining walls and batters should be well integrated into the design of the building and its envelope.

d) Retaining walls should be visually softened through planting.

e) Material excavated from site to form lots should be re used wherever possible.

7.5 Recommended Plant Species Schedule for Landscape Typologies

Copse Planting		
Botanic Name	**Common Name**	**Mature Size**
Eucalyptus crebra	Narrow-leaved Ironbark	20m x 8m
Corymbia maculata	Spotted Gum	23m x 10m
Eucalyptus tereticornis	Forest Red Gum	24m x 10m

Native Grass Understorey		
Botanic Name	**Common Name**	**Mature Size**
Eragrostis brownii	Brown's Lovegrass	0.6m
Eragrostis leptostachya	Paddock Lovegrass	1m
Microlaena stipoides	Weeping Grass	0.2m
Themeda australis	Kangaroo Grass	0.5m

Landscape Setback		
Botanic Name	**Common Name**	**Mature Size**
Canopy Trees		
Eucalyptus crebra	Narrow-leaved Ironbark	20m x 8m
Eucalyptus fibrosa	Red Ironbark	20m x 9m
Corymbia maculata	Spotted Gum	23m x 10m
Eucalyptus moluccana	Grey Box	25m x 10m
Melaleuca decora	White Feather Honey Myrtle	8m x 4m
Melaleuca stypheliodes	Prickly-leaved Tea Tree	9m x 5m
Groundcovers		
Dianella longifolia	Blueberry Lily	1m
Dianella revoluta	Blueberry Lily	0.7m
Lomandra filiformis	Wattle Mat-rush	0.6m
Lomandra multiflora	Many-flowered Mat-rush	0.5m
Carex inversa	Knob Sedge	0.6m
Native Grasses		
Eragrostis brownii	Brown's Lovegrass	0.6m
Eragrostis leptostachya	Paddock Lovegrass	1m
Microlaena stipoides	Weeping Grass	0.2m
Themeda australis	Kangaroo Grass	0.5m

Lawn		
Botanic Name	**Common Name**	**Mature Size**
Cynodon dactylon	Couch	0.05m
*Dichondra repens**	Kidney grass	0.05m

* Lawn alternative in shaded areas.

Screen Planting (general)		
Botanic Name	**Common Name**	**Mature Size**
Acacia decurrens	Black Wattle	6m x 3m
Acacia falcata	Hickory Wattle	5m x 3m
Kunzea ambigua	Tick Bush	3.5m x 2m

Screen Planting to Northern and Western Boundary		
Botanic Name	**Common Name**	**Mature Size**
Trees		
Eucalyptus crebra	Narrow-leaved Ironbark	20m x 8m
Eucalyptus tereticornis	Forest Red Gum	24m x 10m
Corymbia maculata	Spotted Gum	23m x 10m
Melaleuca decora	White Feather Honey Myrtle	8m x 4m
Native Hedge		
Syzygium sp.	Lillypilly	3m x 2m
Shrub Understorey (mix)		
Acacia falcata	Hickory Wattle	5m x 3m
Bursaria spinosa	Sweet Bursaria	4m x 3m
Daviesia ulicifolia	Gorse Bitter Pea	2m x 1.5m
Dillwynia juniperina	Prickly Parrot-pea	1.5m x 1.5m
Dodonaea viscosa ssp. cuneata	Wedge-leaf Hopbush	3m x 2m
Indigofera australis	Australian Indigo	1.5m x 1m
Feature Banding (mix)		
Dianella longifolia	Blueberry Lily	1m
Lomandra filiformis	Wattle Mat-rush	0.6m
Microlaena stipoides	Weeping Grass	0.2m
Poa labillardieri	Tussock Grass	0.6m
Themeda australis	Kangaroo Grass	0.5m

Screen Planting to Northern and Western Boundary		
Grasses and Other Tufted Species (mix)		
Aristida ramosa	Purple Wiregrass	1.2m
Aristida vagans	Threeawn Speargrass	1m
Bothriochloa decipiens / macra	Red Grass	0.6m
Capillipedium parviflorum	Scented-top Grass	0.8m
Chloris ventricosa	Plump Windmill Grass	0.4m
Commelina cyanea	Native Wandering Jew	0.3m
Cymbopogon refractus	Barbed Wire Grass	1m
Austrodanthonia spp.	Wallaby Grass	0.6m
Dianella longifolia	Blueberry Lily	1m
Dichelachne micrantha	Shorthair Plumegrass	0.5m
Dichondra repens	Kidney Weed	0.05m
Elymus scaber	Common Wheatgrass	1.2m
Eremophila debilis	Winter Apple	0.8m
Gahnia aspera	Rough Saw-sedge	1m
Imperata cylindrica	Blady Grass	0.5m
Microlaena stipoides	Weeping Grass	0.2m
Poa labillardieri	Tussock Grass	0.6m
Solanum prinophyllum	Forest Nightshade	0.3m
Sorghum leilocladum	Wild Sorghum	0.9m
Themeda australis	Kangaroo Grass	0.5m

Hedges / Mid-storey		
Botanic Name	**Common Name**	**Mature Size**
Acmena smitthii	Lilly Pilly	4m x 3m
Dodonaea viscosa	Sticky Hop-bush	3m x 2m
Indigofera australis	Australian Indigo	1.5m x 1m
Syzygium paniculatum	Magenta Cherry	2m x 1.5m
Westringia fruticosa	Native Rosemary	1m x 1m

Landscape Strip between Allotments		
Botanic Name	**Common Name**	**Mature Size**
Eucalyptus crebra	Narrow-leaved Ironbark	20m x 8m
Eucalyptus moluccana	Grey Box	25m x 10m
Eucalyptus tereticornis	Forest Red Gum	24m x 10m
Melaleuca decora	White Feather Honey Myrtle	8m x 4m

Street Trees		
Botanic Name	**Common Name**	**Mature Size**
Corymbia maculata	Spotted Gum	23m x 10m
Eucalyptus moluccana	Grey Box	25m x 10m
Melaleuca decora	White Feather Honey Myrtle	8m x 4m

Bioretention		
Botanic Name	**Common Name**	**Mature Size**
Shrubs		
Dodonaea viscosa	Sticky Hop-bush	3m x 2m
Goodenia hederacea subsp. hederacea	Forest Goodenia	0.3m
Leptospermum continentale	Tea-tree	2m x 2m
Leptospermum trinervium	Slender Tea-tree	2m x 1.5m
Melaleuca erubescens	Rosy Paperbark	3m x 2m
Melaleuca linearifolia	Flax-leaved Paperbark	3m x 1.5
Melaleuca nodosa	Paperbark	4m x 2m
Groundcovers		
Dichondra repens	Kidney Weed	0.05m
Goodenia hederacea subsp. Hederacea	Forest Goodenia	0.3m
Hardenbergia violacea	False Sarsparilla	0.4m
Hibbertia diffusa	Wedge Guinea Flower	0.2m
Hibbertia scandens	Climbing Guinea flower	0.3m
Poranthera microphylla	Small Poranthera	0.15m
Phyllanthus similis	Phyllanthus	0.6m
Wahlenbergia gracillis	Australian Bluebell	0.15m
Native Grasses and Other Tufted Species		
Aristida vagans	Threeawn Speargrass	1m
Austrostipa setacea	Corkscrew Grass	0.8m
Cyperus trinervis	Australian Flatsedge	0.25m
Austrodanthonia tenuior	Wallaby Grass	0.6m
Dichelachne micrantha	Shorthair Plumegrass	0.5m
Dianella longifolia	Blueberry Lily	1m
Entolasia marginata	Bordered Panic Grass	0.3m
Eragrostis leptostachya	Paddock Love-Grass	1m
Lepidosperma laterale	Variable Sword Sedge	1m
Lomandra filiformis	Wattle Mat-rush	0.6m
Lomandra filiformis subsp. Filiformis	Wattle Mat-rush	0.6m
Lomandra longifolia	Spiny-headed Mat-rush	1m
Lomandra multiflora subsp. Multiflora	Many-flowered Mat-rush	0.6m
Microlaena stipoides	Weeping Grass	0.2m
Poa labillardieri	Tussock Grass	0.6m
Themedia australis	Kangaroo Grass	0.5m

Stormwater Treatment Wetlands		
Botanic Name	**Common Name**	**Mature Size**
Ephermal Zone (NWL to +0.2m)		
Carex polyantha	Creek Sedge	0.8m
Cyperus lucidus	Leafy Flat Sedge	1.5m
Cyperus sphaeroideus		0.5m
Eleocharis acuta	Common Spike-rush	0.6m
Juncus subsecundus	Finger Rush	0.7m
Lythrum salicaria	Purple Loosestrife	1.5m
Microlaena stipoides	Weeping Grass	0.2m
Persicaria decipiens	Slender Knotweed	0.7m
Shallow Marsh (NWL to -0.2m)		
Baumea rubiginosa	Soft Twig-rush	1m
Eleocharis acuta	Common Spike-rush	0.6m
Isolepis inundata	Swamp Club-rush	0.5m
Marsh (-0.2m to -0.35m)		
Baumea articulata	Jointed Twig-rush	1.2m
Bolboschoenus caldwellii		0.5m
Schoenoplectus mucronatus	Sea Club-rush	0.8m
Schoenoplectus pungens	Sharp Club-rush	0.6m
Deep Marsh (-0.35m to -0.5m)		
Eleocharis sphacelata	Giant Spike-rush	3m
Schoenoplectus validus	River Club-rush	0.8m
Open Water (-0.5m to 1m)		
Potamogeton ochreatus	Blunt Pondweed	0.05m x 4m
Potamogeton tricarinatus	Floating Pondweed	
Triglochin procera	Water Ribbons	0.3m x 2m
Wetland Batters		
Austrostipa verticillata	Slender Bamboo Grass	2m
Einadia hastata	Berry Saltbush	0.4m x 0.4m
Gahnia filifolia	Saw-sedge	0.5m
Imperata cylindrica	Blady Grass	0.5m
Lomandra filiformis	Wattle Matt-rush	0.6m
Lomandra longifolia	Spiny-headed Matt-rush	1m
Microlaena stipoides	Weeping Grass	0.2m
Poa labillardierei	Tussock Grass	0.6m
Themedia australis	Kangaroo Grass	0.3m

Detention Basin / Waterway / Riparian Zone**		
Botanic Name	**Common Name**	**Mature Size**
Groundcover		
Carex appressa	Tall Sedge	0.6m
Carex inversa	Knob Sedge	0.5m
Bursaria spinosa	Sweet Bursaria	4m x 4m
Casuarina glauca	Swamp Oak	10m x 4m
Hibbertia diffusa	Wedge Guinea Flower	0.2m
Hymenanthera dentata	Tree Violet	2m x 1m
Lepidosperma laterale	Sword Sedge	0.5m
Lomandra filiformis	Wattle Mat-rush	0.6m
Melaleuca linariifolia	Flax-leaved Paperbark	3m x 1.5m
Native Grasses		
Imperata cylindrica	Blady Grass	0.5m
Microlaena stipoides	Weeping Grass	0.2m
Poa labillardierei	Tussock Grass	0.6m

Figure 7.5 Planting Schedule

7.6 Stormwater Management

7.6.1 Potable Water Conservation

Part 1 - Design Objectives

1) To reduce demands on potable water

Part 2 - Design Requirements

a) Buildings not affected by BASIX such as those in industrial estates must meet minimum water conservation ratings as defined by the Water Efficiency Labelling Standards (WELS) Scheme and investigate the use of rainwater tanks to supplement potable water supply. For any water use within public open space an alternative water source must be identified to meet as much of this demand as possible.

b) Provision must be made in development for collection of runoff and discharge to the proposed recycled water network

7.6.2 Stormwater Quality

Part 1 - Design Objectives

1) To improve the quality of stormwater that is discharged from the site in order to protect the ecosystem health of the receiving waterways.

2) To ensure consistency with the WSUD report strategy.

Part 2 - Design Requirements

a) Reduction in the post development average annual load of gross pollutants (>5mm), TSS (total suspended solids) TP (total Phosphorus) and TN (total Nitrogen) of 90%, 85%, 65% and 45%, respectively.

Stormwater bioretention within road reserve

Bio stormwater bio swale

7.6.3 Waterway Stability

Part 1 - Design Objectives

1) To attenuate the velocity and magnitude of flows that is discharged from the site in order to protect the stability of the receiving waterways.

Part 2 - Design Requirements

a) Post development duration of flows greater than the "stream-forming flow" should be no greater than 3-5 times the natural duration of this flow. "Stream-forming flow" is defined as 50% of the 2year flow rate estimated for the catchment under natural conditions.

b) Onsite detention is not required for individual site.

c) Stormwater network shall be developed to contain Master plan runoff within the appropriate detention basins prior to discharge outside of site boundaries. Street drainage must be appropriately sized to accommodate this outcome.

Conclusion

In conclusion, the development site is a strategically located site with exceptional access and exposure to major infrastructure, forming the gateway to the Western Sydney Employment Area. As such, this report and the guidelines therein serve to provide the broader key performance objectives for future site development applications to be based and assessed upon.

This will ensure that future development is of the site occurs within the framework of a well considered and integrated master plan where the potential of the site is optimized through quality urban design, environmental and stormwater controls.

Conclusion

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