Statement of Environmental Effects

Proposed Residential Subdivision

Land at 86-94 Andromeda Drive Cranebrook NSW

INSITES DEVELOPMENT CONSULTANTS

Foreword:

The Statement of Environmental Effects has been prepared by Whelans InSites Pty Ltd on behalf of the Trustees of the Roman Catholic Church for the Diocese of Parramatta in accordance with the statutory requirements of the *Environmental Planning and Assessment Act, 1979.* It supports an application for Torrens title subdivision of land at the rear of the property at 86-94 Andromeda Drive, Cranebrook.

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1. THE SITE

1.1 BACKGROUND

Corpus Christi Primary School, Cranebrook, was initially established at Andromeda Drive in 1987, and continues to provide education across Years K to 6 for students resident within the local Cranebrook area, and beyond. As originally acquired, the site was substantially larger than ultimately required for primary school use. During the construction and development of Xavier College at Ninth Avenue, Llandilo, students commencing their secondary studies were temporarily accommodated in demountable buildings on land to the rear of the primary school from 1999 to 2004. However, following completion of the permanent College buildings at Ninth Avenue, demountable buildings were progressively removed from the rear of the Andromeda Drive site. Land to the rear of the primary school is therefore now surplus to Church needs (Figure 1.1), and has been separately delineated as Proposed Lot 101 in plan of subdivision of Lot 1 in DP 1144668 (DA 12/0786).

Figure 1.1
Local Context
Land at 86-94 Andromeda Drive, Cranebrook
Source: Department of Lands Spatial Information Exchange 2013.

Site looking west from Northern Road boundary alignment

1.2 LOCAL CONTEXT

Land which is the subject of this application is formally identified as Part Lot 1 in DP 1144668, being proposed Lot 101 in Plan of Subdivision approved under Development Application 12/0786 of 12 November 2012. An application has recently been lodged with Penrith City Council to amend the subdivision boundary of proposed Lot 101 to maintain consistency with the adjacent residential subdivision oundary. The resulting site, in accordance with the plans submitted with the S96 application has a total area of approximately 20,111m^2, and lies to the east of the Corpus Christi Primary School complex which adjoins the western boundary.

The subject land parcel is generally rectangular in shape and has a frontage of approximately 113.65m to the western alignment of The Northern Road, a rear boundary of 110.6m, a northern boundary line of 184m and a southern boundary line of some 199.4m (Figure 1.2).

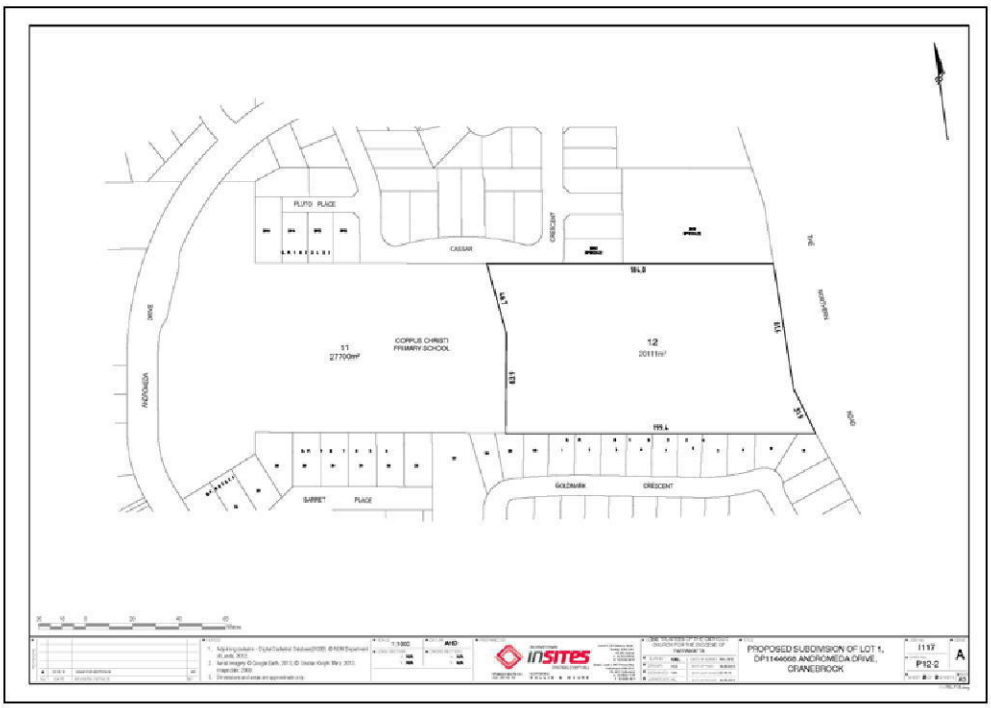


Figure 1.2
Approved Subdivision Parcels (DA 12/0786)
Land at 86-94 Andromeda Drive, Cranebrook
Source: Whelans InSites Pty Ltd 2012.

The site is relatively flat with a gentle slope from east to west of approximately 3%.

1.3 REGIONAL CONTEXT

The Andromeda Drive property is substantially surrounded by established residential development. To the south, residential allotments fronting Goldmark Crescent were initially developed in 1991 and are now fully occupied, while land to the north fronting Cassar Crescent was subsequently developed in 2001. More recently, to the east of the Northern Road lies the landmark 'Jordan Springs' urban residential precinct, currently being developed by Lend Lease. In this context, residential subdivision of the subject land represents infill development that is entirely consistent and compatible with both the surrounding land use and the prevailing urban form (Figure 1.3).

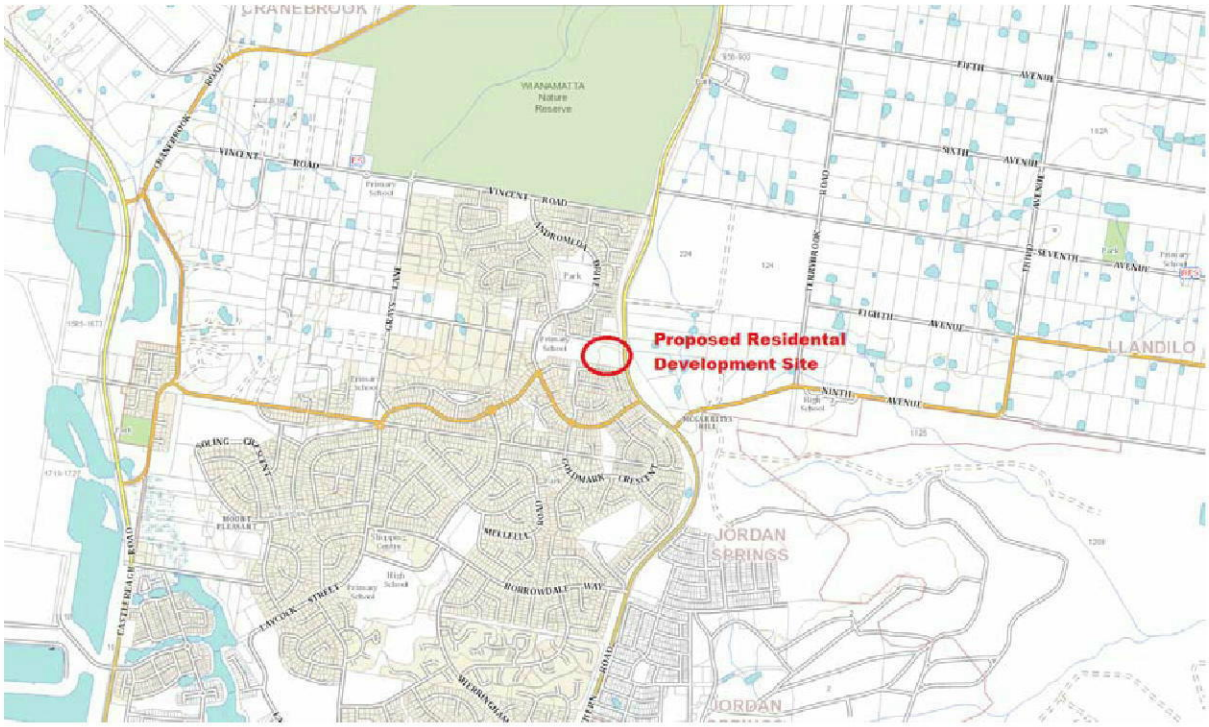


Figure 1.3
Regional Context
Land at 86-94 Andromeda Drive, Cranebrook
Source: Department of Lands Spatial Information Exchange 2013.

Adjacent Residential Development, Cassar Crescent, Cranebrook

2. OPPORTUNITIES AND CONSTRAINTS

2.1 SECTION 149 CERTIFICATE MATTERS

2.1.1 Environmental Planning Instruments and non statutory planning controls

Section 149 Certificate No 12/03250 includes reference to the following Environmental Planning Instruments and Development Control Plans, which are of key relevance to this application:

- Penrith *Local Environmental Plan 1998 (Urban Land)*

  Penrith Local Environmental Plan 1998 (Urban Land) came into effect on 8 January 1999 and sets the statutory framework for the land use across the region. *Penrith Local Environment Plan 1998 (Urban Land)* aims to achieve the objects of the *Environmental Planning and Assessment Act, 1979* and establishes the requirements for the use and development of land. Through zoning and development controls the *Penrith Local Environmental Plan 1998 (Urban Land)* allows Penrith City Council to supervise the ways in which land is used and direct future growth.

- *Sydney Regional Environmental Plan No. 20 – Hawkesbury-Nepean River (No.2 - 1997)*

  The aim of *Sydney Regional Environmental Plan No. 20 – Hawkesbury-Nepean River (No.2 - 1997)* is to protect the environment of the Hawkesbury-Nepean River system by ensuring that the impacts of future land uses are considered in a regional context.

- Penrith Development Control Plan 2006

  Penrith City Council has a number of Development Controls Plans that apply to land across the Penrith City Council Area. The role of these Development Control Plans is to provide detailed standards and controls designed to guide development in the region to satisfy the purpose of an LEP and Part 5 of the *Environmental Planning & Assessment Act, 1979*.

2.1.2 Site Issues and Constraints

Section 149 Certificate No 12/03250 (**Appendix 2**) also identifies the following with respect to the subject property:

2.1.2.1 Conservation Area

The land is **not** within a Heritage Conservation Area.

2.1.2.2 Environmental Heritage

The site is **not** identified as an item of Environmental Heritage.

2.1.2.3 Road Widening

The property subject to this development application is **not** affected by any road widening or realignment.

2.1.2.4 Coastal Protection

The site is **not** affected by Section 38 or 39 of the *Coastal Protection Act, 1979.*

2.1.2.5 Risk of Land Slip or Subsidence

The land is **not** within a Proclaimed Mine Subsidence District.

2.1.2.6 Identified Critical Habitat

The land does **not** contain any identified critical habitats.

2.1.2.7 No Acquisition by a public Authority

The land is **not** subject to acquisition by a public authority.

2.1.2.8 State Significant Development

The land is **not** subject to an order by the Minister for Urban Affairs and Planning regarding State Significant Development pursuant of Section 76A(7)(b) of the *Environmental Planning and Assessment Act, 1979*.

2.1.2.9 Flood Management Plan

The land is **not** identified as being below the adopted flood planning level.

2.1.2.10 Biodiversity Certified Land

The land does **not** contain any Biodiversity Certified Land

2.1.2.11 Biobanking Agreement

The land is **not** subject to a Biobanking Agreement under Part 7a of the *Threatened Species Conservation Act 1995*.

2.1.2.12 Bushfire

The land is **not** identified as Bush Fire prone according to Council records.

2.1.3 Contextual Planning Controls

Under the terms of Penrith Local Environmental Plan 1998 (Urban Land) the site is zoned as Zone 2(b) Residential (Low Density), and accordingly has been earmarked for future residential development since that time. Mapping previously provided by Council in relation to the site also indicates that vehicular access is denied to The Northern Road (Figure 2.1).

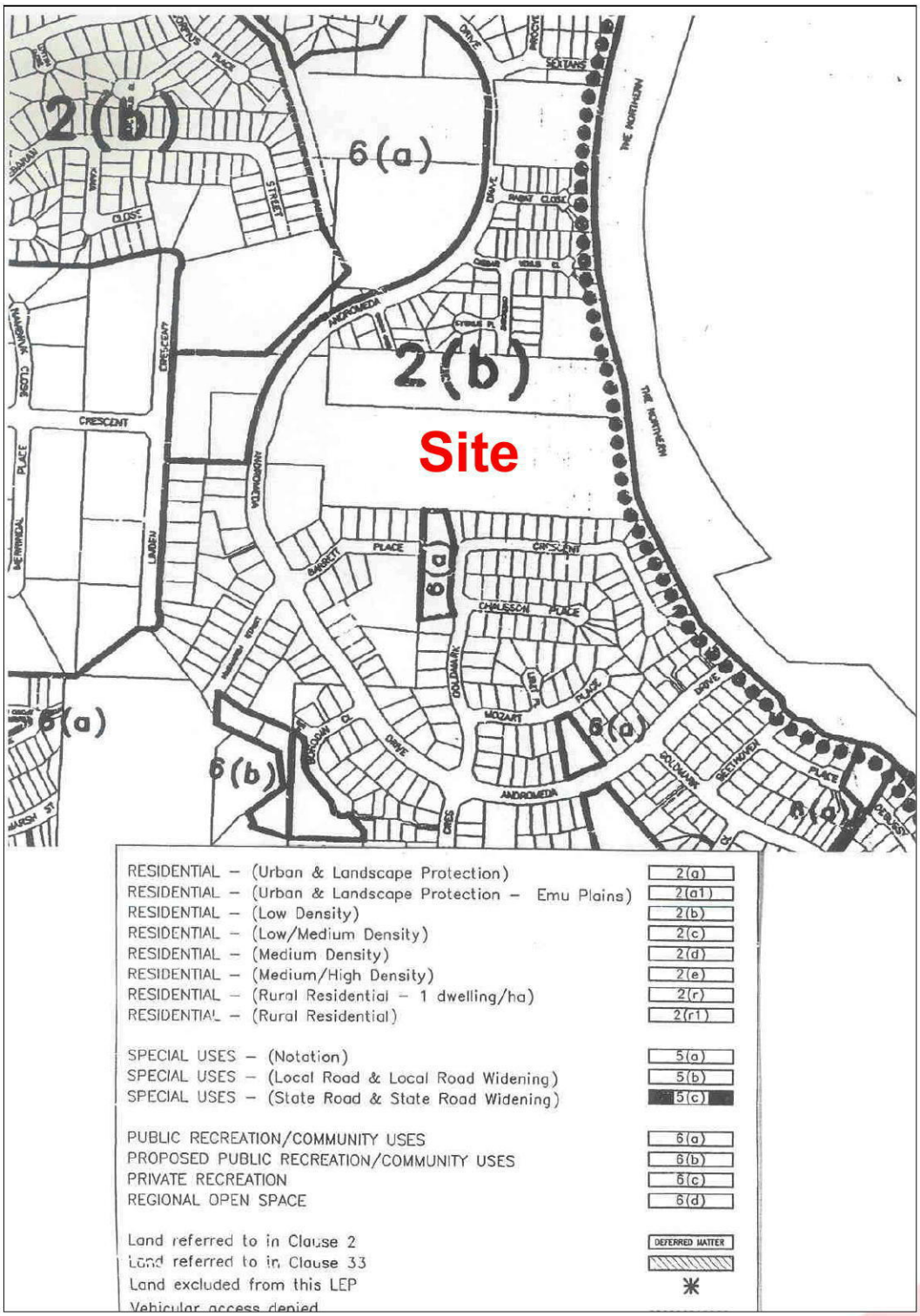


Figure 2.1
Land Use Zoning
Land at 86-94 Andromeda Drive, Cranebrook
Source: Penrith City Council

The subject site has also previously been identified within a former version of *Penrith Development Control Plan 2006 Part 6 Section 6.5 Cranebrook Release (Adopted 21 August 2006, in Force 15 December 2006).* However, it would appear that Section 6.5 of the Penrith Development Control Plan 2006 was replaced in 2010, and now no longer includes specific reference to the Cranebrook urban release (Figure 2.2).

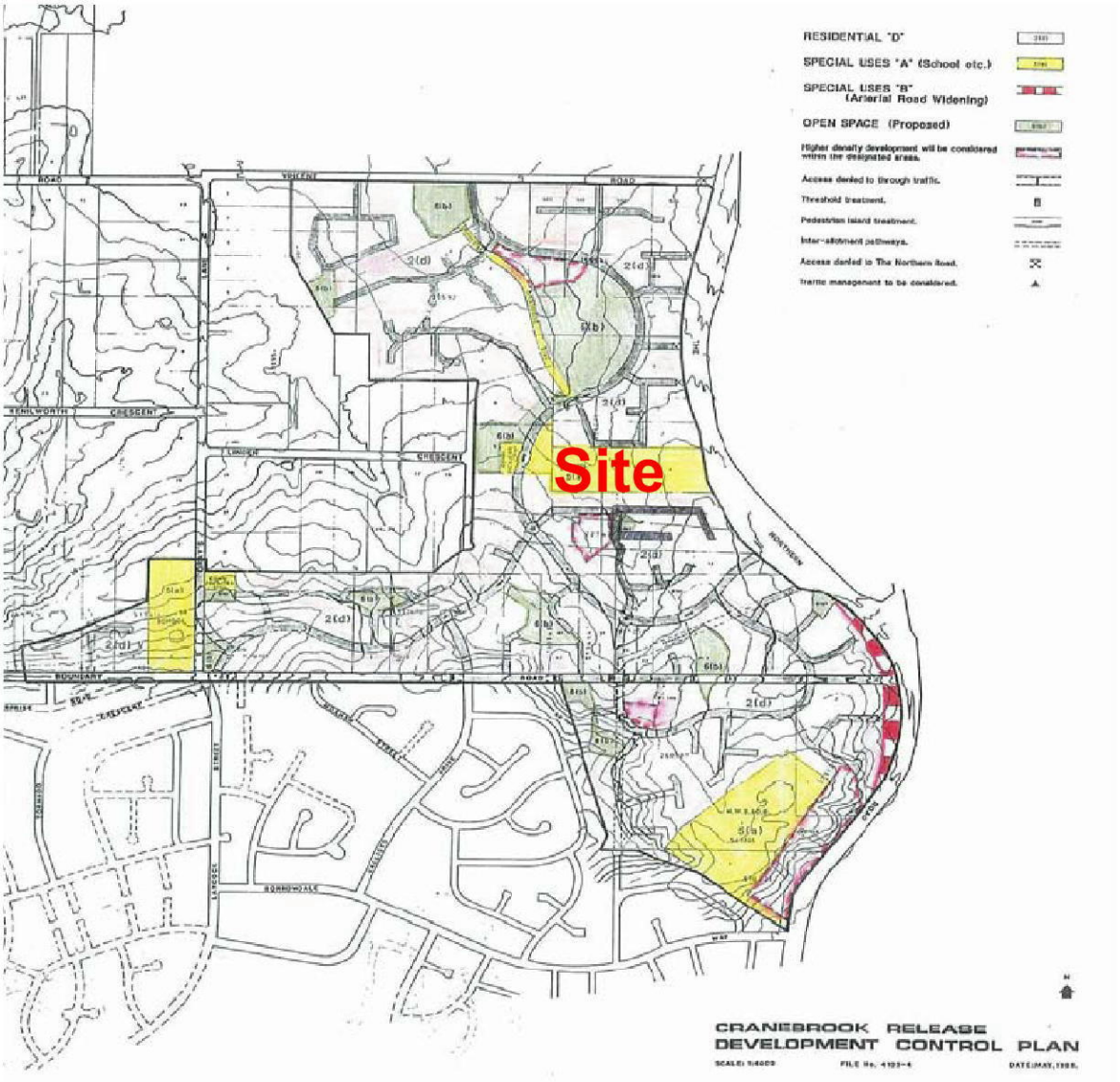


Figure 2.2
Former Cranebrook Release Area Development Control Plan
Source: Penrith City Council, 2006.

3. SITE ANALYSIS

4. PROPOSED DEVELOPMENT

4.1 DESCRIPTION OF PROPOSAL

Following an extensive process of site investigation, environmental assessment and consultation with Council, a proposal for residential subdivision of vacant land to the rear of the Corpus Christi primary school site has now been developed.

The current proposal specifically responds to the identified ecological characteristics of the site, and proposes retention and translocation of vegetation within two buffer zones, located to the east and north of the central residential component. In total, some 21 residential lots are proposed, together with a residue parcel for the permanent translocation of on-site vegetation (Figure 4.1).

Figure 4.1
Proposed Residential Development
Land at 86-94 Andromeda Drive, Cranebrook
Source: Whelans InSites Pty Ltd 2013.

Table 4.1: Proposed Allotment Characteristics

Lot	Area (m^2)	Width (m)	Depth (m)	Type
1	1033	20	54	Corner
2	811	15	54.1	Regular
3	811	15	54.1	Regular
4	811	15	54.1	Regular
5	811	15	54.1	Regular
6	808	15	54.1	Regular
7	739	15	44.8	Regular
8	1431	25	44.8	Regular
9	1614	18	43.2	Regular
10	620	15	41	Regular
11	615	15	41	Regular
12	615	15	41	Regular
13	615	15	41	Regular
14	615	15	41	Regular
15	615	15	41	Regular
16	615	15	41	Regular
17	622	15	41	Regular
18	648	15	43.1	Regular
19	896	23.1	34	Battleaxe
20	663	15.1	22.8	Regular
21	570	20.1	22.8	Regular

It is proposed that lot 9 be accessed via a private driveway (Figure 4.2).

Figure 4.2
Proposed Residential Development
Land at 86-94 Andromeda Drive, Cranebrook
Source: Whelans InSites Pty Ltd 2012.

5. ENVIRONMENTAL ASSESSMENT

This section provides an assessment of the proposal against the specific matters for consideration set out within Section 79C of the *Environmental Planning and Assessment Act, 1979.*

5.1 THE PROVISIONS OF ANY ENVIRONMENTAL PLANNING INSTRUMENT (SECTION 79C(1)(A)(I))

5.1.1 Penrith Local Environmental Plan 1998 (Urban Land)

Clause 9 – Zone objectives and Development Control Table

The subject land is wholly contained within Zone No 2(b) Residential (Low Density) under the provisions of Penrith Local Environmental Plan (PLEP) 1998 (Urban Land).

The objectives of Zone No 2(b) Residential (Low Density) are:

(i) to reinforce the importance of natural landscape settings and areas with heritage conservation values, and

(ii) to promote the established urban and landscape character of traditional residential subdivisions by limiting the range of permissible uses, and

(iii) to allow a limited range of compatible non-residential uses.

Clause 9 describes uses that are permitted without development consent to include:

- *Bed and breakfast establishments*
- *Family day care homes*
- *Bushfire hazard reduction*
- *Home activities*

The following uses and development types are permitted in Zone No 2(b) Residential (Low Density) only with development consent in accordance with Clause 9:

- *general stores,*
- *changes of building use,*
- *child care centres,*
- *community facilities,*
- *demolition of buildings or other structures,*
- *drains,*
- *dual occupancies,*
- *dwelling houses,*
- *educational establishments,*
- *buildings or other structures ordinarily associated with dwelling houses,*
- *health care consulting rooms,*
- *home businesses,*
- *hospitals,*
- *places of worship,*
- *internal structural work in bed and breakfast establishments,*
- *recreation areas,*
- *roads,*
- *utility installations,*
- *utility undertakings.*

Any land use that is not listed as permitted without consent or permitted only with development consent is a prohibited use within the Zone 2(b) Residential (Low Density) zone.

The proposed development is consistent with the objectives of the 2(b) Residential (Low Density) zone, as it accommodates the characteristics of the natural landscape, makes provision for the retention of local vegetation, and reflects the dominant subdivision pattern of the local area.

The proposed development promotes the established urban and landscape character of traditional residential subdivisions by incorporating a range of lot sizes suitable for various types of residential development. The lots are generally rectangular in shape and provide for good solar access, vehicular and pedestrian convenience and a high level of locality amenity.

It is considered that the proposed lot layout maintains the prevailing settlement patterns and promotes housing choice.

Clause 10 – Subdivision Controls Generally

The objectives of clause 10 are to prescribe minimum lot areas and minimum lot widths for land within a residential or rural-residential zone that will:

(a) provide for development that promotes housing choice,

(b) encourage lot dimensions and lot areas appropriate for development permissible in each zone,

(c) maintain the prevailing settlement patterns in each of the residential and rural-residential zones, and

(d) permit "strata" subdivision of dual occupancy and multi-unit housing development

Table 3.1 below prescribes minim lot areas and widths for subdivision of land within Penrith City Local Government Area:

	Standard Lot		Internal Lot	
Zone No.	**minimum area**	**minimum width**	**minimum area**	**minimum width**
2(a1)	**600m²**	**20m**	**700m²**	**20m**
2(a)	**600m²**	**15m**	**700m²**	**20m**
2(b)	**550m²**	**15m**	**650m²**	**15m**
2(c)	**475m²**	**12m**	**525m²**	**15m**
2(d)	**400m²**	**12m**	**450m²**	**15m**
2(e)	**400m²**	**10m**	**450m²**	**12m**

Table 3.1 – General Subdivision Controls
Source – PLEP1998 (Urban Land)

The proposed subdivision of the land into 21 residential lots and one residual lot (for translocation of vegetation) complies with the *Penrith Local Environmental Plan 1998* in that the minimum lot size for a standard lot is 550m^2 and the minimum proposed lot size for an internal lot is 650m^2 excluding the access handle.

Clause 14– Provision for design principles in development generally

The purpose of this clause is to ensure that development maintains high levels of design resulting in development that is compatible with the scale, design and amenity of neighbouring development. Any development must consider the following:

(a) reinforcement and protection of local topography and setting,
(b) reflection of the forms, features or qualities of traditional residential neighbourhoods across Penrith local government area,
(c) consistency or compatibility with the scale, design and amenity of neighbouring development,
(d) contribution to attractive streetscapes through the diversity of building forms and landscaped areas that can be seen from any public place nearby,
(e) provision for contemporary standards of amenity within each dwelling and the associated private open space,
(f) preservation and enhancement of any significant vista that currently might be available from a public place nearby.

The subdivision as proposed is located on a relatively level site with minimal topographical features. The subdivision pattern is consistent with the prevailing form of the surrounding residential neighbourhood, mirroring the local design and layout in accordance with relevant provisions of the Penrith Development Control Plan 2006.

No approval for dwelling construction is sought in this present application. The scale and design of future dwellings on the site will be subject to future individual assessment by Penrith City Council under separate applications. It is considered that the amenity of the locality will be enhanced as a result of the proposed subdivision, with the retention of existing vegetation along the Northern Road Frontage and the translocation and regeneration of species in the retained parcels and additional road reserve adjacent to Cassar Crescent.

Clause 29 – Prohibited Access

(1) Except as provided in subclause (2), the creation of a vehicular crossing in, on or through the boundary of any land shown on the map with the notation "Vehicular access denied" and marked on the map with a series of heavy black dots is prohibited.
(2) Despite subclause (1), the council may grant consent for development that involves such a vehicular crossing where it is satisfied that carrying out the development would be impracticable unless direct vehicular access is provided.

The subject site abuts the western alignment of The Northern Road. As indicated on Council's LEP Map, vehicular access is denied across this alignment. Thompson Stanbury has confirmed that vehicular access to the site from The Northern Road would not be supported (Thompson Stansbury Associates 2013, p14).

Clause 34 – Consent required for subdivisions

Land to which this plan applies may be subdivided only with development consent.

Torrens title subdivision is proposed creating 21 residential lots and road widening. The proposed development is permissible with consent in accordance with clause 34 of PLEP 1998.

5.1.2 Sydney Regional Environmental Plan No. 20 – Hawkesbury-Nepean River (No.2 - 1997)

The subject site to the rear of property at No 86-94 Andromeda Drive, Cranebrook is within the Hawkesbury-Nepean River catchment. The following provisions and strategies apply:

Strategy	RESPONSE/COMMENT	COMPLIANCE
6 Specific planning policies and recommended strategies		
(3) Water quality		
(a) Quantify, and assess the likely impact of, any predicted increase in pollutant loads on receiving waters.	The stormwater management strategy, prepared by InSites Engineering, proposed for the development complies with the requirements of Penrith City Council as set out in the DCP 2006 - Part 2.3, LEP, Engineering Design Specifications and Australian Rainfall & Runoff. The stormwater treatment strategy has been prepared with the view of ensuring long-term efficiency and sustainability by proposing treatment measures which are easy and cost effective to maintain and provide an aesthetically pleasing solution. The stormwater drainage strategy report is attached in full at **Appendix 7**.	YES
(b) Consider the need to ensure that water quality goals for primary contact recreation and aquatic ecosystem protection are achieved and monitored.		YES
(c) Approve development involving primary contact recreation or the withdrawal of water from the river for human contact (not involving water treatment), such as showers, only in locations where water quality is suitable (regardless of water temperature).		YES
(d) Do not carry out development involving on-site disposal of sewage effluent if it will adversely affect the water quality of the river or groundwater. Have due regard to the nature and size of the site.		YES
(e) Develop in accordance with the land capability of the site and do not cause land degradation.		YES
(f) Consider the need for an Erosion and Sediment Control Plan (to be in place at the commencement of development) where the development concerned involves the disturbance of soil.		YES
(g) Minimise or eliminate point source and diffuse source pollution by the use of best management practices.		YES
(h) Site and orientate development appropriately to ensure bank stability. Plant appropriate native vegetation along banks of the river and tributaries of the river, but not so as to prevent or inhibit the growth of aquatic plants in the river, and consider the need for a buffer of native vegetation.		YES
(i) Consider the impact of the removal of water from the river or from groundwater sources associated with the development concerned.		YES
(j) Protect the habitat of native aquatic plants.		YES

Strategy	RESPONSE/COMMENT	COMPLIANCE
(4) Water quantity		
(a) Future development must be consistent with the interim or final river flow objectives that are set for the time being by the Government.	The stormwater management strategy, prepared by InSites Engineering, proposed for the development complies with the requirements of Penrith City Council as set out in the DCP 2006 - Part 2.3, LEP, Engineering Design Specifications and Australian Rainfall & Runoff. The stormwater treatment strategy has been prepared with the view of ensuring long-term efficiency and sustainability by proposing treatment measures which are easy and cost effective to maintain and provide an aesthetically pleasing solution. The stormwater drainage strategy report is attached in **Appendix 7**.	YES
(b) Ensure the amount of stormwater run-off from a site and the rate at which it leaves the site does not significantly increase as a result of development. Encourage on-site stormwater retention, infiltration and (if appropriate) reuse.		YES
(c) Consider the need for restricting or controlling development requiring the withdrawal or impoundment of water because of the effect on the total water budget of the river.		YES
(d) Consider the impact of development on the level and quality of the water table.		YES
(6) Flora and fauna		
(a) Conserve and, where appropriate, enhance flora and fauna communities, particularly threatened species, populations and ecological communities, aquatic habitats, wetland flora, rare flora and fauna, riverine flora, flora with heritage value, habitats for indigenous and migratory species of fauna, and existing or potential fauna corridors.	The Flora and Fauna Report prepared by SLR Consulting, dated November 2012, supports the proposed subdivision. *'CRCIF (Cooks River Castlereagh Ironbark Forest) community present on the subject site at Cranebrook is small, patchy, isolated and degraded, and does not represent a special or important example of that vegetation. Given those circumstances, as well as the proposed salvage and reuse of plant material, and the rehabilitation of vegetation in the two reserves, there will be no adverse impact (or "significant effect") imposed upon the CRCIF community.'* (SLR Consulting, 2013, p16) The Flora and Fauna report is attached in **Appendix 6.** Retention of local flora and fauna existing on the site will be enhanced by the retention of the corridor to the north of the residential precinct, within private ownership.	YES
(b) Locate structures where possible in areas which are already cleared or disturbed instead of clearing or disturbing further land.		YES
(c) Minimise adverse environmental impacts, protect existing habitat and, where appropriate, restore habitat values by the use of management practices.		YES
(d) Consider the impact on ecological processes, such as waste assimilation and nutrient cycling.		YES
(e) Consider the range of flora and fauna inhabiting the site of the development concerned and the surrounding land, including threatened species and migratory species, and the impact of the proposal on the survival of threatened species, populations and ecological communities, both in the short and longer terms.		YES
(f) Consider the need to provide and manage buffers, adequate fire radiation zones and building setbacks from significant flora and fauna habitat areas.		YES
(g) Consider the need to control access to flora and fauna habitat areas.		YES
(g) Consider the need to maintain corridors for fish passage, and protect spawning grounds and gravel beds.		YES

Strategy	RESPONSE/COMMENT	COMPLIANCE
(10) Urban development		
(a) When considering a proposal for the rezoning or subdivision of land which will increase the intensity of development of that land (for example, by increasing cleared or hard surface areas) so that effluent equivalent to that produced by more than 2,500 people will be generated, consider requiring the preparation of a Total Water Cycle Management Study or Plan.	The proposed subdivision will provide 21 residential lots and will not result in effluent for more than 2,500 people.	YES
(b) Consider urban design options to reduce environmental impacts (such as variable lot sizes and shapes, and the clustering of development).	The design of the subdivision is such that the environmental impacts will be minimal in the context of the surrounding development. The subdivision proposes variable lot sizes and shapes, and the clustering of development	YES
(12) Metropolitan strategy		
(a) Consider the impacts of transport infrastructure proposals on water quality and air quality.	The proposed subdivision is not a transport infrastructure proposal.	YES
(b) Consider the impacts of metropolitan waste disposal on water quality.	The proposed subdivision is not for metropolitan waste disposal.	YES
(c) Consider the impacts of development on air quality.	The proposed development is not considered to have adverse impacts on air quality.	YES
(d) Consider the need for waste avoidance, waste reduction, reuse and recycling measures.	Waste produced from future residential development will be captured within Council's waste disposal services.	YES
(e) Consider the implications of predicted climate change on the location of development and its effect on conservation of natural resources.	It is not expected that the predicted climate changes will impact on the proposed subdivision.	YES
11 Development controls		
(7) Filling		
Definition: Filling of land, including submerged aquatic land, by raising the ground level through disposal of spoil from any landfill method (such as mining, dredging or refuse dumping), whether or not to enable the construction of a road or the erection of buildings or pylons or any other structure, where filling exceeds 1 metre in depth, or an area of 100 square metres. (Consent required) .	Fill/regrading proposed up to 600mm.	YES

5.2 THE PROVISIONS OF ANY DEVELOPMENT CONTROL PLAN (SECTION 79C(1)(A)(III))

5.2.1 Penrith Development Control Plan 2006

Penrith Development Control Plan (PDCP) 2006 aims to provide comprehensive planning controls for residential development across the Penrith LGA. The following assessment addresses relevant numerical controls applying to the subdivision of the land, as set out within PDCP 2006. However, before specifically addressing the relevant clause of PDCP 2006 it is important to recognise the desired future character of Penrith City LGA, as established through specific "Principles" set out within the sister document, *Penrith Development Control Plan (PDCP) 2010.* While PDCP 2010 does not technically apply to the site, it is relevant to consider these established principles as an overarching guide to Council's objectives for development within the LGA generally. Relevant principles are addressed in the following table.

Principle	Comment
Penrith DCP 2010	
Part B DCP Principles	
Provide a long term vision for cities, based on sustainability; intergenerational, social, economic and political equity; and their individuality.	The proposed subdivision creates a sustainable environment that supports social and community growth and allows individuality to be expressed in housing form and activity.
Achieve long term economic and social security.	Long term economic and social security is supported by the proposal, as it provides for residential lots in close proximity to services and facilities as well as providing a high amenity living environment.
Recognise the intrinsic value of biodiversity and natural ecosystems, and protect and restore them.	A goal of this development is to preserve and translocate existing individual plants within the site. The currently small, patchy, isolated and degraded communities are intended to be consolidated within a dedicated vegetation buffer, and protected and restored in perpetuity. A Vegetation Management Plan is attached in **Appendix 12.**
Enable communities to minimise their ecological footprint.	The location of the proposed subdivision is close to services and schools supporting a more active and walkable community with a minimal ecological footprint.
Build on the characteristics of ecosystems in the development and nurturing of healthy and sustainable cities.	The proposed subdivision will build on the characteristics of ecosystems in the local area. The currently small, patchy, isolated and degraded communities are intended to be consolidated within a dedicated vegetation buffer, and protected and restored in perpetuity. A Vegetation Management Plan is attached in **Appendix 12.**
Recognise and build on the distinctive characteristics of cities, including their human and cultural values, history and natural systems.	The proposed subdivision is consistent with the existing subdivision pattern and allows for development in the area which may enhance the human and cultural values of the locality.
Empower people and foster participation.	The location of the subdivision supports the fostering of broad community participation by future residents.
Expand and enable cooperative networks to work towards a common, sustainable future.	The development provides for preservation of local ecosystems, treatment of downstream water quality, and increased social and community connectivity. The proposal works towards the expansion of cooperative networks to work towards a common,

	sustainable future.
Promote sustainable production and consumption, through appropriate use of environmentally sound technologies and effective demand management.	The development provides for preservation of local ecosystems, treatment of downstream water quality, and increased social and community connectivity. The proposal promotes sustainable production and consumption, through appropriate use of environmentally sound technologies and effective demand management in relation to water quality and solar access.
Enable continual improvement, based on accountability, transparency and good governance.	The proposed subdivision displays a progression in the continual improvement of the site to create a quality urban environment and enhance areas of local endemic biodiversity.

The following clauses of PDCP 2006 specifically apply to the subject application:

CONTROL	RESPONSE/COMMENT	COMPLIANCE
Part 4 Section 4.7 Residential – Guidelines for Subdivision		
2 Controls for subdivision in residential zones		
2.1 Application procedure Where the lots proposed are greater than 400m^2 a development application may be made for the subdivision alone. Where the lots proposed are less than 400m^2 a development application must include both subdivision and the development proposed on each lot.	The subdivision proposed comprises lots with an area of no less than 555m^2.	YES
2.4 Site Frontage Minimum frontage standards are not specified in this plan. Minimum frontage of 15m is specified by Clause 10 of the PLEP 1998.	Minimum frontage of each lot not less than 15m	YES
2.5 Allotment dimensions Allotments with an area of greater than 400m^2 must be capable of containing a rectangular building envelope measuring 10m x 12m or 8m x 15m. Where battle-axe allotments are proposed an area greater than 400m^2 may be required. The access corridor shall not be included in the site area calculation or battle-axe allotments. Requirements for access corridors are: • minimum width – 4m • minimum width, shared corridor – 5m • maximum length – 60m Generally battle-axe lots are discouraged and no more than two allotments shall be served by a shared access corridor.	All 21 residential lots provide for building envelope measuring 10m x 12m or 8m x 15m behind the front building line. One battleaxe lot is proposed. Lot 19 is access via a 5m wide access corridor that is 23..8m in length .	YES YES YES
2.6 Road network Access Place (or cul-de sac) – minor road which carries a low traffic volumes. Pedestrian, vehicle and recreation use is shared, with pedestrians having priority – where serving allotments greater than 400^2 shall serve a maximum 24 allotments.	An access place is proposed with a maximum 21 residential lots in excess of 550m^2 gaining access off the cul-de sac. The proposed road reserve maintains a width no less than 14m and a centrally located	YES

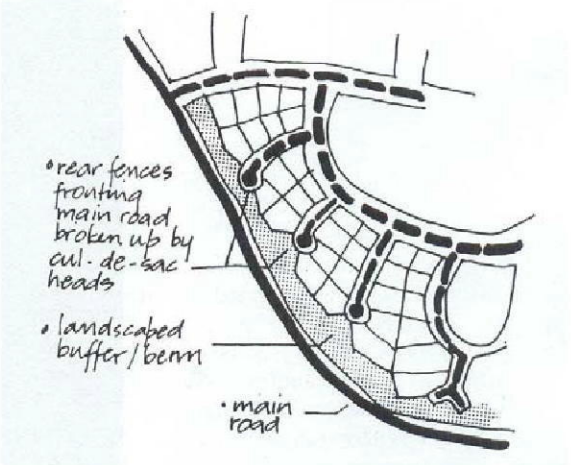
<table>
<tr><th>CONTROL</th><th>RESPONSE/COMMENT</th><th>COMPLIANCE</th></tr>
<tr><td>
<table>
<tr><th>Road</th><th>Carriageway</th><th>Verge</th><th>Road Reserve</th></tr>
<tr><td>Shareway</td><td>3.5m</td><td>Variable</td><td>10m</td></tr>
<tr><td>Access Place</td><td>5.5m or 7m</td><td>3.5m</td><td>12.5m or 14m</td></tr>
<tr><td>Access Street</td><td>7m</td><td>3.5m</td><td>14m</td></tr>
</table>
Figure 3.1: Road design Penrith DCP

An access place or street shall be provided with a minimum of one 1.2m wide paved footpath. An access street shall provide for a future second footpath.
</td><td>carriageway of 7m in width.

All horizontal geometry has been designed in accordance with Austroads specifications and permitting a large rigid vehicle to turn in a standard 3 point turning pattern.

A 1.2m wide footpath can be provided.</td><td>

YES</td></tr>
<tr><td>2.8 Landscape design
For allotments greater than 400m^2, street tree planting or contribution for one super advanced tree per 10m road frontage is required.

Rear fences fronting public roads are discouraged. Where unavoidable, the following measures may be required:
• greater setbacks for landscaping against fences, consistent with acoustic and road design standards
• building frontages to face road by provision of parallel access road separated by acoustic and landscaped buffer.
• landscaped berms and other planting, particularly where a minimal amount of rear fencing is provided such as with cul-de-sac heads abutting the major road boundary.
Figure: Road design Penrith DCP
Source: Penrith City Council 2006
 
</td><td>Street tree planting and/or a contribution to Penrith City Council for advanced planting may be provided if required.

The proposal provides for a buffer between the development and the Northern Road.

Figure: Proposed road design</td><td>YES

YES

YES</td></tr>
</table>

CONTROL	RESPONSE/COMMENT	COMPLIANCE
2.9 Services The design and construction of utility services shall conform to the specific standards of the relevant serving authority.	Utility services are available locally, and may be designed to conform with the specific standards of the relevant servicing authority.	YES
Where possible, compatible public utility services shall be co-ordinated in common trenching to maximum cost effect.	Common trenches are utilised in the site where appropriate.	YES
In access places and streets, the design of street lighting as part of a thematic streetscape is encouraged.	The lighting in the streetscape is designed to ensure he up most safe and secure environment while providing for reasonable amenity.	YES

5.3 THE PROVISIONS OF ANY PLANNING AGREEMENT (SECTION 79C(1)(A)(IIIA))

There are no known planning agreements that apply to the site of development.

5.4 THE LIKELY IMPACTS OF THE DEVELOPMENT (SECTION 79C(1)(B))

Aboriginal Cultural Heritage

The proposed development will incorporate a small amount of soil disturbance to provide servicing and utilities to the newly created lots. An AHIMS search has been completed to identify any aboriginal places or sites that may be apparent on the land. The AHIMS search did not result in the identification of any aboriginal sites or places. A visual inspection of the site did not result in the identification of any aboriginal sites, places or relics.

A copy of the AHIMS search and due diligence process is attached in **Appendix 4**.

The proposed Torrens title subdivision will not result in any adverse impacts on the natural or built environments nor does it adversely impact on the social and economic characteristics of the locality.

Bushfire

The subject site is not within Bushfire Prone Land. No further bushfire risk assessment is warranted at this stage given the available information, confirmed by Clause 11 of the Section 149 Certificate which states that '*the land is not identified as bush fire prone land according to Council records'.*

A bushfire investigation was undertaken by Australian Bushfire Protection Planers and has confirmed that the site is not considered to be bushfire prone land (**Appendix 9**)

Traffic

A Traffic Impact Statement has been prepared by Thompson Stansbury Associates, which is attached in **Appendix 5**. The key conclusions detailed on page 17 of this report are:

- *'Vehicles associated with the proposed residential subdivision will have little difficulty in undertaking movements between proposed Road No. 1 and private driveway, given the low volumes expected within Road No. 1;*
- *The proposed private access roads and the associated rights of carriageway will facilitate safe and convenient access for the battle-axe configured lots, being lots 2, 8 and 9;*
- *The proposed development has been assessed to generate 19 morning and afternoon peak hour vehicles. The existing traffic utilising Cassar Crescent, as well as the additional traffic from the proposed development does not result in the prescribed environmental capacity of Cassar Crescent being exceed. Accordingly, it is not our expectation that the existing residential amenity will be unreasonably impacted upon associated with 19 additional peak hour vehicles associated with the proposed development;*
- *Proposed Road No. 1 intersects the south western corner of Cassar Crescent. A concept design has been prepared of this new intersection, providing a north/south priority movement between Cassar Crescent (east) and proposed Road No. 1. The intersection design seeks to encourage vehicles associated with the proposed subdivision to utilise the*

intersection of Andromeda Drive and Cassar Crescent (east) where sight distance more than adequately meets AUSTROADS recommendations in both directions.

- *With sufficient sight distance and frequent gaps in Andromeda Drive traffic flow, morning and afternoon peak hour movements at the intersection of Andromeda Drive and Cassar Crescent (east) are expected to occur without any significant delay and under relative safety.*

- *It could be expected that a small proportion of traffic related to the proposed development will utilise the western Cassar Crescent intersection, providing a more direct route for motorists destined to the south. We note that sight distance at the intersection of Andromeda Drive and Cassar Crescent (west) to the east is sufficient to allow motorists to undertake a left hand turn from Cassar Crescent into Andromeda Drive. These movements are expected to occur with minimal delay.*

Based on our traffic assessment and the conclusions and recommendations reached herein, we do not consider that there are any traffic related matters that should prevent approval of the subject development application. Accordingly, we recommend that action to Council.' (Thompson Stansbury Associates, 2013, p17).

Contamination

The previous site history includes the approved use for a school. The site history does not indicate the likelihood of significant risk of contamination, or any reason or indication that further contamination assessment is warranted at the present time.

Biodiversity

The Flora and Fauna Report prepared by SLR Consulting, dated 21 December 2012, supports the proposed subdivision.

> *'CRCIF (Cooks River Castlereagh Ironbark Forest) community present on the subject site at Cranebrook is small, patchy, isolated and degraded, and does not represent a special or important example of that vegetation. Given those circumstances, as well as the proposed salvage and reuse of plant material, and the rehabilitation of vegetation in the two reserves, there will be no adverse impact (or "significant effect") imposed upon the CRCIF community.'* (SLR Consulting, 2013, p15)

The Flora and Fauna report is attached in **Appendix 6.**

A Vegetation Management Plan has also been prepared and is attached in **Appendix 12.** This plan outlines the ongoing maintenance and enhancement of the vegetated areas proposed to be retained in the rear yards of Lots 1 through 8.

Stormwater Management

Investigations have indicated that it is feasible to connect to the current street drainage system in Cassar Crescent, with minimal increase to the peak flow rates immediately downstream of the site.

The majority of the stormwater runoff from the site will be captured the via street and inter-allotment drainage systems which will connect into two additional stormwater pits proposed in the road reserve of Cassar Crescent.

The stormwater management strategy proposed for the development complies with the requirements of Penrith City Council as set out in the DCP 2006 - Part 2.3, LEP, Engineering Design Specifications and Australian Rainfall & Runoff. The stormwater treatment strategy has been prepared with the view of ensuring long-term efficiency and sustainability by proposing treatment measures which are easy and cost effective to maintain and provide an aesthetically pleasing solution. The stormwater drainage strategy report is attached in **Appendix 7**.

The Stormwater Management Strategy includes the provision of a bio-retention basin adjacent to Cassar Crescent. Following issue of the final Subdivision Certificate, it is intended that the basin will transfer to the ownership of Council as public reserve, being adjacent to the proposed additional dedicated widening of Cassar Crescent. In relation to this proposed land dedication, the proponent has now formally confirmed the offer to make a contribution to Council to cover the long-term maintenance of the bio-retention basin, following issue of the final Subdivision Certificate.

Two options are presented for Council's consideration.

Option 1 provides a contribution of $70,238.00, payable prior to issue of the Subdivision Certificate, at which time Council would assume responsibility for ongoing basin maintenance.

Option 2 provides a contribution of $25.644.09, again payable prior to issue of the Subdivision Certificate (at which time land ownership would transfer to Council), but with the Developer to retain responsibility for basin maintenance for a period of four years. Under this option, it is understood that appropriate bonding arrangements would be put in place.

The proponents preference is to proceed in accordance with Option 1.

A formal letter of offer for a contribution to the above effect from the The Trustees of the Roman Catholic Church, Diocese of Parramatta is attached at **Appendix 13.**

Acoustic

An acoustic report was commissioned to asses the potential acoustic impacts associated with the proposed residential subdivision of land, to the east of the Corpus Christi Primary School at The Northern Road, Cranebrook.

Addressed the following issued raised by Council:

- Conduct an external noise impact assessment (traffic noise and noise from the existing external recreational areas of the school) and outline indicative treatments to ensure that a reasonable level of amenity is achieved for future tenants.
- Identify potential noise sources generated by the site, and determine noise emission goals for the development to meet relevant State, Council and Environment Protection Authority (EPA) acoustic requirements; to ensure that nearby developments are not adversely impacted.

The acoustic assessment concludes that acoustic matters do not prohibit residential on the site. The full report is attached in **Appendix 10.**

5.5 KEY ISSUES AND OUTCOMES AS IDENTIFIED IN THE PRE LODGEMENT MEETING WITH COUNCIL OFFICERS ON 13.12.2012

Council comment	Action
PLANNING Council have advised that the following key issues should be specifically addressed:	
Under DA12/0786 approval was granted for subdivision which requires an 88B instrument to be created stating that no further development of Lot 101 can occur unless appropriate provision is made for access, services and drainage. Any application would clearly need to address this restriction.	Access to the site is gained through Cassar Crescent with road traffic leaving the site directed to the intersection of Cassar Crescent and Andromeda Drive (east). Vehicular access to The Northern Road is not prosed and will not be required.
A traffic assessment needs to be prepared and Council officers raise concerns about the capacity and safety of intersection with Cassar Crescent.	A Traffic Impact Statement has been prepared by Thompson Stansbury Associates, which is attached in **Appendix 5**. Thompson Stansbury Associates do not consider that there are any traffic related matters that should prevent approval of the subject development application.
Flora and fauna assessment will inform the layout of the proposed subdivision. Trees and vegetation with higher values are to be retained. DCP 2006 require subdivision layout to be designed so that existing streetscape and landscape characters are maintained. This DCP also requires the preservation of mature trees and associated landscape elements.	Flora and Fauna Assessment completed by SLR Consulting. *'CRCIF (Cooks River Castlereagh Ironbark Forest) community present on the subject site at Cranebrook is small, patchy, isolated and degraded, and does not represent a special or important example of that vegetation. Given those circumstances, as well as the proposed salvage and reuse of plant material, and the rehabilitation of vegetation in the two reserves, there will be no adverse impact (or "significant effect") imposed upon the CRCIF community.'* (SLR Consulting, 2013, p16)
Cul-de-sacs are not preferred and should be avoided as far as possible as they deteriorate permeability.	Access not permitted from The Northern Road. A Traffic Impact Statement has been prepared by Thompson Stansbury Associates, which is attached in **Appendix 5**. Thompson Stansbury Associates do not consider that there are any traffic related matters that should prevent approval of the subject development application. Less than 24 allotments are proposed, consistent with Clause 2.6 of Council's DCP. Access via The Northern Road is prohibited and Council has previously expressed concern for the provision of pedestrian access through to the Northern Road as proposed in DA.
The interface with the existing school and public reserve is a key consideration. Blank walls or high fences should not be proposed where there is this interface. Overlooking opportunities must be enhanced as far as possible.	The proposed translocation area will provide a buffer between the primary school and the proposed residential development Blank walls and high fencing is not proposed..
The interface with the Northern Road is also a key consideration. Dwellings should have some form of orientation onto the Northern Road although vehicular access may be obtained from Road 1.	The interface with The Northern Road will be primarily green and vegetated zones may be protected via 88B on the title of proposed Lots 8, 9 and 10.
Battleaxe blocks are not a preferred outcome for this subdivision. Battleaxe blocks should be removed and the subdivision pattern re-designed. Each residential lot should be afforded a street frontage and address.	The proposal has been designed in close cooperation with SLR Consulting to achieve an appropriate residential yield while providing reasonable and appropriate opportunity for the rehabilitation of bushland.

Council comment	Action
	The Traffic Impact Statement prepared by Thompson Stansbury Associates confirms that the proposed arrangements are acceptable.
Allotment orientation is to consider the various types of dwellings which may be constructed on them. Building envelopes should be provided which demonstrate the development potential for each lot.	Building envelopes are shown on the submitted plans.
Areas of proposed reserve are not zoned for that purpose or included in Council's Section 94 plans for acquisition therefore they must be retained in private ownership and appropriately maintained.	The proposed translocation area will form a buffer between the school and the proposed residential development, and is proposed to be retained in private ownership. Minor widening of the Cassar Crescent road reserve is proposed, as separately requested by Council.
SITE PLANNING AND DESIGN	
Excessive retaining walls and tall fencing would not be appropriate where private lots have an interface with the reserve land or road frontages.	Excessive retaining walls and tall fencing are not proposed. Fill/regrading proposed up to 600mm.
Opportunities for overlooking are essential and details of retaining walls and fencing are to be provided with this development application.	No substantial retaining walls or dwellings are proposed. Existing fencing to be retained on site.
The natural topography and existing vegetation are to be retained as part of this development.	Topography remains primarily unaltered. Vegetation retained where appropriate or species translocated in accordance with the recommendations of the SLR Flora and Fauna Assessment report.
Retaining walls are to be minimised.	Fill/regrading proposed up to 600mm.
Landscaping should enhance the natural features of the land.	Translocation of species proposed in accordance with the SLR Flora and fauna Assessment Report. Landscaping on residential sites are subject to LEP and DCP controls on application for future dwellings on the land.
The application is to demonstrate how the subdivision layout has been designed to consider how each lot can be developed for residential purposes. This is to include setbacks, private open space, aspect, car parking and landscaping. This is particularly relevant on sloping land.	Building envelopes are shown on the submitted plans which clearly show setbacks, open space, aspect and car parking requirements can be met.
The subdivision layout is to provide land that can be developed in future with minimal need for cut and fill.	Land is relatively level. Cut and fill minimised.
LAND MANAGEMENT	
The application is to address all relevant requirements under State Environmental Planning Policy 55 Remediation of Land (SEPP 55). Council cannot consent to any development unless these requirements have been satisfied. Should remediation be required this will require development consent. The application is to demonstrate that the land is suitable for the proposed purpose.	The previous site history includes residential zoning and the prior approved use as a school, with accessible soil. The site history does not indicate any reason or indication that a concernable risk of contamination is present. No further contamination assessment is considered warranted at the present time.
LANDSCAPE DESIGN	
A street tree planting plan should be submitted with the application.	Street tree planting may be provided in accordance with Council's standard conditions of consent for residential developments of this scale and nature.
INFRASTRUCTURE SERVICES	
The application will need to demonstrate that sewer,	An appropriate stormwater strategy has been prepared.

Council comment	Action
water, electricity and telecommunications are available or will be made available.	All other relevant utility services are available in the locality.
BUSHFIRE	
The site is not strictly bushfire prone however the application will be referred to the Rural Fire Service. Council recommends early consultation with the RFS. A bushfire report is required. Future BAL construction standards for relevant lots is to be nominated.	The subject site is not within Bushfire Prone Land., and is largely surrounded by established residential development and urban roads. Clause 11 of the subject Section 149 Certificate states that 'the land is **not** identified as bush fire prone land according to Council records'.
SECTION 94 CONTRIBUTIONS	
Are applicable and would be levied under Local Open Space, District Open Space and Footpath Plans. Please refer to Council's website for copies of these Section 94 Plans.	It is acknowledged that S94 contributions will be payable in accordance with Council's relevant Section 94 Plan.
ENGINEERING	
Traffic	
The subject site includes a frontage to The Northern Road, it would be appropriate to seek guidance from the RMS. During the preliminary consultation with the RMS, it is advised that the option of gaining direct vehicular access from The Northern Road is discussed.	PLEP 1998 (Urban land) confirms that access from Northern Road is not permitted. Thompson Stansbury Associates have confirmed that access from the Northern Road will not be supported.
The development will only be permitted to have one vehicular access point.	The proposed access point and intersection with Cassar Crescent has been designed in accordance with relevant Australian Standards.
The application shall be supported by a traffic report prepared by a suitably qualified person, the report shall analyse but not be limited to the following: • the safety of the intersections at Andromeda Drive/Cassar Crescent due to additional traffic volumes generated by the development • the available road network capacity in Cassar Crescent to support the developments traffic volumes • the report shall also consider the additional traffic volumes generated by the vacant land to the north that will potentially be subdivided in the near future • consideration of the pavement width with respect to the function	A Traffic Impact Statement has been prepared by Thompson Stansbury Associates, which is attached in Appendix 5. Thompson Stansbury Associates do not consider that there are any traffic related matters that should prevent approval of the subject development application.
The application must demonstrate that access, car parking and manoeuvring details comply with AS2890 Parts 1, 2 & 6 and Council's Development Control Plan.	Compliance with Parts 1, 2 & 6 and Council's Development Control Plan is achieved.
The application shall be supported by turning paths in accordance with AS2890 clearly demonstrating satisfactory manoeuvring on-site and forward entry and exit to and from the public road.	Proposed plan of subdivision includes compliant turning paths for each lot and cul de sac head for service vehicles.
Stormwater	
Stormwater drainage for the site must be in accordance with Council's Development Control Plan.	A stormwater drainage strategy and plan accompanies this application.

Council comment	Action
A stormwater concept plan shall be submitted with the application.	A stormwater drainage strategy and plan accompanies this application.
The stormwater concept plan shall be accompanied by a supporting report and calculations and also must analyse the available capacity of the downstream drainage infrastructure.	A stormwater drainage strategy and plan accompanies this application.
A water quality treatment device shall be provided in accordance with Council's Development Control Plan.	A stormwater drainage strategy and plan accompanies this application.
Additional information may be obtained from Council's draft policy 'Stormwater Drainage for Building Developments' which is available from Council's website at the following link: http://www.penrithcity.nsw.gov.au/index.asp?id=3196	A stormwater drainage strategy and plan accompanies this application.
Roadworks	
The development will require the following external road works: • Provisions for an unconventional intersection to provide access to the development	Access to the site is gained through Cassar Crescent with road traffic leaving the site directed to the intersection of Cassar Crescent and Andromeda Drive (east). Plans accompany this application detail the road design.
The proposed road is classified as an "Access Place" and will require a 14m road reserve. The road reserve will be made up of a 7m pavement and 2 x 3.5m verge areas.	Plans accompany this application detail the road design.
Earthworks	
No retaining walls or filling is permitted for this development which will impede, divert or concentrate stormwater runoff passing through the site.	Fill/regrading proposed up to 600mm. Filling and retaining walls will not ill impede, divert or concentrate stormwater runoff passing through the site. Stormwater runoff will be captured in the concept stormwater management system.
Earthworks and retaining walls must comply with Council's Development Control Plan.	Fill/regrading proposed up to 600mm and will comply with Penrith DCP 2006.
Proposed fill material must comply with Council's Development Control Plan.	Fill/regrading proposed up to 600mm and will comply with Penrith DCP 2006.
Subdivision Works	
The application is to be accompanied by a subdivision concept plan.	Subdivision plans accompany this application.
The subdivision layout shall be in general accordance with Council's Development Control Plan.	Subdivision plans accompany this application.
All subdivision works must be designed in accordance with Council's Design and Construction Guidelines.	Subdivision plans accompany this application.
The application should discuss how services will access the proposed development	Servicing plans to be prepared
Any request for works in kind shall form part of the development application.	N/A
The subdivision will require the following key infrastructure works: • Potential Drainage upgrades • Pedestrian footpath works	Proposed subdivision plans include concept stormwater and servicing design.
The width and design of the access handles shall be in accordance with Council's Development Control Plan.	*'The proposed private access roads and the associated rights of carriageway will facilitate safe and convenient access for the battle-axe configured lots, being lots 2, 8 and 9'* (Thompson Stansbury Associates, 2013, p17).
Dedication of land for road reserve purposes in Cassar Place	Road access and dedication shown on plans accompany this application.
Provision of footpaths within the development.	Road access shown on plan accompanying this application, footpaths may be provided as specified.

5.6 THE SUITABILITY OF THE SITE FOR THE DEVELOPMENT (SECTION 79C(1)(C))

The site has been zoned for residential subdivision since 1998, and/or before. The site is suitable for the proposed Torrens title subdivision into 21 residential lots. Each lot has an area equal to or greater than 550m^2 within Zone 2(b) Residential (Low Density) as specified in PLEP 1998 (Urban Land).

5.7 ANY SUBMISSIONS MADE IN ACCORDANCE WITH THE ACT (SECTION 79C(1)(D))

No further submissions are apparent at the time this application was submitted to the determining authority. Council will undertake any notification and advertising process deemed necessary by the consent authority.

5.8 THE PUBLIC INTEREST (SECTION 79C(1)(E))

Torrens title subdivision of land at the rear of 86-94 Andromeda Drive, as proposed in this application, is demonstrably in the public interest, as it will facilitate the provision of much needed additional housing opportunities within the Penrith LGA. The development addresses and meets all relevant environmental planning controls and policies applicable to the site.

6. CONCLUSIONS AND RECOMMENDATIONS

Proposed Torrens title subdivision of land to the rear of property at 86-94 Andromeda Drive, Cranebrook, has been assessed against the heads of consideration set out within Section 79C of the Environmental Planning and Assessment Act, 1979, including the controls specified in PLEP 1998 and PDCP 2006, and is considered to represent the form of development that is entirely appropriate for the locality. The proposed subdivision is consistent with Council's statutes and policies, and will provide for additional housing choice in close proximity to an established community.

The assessment against Section 79C of the *Environmental Planning and Assessment Act, 1979* has identified the proposal as acceptable, with no significant adverse environmental impacts. Accordingly it is recommended that the proposed Torrens Title subdivision at 86-94 Andromeda Drive, Cranebrook be approved, subject to appropriate conditions.

7. APPENDIXES

Appendix 1 – Title Documents

Appendix 2 – Section 149 Certificate

Appendix 3 – Proposed Subdivision Plan

Appendix 4 – AHIMS search and Due Diligence

Appendix 5 – Traffic Impact Statement

THOMPSON STANBURY ASSOCIATES

Appendix 6 – Flora and Fauna Report

Appendix 7 – Stormwater Drainage Strategy Report

Appendix 8 – Notes of Pre Lodgement Meeting

Appendix 9 – Bushfire Report

ABPP
Australian Bushfire
Protection Planners Pty Ltd
ACN 083085474
Bushfire Mitigation Consultants

Appendix 10 – Acoustic Report

Appendix 11 – Landscape Plan

NBRS+PARTNERS

Appendix 12 – Vegetation Management Plan

Appendix 13 – Letter of Offer for financial Contributions

Title Search

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 1/1144668

SEARCH DATE	TIME	EDITION NO	DATE
13/7/2012	10:39 AM	1	23/10/2009

LAND

LOT 1 IN DEPOSITED PLAN 1144668
AT CRANEBROOK
LOCAL GOVERNMENT AREA PENRITH
PARISH OF CASTLEREAGH COUNTY OF CUMBERLAND
TITLE DIAGRAM DP1144668

FIRST SCHEDULE

TRUSTEES OF THE ROMAN CATHOLIC CHURCH FOR THE DIOCESE OF PARRAMATTA

SECOND SCHEDULE (10 NOTIFICATIONS)

1 LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT(S)

2 K440199 COVENANT AFFECTING THE PART SHOWN SO BURDENED IN THE TITLE DIAGRAM

3 K412663 COVENANT AFFECTING THE PART SHOWN SO BURDENED IN THE TITLE DIAGRAM.

4 DP818806 RESTRICTION(S) ON THE USE OF LAND AFFECTING THE PART SHOWN SO BURDENED IN THE TITLE DIAGRAM
I659131 VARIATION

5 DP836641 EASEMENT TO DRAIN WATER 3 WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM

6 DP827856 RESTRICTION(S) ON THE USE OF LAND AFFECTING THE PART SHOWN SO BURDENED IN THE TITLE DIAGRAM
I659131 VARIATION

7 DP836641 EASEMENT TO DRAIN WATER 18 WIDE AND VARIABLE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM

8 DP827856 EASEMENT TO DRAIN WATER 2 WIDE APPURTENANT TO THE PART SHOWN SO BENEFITED IN THE TITLE DIAGRAM
I274454 EASEMENT RELEASED IN SO FAR AS IT AFFECTS LOTS 20, 21 & 24 IN DP827856

9 DP1022246 EASEMENT FOR ELECTRICITY PURPOSES 2.75 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN DP1022246

10 DP829162 EASEMENT TO DRAIN WATER 2 WIDE AFFECTING THE PART OF THE LAND ABOVE DESCRIBED SHOWN SO BURDENED IN THE TITLE DIAGRAM

FOLIO: 1/1144668 PAGE 2

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

PENRITH CITY COUNCIL
Serving Our Community

Civic Centre
601 High Street, Penrith

PO Box 60 Penrith NSW 2751
DX 8017 Penrith
Email: pencit@penrithcity.nsw.gov.au

Telephone: 02 4732 7777
Facsimile: 02 4732 7958

PLANNING CERTIFICATE UNDER SECTION 149

Environmental Planning and Assessment Act, 1979

Property No: 785336
Your Reference: i117ur post
Contact No: 82348312

Issue Date: 10/08/2012
Certificate No: 12/03250
Receipt Date: 10/08/2012
Receipt No: 2443488

Issued to: Insites
Level 12, 80 Clarence Street
SYDNEY NSW 2000

PRECINCT 374

DESCRIPTION OF LAND

County: CUMBERLAND **Parish: CASTLEREAGH**

Location: 1011-1019 The Northern Road CRANEBROOK NSW 2749
Land Description: Lot 1 DP 1144668

- PART 1 PRESCRIBED MATTERS –

In accordance with the provisions of Section 149(2) of the Act the following information is furnished in respect of the abovementioned land:

1 *NAMES OF RELEVANT PLANNING INSTRUMENTS AND DCPs*

1(1) The name of each environmental planning instrument that applies to the carrying out of development on the land:

Penrith Local Environmental Plan 1998 (Urban Land), gazetted 8 January 1999, as amended, applies to the land.

Penrith Local Environmental Plan No. 255 – Exempt and Complying Development, gazetted 24 March 2000, as amended, applies to land within the City of Penrith. (Note: This plan does not apply to the land to which Sydney Regional Environmental Plan No.30 – St Marys applies, except as provided by clause 43 of SREP No. 30 – St Marys.)

Penrith Local Environmental Plan No. 258 – Consent for Dwelling Houses and Other Development, gazetted 29 June 2001, applies to the land.

Sydney Regional Environmental Plan No.9 - Extractive Industry (No.2), gazetted 15 September 1995, as amended, applies to the local government area of Penrith.

Sydney Regional Environmental Plan No. 20 - Hawkesbury-Nepean River (No. 2 - 1997), gazetted 7 November 1997, as amended, applies to the local government area of Penrith (except land to which Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme applies).

The following State environmental planning policies apply to the land:

PENRITH CITY COUNCIL
Serving Our Community

Civic Centre
601 High Street, Penrith

PO Box 60 Penrith NSW 2751
DX 8017 Penrith
Email: pencit@penrithcity.nsw.gov.au

Telephone: 02 4732 7777
Facsimile: 02 4732 7958

PLANNING CERTIFICATE UNDER SECTION 149

Environmental Planning and Assessment Act, 1979

State Environmental Planning Policy No.1 - Development Standards.
State Environmental Planning Policy No.4 - Development Without Consent and Miscellaneous Exempt and Complying Development. (Note: This policy may not apply to land reserved for certain public purposes. See clause 4 of the policy.)
State Environmental Planning Policy No.6 - Number of Storeys in a Building.
State Environmental Planning Policy No.19 - Bushland in Urban Areas. (Note: This policy does not apply to certain land referred to in the National Parks and Wildlife Act 1974 and the Forestry Act 1916.)
State Environmental Planning Policy No.21 - Caravan Parks.
State Environmental Planning Policy No.22 - Shops and Commercial Premises.
State Environmental Planning Policy No.30 - Intensive Agriculture.
State Environmental Planning Policy No.32 - Urban Consolidation (Redevelopment of Urban Land). (Note: This policy does not apply to land identified as coastal protection, environmental protection, escarpment, floodway, natural hazard, non-urban, rural, rural residential, water catchment or wetland.)
State Environmental Planning Policy No.33 - Hazardous and Offensive Development.
State Environmental Planning Policy No.50 - Canal Estate Development. (Note: This policy does not apply to the land to which Penrith Local Environmental Plan 1998 (Lakes Environs) and Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme apply.)
State Environmental Planning Policy No.55 - Remediation of Land.
State Environmental Planning Policy No.62 - Sustainable Aquaculture.
State Environmental Planning Policy No.64 - Advertising and Signage.
State Environmental Planning Policy No.65 - Design Quality of Residential Flat Development.
State Environmental Planning Policy No.70 - Affordable Housing (Revised Schemes).
State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 (Note: This policy applies to land within New South Wales that is land zoned primarily for urban purposes or land that adjoins land zoned primarily for urban purposes, but only as detailed in clause 4 of the policy.)
State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004.
State Environmental Planning Policy (Major Development) 2005.
State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007.
State Environmental Planning Policy (Temporary Structures) 2007.
State Environmental Planning Policy (Infrastructure) 2007.
State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.
State Environmental Planning Policy (Affordable Rental Housing) 2009.
State Environmental Planning Policy (State and Regional Development) 2011.

1(2) The name of each proposed environmental planning instrument that will apply to the carrying out of development on the land and that is or has been the subject of community consultation or on public exhibition under the Act:

(Information is provided in this section only if a proposed environmental planning instrument that is or has been the subject of community consultation or on public exhibition under the Act will apply to the carrying out of development on the land.)

Draft State Environmental Planning Policy (Affordable Rental Housing) Amendment (Group Homes) 2012 applies to the land

Draft State Environmental Planning Policy (Competition) 2010 applies to the land.

1(3) The name of each development control plan that applies to the carrying out of development on the land:

Penrith Development Control Plan 2010 applies to all land subject to Penrith Local Environmental Plan 2010. Penrith Development Control Plan 2006 applies to all land not subject to Penrith Local Environmental Plan 2010.

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PLANNING CERTIFICATE UNDER SECTION 149

Environmental Planning and Assessment Act, 1979

2 *ZONING AND LAND USE UNDER RELEVANT LEPs*

For each environmental planning instrument or proposed instrument referred to in clause 1 (other than a SEPP or proposed SEPP) that includes the land in any zone (however described):

2(a)-(d) the identity of the zone; the purposes that may be carried out without development consent; the purposes that may not be carried out except with development consent; and the purposes that are prohibited within the zone. Any zone(s) applying to the land is/are listed below and/or in annexures.

(Note: If no zoning appears in this section see section 1(1) for zoning and land use details (under the Sydney Regional Environmental Plan or State Environmental Planning Policy that zones this property).)

Under the terms of Penrith Local Environmental Plan 1998 (Urban Land) the land is zoned as Zone No.2(b) Residential (Low Density).

(a) Objectives of the zone

(i) to reinforce the importance of natural landscape settings and areas with heritage conservation values, and
(ii) to promote the established urban and landscape character of traditional residential subdivisions by limiting the range of permissible residential uses, and
(iii) to allow a limited range of compatible non-residential uses.

(b)(i) Without development consent

bed and breakfast establishments; bushfire hazard reduction; family day-care homes; home activities

(b)(ii) Only with development consent

buildings or other structures ordinarily associated with dwelling houses; changes of building use (as defined in the Act); child care centres; community facilities; demolition of buildings or other structures; drains; dual occupancies; dwelling houses; educational establishments; general stores; health care consulting rooms; home businesses; hospitals; internal structural work in bed and breakfast establishments; places of worship; recreation areas; roads; utility installations; utility undertakings.

(b)(iii) Prohibited

Any land use other than those included in items (b)(i) and (b)(ii).

Note:
(1) Despite any other provisions of Penrith Local Environmental Plan 1998 (Urban Land), a person may carry out development for the purpose of any one or more of the following on any land to which this plan applies without the consent of the Council:
(a) an internal window display;
(b) any advertisement erected on land that is not visible from outside the land (but not an

advertisement on a heritage item or on a site within a heritage conservation area);
(c) a temporary advertisement, being one which is displayed for a period not exceeding 2 months in total in any one year;
(d) a public notice in a public place;
(e) a road safety or advisory sign;
(f) a specific sign directing the travelling public to buildings or places of tourist interest.
(Clause 31 of the LEP.)

(2) Land to which Penrith Local Environmental Plan 1998 (Urban Land) applies may be subdivided only with development consent. (Clause 34 of the LEP.)

Penrith Local Environmental Plan No. 258 – Consent for Dwelling Houses and Other Development
In addition to any controls detailed above Penrith Local Environmental Plan No. 258 – Consent for Dwelling Houses and Other Development sets out further circumstances where development consent will be required for particular development. A copy of this LEP is attached.

2(e) whether any development standards applying to the land fix minimum land dimensions for the erection of a dwelling-house on the land and, if so, the minimum land dimensions so fixed:

No minimum land area provisions for the erection of a dwelling-house apply to the land.
Note: There are also certain performance requirements with regard to land dimensions affecting the construction of a dwelling-house on the land. In this regard Council has not considered the physical configuration or suitability of this particular land for the erection of a dwelling-house.

2(f) whether the land includes or comprises critical habitat:

(Information is provided in this section only if the land includes or comprises critical habitat.)

2(g) whether the land is in a conservation area (however described):

(Information is provided in this section only if the land is in a conservation area (however described).)

2(h) whether an item of environmental heritage (however described) is situated on the land:

(Information is provided in this section only if an item of environmental heritage (however described) is situated on the land.)

2A ZONING AND LAND USE UNDER STATE ENVIRONMENTAL PLANNING POLICY (SYDNEY REGION GROWTH CENTRES) 2006

(Information is provided in this section only if the land is within any zone under State Environmental Planning Policy (Sydney Region Growth Centres) 2006.)

3 COMPLYING DEVELOPMENT

GENERAL HOUSING CODE

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Complying development under the General Housing Code **may** be carried out on the land.

RURAL HOUSING CODE

Complying development under the Rural Housing Code **may** be carried out on the land.

HOUSING ALTERATIONS CODE

Complying development under the Housing Alterations Code **may** be carried out on the land.

GENERAL DEVELOPMENT CODE

Complying development under the General Development Code **may** be carried out on the land.

GENERAL COMMERCIAL AND INDUSTRIAL CODE

Complying development under the General Commercial and Industrial Code **may** be carried out on the land.

SUBDIVISIONS CODE

Complying development under the Subdivisions Code **may** be carried out on the land.

DEMOLITION CODE

Complying development under the Demolition Code **may** be carried out on the land.

(NOTE: (1) Council has relied on Department of Planning Circulars and Fact Sheets in the preparation of this information. Applicants should seek their own legal advice in relation to this matter with particular reference to State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.)

(2) Penrith Local Environmental Plan 2010 (if it applies to the land) contains additional complying development not specified in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.)

4 COASTAL PROTECTION

The land is not affected by the operation of sections 38 or 39 of the Coastal Protection Act 1979, to the extent that council has been so notified by the Department of Public Works.

5 MINE SUBSIDENCE

The land is not proclaimed to be a mine subsidence district within the meaning of section 15 of the Mine Subsidence Compensation Act 1961.

6 *ROAD WIDENING AND ROAD REALIGNMENT*

The land is not affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or

(b) an environmental planning instrument, or
(c) a resolution of council.

7 COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

(a) Councils Policies
The land is not affected by a policy adopted by the council that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

(b) Other Public Authority Policies
The Bush Fire Co-ordinating Committee has adopted a Bush Fire Risk Management Plan that covers the local government area of Penrith City Council, and includes public, private and Commonwealth lands.
The land is not affected by a policy adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council, that restricts the development of the land because of the likelihood of land slip, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

7A FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

(1) This land has not been identified as being below the adopted flood planning level (ie. the 1% Annual Exceedance Probability flood level plus 0.5 metre) and as such flood related development controls generally do not apply for dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) if such uses are permissible on the land. Council reserves the right, however, to apply flood related development controls depending on the merits of any particular application. Should future studies change this situation this position may be reviewed.

(2) This land has not been identified as being below the adopted flood planning level (ie. the 1% Annual Exceedance Probability flood level plus 0.5 metre) and as such flood related development controls generally do not apply for any other purpose not referred to in (1) above. Council reserves the right, however, to apply flood related development controls depending on the merits of any particular application. Should future studies change this situation this position may be reviewed.

8 LAND RESERVED FOR ACQUISITION

No environmental planning instrument or proposed environmental planning instrument referred to in clause 1 makes provision in relation to the acquisition of the land by a public authority, as referred to in section 27 of the Act.

9 CONTRIBUTIONS PLANS

The Footpath Construction in Established Residential Areas of the City Development Contributions Plan applies if residential development is permissible on the land.
The Cultural Facilities Development Contributions Plan applies to the land.

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The Penrith City District Open Space Facilities Development Contributions Plan applies anywhere residential development is permitted within the City of Penrith, with the exclusion of industrial lands and the Penrith Lakes development site.

9A BIODIVERSITY CERTIFIED LAND

(Information is provided in this section only if the land is biodiversity certified land (within the meaning of Part 7AA of the *Threatened Species Conservation Act 1995*).)

10 BIOBANKING AGREEMENTS

(Information is provided in this section only if Council has been notified by the Director-General of the Department of Environment, Climate Change and Water that the land is land to which a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995* relates.)

11 BUSH FIRE PRONE LAND

The land is not identified as bush fire prone land according to Council records.

12 PROPERTY VEGETATION PLANS

(Information is provided in this section only if Council has been notified that the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.)

13 ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

(Information is provided in this section only if Council has been notified that an order has been made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.)

14 DIRECTIONS UNDER PART 3A

(Information is provided in this section only if there is a direction by the Minister in force under section 75P(2)(c1) of the Act that a provision of an environmental planning instrument prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act does not have effect.)

15 SITE COMPATIBILITY CERTIFICATES AND CONDITIONS AFFECTING SENIORS HOUSING

(Information is provided in this section only if:

(a) there is a current site compatibility certificate (seniors housing), of which the council is aware, issued under State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land; and/or

(b) any terms of a kind referred to in clause 18(2) of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 have been imposed as a condition of consent to a development application granted after 11 October 2007 in respect of the land.)

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PLANNING CERTIFICATE UNDER SECTION 149

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16 SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

(Information is provided in this section only if there is a valid site compatibility certificate (infrastructure), of which council is aware, in respect of proposed development on the land.)

17 SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

(Information is provided in this section only if:

(a) there is a current site compatibility certificate (affordable rental housing), of which the council is aware, in respect of proposed development on the land; and/or

(b) any terms of a kind referred to in clause 17(1) or 37(1) of State Environmental Planning Policy (Affordable Rental Housing) 2009 have been imposed as a condition of consent to a development application in respect of the land.)

NOTE: The following matters are prescribed by section 59(2) of the Contaminated Land Management Act 1997 as additional matters to be specified in a planning certificate

(a) (Information is provided in this section only if, as at the date of this certificate, the land (or part of the land) is significantly contaminated land within the meaning of the Contaminated Land Management Act 1997.)

(b) (Information is provided in this section only if, as at the date of this certificate, the land is subject to a management order within the meaning of the Contaminated Land Management Act 1997.)

(c) (Information is provided in this section only if, as at the date of this certificate, the land is the subject of an approved voluntary management proposal within the meaning of the Contaminated Land Management Act 1997.)

(d) (Information is provided in this section only if, at the date of this certificate, the land subject to an ongoing maintenance order within the meaning of the Contaminated Land Management Act 1997.)

(e) (Information is provided in this section only if the land is the subject of a site audit statement within the meaning of the Contaminated Land Management Act 1997 – a copy of which has been provided to Council.)

Note: Section 149(5) information for this property may contain additional information regarding contamination issues.

Note: The Environmental Planning and Assessment Amendment Act 1997 commenced operation on the 1 July 1998. As a consequence of this Act the information contained in this certificate needs to be read in conjunction with the provisions of the Environmental Planning and Assessment (Amendment) Regulation 1998, Environmental Planning and Assessment (Further Amendment) Regulation 1998 and Environmental Planning and Assessment (Savings and Transitional) Regulation 1998 and Environmental Planning and Assessment Regulation 2000.

Information is provided only to the extent that Council has been notified by relevant government departments.

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PLANNING CERTIFICATE UNDER SECTION 149

Environmental Planning and Assessment Act, 1979

149(5) Certificate
This Certificate is directed to the following relevant matters affecting the land

When information pursuant to section 149(5) is requested the Council is under no obligation to furnish any of the information supplied herein pursuant to that section. Council draws your attention to section 149(6) which states that a council shall not incur any liability in respect of any advice provided in good faith pursuant to sub-section (5). The absence of any reference to any matter affecting the land shall not imply that the land is not affected by any matter not referred to in this certificate.

Note:

- Council's 149(5) information does not include development consent or easement information. Details of development consents may be obtained by making enquiries with Council's Development Services Department pursuant to section 12 of the Local Government Act 1993 or (for development applications lodged after January 2007) by viewing the Online Services area at www.penrithcity.nsw.gov.au . Details of any easements may be obtained from a Title Search at Land and Property Information New South Wales.
- This certificate does not contain information relating to Complying Development Certificates.
- This certificate may not provide full details of development rights over the land.

* When considering any development application Council must have regard to the Threatened Species Conservation Act 1995. Please note that this legislation may have application to any land throughout the city. Interested persons should make their own enquiries in regard to the impact that this legislation could have on this land.

* The land is subject to minimum building setback requirements. Penrith Development Control Plan 2006 should be consulted to determine exact requirements for the subject land.

* The land is affected by a Tree Preservation Order.

* This land is affected by a covenant or covenants.

* The land is adjacent to one or more of the following roads: Dunheved Road, Erskine Park Road, Gipps Street, Great Western Highway, Mamre Road, M4 Motorway, Mulgoa Road, Richmond Road, The Northern Road.
Clause 29 of Penrith Local Environmental Plan 1998 (Urban Land) prohibits in this location the creation of a vehicular crossing in, on or through a boundary to any of the abovementioned roads.
Despite the above, Council may allow a vehicular crossing where it is satisfied that development would be impracticable unless direct vehicular access is provided.

Alan Stoneham
General Manager

PER _____

Attachment

Penrith Local Environmental Plan No 258 – Consent for Dwelling Houses and Other Development

1 Name of plan

This plan is *Penrith Local Environmental Plan No 258 – Consent for Dwelling Houses and Other Development.*

2 Aims of plan

This plan aims to:

(a) require development consent for dwelling houses on residentially zoned land within the City of Penrith, and

(b) require development consent for dwelling houses on land within the Non-urban zone under the *Penrith Planning Scheme Ordinance* and on land within the Special Business zone under *Penrith Local Environmental Plan 1997 (Penrith City Centre),* and

(c) require development consent for dwelling houses attached to and used in conjunction with shops on land within the Neighbourhood Business zone under the *Penrith Planning Scheme Ordinance,* and

(d) require development consent for the following:

(i) the erection of a building or structure ordinarily associated with a dwelling house,
(ii) a change of building use,

Note. At the commencement of this plan, **a change of building use** meant a change of use of a building from a use that the *Building Code of Australia* recognises as appropriate to one class of building to a use that the *Building Code of Australia* recognises as appropriate to a different class of building.

(iii) demolition of a building or structure,
(iv) carrying out structural alterations to a building, internal alterations to a building, or external building work in association with business premises, a bed and breakfast establishment, office premises, commerical premises or take away food shops,
(v) the subdivision of land,

to the extent to which such development does not already require development consent because of another environmental planning instrument in order to be carried out.

3 Land to which plan applies

This plan applies to all land within the City of Penrith.

4 Relationship to other environmental planning instruments

(1) In the event of an inconsistency between this plan and any other local environmental planning instrument or deemed environmental planning instrument, this plan shall prevail to the extent of the inconsistency, subject to section 36 (4) of the Act.

(2) This plan amends:

(a) Penrith Planning Scheme Ordinance in the manner set out in Schedule 1,

(b) Penrith Local Environmental Plan 1997 (Penrith City Centre) in the manner set out in Schedule 2, and

(c) Penrith Local Environmental Plan 1998 (Urban Land) in the manner set out in Schedule 3.

(3) This plan does not affect the application of:

(a) State Environmental Planning Policy No 3 – Castlereagh Liquid Waste Disposal Depot,

(b) State Environmental Planning Policy No 27 – Prison Sites,

(c) *Sydney Regional Environmental Plan No 9 – Extractive Industry,*

(d) *Sydney Regional Environmental Plan No. 11 – Penrith Lakes Scheme,*

(e) *Sydney Regional Environmental Plan No 20 – Hawkesbury-Nepean River (No 2-1997),*

(f) *Sydney Regional Environmental Plan No 30 – St Marys,* or

(g) *Penrith Local Environmental Plan No 255 – Exempt and Complying Development,*

to land to which this plan applies.

5 Definitions

(1) In this plan:

a building or structure ordinarily associated with a dwelling house means a garage, carport, pergola, swimming pool, and the like, and includes alterations and additions to an existing dwelling house.

change of building use has the same meaning as in the Act.

Note. At the commencement of this plan, a ***change of building use*** meant a change of use of a building from a use that the *Building Code of Australia* recognises as appropriate to one class of building to a use that the *Building Code of Australia* recognises as appropriate to a different class of building.

dwelling means a room or number of rooms occupied or used, or so constructed or adapted as to be capable of being occupied or used, as a separate domicile.

dwelling house means a dwelling which is the only dwelling erected on an allotment of land.

subdivision of land has the same meaning as in the Act.

the Act means the *Environmental Planning and Assessment Act 1979.*

(2) The list of contents and notes in this plan are not part of this plan.

6 Dwelling houses require development consent

(1) The erection of a dwelling house must not be carried out without development consent.

(2) This clause applies to residentially zoned land within the City of Penrith.

(3) This clause applies if the development:

(a) does not require development consent because of another environmental planning instrument, and

(b) is not prohibited by another environmental planning instrument.

7. Miscellaneous development that requires development consent

(1) The following development must not be carried out without development consent:

(a) erection of a building or structure ordinarily associated with a dwelling house, or

(b) development that results in a change of building use, or

(c) demolition of a building or structure, or

(d) structural, internal or external building work in association with business premises, a bed and breakfast establishment, office premises, commercial premises or take away food shops.

(2) This clause applies if the development:

(a) does not require development consent because of another environmental planning instrument, and

(b) is not prohibited by another environmental planning instrument, and

(c) is not identified in *Penrith Local Environmental Plan No 255 – Exempt and Complying Development* as exempt development, and

(d) does not involve Crown building work as defined in section 116G of the Act.

8 Subdivisions require development consent

(1) A subdivision of land must not be carried out without development consent.

(2) This clause applies if the subdivision of land:

(a) does not require development consent because of another environmental planning instrument, and

(b) is not prohibited by another environmental planning instrument, and

(c) is not identified in *Penrith Local Environmental Plan No 255 – Exempt and Complying Development* as exempt development, and

(d) does not involve Crown building work as defined in section 116G of the Act.

Schedule 1 Amendment of Penrith Planning Scheme Ordinance

(Clause 4 (2) (a))

[1] Clause 4 Interpretation
Omit the definition of ***Country dwelling.***

[2] Clause 26 Erection or use of buildings or works
Omit "country dwellings;" from Column III for Zone No 1 of the Table to the clause.

[3] Clause 26, Table
Omit "dwelling-houses other than country dwellings and rural dwellings;" from Column V for Zone No. 1.

[4] Clause 26, Table
Omit "Dwelling-houses other than semi-detached and terrace buildings." from Column III for Zone No 2(a).

[5] Clause 26, Table
Omit "Residential buildings." from Column III for Zone No 2 (b).

[6] Clause 26, Table
Omit "Dwelling-houses other than semi-detached or terrace buildings." from Column III for Zone No 2 (c).

[7] Clause 26, Table
Omit ";dwelling-houses attached to and used in conjunction with shops" from Column III for Zone No 3 (c).

[8] Clause 26, Table
Omit "Purposes" from Column IV for Zone No 3(c).

Insert instead "Buildings or other structures ordinarily associated with dwelling houses; changes of building use (as defined in the *Environmental Planning and Assessment Act 1979)*; dwelling-houses attached to and used in conjunction with shops; demolition of buildings or other structures; land uses and premises".

[9] Clause 26, Table
Insert "; structural or internal alterations to, or external building work in association with, commercial premises or refreshment rooms" after "roads" in Column IV for Zone No 3(c).

[10] Clause 38 Development in residential zones
Omit the clause.

[11] Clause 46 Variation of area required for country dwelling
Omit the clause.

Schedule 2 Amendment of Penrith Local Environmental Plan 1997 (Penrith City Centre)

(Clause 4 (2) (b))

[1] Clause 9 Zone objectives and development control table

Omit from item (b) (i) **Without development consent** for Zone No 2 (f) in the Development Control Table:

- dwelling-houses

[2] Clause 9, table

Insert in alphabetical order in item (b) (ii) **Only with development consent** for Zone No 2 (f):

- buildings or other structures ordinarily associated with dwelling-houses
- demolition of buildings or other structures
- dwelling-houses

[3] Clause 20 Development of land within Zone No 3 (a)

Insert "where the new use does not involve structural or internal alterations or external buildings works" after the words "or take away food shops".

Schedule 3 Amendment of Penrith Local Environmental Plan 1998 (Urban Land)

(Clause 4 (2) (c))

[1] Clause 9 Zone objectives and development control table

Omit wherever occurring from item (b) (i) **Without development consent** for Zones Nos 2 (a1), 2 (a), 2 (b), 2 (c), 2 (d) and 2 (e) in the Development Control Table:

- dwelling houses

[2] Clause 9, table

Insert in alphabetical order in item (b) (ii) **Only with development consent** for Zones Nos 2 (a1), 2 (a), 2 (b), 2 (c), 2 (d) and 2 (e):

- buildings or other structures ordinarily associated with dwelling houses
- changes of building use (as defined in the Act)
- demolition of buildings or other structures
- dwelling houses
- internal structural work in bed and breakfast establishments

[3] Clause 9, table

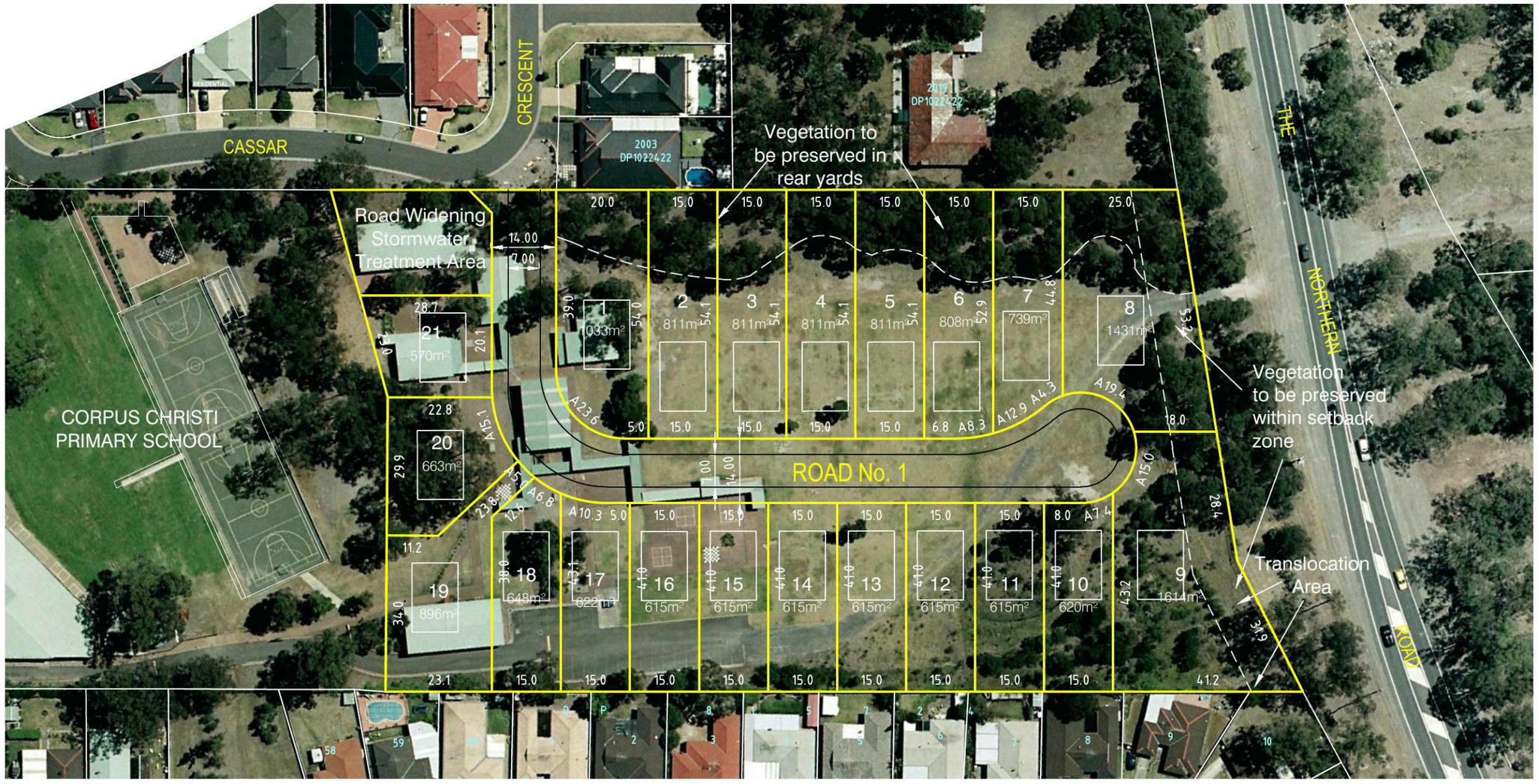
Insert in alphabetical order in item b (ii) **Only with development consent** for Zones Nos 2 (r) and 2 (r1);

- buildings or other structures ordinarily associated with dwelling houses
- changes of building use (as defined in the Act)
- demolition of buildings or other structures
- structural or internal alterations to bed and breakfast establishments

[4] Clause 9, table

Insert in alphabetical order in item (b) (ii) **Only with development consent** for Zone No 3 (f):

- changes of building use (as defined in the Act)
- demolition of buildings or other structures
- external building work associated with an existing land use carried out with consent
- structural or internal alterations to a building or other structure erected with consent or building approval



20 10 0 20 40 60 Metres

REVISIONS			
No.	DATE	REVISION DETAILS	BY
A	18-10-2013	LOT LAYOUT ISSUE FOR DA	KG

NOTES:
1. Adjoining cadastre - Digital Cadastral Database(DCDB) © NSW Department of Lands, 2012.
2. Aerial imagery © Google Earth, 2013; © Sinclair Knight Merz, 2013. Image date: 2009.
3. Dimensions and areas are approximate only.

SCALE: 1:1000 | DATUM: AHD
LONG SECTION: H : N/A V : N/A | CROSS SECTION: H : N/A V : N/A

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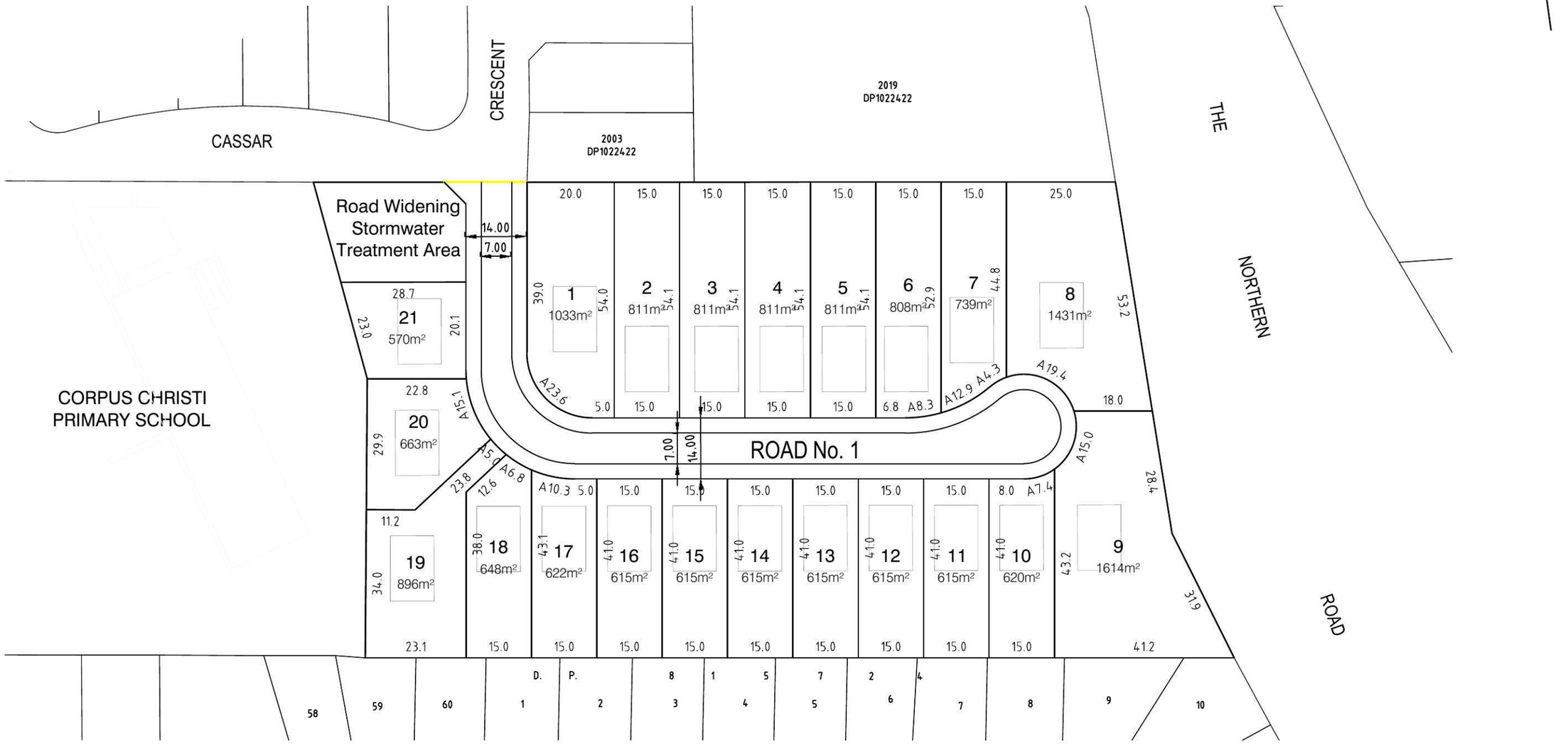
CLIENT: THE TRUSTEES OF THE CATHOLIC CHURCH FOR THE DIOCESE OF PARRAMATTA

SURVEY:	C.G.L	DATE OF SURVEY:	Feb. 2012
DRAWN:	K.G.	DATE OF PLAN:	16-08-2013
DESIGNED:	N/A	DATE LAST SAVED:	18.10.13
APPROVED:	P.L.	DATE APPROVED:	16-08-2013

TITLE: LOT LAYOUT
PROPOSED SUBDIVISION OF LOT 1, DP1144668 ANDROMEDA DRIVE, CRANEBROOK

JOB No: I117 | ISSUE: A
DWG No: P12-1
SHEET 1 OF 2 SHEETS | SIZE: A3

I:\I17\EG P12.dwg



20 10 0 20 40 60 Metres

REVISIONS

No.	DATE	REVISION DETAILS	BY
A	18-10-13	LOT LAYOUT ISSUE FOR DA	KG

NOTES:

1. Adjoining cadastre - Digital Cadastral Database(DCDB) © NSW Department of Lands, 2012.
2. Aerial imagery © Google Earth, 2013; © Sinclair Knight Merz, 2013. Image date: 2009.
3. Dimensions and areas are approximate only.

SCALE: 1:1000
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CROSS SECTION: H : N/A V : N/A

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SURVEY:	C.G.L	DATE OF SURVEY:	Feb. 2012
DRAWN:	K.G.	DATE OF PLAN:	16-08-2013
DESIGNED:	N/A	DATE LAST SAVED:	18.10.13
APPROVED:	P.L.	DATE APPROVED:	16-08-2013

TITLE

LOT LAYOUT
PROPOSED SUBDIVISION OF LOT 1, DP1144668 ANDROMEDA DRIVE, CRANEBROOK

JOB No: I117
ISSUE: A
DWG No: P12-2
SHEET 2 OF 2 SHEETS
SIZE: A3

I:\17EG P\2.dwg

AHIMS Web Services (AWS)
Search Result

Your Ref Number : i117UR

Client Service ID : 96945

Myall Stevens

Level 12 80 Clarence Street
Stdney New South Wales 2000

Attention: Myall Stevens

Email: mstevens@insites.com.au

Date: 04 April 2013

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 1, DP:DP1144668 with a Buffer of 50 meters, conducted by Myall Stevens on 04 April 2013.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.

A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

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TRAFFIC IMPACT STATEMENT
PROPOSED RESIDENTIAL SUBDIVISION
86-94 ANDROMEDA DRIVE
CRANEBROOK

Ref: 12-153

APRIL 2013

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1 Proposed Subdivision Plan
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1. INTRODUCTION

The Practice of Thompson Stanbury Associates has been commissioned by the Catholic Diocese of Parramatta to prepare a Traffic Impact Statement accompanying a Development Application to be lodged with Penrith City Council (Council). Development Consent is sought from Council for the subdivision of land to the rear of the Corpus Christi Primary School, Andromeda Drive, Cranebrook, to create 22 residential lots and 1 residue lot.

The purpose of this report is to assess and report on the likely traffic related consequences resulting from the proposed development and to identify appropriate remedial measures, if necessary. To this end, this report:

- Assesses the existing traffic conditions in the immediate vicinity of the site, including existing levels of service for motorists, sight distance and general traffic and pedestrian safety;

- Undertakes an assessment of the proposed road network, including proposed carriageway widths and road alignment within the context of the future traffic demand;

- Identifies the additional traffic that could be expected from the proposed development and assesses the ability of the surrounding road network to safely and efficiently accommodate this additional traffic;

A proposed subdivision plan has been prepared by Whelans Insites Pty Ltd, a reduced scale copy of which is included as **Appendix 1**.

2. BACKGROUND

Development Consent was recently granted by Penrith City Council on for the subdivision of land at 86 – 94 Andromeda Drive into two (2) lots, being Lots 100 and 101. Proposed Lot 100 comprises the western portion of the school site and accommodates the existing Parish, school buildings and related infrastructure.

Proposed Lot 101 comprises the eastern portion of the site. This land is surplus to the current and future asset requirements of Corpus Christi Primary School and is intended to be used for a more efficient use.

3. SITE DETAILS

3.1 Site Location

Corpus Christi Primary School is situated on the eastern side of Andromeda Drive, between Barrett Place and Cassar Crescent, Cranebrook. The land that is the subject of this report (hereafter referred to as the 'subject land' or 'subject site') is situated on the southern side of Cassar Crescent, between The Northern Road to the east and the existing buildings with Corpus Christi to the west. This location is shown in the neighbourhood context as **Figure 1**.

3.2 Site Description

The subject land generally forms an east/west orientation, with frontage to The Northern Road at is eastern extremity of approximately 113.5m. It also has frontage to Cassar Crescent of approximately 45m.

3.3 Existing Uses

The land the subject of the current DA is currently vacant.

3.4 Surrounding Uses

Buildings and ancillary infrastructure associated with the Corpus Christi Primary School adjoins the site to the immediate west. Detached residential development adjoins the land to the immediate north and south, which is the predominant built form in the immediate vicinity of the site.

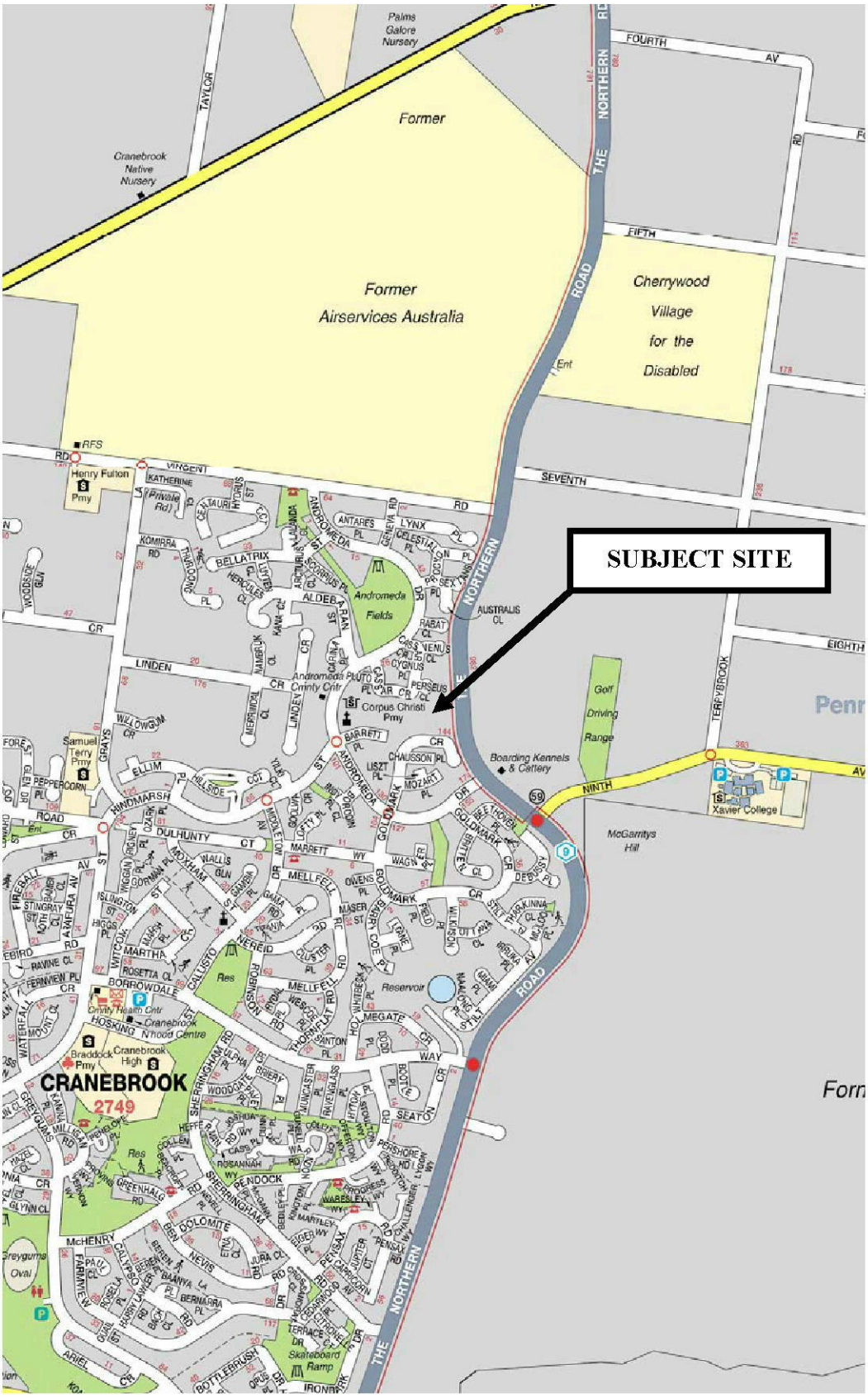


FIGURE 1 – SITE LOCATION

4. PROPOSED DEVELOPMENT

4.1 Residential Subdivision

The subject Development Application seeks Council approval for the subdivision of Lot 101 situated on the eastern portion of the Corpus Christi Primary School into 22 residential allotments and a residue lot accommodating existing vegetation.

The following areas (**Table 1**) are proposed for each of the lots (excluding the area of any access handle):

TABLE 1
LOT SCHEDULE

Lot No.	Area (m^2)
1	569
2	640
3	688
4	630
5	612
6	612
7	604
8	674
9	999
10	596
11	871
12	1303
13	555
14	555
15	555
16	555
17	555
18	555
19	555
20	555
21	583
22	1022

4.2 Residential Access

A new access road (Road No. 1) is proposed to intersect with Cassar Crescent at its south eastern corner, forming a cul-de-sac at its eastern extremity adjacent to The Northern Road. The new access road is proposed with an overall road reserve width of 14m, accommodating a carriageway width of 7m and 2 x 3.5m wide verges.

The subdivision plan included as **Appendix 1** incorporates a concept design of the proposed intersection treatment at the new junction of Cassar Crescent and Road No. 1. Having regard to the existing traffic conditions, in particular sight lines along Cassar Crescent and at the intersection of Andromeda Drive/Cassar

Crescent (see further discussion at Section 5), the proposed concept design involves a north/south priority treatment between Road No 1 and the eastern section of Cassar Crescent. The western leg of the new intersection (Cassar Crescent) will give way to vehicles within the eastern section of Cassar Crescent and proposed Road No. 1. As illustrated in the proposed concept design, this will be achieved through modifications to the existing kerb line, a new continuity line to identify the priority movement, and a new BB line within the western section Cassar Crescent on approach to the new intersection. The intention of the proposed intersection design is to encourage vehicles associated with the proposed development to utilise the eastern section of Cassar Crescent and, subsequently, its eastern intersection with Andromeda Drive where sight distance is more desirable than the intersection of Andromeda Drive and Cassas Crescent (west).

The majority of the proposed residential allotments are provided with direct access to proposed Road No. 1, with the exception of proposed lot 2, 8, 9, and to a lesser extent, lot 22. Proposed lot 2 is provided with an access handle of 4m in width to the south of proposed lot 1. We note that a width of 4m does not allow 2 on-coming vehicles to pass, however, given the access handle serves one dwelling and that traffic volumes will be very low, the proposed 4m width is considered satisfactory.

Lots 8 and 9 are each provided with a 3m wide access handle. Reciprocal rights of carriageway will be provided over Lot 8 and 9, effectively providing a legal right for the owner of Lot 8 to use the access handle within Lot 9, and the owner of Lot 9 to use the access handle within Lot 8. As such, a 6m wide access handle will be available to serve Lots 8 and 9, allowing two on-coming vehicles to safely pass.

Proposed lot 22 situated in the south western corner of the proposed subdivision has a narrow frontage of 5.1m (arc), requiring a relatively short internal driveway of approximately 5.5m in length to access the more regular lot configuration.

4.3 Parking

It is understood that each of the proposed residential allotments are intended to accommodate a detached residential dwelling. The off-street parking provision will therefore be provided as part of the construction of the built form.

Additional parking will also be available within the carriageway of proposed Road No. 1. The 7m wide carriageway width for Road No. 1 allows a moving vehicle to pass a stationary vehicle that may be parked kerbside.

5. EXISTING TRAFFIC CONDITIONS

5.1 Road Network

Cassar Crescent forms a pavement width of approximately 7m within an overall road reservation of 14m. It serves a local residential function serving the adjacent low density residential development as well as 4 short cul-de-sacs that intersect therewith, being Venus Close, Cygnus Place, Perseus Close and Pluto Place. The available carriageway width facilitates one through lane of traffic in conjunction with parallel parking along both kerb alignments where this parking somewhat impedes through vehicular traffic as discussed with respect to the proposed internal subdivision Road No. 1. A speed limit of 50km/h applies.

Consistent with its low order localised residential function, traffic volumes within Cassar Crescent are low, with gap conditions predominating (refer Section 5.2). In this regard, vehicles associated with the existing residential development would have little difficulty in undertaking access movements between the public road and private driveways.

Cassar Crescent intersects with Andromeda Drive at both its north eastern and south western extremity, consistent with its 'crescent function'. Both intersections are under major/minor give-way control, with Cassar Crescent provided with paved surface treatment at these intersections to reinforce its low order residential status in the road hierarchy.

Andromeda Drive is considered to perform a major collector function within the local road hierarchy, providing a north/south link between Vincent Road to the north and The Northern Road to the south. In the vicinity of Cassar Crescent and Corpus Christi Primary School, Andromeda Drive forms a pavement width of 13m with an overall road reserve of 20m, generally providing one kerb-side parking land and one through lane in either direction in conjunction with marked parking lanes along both alignments. A speed limit of 50km/h applies, with school zone 40km/h restrictions applying between 8.00am - 9.30am and 2.30pm – 4.00pm.

Sight distance at Andromeda Drive and it junctions with Cassar Crescent (west) and Cassar Crescent (east) have been assessed by this Practice based on survey information prepared by Whelans Insites. The following table (**Table 2**) presents the outcomes of this assessment, with survey information included as **Appendix 2**.

TABLE 2
SIGHT DISTANCE ASSESSMENT

AUSTROADS REQUIREMENT FOR 50km/h = 90m

Cassar Crescent (West)		**Cassar Crescent (East)**	
To the East	145m	To the East	125m
To the West	60m	To the West	212m
Complies	No	Complies	Yes

Table 2 identifies that sight distance at the intersection of Andromeda Drive and Cassar Crescent (east) adequately meets minimum AUSTROADS requirements. At the intersection of Andromeda Drive and Cassar Crescent (west), adequate sight distance is provided to the east for vehicles destined to the south however, sight distance to the west does not meet AUSTROADS recommendations.

Nevertheless, the concept design at the intersection of Cassar Crescent and proposed Road No.1 has been developed with the intention of encouraging vehicles from the proposed residential subdivision to utilise the intersection of Andromeda Drive and Cassar Crescent (east) where sight distance in both directions more than adequately meets AUSTROADS criteria.

5.2 Traffic Volumes

Traffic surveys were undertaken by this Practice at Cassar Crescent and its eastern and western intersections with Andromeda Drive. Surveys for the morning period were undertaken between 7.30am-9.30am on Wednesday 6 February, 2013, with surveys for the evening period undertaken between 4.00pm-6.00pm on Monday 4 February, 2013. Morning and afternoon peak hour volumes are represented in **Figure 2** overleaf. **Appendix 3** contains full survey data.

FIGURE 2
PEAK HOUR TRAFFIC VOLUMES
INTERSECTIONS OF ANDROMEDA DRIVE & CASSAR CRESCENT

Legend: AM Peak / PM Peak

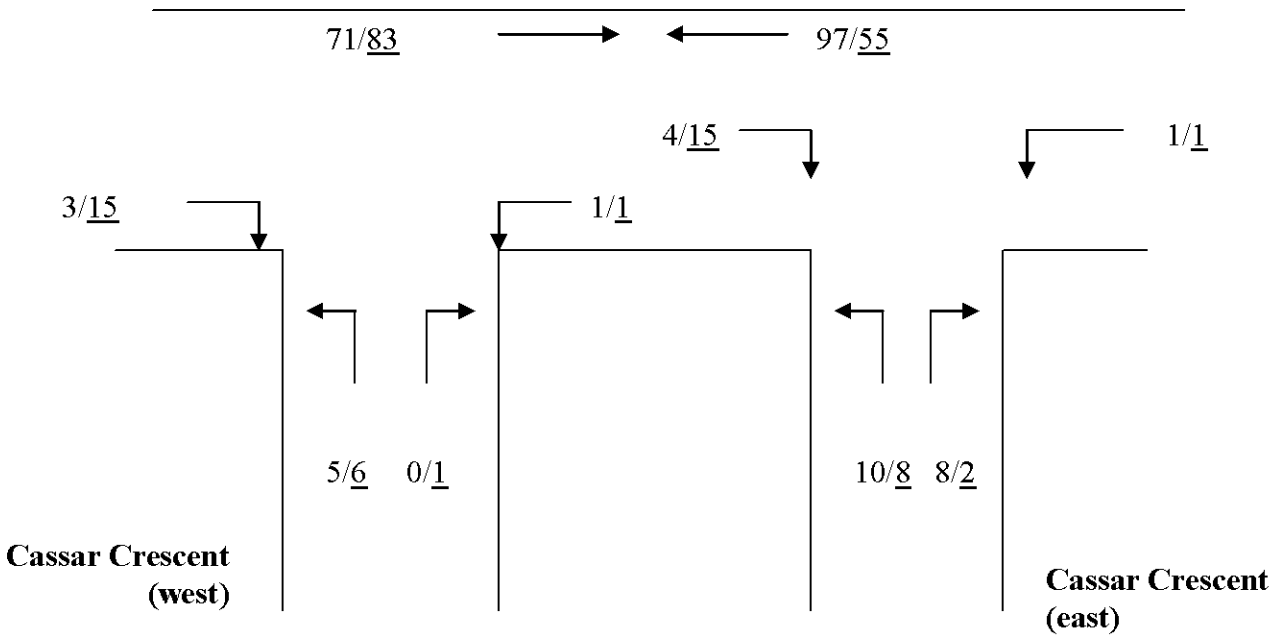


Figure 2 identifies that traffic volumes within the immediate vicinity of the proposed residential subdivision are minimal, particularly within Cassar Crescent.

6. POST DEVELOPMENT TRAFFIC CONDITIONS

6.1 Traffic Generation

The Roads and Maritime Services, in their *Guide to Traffic Generating Developments*, have established traffic generation rates for various land uses based on surveys of similar developments.

It is understood that each proposed allotment will accommodate a detached residential dwelling. The *Guide to Traffic Generating Developments* establishes the following traffic generation rates for detached dwellings:

Daily vehicle trips = 9.0 per dwelling
Weekday peak hour vehicle trips = 0.85 per dwelling.

The proposed residential subdivision, ultimately accommodating 22 detached residential dwellings, could be expected to generate 198 daily vehicle trips and 19 peak hour vehicle trips. It is reasonable to expect that the peak hour vehicle trips would consists of outward movements in the morning peak and inward movements in the evening peak associated with journeys to work and return.

6.2 Trip Assignment

For the purposes of determining the potential impact of the proposed development, it is necessary to assign traffic to/from a particular route. Peak hour traffic movements from residential development are predominantly influenced by the location of major employment centres, key arterial road networks and localized traffic conditions.

The Penrith Central Business District is situated some 8km to the south of the subject land, with the M4 motorway, one of Sydney's most significant east/west connections, also situated to the south. It is therefore our expectation that the majority, say three-quarters, of morning peak hour traffic will be destined to the south, with the remaining quarter destined to the north.

The proposed intersection treatment at Cassar Crescent and proposed Road No. 1 has been designed to encourage vehicles to utilise the eastern most intersection of Andromeda Drive and Cassar Crescent, with vehicles then undertaking either a left or right hand turn. It could be expected, however that a small proportion of traffic from the proposed subdivision will utilise the western intersection of Andromeda Drive and Cassar Crescent.

The following figures (**Figure 3 & 4**) represent a likely trip distribution in the morning and afternoon peak hour periods, based on the concept design proposed as part of this Report for the intersection of Cassar Crescent and Road No. 1.

FIGURE 3
PEAK HOUR TRAFFIC DISTRIBUTION
INTERSECTION OF CASSAR CRESCENT & PROPOSED ROAD NO. 1

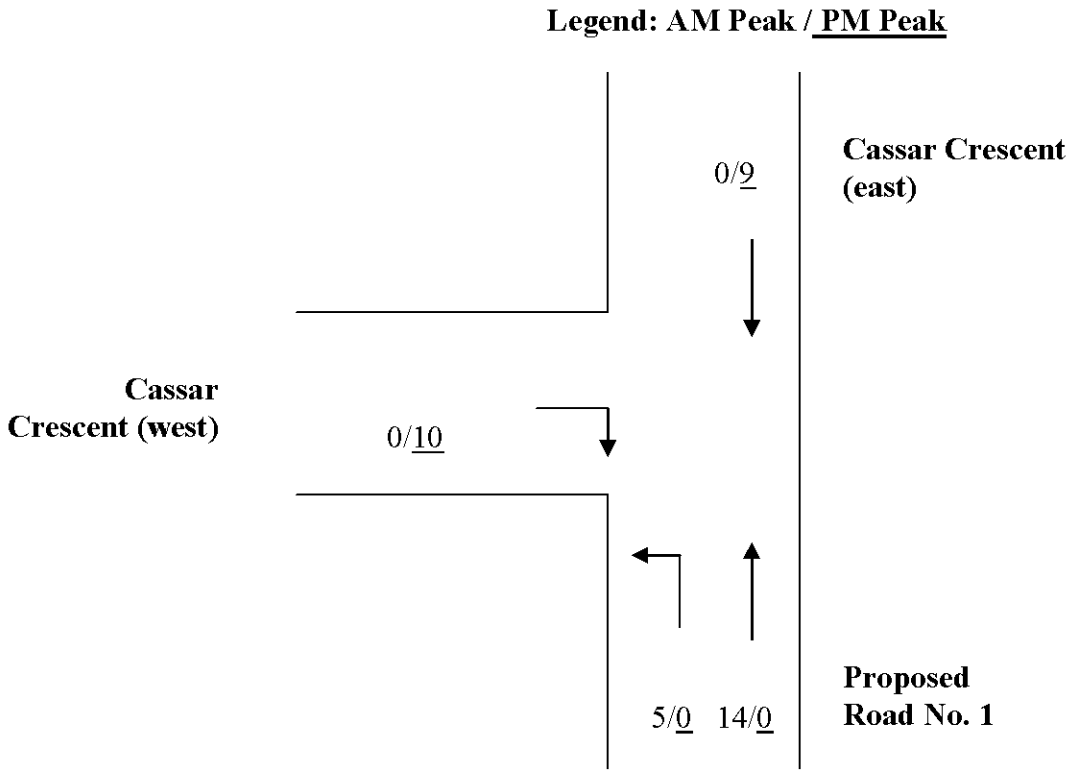
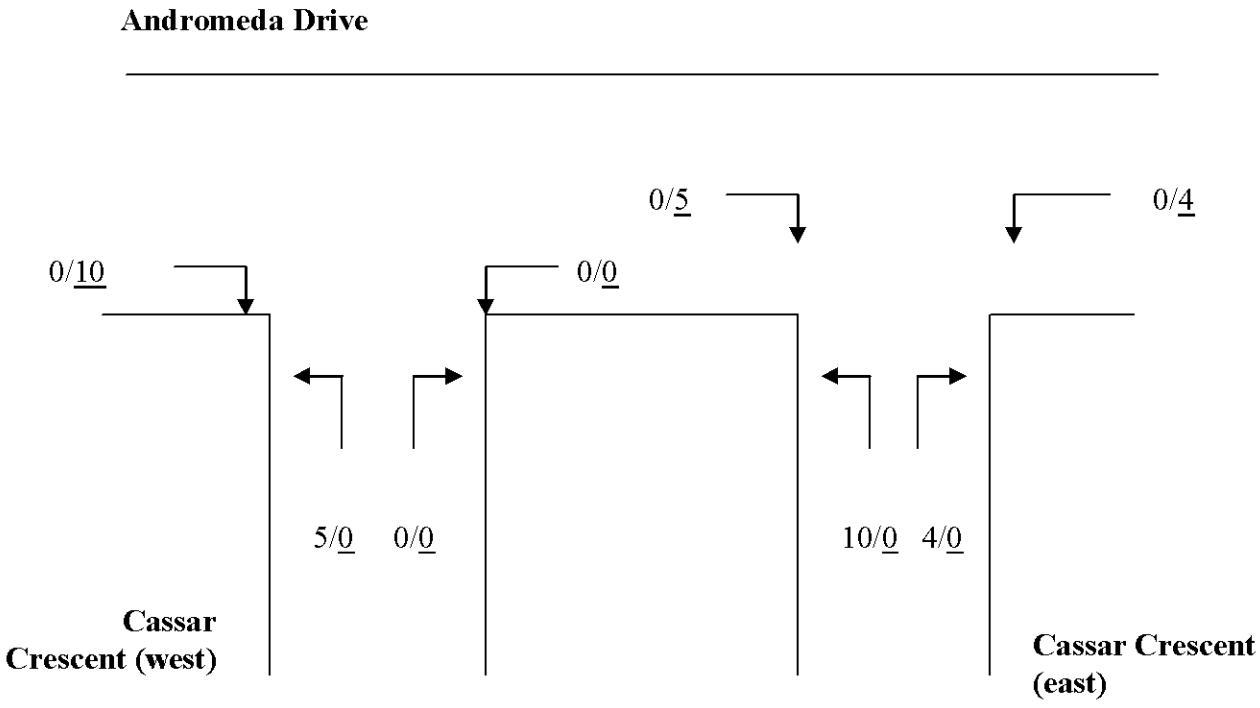


FIGURE 4
PEAK HOUR TRAFFIC DISTRIBUTION
INTERSECTIONS OF CASSAR CRESCENT & ANDROMEDA DRIVE



6.3 Traffic Impact of the Proposed Development

6.3.1 Road No. 1

Road No. 1 is proposed to be constructed with a carriageway width of 7m within an overall road reservation of 14m (i.e. 2 x 3.5m wide verges), according with the existing design characteristics of Cassar Crescent.

Given the low flow volumes anticipated within proposed Road No. 1, vehicles associated with the residential subdivision will have little difficulty undertaking movements between the future public road and the residential driveways.

It is understood that Council has identified a preference for proposed Road No. 1 to solely intersect with the Northern Road, to avoid traffic from the proposed development utilising the local road network. Preliminary enquiries with the Roads and Maritime Services have identified that access to The Northern Road from proposed Road No. 1 would not be supported as such access would be inconsistent with their objective of maintaining the efficiency of the arterial road network. In any event, and as further identified below, the minimal traffic from the proposed development utilising Cassar Crescent is unlikely to result in any adverse consequences.

6.3.2 Environmental Capacity

The proposed 22 lot residential subdivision has been assessed to generate approximately 19 morning and afternoon peak hour vehicle trips. Such a level of additional traffic represents approximately 1 additional vehicle every 3 minutes utilising Cassar Crescent in the morning and afternoon peak. It is highly unlikely that this level of additional traffic will result in any unreasonable impacts on existing traffic conditions.

In support of the above, the Roads & Maritime Services provide environmental capacity performance standards to measure the level of amenity experienced by the general community, not just motorists. The Roads & Maritime Services specify an environmental capacity for local roads of 300 vehicles in both directions in any one hourly period. The existing surveyed peak hourly traffic demands of Cassar Crescent are 49 vehicles in the PM peak. This existing demand, coupled with the additional 19 peak hour vehicles likely to be generated by the proposed development, maintains the identified threshold for local roads of 300 vehicles per hour. In this regard, we reiterate that the proposed development is unlikely to generate any noticeable impacts for traffic flow within Cassar Crescent, nor is the existing residential amenity likely to be noticeably compromised.

6.3.3 Andromeda Drive and Cassar Crescent Intersections

An additional 19 peak hour vehicles utilising the intersections of Andromeda Drive and Cassar Crescent (east and west), are unlikely to have any measurable impact on the operational efficiency of either of these intersections.

The trip distribution exercise presented in Section 6.2 has identified that the majority (say 15) of the 19 morning peak hour vehicle trips could destined to the employment centres and transport connections to the south, with the remaining 4 vehicles destined to the north. It has been identified that sight lines to the west at the intersection of Andromeda Drive and Cassar Crescent (west), whilst serving existing residential development, are less than desirable. In the interest of encouraging vehicles to utilise the intersection of Andromeda Drive and Cassar Crescent (east), the intersection treatment at Cassar Crescent and Road No. 1 has been designed to provide vehicles leaving the new subdivision with priority treatment to the north, to arrive at the intersection of Andromeda Drive and Cassar Crescent (east).

Given the priority treatment at the intersection of Cassar Crescent and Road No. 1, our trip assignment has suggested that 14 of the 19 vehicles generated from the proposed development in the morning peak will utilise the eastern intersection with Andromeda Drive. At this intersection, sight distance is more than adequate in both directions. This, coupled with the frequent observed gap conditions in both north and south bound flow, suggests that movements from Cassar Crescent (east) to Andromeda Drive in the morning peak should occur without any unreasonable delay.

It is acknowledged that some vehicles destined to the south in the morning peak will seek to use the western intersection of Andromeda Drive and Cassar Crescent, representing a reduced travel distance. In this regard, out trip assignment has earmarked 5 vehicles to utilise this intersection in the morning peak, undertaking a left hand turn from Cassar Crescent (west) into Andromeda Drive. Sight distance diagrams identify that sight distance to the east at this intersection meets AUSTROADS requirements. In this regard, vehicles destined to the south, undertaking a left hand turn, will be able to do so under suitable sight distance conditions.

Sight distance to the west, at the intersection of Andromeda Drive and Cassar Crescent (west) does not meet AUSTROADS recommendations, effecting right turn movements from Cassar Crescent (west). It is our expectation that with the priority treatment at Cassar Crescent/Road No.1, vehicles destined to the north will utilise the Cassar Crescent (east) intersection to access Andromeda Drive thence the Northern Road, as reflected in our trip assignment. As such, we do not anticipate any traffic associated with the proposed development to contend with the less than desirable sight distance circumstances at the intersection of Andromeda Drive and Cassar Crescent (west).

In the evening peak hour period, the additional traffic from the proposed subdivision has been assessed to undertaken either a left hand or right hand turn from Andromeda Drive to either Cassar Crescent (east) or Cassar Crescent

(west). The left turn movements will occur unimpeded and will therefore impose little impact on the operational efficiency of Andromeda Drive. Current traffic conditions on Andromeda Drive are such that frequent gaps of adequate duration are available in south bound traffic flow to allow right turn movements into Cassar Crescent (east) or Cassar Crescent (west) to be undertaken with minimal delay. Sight distance is sufficient at both intersections to allow right turning vehicles to observe oncoming southbound vehicles.

7. CONCLUSION

This Practice has undertaken an assessment of the proposed traffic related implications resulting from a proposed 22 lot residential subdivision of surplus land to the east of Corpus Christi Primary School. Based on our traffic assessment, the following can now be concluded:

- Vehicles associated with the proposed residential subdivision will have little difficulty in undertaking movements between proposed Road No. 1 and private driveway, given the low volumes expected within Road No. 1;

- The proposed private access roads and the associated rights of carriageway will facilitate safe and convenient access for the battle-axe configured lots, being lots 2, 8 and 9;

- The proposed development has been assessed to generate 19 morning and afternoon peak hour vehicles. The existing traffic utilising Cassar Crescent, as well as the additional traffic from the proposed development does not result in the prescribed environmental capacity of Cassar Crescent being exceed. Accordingly, it is not our expectation that the existing residential amenity will be unreasonably impacted upon associated with 19 additional peak hour vehicles associated with the proposed development;

- Proposed Road No. 1 intersects the south western corner of Cassar Crescent. A concept design has been prepared of this new intersection, providing a north/south priority movement between Cassar Crescent (east) and proposed Road No. 1. The intersection design seeks to encourage vehicles associated with the proposed subdivision to utilise the intersection of Andromeda Drive and Cassar Crescent (east) where sight distance more than adequately meets AUSTROADS recommendations in both directions. With sufficient sight distance and frequent gaps in Andromeda Drive traffic flow, morning and afternoon peak hour movements at the intersection of Andromeda Drive and Cassar Crescent (east) are expected to occur without any significant delay and under relative safety.

- It could be expected that a small proportion of traffic related to the proposed development will utilise the western Cassar Crescent intersection, providing a more direct route for motorists destined to the south. We note that sight distance at the intersection of Andromeda Drive and Cassar Crescent (west) to the east is sufficient to allow motorists to undertake a left hand turn from Cassar Crescent into Andromeda Drive. These movements are expected to occur with minimal delay.

Based on our traffic assessment and the conclusions and recommendations reached herein, we do not consider that there are any traffic related matters that should prevent approval of the subject development application. Accordingly, we recommend that action to Council.

APPENDIX 1

CIVIL WORKS STRATEGY PLAN
FOR PROPOSED SUBDIVISION OF
LOT 1 DP 1144668
ANDROMEDA DRIVE, CRANEBROOK

Source: Google Earth

LOCALITY DIAGRAM

NTS

SHEET DESCRIPTION	SHEET No.	DRAWING No.
COVER SHEET & LOCALITY SKETCH	1	I117EG P1-1
PLAN AND LONG. SECTION & TYPICAL CROSS SECTIONS	2	I117EG P1-2
CATCHMENT PLAN AND BIORETENTION DETAIL	3	I177EG P1-3

ISSUE FOR D.A.

REVISIONS			
B	28.03.13	ISSUE FOR D.A.	K.G.
A	07.03.13	DRAFT ISSUE	S.W.
No.	DATE	REVISION DETAILS	BY

NOTES:

DIAL BEFORE YOU DIG www.1100.com.au

SCALE:

DATUM: AHD

LONG SECTION: H : N/A V : N/A

CROSS SECTION: H : N/A V : N/A

SCALE IN METRES AT ORIGINAL REDUCTION RATIO

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CLIENT: THE TRUSTEES OF THE CATHOLIC CHURCH FOR THE DIOCESE OF PARRAMATTA

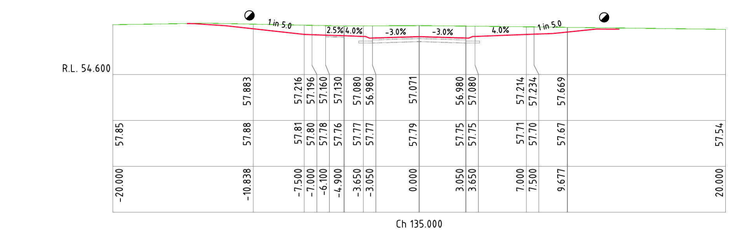
SURVEY: C.L. | DATE OF SURVEY: 18.01.13
DRAWN: S.W./K.G. | DATE OF PLAN: 07.03.13
DESIGNED: -- | DATE LAST SAVED: 02.04.13
APPROVED: B.L. | DATE APPROVED: --

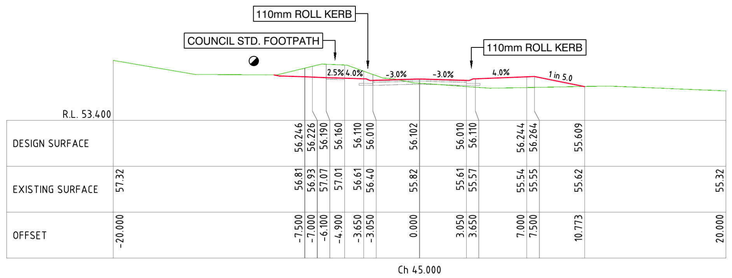
TITLE: COVER SHEET AND LOCALITY SKETCH
CIVIL WORKS STRATEGY PLAN
PROPOSED SUBDIVISION OF LOT 1, DP1144668
ANDROMEDA DRIVE, CRANEBROOK

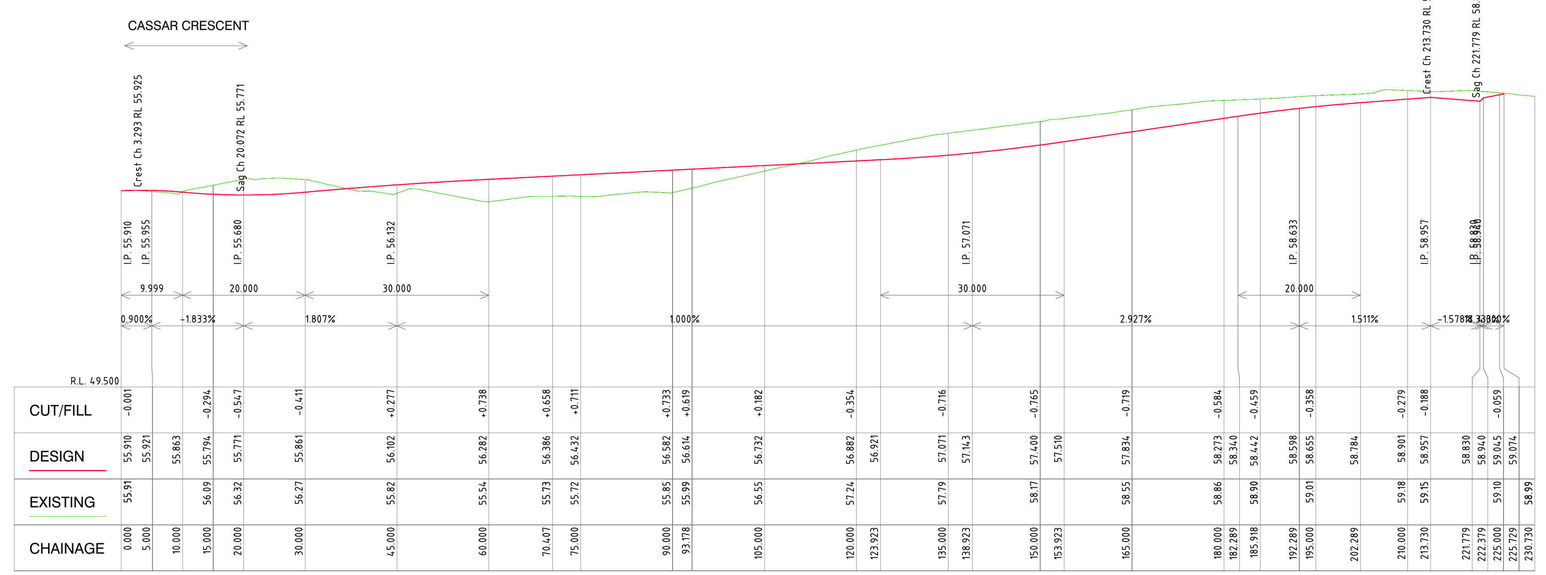
JOB No I117EG | ISSUE A
DWG No P6-1
SHEET 1 OF 3 SHEETS | SIZE A1

I117EG P6.dwg

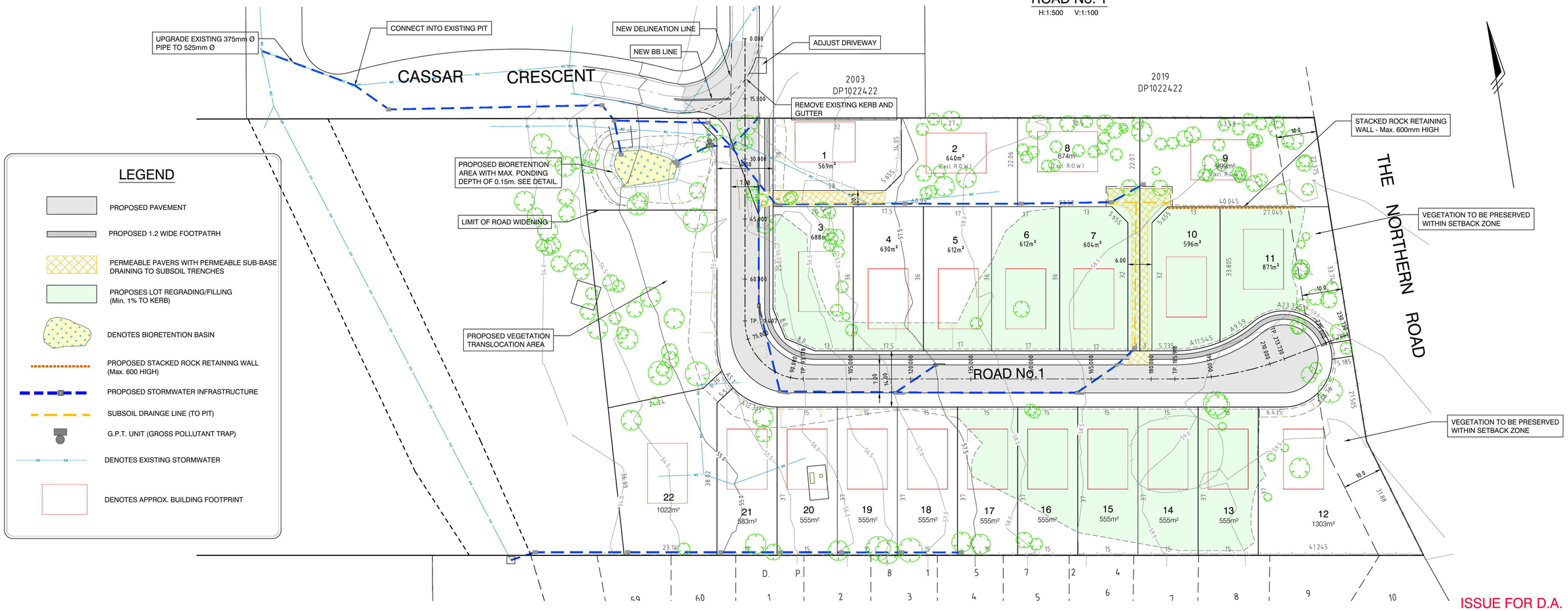
LOT REGRADING/FILLING - Min. 1% TO VERGE







TYPICAL



LEGEND

- PROPOSED PAVEMENT
- PROPOSED 1.2 WIDE FOOTPATRH
- PERMEABLE PAVERS WITH PERMEABLE SUB-BASE DRAINING TO SUBSOIL TRENCHES
- PROPOSES LOT REGRADING/FILLING (Min. 1% TO KERB)
- DENOTES BIORETENTION BASIN
- PROPOSED STACKED ROCK RETAINING WALL (Max. 600 HIGH)
- PROPOSED STORMWATER INFRASTRUCTURE
- SUBSOIL DRAINGE LINE (TO PIT)
- G.P.T. UNIT (GROSS POLLUTANT TRAP)
- DENOTES EXISTING STORMWATER
- DENOTES APPROX. BUILDING FOOTPRINT

ISSUE FOR D.A.

REVISIONS

No.	DATE	REVISION DETAILS	BY
C	02.04.13	LONG. SECTION AMENDED	K.G.
B	28.03.13	ISSUE FOR D.A.	K.G.
A	07.03.13	DRAFT ISSUE	S.W.

NOTES:

1. EXISTING SURFACE - 0.5m INTERVAL

DIAL BEFORE YOU DIG www.1100.com.au

SCALE: 1:500 DATUM: AHD

LONG SECTION: H: 1:500 V: 1:100

CROSS SECTION: H: 1:500 V: 1:100

10 5 0 10 20 30

SCALE IN METRES AT ORIGINAL REDUCTION RATIO

PREPARED BY

ENGINEERING INSITES insites.com.au

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CLIENT: THE TRUSTEES OF THE CATHOLIC CHURCH FOR THE DIOCESE OF PARRAMATTA

SURVEY:	C.L.	DATE OF SURVEY:	18.01.13
DRAWN:	S.W./K.G.	DATE OF PLAN:	07.03.13
DESIGNED:	--	DATE LAST SAVED:	02.04.13
APPROVED:	B.L.	DATE APPROVED:	--

TITLE

PLAN, LONG. SECTION & TYPICAL CROSS SECTIONS
CIVIL WORKS STRATEGY PLAN
PROPOSED SUBDIVISION OF LOT 1, DP1144668
ANDROMEDA DRIVE, CRANEBROOK

JOB No. I117EG

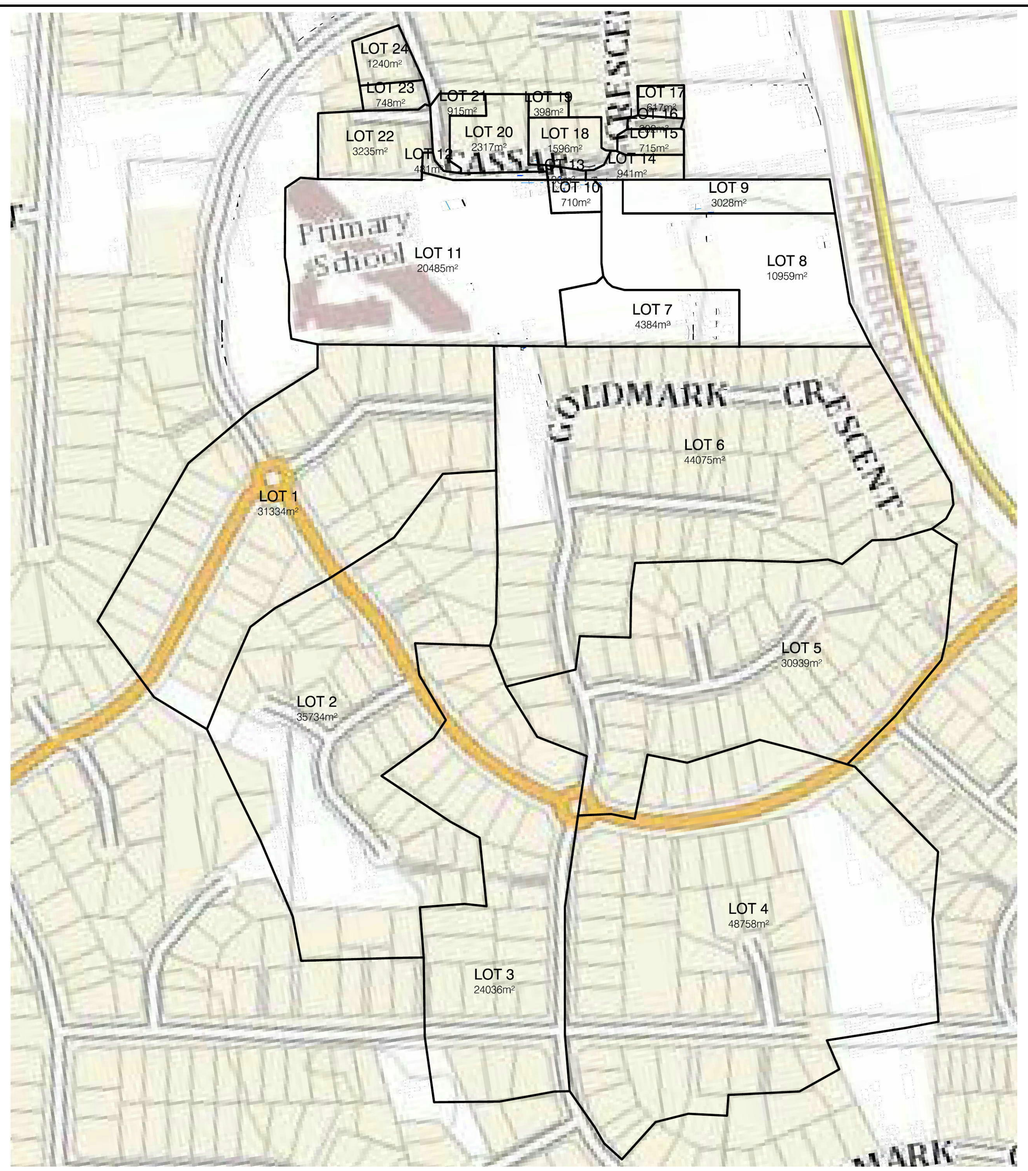
ISSUE C

DWG No. P6-2

SHEET 2 OF 3 SHEETS

SIZE A1

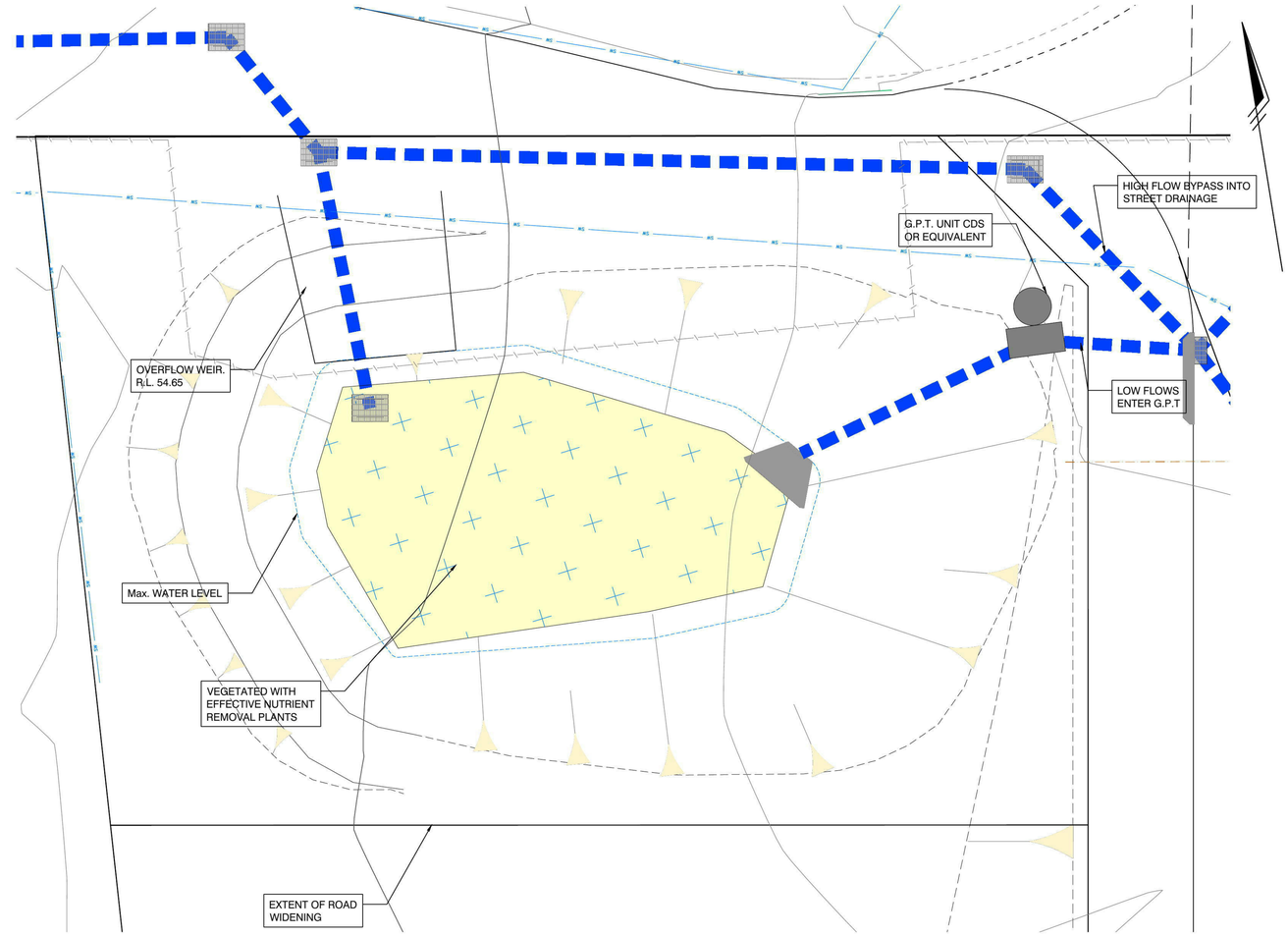
I117EG P6.dwg



Background Source: SixViewer

CATCHMENT PLAN

1:2000



BIORETENTION DETAIL

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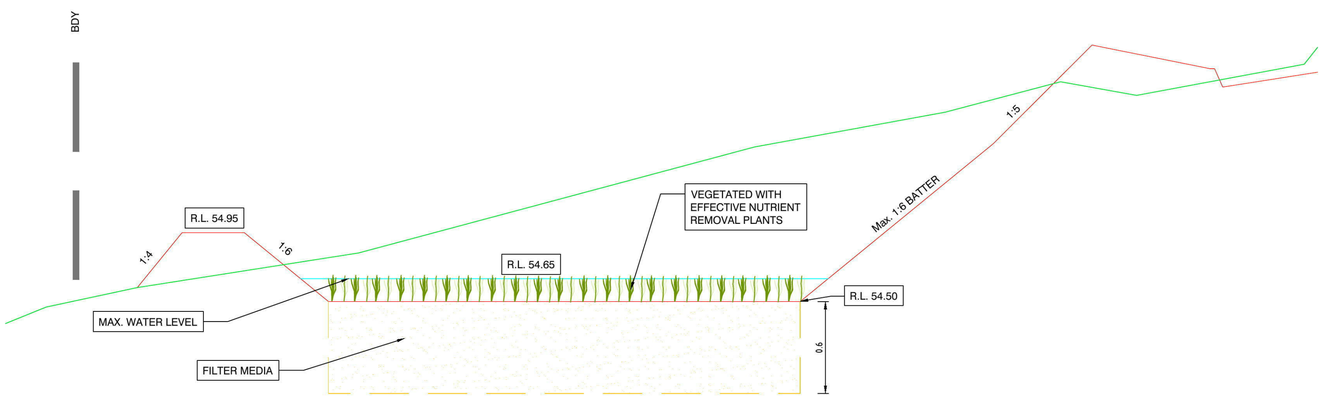

BIORETENTION TYPICAL SECTION

H:1:500 V:1:100

ISSUE FOR D.A.

REVISIONS

No	DATE	REVISION DETAILS	BY
A	28.03.13	ISSUE FOR D.A.	K.G.

NOTES:

DIAL BEFORE YOU DIG www.1100.com.au

SCALE: 1:2000

DATUM: AHD

LONG SECTION: H : N/A V : N/A

CROSS SECTION: H : 1:500 V : 1:100

40 20 0 40 80 120

SCALE IN METRES AT ORIGINAL REDUCTION RATIO

PREPARED BY

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CLIENT: THE TRUSTEES OF THE CATHOLIC CHURCH FOR THE DIOCESE OF PARRAMATTA

SURVEY:	C.L.	DATE OF SURVEY:	18.01.13
DRAWN:	S.W./K.G.	DATE OF PLAN:	07.03.13
DESIGNED:	--	DATE LAST SAVED:	02.04.13
APPROVED:	B.L.	DATE APPROVED:	--

TITLE

CATCHMENT PLAN & BIORETENTION DETAIL
CIVIL WORKS STRATEGY PLAN
PROPOSED SUBDIVISION OF LOT 1, DP1144668
ANDROMEDA DRIVE, CRANEBROOK

JOB No: I117EG

ISSUE: A

DWG No: P6-3

SHEET 3 OF 3 SHEETS

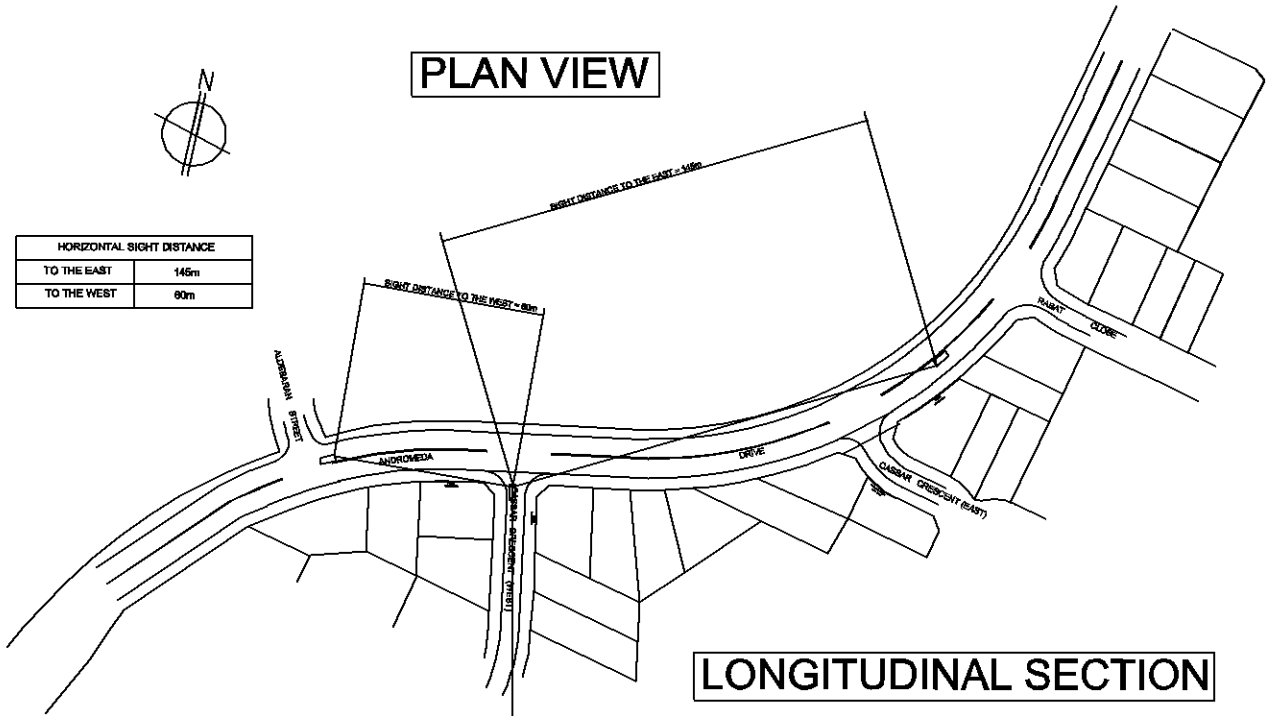
SIZE: A1

I117EG P6.dwg

APPENDIX 2

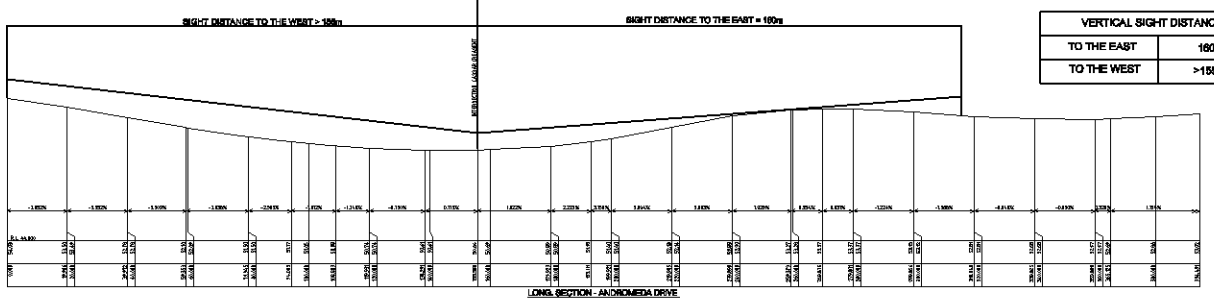
CASSAR CRESCENT (WEST)

PLAN VIEW



HORIZONTAL SIGHT DISTANCE	
TO THE EAST	145m
TO THE WEST	60m

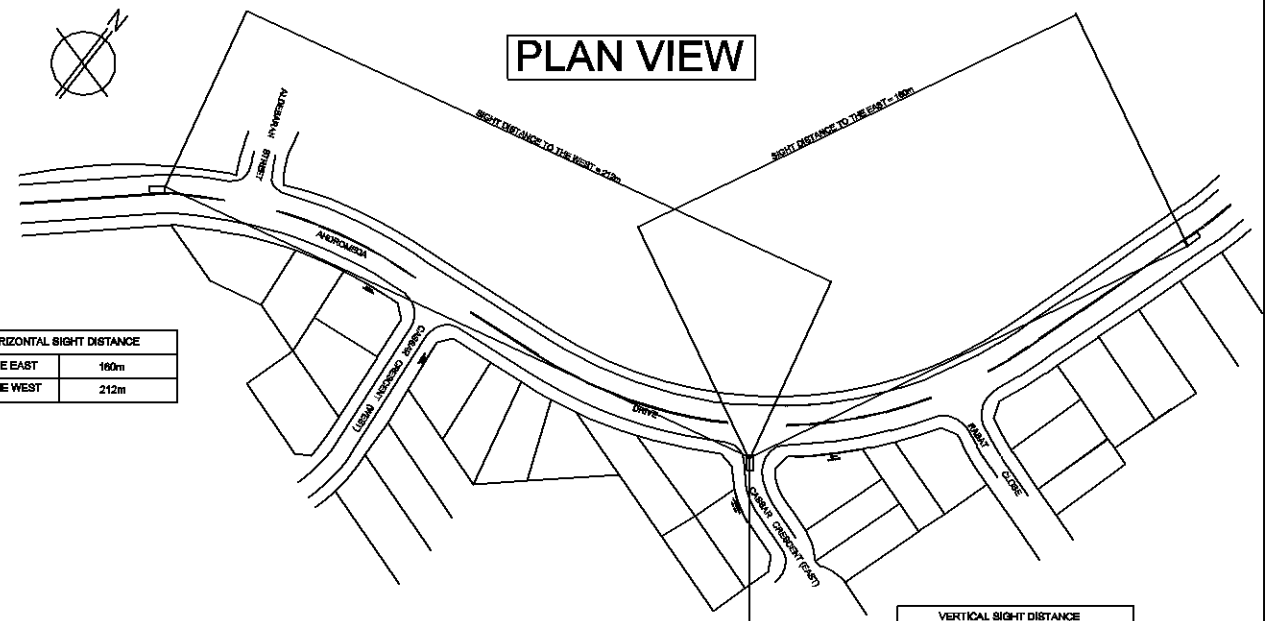
LONGITUDINAL SECTION



VERTICAL SIGHT DISTANCE	
TO THE EAST	160m
TO THE WEST	>155m

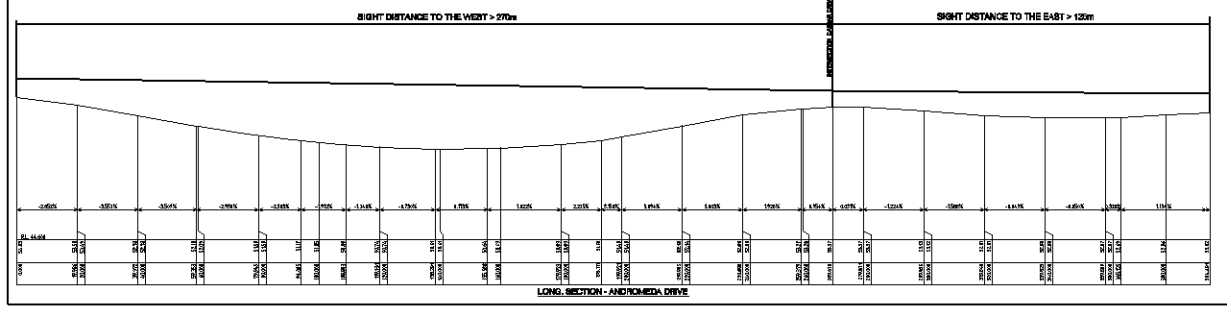
CASSAR CRESCENT (EAST)

PLAN VIEW



HORIZONTAL SIGHT DISTANCE	
TO THE EAST	160m
TO THE WEST	212m

LONGITUDINAL SECTION



VERTICAL SIGHT DISTANCE	
TO THE EAST	>125m
TO THE WEST	>270m

SUMMARY SIGHT DISTANCE TABLE AUSTROADS MINIMUM SIGHT DISTANCE FOR 50KM/H = 90m			
CASSAR CRESCENT (WEST)		CASSAR CRESCENT (EAST)	
TO THE EAST	145m	TO THE EAST	125m
TO THE WEST	60m	TO THE WEST	212m
COMPLIES?	NO	COMPLIES?	YES

NOTES:

1. THIS PLAN HAS BEEN FORMULATED UTILISING SURVEY PLAN PREPARED BY SITE PLUS.
2. SAFE INTERSECTION SIGHT DISTANCE FOR 50KM/H = 90m (AUSTROADS GUIDE TO ROAD DESIGN PART 4A: UNSIGNALISED AND SIGNALISED INTERSECTIONS).

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and Environmental Consultants

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THOMPSON STANBURY ASSOCIATES

SIGHT DISTANCE DIAGRAM
CASSAR CRESCENT JUNCTIONS WITH
ANDROMEDA DRIVE
CRANEBROOK

HORIZONTAL SCALE: 1: 2500 - VERTICAL SCALE: 1:500 (AT A3)

FILE: 12-153

SUPERSEDES SHEET/ISSUE -

DATE: MARCH 2013

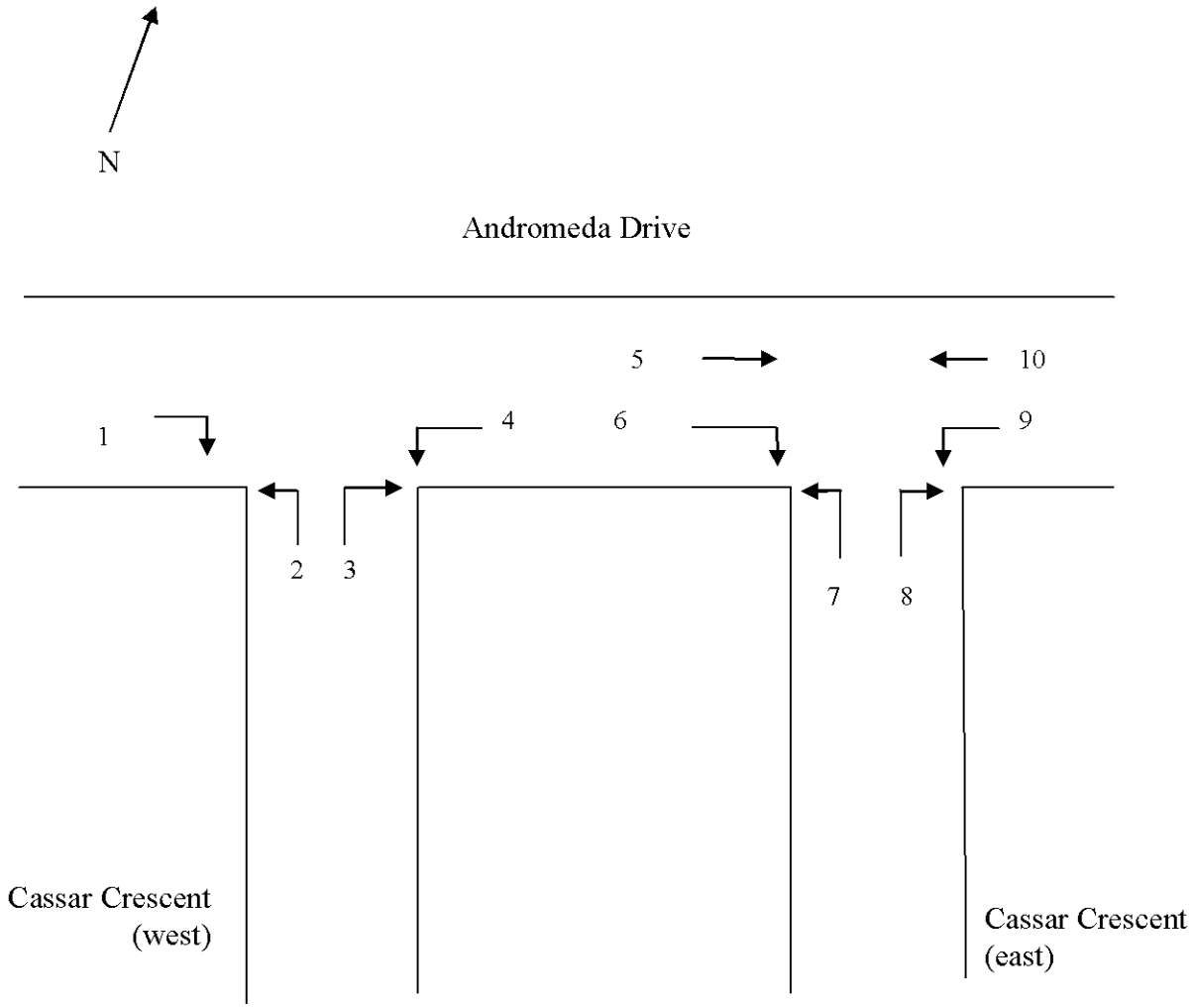
ISSUE A

SHEET 1

APPENDIX 3

TRAFFIC COUNTS AT: Andromeda Drive junctions with Cassar Crescent
DATE: Monday (PM)/Wednesday (AM), February 4/6, 2013
TIME: 7.30 am-9.30 am and 4.00 pm – 6.00 pm
WEATHER: Fine

Time	Direction of Vehicular Traffic									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
7.30-7.45 am	0	1	0	0	7	0	1	0	0	1
7.45-8.00 am	0	2	0	0	8	0	2	1	0	9
8.00-8.15 am	0	2	0	0	12	4	4	1	0	19
8.15-8.30 am	0	0	0	0	29	0	3	0	1	30
TOTAL	**0**	**5**	**0**	**0**	**56**	**4**	**10**	**2**	**1**	**65**
8.30-8.45 am	1	1	0	0	22	0	1	0	1	31
8.45-9.00 am	0	3	0	0	30	0	1	0	0	37
9.00-9.15 am	1	1	0	1	11	2	2	4	0	14
9.15-9.30 am	1	0	0	0	8	1	4	4	0	15
TOTAL	**3**	**5**	**0**	**1**	**71**	**3**	**8**	**8**	**1**	**97**
4.00 – 4.15pm	2	1	0	0	7	1	0	0	0	6
4.15 – 4.30pm	2	2	0	0	8	5	0	0	0	8
4.30 – 4.45pm	9	3	1	1	28	1	1	1	1	10
4.45 – 5.00pm	2	0	0	0	22	3	3	1	0	19
TOTAL	**15**	**6**	**1**	**1**	**65**	**10**	**4**	**2**	**1**	**43**
5.00 – 5.15pm	3	1	0	0	21	5	2	1	0	16
5.15 – 5.30pm	1	0	0	0	26	3	2	0	0	8
5.30 – 5.45pm	2	1	0	0	14	3	2	0	0	16
5.45 – 6.00pm	1	0	0	0	22	4	2	1	0	15
TOTAL	**7**	**2**	**0**	**0**	**83**	**15**	**8**	**2**	**0**	**55**



global environmental solutions

Part Lot 1 DP 1144668
Cassar Crescent, Cranebrook

Proposed Residential Subdivision

Flora & Fauna Assessment Report

21 November 2013

Part Lot 1 DP 1144668
Cassar Crescent, Cranebrook

Proposed Residential Subdivision

Flora & Fauna Assessment Report

21 November 2013

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
2 Lincoln Street Lane Cove NSW 2066 Australia

Document Control

Reference	Status	Date	Prepared	Checked	Authorised
610.11706	Version 1.0	29th October 2012	Fiona Iolini	F. Dominic Fanning	F. Dominic Fanning
610.11706	Version 2.0	21st December 2012	Fiona Iolini	F. Dominic Fanning	F. Dominic Fanning
610.11706	Version 3.0	21st November 2013	Fiona Iolini	F. Dominic Fanning	F. Dominic Fanning

PART LOT 1 DP 1144668
CASSAR CRESCENT, CRANEBROOK

PROPOSED RESIDENTIAL SUBDIVISION

FLORA & FAUNA ASSESSMENT REPORT

21 November 2013

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Figure 2 Details of the subject site at The Northern Road, Cranebrook

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Figure 4 Vegetation and threatened plants on the subject site at Cranebrook

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Appendix A Photographs of the subject site at Cranebrook

Appendix B OEH Wildlife Atlas Search

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Appendix D Flora species list on the subject site at Cranebrook

Appendix E Fauna species list on the subject site at Cranebrook

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PART LOT 1 DP 1144668
CASSAR CRESCENT, CRANEBROOK

PROPOSED RESIDENTIAL SUBDIVISION

FLORA & FAUNA ASSESSMENT REPORT

21 November 2013

PART A INTRODUCTION & INFORMATION BASE

1 INTRODUCTION

1.1 Background

The subject site is known formally as part of Lot 1 DP 1144668 The Northern Road, Cranebrook (Figure 1). The subject site is located approximately 50 kilometres to the northwest of the Sydney Central Business District (CBD), within the Penrith City Council Local Government Area (LGA).

The site is bound by residential development to the north and south, The Northern Road to the east and Andromeda Drive to the west. The primary school is accessed off Andromeda Drive at its western boundary, with a large carpark and the school buildings and associated features in the western 'half' portion of the site. The eastern 'half' of the subject site comprises a predominantly cleared grassed area, with some degraded native vegetation at its peripheries (Figure 2).

The eastern portion of the subject site had been used in the past as a temporary location for the Xavier Secondary College while a new College was under construction. The demountable buildings associated with this activity were decommissioned approximately five years ago, when the Xavier Secondary College was relocated to the new facility.

The principal author of this *Report* is the previous owner and director of Gunninah Environmental Consultants and was the director of Environmental InSites. In both roles, Dominic Fanning was involved in the preparation of flora and fauna assessments for works on the site, including for those associated with the temporary secondary college facility.

The previous investigations on the subject site at Cranebrook detected the presence of three threatened plants (a number of specimens of the *Dillwynia tenuifolia* and *Grevillea juniperina* subsp. *juniperina*, as well as a few specimens of *Pultenaea parviflora*) and an "*endangered ecological community*" known as the Shale Gravel Transition Forest (SGTF) community.

The subject site is zoned *Residential 2(b) – Low Density* under the provisions of the Penrith LEP 1998 (urban land). The subject site is proposed to be allocated the *R(2) – Low Density Residential* zone pursuant to the Penrith *Local Environmental Plan – Planning Proposal 2012* (Penrith City Council 2012), and the proposed residential development of the subject site is consistent with the existing and the proposed future urban landscape of this part of Cranebrook.

1.2 Definitions

Definitions used in this *Report* include:

- "*subject site*" Part Lot 1 DP 1144668 Cassar Crescent, Cranebrook (Figure 1)
- "*study area*" the "*subject site*" and areas directly or indirectly associated with it
- "*locality*" an area 10km around the "*subject site*"

1.3 Proposed Development

Approval for separation of the site (Lot 1 DP 1144668) into its two component parts has previously been approved by Penrith Council under DA 12/0786.

This previously approved subdivision reflects the historical use and occupation of the site, with the western portion encompassing the whole of the Corpus Christi Primary School site. The eastern portion of the site (identified as proposed Lot 101 within DA 12/0786) was historically occupied by demountable school buildings which accommodated the temporary campus of Xavier College. As Xavier College is now established on its permanent site at Ninth Avenue, Llandilo, it is understood that the land encompassed by proposed Lot 101 is surplus to longer term Church requirements.

The current proposal provides for the creation of 21 residential allotments, and includes:

- connection of each site to services;
- the construction of the new road and cul-de sac; and
- the construction of a stormwater treatment area in the northwestern corner of the site.

Whilst no dwellings are currently proposed, indicative footprints have been provided (Figure 5), and this *Flora & Fauna Assessment Report* (FFAR) considers the ultimate impact of future residential development (including construction of dwellings) across the site.

The majority of the eastern portion of the subject site (the 'development area') is intended for residential development (inclusive of lots, an access road and stormwater treatment area), with the exception of a band encompassing existing vegetation along the eastern boundary and another along the northern boundary, where vegetation is to be preserved.

As part of the residential development, a *Vegetation Management Area* (VMA) is to be established at the rear of the properties along the northern boundary (Figure 5). This area contains EEC vegetation and "*threatened species*" of flora which are to be retained and managed for biodiversity conservation purposes. A detailed *Vegetation Management Plan* (SLR 2013) has been prepared for the VMA and forms part of the *Development Application* (DA). In addition specimens of threatened plants are being retained within the stormwater treatment area in the northwestern corner of the site.

It is also an assumption of this *Assessment Report* that the mitigation measures proposed, involving the implementation of the *Vegetation Management Plan* (VMP) and the salvage and relocation of vegetation to the proposed VMA, will be fully implemented as part of the subdivision, road and services works.

1.4 Scope and Aims of this Report

The aims of this *Flora & Fauna Assessment Report* with respect to the subject site at Cassar Crescent, Cranebrook are:

- to undertake a survey to identify the biota present and/or likely to occur;
- to assess the likely impacts of the proposed future development of the land on the natural environment in general and on threatened biota in particular; and
- to undertake a detailed assessment of likely impacts pursuant to:
  - the *Environmental Planning & Assessment Act 1979* (EP&A Act); and
  - the *Threatened Species Conservation Act 1995* (TSC Act).

Consideration of the *Environmental Protection & Biodiversity Conservation Act 1999* (EPBC Act 1999) is also provided. It should be noted, however, that the EPBC Act is not a matter to be determined by a consent authority in determining a *Development Application* (DA) pursuant to NSW planning legislation.

2 INFORMATION BASE

A number of previous ecological studies (Gunninah 1998a, 1999, 2000a, 2000b) have been referred to in the preparation of this *Report*. Site work undertaken on the subject site during those previous studies involved:

- five days of survey work in June 1998;
- a site inspection and search for threatened species in September 1998;
- a detailed vegetation survey in October 1999; and
- targeted surveys for relevant threatened biota (including the Cumberland Plain Woodland, Cumberland Plain Land Snail, Green and Golden Bell Frog, *Pultenaea parviflora*, *Pimelea spicata*, *Dillwynia tenuifolia*, *Micromyrtus minutiflora* and *Acacia pubescens*) in 1998 and 1999.

Other existing information regarding relevant threatened and other native biota was also obtained from:

- previous investigations undertaken by Gunninah Environmental Consultants and Environmental InSites on lands in the vicinity of the subject site (*eg* at the ADI site);
- recent work undertaken by SLR Ecology (*eg* at Glenmore Park and St Marys);
- inspection of the OEH[1] Atlas of NSW Wildlife records for the locality (Appendix B);
- inspection of the NPWS (2002) vegetation mapping of the locality (Figure 3); and
- the general published literature on threatened biota (see *Bibliography*).

[1] The OEH (Office of Environment & Heritage) incorporates most of the former DEC, DECC, DECCW and National Parks & Wildlife Service (NPWS).

A supplementary site survey was undertaken by SLR Ecology on the 27th of August 2012 to provide specific data and observations for this *Report*. The site work involved:

- the collection of a 'Random Meander' (*sensu* Cropper 1993) flora species list;
- the collection of an opportunistic fauna species list;
- targeted searches for the threatened species which had previously been recorded on the site, including;
  - the Cumberland Plain Land Snail, which is listed as a "*vulnerable*" species in the *Threatened Species Conservation Act 1995* (TSC Act);
  - Juniper-leaved Grevillea - a threatened *'vulnerable'* plant listed in the TSC Act; and
  - *Dillwynia tenuifolia*, which is also a threatened plant listed as "*vulnerable*" in the TSC Act.

Weather conditions on the 27th of August were clear and warm with a light northeasterly wind. Whilst no rain fell during the survey, there had been some rain prior to the survey (on the 24th of August) improving conditions for detection of the Cumberland Plain Land Snail.

3 The EXISTING ENVIRONMENT

3.1 The Locality

The subject site is located within a low-density residential precinct on the western periphery of the Sydney metropolitan area (Figure 1). Accordingly, the land in the vicinity of the subject site comprises a mixture of cleared and developed land, as well as partly cleared and fully vegetated land.

The subject site itself is situated within a residential precinct and, consequently, areas of vegetation in the direct vicinity are scattered and patchy, including:

- a narrow band of vegetation along The Northern Road, which is within the road reserve and is likely to require clearing to facilitate its future upgrade;
- a small band of vegetation within an original large-lot residential subdivision which abuts the northern boundary of the subject site in its northeastern corner; and
- patches and scatters of vegetation within similar large-lot residential areas to the east of The Northern Road.

There are substantial areas of 'relatively' intact native forest and woodland vegetation in the wider vicinity. These include *Priority Conservation Lands* (PCLs) identified in the *Cumberland Plain Recovery Plan* (see Chapter 4.5.2) which are located further to the north, northeast and southeast of the subject site (Figure 1).

The vegetation on the site and nearby has been mapped by the NPWS 2002 (Figure 3) as:

- Shale Gravel Transition Forest;
- Cooks River Castlereagh Ironbark Forest;
- Shale Hills Woodland; and
- Shale Plains Woodland.

The majority of the vegetation in the direct vicinity of the subject site (*ie* within the residential area) is mapped by NPWS (Figure 3) as having a <10% cover, and much of the vegetation has been reduced to scattered individual trees in backyards, small areas of public open space and on road verges. The NPWS 2002 mapping, however, is not accurate (see Figures 2 and 3).

Despite the high level of disturbance, and given the location and circumstances of the vegetation present across the study area, that vegetation could (in part at least) constitute one or other of the Cooks River Castlereagh Ironbark Forest (CRCIF), Shale Gravel Transition Forest (SGTF) and/or Cumberland Plain Woodland (CPW), which are all "*endangered ecological communities*" (EECs) listed in the TSC Act and/or EPBC Act. The latter is listed as a "*critically endangered ecological community*" (CEEC) in the TSC Act, and the SGTF and CPW are also listed as a CEEC in the EPBC Act.

3.2 The Subject Site

As mentioned above, the western portion of current Lot 1 in DP 1144668 contains the school buildings and associated features with the eastern portion being substantially cleared with narrow patches of degraded vegetation (Figure 2). The site is relatively flat with a gentle west-facing slope towards the school.

The subject site, although largely cleared and developed (Figure 2) is mapped by NPWS 2002 (Figure 3) as containing:

- 'Cooks River Castlereagh Ironbark Forest' with an urbanised <10% cover - around the school buildings in the western portion of the site;
- 'Shale/Gravel Transition Forest' with a <10% cover - in the central western portion of the subject site, as well as a narrow band of >10% cover - in the central eastern portion; and
- 'Shale Plains Woodland' with a >10% cover - in the eastern portion of the subject site.

As noted above, these vegetation communities could (in some circumstances) constitute "*endangered ecological communities*" (EECs) or "*critically endangered ecological communities*" (CEECs) known as Cooks River Castlereagh Ironbark Forest (CRCIF), Shale/Gravel Transition Forest (SGTF) and/or Cumberland Plain Woodland (CPW).

There are no other outstanding natural features (such as creeks, caves or rock outcrops) evident on the subject site (Appendix A).

4 FLORA and VEGETATION

4.1 Existing vegetation

The western portion of the site is characterised by the Corpus Christi Primary School, including carparking, buildings, paved and grassed areas. Whilst the NPWS maps two vegetation communities across this portion of the site (Figure 3) there are in fact only a few scattered trees in this area (Figure 2), which arguably do not constitute an 'ecological community' in this form.

The eastern portion of the site (which is proposed for residential subdivision) was previously the temporary location of the Xavier College, and is now characterised by a cleared open area of exotic lawn grasses, with a narrow band of native vegetation along its peripheries, slightly more substantial along the northern boundary (Figure 2).

Based on the previous tree data and the recent site inspection, the vegetation and scattered trees in the eastern part of the subject site are dominated by a canopy of Broad-leaved Ironbark, with a substantial mid-storey of *Melaleuca decora*.

Other tree species observed during the recent site inspection include Rough-barked Apple (in the road reserve), Forest Oak, Green Wattle and Prickly-leaved Paperbark (Appendix D). The understory generally comprises scattered specimens of *Dillywnia sieberi*, Blackthorn, Gorse Bitter Pea, Berry Saltbush and Dogwood.

The groundcover within the 'wooded' portion of the site is relatively sparse, with a substantial amount of leaf litter accumulation beneath the canopy of Ironbarks. Native groundcover specimens were scattered or present only in small patches and included herbs (such as Kidney Weed, Slender Tick-trefoil and White Root), grasses (such as Wiregrass, Wiry Panic and Weeping Grass) and other graminoids (such as Spiny-headed Mat-Rush, *Lomandra filiformis* and *Lepidosperma laterale*).

4.2 Flora Species

Random Meander and systematic botanical surveys conducted as part of this investigation have recorded a total of 58 plant species from within the subject site and adjoining road reserve (Appendix D). Of these, a total of 39 native species were recorded, along with 19 exotic species. A few of the exotic species including Mother of Millions and Wandering Jew are also listed as noxious species in NSW.

4.3 Threatened Species

The recent site inspection mapped 39 specimens of the threatened *Dillwynia tenuifolia*, and 54 specimens of the Juniper-leaved Grevillea *Grevillea juniperina* subsp. *juniperina* across the subject site and adjoining road reserve at Cranebrook. *Dillwynia tenuifolia* and Juniper-leaved Grevillea are both listed as "*vulnerable*" species on the TSC Act.

The specimens of *D. tenuifolia* are located along the northern boundary within areas of protection fencing, which was a management measure in association with the temporary Xavier Secondary College.

The specimens of Juniper-leaved Grevillea are mainly located also within the fenced areas, with a few scattered specimens outside these areas. There is also a substantial patch of Juniper-leaved Grevillea within The Northern Road reserve, just outside the northeastern boundary of the site. A number of the Grevillea in the fenced area in the southeastern corner of the subject site were dead or in poor health (Figure 4).

No other "*threatened species*" of flora were recorded on the subject site during the recent site inspection, and no specimens of *Pultenaea prunifolia* (of which there were originally only two remaining) were located.

Given the intensity of past and present surveys, as well as the highly disturbed nature and artificial condition of the vegetation across the subject site and in its vicinity, and the long history of management (doubtless using fertilisers, irrigation and weed control), no suitable habitat for any additional threatened plant species is present.

4.4 Threatened Populations

No "*endangered populations*" of any flora species listed on the TSC Act have been recorded from the subject site, and there are none that have been detected in the vicinity (Appendix B).

4.5 Endangered Ecological communities

As noted above, the vegetation communities mapped by NPWS as present on the subject site could constitute EECs known as Shale Gravel Transition Forest (SGTF), Cooks River Castlereagh Ironbark Forest (CRCIF) and Cumberland Plain Woodland (CPW).

The native plants surveyed during the recent site inspection include a number of species which are listed as 'characteristic' of the SGTF, CRCIF and CPW communities (Appendix D). The following should be noted with regard to these species and EECs:

- a total of 20 species typical of CRIF EEC are present, with 18 SGTF species and only 15 CPW species;
- 7 of the 20 species of CRCIF are exclusive to that community (*ie* not 'characteristic' of CRCIF or CPW), with only one species exclusive to the CRCIF and CPW communities;
- several canopy and mid-canopy species of the CRCIF were present (including Broad-leaved Ironbark, Grey Box, Rough-barked Apple, Turpentine, Prickly-leaved Paperbark and *Melaleuca decora*);
- the only canopy species typical of the CPW community is the Grey Box, which is present in extremely small numbers;
- the Broad-leaved Ironbark, Grey Box and *M. decora* are typical of the SGTF EEC;
- the list of 'characteristic species' for CPW is considerably larger than the list of characteristic species of the other communities, and yet the number of species present on the subject site is less than for the other EECs; and
- the list of 'characteristic species' for CRCIF is slightly larger than the list of characteristic species of SGTF.

The current floristic analysis suggests that the vegetation present on the subject site more closely correlates to the Cooks River Castlereagh Ironbark Forest (CRCIF), but also fits relatively well into the description of the Shale Gravel Transition Forest (SGTF). Given the high level of disturbance within and surrounding the remaining vegetation, as well as the similarities between SGTF and CRCIF, it is difficult to determine between the two communities. It is possible that the vegetation present on the site may have once represented an eco-tone between the CRCIF and SGTF communities.

It is noted that both the CRCIF and SGTF are listed as "*endangered ecological communities*" in the TSC Act, but the SGTF has also been listed as "*critically endangered*" in the EPBC Act.

On the basis of the floristic data detailed above, the vegetation on the subject site and adjoining it is considered to constitute a degraded example of the CRCIF community. However, given its condition and circumstances, and the objectives outlined in the *Cumberland Plain Recovery Plan*, the authors are of the opinion that the vegetation on the subject site does not constitute a significant stand of the CRCIF community.

Nevertheless, an assessment of the relevance or otherwise of the vegetation on the subject site to the survival of the CRCIF community has been provided in the *Section 5A Assessment of Significance* attached to this *Report*.

5 FAUNA and FAUNA HABITATS

5.1 Fauna Habitats

The subject site at Cranebrook is located in a relatively densely populated part of Sydney, which is largely urban and which has had a long history of agricultural activity. The subject site is largely cleared, but contains a narrow band of native vegetation along its northern boundary, which extends approximately 50m to the northeast into the adjoining large-lot residential property and along the road reserve for The Northern Road.

The subject site provides only extremely limited habitat opportunities for native fauna, threatened or otherwise, and is unlikely to be utilised by any fauna groups other than highly mobile species and/or habitat generalists (such as some bats and birds).

The fauna species observed during the recent site inspection during September 2012, attest to this observation. Only four native birds were observed - common in urban and peri-urban environments. During the recent site inspection, a dead shell of the Cumberland Plain Land Snail was recorded along the road reserve, but no live snails were found, and no snails or shells were recorded within the subject site itself. In addition, only dead shells have been recorded on the site in the past (Gunninah 2001).

There are no hollow-bearing trees on the subject site at Cranebrook. Habitat features such as hollow logs or notable woodland debris are also absent.

The degraded and sparse understorey vegetation (native and exotic) across the subject site provides little habitat and shelter, and is mainly suitable only for small reptiles such as skinks. This lack of shelter indicates that native terrestrial mammals are not likely to be present. In addition, a domestic cat was observed during the site inspection, which is likely to deter and limit the presence of native terrestrial animals.

There are no other habitat features or resources present which are of any significance for any native fauna, threatened or otherwise. The nature, condition and context of the subject site render it of value only for abundant, widespread, cosmopolitan and adaptable species of native fauna, and of little or no relevance for any threatened species.

5.2 Fauna Species

Field investigations within the subject site during 2012 identified a fauna assemblage of 5 native species (4 birds and 1 snail) and 2 introduced/domestic species (Appendix E).

Doubtless, a number of additional urban-tolerant and peri-urban fauna species would be likely to utilise the subject site, on occasions at least. In particular, an array of native bird species would likely to utilise plants on the subject site when flowering, and it is also likely that some microchiropteran bats would fly over the site for foraging purposes. There are, however, no significant natural features which would contribute to the survival of local populations of native biota.

No amphibian species were recorded during the survey period and none are likely to occur. The subject site does not provide any habitat for the Green & Golden Bell Frog, which is the only threatened amphibian known in the locality (Appendix B).

No reptiles have been observed using the subject site, and only common urban and peri-urban reptile species (such as the Common Blue-tongue Lizard and Garden Sun-skink) are likely to occur. There are no threatened reptile species known to the locality (Appendix B).

Four native bird species have been recorded in the subject site (Appendix E), all of which occur commonly in urban and peri-urban environments. Whilst the subject site could theoretically be utilised on a temporary basis by individuals of some of the more wide-ranging threatened bird species known to occur in the locality, the modified and disturbed nature of the vegetation present indicates that the subject site would not be important for any of these species.

Nine threatened mammals have been recorded within the locality (4 microchiropteran bats, the Grey-headed Flying Fox and 4 non-flying mammals), the majority of which are forest-dependent. These species are highly unlikely to occur other than possibly as occasional foraging individuals.

Given the large area of the subject site, it is theoretically possible that individuals of the more mobile wide-ranging and habitat generalist species (such as the Grey-headed Flying Fox) could utilise the subject site on an infrequent basis. Notwithstanding this possibility, however, the disturbed nature, small size and lack of high quality habitat on and/or within the general vicinity of the land indicates that it is highly unlikely to be important for any of these species.

During targeted searches for the Cumberland Plain Land Snail on the 27th of August 2012, only one individual dead shell was located within The Northern Road reserve outside the southeastern boundary of the subject site. The past records of the species on the site were also dead shells, and no live specimens have ever been found on the site.

5.3 Threatened Species

One threatened species, the Cumberland Plain Land Snail was recorded during the recent site survey at Cranebrook, being a single dead shell within The Northern Road reserve, outside the southeastern boundary of the subject site. The past and present records of dead shells on the subject site and adjoining areas indicate that there is no extant population within the subject site.

Whilst it is theoretically possible that individuals of some highly mobile threatened birds and mammals (particularly those tolerant of urban and peri-urban environments) could occur on a temporary basis, the subject site could not constitute a significant area of habitat for even individuals of these species - due to its small size, disturbed nature and the nature of the locality.

Nevertheless, a generic *Assessment of Significance* pursuant to Section 5A of the EP&A Act for threatened fauna (including consideration of the Cumberland Plain Land Snail) is provided in Chapter 6.3 of this *Report*.

6 GENERAL IMPACT ASSESSMENT and DEVELOPMENT CONSTRAINTS

Whilst the proposed development at Cranebrook (as noted above) will require the removal of native trees from the subject site, there are a number of relevant considerations in assessing the potential or likely impacts of the proposal. Relevant matters in this assessment include:

- the small area of vegetation within the subject site (approximately 0.6 hectare), as well as the small size of the whole patch (approximately 1ha);
- the retention and rehabilitation of the majority of the vegetation on the subject site;
- the narrow, contorted shape of the patch (Figure 4), which exposes the vegetation to very significant 'edge effects';
- the highly modified and artificial nature of the overwhelming majority of the site;
- the lack of connectivity of vegetation on the site to larger areas of vegetation on lands to the east and northeast (see Figure 1); and
- the lack of special resources or habitat features of particular significance for any native fauna, including in particular for threatened species.

Given the marginal likely relevance of the subject site for additional threatened species which could potentially occur, beyond the recorded species (as discussed in Chapters 4 and 5), detailed *Assessments of Significance* for an array of potential species, pursuant to Section 5A of the EP&A Act, are not considered necessary. Nevertheless, a generic *Section 5A Assessment of Significance* for threatened species is provided in Chapter 6.3 of this *Report*. Detailed *Section 5A Assessments of Significance* for the Cooks River Castlereagh Ironbark Forest (CRCIF) and the two threatened plants are provided in Appendix F.

The proposed residential development of the subject site at Cranebrook is consistent with the recent and ongoing expansion of residential development areas in this part of Sydney. Even if retained (other than the areas identified as 'preserved'), it is extremely likely that the vegetation on the subject site would only continue to degrade, particularly given its size, its narrow shape and the nature of surrounding development. Following the future expansion of The Northern Road, the patch of vegetation (part of which is on the subject site) will be reduced to less than one hectare.

Non-development of the subject site would achieve little (if anything) in biodiversity conservation terms, as the vegetation present (consisting of a highly disturbed narrow band of CRCIF vegetation) is not regarded as of particular conservation value or relevance.

7 SECTION 79C of the EP&A ACT

The subject site at Cranebrook has long been highly modified, and does not constitute a significant element of the "*natural environment*". Whilst there is a narrow band of CRCIF vegetation as well as two threatened plant species on the subject site, the long-term prognosis for this vegetation is very low, given:

- the small area of vegetation within the subject site;
- the shape of the patch, which exposes the vegetation to very significant 'edge effects';
- the highly modified and artificial nature of the overwhelming majority of the site;
- the lack of connectivity of vegetation on the site to larger areas of vegetation; and
- the lack of special resources or habitat features of particular significance for any native fauna, including in particular for threatened species.

Notwithstanding the loss of some of the vegetation present, the proposed residential development of the site would not impose an unreasonable or substantial adverse impact upon the *"natural environment"* in general, given:

- the disturbed nature of the vegetation present;
- the retention, protection and enhancement of the majority of the vegetation on the site;
- the minimal conservation significance or value of the vegetation identified for removal;
- the very small area involved, as well as its narrow shape and patchy nature; and
- the very poor prognosis even if retained in general access parks and/or backyards, given the residential nature of the vicinity.

An additional consideration is the context of the subject site, and the known or likely future development of other lands at this location. The site is bound by residential development, the school and The Northern Road, which involve activities which are not conducive to the survival or flourishing of small narrow patches of vegetation. In any case, the majority of the vegetation will be retained and managed in accordance with the VMP.

Additionally, the removal of vegetation from the proposed lot areas will be mitigated by the salvage and re-use of the CRCIF vegetation and threatened plants at the subdivision stage. The proposed development involves the preservation of vegetation within two locations on the site, including:

- an approximately 10m wide band along The Northern Road (Figure 5) – possibly to be added to The Northern Road reserve; and
- a larger band of vegetation at the rear of proposed lots along the northern boundary of the site, which forms the *Vegetation Management Area* (VMA) (Figure 5) – this area is to be protected and managed in accordance with the VMP.

In addition the threatened plants in the stormwater treatment area are to be retained and protected and the plant materials are to be salvaged from the development footprint for re-use in the VMA.

Given those circumstances, the proposed development does not constitute an activity which could be regarded as unacceptable or unreasonable in terms of Section 79C of the EP&A Act.

8 SECTION 5A of the EP&A ACT

8.1 The Statutory Regime

The *Threatened Species Conservation Act 1995* (TSC Act) has modified the *Environmental Planning & Assessment Act 1979* (EP&A Act) by, *inter alia*, including a requirement to determine "*whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*". The relevant factors of Section 5A of the EP&A Act "*must be taken into account*" by a consent or determining authority when considering a *Development Application*, and in administering Sections 78A, 79B, 79C, 111 and 112 of the EP&A Act, as relevant.

In addition to the seven factors which "*must be taken into account*" (where relevant) pursuant to Section 5A(2) of the EP&A Act (see below), Section 5A(1)(b) of the EP&A Act requires that "*any* [relevant] *assessment guidelines*" promulgated by the relevant authorities (particularly in this instance the OEH) also "*must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*".

In undertaking the formal *Section 5A Assessments of Significance* documented below, the authors have "*taken into account*" the *Threatened Species Assessment Guidelines: the Assessment of Significance* prepared by the then Department of Environment & Climate Change (now OEH), dated August 2007.

The A*ssessment of Significance* provided below, prepared pursuant to Section 5A of the EP&A Act, deals with those threatened biota which could theoretically or potentially occur on the subject site (*eg* individuals of some threatened mammals, particularly microchiropteran bats, or threatened birds, as well the Cumberland Plain Land Snail).

The CRCIF community, as well as the Juniper-leaved Grevillea and *Dillwynia tenuifolia*, are considered in detailed *Section 5A Assessments of Significance* in Appendix F of this *Report*.

8.2 The Seven Factors of Section 5A

Factor a Threatened Species – Risk of Extinction

It is not likely that the subject site itself would support or be crucial to the survival of a "*viable local population*" of any of the additional "*threatened species*" which could potentially occur on the site.

With respect to threatened fauna, it is likely only that individuals of a few wide-ranging threatened species (such as microchiropteran bats or birds) would or may utilise the subject site on occasions. The subject site itself does not provide particularly suitable habitat for any such species.

A single dead shell of the Cumberland Plain Land Snail was the only record of this species in the vicinity of the subject site (along The Northern Road), and detailed searches for the Snail were unable to locate any further evidence of the species within the subject site. It is most likely that there is no live population of the Snail on the subject site at Cranebrook, as the understory is only of marginal habitat value (at best) for the species, and there is no suitable shelter (rocks or logs) and no preferred food resource (rotting logs or other decaying vegetation).

It is not likely that a "*viable local population*" of any of the species considered above would be dependent on the subject site, either in isolation or as a significant element in a broader area of habitat.

Two species of threatened flora have been detected within the vegetation on the subject site, and are assessed in detailed *Section 5A Assessments of Significance* in Appendix F.

No other threatened flora species were recorded on the subject site during the site inspection and, given the highly disturbed nature of the site, none are likely to be present. Consequently, the removal of vegetation from the subject site could not be regarded as significant in terms of the "*life cycle*" of any of those possible threatened biota.

Given the considerations discussed above, there is no likelihood of a "*viable local population*" of any "*threatened species*" being "*placed at risk of* ***extinction***"[2] (emphasis added).

Factor b Endangered Populations – Risk of Extinction

The TSC Act defines an "*endangered population*" as "*a population specified in Part 2 of Schedule 1*" of the Act.

There is no "*endangered population*" of any species likely to occur or be present on the subject site or in the locality.

Factor c Endangered Ecological Communities – Risk of Extinction

The TSC Act defines an "*endangered ecological community*" as "*a community specified in Part 3 of Schedule 1*" of the Act.

The CRCIF vegetation on the subject site and the land adjoining the northern and eastern boundaries is highly degraded and isolated. Given those circumstances, the removal of some of the vegetation from the subject site would not impose a "*significant effect*" upon the CRCIF community at this location, or generally.

Nevertheless this community is considered in a detailed *Section 5A Assessment of Significance* in Appendix F of this *Report*.

Factor d Impacts on Habitat for Threatened Biota

As noted above, the subject site does not contain significant or important habitat or resources for any of the additional threatened biota which could potentially occur on the land, as a consequence of the highly modified nature of the site, its context, its location and its size.

Those additional threatened species which could potentially occur on the subject site are likely to be widely distributed in the general locality and/or are wide-ranging and highly mobile. Those parts of the subject site proposed for development activities do not constitute significant, critical or important habitat for any such possible threatened biota.

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2 The term "*extinction*" is significant. It means the destruction of or the obliteration of a "*viable local population*" – its cessation to exist. It does not mean merely some reduction in the population or in the extent of its distribution, or some reduction in the extent of relevant habitat.

Given the circumstances described above, and given the nature and condition of the subject site, as well as its context and size, "*the action proposed*":

- is not likely to result in the removal or modification of significant areas of potential habitat for any threatened biota ("*threatened species, endangered populations, or ecological communities*"). The area to be affected by the proposal is not of any particular relevance or significance for any threatened biota, and constitutes only a very small proportion of potentially suitable habitat for any such biota in the locality – Factor (d)(i);
- is not likely to result in any habitat for threatened biota becoming "*fragmented or isolated from other areas of habitat*" – Factor (d)(ii), given:
  - the extent and distribution of potential habitat in the locality;
  - the context and location of the site; and
  - the lack of significant or relevant resources;
- is not likely to result in any disturbance to important or significant habitat for any threatened biota, even if any such biota are present. Those portions of the subject site proposed to be developed cannot reasonably be regarded as of importance with respect to "*the long-term survival*" of any threatened biota "*in the locality*" – Factor (d)(iii).

Factor e Critical Habitat

The TSC Act defines "*critical habitat*" as "*habitat declared to be critical habitat under Part 3*" of the *Act*.

The subject site does not represent listed "*critical habitat*" for any threatened biota.

Factor f Recovery Plans and Threat Abatement Plans

The *Cumberland Plain Recovery Plan* is discussed in detail in Chapter 4.5 of this *Report*. The subject site is not identified as an area of *Priority Conservation Land* (PCL) pursuant to that *Recovery Plan*, and the proposed development does not contravene the objectives of the *Cumberland Plain Recovery Plan*. The vegetation on the site is small in extent, patchy, degraded, narrow and surrounded by residential development. Its long-term prognosis is extremely poor.

There are no other relevant *Recovery Plans* or *Threat Abatement Plans* which relate to any of the biota or of potential relevance to the subject site at Cranebrook.

Factor g Key Threatening Processes

The only "*key threatening processes*" listed in the TSC Act which could be of even potential relevance to the proposed development on the subject site are the "*clearing of native vegetation*".

With respect to the "*clearing of native vegetation*", however:

- it is to be noted that the "*vegetation*" present is highly degraded and isolated; and
- the loss of small patches of degraded vegetation from within the development footprint (the only element of "*native vegetation*" to be removed) is not considered of significance with respect to threatened biota which could potentially occur on the site (see Factor a and Factor d above).

In addition, much of the vegetation to be removed is to be salvaged and re-used in the rehabilitation of the VMA.

Given those considerations, the minor imposition of or exacerbation of "*key threatening processes*", as required for the development of the subject site for residential purposes as proposed, is not of significance with respect to any threatened biota. Importantly, the imposition of those "*key threatening processes*" as a result of the "*action proposed*" is not such as to be "*likely*" to impose a "*significant effect*" upon any of the additional threatened biota that could occur on the site.

8.3 Conclusions

Given the considerations outlined above, the proposed development on the subject site at Cranebrook is not "*likely*" to impose a "*significant effect*" upon any "*threatened species, populations or ecological communities, or their habitats*", pursuant to Section 5A of the EP&A Act.

As discussed in considerable detail above, the CRCIF community present on the subject site at Cranebrook is small, patchy, isolated and degraded, and does not represent a special or important example of that vegetation. Given those circumstances, as well as the proposed retention and rehabilitation of much of the vegetation on the site, and the salvage and re-use of plant material from the development footprint, there will be no adverse impact (or "*significant effect*") imposed upon the CRCIF community (see detailed assessment in Appendix F).

The two threatened plant species recorded on the site are not "*likely*" to be subjected to a "*significant effect*", as documented in Appendix F.

Even if some additional threatened biota do use the subject site, it is not likely that the vegetation present would support a "*viable local population*" of any such biota in isolation. It is not likely that any such "*population*", nor indeed any individuals of any such additional species, would be dependent or reliant solely (or to any relevant extent) on that portion of the subject site proposed for development activities.

There is no requirement for the preparation of a *Species Impact Statement* (SIS) for the proposed development at Cranebrook.

9 APPLICATION of the EPBC ACT

The *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act) requires consideration of the potential for a "*significant impact*" to be imposed by an activity on a *Matter of National Environmental Significance* (MNES).

In the event that such an "*impact*" is "*likely*" to be imposed, the activity proposed must be referred to the Commonwealth for determination as to whether it constitutes a "*controlled action*". Where a development activity does constitute a "*controlled action*", an approval from the Commonwealth Minister of the Environment is required.

That portion of the subject site at Cranebrook which is proposed for development activities with respect to the residential subdivision proposal is of no relevance with respect to any biota listed in the EPBC Act, or any other MNES. There is no record of any listed threatened biota or migratory species on the subject site, and any that could conceivably be present are confined to possible occasional individuals of highly mobile fauna species.

There is no likelihood that a "*significant impact*" would be imposed upon any MNES as a result of the proposed residential development on the subject site at Cranebrook. There is, consequently, no requirement for any "*referral*" of the proposal to the Commonwealth pursuant to the EPBC Act.

It should be noted that matters with respect to the EPBC Act are not relevant to the determination of a *Development Application* by a consent authority pursuant to the EP&A Act.

10 IMPACT AMELIORATION and ENVIRONMENTAL MANAGEMENT MEASURES

Notwithstanding the minor impacts on the "*natural environment*" which would ensue from development of the subject site at Cranebrook as proposed, appropriate impact amelioration and environmental management measures would be anticipated (as is standard practice) for implementation as part of any future development of the site.

Specific measures in this regard which either have been incorporated into the residential development design or which should be included as *Conditions of Consent* should include:

- the management of stormwater discharge volumes and water quality from the development area, both during construction activities and following completion and occupation of the site, according to current 'best practice' and 'Water Sensitive Urban Design' principles;
- the use of sediment fences and other appropriate control measures during construction activities to avoid erosion and sediment discharge or the discharge of other pollutants or contaminants;
- the implementation of a management regime during the construction process to ensure that no other wastes (including building rubble, garbage, contaminants, fuels, oils, paints or other chemicals) are discharged from the construction area, and that all such wastes and contaminants are contained within the construction footprint, and are appropriately managed;
- the use of appropriate plant species in the landscaping of roads and public areas to enhance the adjoining vegetation and to avoid invasive species; and
- the implementation of the *Vegetation Management Plan* (SLR 2013) which will facilitate:
    - the protection of the vegetation within the *Vegetation Management Area* (VMA);
    - the salvage, relocation and establishment of native plant material from the development site to the VMA, prior to any construction works for the subdivision;
    - the removal of rubbish and weeds from the VMA; and
    - the monitoring and reporting of the biodiversity features in the VMA.

GLOSSARY

DA	A *Development Application* prepared pursuant to the EP&A Act.
DEC	Department of Environment & Conservation.
DECC	Department of Environment & Climate Change.
DECCW	Department of Environment, Climate Change & Water.
Endangered Ecological Community	"*an ecological community specified in Part 3 of Schedule 1*" of the TSC Act.
Endangered Population	"*a population specified in Part 2 of Schedule 1*" of the TSC Act.
EP&A Act	*Environmental Planning & Assessment Act 1979*.
EPBC Act	Environment Protection & Biodiversity Conservation Act 1999.
Key Threatening Process	"*a threatening process specified in Schedule 3*" of the TSC Act.
NPWS	NSW National Parks & Wildlife Service.
OEH	Office of the Environment & Heritage, which is part of the Department of Premier & Cabinet, and which incorporates most of the DECCW.
Proposal	"*the development, activity or action proposed*" (DGRs).
Recovery Plan	"*a plan prepared and approved under Part 4*" of the TSC Act.
Region	"*a bioregion defined in a national system of bioregionalisation that is determined (by the Director-General by order published in the Gazette) to be appropriate for those purposes*" (TSC Act).
SIS	*Species Impact Statement* prepared pursuant to Sections 109, 110 and 111 of the TSC Act.
Threatened Species	"*a species specified in Part 1 or 4 of Schedule 1, Part 1 of Schedule 1A or Part 1 of Schedule 2*" of the TSC Act.
Threatened Ecological Community	"*an ecological community specified in Part 3 of Schedule 1, Part 2 of Schedule 1A or Part 2 of Schedule 2*"
Threatening Process	"*a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities*" (TSC Act).
TSC Act	*Threatened Species Conservation Act 1995*.

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Figure 1 Location of the subject site at The Northern Road, Cranebrook

LEGEND

Subject site

0 100 200 400 600 800
Metres

N

NOTES

1. Basemap courtesy of Nearmap 26/08/2012
2. Digital cadastral database (DCDB) © LPMA 2012
3. Subject site boundary based on DCDB © 2012
4. All features are approximate only and subject to detailed survey

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The Catholic Education Office

Project No: **610.11706**

Scale	Date
1:20,000	21-Dec-2012

Drafted	Approved
Sepehr Sobhani	Fiona Iolini

Figure 2 Details of the subject site at The Northern Road, Cranebrook

LEGEND

Subject site

0 50 100
Metres

N

NOTES

1. Basemap courtesy of Nearmap 02/08/2012
2. Digital cadastral database (DCDB) © LPMA 2012
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1:2,500	21-Dec-2012

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@ A3

Figure 3

Vegetation mapping by the NPWS (2002)

LEGEND

- Subject site

NPWS Vegatation

Greater than 10% cover

- Shale/Gravel Transition Forest
- Cooks River Castlereagh Ironbark Forest
- Shale Plains Woodland

Less than 10% cover

- Cooks River Castlereagh Ironbark Forest
- Shale/Gravel Transition Forest
- Shale Hills Woodland
- Shale Plains Woodland

Less than 10% cover and urbanised

- Cooks River Castlereagh Ironbark Forest
- Shale Plains Woodland

0 100 200
Metres

N

NOTES

1. Basemap courtesy of NearMap 02/08/2012
2. Digital cadastral database (DCDB) © LPMA 2012
3. Subject site boundary based on DCDB © 2012
4. Vegetation mapping © NPWS 2002 (Cumberland Plain Vegetation mapping project)
5. All features are approximate only and subject to detailed survey

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Figure 4 Vegetation and threatened plants on the subject site at Cranebrook

LEGEND

- Subject site
- EEC Vegetation
- Dillwynia tenuifolia (39)

Grevillea juniperina

- dead (2)
- dying (2)
- live (50)

N

0 20 40

Metres

NOTES

1. Basemap courtesy of Nearmap 02/08/2012
2. Digital cadastral database (DCDB) © LPMA
3. Subject site boundary based on DCDB © 2012
4. Vegetation and threatened plants 27th August 2012
5. All features are approximate only and subject to detailed survey

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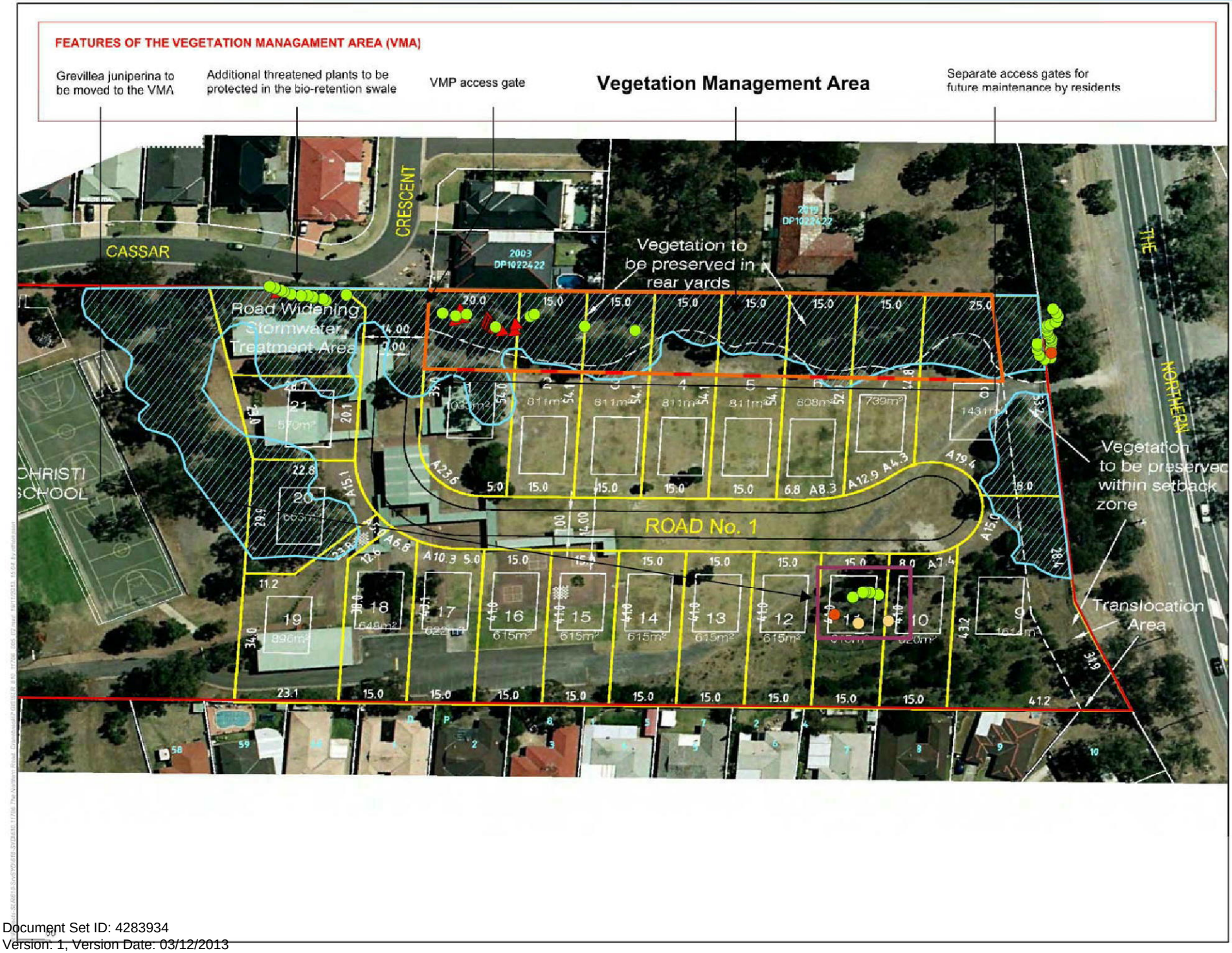
@ A3

Figure 5 The Proposed Subdivision and Vegetation Management Area on the subject site at Cranebrook



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Prepared for: **The Catholic Education Office**

Project No: **610.11706**

Scale	Date
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Drafted	Approved
NT	Fiona Iolini

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Appendix A
Photographs of the subject site at Cranebrook

21 November 2013

Appendix A Photographs taken of the subject site on the 27th of August 2012

Photo 1 Facing east from the western boundary of the subject site, showing the exotic grassed area and the vegetation lining the southern and northern boundaries

Photo 2 Facing north along the western boundary of the subject site, showing the scattered trees and managed understorey

Appendix A Photographs taken of the subject site on the 27th of August 2012

Photo 3 A small patch of maintained native vegetation in the grassed area on the subject site at Cranebrook

Photo 4 A stand of Black Wattles above a highly disturbed groundcover in the southeastern corner of the subject site

Photo 5 Some dieback within the stand of Black Wattles in the southeastern corner of the subject site

Photo 6 The *Grevillea juniperina* experiencing severe dieback in the southeastern corner of the subject site

Photo 7 Garden escapes entering the vegetation along the northern boundary of the subject site at Cranebrook

Photo 8 The location of the few remaining *Dillwynia tenuifolia*, within the fenced area along the northern boundary of the subject site

Photo 9 The *Dillwynia tenuifolia* under threat by invasion of African Love Grass along the northern boundary of the subject site

Photo 10 The *Dillwynia tenuifolia* flowering along the northern boundary of the subject site

Appendix A Photographs taken of the subject site on the 27th of August 2012

Photo 11 The band of vegetation within the road reserve along The Northern Road. Note the distance of the vegetation to the east of The Northern Road

Photo 12 The Cumberland Plain Land Snail shell found in the road reserve along The Northern Road

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Appendix B
OEH Wildlife Atlas Search

21 November 2013

KEY	
Status	The "*threatened species*" listing in the *Threatened Species Conservation Act 1995*
V	Species listed as "*vulnerable*"
E1	Species listed as "*endangered*"
E4A	Species listed as "*critically endangered*"
Records	The number of records of the relevant "*threatened species*" listed in the search area
Relevance	The potential relevance that the "*threatened species*" might have to the subject site.
H	Considered by SLR Ecology to have a "*high*" potential relevance to the subject site
M	Considered by SLR Ecology to have a "*moderate*" potential relevance to the site
L	Considered by SLR Ecology to have a "*low*" potential relevance to the subject site
N	Considered by SLR Ecology to have "*no*" potential relevance to the subject site

NOTES

The table below is based on data obtained from the recently reformed *Atlas of NSW Wildlife* website http://www.bionet.nsw.gov.au/, and the following notes accompany this dataset:

- Data from the BioNet Atlas of NSW Wildlife website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions.
- Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°; ^^ rounded to 0.01°).
- Copyright the State of NSW through the Office of Environment and Heritage.
- Search criteria: Public Report of all Valid Records of Threatened (listed on TSC Act 1995) Animals and Plants in selected area [North: -33.65 West: 150.66 East: 150.76 South: -33.76] returned a total of 459 records of 204 species.
- Report generated on 24/08/2012 5:40 PM
- Note – the species listed in the table below have been modified to include only those species with actual known records in the vicinity.

Status	Scientific Name	Common Name	Records	Relevance
	PLANTS			
	Fabaceae – Faboideae			
V	*Dillwynia tenuifolia*	-	59	H
E1	*Pultenaea parviflora*	-	32	L/N
	Fabaceae – Mimosoideae			
E1	*Acacia bynoeana*	Bynoe's Wattle	23	N
	Myrtaceae			
E1	*Micromyrtus minutiflora*	-	28	N
	Orchidaceae			
E1	^*Pterostylis saxicola*	Sydney Plains Greenhood	1	N
	Proteaceae			
V	*Grevillea juniperina* subsp. *juniperina*	Juniper-leaved Grevillea	32	H
E1	*Persoonia nutans*	Nodding Geebung	126	N
	Thymelaeaceae			
E1	*Pimelea spicata*	Spiked Rice-flower	4	N
	AMPHIBIAN			
	Hylidae			
E1	*Litoria aurea*	Green & Golden Bell Frog	3	N
	AVES			
	Anatidae			
V	*Stictonetta naevosa*	Freckled Duck	2	N

Appendix B OEH Wildlife Atlas Search for "*threatened species*" within 10km of the subject site

Status	Scientific Name	Common Name	Records	Relevance
	Ciconiidae			
E1	*Ephippiorhynchus asiaticus*	Black-necked Stork	1	N
	Accipitridae			
V	*Hieraaetus morphnoides*	Little Eagle	2	N
V	^^*Lophoictinia isura*	Square-tailed Kite	3	N
	Cacatuidae			
V	^^*Callocephalon fimbriatum*	Gang-gang Cockatoo	2	N
V	^*Calyptorhynchus lathami*	Glossy Black-Cockatoo	2	N
	Psittacidae			
V	*Glossopsitta pusilla*	Little Lorikeet	3	N
E1	^^*Lathamus discolor*	Swift Parrot	15	N
V	^^*Neophema pulchella*	Turquoise Parrot	2	N
	Tytonidae			
V	^^*Tyto tenebricosa*	Sooty Owl	1	N
	Acanthizidae			
V	*Pyrrholaemus saggitatus*	Speckled Warbler	3	N
	Meliphagidae			
E4A	*Anthochaera phrygia*	Regent Honeyeater	12	N
V	*Grantiella picta*	Painted Honeyeater	1	N
V	*Melithreptis gularis gularis*	Black-chinned Honeyeater	3	N
	Neosittidae			
V	*Daphoenositta chrysoptera*	Varied Sittella	11	N
	Petroicidae			
V	*Petroica boodang*	Scarlet Robin	7	N
V	*Petroica phoenicea*	Flame Robin	2	N
	Petroica rodinogaster	Pink Robin	1	N
	MAMMALS			
	Dasyuridae			
V	*Dasyurus maculatus*	Tiger Quoll	1	N
	Phascolarctidae			
V	*Phascolarctos cinereus*	Koala	1	N
	Petauridae			
V	*Petaurus australis*	Yellow-bellied Glider	1	N
V	*Petaurus norfolcensis*	Squirrel Glider	2	N
	Pteropodidae			
V	*Pteropus poliocephalus*	Grey-headed Flying Fox	13	L/N
	Molossidae			
V	*Mormopterus norfolkensis*	Eastern Freetail Bat	8	L
	Vespertilionidae			
V	*Miniopterus schreibersii oceanensis*	Eastern Bent-wing Bat	13	L
V	*Myotis macropus*	Southern Myotis	4	N
V	*Scoteanax rueppellii*	Greater Broad-nosed Bat	3	L
	GASTROPODS			
	Camaenidae			
E1	*Meridolum corneovirens*	Cumberland Plain Snail	15	L

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Proposed Residential Subdivision

Flora & Fauna Assessment Report

Appendix C
Protected Matters Search

21 November 2013

Australian Government
Department of Sustainability, Environment, Water, Population and Communities

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

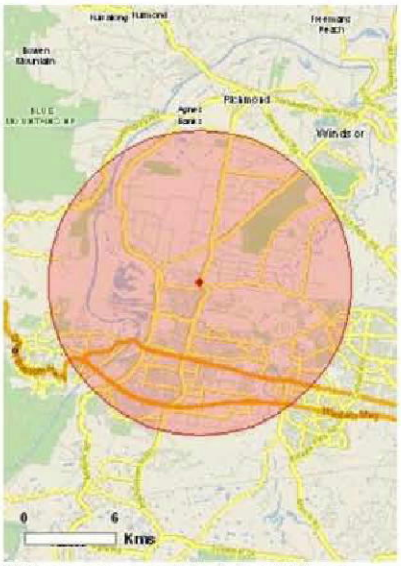
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 19/09/12 15:24:23

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

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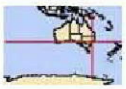

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	1
National Heritage Places:	1
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	42
Listed Migratory Species:	14

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate.

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	16
Commonwealth Heritage Places:	4
Listed Marine Species:	12
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

Place on the RNE:	29
State and Territory Reserves:	7
Regional Forest Agreements:	None
Invasive Species:	18
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

World Heritage Properties [Resource Information]

Name	State	Status
The Greater Blue Mountains Area	NSW	Declared property

National Heritage Properties [Resource Information]

Name	State	Status
Natural		
The Greater Blue Mountains Area	NSW	Listed place

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically Endangered	Community likely to occur within area
Shale/Sandstone Transition Forest	Endangered	Community likely to occur within area
Temperate Highland Peat Swamps on Sandstone	Endangered	Community known to occur within area
Turpentine-Ironbark Forest in the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion	Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Endangered	Species or species habitat likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Lathamus discolor		
Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Rostratula australis		
Australian Painted Snipe [77037]	Vulnerable	Species or species habitat likely to occur within area
Fish		
Macquaria australasica		
Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Prototroctes maraena		
Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Heleioporus australiacus		
Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea		
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
Litoria littlejohni		
Littlejohn's Tree Frog, Heath Frog [64733]	Vulnerable	Species or species habitat may occur within area
Mixophyes balbus		
Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Mixophyes iteratus		
Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus		
Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pseudomys novaehollandiae		
New Holland Mouse [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Acacia bynoeana		
Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat likely to occur within area

Appendix C EPBC Act website search within 10km of the subject site at Cranebrook

Name	Status	Type of Presence
Allocasuarina glareicola [21932]	Endangered	Species or species habitat likely to occur within area
Asterolasia elegans [56780]	Endangered	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Haloragodendron lucasii Hal [6480]	Endangered	Species or species habitat likely to occur within area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat may occur within area
Micromyrtus minutiflora [11485]	Vulnerable	Species or species habitat likely to occur within area
Pelargonium sp. Striatellum (G.W.Carr 10345) Omeo Stork's-bill [84065]	Endangered	Species or species habitat likely to occur within area
Persoonia nutans Nodding Geebung [18119]	Endangered	Species or species habitat likely to occur within area
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat may occur within area
Pimelea spicata [20834]	Endangered	Species or species habitat known to occur within area
Pomaderris brunnea Rufous Pomaderris [16845]	Vulnerable	Species or species habitat likely to occur within area
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area
Pterostylis saxicola Sydney Plains Greenhood [64537]	Endangered	Species or species habitat likely to occur within area
Pultenaea glabra Smooth Bush-pea, Swamp Bush-pea [11887]	Vulnerable	Species or species habitat likely to occur within area
Pultenaea parviflora [19380]	Vulnerable	Species or species habitat likely to occur within area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area
Streblus pendulinus Siah's Backbone, Sia's Backbone, Isaac Wood [21618]	Endangered	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Tetratheca glandulosa		
Glandular Pink-bell [2350]	Vulnerable	Species or species habitat may occur within area
Thelymitra sp. Kangaloon (D.L.Jones 18108)		
Kangaloon Sun-orchid [81971]	Critically Endangered	Species or species habitat may occur within area
Reptiles		
Hoplocephalus bungaroides		
Broad-headed Snake [1182]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat may occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat known to occur within area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat known to occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Breeding likely to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Breeding may occur within area
Xanthomyza phrygia		
Regent Honeyeater [430]	Endangered*	Species or species habitat likely to occur within area
Migratory Wetlands Species		
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato)		
Painted Snipe [889]	Vulnerable*	Species or species

Name	Threatened	Type of Presence
		habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -
Commonwealth Land - Airservices Australia
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Postal Corporation
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Defence Housing Authority
Commonwealth Land - Defence Service Homes Corporation
Commonwealth Land - Deputy Director of War Service Homes
Commonwealth Land - Director of War Service Homes
Commonwealth Land - Telstra Corporation Limited
Defence - 1CAD ORCHARD HILLS KINGSWOOD
Defence - AIRTC ST MARYS
Defence - LONDONDERRY PARACHUTE DROP ZONE
Defence - LONDONDERRY RTS (Communication Station)
Defence - PENRITH DEPOT (Army Stores)
Defence - SIGNAL STRS DEPOT-KINGSWOOD

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Natural		
Orchard Hills Cumberland Plain Woodland	NSW	Listed place
Shale Woodland Llandilo	NSW	Listed place
Historic		
Llandilo International Transmitting Station	NSW	Listed place
Thornton Hall & Surrounds	NSW	Listed place

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat may occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis Cattle Egret [59542]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Breeding may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Vulnerable*	Species or species habitat likely to occur within area

Extra Information

Places on the RNE [Resource Information]

Note that not all Indigenous sites may be listed.

Name	State	Status
Natural		
The Blue Mountains	NSW	Indicative Place
Agnes Banks Nature Reserve and Adjoining Areas	NSW	Registered
Blue Mountains National Park (1980 boundary)	NSW	Registered
Castlereagh Jewel Beetle Habitat and Movement Corridor	NSW	Registered
Castlereagh State Forest and Adjacent Area	NSW	Registered
Mulgoa Natural Area	NSW	Registered
Orchard Hills Cumberland Plain Woodland	NSW	Registered
Shale Woodland Llandilo	NSW	Registered
University of Western Sydney Hawkesbury Native Vegetation	NSW	Registered
Western Sydney Shale Woodland St Marys	NSW	Registered
Indigenous		
Shaws Creek Rock Shelter KII	NSW	Indicative Place
Lapstone Area	NSW	Registered
Historic		
Castlereagh Area	NSW	Indicative Place
Castlereagh Cemetery	NSW	Indicative Place
Homestead Site & Windbreak	NSW	Indicative Place
Minnaville	NSW	Indicative Place
The Lewers Bequest & Penrith Regional Art Gallery & Garden	NSW	Indicative Place
Upper Room Chapel, Hall and Cemetery	NSW	Indicative Place

Name	State	Status
Combewood, Outbuildings and Garden	NSW	Registered
Emu Plains Community Arts Centre	NSW	Registered
King Family Farm Sites and Trees	NSW	Registered
Museum of Fire	NSW	Registered
Nepean Park	NSW	Registered
St Mary Magdalene Anglican Church & Cemetery	NSW	Registered
St Marys Permanent Cottage Area	NSW	Registered
St Stephens Anglican Church & Graveyard	NSW	Registered
Thornton Hall & Surrounds	NSW	Registered
Victoria Bridge	NSW	Registered
Werrington House	NSW	Registered

State and Territory Reserves [Resource Information]

Name	State
Agnes Banks	NSW
Blue Mountains	NSW
Castlereagh	NSW
Mulgoa	NSW
Penrith Lakes	NSW
Wianamatta	NSW
Yellomundee	NSW

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Frogs		
Bufo marinus Cane Toad [1772]		Species or species habitat likely to occur within area
Mammals		
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area

Appendix C EPBC Act website search within 10km of the subject site at Cranebrook

Name	Status	Type of Presence
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat may occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

Coordinates

-33.711815 150.721076

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Department of Environment, Climate Change and Water, New South Wales
-Department of Sustainability and Environment, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment and Natural Resources, South Australia
-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts
-Environmental and Resource Management, Queensland
-Department of Environment and Conservation, Western Australia
-Department of the Environment, Climate Change, Energy and Water
-Birds Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-SA Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
-State Forests of NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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The Northern Road, Cranebrook

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Appendix D
Flora species list on the subject site at Cranebrook

21 November 2013

Appendix D Flora Species List surveyed from the subject site on the 27th of August 2012

KEY	
Symbol	**Description**
Status	
*	Exotic species
**	Noxious species
SGTF	Species is listed as "*characteristic*" within the Final Determination (Scientific Committee 2012) for the Shale Gravel Transition Forest, which is listed as: • an "*endangered ecological community*" (EEC) on the *Threatened Species Conservation Act 1995* (TSC Act); and • a "*critically endangered ecological community*" (CEEC) on the *Environmental Protection of Biodiversity Conservation Act 1999* (EPBC Act).
CRCIF	Species is listed as "*characteristic*" within the Final Determination for the Cooks River/Castlereagh Ironbark Forest, which is listed as an EEC on the TSC Act.
CPW	Species is listed as "*characteristic*" within the Final Determination for the Cumberland Plain Woodland, which is listed as a CEEC on the TSC Act and EPBC Act.

Status	Species name	Common name
	Acanthaceae	
SGTF, CPW	*Brunoniella australis*	Blue Trumpet
	Apocynaceae	
*	*Araujia sericifera*	Moth Vine
	Asparagaceae	
*	*Asparagus aethiopicus*	Asparagus 'Fern'
*	*Asparagus asparagoides*	Bridal Creeper
	Asteraceae	
*	*Bidens pilosa*	Cobblers Peg
	Cotula australis	Carrot Weed
*	*Gamochaeta purpurea*	Purple Cudweed
*	*Hypochaeris radicata*	Catsear
CRCIF	*Ozothamnus diosmifolius*	White Dogwood
*	*Sonchus oleracheus*	Common Sowthistle
*	*Taraxacum officinale*	Dandelion
SGTF, CPW, CRCIF	*Vernonia cinerea* var. *cinerea*	-
	Cactaceae	
*	*Hylocereus undatus*	Dragon Fruit
*	*Opuntia* sp.	Prickly Pear
	Casuarinaceae	
	Allocasuarina torulsa	Forest Oak
	Chenopodiaceae	
CPW	*Einadia hastata*	Berry Saltbush
CPW, CRCIF	*Einadia nutans* subsp. *linifolia*	-
	Commelinaceae	
**	*Tradescantia fluminensis*	Wandering Jew
	Convolvulaceae	
SGTF, CPW	*Dichondra repens*	Kidney Weed
	Crassulaceae	
**	*Bryophyllum delagoense*	Mother-of-millions
	Cyperaceae	
SGTF, CRCIF	*Lepidosperma laterale*	-

Appendix D Flora Species List surveyed from the subject site on the 27th of August 2012

Status	Species name	Common name
	Fabaceae – Faboideae	
SGTF, CPW	*Daviesia ulicifolia*	Gorse Bitter Pea
SGTF, CPW	*Desmodium varians*	Slender Tick-trefoil
CPW, CRCIF	*Dillwynia sieberi*	-
V	*Dillwynia tenuifolia*	-
SGTF, CPW	*Hardenbergia violaceae*	False Sarsparilla
*	*Medicago lupulina*	Black Medic
*	*Trifolium repens*	White Clover
*	*Vicia sativa* subsp. *nigra*	Narrow-leaved Vetch
	Fabaceae – Mimosoideae	
	Acacia decurrens	Black Wattle
SGTF	*Acacia parramattensis*	Green Wattle
	Lauraceae	
CRCIF	*Cassytha sp.*	-
	Lobeliaceae	
SGTF, CPW, CRCIF	*Pratia purpurascens*	White-root
	Lomandraceae	
SGTF, CPW	*Lomandra filiformis*	
CRCIF	*Lomandra longifolia*	Mat Rush
	Myrtaceae	
CRCIF	*Angophora floribunda*	Rough-barked Apple
SGTF, CRCIF	*Eucalyptus fibrosa*	Broad-leaved Ironbark
SGTF, CPW, CRCIF	*Eucalyptus mollucana*	Grey Box
SGTF, CRCIF	*Melaleuca decora*	-
CRCIF	*Melaleuca nodosa*	Prickly-leaved Paperbark
CRCIF	*Syncarpia glomulifera*	Turpentine
	Pittosporaceae	
SGTF, CPW, CRCIF	*Bursaria spinosa*	Blackthorn
	Plantaginaceae	
*	*Plantago lanceolata*	Lamb's Tongue
	Poaceae	
	Aristida sp.	A Wiregrass
+	*Cynodon dactylon*	Common Couch
	Echinopogon sp.	Hedgehog Grass
*	*Ehrharta erecta*	Panic Veldt Grass
*	*Eragrostis curvula*	African Love Grass
SGTF, CRCIF	*Entolasia stricta*	Wiry Panic
SGTF, CPW, CRCIF	*Microlaena stipoides* var. *stipoides*	Weeping Grass
	Poa affinis	-
*	*Setaria pumila*	Pale Pigeon Grass
	Polygonaceae	
	Rumex brownie	Swamp Dock
	Proteaceae	
V	*Grevillea juniperina* subsp. *juniperina*	Juniper-leaved Grevillea
	Pteridaceae	
SGTF, CPW, CRCIF	*Cheilanthes sieberi* subsp. *sieberi*	Poison Rock Fern
	Rubiaceae	
SGTF, CRCIF	*Pomax umbellata*	-

Appendix D Flora Species List surveyed from the subject site on the 27th of August 2012

Status	Species name	Common name
CRCIF	**Santalaceae** *Exocarpos cupressiformis* **Sapindaceae** *Dodonaeae triqueta*	Native Cherry Large-leaf Hop-bush

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Appendix E
Fauna species list on the subject site at Cranebrook

21 November 2013

Appendix E Fauna species list surveyed from the subject site on the 27th of August 2012

KEY	
Symbol	**Description**
*	Exotic species
En	Species listed as "*endangered*" in the TSC Act

Status	Species name	Common name
AVES		
	Columbidae	
	Ocyphaps lophotes	Crested Pigeon
	Streptopelia chinensis	Spotted Dove
	Meliphagidae	
	Manorina melanocephala	Noisy Miner
	Rhipiduridae	
	Rhipidura leucophrys	Willie Wagtail
	Sturnidae	
*	*Acridotheres tristis*	Indian Myna
MAMMALS		
	Felidae	
*	*Felis* sp.	Domestic Cat
GASTROPOD		
	Camaenidae	
En	*Meridolum corneovirens*	Cumberland Plain Land Snail

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Appendix F
Section 5A Assessment of Significance

21 November 2013

CORPUS CHRISTI PRIMARY SCHOOL
THE NORTHERN ROAD, CRANEBROOK

PROPOSED RESIDENTIAL SUBDIVISION

FLORA & FAUNA ASSESSMENT REPORT

SECTION 5A ASSESSMENT of SIGNIFICANCE

21 November 2013

1 INTRODUCTION

The *Threatened Species Conservation Act 1995* (TSC Act) has modified the *Environmental Planning & Assessment Act 1979* (EP&A Act) by, *inter alia*, including a requirement to determine "*whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*". Section 5A (2) identifies seven factors which "*must be taken into account*" by a consent or determining authority in administering Sections 78A, 79B, 79C, 111 and 112 of the EP&A Act, as relevant in the circumstances.

The factors contained within Section 5A (2) of the EP&A Act which "*must be taken into account*" in determining "*whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*" were amended in 2005, after proclamation of the *Threatened Species Amendment Act 2002* (TSAA Act). This *Report* addresses the amended version of Section 5A and the relevant factors contained therein.

In addition to the seven factors which "*must be taken into account*" (where relevant) pursuant to Section 5A(2) of the EP&A Act (see below), Section 5A(1)(b) of the EP&A Act requires that "*any* [relevant] *assessment guidelines*" promulgated by the relevant authorities (particularly in this instance the OEH) also "*must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*".

The *Section 5A Assessment of Significance* contained herein, and the generic *Section 5A Assessment of Significance* contained in the main *Report*, have been prepared in cognisance of the *Threatened Species Assessment Guidelines – The Assessment of Significance* prepared by the then Department of Environment & Climate Change (dated August 2007).

2 FACTORS for CONSIDERATION

The factors which "*must be taken into account*" pursuant to Section 5A of the EP&A Act (as amended in 2005) are:

(a) in the case of threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such as that a viable local population of the species is likely to be placed at risk of extinction.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

  (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

  (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

(d) in relation to the habitat of a threatened species, population or ecological community:

  (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

  (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

  (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

3 NOT the 7 PART TEST

Section 5A of the EP&A Act is often (erroneously) referred to as the "*seven part test*".

However, there is no such thing as the "*seven part test*".

In this regard:

1 there is **nothing** currently listed on the TSC Act, nor can there **ever** be anything so listed, to which all of the seven factors contained in Section 5A apply. At the very **most**, only five of the factors can apply to anything listed (now or ever) on the TSC Act, and in most instances only three or four apply;

2 Section 5A is **not** a "*test*" (DECC 2007) – "*The assessment of significance should* **not** *be considered a 'pass or fail'* **test** *but a system allowing applicants/proponents to undertake a* **qualitative analysis** *of the likely impacts*" (emphases added);

3 the 7 factors (**not** "*parts*") of Section 5A "*must be* **taken into account**" (emphasis added) in coming to a conclusion with respect to the likelihood or otherwise of a "*significant effect*" being imposed. The seven factors are **not** the fundamental question of Section 5A of the EP&A Act; and

4 further, the seven factors are **not** the only consideration in answering the fundamental question of Section 5A (*ie* whether there is "*likely to be a significant effect*" on threatened biota or their habitats). Other relevant matters also need to be considered.

Given the considerations outlined above, if Section 5A is to be represented (or misrepresented) by some other term, it should be either:

- the "*3, 4 or 5 part test*" (in respect of Point 1 above); OR
- the "*3, 4 or 5 part assessment*" (in respect of Points 1 and 2 above); OR
- the "*3, 4 or 5 factors assessment of likely significance*" (in respect of Points 1, 2 and 3 above); OR
- the "*3, 4 or 5 factors plus other relevant matters assessment of likely significance*" (in respect of Points 1-4 above).

4 ASSESSMENTS of SIGNIFICANCE

4.1 Relevant Biota

The relevant threatened biota to be affected by the proposed activities on the subject site at Cranebrook include:

- the Cooks River Castlereagh Ironbark Forest (CRCIF) community - which is listed as an "*endangered ecological community*" (EEC) in the TSC Act;
- *Dillwynia tenuifolia*, a threatened plant - listed as "*vulnerable*" on the TSC Act; and
- the Juniper-leaved Grevillea *Grevillea juniperina* subsp. *juniperina* - a threatened plant listed as "*vulnerable*" on the TSC Act.

Whilst a number of other threatened species are likely to utilise the subject site on occasions at least (either as individuals, vagrants or on seasonal basis), it is not considered likely that the subject site *per se* would support a "*viable local population*" of any such species. This consideration applies equally to the Cumberland Plain Land Snail (of which one dead shell has only been recorded adjacent to the site) as to other threatened biota that could occur. These species have been considered within a generic *Section 5A Assessment of Significance* within Chapter 6 of the main *Report*.

The following *Section 5A Assessments of Significance* provides an analysis of those relevant threatened biota detected on the subject site at Cranebrook (as listed above).

4.2 Definitions Used in This Report

The definitions of areas relevant to this *Report*, and to the assessment of potential or real impacts arising from the proposed development, are:

"*subject site*"	The Corpus Christi Primary School on The Northern Road at Cranebrook
"*study area*"	the "*subject site*" and any areas directly or indirectly associated with that land
"*locality*"	an area of 10km radius around the "*subject site*"
"*the proposal*"	the proposed subdivision of the subject site at Cranebrook

Local Occurrence

The DECC *Assessment Guidelines* (2007) define the "*local occurrence*" of an "*endangered ecological community*" as:

- "*the ecological community that occurs within the study area. However, the local occurrence may include adjacent areas if the ecological community on the study area forms part of a larger contiguous area of that ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated*".

With respect to the subject site at The Northern Road, Cranebrook, the vegetation on the subject site is contiguous with vegetation on adjoining land to the immediate northeast and a small area of vegetation to the immediate west (on the Corpus Christi Primary School). There is also a patch of CRCIF in parkland to the southeast.

Notwithstanding to the presence of some small breaks in the tree canopy in the immediate and general vicinity, there can be no doubt that there would be the "*exchange of genetic material across the boundary of the study area*" and throughout those near contiguous stands of native vegetation by virtue of the movement of pollinators (bees, butterflies and birds), including across roads or other small gaps and vegetation. It is also likely that pollen and seeds of a number of native plants would be blown across those gaps during periods of high wind, thus further ensuring the "*exchange of genetic material*".

Given those circumstances, the "*local occurrence*" of the CRCIF vegetation is as described in Factor (c), below.

Risk of Extinction

It is to be noted that Factors a, b and c of Section 5A of the EP&A Act address the issue of whether the relevant biota "*is likely to be placed at risk of* ***extinction***" (emphasis added).

The DECC *Assessment Guidelines* define the "*risk of extinction*" as:

- "*the likelihood that the local population will become extinct over a short-term or in the long-term as a result of direct or indirect impacts on the viability of that population*".

In considering the likelihood of a "*significant effect*" to be imposed as a result of any proposed development, therefore, it is necessary to consider whether that activity renders the relevant biota "*likely*" to be completely obliterated or rendered totally unviable on a "*local*" scale.

In this regard, it is not sufficient that a proposal be likely to adversely affect such biota in an adverse way, or even that there be some notable reduction in population or the distribution or abundance of relevant resources. Rather, it must be "***likely***" that the "*local occurrence*" of an "*endangered ecological community*" be rendered incapable of surviving in the locality.

4.3 Cooks River Castlereagh Ironbark Forest

Factor (a) Threatened Species and the Risk of Extinction

A "*threatened species*" is defined in the TSC Act as "*a species specified in Part 1 or 4 of schedule 1 or in schedule 2*" of the Act.

The Cooks River Castlereagh Ironbark Forest (CRCIF) community is not a "*threatened species*".

Factor (b) Endangered Populations and the Risk of Extinction

The TSC Act defines an "*endangered population*" as "*a population specified in Part 2 of schedule 1*" of the Act.

The CRCIF community is not an "*endangered population*".

Factor (c) Endangered Ecological Communities and the Risk of Extinction

The "*local occurrence*" of the CRCIF vegetation includes the degraded patches of CRCIF on the subject site at Cranebrook, as well as CRCIF trees and vegetation on adjoining lands to the northeast, east, and southeast (see Figure 1).

The patch of CRCIF vegetation on the subject site is highly degraded and modified, and is likely to continue to degrade as a consequence of its size, shape and context, and ongoing activities. It has an extremely poor prognosis in terms of biodiversity conservation values.

The small patches of CRCIF vegetation within the subject site, which are proposed for removal for the residential subdivision and development, are:

- very small (less than 1ha) in size;
- highly degraded and modified as a result of long-term disturbance from surrounding and on-site land uses; and
- substantially modified from their original condition.

Given those circumstances, and given the condition, size and context of the CRCIF vegetation on the subject site at Cranebrook:

- the loss of that area of the CRCIF vegetation from the subject site itself is not considered of significance with respect to the survival of CRCIF in general, either in the locality or in the region;
- the remaining areas of CRCIF vegetation in the vicinity, as well as the vegetation within the proposed vegetation to be retained and rehabilitated on the subject site, would prevent the "*local occurrence*" of the highly degraded CRCIF vegetation at this location being "*placed at risk of **extinction***" (emphasis added); and

- the removal of vegetation from the subject site would not "*substantially and adversely modify the composition of the ecological community*" on the site itself. Further, any such loss would not be "*such that its local occurrence is likely to be placed at risk of* ***extinction***" (emphasis added).

Given those considerations, and given the highly degraded and depauperate nature of the vegetation at this location, it is concluded that, with respect to the proposed development of the subject site at Cranebrook:

- the "*local occurrence*" of the CRCIF community would not be "*placed at risk of extinction*" as a result of the proposal; and
- the loss of CRCIF vegetation from the subject site would not constitute a "*significant effect*" with respect to the CRCIF community.

Factor (d) Habitat Removal, Modification, Fragmentation, Isolation and Importance

The area of CRCIF vegetation on the subject site at Cranebrook which is to be removed for development purposes is extremely degraded and modified, and is not regarded as significance or value with respect to the conservation of CRCIF, either in the immediate locality or in the general vicinity.

With respect to the relevant considerations contained in Factor (d) of Section 5A of the EP&A Act;

- the area of CRCIF vegetation on the subject site to be "*removed or modified as a result of the proposed action*" is small and is of no particular significance with respect to the survival of CRCIF vegetation in the locality – Factor (d)(i);
- the CRCIF vegetation present on the subject is already highly "*fragmented*" and "*isolated*", and contributes little to the survival of CRCIF vegetation in the locality – Factor (d)(ii); and
- the area of highly modified and degraded CRCIF vegetation, and its habitat at this location, is not regarded of importance or value with respect to the "*long-term survival*" of the CRCIF community "*in the locality*", given the considerations outlined above – Factor (d)(iii).

Factor (e) Critical Habitat – Direct and Indirect Effects

The TSC Act 1995 defines "*critical habitat*" as "*habitat declared to be critical habitat under Part 3*" of the Act. At the time of this *Report*, no "*critical habitat*" for the CRCIF community had been declared.

Factor (f) Recovery Plans and Threat Abatement Plans

There are currently no relevant *Threat Abatement Plans* with respect to the CRCIF community.

Whilst there is no *Threat Abatement Plan* of relevance, an approved *Recovery Plan* for Cumberland Plain vegetation has been prepared by the then DECCW. The *Cumberland Plain Recovery Plan* contains *inter alia* a number of "*proposed recovery objectives, actions and performance criteria*" which are intended "*to provide for the long-term survival and protection of the threatened biodiversity of the*

Cumberland Plain". Whilst many of the proposed "*recovery actions*" are predominantly to be implemented by the OEH, the DPI and/or local Councils, there are "*recovery actions*" which may be implemented by individual landowners.

The proposed development of the subject site at Cranebrook does not contravene the proposed "*recovery objectives*", "*recovery actions*" or "*key performance targets*" which are outlined in the *Cumberland Plain Recovery Plan*. The subject site is not an identified "*Priority Conservation Area*" (as discussed in detail in the accompanying *Flora & Fauna Assessment Report*) and is of no relevance to the survival of the CRCIF community, at any scale.

Factor (g) Key Threatening Processes

Several of the "*key threatening processes*" (KTPs) listed on Schedule 3 of the TSC Act are of relevance or potential relevance to the CRCIF community in respect of the proposed development, particularly the "*clearing of native vegetation*".

However, the area of CRCIF vegetation to be removed from the subject site at The Northern Road, Cranebrook is highly degraded, and constitutes only a small proportion of the "*local occurrence*" of that community. The majority of the CRCIF vegetation on the subject site is to be retained and rehabilitated, and the small patches to be removed will be salvaged for re-use in site rehabilitation efforts. The current long-term prognosis (without rehabilitation efforts) for the areas of vegetation on the subject site is extremely poor, given their size and shape, and the existing high levels of disturbance and modification arising from existing and future residential development.

Given those circumstances, and given the nature and condition of the vegetation present, and the proposed rehabilitation efforts on the subject site, the likely contribution of the proposed development to the "*key threatening process*" listed as the "*clearing of native vegetation*" is regarded as of little significance or relevance. Whilst the proposal will involve the removal of a small area of native vegetation from the "*local occurrence*", that vegetation is in such condition and has such a poor long-term prognosis that the proposal does not constitute a significant exacerbation of the "*clearing of native vegetation*" KTP.

A number of other "*key threatening processes*" are or may be of relevance to the CRCIF community, including invasion by a number of weed species, changes in fire regimes and stormwater discharge regimes, and the removal of dead wood and dead trees.

The proposed development of the subject site at Cranebrook would not impose or exacerbate any of those other "*key threatening processes*". Further, the CRCIF vegetation to be preserved within the *Vegetation Management Area* (VMA) along the northern boundary of subject site would be the subject of a *Vegetation Management Plan* (VMP) - designed *inter alia* to avoid any exacerbation of those KTPs (particularly invasion by various weed or grass species).

It is not likely that the proposed development of the subject site would result in either the imposition of or the exacerbation of any "*key threatening processes*" to the extent that the "*local occurrence*" of the CRCIF community would be placed "*at risk of extinction*".

CONCLUSIONS

The relevant factors which must be considered pursuant to Section 5A of the EP&A Act in the determination of "*whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*" are discussed above with regard to the CRCIF community and the proposed development on the subject site at Cranebrook.

The proposed development of the subject site at Cranebrook is not considered "*likely*" to impose a "*significant effect*" upon the CRCIF community given:

- the small area of that vegetation proposed for removal relative to the extent of the "*local occurrence*";
- its highly degraded, modified and disturbed condition; and
- its extremely poor prognosis given likely ongoing activities, and the proximity of new urban development.

The vegetation present on the subject site at Cranebrook does not constitute a significant example of the CRCIF community. The loss of that patch would not significantly affect the survival of that community, and would not place the "*local occurrence*" of the CRCIF community "*at risk of* ***extinction***" (emphasis added).

A *Species Impact Statement* (SIS) is not required for the proposed development at Cranebrook with respect to the CRCIF community.

4.4 *Dillwynia tenuifolia*

Factor (a) Threatened Species and the Risk of Extinction

A "*threatened species*" is defined in the TSC Act as "*a species specified in Part 1 or 4 of Schedule 1 or in Schedule 2*" of the Act. *Dillwynia tenuifolia* is listed as a "*threatened species*" in the TSC Act, at the lower level of concern (*vulnerable* rather than *endangered*).

A total of 39 individuals of *Dillwynia tenuifolia* were recorded on the subject site during the 2012 investigation, of which one is located in the proposed stormwater treatment area, with the remainder located within the proposed *Vegetation Management Area*. All specimens of *D. tenuifolia* are to be retained *in situ* on the subject site at Cranebrook.

Given the proposed retention of the population on the subject site, as well as the rehabilitation efforts and implementation of a dedicated *Vegetation Management Plan* (VMP), the development of the subject site (as currently proposed) will not place the population of *D. tenuifolia* at "*risk of extinction*".

Factor (b) Endangered Populations and the Risk of Extinction

An "*endangered population*" is defined in the TSC Act as "*a population specified in Part 2 of Schedule 1*".

There is no "*endangered population*" of *Dillwynia tenuifolia*.

Factor (c) Endangered Ecological Communities and the Risk of Extinction

The TSC Act defines an "*endangered ecological community*" as "*an ecological community specified in Part 3 of Schedule 1*" of the Act.

The species *Dillwynia tenuifolia* is not an "*endangered ecological community*".

Factor (d) Habitat Removal, Modification, Fragmentation, Isolation and Importance

The proposed activity on the subject site includes the *in situ* retention of all 39 specimens of *Dillwynia tenuifolia* on the site. In addition, 38 of those specimens are included within the *Vegetation Management Area* (VMA) - which is to undergo enhancement through the implementation of a dedicated *Vegetation Management Plan* (VMP - SLR 2013). The outcome is likely to result in a substantial improvement to the longevity of the population of *D. tenuifolia*, given the existing threat by invasive weeds (in particular the invasion of African Love Grass).

Given the existing isolated nature of these specimens, and their *insitu* retention (as proposed) there will be no further isolation of populations of *D. tenuifolia* in the vicinity.

As noted above, and in the main body of the associated *Report*, the "*local population*" of *Dillwynia tenuifolia* present on the subject site is confined to two small patches in the northwestern part of the

site. These patches, along with the band of adjoining EEC vegetation along the northern boundary of the site, are to be retained and enhanced by the implementation of a VMP.

With respect to the matters raised in Factor (d) of Section 5A of the EP&A Act, and with respect to the "*population*" of *D.tenuifolia* on the subject site at Cranebrook:

- whilst an area of potentially suitable habitat for this species is to be removed (the small patches of degraded native vegetation across the 'development footprint' area), the majority of habitat, and all of the existing population, present on the subject site is to be retained and rehabilitated.

  In reference to the broader "*extent*" of habitat for *D. tenuifolia*, the area of potential habitat for the species which is to be "*removed or modified as a result of the action proposed*" is extremely small – Factor (d)(i);

- vegetation on the subject site, and known or potential habitat for *D. tenuifolia* on the site, is already highly isolated from other areas of known or potential habitat for this species. Given the proposed retention of the population and of EEC vegetation along the northern boundary, as well as the intensity of surrounding residential development and urban roads, the "*proposed action*" will not result in relevant habitat for the species becoming further "*fragmented or isolated from other areas of habitat*" – Factor (d)(ii); and

- the habitat which is to be affected by the proposed development of the subject site at Cranebrook is not regarded as of "*important .. to the long-term survival of the species .. in the locality*". Given the retention of the population and adjoining EEC vegetation, the proposal would not limit the survival of the species "*in the locality*" – Factor (d)(iii).

Factor (e) Critical Habitat – Direct and Indirect Effects

The TSC Act 1995 defines "*critical habitat*" as "*habitat declared to be critical habitat under Part 3*" of the Act.

At the time of this *Report*, no "*critical habitat*" for *Dillwynia tenuifolia* had been declared.

Factor (f) Recovery Plans and Threat Abatement Plans

There is no relevant *Recovery Plan* for *Dillwynia tenuifolia* or its habitat in place at the time of this *Report*.

Similarly, there are no *Threat Abatement Plans* in place for any "*key threatening process"* of relevance to this species.

Factor (g) Key Threatening Processes

The only potentially relevant "*key threatening process"* listed on the TSC Act likely to be of relevance to *Dillwynia tenuifolia* in respect of the proposed development is the "*clearing of native vegetation*".

The action of clearing native vegetation from the subject site for the development as currently proposed would involve the removal of a small area of highly degraded potential habitat for the

species. The entire "*local population*" of *D. tenuifolia* in the northern part of the subject site will be retained, and its habitat enhanced by VMP activities.

Given those circumstances, the "*clearing of native vegetation*" from the subject site would not result in a "*significant effect*" being imposed upon the species as a whole either in the "*locality*" or in western Sydney.

No other KTPs of potential relevance to *D. tenuifolia* will be either imposed or exacerbated by the proposed development at Cranebrook.

CONCLUSIONS

The relevant factors which must be considered in Section 5A of the EP&A Act in the determination of "*whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*" are discussed above with regard to *Dillwynia tenuifolia*.

On the basis of the assessment provided above, it is considered that the proposed development of the subject site at Cranebrook is not "*likely*" to involve the imposition of "*a significant effect*" on *D. tenuifolia*. Based on the current threat of invasive weeds and the enhancement measures proposed, the proposal is indeed likely to result in an improvement to the population and its remaining habitat.

A *Species Impact Statement* is not required for the proposed development with respect to *Dillwynia tenuifolia*.

4.5 *Grevillea juniperina* subsp. *juniperina*

Factor (a) Threatened Species and the Risk of Extinction

A "*threatened species*" is defined in the TSC Act as "*a species specified in Part 1 or 4 of Schedule 1 or in Schedule 2*" of the Act. *Grevillea juniperina* subsp. *juniperina* is listed as a "*threatened species*" (vulnerable) in the TSC Act.

A total of 54 individuals of *Grevillea juniperina* subsp. *juniperina* were recorded on the subject site and in the adjoining road reserve. The specimens located in the southeastern corner of the subject site, and a few along the road reserve, were dead or in poor health.

The majority of the *G. juniperina* on the subject site will be retained within the stormwater treatment area and *Vegetation Management Area* (VMA). Conversely, the very small stand of dead *G. juniperina* or specimens in poor health in the southeastern part of the land would be removed by the proposed development.

It would not be reasonable to regard each of those individual stands across the site as a separate "*local population*" of *G. juniperina*, because of their proximity. It is certain that cross-pollination and fertilisation would be occurring between these small stands of plants, as a result of the activities of insects and/or birds.

Given the retention of three of the four small stands of *G. juniperina* on the subject site and along The Northern Road reserve, it is not "*likely*" that a "*viable local population*" of this species will be "*placed at risk of extinction*".

Factor (b) Endangered Populations and the Risk of Extinction

An "*endangered population*" is defined in the TSC Act as "*a population specified in Part 2 of Schedule 1*".

There is no "*endangered population*" of *Grevillea juniperina* subsp. *juniperina*.

Factor (c) Endangered Ecological Communities and the Risk of Extinction

The TSC Act defines an "*endangered ecological community*" as "*an ecological community specified in Part 3 of Schedule 1*" of the Act.

The plant *Grevillea juniperina* subsp. *juniperina* is not an "*endangered ecological community*".

Factor (d) Habitat Removal, Modification, Fragmentation, Isolation and Importance

As discussed above, and in the body of the main *Report*, habitat for *G. juniperina* is located at the eastern and western ends of the subject site, as well as along the northern boundary. One small sub-

population of the "*local population*" (located in the southeastern corner of the site) is to be removed for the development as currently proposed and small areas of the potential habitat will also be removed.

However, the majority of the population, as well as most of the known and potential habitat for *G. juniperina*, is to be retained along the northern boundary of the development area. As also noted in the SLR Ecology 2013 *Report*, *G. juniperina* is a highly resilient species - which appears highly tolerant to disturbance and modification (as demonstrated by its frequent occurrence along roads and tracks).

With respect to the matters raised in Factor (d) of Section 5A of the EP&A Act, in respect of *G. juniperina* on the subject site at Cranebrook:

- the extent of known or suitable habitat for *G. juniperina* which is to be removed is insignificant with respect to the broader extent of habitat for the species "*in the locality*". In respect of the survival either of the "*local population*" or of *G. juniperina* in the broader context, the area of known or potential habitat for the species which is to be removed or modified as a result of the action proposed is extremely small, and not of significance – Factor (d)(i);
- as discussed elsewhere, the subject site is isolated by surrounding residential and urban development and infrastructure, and has no direct connectivity to large areas of native vegetation of any significance. The development as currently proposed would not increase the fragmentation of habitat for this species, given the retention of specimens and habitat along the northern boundary and the existing urban circumstances of the site – Factor (d)(ii); and
- the habitat which is to be affected by the proposed development of the subject site at Cranebrook is not regarded as of "*importance .. to the long-term survival of the species .. in the locality*" – Factor (d)(iii).

Factor (e) Critical Habitat – Direct and Indirect Effects

The TSC Act 1995 defines "*critical habitat*" as "*habitat declared to be critical habitat under Part 3*" of the Act.

At the time of this *Report*, no "*critical habitat*" for *Grevillea juniperina* subsp. *juniperina* had been declared.

Factor (f) Recovery Plans and Threat Abatement Plans

There is no relevant *Recovery Plan* for *Grevillea juniperina* subsp. *juniperina* or its habitat in place at the time of this *Report*.

Similarly, there are no *Threat Abatement Plans* in place for any "*key threatening process*" of relevance to this species.

Factor (g) Key Threatening Processes

The only potentially relevant "*key threatening process"* listed in the TSC Act likely to be of relevance to *G. juniperina* in respect of the proposed development is the "*clearing of native vegetation*".

The action of clearing native vegetation from the subject site for the development as currently proposed would involve the removal of a small area of known degraded habitat for *G. juniperina* - in the southeastern corner of the subject site. As noted above, however, the majority of its habitat on the site is to be retained. In addition the species is highly resilient and disturbance-tolerant, and the "*clearing of native vegetation*" from the subject site would not result in a "*significant effect*" being imposed upon the species as a whole either in the "*locality*" or in western Sydney.

Notwithstanding the loss of a few specimens from the southeastern corner of the site, and a small area of degraded habitat for the "*local population*", the "*clearing of native vegetation*" as proposed is not considered to be a process which would threaten the species or result in a "*significant effect*" on the species at this general location.

CONCLUSIONS

The relevant factors which must be considered in Section 5A of the EP&A Act in the determination of "*whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*" are discussed above with regard to *Grevillea juniperina* subsp. *juniperina*.

On the basis of the assessment provided above, the proposed development of the subject site at Cranebrook is not "*likely*" to involve the imposition of "*a significant effect*" on *Grevillea juniperina* subsp. *juniperina* or its habitat.

A *Species Impact Statement* is not required for the proposed development with respect to *Grevillea juniperina* subsp. *juniperina*.

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STORMWATER DRAINAGE STRATEGY REPORT

TO

ACCOMPANY DEVELOPMENT APPLICATION

FOR

PROPOSED SUBDIVISION
OF LOT 1 DP 1144668
ANDROMEDA DRIVE, CRANEBROOK

Prepared for:

The Trustees of the Roman Catholic Church for the Diocese of Parramatta

November 2013

Version 4

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1.0 INTRODUCTION

The Diocese of Parramatta propose to create residential lots at the eastern, vacant portion of Lot 1 DP1144668 at Andromeda Drive and Cassar Crescent, Cranebrook.
This report summarises the stormwater drainage strategy for the proposed subdivision. The locality of the site is shown on ***Figure 1***.

Figure 1 - Site location

Source: GoogleEarth

2.0 PROPOSED DEVELOPMENT

The development is proposed to create 21 residential lots with areas ranging from 570m^2 to 1614m^2 and a vegetation translocation area.

A cul-de-sac is to be created to service the lots and is to be extended off Cassar Crescent. It is proposed to have a straight through road entering the site from the northern section of Cassar Crescent and a 'give way' situation for cars turning left out of the site or right into the site.

Vegetation to be preserved for biodiversity conservation purposes along the northern boundary in the rear yards of lots 1-8 in an area of approximately 1950m^2. The strip of vegetation along the eastern boundary of the site, adjacent to the Northern Road is to be preserved within the setback zone of the proposed lots along this boundary with a vegetation translocation area in the southern portion of this setback zone. This area is approximately 1140m^2.

3.0 THE SITE

The site has an area of 2.05 ha. and adjoins the boundary of the Corpus Christi Primary School site, which has access via Andromeda Drive. There is existing residential development to the north and south of the site and The Northern Road adjoins the site to the east. The site predominantly contains open grassed land, with dense clusters of trees towards the outer edges of the site. The site slopes gently to the west at an average slope of 4%.

4.0 CODES & POLICIES

The stormwater drainage strategy for the proposed development was prepared to comply with the requirements and objectives in the following documents:

- *Penrith Local Environmental Plan 1998 (Urban Land)*
- *Penrith Development Control Plan 2006*
- *Penrith Council's Guidelines for Engineering Works – Part 1 Design*
- *Institution of Engineers Australia Rainfall & Runoff (1987)*

5.0 STORMWATER DRAINAGE STRATEGY

5.1 Existing stormwater drainage and catchment

The site contains a piped depression which drains to the north along the western portion of Cassar Crescent. The catchment area from the south extends to Wagner Place and Hindmarsh Street and consists of approximately 26 hectares as shown in the Catchment Plan in *Appendix 1*, sheet 3. The drainage system from the south drains along a Reserve from Goldmark Crescent, through the school site and Cassar Crescent (west) and to the north of Andromeda Drive. The pipe system consists of 1350mm diameter pipes, inlet pits and gully pits.

Current runoff from the development site drains to the west where there is an existing easement for drainage. This easement connects into a raised grated letterbox pit adjacent to the northern boundary of the school on the western bend of Cassar Crescent. Cassar Crescent contains roll kerb and drains at approximately 1% towards the intersections with Andromeda Drive, from a crest located on the eastern bend of Cassar Crescent. The existing street drainage in Cassar Crescent drains from the north side of the crest towards the intersection with Andromeda Drive where it connects into a large GPT located in an overland flow channel adjacent to a public reserve. The overland flow channel flows into Andromeda Drive Reserve downstream of the catchment.

The site is contained within a catchment in the Hawkesbury and Nepean Catchment Authority area.

5.2 Proposed Stormwater Strategy

The proposed strategy for draining and discharging stormwater is:

- To connect to the street drainage system in Cassar Crescent adjacent to the site.
- To check flow rates in the existing pipe system within Cassar Crescent to confirm that changes to the current flow regimes will be minimal. It is recognised that the entire catchment to Cassar Crescent is 26ha and is fully developed except for this site which is 2ha. Consequently minimal changes would be expected to the existing flow regime. Also any shortcomings in the existing system could not be expected to be rectified.
- To achieve the overall pollutant removal efficiencies from the site as required in Council's DCP.
- To be efficient in terms long term management and maintenance.
- To produce a safe, cost effective and aesthetically pleasing design.

5.3 Stormwater Quality

Penrith City Council's DCP states the objective to '*minimise urban runoff pollutants to watercourses*'.

The strategy proposed for this development is applying treatment measures within the development to achieve the required objectives at the point of discharge from the site.

Penrith City Council's DCP 2010 requires the following levels of treatments to be achieved in the post-development phase:

Pollutant	**Retention Criteria**
Litter (gross pollutants)	70 % of material > 5mm
Coarse Sediment	80% for particles <0.5mm
Nutrients	45% retention
Fine Particles	50% for particles <0.1mm
Oil & Grease	90% of load with no visible discharges

Table 5.3.1: Treatment removal efficiencies criteria

The measures proposed are:

- Allowance for provision of rainwater re-use in rainwater tanks on future houses. Rainwater tanks will be required as part of the development consent by Penrith City Council for future dwelling houses on each lot in accordance with the DCP and BASIX requirements. Rainwater re-use tanks will reduce the total runoff from the development site and will reduce the demand for potable water from the street watermain. Water tanks have been specified as having a volume of storage of 6KL per proposed dwelling.
- A gross pollutant trap is designed to collect gross pollutants and coarse and fine sediments prior to discharge into the bioretention system
- A shallow bioretention system is proposed to further treat the runoff by removing nutrients and course and fine sediments prior to discharge. This shallow bioretention basin is proposed to take low flows, with high flows bypassing the basin. The extended detention depth is proposed to be 0.15m with a total surface area of 190m^2, a filter area of 145m^2 and a filter media depth of 0.6m. The bioretention area is to be planted with effective nutrient removing native plants which will compliment the retained trees within the vicinity.

Soil erosion and sediment control works would be implemented during construction to control impacts during this stage.

The proposed stormwater quality treatment measures have been modelled using MUSIC Version 5 computer program by eWater. The proposal has been modelled subdividing the catchments into

contributing areas. The latest advice and recommendations from eWater has been applied in modelling this development (see *Appendix 4* for specific recommendations and assumptions used).

An area of 1530 m^2 has been excluded from the MUSIC modeling as it is an existing 'forest' type catchment which currently and will continue in the future to drain away from the site and not contribute to the drainage network. This area will remain in its unchanged natural state. Refer to *Appendix 4* for MUSIC catchment breakdown.

A schematic of the model is included in *Appendix 3* and a summary of the treatment train effectiveness is shown in *Table 5.3.2* below.

The MUSIC model does not specifically model for Feacal coliforms or oils and greases, however based on advice from eWater these pollutants are removed as part of the treatment train. The reason that these pollutants are not included in the model at present is that there is insufficient data on source node generation or pollutant removal efficiencies, especially from the Australian context.

Summary of the Treatment Train Effectiveness

	Sources	Residual Load	% Reduction
Flow (ML/yr)	20.7	17.3	16.7
Peak Flow (m3/s)	0.17	0.418	-146.5
Total Suspended Solids (kg/yr)	4050	1270	68.7
Total Phosphorus (kg/yr)	8.32	3.94	52.6
Total Nitrogen (kg/yr)	57.6	31.7	45.1
Gross Pollutants (kg/yr)	516	134	74.1

Table 5.3.2: Summary of treatment train effectiveness of total catchment

The retention criterion for total suspended solids was separated into two components by Penrith City Council, namely course and fine sediments. These two components have different removal efficiency criteria of 80% and 50% respectively. As MUSIC does not separate total suspended solids into these two components, the percentage reduction of 68.7% obtained indicates that it is most likely that both these criteria have been met by the proposed treatment measures as it is greater than the average of the two criteria.

The results shown in the table above indicate that the treatment measures proposed for the development achieve the retention criteria stipulated by Penrith City Council.

5.4 Hydrology

The proposed stormwater drainage system and the existing and post development stormwater catchments for the development are shown in *Appendix 1*, pages 2 and 3 respectively. The proposed strategy is to connect to the current street drainage system in Cassar Crescent, with minimal increase to the peak flowrates immediately downstream of the site.

The proposed strategy includes capturing the majority of the stormwater runoff from the site via street and interallotment drainage systems. Runoff from the road area and lots 1-13 & 21 will connect into 2 existing pits in Cassar Crescent. Low flows will enter the GPT and bioretention basin and then into an existing pit in Cassar Crescent, while high flows will bypass directly into another existing pit.

A portion of the site catchment, approximately 4675m^2, containing lots 14-20, will drain to an interallotment drainage line along the southern boundary of the site. This interallotment drainage line will connect into an existing letterbox pit adjacent to the southern boundary of the school site located in the public reserve at the end of Goldmark Crescent.

Computer model DRAINS by Watercom has been used to model both the predevelopment and post development conditions of the site, using the catchments shown in *Appendix 1*, page 3. Hydraulic modelling of the 5, 20 and 100 year ARI have been utilised to establish the legitimacy of the stormwater drainage strategy. Tables 1 summarises the peak outflows calculated downstream of the site marked 'A' in *Appendix 2*.

Table 2 summarises peak pipe flows and overland flowrates, pre and post development, at the locations marked 'B' and 'C(1)', 'C(2)' and 'D'. The 2 year flow has also been modelled under post development conditions to assess the capacity of the existing pipe drainage network with post development flows in a more frequent rainfall event.

For the purposes of comparison, a DRAINS model was prepared for the post development site which includes a detention storage sized to reduce peak post development flows from the site to the peak pre development flows from the site. The flows were then connected to the existing model and the changes in flow rates and d x V at downstream points assessed. Table 3 shows a summary of flow characteristics.

		Total combined flow, m^3/s		**Overland flow***	
Location	**ARI**	*Predevelopment*	*Postdevelopment*	*dVpre*	*dVpost*
A	5 year	5.69	5.87		
	20 year	7.59	7.84		
	100 year	10.3	10.4	0.50	0.51

Table 5.4.1: Summary of existing and post development peak flows at 'A'.

*dV values are for the overland flow between the 2 most downstream pits in Cassar Crescent, near the Andromeda Drive intersection. This is the last stretch of flow that will run in a gutter profile before the overland flow reaches the intersection and will spread over a wide distance

	Pipe Flow, m^3/s			**Overland Flow, m^3/s**				**Roll Kerb**	
Area	**ARI, year**	*Pre*	*Post*	*Pre*	*Post*	*d x V Pre*	*d x V Post*	*Width of flow, m Pre*	*Width of flow, m Post*
B	2		4.59		0.00				
	5	5.62	5.76	0.00	0.05			0.0	1.89
	20	6.10	6.11	1.57	1.72				
	100	6.02	6.02	4.17	4.29	0.52	0.53		
C(1)	2		0.32		0.00				
	5	0.21	0.37	0.01	0.08			0.02	2.23
	20	0.24	0.41	0.08	0.17				
	100	0.28	0.42	0.16	0.21	0.11	0.08		
C(2)	2				0.00				
	5			0.00	0.07			0.0	2.15
	100			0.00	0.34	0	0.11		
D	2		0.24		0.00				
	5	0.08	0.30	0.00	0.00			0.0	0.3
	20	0.10	0.33	0.00	0.12				
	100	0.14	0.35	0.01	0.20	0.02	0.17		

Table 5.4.2: Summary of existing and post development peak flows at 'B', 'C' and 'D'.

Location	Pre Developed,				Post Developed with OSD, m^3/s				Post Developed without OSD, m^3/s			
	Flow, m^3/s	d, m	V, m/s	dV, m^2/s	Flow, m^3/s	d, m	V, m/s	dV, m^2/s	Flow, m^3/s	d, m	V, m/s	dV, m^2/s
Combined flow from proposed subdivision site	0.796				0.791				1.07			
A combined flow	10.3				10.4				10.4			
A (Overland Flow*)	4.05	0.194	2.95	0.50	4.13	0.225	2.26	0.51	4.18	0.226	2.28	0.51
B (gutter flow only)	4.17	0.221	2.36	0.52	4.26	0.224	2.37	0.53	4.29	0.225	2.37	0.53

Table 5.4.3: Comparison of peak 100 year ARI flows for the predevelopment, post developed and post developed with OSD.

	Pre	Post with OSD	% increase from predeveloped	Post without OSD	% increase from predeveloped
Location A total combined flow, m^3/s	10.3	10.4	0.97%	10.4	0.97%
Overland Flow A* dV, m^2/s	0.5	0.51	2.00%	0.51	2.00%
Overland Flow B dV, m^2/s	0.52	0.53	1.92%	0.53	1.92%

Table 5.4.4: Summary

5.4.1 Discussion

a) Minimal changes to flow regime in lower Cassar Crescent

DRAINS results show that for the 5, 20 and 100 year rainfall events, there is a minimal increase in flows in the outlet for the combined flows for the entire catchment area, marked 'A' in *Appendix 2*. The increases are between less than 1% for the 100 year ARI and 3.3% for the 20 year ARI. The current predeveloped overland flowrate in the 100 year rain event in the two most downstream pits in Cassar Crescent already result in a depth-velocity product of $0.50m^2/s$, which exceeds the recommended AR&R criterion of $0.4m^2/s$. While the overland flowrate for the postdeveloped case is slightly higher than the predeveloped flowrate it only increases by 2% or $0.01m^2/s$.

Table 5.4.2 shows the results for the various locations marked in *Appendix 2* for pipe flow, overland flow, dV products for the 100 year event and width of flow for the 5 year event. The width of flow is less than 2.5m for all post developed flows in the 5 year event and the dV products are below 0.4m2/s except for the downstream lengths in the northern stretch of Cassar Crescent, which already exceed this recommended value under current conditions.

b) Increased flow rate in Cassar Crescent (East-West section)

Overland flow rates are apparent in the post developed 5 year event, which indicates that the capacity of the existing street drainage has been reached in location 'C1'. The 2 year rainfall event has been modelled to show that the capacity of the existing street drainage can take the post developed follows of the more common rainfall event. During recent discussions with Council, it was apparent that it was considered undesirable to upgrade the pipe size at location 'C' from 375 to 525mm as was proposed by Insites to accommodate for the 5 year flows in the existing upstream end of Cassar Crescent. The results shown in Table 5.4.2 shows that while there is a small amount of overland flow during the 5

year event, the existing street drainage system can take the 2 year event with no upgrading of any existing pipe. Given that this area is low density residential, street drainage designed for the 2 year ARI is considered acceptable (refer also to Australian Rainfall and Runoff Section 14.5.1).

While not considered necessary under the circumstances, upgrading of the existing pipe at location 'C' from 375 to 575mm may be undertaken as part of the development if considered desirable by Council.

5.4.2 Assessment of On-Site Detention Feasibility

The post developed site was modelled to include a 'dummy' on-site detention basin that captures all flows from the subject site. The basin was modelled to produce the same flowrate from the site as exists under predeveloped conditions, that is approximately 0.8 m^3/s. The results for the predeveloped and post developed with and without OSD are shown in Table 3 for the 100 year rainfall event at various locations. The results show that having an OSD basin to reduce flows to predeveloped conditions has little effect on the downstream performance of the existing drainage system.

The overland flow in the gutter at the downstream end of Cassar Crescent increases by almost 2% from predeveloped flowrates to postdeveloped flowrates with OSD. This compares with an increase of 3.2% when comparing predeveloped and post developed without OSD.

The overland flow in the gutter in the area of Cassar Crescent marked 'B', increases from predeveloped flowrates by 2.1% and 2.8% for post developed flows with and without OSD respectively. This is marginal difference of 0.8%.

There is no difference in the total flow downstream of Cassar Crescent, where the flows would enter the existing GPT, between post developed flowrates with and without OSD. The depth-velocity products are also the same for both gutter flows shown in the table and while they are over the recommended $0.4m^2/s$, this is also true for predeveloped dV products. To achieve a reasonable reduction in this parameter would not be possible with an OSD restriction on the subject site.

The downstream conditions in the 100 year event, including overflow rates in Cassar Crescent, are a result of a catchment wide issue from the contributing catchment of over 26 hectares. There are no formal OSD requirements in this area and no other developments contributing to the catchment have included OSD. Overland flow volumes experienced in the 100 year ARI event in Cassar Crescent are already present and are therefore not isolated to this development but rather a catchment wide issue. Therefore, on site detention for this site, which is less than 8% of the total contributing catchment, would not be effective to reduce these flows as demonstrated by the results in Table 3.

Given that having OSD on this site would have such a minor impact on the downstream street drainage system and considering the increase in cost, maintenance and risk factors that imposing OSD has for the Council and/or residents of a development, it is considered that on site detention of stormwater is not applicable to and would not be beneficial for this development.

It should be noted that to increase conservatism of these results the predeveloped catchment area for the site was assumed to be 100% pervious even though until recently there were several buildings and covered walkways within the site catchment area and an area of bitumen pavement, which can be seen in recent aerial photography.

6.0 SENSITIVITY ANALYSIS

A sensitivity analysis was undertaken to determine the likely overland flowrates that would result as a consequence of upstream pits becoming blocked by 20% and 50% under predeveloped and postdeveloped conditions in the 100 year event.

The pits upstream of the site have been modelled as 'dummy' pits, that is, each pit represents numerous on-grade, sag and interallotment drainage pits. Therefore it would be inaccurate to model these pits with large blockage factors such as 20 and 50% as this would result in extremely conservative and unrealistic overland flow rates. Furthermore, the purpose of this report is to compare pre and post developed conditions and as such percentage increases in flowrates would remain unchanged if all pits were modeled with blocking factors in both scenarios as these catchments remain unchanged. All pits from within the site area and Cassar Crecent have been modelled with the blockage factors.

		Overland Flow, m^3/s				
Area	*Blockage Factor, %*	*Pre*	*Post*	*d x V Pre*	*d x V Post*	*% Increase of dV*
A*	20	4.03	4.21	0.50	0.52	4.00%
B	20	4.12	4.28	0.52	0.53	1.92%
C(1)	20	0.16	0.21	0.11	0.13	
C(2)	20	0.00	0.36	0.00	0.12	
D	20	0.01	0.24	0.02	0.19	
A*	50	4.15	4.31	0.51	0.52	1.96%
B	50	4.15	4.30	0.52	0.53	1.92%
C(1)	50	0.16	0.22	0.11	0.13	
C(2)	50	0.00	0.44	0.01	0.13	
D	50	0.01	0.31	0.03	0.22	

Table 6.1.1 Summary of overland flows in Cassar Crescent with blockage factors applied to pits.

All overland flowrates are in accordance with the AR&R recommendation for the depth-velocity product of $0.4m^2/s$ except for the overland flow paths in the northern stretch of Cassar Crescent. The conditions contributing to the values exceeding the recommended limit already exist in the larger catchment area as shown by the dV values exceeding $0.4m^2/s$ for the predeveloped case. Under post developed conditions the dV product increases at most by $0.02m^2/s$ or 4%.

7.0 SUMMARY

The proposed stormwater management strategy for the development complies with the requirements of Penrith City Council as set out in the DCP, LEP, Engineering Design Specifications and Australian Rainfall & Runoff.

The stormwater treatment strategy has been prepared with the view of ensuring long-term efficiency and sustainability by proposing treatment measures which are easy and cost effective to maintain and provide an aesthetically pleasing solution.

Whelans InSites

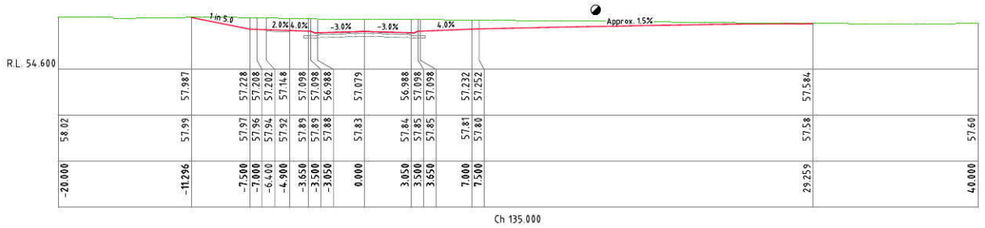
Brian Lapham
CPEng NPER

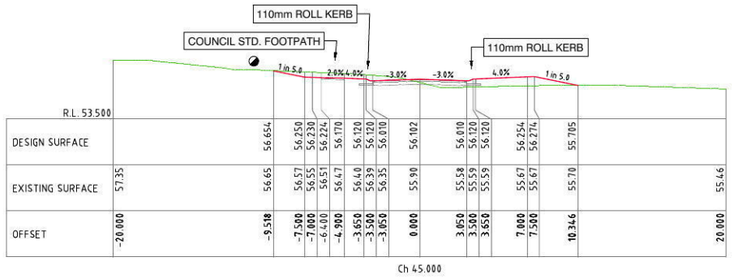
Appendix 1

Stormwater Drainage Strategy Plan

I117G P11 – Sheets 2 & 3

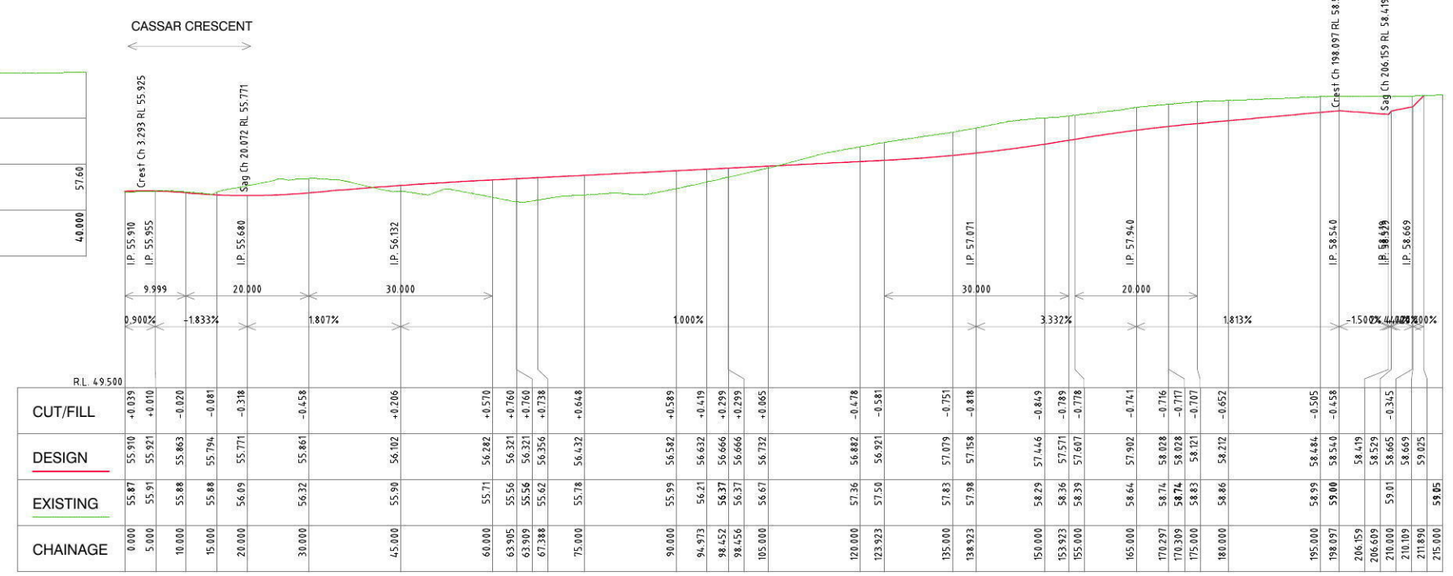
LOT REGRADING/FILLING - Min. 1% TO VERGE





TYPICAL

CASSAR CRESCENT



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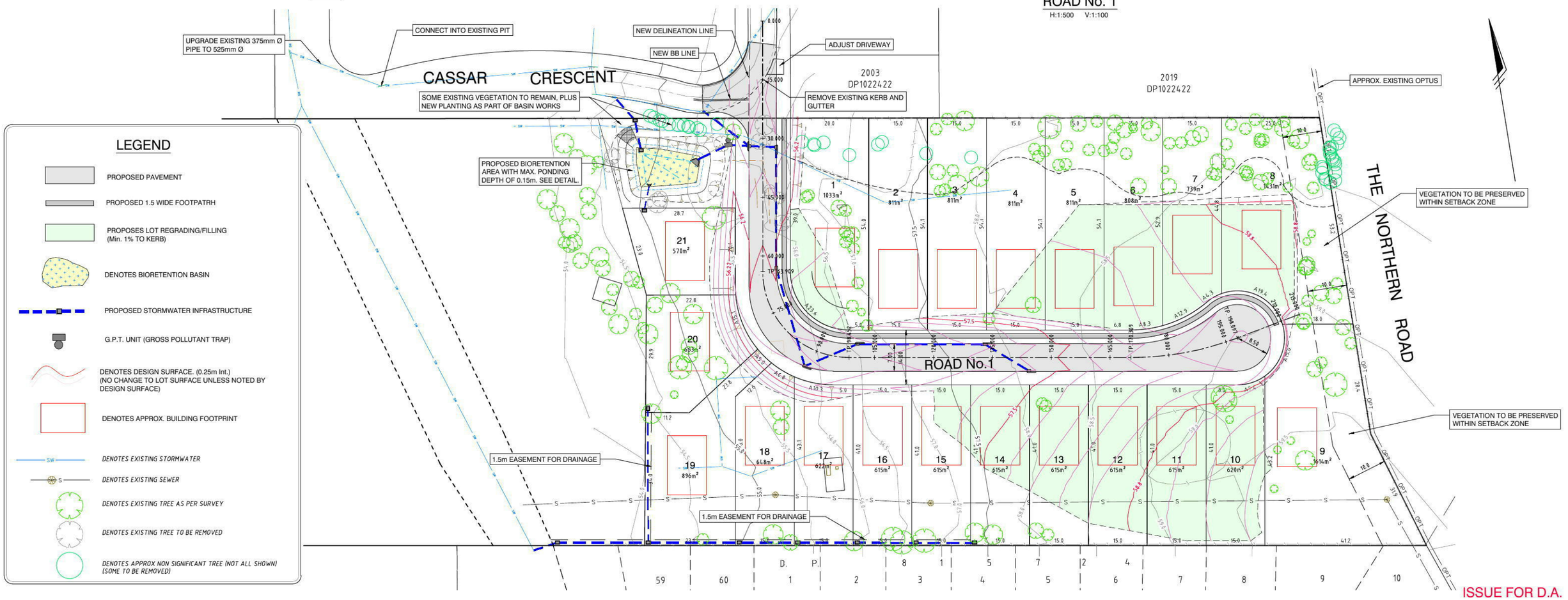

LEGEND

- PROPOSED PAVEMENT
- PROPOSED 1.5 WIDE FOOTPATRH
- PROPOSES LOT REGRADING/FILLING (Min. 1% TO KERB)
- DENOTES BIORETENTION BASIN
- PROPOSED STORMWATER INFRASTRUCTURE
- G.P.T. UNIT (GROSS POLLUTANT TRAP)
- DENOTES DESIGN SURFACE. (0.25m Int.) (NO CHANGE TO LOT SURFACE UNLESS NOTED BY DESIGN SURFACE)
- DENOTES APPROX. BUILDING FOOTPRINT
- *DENOTES EXISTING STORMWATER*
- *DENOTES EXISTING SEWER*
- *DENOTES EXISTING TREE AS PER SURVEY*
- *DENOTES EXISTING TREE TO BE REMOVED*
- *DENOTES APPROX NON SIGNIFICANT TREE (NOT ALL SHOWN) (SOME TO BE REMOVED)*

ISSUE FOR D.A.

REVISIONS			
No.	DATE	REVISION DETAILS	BY
A	08.10.13	REVISED LAYOUT - ISSUE FOR D.A.	S.W.

NOTES:
1. EXISTING SURFACE - 0.5m INTERVAL

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LONG SECTION: H: 1:500 V: 1:100 | CROSS SECTION: H: 1:200 V: 1:200
10 5 0 10 20 30
SCALE IN METRES AT ORIGINAL REDUCTION RATIO

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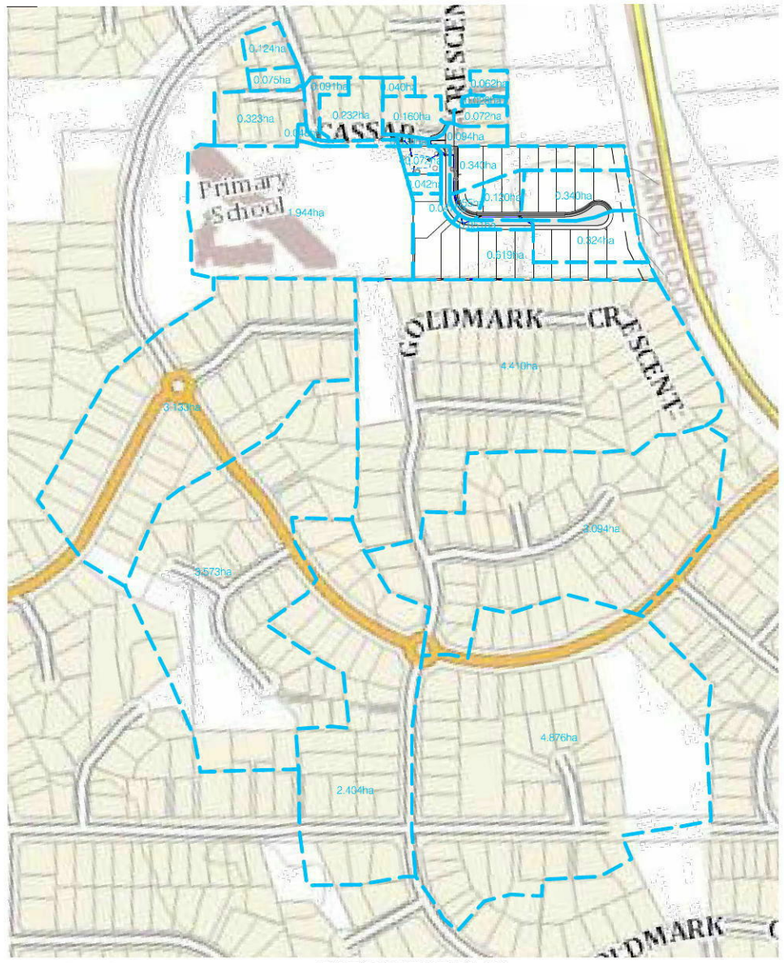
CLIENT: THE TRUSTEES OF THE CATHOLIC CHURCH FOR THE DIOCESE OF PARRAMATTA

SURVEY:	C.L.	DATE OF SURVEY:	18.01.13
DRAWN:	S.W./K.G.	DATE OF PLAN:	08.10.13
DESIGNED:	--	DATE LAST SAVED	09.10.13
APPROVED:	B.L.	DATE APPROVED:	--

TITLE: PLAN LONG. SECTION & TYPICAL CROSS SECTIONS
CIVIL WORKS STRATEGY PLAN
PROPOSED SUBDIVISION OF LOT 1, DP1144668
ANDROMEDA DRIVE, CRANEBROOK

JOB No: I117EG | ISSUE: A
DWG No: P11-2
SHEET: 2 OF 3 SHEETS | SIZE: A1

I117EG P11.dwg



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CATCHMENT PLAN

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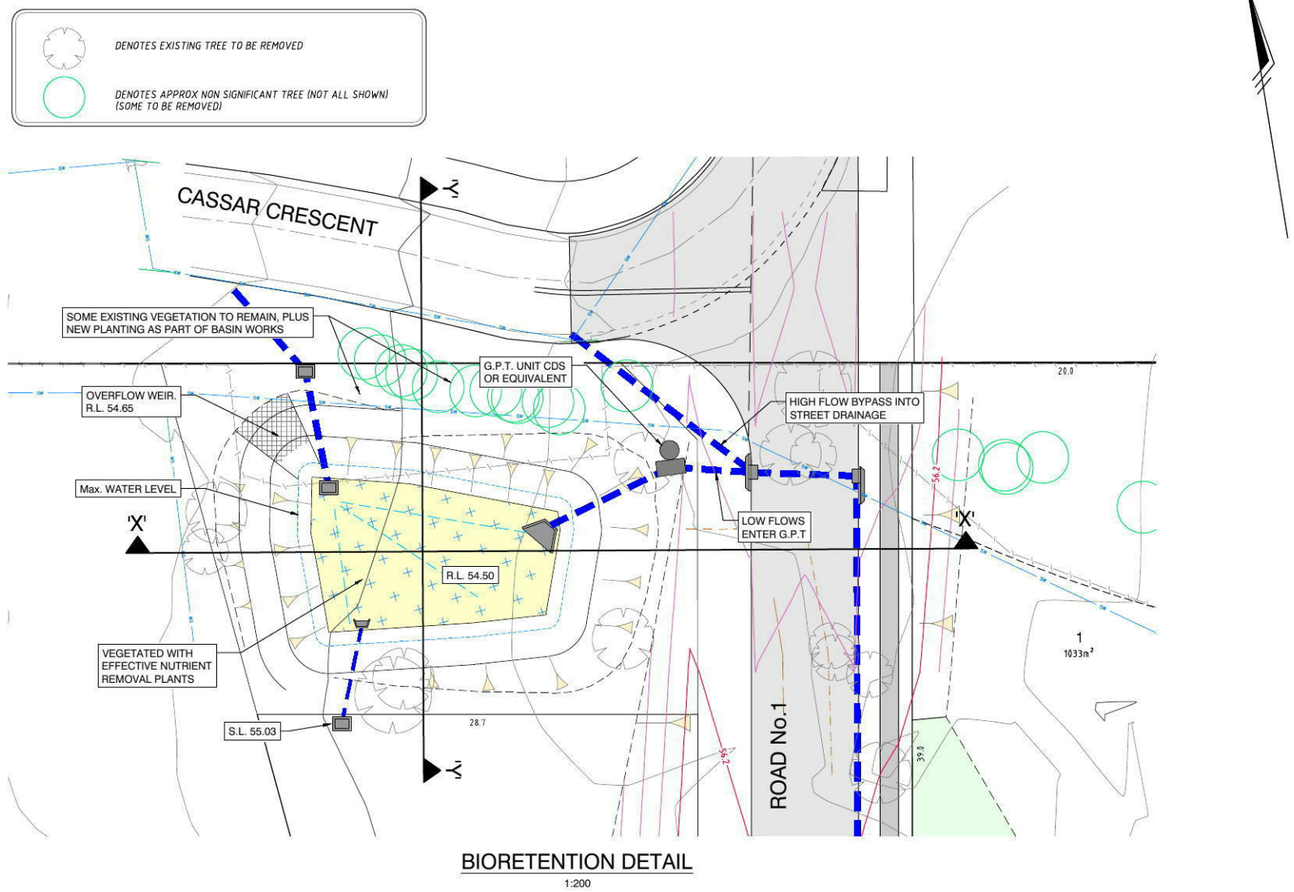

BIORETENTION DETAIL

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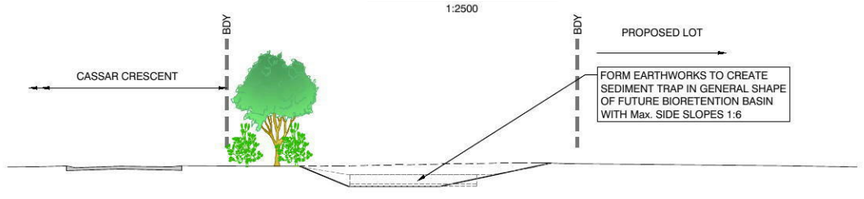

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FORMATION PRIOR TO CONSTRUCTION OF BASIN

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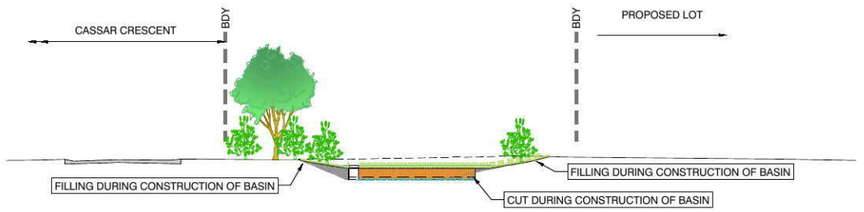

BIORETENTION TYPICAL SECTION Y-Y

AFTER CONSTRUCTION OF BASIN

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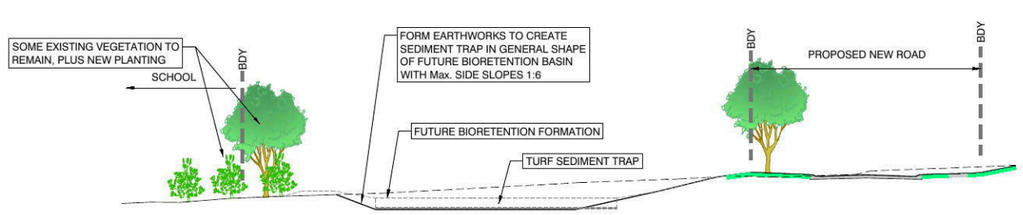

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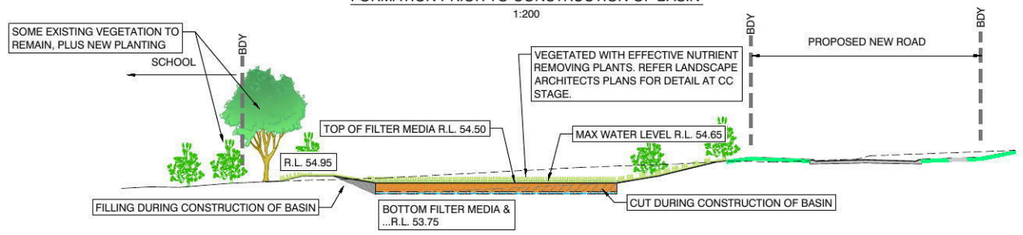

BIORETENTION TYPICAL SECTION X-X

AFTER CONSTRUCTION OF BASIN

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ISSUE FOR D.A.

REVISIONS				
No	DATE	REVISION DETAILS		BY
A	08.10.13	REVISED LAYOUT - ISSUE FOR D.A.		S.W.

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SURVEY:	C.L.	DATE OF SURVEY:	18.01.13
DRAWN:	S.W./K.G.	DATE OF PLAN:	08.10.13
DESIGNED:	--	DATE LAST SAVED:	09.10.13
APPROVED:	B.L.	DATE APPROVED:	--

TITLE: CATCHMENT PLAN & BIORETENTION DETAIL
CIVIL WORKS STRATEGY PLAN
PROPOSED SUBDIVISION OF LOT 1, DP1144668
ANDROMEDA DRIVE, CRANEBROOK

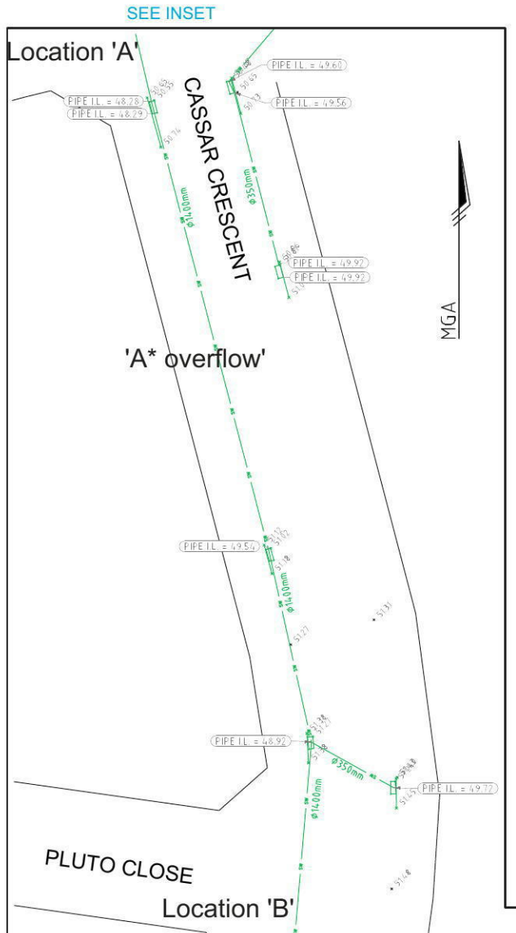
JOB No: I117EG | ISSUE: A
DWG No: P11-3
SHEET: 3 OF: 3 SHEETS | SIZE: A1

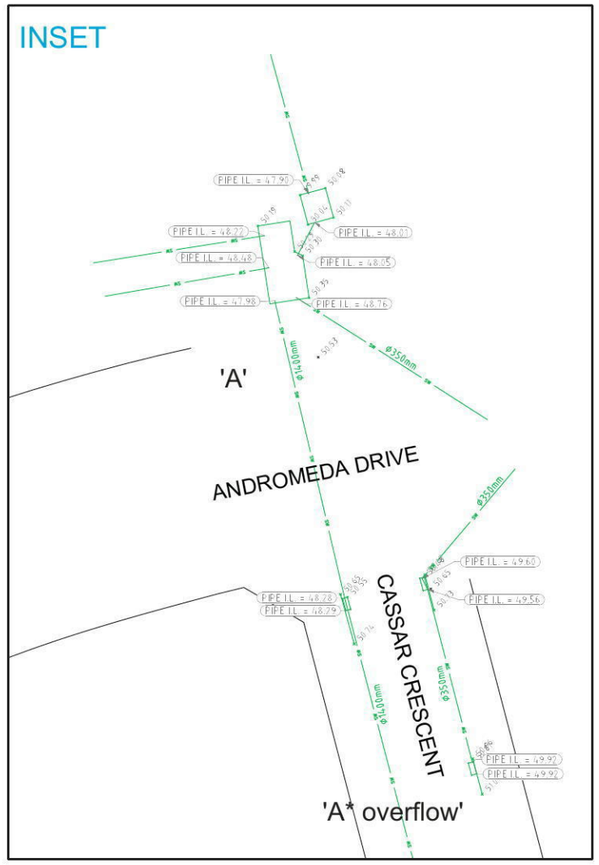
I117EG P11.dwg

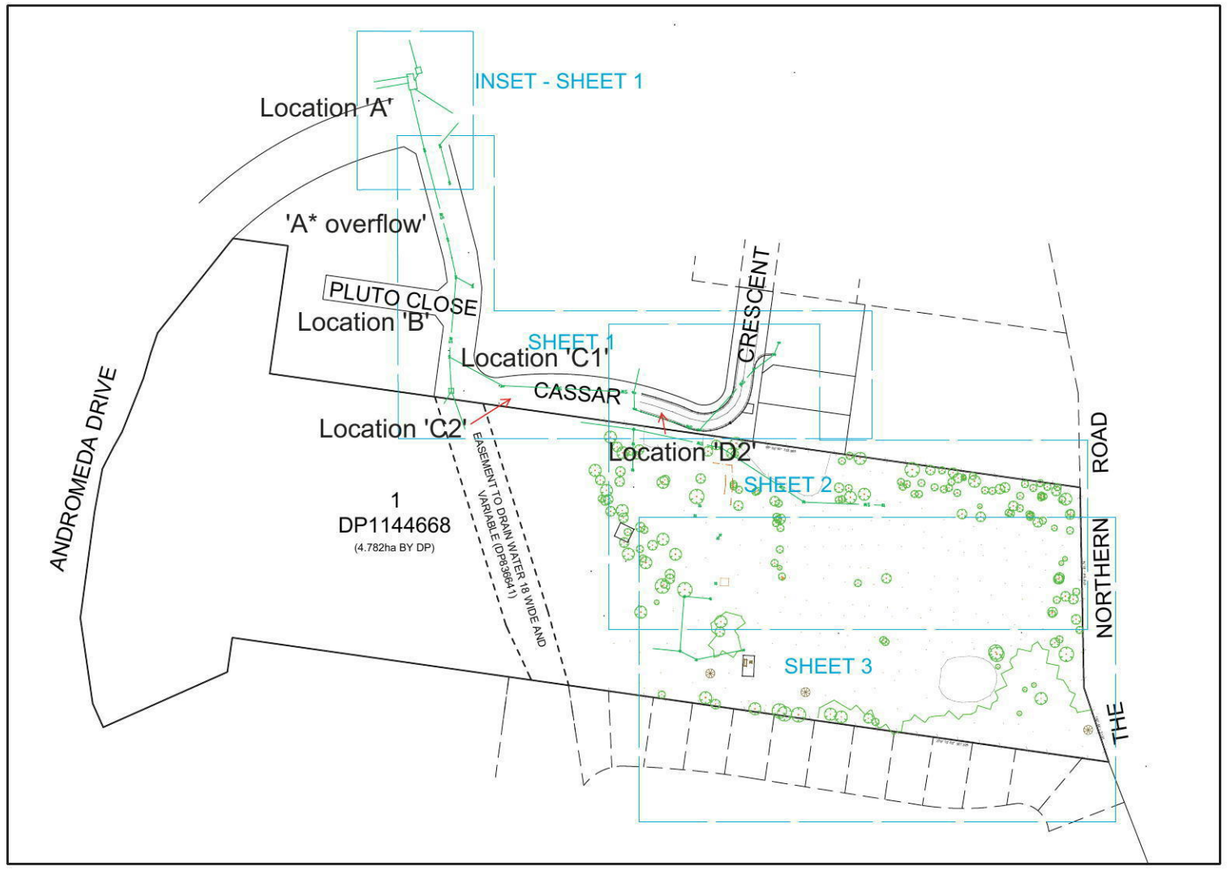
Appendix 2

Partial Detail Survey Plan

I117SW D01- Sheet 1







Survey Notes:

1. This plan does not define boundaries. No formal boundary definition has been undertaken & as such all boundary dimensions are subject to final survey.
2. The position of features shown is subject to a boundary survey.
3. Any Services shown are indicative only. Positions are based on surface indicator/s located during field survey. Other services may exist which are not shown.
4. No investigation of underground services has been undertaken as part of this survey. Lines shown joining pits are a best estimate based on surface indicators
5. Prior to any demolition, excavation or construction on the site, the relevant service authority MUST be contacted for possible location of further underground services and detailed locations of all services.
6. All dimensions are based on Australian Height Datum (AHD) - Origin of levels is SSM97355 on Andromeda Drive (RL = 50.53).
7. Origin of coordinates: SSM97355.
8. Azimuth - D.P. : MGA North
9. Contours are indicative of ground form only. Spot levels should be used, with caution, for calculations of quantities.
10. Contour interval: 0.5m.
11. All adjoining building information is indicative only and is subject to further survey

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LEGEND

BB	BOTTOM OF EMBANKMENT
BK	BACK OF KERB
EG	EDGE OF GARDEN
FE	FENCE (CONSTRUCTED)
IP	GULLY PIT OUTLINE"
JM	TIMBER / SCRUB MEDIUM
LP	LIP LINE OF KERB
PEJB	ELEC.CABLE JUNCT. BOX
PSMH	SEWER MANHOLE CNTR
PWMR	WATER METER
PWTP	WATER TAP
RC	CENTRE OF ROAD
TC	TOP OF BANK
TREE	(TAG NUMBER SHOWN)

CASSAR CRESCENT
Location 'D2'
SSM116800
RL = 55.82
2003
DP1022422
SEE SHEET 2

REVISIONS No.	DATE	REVISION DETAILS	BY
A	24.01.2013	Original Issue	CGL

NOTES: See Flyout Page 1

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SCALE IN METRES AT ORIGINAL REDUCTION RATIO

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CLIENT: Catholic Diocese of Parramatta
SURVEY: VT/EM | DRAWN: C.G.L. | DESIGNED: | APPROVED: B.J.F.
DATE OF SURVEY: 18.01.13 | DATE OF PLAN: 25.01.13 | DATE LAST SAVED: 29.01.13 | DATE APPROVED: 25.01.13

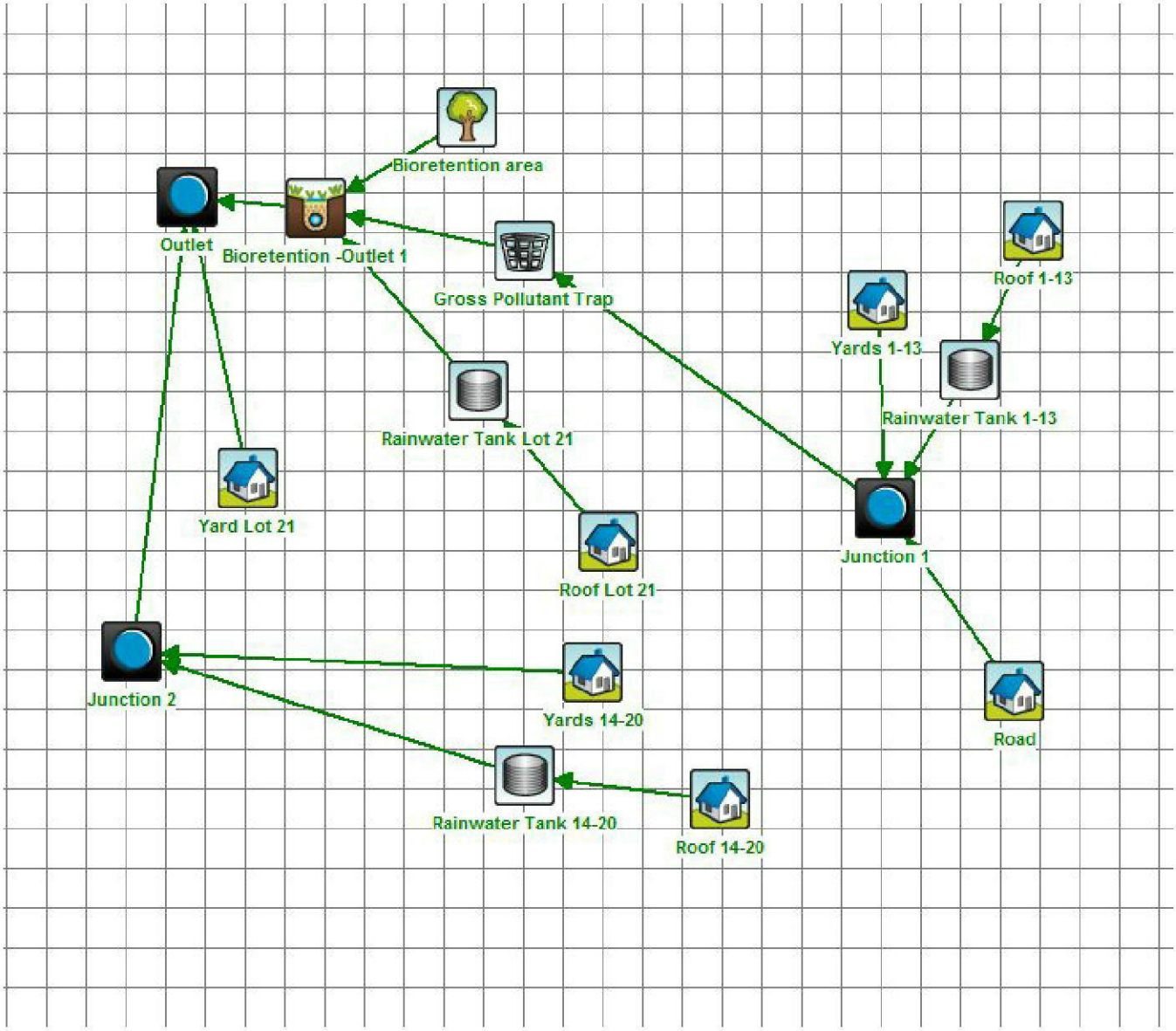
TITLE: DETAIL SURVEY OVER XAVIER COLLEGE
LOT 1, DP1144668
86-94 ANDROMEDA DRIVE
CRANEBROOK

JOB No: 117SW | ISSUE: A
DWG No: D01
SHEET 1 OF 3 SHEETS | SIZE: A1

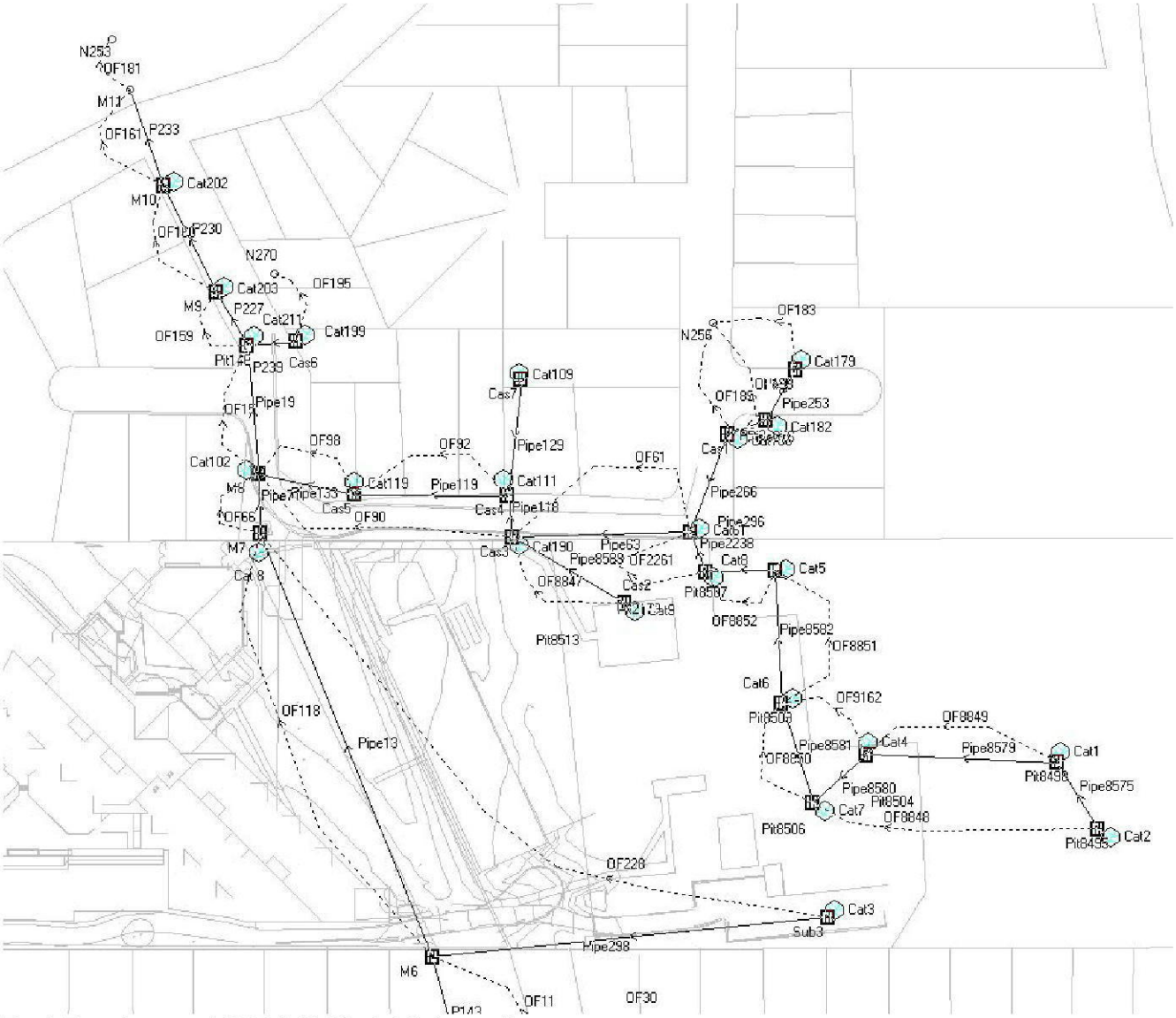
117_D01A.dwg

Appendix 3

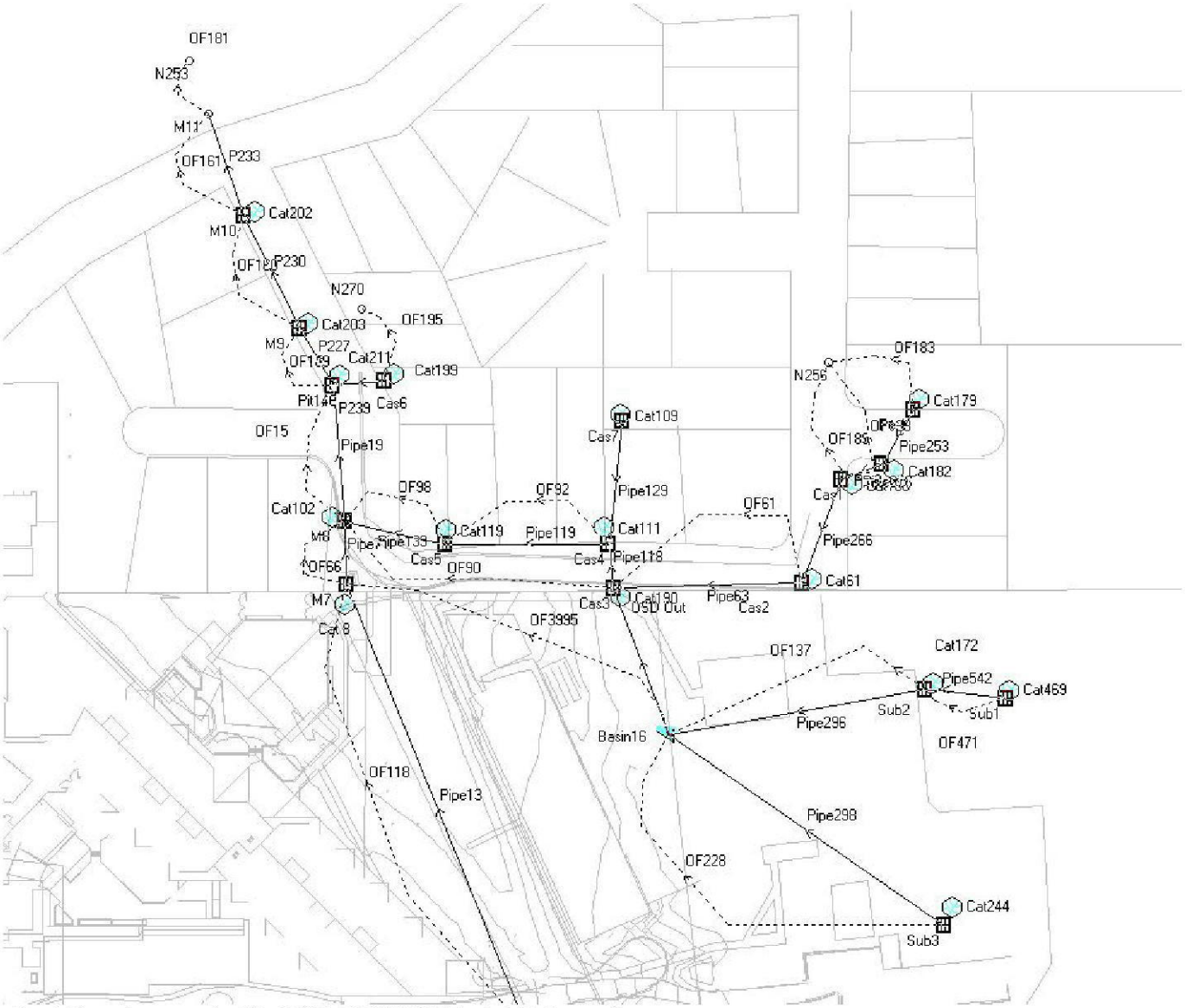
Schematic of MUSIC model layout & DRAINS model layout



MUSIC Model Schematic



Post Development DRAINS Model Schematic



Post Development with OSD DRAINS Model Schematic

Appendix 4

Recommendations and Assumptions used In MUSIC and DRAINS Modelling

Stormwater Quality – recommendation used from MUSIC - eWater and Draft Music Modelling Guidelines for NSW 2010

Assumptions:

Rainwater tanks:

- High flow bypass 100m^3/s
- Volume below overflow pipe = 6k/L
- Depth above overflow = 0.2m
- Surface area = 3m^2
- Reuse properties with stored water reused for irrigation or other purpose, PET – Rain = 112kL/year scaled by daily (for daily external use – from Draft Music Modelling Guidelines for NSW 2010 ,Table 3-12)
- Daily demand = 0.47kL/day (for an average of 4 occupants/dwelling – from Draft Music Modelling Guidelines for NSW 2010 ,Table 3-12)

Bioretention Area:

- High flow bypass = 0.17 m^3/s
- Extended Detention Depth = 0.15m
- Surface area = 190m^2
- Filter area = 145 m^2
- Unlined Filter media perimeter = 50m
- Saturated Hydraulic Conductivity = 100mm/hour (36-180 mm/hr recommended for sandy loam
- Filter depth = 0.6m
- TN content of filter media = 800 mg/kg (Values of between 750-950mg/kg is considered suitable)
- Orthophosphate Content of Filter media = 50mg/kg (Plants will be chosen on the basis that they can achieve this result as a value of less than 55 mg/kg will give optimal treatment performance)
- Exfiltration rate = 0 mm/hr
- Base is not lined
- Vegetated with effective nutrient removal plants
- Overflow weir width = 2 m
-

Penrith City Council's DCP 2006 requirements regarding water quality:

Penrith City Council's DCP states the objective to '*minimise urban runoff pollutants to watercourses*'.

Penrith City Council's DCP requires the following levels of treatments to be achieved in the post-development phase and was the table instructed by Council to be used for this proposal:

Pollutant	**Retention Criteria**
Litter (gross pollutants)	70 % of material > 5mm
Coarse Sediment	80% for particles <0.5mm
Nutrients	45% retention
Fine Particles	50% for particles <0.1mm
Oil & Grease	90% of load with no visible discharges

Table C3.2: Pollution Retention Criteria Penrith City Council's DCP 2006

DRAINS Assumptions:

Contributing Upstream Catchment:

- 80% impervious area for all residential catchments with a half road. Where there are existing reserve areas within a catchment, this area was assumed to be 100% pervious with the area calculated using aerial photography.
- After a site visit to the catchment area, using six viewer contours and using aerial photography the contributing catchment area was assumed to be 26.7ha.
- 'Dummy' pits have been used to model several pits including on-grade, sag and interallotment pits, with all flow entering the pipe system.
- Penrith City Council Design Guidelines 1996 was used to get all assumption such as impervious percentages and flow path roughness.

ISSUE FOR D.A.

REVISIONS

No.	DATE	REVISION DETAILS	BY

NOTES:

SCALE: 1:500 | DATUM: AHD

LONG SECTION: H: N/A V: N/A | CROSS SECTION: H: N/A V: N/A

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SCALE IN METRES AT ORIGINAL REDUCTION RATIO

PREPARED BY

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CLIENT: THE TRUSTEES OF THE CATHOLIC CHURCH FOR THE DIOCESE OF PARRAMATTA

SURVEY:	C.L.	DATE OF SURVEY:	18.01.13
DRAWN:	S.W./K.G.	DATE OF PLAN:	08.10.13
DESIGNED:	--	DATE LAST SAVED:	09.10.13
APPROVED:	B.L.	DATE APPROVED:	--

TITLE:
CATCHMENT BREAKUP FOR MUSIC MODELLING
CIVIL WORKS STRATEGY PLAN
PROPOSED SUBDIVISION OF LOT 1, DP1144668
ANDROMEDA DRIVE, CRANEBROOK

JOB No: I117EG
ISSUE:
DWG No: SK1
SHEET 1 OF 1 SHEETS
SIZE: A1

Catchments_Music P1 1.dwg

PENRITH

Our Ref: PL12/0146
Contact: Schandel Jefferys
Telephone: (02) 4732 8125

27 December 2012

Whelans Insites Pty Ltd
Peter Laybutt
Level 12, 80 Clarence Street
SYDNEY NSW 2000

Dear Mr Laybutt

Pre-lodgement Meeting
Proposed Subdivision - Torrens Title x 21 Lots
86-94 Andromeda Drive Cranebrook

We welcome your initiative to commence your project in the Penrith Local Government Area.

Thankyou for participating in Council's pre-lodgement meeting on 13 December 2012. We consider that the pre-lodgement process will assist in the preparation and determination of your proposal.

If you require any further assistance regarding the attached advice please contact me on (02) 4732 8125.

Yours faithfully

Schandel Jefferys
Principal Planner

***** Important Note *****

The pre-lodgement panel will endeavour to provide information which will enable you to identify issues that must be addressed in any application. The onus remains on the applicant to ensure that all relevant controls and issues are considered prior to the submission of an application.

Information given by the pre-lodgement panel does not constitute a formal assessment of your proposal and at no time should comments of the officers be taken as a guarantee of approval of your proposal.

It is noted that there is no Development Application before the Council within the meaning of the Environmental Planning and Assessment Act 1979. This response is provided on the basis that it does not fetter the Council's planning discretion and assessment of any Development Application if lodged. It is recommended that you obtain your own independent expert advice.

The response is based upon the information provided at the time of the meeting.

Penrith City Council
PO Box 60, Penrith
NSW 2751 Australia
T 4732 7777
F 4732 7958
penrithcity.nsw.gov.au

PROPERTY AND PLANNING INFORMATION	
Attendees	Proponent – Myall Stevens, Peter Laybutt and Keiran Lay. Penrith City Council - Schandel Jefferys (Planning), Mark Cremona (Engineering) and Chris Martyn (Administration).
Proposal	Subdivision - Torrens Title x 21 Lots
Address	Lot 1 DP 1144668 86-94 Andromeda Drive Cranebrook
Zoning and permissibility	The land is zoned 2B Residential under Penrith Local Environmental Plan 1998 (Urban Land). In this zone subdivision is permitted. The minimum lot size is 550m² with a minimum 15m width. For an internal lot the minimum lot size is 650m².
Site constraints	— Bushfire – although not included in maps prepared by the RFS council requires a bushfire assessment report to be submitted with the application. The proposal will be referred to the RFS for comment. The reason for this is the RFS maps are out of date and therefore nearby areas of high bushfire risk vegetation. — Easements – for drainage — Flora and fauna — Tree preservation.

KEY ISSUES AND OUTCOMES

The proposal is to address the following issues:

RELEVANT EPIs POLICIES AND GUIDELINES

Planning provisions applying to the site, including permissibility and the provisions of all plans and policies are contained in **Appendix A**.

PLANNING

Key Issues

The following key issues must be addressed prior to lodging a development application with Council.

1. Under DA12/0786 approval was granted for subdivision which requires an 88B instrument to be created stating that no further development of Lot 101 can occur unless appropriate provision is made for access, services and drainage. Any application would clearly need to address this restriction.
2. A traffic assessment needs to be prepared and Council officers raise concerns about the capacity and safety of intersection with Cassar Crescent.
3. Flora and fauna assessment will inform the layout of the proposed subdivision. Trees and vegetation with higher values are to be retained.

DCP 2006 require subdivision layout to be designed so that existing streetscape and landscape characters are maintained. This DCP also requires the preservation of mature trees and associated landscape elements.

4. Cul-de-sacs are not preferred and should be avoided as far as possible as they deteriorate permeability.
5. The interface with the existing school and public reserve is a key consideration. Blank walls or high fences should not be proposed where there is this interface. Overlooking opportunities must be enhanced as far as possible.
6. The interface with the Northern Road is also a key consideration. Dwellings should have some form of orientation onto the Northern Road although vehicular access may be obtained from Road 1.
7. Battleaxe blocks are not a preferred outcome for this subdivision. Battleaxe blocks should be removed and the subdivision pattern re-designed. Each residential lot should be afforded a street frontage and address.
8. Allotment orientation is to consider the various types of dwellings which may be constructed on them. Building envelopes should be provided which demonstrate the development potential for each lot.
9. Areas of proposed reserve are not zoned for that purpose or included in Council's Section 94 plans for acquisition therefore they must be retained in private ownership and appropriately maintained.

SITE PLANNING AND DESIGN

- Excessive retaining walls and tall fencing would not be appropriate where private lots have an interface with the reserve land or road frontages.
- Opportunities for overlooking are essential and details of retaining walls and fencing are to be provided with this development application.
- The natural topography and existing vegetation are to be retained as part of this development.
- Retaining walls are to be minimised.
- Landscaping should enhance the natural features of the land.
- The application is to demonstrate how the subdivision layout has been designed to consider how each lot can be developed for residential purposes. This is to include setbacks, private open space, aspect, car parking and landscaping. This is particularly relevant on sloping land.
- The subdivision layout is to provide land that can be developed in future with minimal need for cut and fill.

LAND MANAGEMENT

The application is to address all relevant requirements under State Environmental Planning Policy 55 Remediation of Land (SEPP 55). Council cannot consent to any development unless these requirements have been satisfied. Should remediation be required this will require development consent. The application is to demonstrate that the land is suitable for the proposed purpose.

LANDSCAPE DESIGN

A street tree planting plan should be submitted with the application.

INFRASTRUCTURE SERVICES

The application will need to demonstrate that sewer, water, electricity and

telecommunications are available or will be made available.

BUSHFIRE

- The site is not strictly bushfire prone however the application will be referred to the Rural Fire Service.
- Council recommends early consultation with the RFS.
- A bushfire report is required.
- Future BAL construction standards for relevant lots is to be nominated.

SECTION 94 CONTRIBUTIONS

Are applicable and would be levied under Local Open Space, District Open Space and Footpath Plans. Please refer to Council's website for copies of these Section 94 Plans.

ENGINEERING

Traffic

- The subject site includes a frontage to The Northern Road, it would be appropriate to seek guidance from the RMS. During the preliminary consultation with the RMS, it is advised that the option of gaining direct vehicular access from The Northern Road is discussed.
- The development will only be permitted to have one vehicular access point.
- The application shall be supported by a traffic report prepared by a suitably qualified person, the report shall analyse but not be limited to the following:
    - the safety of the intersections at Andromeda Drive/Cassar Crescent due to additional traffic volumes generated by the development
    - the available road network capacity in Cassar Crescent to support the developments traffic volumes
    - the report shall also consider the additional traffic volumes generated by the vacant land to the north that will potentially be subdivided in the near future
    - consideration of the pavement width with respect to the function
- The application must demonstrate that access, car parking and manoeuvring details comply with AS2890 Parts 1, 2 & 6 and Council's Development Control Plan.
- The application shall be supported by turning paths in accordance with AS2890 clearly demonstrating satisfactory manoeuvring on-site and forward entry and exit to and from the public road.

Stormwater

- Stormwater drainage for the site must be in accordance with Council's Development Control Plan.
- A stormwater concept plan shall be submitted with the application.
- The stormwater concept plan shall be accompanied by a supporting report and calculations and also must analyse the available capacity of the downstream drainage infrastructure.

- A water quality treatment device shall be provided in accordance with Council's Development Control Plan.
- Additional information may be obtained from Council's draft policy 'Stormwater Drainage for Building Developments' which is available from Council's website at the following link: **http://www.penrithcity.nsw.gov.au/index.asp?id=3196**

Roadworks

- The development will require the following external road works:
    - Provisions for an unconventional intersection to provide access to the development
- The proposed road is classified as an "Access Place" and will require a 14m road reserve. The road reserve will be made up of a 7m pavement and 2 x 3.5m verge areas.

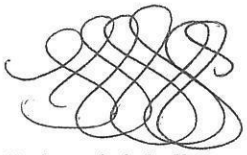
Earthworks

- No retaining walls or filling is permitted for this development which will impede, divert or concentrate stormwater runoff passing through the site.
- Earthworks and retaining walls must comply with Council's Development Control Plan.
- Proposed fill material must comply with Council's Development Control Plan.

Subdivision Works

- The application is to be accompanied by a subdivision concept plan.
- The subdivision layout shall be in general accordance with Council's Development Control Plan.
- All subdivision works must be designed in accordance with Council's Design and Construction Guidelines.
- The application should discuss how services will access the proposed development
- Any request for works in kind shall form part of the development application.
- The subdivision will require the following key infrastructure works:
    - Potential Drainage upgrades
    - Pedestrian footpath works
- The width and design of the access handles shall be in accordance with Council's Development Control Plan.
- Dedication of land for road reserve purposes in Cassar Place
- Provision of footpaths within the development.

Documents to be submitted with development application	— Subdivision plan — Statement of environmental effects — Notification plan — Stormwater concept plan (see comments above) — Waste management plan — Landscape plan – street tree planting — Flora and fauna assessment — Traffic assessment — Schedule of external materials and finishes — Ten printed and a CD copy of your development application Please refer to Council's Development Application checklist, as attached, for further details of submission requirements and ensure that plans submitted illustrate consistent detail. Please ensure you contact Council's duty officer on 4732 7991 to make an appointment for lodgement of this application.
Fees	Please call Development Services Department's Administrative Support on (02) 4732 7991 to enquire about fees and charges.



Schandel Jefferys
Principal Planner

APPENDIX A

- SREP 20 – Hawkesbury Nepean
- SEPP 55 - Remediation of Land
- SEPP (Infrastructure) 2007
- Penrith Urban Land LEP 1998
- Penrith DCP 2006
- Nature and extent of any non-compliance with relevant environmental planning instruments, plans and guidelines and justification for any non-compliance.

PENRITH CITY COUNCIL

Civic Centre, 601 High Street, Penrith 2750 • PO Box 60, Penrith 2751
Phone 02 4732 7777 • Fax 02 4732 7879 • Email pencit@penrithcity.nsw.gov.au • DX 8017 Penrith

The headings listed below refer directly to the items listed in the left-hand column of the Matrix of Information on page 4 of the Application Form. This information is provided to assist you with the preparation of your Application and it's supporting information.

SITE PLAN (scale of 1:200)

A site plan is an aerial view of the land showing the existing and proposed development. These should include:

- The location of the land, the measurements of the boundaries of the land, and which direction is north.
- The location and uses of buildings, structures, swimming pools and fences that are proposed and already on the land.
- The distances to boundaries and other structures from the proposed development.
- The existing and proposed levels of the land (provide AHD levels on flood affected properties).
- The extent of any cut or fill and details of proposed retaining walls.
- The location of any trees (including street trees), their species names and canopy diameter.
- The location and width of any easement, right of ways and watercourses.
- The location of driveways, laybacks and utility installations (such as light poles) where applicable.
- The landscape area calculation.
- The location and uses of buildings on sites that adjoin the land.

FLOOR PLAN (scale of 1:100)

A floor plan is an aerial view of the internal layout of the development. These should include:

- The layout of the proposed and existing rooms, the room names, areas and dimensions.
- The window and door locations and sizes.
- The wall structure type and thickness.
- The floor levels (provide AHD levels on flood affected properties).
- The location of smoke detectors (where applicable).

ELEVATION PLAN (scale of 1:100)

An elevation plan is an external view of the proposed development. These should include:

- The side on views of each profile of the proposed development.
- The external walls and ridge heights.
- The window and door locations and sizes.
- The external materials and finishes.
- For additions and alterations you must clearly distinguish between the existing and proposed work.
- A 3D coloured perspective may be required for certain developments.

SECTION PLAN (scale of 1:100)

A section plan is a diagram showing a cut through the development at important or typical points. These should include:

- The section names and their location on the floor plan.
- Proposed construction methods for floors, walls and roofs.
- Floor to ceiling heights.

SPECIFICATIONS

A specification is a written statement that details all building materials and methods of construction. This should include:

- The materials to be used, type, size, spacing.
- The construction and installation methods.
- Compliance with or referenced to any relevant Australian Standards and the Building Code of Australia.
- Method of termite control.
- Engineer's details where applicable.

STATEMENT OF ENVIRONMENTAL EFFECTS

A Statement of Environmental Effects is a written document that supports the development application. It demonstrates that, as the applicant, you have considered what impact your development will have on the natural and built environment and how you propose to mitigate any negative effects. All developments will require a Statement of Environmental Effects although the level of detail may vary according to the type of development.

A Statement of Environmental Effects should include, but is not limited to, the following:

Site Suitability –

- Flooding
- Mine subsidence
- Drainage
- Soil erosion
- Landslip
- Bushfire or any other risk

Access and Traffic –

- Driveway access, maneuverability and pedestrian safety.
- Suitability of the existing road network.
- Number of vehicle movements entering and exiting the site, including delivery trucks.
- Number and location of parking spaces.

Our Reference: B132020 - Letter

The Diocese of Parramatta
C/-
Whelans Insites Pty Ltd
80 Clarence Street,
Sydney 2000

ABPP
Australian Bushfire
Protection Planners Pty Ltd
ACN 083085474
Bushfire Mitigation Consultants

Attention: Myall Stevens

Re: Residential Subdivision of Lot 1 in DP 1144668, No, 86 – 94 Andromeda Drive, Cranebrook

Dear Myall,
I have undertaken an inspection of the site of the proposed residential subdivision within Lot 1 in DP 1144668, No. 86 – 94 Andromeda Drive at Cranebrook and the adjoining land to the north, east and south.

The land to the north and south of the site contains existing residential development whilst to the east the site is adjoined by The Northern Road carriageway with existing rural residential development located to the east of The Northern Road.

The Northern Road carriageway and the rural residential development contain scattered, remnant woodland vegetation which is managed. This vegetation does not constitute vegetation which could lawfully be mapped as bushfire prone vegetation, pursuant to the provisions of Section 146 of the *Environmental Planning & Assessment Act 1979.*

A review of the Penrith City Council certified Bushfire Prone Land Map confirms that the development site neither contains bushfire prone vegetation nor is it impacted by a buffer zone to bushfire prone vegetation. My site inspection confirmed this to be the case – Refer to Attachment A – Copy of the Penrith Bushfire Prone Land Map.

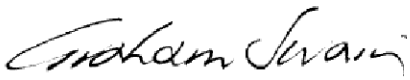
As the development site is not mapped as containing bushfire prone vegetation or the buffer zone to bushfire prone vegetation, the proposed residential subdivision of the land is not affected by the requirements of Section 91(1) of the *Environmental Planning & Assessment Act 1979* or Section 100B of the *Rural Fires Act 1997.*

Therefore, there is no requirement to comply with the specifications of *Planning for Bushfire Protection 2006* or Australian Standard A.S. 3959 – 2009 – *'Construction of Buildings in Bushfire Prone Areas'.*

Furthermore, there is no requirement for the issue of a Bushfire Safety Authority pursuant to Section 100B of the *Rural Fires Act 1997.*

If you require any further information please contact the undersigned.

Yours faithfully,

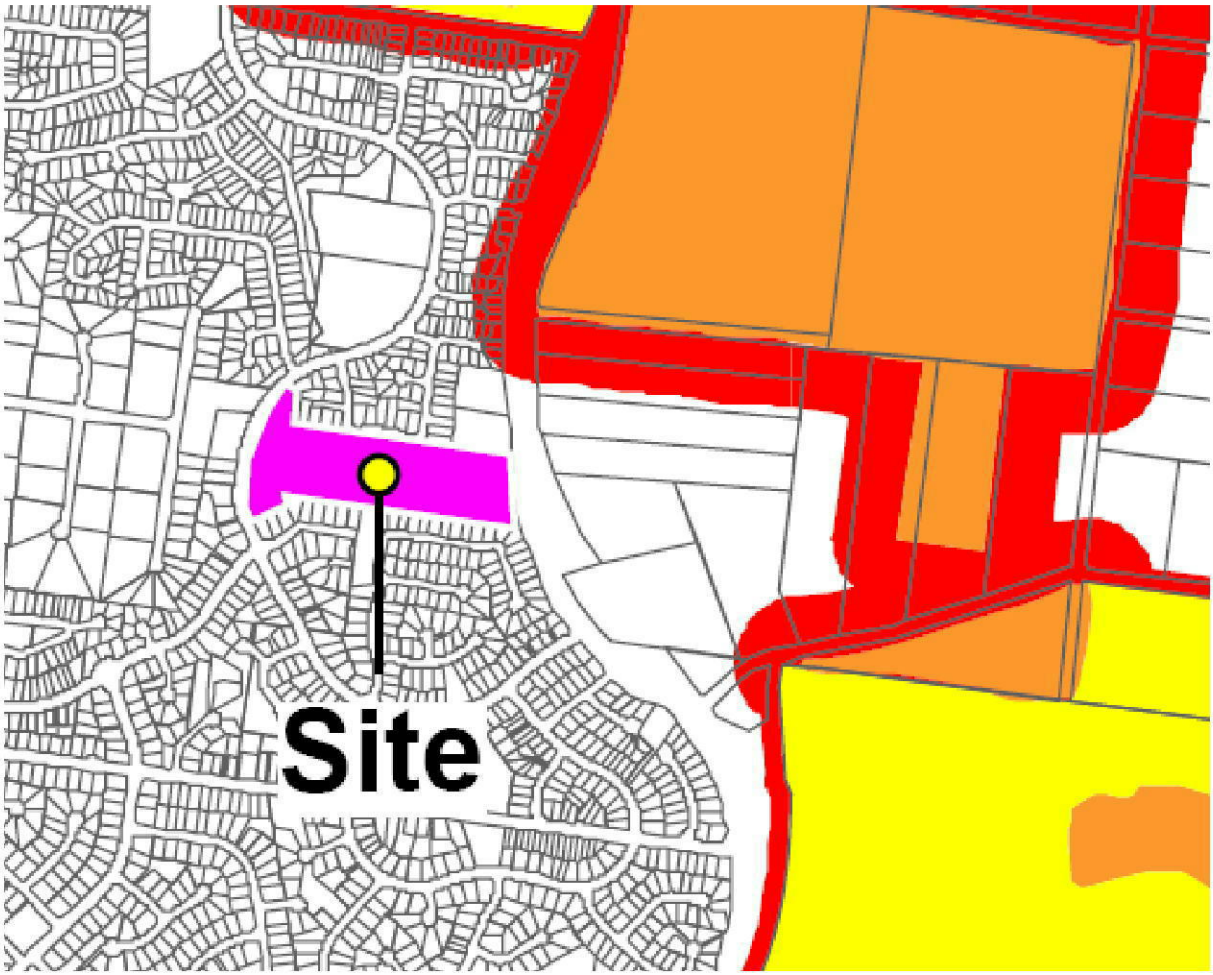


Graham Swain,
Managing Director,
Australian Bushfire Protection Planners Pty Limited
5.6.2013

RMB 3411 Dog Trap Rd Somersby NSW 2250 Tel. 612 43622112 / 612 43621184 Fax. 612 43622204 Mob. 0427 622204
Email. abpp@bigpond.net.au

Attachment A:

Extract from the Penrith City Council Bushfire Prone Land Map showing that the development site does not contain Category 1 or 2 Bushfire Prone Vegetation or the buffer zone to Bushfire Prone Vegetation.



Legend:

Orange:	**Category 1 Bushfire Prone Vegetation**
Yellow:	**Category 2 Bushfire Prone Vegetation**
Red:	**30 & 100 metre wide Buffer Zone to Bushfire Prone Vegetation**

RMB 3411 Dog Trap Rd Somersby NSW 2250 Tel. 612 43622112 / 612 43621184 Fax. 612 43622204 Mob. 0427 622204
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MANAGING DIRECTORS
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DIRECTORS
MATTHEW SHIELDS
BEN WHITE

Land Adjoining Corpus Christi Primary School Site - Andromeda Drive, Cranebrook

Proposed Residential Subdivision - Acoustic Assessment

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DOCUMENT CONTROL REGISTER

Project Number	20130425.2
Project Name	Land Adjoining Corpus Christi Primary School Site - Andromeda Drive, Cranebrook
Document Title	Proposed Residential Subdivision - Acoustic Assessment
Document Reference	20130425.2/1010A/R1/YK
Issue Type	Email
Attention To	Trustees Roman Catholic Church for Diocese Parramatta Mr Kieran Lahey

Revision	Date	Document Reference	Prepared By	Checked By	Approved By
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1 INTRODUCTION

This report presents an analysis of the potential acoustic impacts associated with the proposed residential subdivision of land, to the east of the Corpus Christi Primary School at The Northern Road, Cranebrook.

In this report we will:

- Conduct an external noise impact assessment (traffic noise and noise from the existing external recreational areas of the school) and outline indicative treatments to ensure that a reasonable level of amenity is achieved for future tenants.

- Identify potential noise sources generated by the site, and determine noise emission goals for the development to meet relevant State, Council and Environment Protection Authority (EPA) acoustic requirements; to ensure that nearby developments are not adversely impacted.

2 SITE DESCRIPTION

The subject site is located along The Northern Road, Cranebrook.

The site is bounded by The Northern Road to the east, Corpus Christi Primary School to the west, residential property at 1003-1009 The Northern Road to the north and residential properties at 134-146 Goldmark Crescent to the south.

The proposal includes for the subdivision of the school grounds to create 21 separate residential properties on the western half of the existing site.

The primary external noise source impacting the proposed subdivision will be traffic noise from The Northern Road. This is a two lane arterial road carrying medium-high volumes of traffic.

In addition (to a lesser extent) residential developments on lot 1, 17, 18, 19, 20 & 21 will be impacted from the outdoor recreational areas of the primary school.

Figure 1 below illustrated the locations of the subject site, noise measurements and external noise sources. Figure 2 outlines the proposed layout of the subdivision.

Figure 1 – Site Description (source: SixMaps)

Figure 2 – Proposed Subdivision

3 NOISE DESCRIPTORS

Traffic noise constantly varies in level, due to fluctuations in traffic speed, vehicle types, road conditions and traffic densities. Accordingly, it is not possible to accurately determine prevailing traffic noise conditions by measuring a single, instantaneous noise level. To accurately determine the effects of traffic noise a 15-20 minute measurement interval is utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters. These parameters are used to measure how much annoyance would be caused by a particular noise source.

In the case of environmental noise three principle measurement parameters are used, namely L_{10}, L_{90} and L_{eq}.

The L_{10} and L_{90} measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement interval.

The L_{10} parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the measurement period. L_{eq} is important in the assessment of traffic noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of traffic noise.

Current practice favours the L_{eq} parameter as a means of measuring traffic noise, whereas the L_{10} parameter has been used in the past and is still incorporated in some codes. For the reasons outlined above, the L_{90} parameter is not used to assess traffic noise intrusion.

4 EXTERNAL NOISE IMPACT ASSESSEMENT

The proposed subdivision will be impacted by two different external noise sources;

- Quasi-steady state noise from regular traffic flow along The Northern Road, bounding the subject site to the east; and
- Intermittent noise from the external recreational areas of the Corpus Christi Primary School, bounding the site to the west.

Noise impacts from both these sources will be addressed in this section.

4.1 NOISE MEASUREMENTS

Measurements of external noise was conducted using long term unattended monitoring and short term, hand held measurements.

Long term monitoring was conducted using a two unattended noise monitors installed on site, for a one week period.

- Monitor 1 was installed along the eastern boundary of the subject site, with clear unrestricted view of The Northern Road, approximately 20m from the road.
- Monitor 2 was installed towards the rear of the subject site, approximately 35m from the edge of the cricket nets.

Monitoring was conducted from 15th to 22th May 2013 using an Acoustic Research Laboratories noise monitor set to A-weighted fast response. The monitor was calibrated at the start and end of the monitoring period using a Rion NC-73 calibrator. No significant drift was noted. Noise logger data for both loggers is attached in Appendix 1.

Attended noise measurements of traffic noise along The Northern Road was also conducted by this office. These measurements were conducted on the 15th May 2013, during early morning peak traffic period, to supplement the long term monitoring and assess the traffic noise.

The measured noise levels listed in the table below, were determined based on the logging data and attended measurements. Measured levels have been adjusted for distance and orientation to predict impacts on the proposed subdivision.

Table 1 – Measured Noise Levels

Location	Noise Source	Measured Noise Levels	
Eastern property boundary of site	Traffic	Daytime (7am – 10pm)	67 dB(A)$L_{eq(15hour)}$
		Night (10pm – 7am)	62 dB(A)$L_{eq(9hour)}$
Logger Location (refer Figure 1)	External play areas of school	66 dB(A)$L_{eq(15mins)}$*	

***The primary school outdoor play areas is generally used between the hours of 8-8:30am, 11-11:15am and 1-1:30pm (refer to Appendix 1 for detailed noise logging data). The level outlined above was the loudest typical $L_{eq(15minute)}$ measurement recorded during this period.**

4.2 ACOUSTIC OBJECTIVES

4.2.1 Traffic Noise

Part 12.1 of C12 of the Penrith City Council DCP 2010 relates to Road Traffic Noise impacts on new developments. However, this section does not outline any specific criteria (numeric or otherwise) with regards to a suitable level of amenity at or within the proposed development.

Hence, internal traffic noise criteria for the future residential developments on the proposed subdivision will be based on the requirements of the NSW State Environmental Planning Policy (Infrastructure) 2007 (SEPP) and Australian Standard 2107:2000.

4.2.1.1 NSW SEPP Requirements

Traffic Volume Map 9 on the NSW Transport Roads and Maritime Services website, indicates the section of The Northern Road adjoining the subject subdivision to the east, as a State road carrying <20,000 AADT and hence not mandatory or recommended under clause 102 of the Infrastructure SEPP. Hence, Australian Standard 2107:2000 will be used as the primary guideline for this assessment.

4.2.1.2 Australian Standard 2107-2000

AS 2107-2000 *"Recommended Design Sound Levels and Reverberation Times for Building Interiors"* outlines recommended design internal noise levels for various occupancy types based on its use/activity. For residential developments, the design criteria is further classified based on its proximity to the type of road (i.e. freeway, highway, collector road, sub-arterial road or local road). The criteria relevant to the proposed development, is presented below.

Table 2 – Traffic Noise Impact Criteria

Space/Activity Type		Recommended Internal Design Noise Levels
Houses near major roads	Sleeping Areas	35 dB(A)$L_{eq(9hour)}$
	Other Habitable Areas	40 dB(A) $L_{eq(15hour)}$

4.2.2 Noise from External Play Areas of the School

The noise from the outdoor play areas of the school will be intermittent in nature. This was confirmed by the unattended noise monitoring conducted towards the rear of the subject site (refer noise logging data attached in Appendix 1). Based on the measured levels, the outdoor play areas are primarily used between the hours of 8-8:30am, 11-11:15am and 1-1:30pm.

It is noted that the new residences will be located adjacent to an existing noise source (being the playgrounds). However, as noted above noise impact from the playgrounds is generally limited to the hours of 8-8:30am, 11-11:15am and 1-1:30pm.

Accordingly, noise from the adjacent playground will not impact on new dwellings between the hours of 6pm to 7am (i.e. evening and nigh-time periods).

4.3 RECOMMENDATIONS

To mitigate noise impacts from the school to the backyards of the proposed residences, minimum 1.8m high imperforate fencing (Colorbond, lapped and capped timber or similar) is recommended along the western boundary of lots 19, 20 and 21.

Based on the measured external noise sources (traffic noise and school playground noise) likely to impact the proposed subdivision, ALC confirms that compliance with internal noise goals (outlined in Table 2 above) can be achieved by standard acoustic treatments to the proposed future residential developments.

These treatments may typically include medium to thick single glazing (6.38mm or 10.38mm laminate glazing), acoustic insulation to ceiling cavity and stud spaced wall with insulation for light-weight external wall constructions.

Detailed assessment of minimum construction requirements (glass thickness, ceiling constructions etc.) for individual dwellings should be finalised when architectural plans are made available.

5 NOISE EMISSION ASSESSMENT

Noise emissions from the site should be assessed to ensure that the amenity of nearby land users is not adversely affected.

Potential noise sources which should be assessed are:

- Noise generated by external mechanical plant/equipment.
- Noise generated by additional traffic in the area as a result of the proposed development.

5.1 BACKGROUND NOISE MONITORING

Unattended background noise monitoring was conducted by this office at two locations on site (refer section 4.1). The background noise levels measured by monitor 2, installed towards the rear of the site, will be used to establish the noise emission goals for the subject subdivision (lower background noise levels measured by this logger). Refer to Appendix 1 for detailed noise logging data.

Measured background noise levels are presented below.

Table 3 – Measured Background Noise Levels

Location	Background noise level dB(A)L_{90}		
	Daytime (7am-6pm)	**Evening (6pm-10pm)**	**Night (10pm-7am)**
Monitor 2 (refer Figure 1)	40	38	33

5.2 ACOUSTIC OBJECTIVES

5.2.1 Noise Generated by External Mechanical Plant and Equipment

In the absence of any relevant criteria stipulated by Penrith Council in their DCP for residential developments, noise emissions from all external mechanical plant and equipment must comply with the requirements of the EPA's '*Protection of the Environment Operations Act 1997*' and the '*Industrial Noise Policy and Noise Control Manual*'.

5.2.1.1 NSW EPA Industrial Noise Policy (INP)

The INP provides guidelines for assessing noise impacts from equipment installed for the operation of a proposed development. The recommended assessment objectives vary depending on the potentially affected receivers, the time of day, and the type of noise source. The policy has two requirements which both have to be complied with, namely an amenity criterion and an intrusiveness criterion. In addition, the EPA in its Environmental Noise Control Manual states that noise controls should be applied with the general intent to protect residences from sleep arousal.

5.2.1.1.1 Intrusiveness Criterion

The guideline is intended to limit the audibility of noise emissions at the boundary of the affected residential receivers, and requires that noise emissions measured using the L_{eq} descriptor, not exceed the background noise level by more than 5 dB(A). Where applicable, the intrusive noise level should be penalised *(increased)* to account for any annoying characteristics such as tonality.

Allowable noise level is as follows:

Table 4 – Allowable Intrusive Noise Levels

Location	Intrusiveness Noise Goals dB(A) $L_{eq(15\ minutes)}$		
	Daytime (7am – 6pm)	Evening (6pm – 10pm)	Night-time (10pm – 7am)
Boundary of any affected residential receiver	45	43	38

5.2.1.1.2 Amenity Criterion

The guideline is intended to limit the absolute noise level from all identified noise sources, to a level that is consistent with the general environment.

The INP sets out acceptable noise levels for various localities. Table 2.1 on page 16 of the policy indicates 4 categories to distinguish different residential areas. They are rural, suburban, urban and urban/industrial interface.

Table 5 provides the recommended ambient noise levels for the suburban residential receivers for the day, evening and night periods. For the purposes of this condition:

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays;
- Evening is defined as the period from 6pm to 10pm; and
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays.

Table 5 – INP Recommended Amenity Noise Levels

Type of Receiver	Time of day	Recommended Acceptable Noise Level dB(A) $L_{eq(period)}$
Residential – Suburban	Day (7am-6pm)	55
	Evening (6pm-10pm)	45
	Night (10pm-7am)	40

5.2.1.2 Protection of the Environment Operations Act Regulation

Protection of the Environmental Operations regulation limits the noise levels associated within the operation of domestic air conditioning criteria during night time periods which is presented below:

Protection of the Environmental Operations (Noise Control) Regulation 2000-Sect 52

52 Air Conditioners

(1) A person must not cause or permit an air conditioner to be used on residential premises in such a manner that it emits noise that can be herd within a habitable room in any other residential premises (regardless of weather any door or window to that room is open):

(a) before 8 am or after 10 pm on any Saturday, Sunday or public holiday, or

(b) before 7 am or after 10 pm on any other day.

5.2.1.3 Sleep arousal

To minimise the potential for sleep arousal the $L_{1\ (1\ minute)}$ noise level of any specific noise source does not exceed the background noise level *(L_{90})* by more than 15 dB(A) outside a resident's bedroom window between the hours of 10pm and 7am.

The L_1 noise level is the level exceeded for 1 per cent of the time and approximates the typical maximum noise level from a particular source. Where the typical repeatable existing L_1 levels exceed the above requirement then the existing L_1 levels form the basis for, sleep disturbance criteria.

5.2.2 Noise Generated by Additional Traffic as a result of Proposed Development

In the absence of any relevant criteria stipulated by Penrith Council in their DCP for residential developments, noise generated by additional traffic on the surrounding road network, as a result of the proposed subdivision, must comply with the requirements of EPA NSW Road Noise Policy.

5.2.2.1 EPA Road Noise Policy

A new access road "Road No. 1" (refer Figure 2) will be the main thoroughfare for all vehicles arriving and departing the proposed subdivision. Access to this new road is only via Cassar Crescent, and hence this will be the main road impacted by the additional traffic generated by the proposed subdivision. As such the residential properties along this Crescent (11 – 17 Cassar Crescent), will be the primary affected existing residences.

Section 2.3.1 of the Road Noise Policy outlines assessment criteria for residences to be applied to particular types of project, road category and land use. Criteria relevant to the subject proposal is detailed below;

Table 6 – Road traffic noise criteria for Residential Land Use Developments

Type of Development	Time of day	Criteria for Acceptable Traffic Noise Level dB(A) $L_{Aeq(1hr)}$
Existing residences affected by additional traffic on local roads generated by land use developments	Day (7am to 10pm)	55
	Night (10pm to 7am)	50

5.3 NOISE EMISSIONS

5.3.1 Noise Assessment Objectives for External Mechanical Plant

Since detailed mechanical plant selection is not available at this stage, this report sets out the noise emission criteria applicable for any future external mechanical plant or equipment associated with the proposed subdivision.

Based on the requirements of the INP, Table 7 below provides a summary of the assessment criteria applicable to the proposed residential subdivision, at the boundaries of neighbouring potentially affected residential receivers.

Table 7 – Noise Objectives for Surrounding Affected Residential Receivers

Time of day	Measured Background Noise Level dB(A) $L_{90(15minutes)}$	Amenity Criteria dB(A) $L_{eq(period)}$	Intrusiveness Criteria Background + 5 dB(A) $L_{eq(15minutes)}$	EPA Criteria for Residential Condensers	EPA Criteria for Sleep Disturbance dB (A) $L_{1(1minute)}$
Day	40	55	45	N/A	N/A
Evening	38	45	43	N/A	N/A
Night	33	40	38	Inaudible within neighbouring premises	48

5.3.1.1 Recommendations

Mechanical plant items are not typically selected at DA stage.

Detailed review of all external mechanical plant should be undertaken at construction certificate stage (once plant selections and locations are finalised). Suitable acoustic treatments should be determined, to ensure compliance with the noise emission objectives outlined in Table 7 of this report.

All plant can be satisfactorily attenuated to levels complying with the noise emission criteria through appropriate location and (if necessary) standard acoustic treatments such as noise screens, enclosures, in-duct treatments (silencers/lined ducting) or similar.

5.3.2 Predicted Noise Generated by Additional Traffic

Cassar Crescent will be the primary existing carriageway affected by additional traffic resulting from the proposed subdivisions. Noise generated by additional traffic as a result of the proposed subdivision has been predicted in the table below. Predicted levels have been calculated taking into account;

- A total of 189 vehicle trips per day and 18 peak hour (daytime) vehicle trips. This information was based on the Traffic Impact Statement *"Proposed Residential Subdivision 86-94 Andromeda Drive, Cranebrook"* (Ref:12-153, dated April 2013) provided by Thompson Stanbury Associates.

- Based on further consultation with Thompson Stanbury Associates, as the subject proposal is a residential subdivision, night-time traffic movements (i.e. between the hours of 10pm and 7am) will be negligible. For the purposes of this assessment night-time peak hour vehicle trips are assumed at 10% of the daytime peak i.e. 2.

- A new carriageway Road No.1 will be the main thoroughfare for the proposed subdivision (refer Figure 2) and all vehicle arrivals/departures will occur via Cassar Crescent (west and east).

- Level are predicted at the façades of the existing residential properties along Cassar Crescent (11 – 17 Cassar Crescent).

- A Sound Power Level (SWL) of 94 dB has been previously measured for a car travelling at 30 – 40 km/hr.

Table 8 – Predicted Noise Levels generated by Additional Traffic

Receiver Location	Predicted Level dB(A)$L_{eq(1hr)}$	Criteria dB(A)$L_{eq(1hr)}$	Complies
11-17 Cassar Crescent	46	55 Daytime (7am to 10pm)	Yes
	<40	50 Night-time (10pm to 7am)	Yes

The predicted noise levels comply with the requirements of NSW EPA and hence no further acoustic amelioration is required for the proposed development.

6 CONCLUSION

An assessment of the potential noise impacts associated with the proposed residential subdivision of land to the east of the Corpus Christi Primary School at The Northern Road, Cranebrook has been conducted.

Existing external noise sources (traffic noise and noise from outdoor play areas of the school) impacting the proposed subdivision have been measured. All future dwellings on the proposed subdivision can be sufficiently treated (refer to section 4.3) to ensure compliance with the noise impact goals outlined in section 4.2.

Potential noise emissions from the proposed subdivision was also assessed and have been presented in section 5.

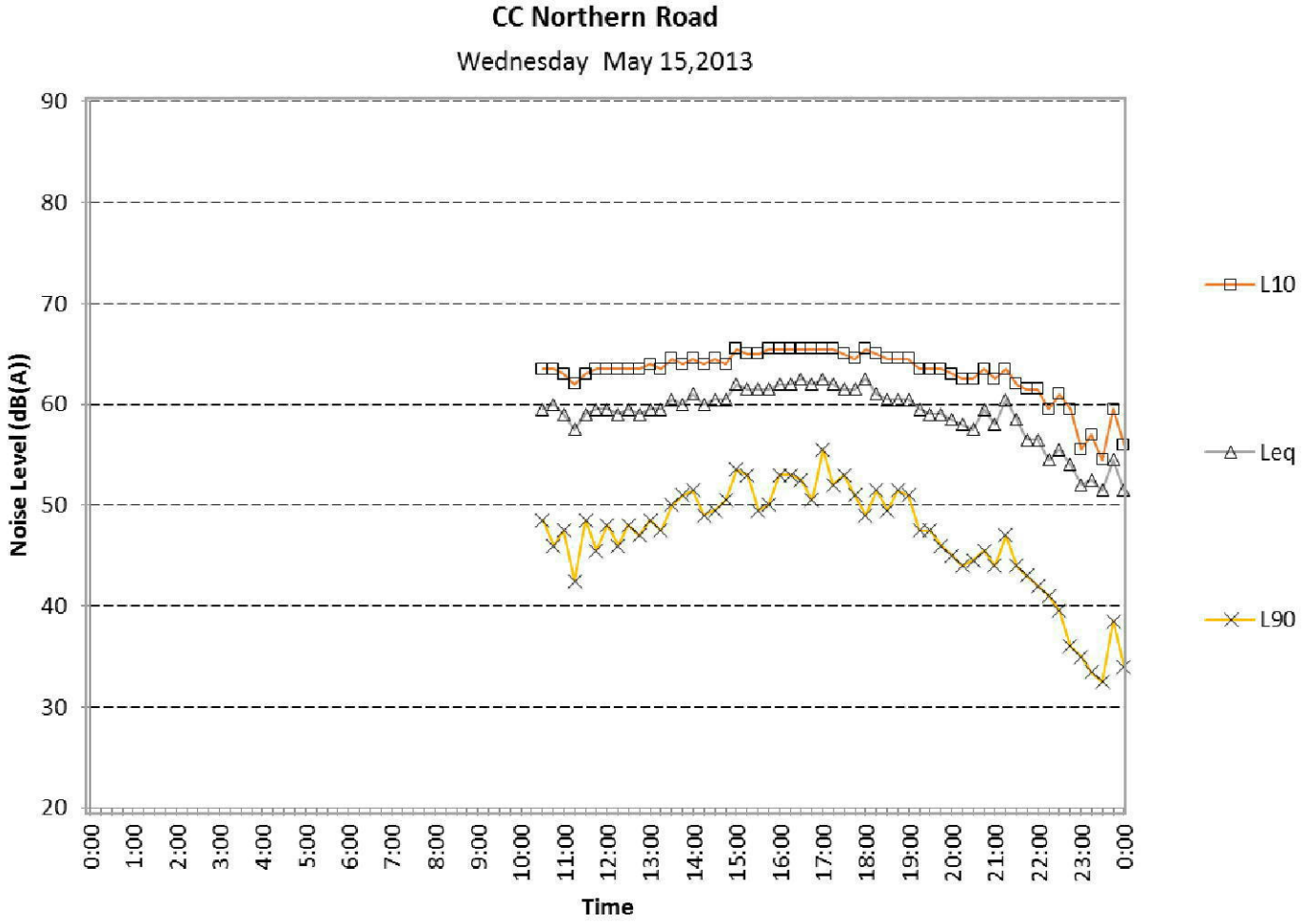
We trust this information is satisfactory. Please contact us should you have any further queries.

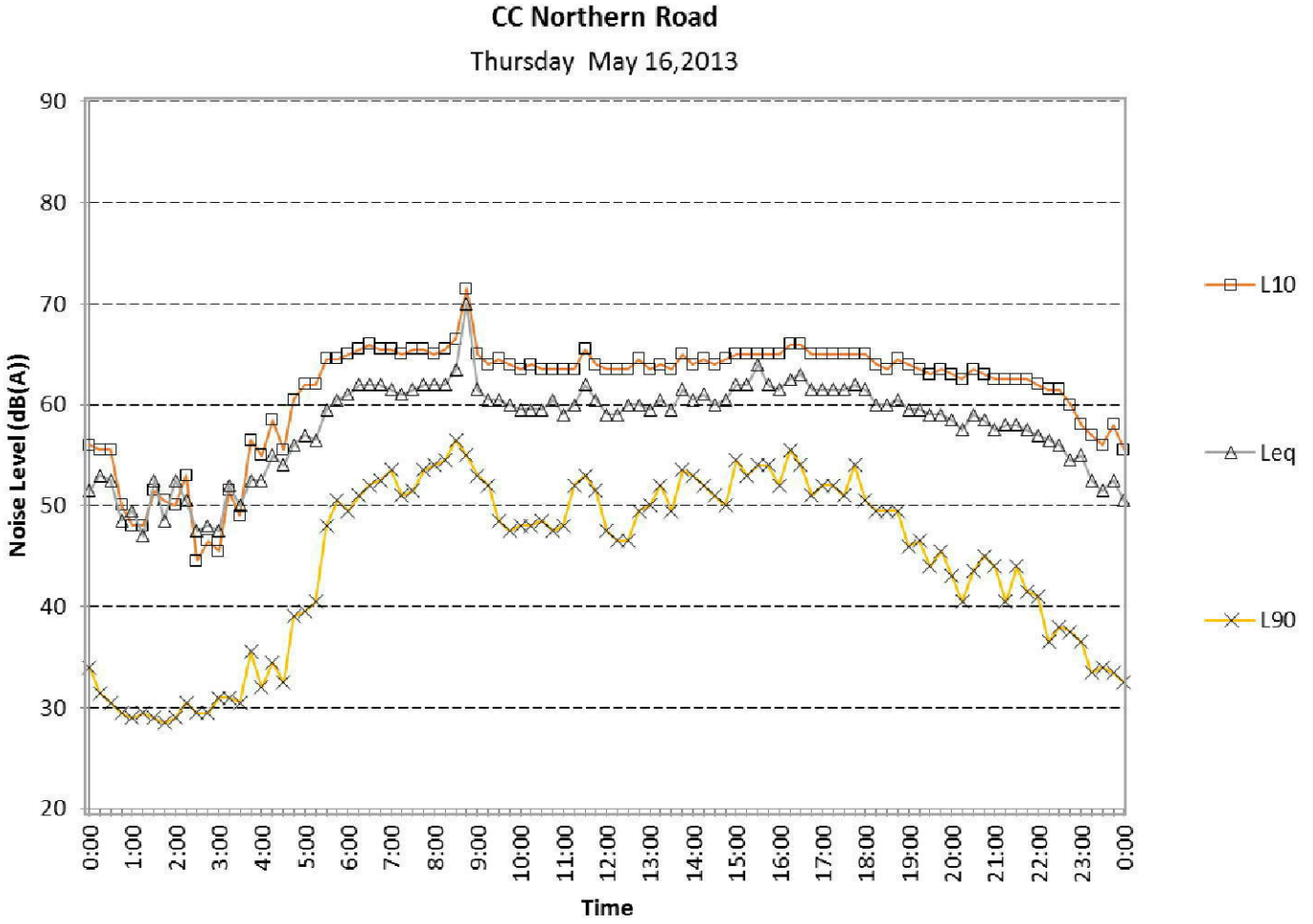
Yours faithfully,

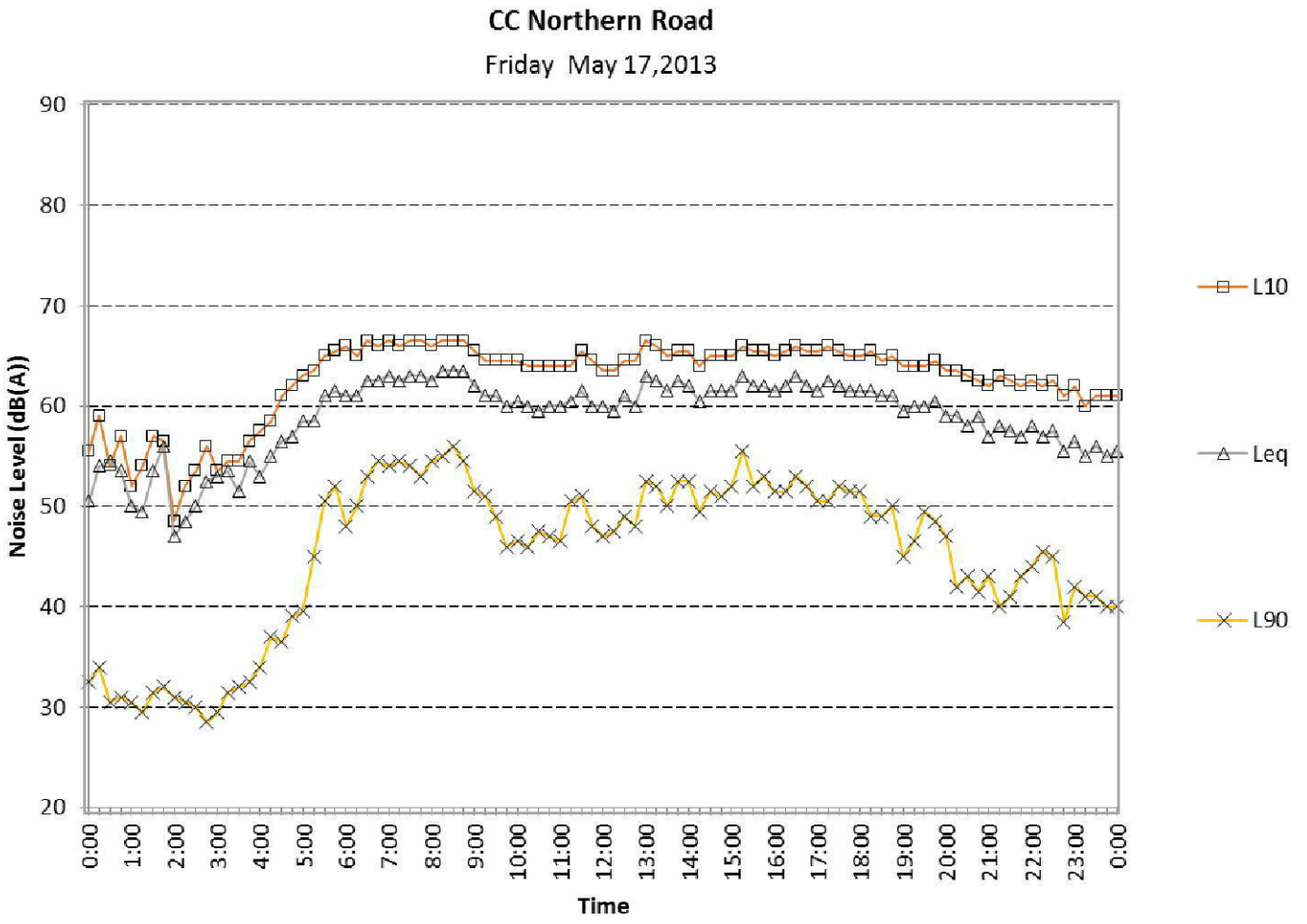
Acoustic Logic Consultancy Pty Ltd
Yogendra Kalkunte

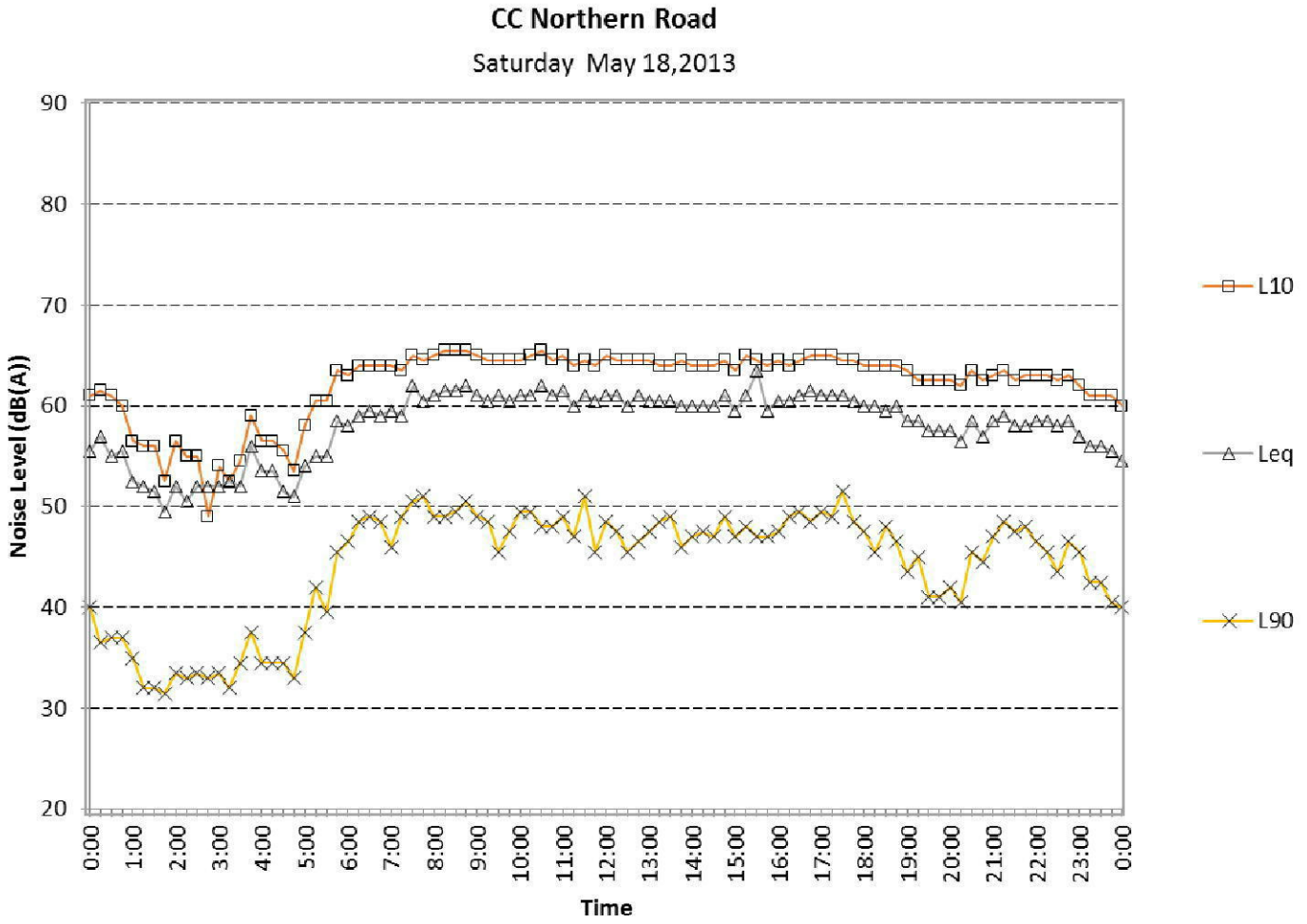
Appendix 1

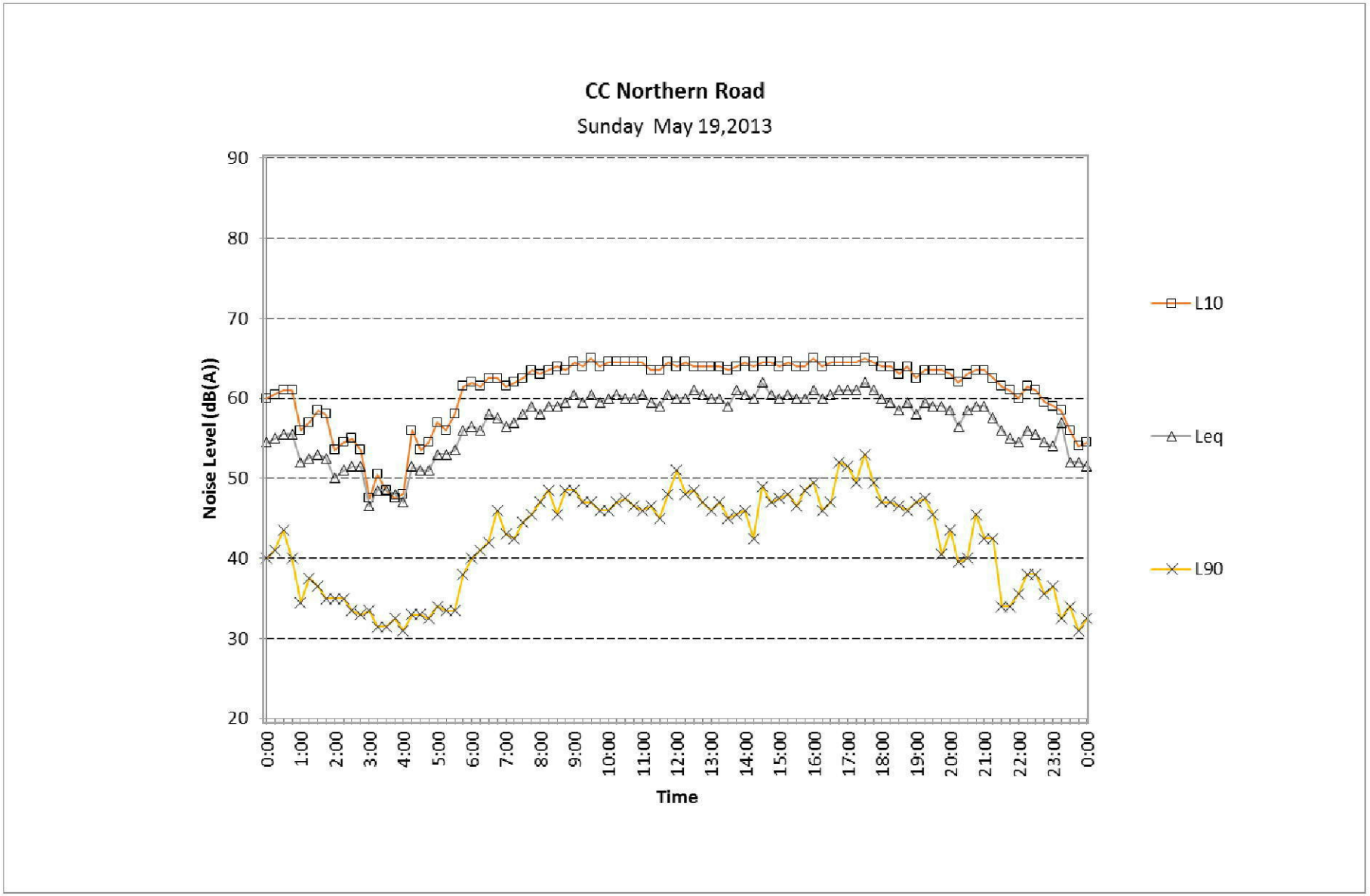
Noise Logging Data

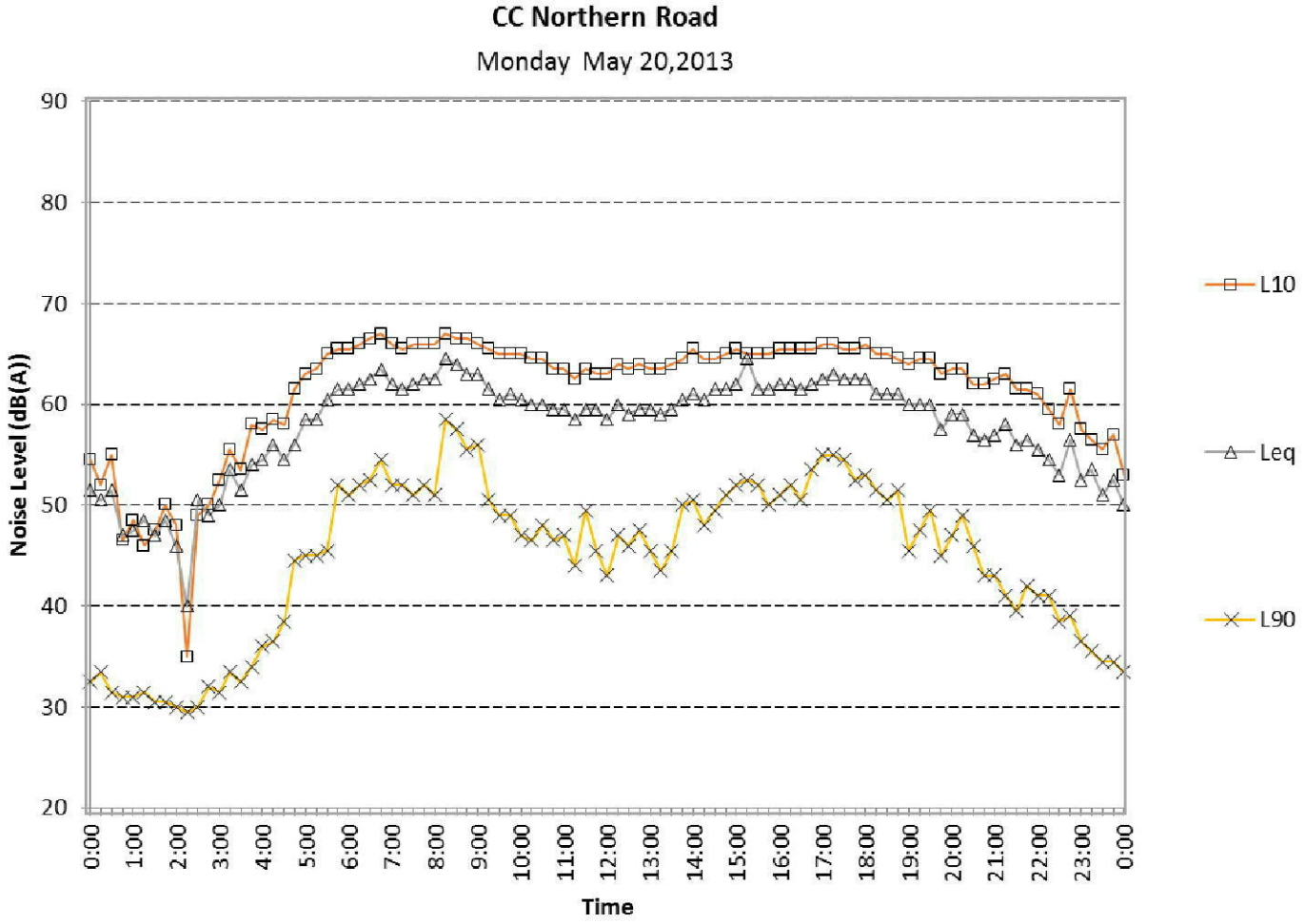


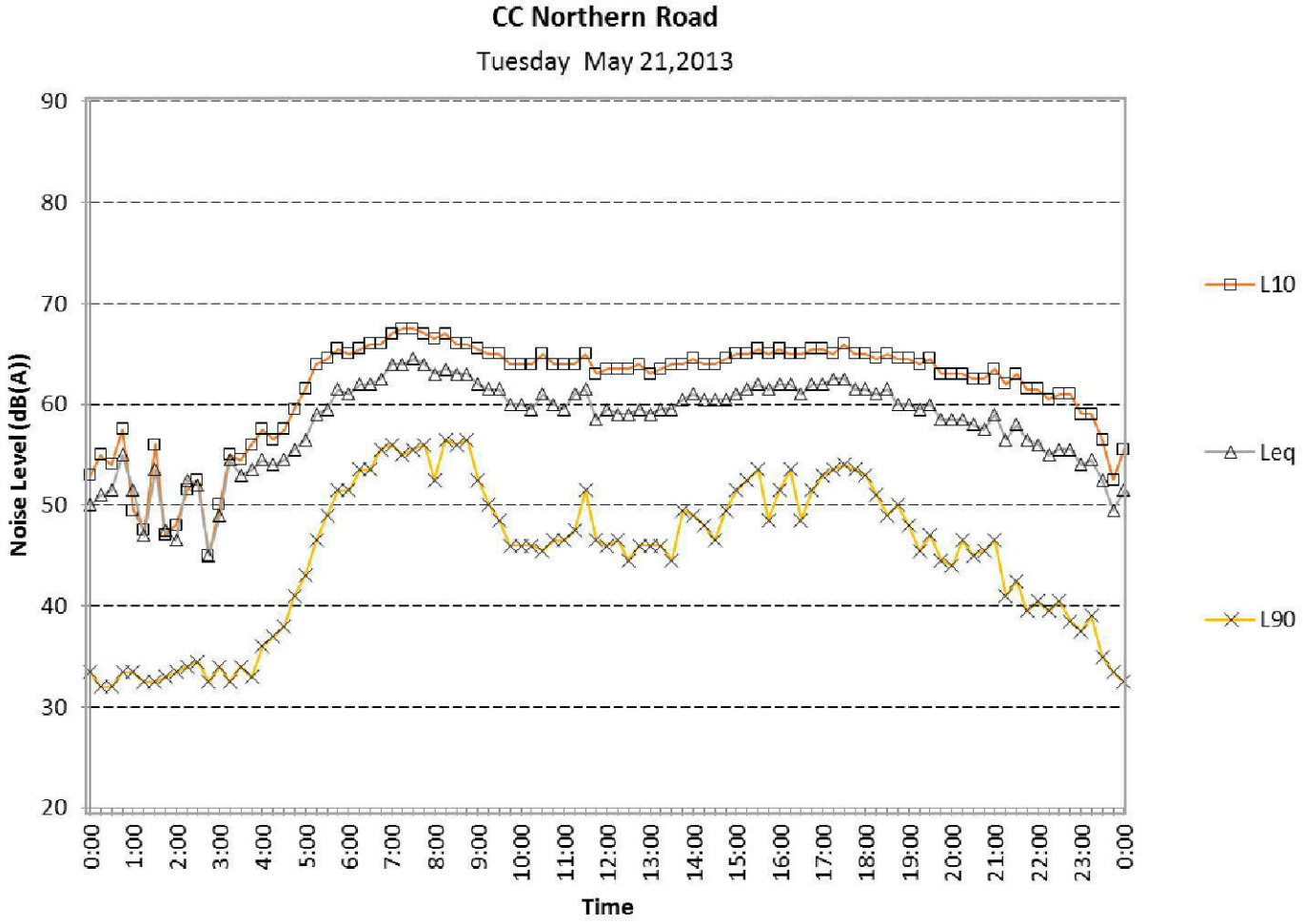


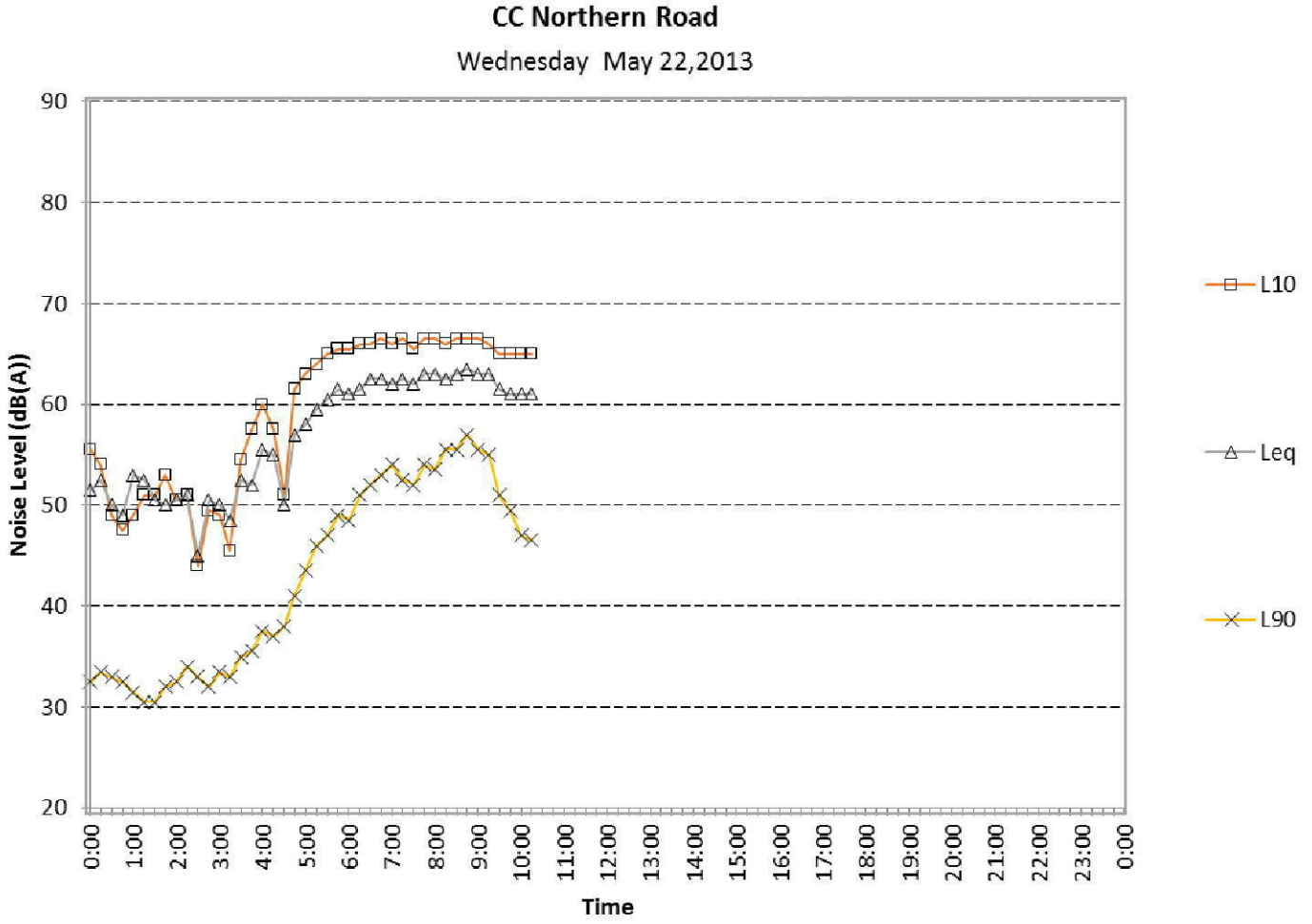


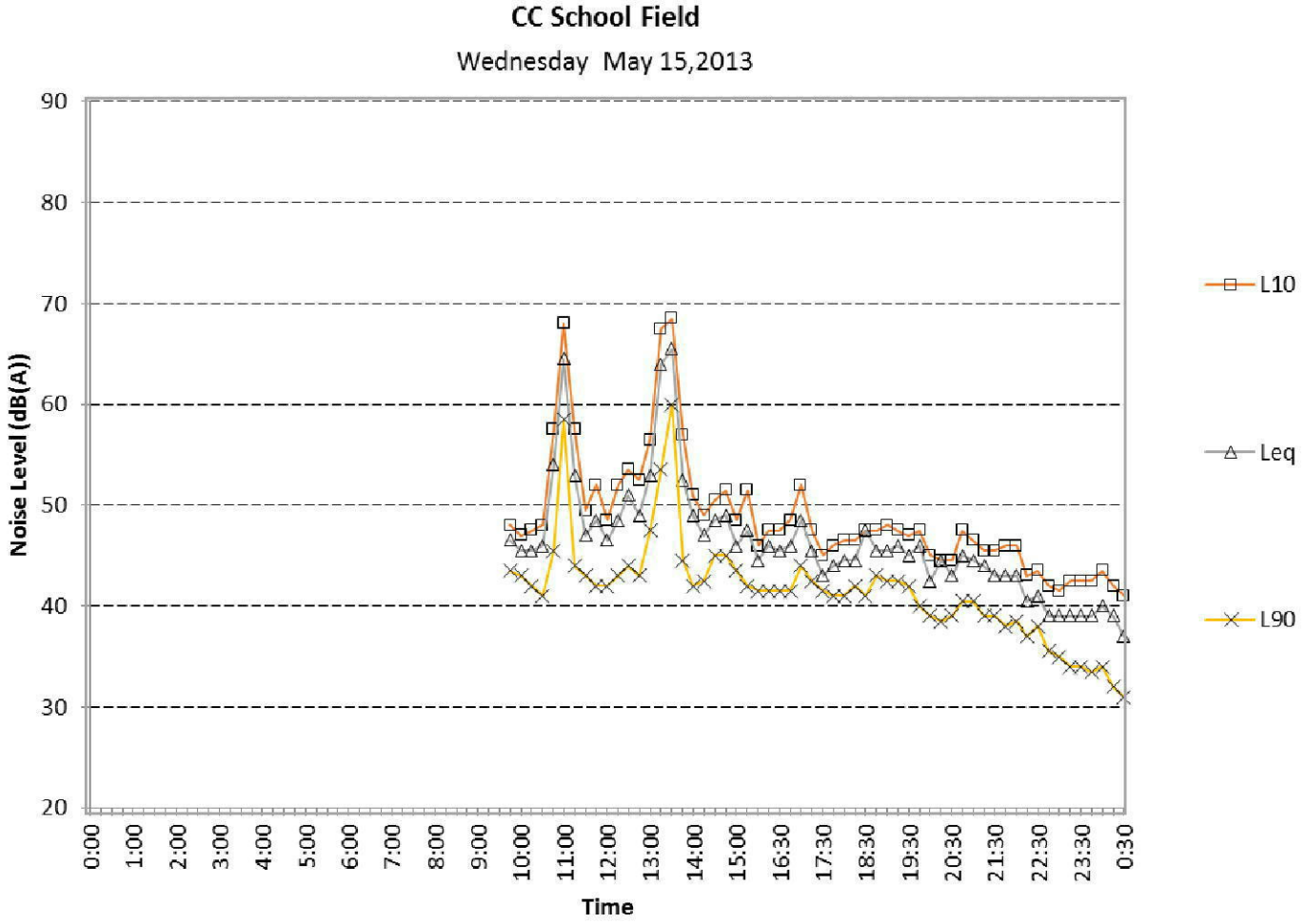


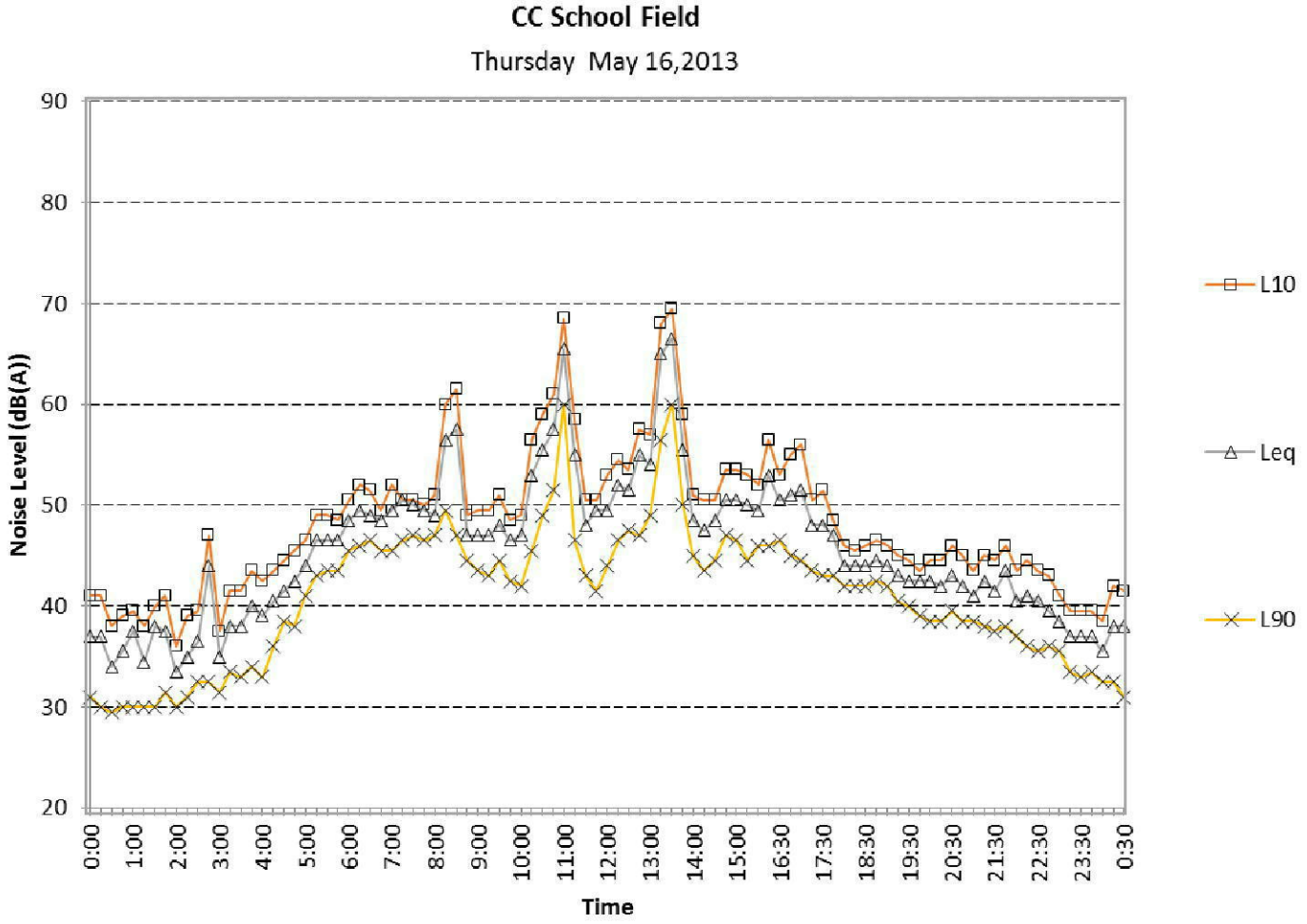


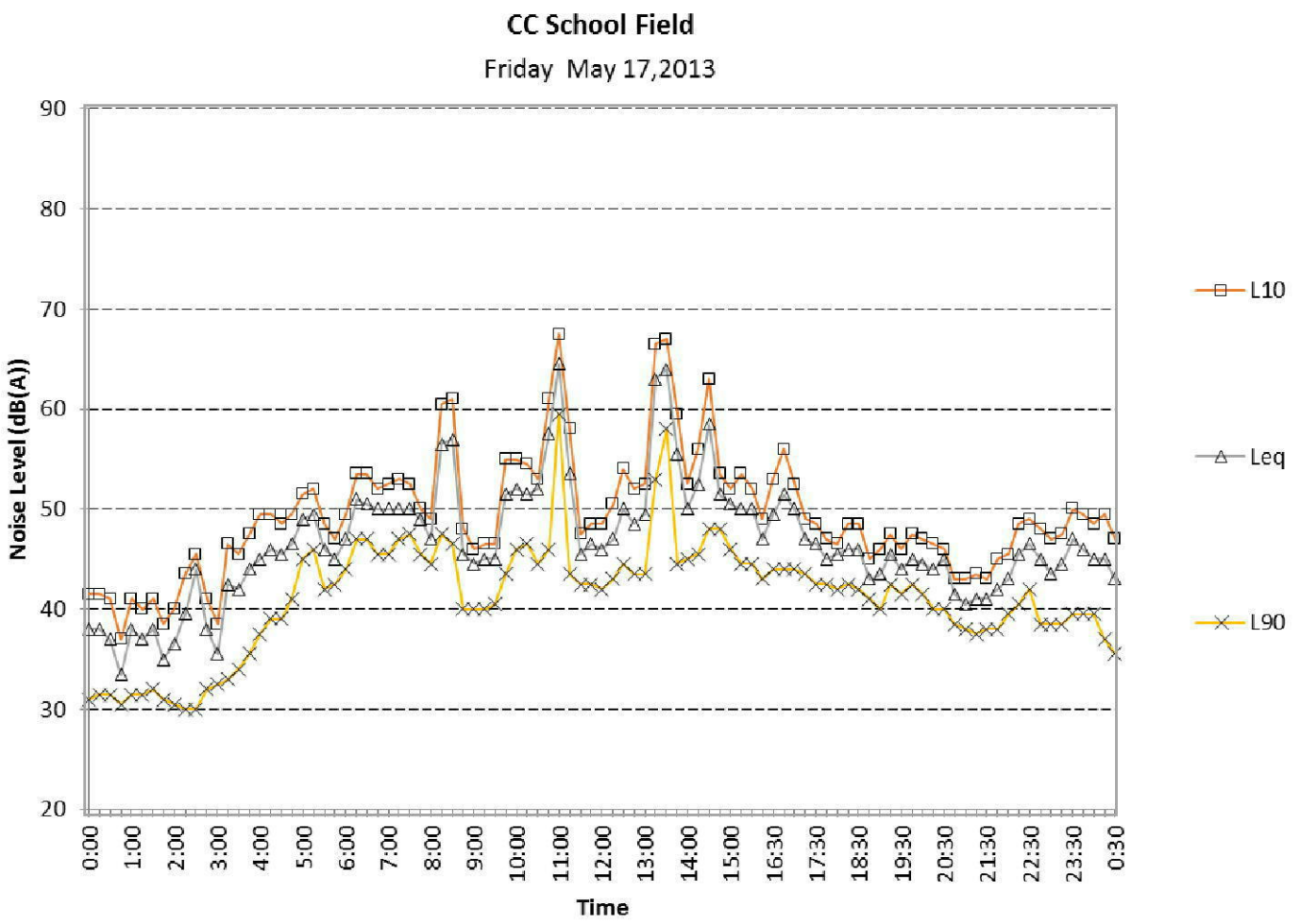


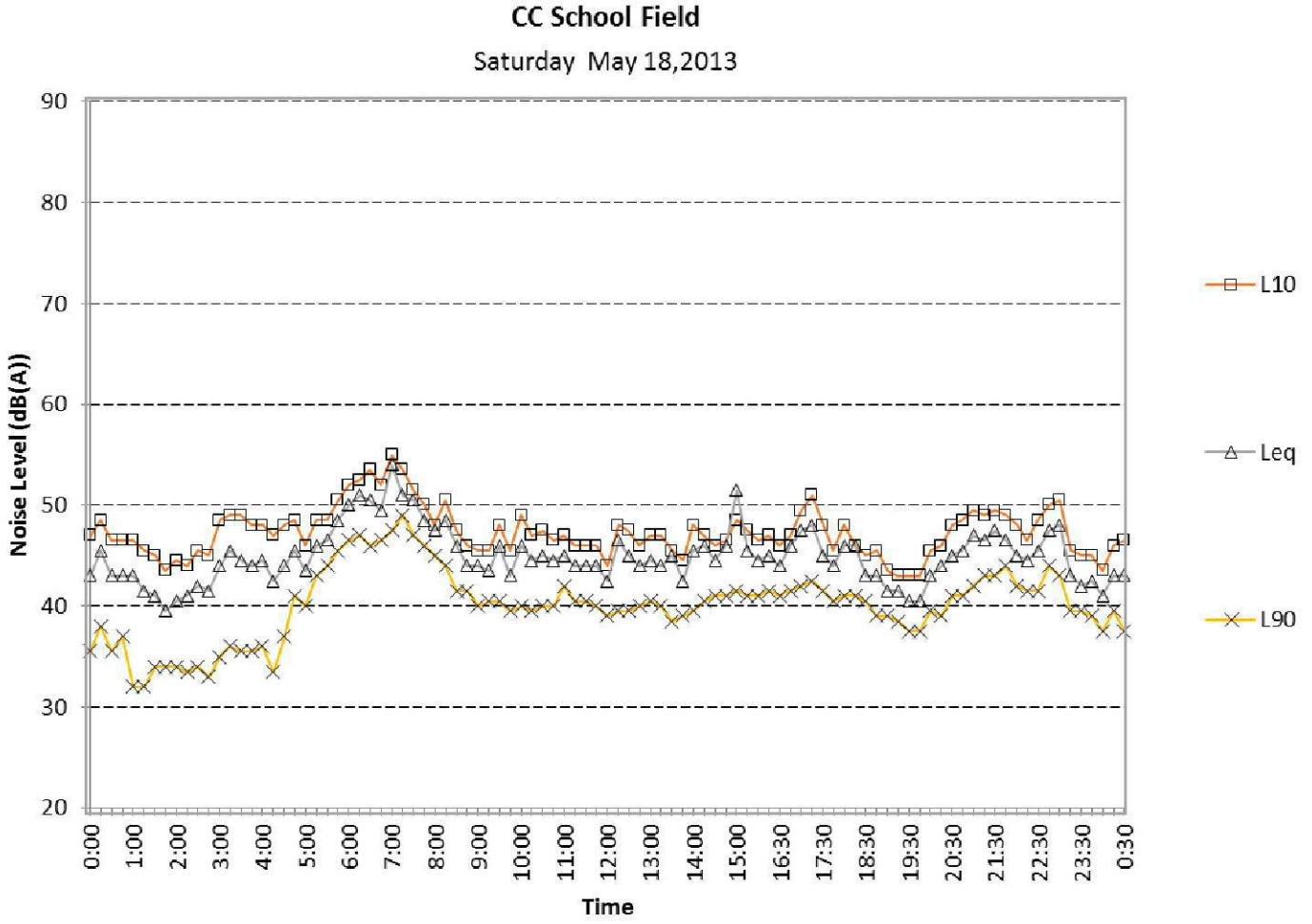


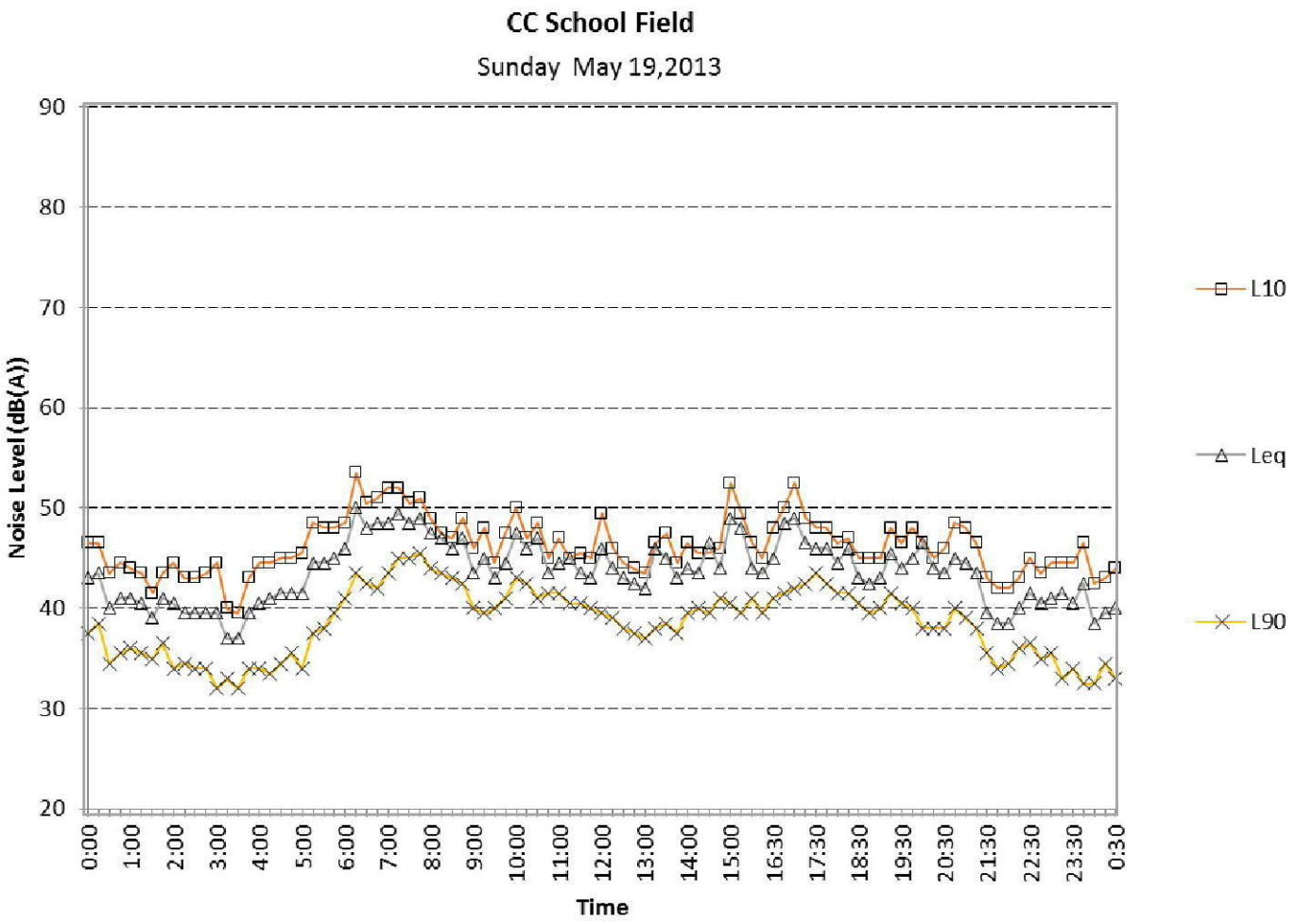


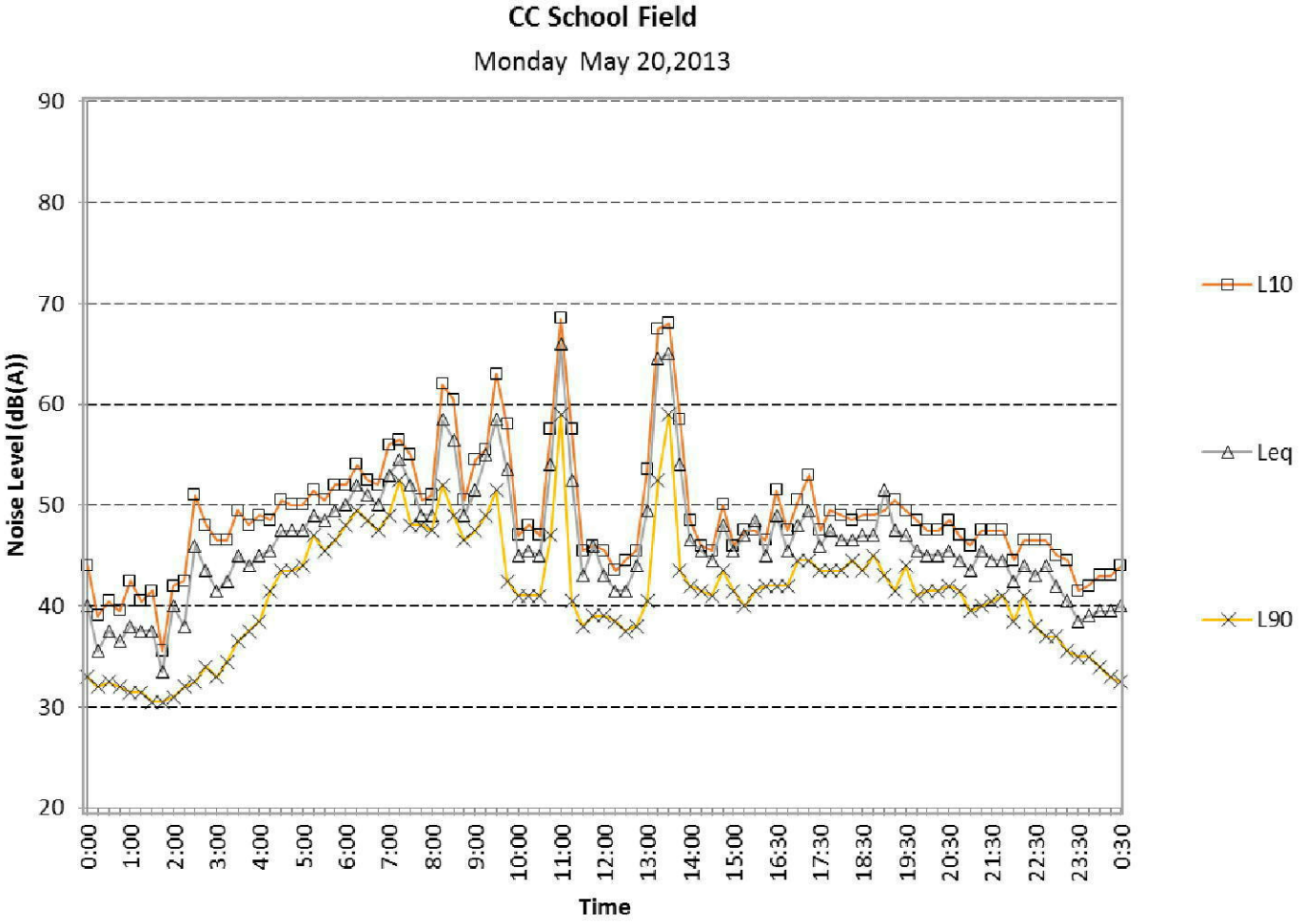


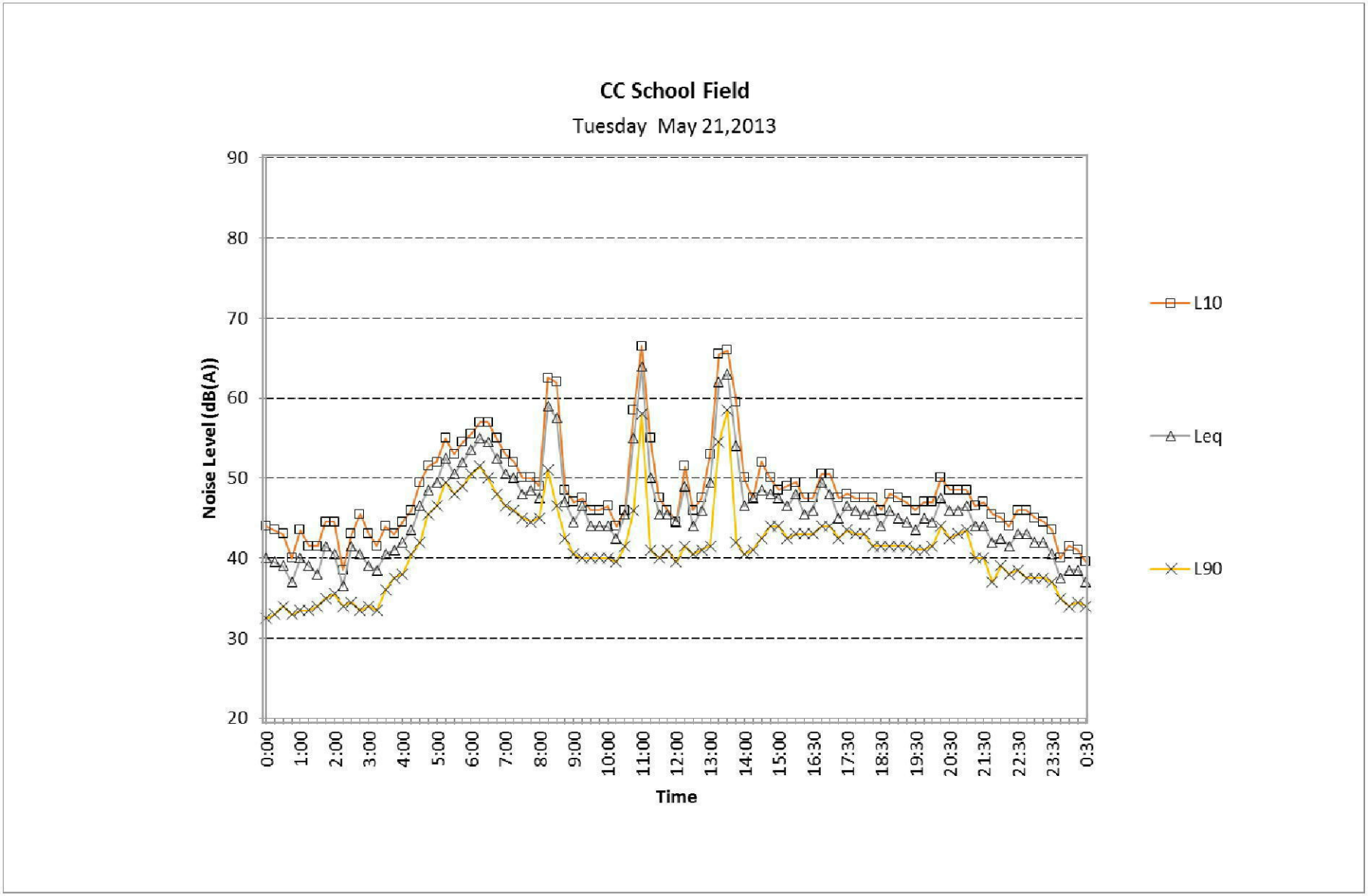


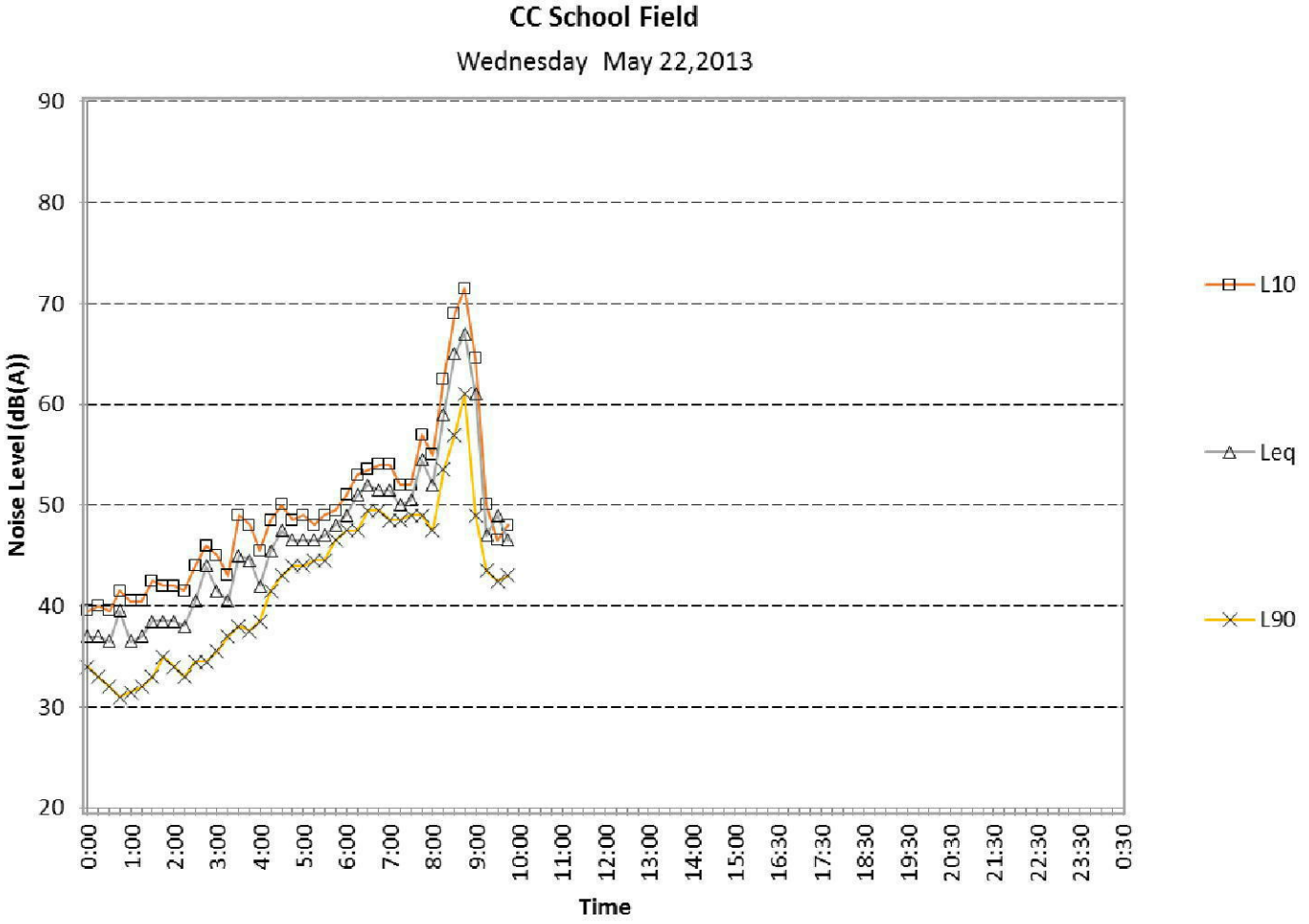












PROPOSED PLANT SCHEDULE						
Key	**Botanical Name**	**Common Name**	**Quantity**	**Install Size**	**Mature HxS**	**Staking to Trees**
TREES						
AF	Angophora floribunda	Rough-Barked Apple	11	100 L	20x8m	Yes
BI	Banksia integrifolia	Coast Banksia	5	75L	10x4m	Yes
CV	Callistemon viminalis	Weeping Bottlebrush	5	75L	10x5m	Yes
EM	Eucalyptus mollucana	Grey Box	10	100 L	20x8m	Yes
ER	Elaeocarpus reticulatus	Blueberry Ash	5	75L	8x4m	Yes
BIOFILTRATION AREA - 6.5 plants/m2						
BA	Baumea articulata *	Jointed Twigrush	228	150		
BF	Bolbocschoenus fluviatilis	River Bulrush	228	150		
CA	Carex appressa *	Tall Sedge	228	150		
EA	Eleocharis acuta	Common Spike-Rush	228	150		
IN	Isolepsis nodosa	Knobby Club Rush	228	150		
JK	Juncus krausi *	Juncus	228	150		
LL	Lomandra longifolia *	Spiny Mat Rush	228	150		
PA	Pennisetum alopecuroides *	Swamp Foxtail	228	150		
PH	Phragmites australis	Common Reed	228	150		
RT	Restio tetraphyllus *	Tassel Grass	228	150		
SV	Schoenoplectus validis	Lake Club-Rush	228	150		
	* Penrith City Council DCP Vegetation for wastewater management systems					
	Lomandra, Isolepsis, Pennisetum and Restio to be located to edges of bio swale.					
TURF						
	Bouteloua dactyloides	Buffalo	Turf Rolls			

LANDSCAPE DESIGN NOTES

THE PROPOSED DESIGN INCORPORATES THE ADDITION OF 21 NEW 100 LITRE STREET TREES AND 2508 BIORETENTION AREA PLANTS (REFER PROPOSED PLANT SCHEDULE). THE STREET TREES HAVE BEEN SELECTED FROM PENRITH CITY COUNCIL'S RECOMMENDED NATIVE PLANTS LIST, AND PLACED TO AVOID CONFLICT WITH UNDERGROUND SERVICES. ADDITIONALLY, THE TREES HAVE BEEN SELECTED BASED ON THEIR LOW WATER REQUIREMENTS AS RATED BY SYDNEY WATER. THE BIOFILTRATION AREA PLANTS PROVIDE A MIX OF EFFECTIVE NUTRIENT-REMOVING SHRUBS AND GRASSES, GUIDED BY COUNCIL'S DCP AND SUGGESTED VEGETATION FOR WASTEWATER MANAGEMENT SYSTEMS.

BUFFALO TURF WILL BE LAID TO ALL VERGES BETWEEN THE NEW ROAD EDGE AND NEW LOT BOUNDARIES, AND TO EACH SIDE OF THE PROPOSED 1.5m WIDE PATH. NEW TURF WILL ALSO BE LAID TO THE BIORETENTION AREA SURROUNDS.

NOTES:

- REFER DRAWING LCD02 FOR TYPICAL PLANTING , TURF AND EDGING DETAILS, AND BIORETENTION AREA DETAIL SECTION
- REFER SURVEY AS PREPARED BY WHELANS INSITES SURVEYING
- REFER ENGINEERS DRAWINGS FOR BIORETENTION/STORMWATER DETAILS AND SECTIONS
- REFER FLORA AND FAUNA REPORT AS PREPARED BY SLR CONSULTING AUSTRALIA

Issue

No.	Date	Description	Chkd
p1	17/10/2013	preliminary	AL
A	18/10/2013	DA Submission	AL

Legend

EXISTING TREES RETAINED / REMOVED
NEW TREES IN MULCH
NEW TURF
NEW BIORETENTION VEGETATION AND SCREEN TREES
VEGETATION PRESERVATION ZONE
SETBACK ZONE
BOUNDARY LINE
NEW FENCE

Drawing Title
Landscape Concept Plan

Project & Client
Proposed Subdivision
at
Andromeda Drive, Cranebrook
for
The Trustees of the Catholic Church for the Diocese of Parramatta

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Date 18/10/2013
Scale 1:500 @ A1
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Drawing Reference
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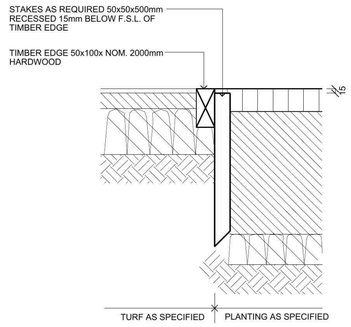

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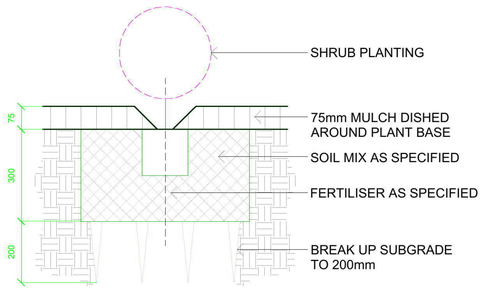

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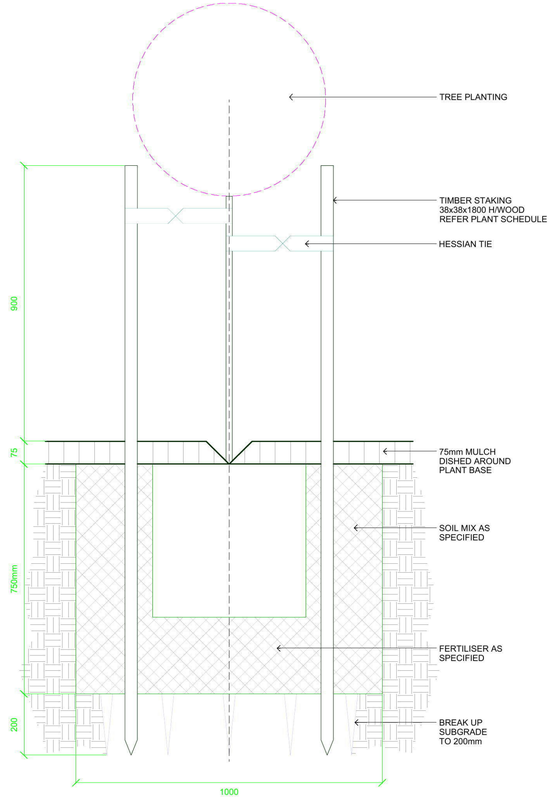

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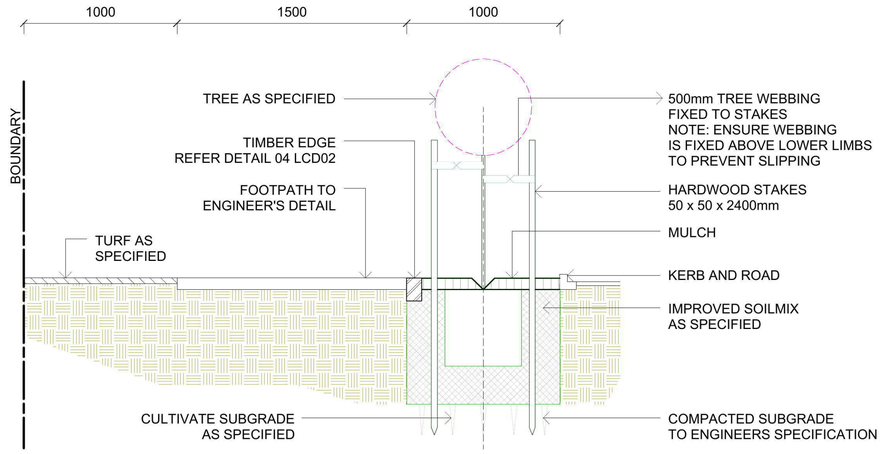
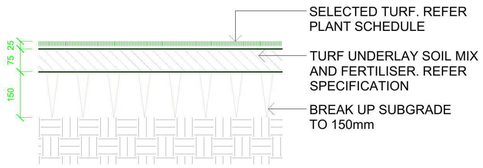


04 100L TYPICAL STREET TREE PLANTING DETAIL
NTS



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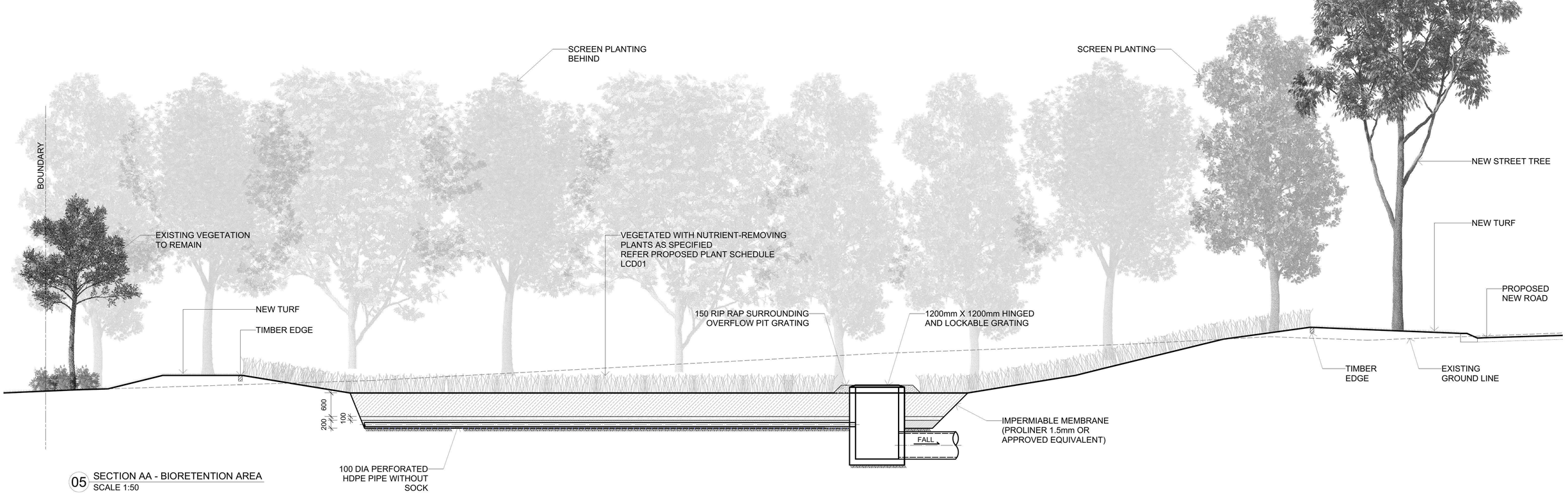

05 SECTION AA - BIORETENTION AREA
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Issue

No.	Date	Description	Chkd
p1	17/10/2013	preliminary	AL
A	18/10/2013	DA Submission	AL

Legend

Drawing Title
Landscape Details

Project & Client
Proposed Subdivision
at
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Architect
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Date 18/10/2013
Scale 1:500 @ A1
0 5 10 15 20 25 30m

Drawing Reference
13633-LCD02-A

Document Set ID: 4283934
Version: 1, Version Date: 03/12/2013

global environmental solutions

Corpus Christi Primary School
The Northern Road, Cranebrook

Proposed Residential Development

Vegetation Management Plan

22 October 2013

Corpus Christi Primary School
The Northern Road, Cranebrook

Proposed Residential Development

Vegetation Management Plan

22 October 2013

SLR Consulting Australia Pty Ltd
2 Lincoln Street Lane Cove NSW 2066 Australia
ABN 29 001 584 612

Document Control

Reference	Status	Date	Prepared	Checked	Authorised
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CORPUS CHRISTI PRIMARY SCHOOL
THE NORTHERN ROAD, CRANEBROOK
PROPOSED RESIDENTIAL DEVELOPMENT

VEGETATION MANAGEMENT PLAN

22 October 2013

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Figures

Figure 1 Location of the subject site at The Northern Road, Cranebrook
Figure 2 The Proposed Subdivision and Vegetation Management Area at Cranebrook

Appendices

Appendix A Flora species list on the subject site at Cranebrook
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CORPUS CHRISTI PRIMARY SCHOOL

The NORTHERN ROAD, CRANEBROOK
PROPOSED RESIDENTIAL DEVELOPMENT

VEGETATION MANAGEMENT PLAN

22 October 2013

PART A INTRODUCTION

1 INTRODUCTION

1.1 Background

The subject site for the purposes of this *Vegetation Management Plan* (VMP) is the existing Corpus Christi Primary School and adjacent vacant land, which is known formally as Lot 1 in DP 1144668 The Northern Road, Cranebrook (Figure 1). The subject site is on the eastern edge of the Cranebrook urban area in the northwestern Sydney metropolitian area, and is within the Penrith Council LGA.

A *Development Application* (DA) for a residential subdivision of the subject site, involving the retention of vegetation and threatened plants along the northern boundary, is currently in the process of being determined. The following *Vegetation Management Plan* (VMP) has been written as additional information to accompany the DA for the proposed residential subdivision (Figure 2).

The area to be the subject of the *Vegetation Management Plan* (VMP) is the corridor of vegetation located at the rear of proposed Lots 1 to 7, along the northern boundary of the subdivision area at Cranebrook (Figure 2). This area, for the basis of this document, will be referred to as the *Vegetation Management Area* (VMA) and is to be rehabilitated as native woodland.

This VMP also addresses:

- the translocation of threatened plants from the southern portion of the subject site;
- the retention and protection of a small patch of threatened plants in the northwestern corner of the subject site; and
- the salvage and re-use of plant materials from the portion of the site to be developed.

Detailed investigations of the subject site have been undertaken, and are documented in the accompanying *Flora & Fauna Assessment Report* (SLR Ecology 2012).

The VMA is already substantially vegetated, and despite some impact from surrounding land-use (such as the presence of rubbish and weeds and some areas of bare soil) a fairly good condition native woodland component (including a small population of threatened plants) remains.

The native woodland contains:

- flora species which are typical of the Cooks River Castlereagh Ironbark Forest (CRCIF) - an "*endangered ecological community*" (EEC) listed in the *Threatened Species Conservation Act 1995* (TSC Act);

- specimens of *Dillwynia tenuifolia* – a "*threatened species*" of plant listed as "*endangered*" in the TSC Act;
- specimens of the Juniper-leaved Grevillea *Grevillea juniperina* – a "*threatened species*" of plant listed as "*vulnerable*" in the TSC Act; and
- provides some potential habitat (though not very suitable) for the Cumberland Plain Land Snail (CPLS) – which is listed as "*vulnerable*" in the TSC Act.

1.2 The Project Team

The following parties would be required to fulfill the roles involved for the implementation of the VMP:

- a *Project Ecologist* (PE) - with suitable qualifications to monitor the success of the project;
- a *Bush Regeneration Contractor* (BRC) - to implement the bush regeneration activities of the VMP; and
- a *Construction Team* (CT) - to erect protection fencing.

The VMP is to be initiated on release of the *Subdivision Certificate* by Council and prior to any clearing or works within the development area. Implementation of the approved VMP, as a condition of future development, will guarantee the successful implementation of the VMP by the proponent.

2 SCOPE & AIMS of this VMP

This *Vegetation Management Plan* (VMP) has been prepared in response to a request for additional information provided by Penrith City Council to support the *Development Application* (DA) for the subdivision and rehabilitation of the subject site.

The objectives of this VMP are:

- to guide the clearing and protection measures associated with the proposed subdivision of the subject site;
- to guide the management, protection and maintenance of the *Vegetation Management Area* on the subject site;
- to assist in the implementation of appropriate enhancement measures within areas of retained native vegetation along the northern boundary of the subject site;
- to facilitate the management of the *Vegetation Management Area* to maintain biodiversity conservation values; and
- to facilitate the maintenance and enhancement of habitat for native fauna.

The specific aims of this VMP include:

- protection of vegetation within the VMA during construction activities;
- a significant reduction in the projected foliage cover of weeds within the entire *Vegetation Management Area*;

- the promotion of native regeneration through the *Vegetation Management Area*; and
- the generation of native vegetation which has low maintenance costs in the long-term.

The VMP will be implemented by a *Bush Regeneration Contractor* (BRC) and monitored by a qualified *Project Ecologist* (PE) for 2.5 years following completion of the initial VMP activities (see Chapter 7).

This *Vegetation Management Plan* (VMP) provides for the establishment and maintenance of an area of predominantly CRCIF vegetation near the northern boundary of the subject site (Figure 2). The *Vegetation Management Area* at the rear of proposed Lots 1 to 7 is to be retained and regeneration works are to be conducted to restore the degraded understory to a natural structure and species composition (of the CRCIF EEC).

3 SITE DESCRIPTION and VEGETATION

The subject site comprises Lot 1 in DP 1144668 which is located on the northeastern outskirts of the town of Cranebrook in the outer Sydney Metropolitan area. The site is relatively flat with a gentle west-facing slope towards the school.

The western portion of the site is occupied by the Corpus Christi Primary School, including carparking, buildings, paved and grassed areas. The eastern portion of the site which is proposed for residential subdivision and rehabilitation was previously the temporary location of the Xavier College. This area is now characterised by a cleared open area of exotic lawn grasses, with a narrow band of native vegetation along its peripheries – which is slightly more substantial along the northern boundary.

The vegetation and scattered trees in the eastern part of the subject site are dominated by a canopy of Broad-leaved Ironbark, with a mid-storey of *Melaleuca decora*. Other tree species include Rough-barked Apple (in the road reserve), Forest Oak, Green Wattle and Prickly-leaved Paperbark (Appendix A). The understory generally comprises scattered specimens of *Dillywnia sieberi*, Blackthorn, Gorse Bitter Pea, Berry Saltbush and Dogwood.

The groundcover is relatively sparse, with a substantial amount of leaf litter accumulation beneath the canopy of Ironbarks. Native groundcover specimens are scattered or present only in small patches and included herbs (such as Kidney Weed, Slender Tick-trefoil and White Root), grasses (such as Wiregrass, Wiry Panic and Weeping Grass) and other graminoids (such as Spiny-headed Mat-Rush, *Lomandra filiformis* and *Lepidosperma laterale*).

There is substantial weed invasion and other disturbance within the vegetation on the site, including:

- exotic garden escapes, particularly along the northern fenceline (abutting adjoining residents);
- exotic invasive grasses (mainly African Lovegrass), particularly along the northern boundary and surrounding areas of threatened plants; and
- rubbish and waste including old garden pots and fencing around the threatened plants in the northwestern corner of the VMA.

There are 39 specimens of *Dillwynia tenuifolia* along the northern boundary of the subject site at Cranebrook. This species is listed as "*endangered*" in the *Threatened Species Conservation Act 1995*

(TSC Act). All specimens are within the VMA and the proposed detention basin and are to be retained and protected.

There are 50 specimens of Juniper-leaved Grevillea *Grevillea juniperina* within the subject site and the adjoining road reserve (of The Northern Road) at Cranebrook. This species is listed as "*vulnerable*" in the TSC Act. A large portion of the specimens on the site will be retained within the proposed VMA and the adjoining bio-retention swale in the northwest of the site. A few specimens in the southeast of the site (approximately 6 specimens) will be re-located (via cuttings) to the VMA. In addition any saplings which are small enough can be directly transplanted to the VMA.

4 MANAGEMENT APPROACH and ACTIVITIES

4.1 Approach and Initiation

The activities identified in the *Vegetation Management Plan* (VMP) are to be initiated on release of the *Subdivision Certificate* by Council, and prior to any clearing or construction works within the approved development area.

Given the presence of existing moderately good condition native woodland vegetation, minimal rehabilitation efforts, such as weeding and small scale re-planting, are required. The rehabilitation program will not involve major earthworks, soil remediation or large-scale replanting. Works within the *Vegetation Management Area* (VMA) at Cranebrook will predominantly involve low-intensity and passive rehabilitation and maintenance activities, designed to minimise the potential for adverse impacts to offset any indirect impacts associated with the proposed development.

The boundary between the VMA and the development area is to be fenced at the initiation of the VMP activities using link-mesh fencing and silt fencing. In addition, appropriate signage will be provided around the *Vegetation Management Area* - to inform people of the relevance of the bushland and of the rehabilitation program, and to encourage passive surveillance of the VMA.

Specific activities to be undertaken in the *Vegetation Management Area* include:

- *Rubbish removal* - in particular the fencing material, garden waste and stockpiling in the northwestern corner of the VMA would need to be removed.
- *Excavation and soil remediation* - there may be some small areas of exotic lawn requiring excavation (small scale soil turning by hand) and top-soil remediation, prior to re-planting.
- *Weed removal and maintenance* - a dedicated initial weed removal and monitoring program is required (in particular to control the garden escapes and African Lovegrass) followed by an ongoing weed maintenance program.
- *Replanting* - it is likely that following removal of rubbish, weeds and areas of lawn some re-planting would be required involving canopy, shrub and groundcover species obtained from the development portions of the site and/or propagated from seed sourced from the site or from a source of local provenance plants;
- *Salvage* - the salvage of plants and other natural materials during the clearing of the development areas is to be undertaken to support re-planting efforts in the VMA.
- *Translocation* - the translocation of Juniper-leaved Grevillea from the southern portion of the subject site (which is to be cleared and developed);
- *Threatened species management* – the population of threatened plants in the VMA and adjoining bio-retention swale need to be monitored and protected during any construction activities and throughout the implementation of the VMP.
- *Monitoring* - a monitoring program is to be implemented to identify any problems which may arise and to monitor the ongoing condition of vegetation in the VMA.
- *Access* – the VMA is to be fenced, with access during the VMP activities from Cassar Crescent and future access by residents at the rear of the lots.

4.2 Weed Suppression and Control

Flora surveys conducted on the subject site have identified 19 weed species, consisting of a variety of woody and herbaceous weeds (Appendix A). A variety of techniques will be used to suppress and control weeds within the *Vegetation Management Area* (Appendix C), including:

- cut-and-paint, stem scraping, stem injection, and frilling and chipping for woody weeds;
- hand removal and crowing for herbaceous weeds; and
- chemical control where appropriate.

As indicated above, a predominantly low intensity approach is to be employed, and the over-riding principles of the Bradley method of bush regeneration will be applied. Weed removal techniques are detailed in Appendix C.

Table 1 Noxious Weed species on the subject site at Cranebrook

Common name	**Class**
Bridal Creeper, Prickly Pear	4
Mother-of-millions	3

4.3 Plant Propagation and Revegetation

Given the level of natural regeneration already present within the *Vegetation Management Area* and/or that is likely to occur once weeds are removed from some areas, it is considered unlikely that intensive replanting works would be required over the whole or even most of the *Vegetation Management Area*. Nevertheless, in the event that areas (particularly where exotic vegetation is removed and where rubbish and other materials are removed) do not display satisfactory natural regeneration within 12 months of initiation of the VMP, then replanting works should be undertaken.

In preparation for any potential planting works, local provenance plant propagules should be collected from within the proposed development area at the initiation of the VMP by the *Bush Regeneration Contractor* (BRC), as detailed in Chapter 5. This includes the collection of cuttings and seeds of the *Grevillea juniperina* specimens in the southeastern corner. In addition, native seedlings from within this area could be transplanted into areas requiring assisted regeneration.

Native species selected for the compensatory plantings should be sourced from the Species List (Appendix A), based on availability of local provenance stock, at the discretion of the BRC. In addition local provenance specimens of species listed in the *Final Determination* for CRCIF (Appendix B) may be sourced.

Other sources of propagules for the planting program would include commercial nurseries that maintain local provenance stock and/or bush regenerators that also maintain local provenance stock for this locality.

Any supplementary planting which is required within the *Vegetation Management Area* will be targeted - based on locations within the *Vegetation Management Area*. The appropriate species will be determined by the BRC based on site circumstances.

It is indicated in Chapter 8 of this VMP that the target for weed species across the *Vegetation Management Area* at the end of implementation of the VMP is that the *Projected Foliage Cover* (PFC) of weed species be 5% or less. Setting targets of absolute numbers of native plants within the *Vegetation Management Area* is not regarded as realistic or appropriate. However, the following goals or targets are to be pursued (these are average numbers):

- 1 semi-mature to mature canopy tree per $16m^2$;
- 1 shrub per $4m^2$; and
- 4 groundcover species per $1m^2$.

In addition, the targets for native plants proposed within the *Vegetation Management Area* are:

- a minimum of 35 native species across the *Vegetation Management Area*; and
- 95% of plant species (both by densities and by species numbers) to be native species.

The native plant species to be used in the rehabilitation program will be selected from the lists provided in Appendices A and B, depending on availability. The BRC will determine the appropriate species to be used, based on natural regeneration on the subject site, and the availability and suitability of other stock.

Target densities for native plants in the various strata are indicated below (Table 2). These targets are to be used:

- for monitoring natural regeneration within the *Vegetation Management Area*; and
- to determine planting densities in areas where active plantings are required.

Table 2 Average plant density and diversity in each stratum within the *Vegetation Management Area*

Layer	**Density**	**Diversity**
Canopy	One canopy tree/$16m^2$	3 species
Mid-storey	One plant/$6m^2$ in clumps	4 species
Shrub layer	One plant/$4m^2$	8 species
Groundcover	Four plants/m^2	16 species

4.4 Permanent Fencing and Protection Measures

As noted above, the entire perimeter of the *Vegetation Management Area* is to be fenced at initiation of the VMP activities (Figure 2), signage and temporary sediment-capturing mesh at the base. The sediment fences are to be removed at the completion of construction activities to allow movement of the Cumberland Plain Land Snail. There are to be no other fences through the VMA.

The Bio-retention lot in the northwestern corner of the site is to be permanently fenced in a similar fashion, which will allow the protection of the additional threatened plants in this area. An internal fence and sediment trap to protect the threatened plants would be required during construction of the bio-retention structure.

Within the *Vegetation Management Area*, planted trees and shrubs are to be protected using plastic 'grow tubes' - to protect the plants from the elements during their establishment period, and to prevent any grazing from rabbits (if present), kangaroos and wallabies.

5 IMPLEMENTATION of the VMP

5.1 Initiation of the VMP

The following activities are to be implemented on the release of the *Subdivision Certificate* by Council.

The *Project Ecologist* (PE) is to:

- collect baseline monitoring data, involving photo-monitoring points and vegetation quadrats, within the *Vegetation Management Area* on the subject site;
- perform a search of the development area following rain (in warm weather), and re-locate any detected Cumberland Plain Land Snails and any natural habitat (*ie* any fallen logs or debris) to suitable locations within the *Vegetation Management Area*;
- remove rubbish and refuse from within the *Vegetation Management Area* and, in the event that any Snails are detected, re-locate those specimens into suitable habitat in the *Vegetation Management Area*;
- undertake monitoring inspections of the site to ensure activities have been satisfactorily completed; and
- prepare an *Initial Site Report* detailing site conditions at the initiation of the VMP.

The PE will also perform a site induction (in consultation with the Project Manager) for site workers, once subdivision works commence, including informing workers of the protected vegetation and their responsibilities to protect the vegetation.

The *Bush Regeneration Contractor* (BRC) is to:

- collect native plant material (in particular from the development area and including all specimens of *Grevillea juniperina* in the southeastern corner of the site) and store that material for re-use in the *Vegetation Management Area*;

- collect seeds and other propagules, and grow native seedlings, for supplementary planting works (in particular of the *Grevillea juniperina*);
- identify appropriate commercial nurseries from which to obtain local provenance seedlings, if necessary; and
- provide a detailed costing for implementation of the VMP.

The *Construction Team* (CT) is to:

- fence the *Vegetation Management Area* as detailed in Chapter 4.4 and Figure 2; and
- erect permanent signage (*eg* Conservation Area - Keep out) around the VMA.

5.2 Immediately After Initiation

The BRC is to:

- implement an intensive weed removal program, involving the extensive removal of any large woody weeds, herbs and grasses within the *Vegetation Management Area*;
- prepare areas of bare soil, exotic lawn and highly disturbed portions of the site for replanting, where deemed necessary; and
- plant prepared areas with stored propagules collected from the development area or other local provenance specimens, as necessary.

The PE is to:

- monitor the regeneration activities and weed removal during the initial phase of the project - to ensure that the VMP is being implemented satisfactorily; and
- ensure that fencing and silt fences are being maintained.

5.3 Ongoing Management of the VMP

On completion of the initial phase of the VMP (*ie* from 6 months after initiation), the following activities will be required.

The BRC is to:

- maintain the management and control of any weed species in the *Vegetation Management Area*;
- undertake supplementary plantings, as necessary, to achieve the goals set out in this VMP; and
- maintain new plantings until self-sustainable.

The PE is to:

- repeat the surveys at the fixed photo and survey points;
- monitor ongoing activities;

- provide advice where necessary regarding the VMP activities; and
- prepare the 6-monthly *Reports* to Council.

5.4 Costings for Implementation of the VMP

The BRC will provide a detailed costing estimate for implementation of the VMP after inspection of the subject site. An approximate costing of the VMP is provided below, but the future BRC will provide a more accurate costing for the project and should not be held to this estimate (in part because the quantum of ongoing weed control and supplementary plantings required to achieve the goals of the VMP cannot be pre-determined).

Activities and approximate costings for the VMP at The Northern Road, Cranebrook include:

- Primary weeding $15,000
- Collection and maintenance of propagules $10,000
- Supplementary planting (estimate) $50,000
- 2.5 years maintenance $25,000

6 ONGOING MAINTENANCE ACTIVITIES

Activities to maintain the vegetation within the *Vegetation Management Area* are to be undertaken by the *Bush Regeneration Contractor* (BRC). These activities will involve:

- site preparation - as outlined in Chapter 5 of this VMP;
- a dedicated weed removal and monitoring program - involving management of weeds every 3 months for 2.5 years after completion of the initial VMP works;
- 6-monthly monitoring of any natural regeneration which might occur;
- determination of a supplementary planting regime (if the monitoring of natural regeneration indicates the need); and
- maintenance of any plantings which are undertaken, and the replacement of any planted specimens which do not survive.

These activities are to be conducted by the BRC for a period of 2.5 years following completion of the initial weed removal and supplementary plantings activities in the *Vegetation Management Area* (*ie* the VMP has an operational life of 3 years). The *Project Ecologist* (PE) is to monitor the success of the bush regeneration works over that period, and provide advice to the BRC when and if required. The PE will also provide relevant *Reports* to the Council, as detailed in Chapter 8 of this VMP.

7 TIMETABLE

Table 1 Summary of vegetation management activities, their timing and persons responsible

Activity	Timing	Role
Initial Works		
Collect baseline monitoring data (photos and quadrat)	On approval of the VMP	PE
Re-locate Cumberland Plain Land Snails and natural habitat from the development area to the *Vegetation Management Area*	On approval of the VMP	PE
Remove rubbish and refuse, and re-locate any detected Cumberland Plain Land Snails to the enhanced natural habitat within the *Vegetation Management Area*	On approval of the VMP	PE
Collect and store seeds and seedlings of native plants from within the development area (in particularly the *Grevillea juniperina*)	Up to the clearing of vegetation footprint	BRC
Temporarily fence and erect signage around *Vegetation Management Area*	On release of the *Subdivision Certificate*	CT
From Release of *Subdivision Certificate*		
Implement an intensive weed removal program at the *Vegetation Management Area*	On release of the *Subdivision Certificate*	BRC
Prepare bare soil and highly disturbed portions of the *Vegetation Management Area* for replanting	On release of the *Subdivision Certificate*	BRC
Plant those prepared areas with stored vegetation previously collected from the development area	On release of the *Subdivision Certificate*	BRC
Maintenance Period (Post Establishment Period)		
Management of weeds, monitoring of natural regeneration and maintenance of plantings and replacement of failed plants	Every 3 months for 2 years	BRC
Collection of photo point and quadrat monitoring data as well as monitoring of the Cumberland Plain Land Snail and CRCIF	Every 6 months for 2 years	PE
Monitoring Reports to Council for the life of the VMP	Every 6 months for 2 years	PE
Prior to Construction Works		
Perform a site induction for site workers	Prior to any construction works	CT
Install sediment fences around areas of earthworks, where relevant, to protect areas of retained vegetation	Prior to any construction works	BRC
Inspection of the pre-construction works	Prior to any construction works	PE

8 MONITORING PROGRAM

The *Project Ecologist* (PE) is to monitor the success of the bush regeneration works and to report to the *Bush Regeneration Contractor* (BRC) if any problems are identified, so that appropriate remedies can be pursued. Monitoring activities would involve:

- baseline quadrat and photo monitoring, as well as an inspection of site preparation activities prior to the construction works, as outlined in Chapter 5 of this VMP;
- continued 6-monthly updating of the photo point and quadrat monitoring data;
- monitoring of the Cumberland Plain Land Snail and CRCIF vegetation; and
- compilation of *Monitoring Reports* to Council every 6 months for the life of the VMP project (*ie* for a total of 3 years after initiation).

Monitoring *Reports* to Council will document:

- the works which have been undertaken during the previous survey period;
- the changes in weed densities throughout the subject site;
- the rates of success and failure of supplementary plantings, and documentation of remedial measures implemented (as required); and
- recommendations for additional works or activities which may be required during the ensuing survey period.

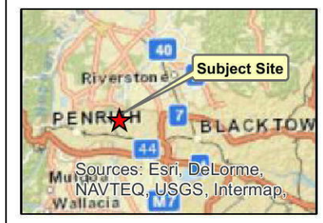
Implementation of the VMP at Cranebrook is intended to achieve several goals by the end of 3 years of implementation, including:

- a reduction in the Projected Foliage Cover (FPC) of weeds across the *Vegetation Management Area* to 5% or less;
- the survival (or replacement) of any supplementary plantings (as identified in the management activities for the site);
- achievement of the native plant densities (Chapter 4.3):
  - 1 semi-mature to mature canopy tree per 16m^2;
  - 1 shrub per 4m^2; and
  - 4 groundcover species per 1m^2.
- a minimum of 35 CRCIF species through the *Vegetation Management Area*;
- 95% of plant species (by density and by species numbers) to be CRCIF species; and
- an ongoing monitoring and maintenance program to identify areas of new weed infestation and to provide a mechanism for their control.

Figure 1 Location of the subject site at The Northern Road, Cranebrook

LEGEND

Subject site



NOTES

1. Basemap courtesy of Nearmap 26/08/2012
2. Digital cadastral database (DCDB) © LPMA 2012
3. Subject site boundary based on DCDB © 2012
4. All features are approximate only and subject to detailed survey

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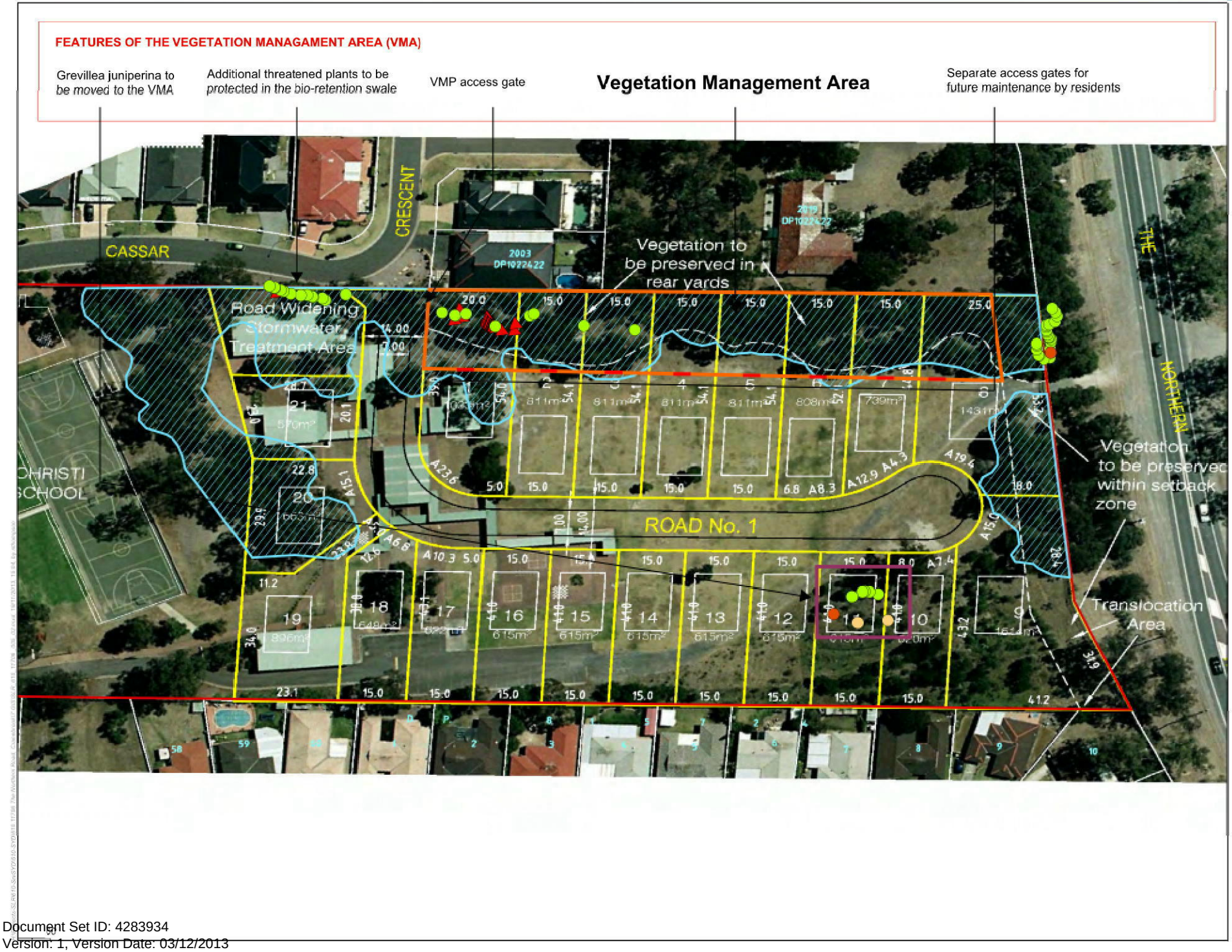
Prepared for:
The Catholic Education Office

Project No: **610.11706**

Scale	Date
1:20,000	21-Dec-2012

Drafted	Approved
Sepehr Sobhani	Fiona Iolini

Figure 2 The Proposed Subdivision and Vegetation Management Area on the subject site at Cranebrook



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Project No **610.11706**

Scale	Date
N/A	19/11/2013
Drafted: NT	Approved: Fiona Iolini

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Corpus Christi Primary School
The Northern Road, Cranebrook

Proposed Residential Subdivision

Vegetation Management Plan

Appendix A
Flora species list on the subject site at Cranebrook

22 October 2013

Appendix A Flora Species List surveyed from the subject site on the 27th of August 2012

KEY	
Symbol	**Description**
Status	
*	Exotic species
**	Noxious species in the Penrith LGA
CRCIF	Species is listed as "*characteristic*" within the Final Determination for the Cooks River/Castlereagh Ironbark Forest, which is listed as an EEC on the TSC Act.

Status	Species name	Common name
	Acanthaceae	
	Brunoniella australis	Blue Trumpet
	Apocynaceae	
*	*Araujia sericifera*	Moth Vine
	Asparagaceae	
*	*Asparagus aethiopicus*	Asparagus 'Fern'
**	*Asparagus asparagoides*	Bridal Creeper
	Asteraceae	
*	*Bidens pilosa*	Cobblers Peg
	Cotula australis	Carrot Weed
*	*Gamochaeta purpurea*	Purple Cudweed
*	*Hypochaeris radicata*	Catsear
CRCIF	*Ozothamnus diosmifolius*	White Dogwood
*	*Sonchus oleracheus*	Common Sowthistle
*	*Taraxacum officinale*	Dandelion
CRCIF	*Vernonia cinerea* var. *cinerea*	-
	Cactaceae	
*	*Hylocereus undatus*	Dragon Fruit
**	*Opuntia* sp.	Prickly Pear
	Casuarinaceae	
	Allocasuarina torulsa	Forest Oak
	Chenopodiaceae	
	Einadia hastata	Berry Saltbush
CRCIF	*Einadia nutans* subsp. *linifolia*	-
	Commelinaceae	
*	*Tradescantia fluminensis*	Wandering Jew
	Convolvulaceae	
	Dichondra repens	Kidney Weed
	Crassulaceae	
**	*Bryophyllum delagoense*	Mother-of-millions
	Cyperaceae	
CRCIF	*Lepidosperma laterale*	-

Appendix A Flora Species List surveyed from the subject site on the 27th of August 2012

Status	Species name	Common name
	Fabaceae – Faboideae	
	Daviesia ulicifolia	Gorse Bitter Pea
	Desmodium varians	Slender Tick-trefoil
CRCIF	*Dillwynia sieberi*	-
V	*Dillwynia tenuifolia*	-
	Hardenbergia violaceae	False Sarsparilla
*	*Medicago lupulina*	Black Medic
*	*Trifolium repens*	White Clover
*	*Vicia sativa* subsp. *nigra*	Narrow-leaved Vetch
	Fabaceae – Mimosoideae	
	Acacia decurrens	Black Wattle
	Acacia parramattensis	Green Wattle
	Lauraceae	
CRCIF	*Cassytha sp.*	-
	Lobeliaceae	
CRCIF	*Pratia purpurascens*	White-root
	Lomandraceae	
	Lomandra filiformis	
CRCIF	*Lomandra longifolia*	Mat Rush
	Myrtaceae	
CRCIF	*Angophora floribunda*	Rough-barked Apple
CRCIF	*Eucalyptus fibrosa*	Broad-leaved Ironbark
CRCIF	*Eucalyptus mollucana*	Grey Box
CRCIF	*Melaleuca decora*	-
CRCIF	*Melaleuca nodosa*	Prickly-leaved Paperbark
CRCIF	*Syncarpia glomulifera*	Turpentine
	Pittosporaceae	
CRCIF	*Bursaria spinosa*	Blackthorn
	Plantaginaceae	
*	*Plantago lanceolata*	Lamb's Tongue
	Poaceae	
	Aristida sp.	A Wiregrass
+	*Cynodon dactylon*	Common Couch
	Echinopogon sp.	Hedgehog Grass
*	*Ehrharta erecta*	Panic Veldt Grass
*	*Eragrostis curvula*	African Love Grass
CRCIF	*Entolasia stricta*	Wiry Panic
CRCIF	*Microlaena stipoides* var. *stipoides*	Weeping Grass
	Poa affinis	-
*	*Setaria pumila*	Pale Pigeon Grass
	Polygonaceae	
	Rumex brownie	Swamp Dock
	Proteaceae	
V	*Grevillea juniperina* subsp. *juniperina*	Juniper-leaved Grevillea
	Pteridaceae	
CRCIF	*Cheilanthes sieberi* subsp. *sieberi*	Poison Rock Fern

Appendix A Flora Species List surveyed from the subject site on the 27th of August 2012

Status	Species name	Common name
	Rubiaceae	
CRCIF	*Pomax umbellata*	-
	Santalaceae	
CRCIF	*Exocarpos cupressiformis*	Native Cherry
	Sapindaceae	
	Dodonaeae triquetra	Large-leaf Hop-bush

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Corpus Christi Primary School
The Northern Road, Cranebrook

Proposed Residential Subdivision

Vegetation Management Plan

Appendix B
CRCIF – Final Determination

22 October 2013

Environment & Heritage

You are here: Home > Threatened species > Scientific Committee > Determinations

Cooks River/Castlereagh ironbark forest in the Sydney Basin Bioregion - endangered ecological community listing

NSW Scientific Committee - final determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion, as an ENDANGERED ECOLOGICAL COMMUNITY on Part 3 of Schedule 1 of the Act, and to omit reference to the Cooks River Clay Plain Scrub Forest as an Endangered Ecological Community. Listing of Endangered Ecological Communities is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion is the name given to the ecological community characterised by the species assemblage listed in paragraph 2. All sites are within the Sydney Basin Bioregion.

2. Cooks River/Castlereagh Ironbark Forest is characterised by the following assemblage:

- Acacia binervia
- Acacia falcata
- Angophora bakeri
- Angophora floribunda
- Aristida ramosa
- Aristida vagans
- Astroloma humifusum
- Austrodanthonia setacea
- Austrodanthonia tenuior
- Austrostipa pubescens
- Austrostipa rudis
- Billardieria scandens
- Boronia polygalifolia
- Bursaria spinosa
- Calotis cuneifolia
- Cassinia arcuata
- Cassytha glabella form glabella
- Cheilanthes sieberi subsp. sieberi
- Dianella revoluta
- Dichelachne micrantha
- Dillwynia parviflora
- Dillwynia sieberi
- Einadia nutans
- Einadia trigonos
- Entolasia stricta
- Eragrostis brownii
- Eucalyptus capitellata
- Eucalyptus fibrosa
- Eucalyptus longifolia
- Eucalyptus moluccana
- Eucalyptus resinifera

- Exocarpos cupressiformis
- Glycine clandestina
- Gonocarpus tetragynus
- Goodenia belledifolia
- Goodenia hederacea subsp. hederacea
- Goodenia paniculata
- Hakea sericea
- Hibbertia empetrifolia
- Hibbertia serpyllifolia
- Kunzea ambigua
- Laxmannia gracilis
- Laxmannia gracilis
- Lepidosperma laterale
- Leptospermum trinervium
- Leucopogon juniperinus
- Lissanthe strigosa
- Lomandra longifolia
- Lomandra multiflora subsp. multiflora
- Melaleuca decora
- Melaleuca decora
- Melaleuca nodosa
- Microlaena stipoides
- Microtis parviflora
- Notelaea longifolia
- Opercularia diphylla
- Orthoceras strictum
- Ozothamnus diosmifolius
- Ozothamnus diosmifolius
- Panicum simile
- Paspalidium distans
- Podolobium ilicifolium
- Pomax umbellata
- Poranthera microphylla
- Pratia purpurascens
- Pultenaea villosa
- Rhytidosporum procumbens
- Stackhousia viminea
- Syncarpia glomulifera
- Thelymitra pauciflora
- Themeda australis
- Vernonia cinerea var. cinerea
- Wahlenbergia gracilis
- Xanthorrhoea media

3. The total species list of flora and fauna of the community is considerably larger than that given in 2 (above), with many species present in only one or two sites or in very small quantity. The community includes invertebrates, many of which are poorly known, as well as vertebrates. In any particular site not all of the assemblage listed above may be present. At any one time, some species may only be present as seeds in the soil seed bank with no above-ground individuals present. Invertebrate species may be restricted to sediments or canopy trees and shrubs for example. The species composition of the site will be influenced by the size of the site and by its recent disturbance history. The number of species and the above-ground composition of species will change with time since fire, and may also change in response to changes in fire frequency.

4. Cooks River/Castlereagh Ironbark Forest is predominantly of open-forest to low woodland structure usually with trees of Eucalyptus fibrosa and Melaleuca decora, sometimes with Eucalyptus longifolia. A relatively dense shrub stratum is typical, commonly with Melaleuca nodosa and Lissanthe strigosa, and to a lesser extent Melaleuca decora. A variety of shrub species may occur, including Acacia pubescens, Dillwynia tenuifolia, Daviesia ulicifolia, Pultenaea villosa and Grevillea juniperina. Commonly occurring species in the ground stratum include Entolasia stricta,

Lepidosperma laterale, Opercularia diphylla, Dianella revoluta, Themeda australis, Microlaena stipoides and Pratia purpurascens.

5. Cooks River/Castlereagh Ironbark Forest usually occurs on clay soils on Tertiary alluvium, or on shale soils on Wianamatta Shale including the Birrong Soil Landscape and associated shale lowlands.

6. Cooks River/Castlereagh Ironbark Forest is described in NSW NPWS (2000a&b) which lists diagnostic plant species for the community. These species provide a guide to identification of the community, but care should be taken in the application and interpretation of diagnostic plant species because of sampling limitations; the reduction in species diversity in degraded sites; and the fact that some species may only be present at a site at some times as a soil seedbank or as dormant bud/tubers.

7. Cooks River/Castlereagh Ironbark Forest is or has been known to occur in the Auburn, Bankstown, Blacktown, Canterbury, Campbelltown, Fairfield, Hawkesbury, Holroyd, Liverpool, Parramatta, Penrith and Strathfield local government areas, but may occur elsewhere in the Sydney Basin Bioregion.

8. It occurred extensively in the Castlereagh area, Holsworthy-Voyager Point area, Kemps Creek area and the upper Cooks River valley, Duck River and associated shale lowlands in the Canterbury-Auburn-Strathfield- Bankstown-Parramatta-Holroyd area.

9. Cooks River/Castlereagh Ironbark Forest may grade into Castlereagh Swamp Woodland in poorly-drained depressions or into Castlereagh Scribbly Gum Woodland where the soil is sandier. Where the Tertiary alluvium is shallow, the community may grade into Shale Gravel Transition Forest.

10. Disturbed Cooks River/Castlereagh Ironbark Forest remnants are considered to form part of the community including remnants where the vegetation would respond to assisted natural regeneration such as where the natural soil and associated seedbank is still at least partially intact.

11. Cooks River/Castlereagh Ironbark Forest has been extensively cleared for urban and rural developments. About 7% of the original distribution is estimated to remain (NSW NPWS 2000a). There has been very extensive clearing and major fragmentation and isolation of remnants in the Canterbury-Auburn-Strathfield-Bankstown-Parramatta-Holroyd area. Much of the remaining area of Cooks River/Castlereagh Ironbark Forest elsewhere has been disturbed by clearing, tracks, weed invasion and soil disturbance. Continuing threats to the community include invasion by exotic species, illegal dumping, water pollution, unauthorised access, fragmentation and clearing for urban, rural-residential, recreational and industrial development.

12. Cooks River/Castlereagh Ironbark Forest has been reported from Agnes Banks Nature Reserve, Castlereagh Nature Reserve and Windsor Downs Nature Reserve. The area of the community in these reserves is about 1.7% of the original distribution.

13. The eastern occurrences of this community, in the Canterbury-Auburn-Strathfield-Bankstown-Parramatta-Holroyd area, are currently listed as the Cooks River Clay Plain Scrub Forest Endangered Ecological Community. The present determination recognises that similar areas in Western Sydney, previously not recognised as part of the community, should be included as part of the listed Endangered Ecological Community.

14. In view of the originally restricted distribution of this community, its inadequate representation within conservation reserves, the extensive disturbance and fragmentation and weed invasion that has occurred and the ongoing development and use threats, the Scientific Committee is of the opinion that Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate and that the community is eligible for listing as an endangered ecological community.

Proposed Gazettal date: 10/05/02
Exhibition period: 10/05/02 - 14/06/02

References

NSW NPWS (2000a). Native vegetation maps of the Cumberland Plain, western Sydney - Interpretation guidelines. NSW National Parks & Wildlife Service, January 2000.

NSW NPWS (2000b). The native vegetation of the Cumberland Plain, Western Sydney - Technical report. NSW National Parks & Wildlife Service, April 2000

About the NSW Scientific Committee

global environmental solutions

Corpus Christi Primary School
The Northern Road, Cranebrook

Proposed Residential Subdivision

Vegetation Management Plan

Appendix C
Weed Removal Techniques

22 October 2013

Appendix C Weed Removal Techniques

Control of Woody Weeds *(eg Lantana, Cotoneaster, Privet, Camphor Laurel Cassia/Senna)*	
Cut and Paint	• Useful for small to medium sized woody weeds up to 100mm in diameter. • Make horizontal cut as close to the ground as possible with secateurs, loppers or a bush saw. • Apply herbicide immediately to the exposed flat stump.
Stem Injection	• For use on larger shrubs or trees with a diameter of more than 100mm. • At the base of the shrub or tree drill at a 45 degree angle into the sapwood at 5cm intervals and inject the herbicide immediately.
Frilling or Chipping	• Make a hole in the sapwood with a chisel or axe. • Fill each hole/cut with herbicide immediately. • Repeat the process at 5m intervals around the tree.
Control of Weeds with Underground Reproductive Systems *(eg Dandelion, Paddys Lucerne, Catsear, Asparagus Fern, Ginger Plant, Oxalis, Onion Weed, Madiera Vine)*	
Hand Removal of Plants with Taproots (*eg* Paddys Lucerne, Dandelion)	• Gently remove and bag seeds or fruit. • Push a narrow trowel or knife into the ground next to the taproot. Carefully loosen soil and repeat this step around the taproot. • Grasp stem at ground level, rock plant backwards and forwards pulling gently.
Crowning (*eg* Asparagus Fern)	• Gently remove and bag stems with seed and/or fruit. • Grasp the stems or leaves together so that the base of the plant is visible. • Insert, at an angle, a knife or lever close to the crown. • Cut through all the roots around the crown. • Remove and bag the crown.
Removal of Plants with Bulbs, Corms or Tubers (*eg* Onion Weed)	• Move leaf litter away from base of plant. • Dig down next to the stem until the bulb or tuber is reached. • Remove plant and carefully remove and bag bulb or tuber.
Herbicide Treatment: Stem Swiping	• Gently remove any seed or fruit and carefully place into a bag. • Using a herbicide applicator, swipe the stems/leaves.
Control of Small Hand Pullable Plants *(eg Fleabane, Crofton Weed, small grasses, seedlings)*	
Hand Removal (minimal disturbance)	• Gently remove any seeds or fruits and carefully place into a bag. • Grasp stem at ground level. • Rock plant backwards and forwards to loosen roots and pull out gently. • Carefully tap the roots to dislodge any soil. • Replace disturbed soil and pat down.
Control of Vines and Scramblers *(eg Balloon Vine, Morning Glory, Madeira Vine, Blackberry)*	
Hand Removal	• Take hold of one runner and gently pull it along the ground towards you. • Check points of resistance where fibrous roots grow from the nodes. • Cut roots with a knife or dig out with a trowel and continue to follow the runner. • The major root system needs to be removed manually or scrape/cut and paint with herbicide immediately. • Bag any reproductive parts.
Stem Scraping	• With a knife, scrape 15-30cm of the stem to reach the layer below the bark/outer layer. • Immediately apply herbicide along the length of the scrape.

BUSH REGENERATION INFORMATION SHEET

Control of Woody Weeds

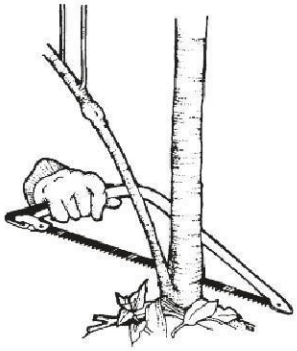
Examples of woody weeds include:
- lantana, bitou bush, cotoneaster, privet (cut and paint)
- camphor laurel, Mickey Mouse bush (ochna) and cassia/senna (stem scrape)

METHODS OF REMOVAL

❶ *CUT AND PAINT* —Useful for small to medium sized woody weeds up to 10cm basal diameter

STEP 1 Make a horizontal cut as close to the ground as possible with secateurs, loppers or a bush saw.

STEP 2 Immediately apply herbicide to the exposed flat stump surface.



SAFETY CONSIDERATIONS

The following general precautions should be made when using herbicides:
- Read the label before opening the container and follow the instructions.
- Wear protective clothing as directed on the label.
- Wash hands after use and before eating or smoking.

considerations

- Cuts should be horizontal to prevent herbicide from running off the stump. Sharp angle cuts are hazardous.
- Herbicide must be applied immediately before the plant cells close and translocation of herbicide ceases.
- If plants resprout, cut and paint the shoots after sufficient regrowth has occurred.
- Stem scraping can be more effective on some woody weeds.

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AABR Australian Association of Bush Regenerators

Illustrations: V.Bear

BUSH REGENERATION INFORMATION SHEET

Control of Weeds with Underground Reproductive Structures

Examples: Weeds with
- Tap roots - catsear, dandelion
- Rhizomes - asparagus fern, ginger plant
- Bulbs and corms - oxalis, onion weed, watsonia, freesias, montbretia
- Tubers - madiera vine, arrow head vine

METHODS OF REMOVAL

❶ *HAND REMOVAL OF PLANTS WITH A TAPROOT*

Examples: Paddy's lucerne, dandelion

STEP 1 Gently remove and bag seeds or fruit.

STEP 2 Push a narrow trowel or knife into the ground next to the taproot. Carefully loosen soil. Repeat this step around the taproot.

STEP 3 Grasp stem at ground level, rock plant back wards and forwards and pull gently.

STEP 4 Gently tap the roots to dislodge soil. Replace disturbed soil and lightly pat down.

❷ *CROWNING (Many grasses can be crowned)*

Example: asparagus fern

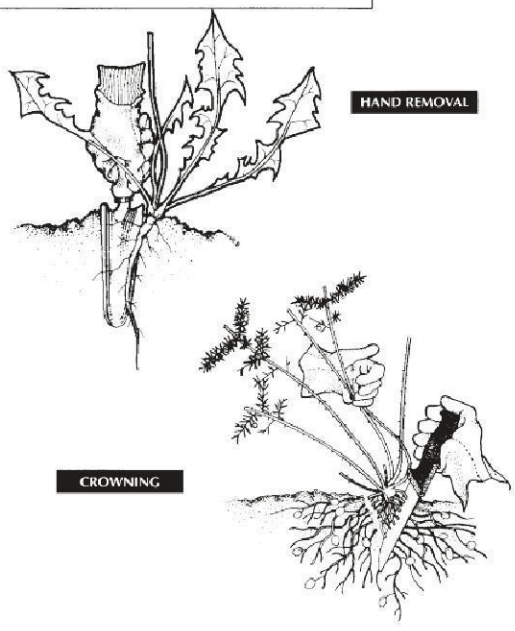
STEP 1 Gently remove and bag stems with seed or fruit.

STEP 2 Grasp the leaves or stems together so that the base of the plant is visible.

STEP 3 Insert, at an angle, a knife or lever, close to the "crown".

STEP 4 Cut through all the roots around the crown.

STEP 5 Remove and bag the crown.



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BUSH REGENERATION INFORMATION SHEET

Control of Small Hand-pullable Plants

To Control:
- **Small soft weeds eg. fleabane, crofton weed, small grasses**
- **Seedlings of any weeds including privet, lantana, moth vine**

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Illustrations: V.Bear

METHODS OF REMOVAL

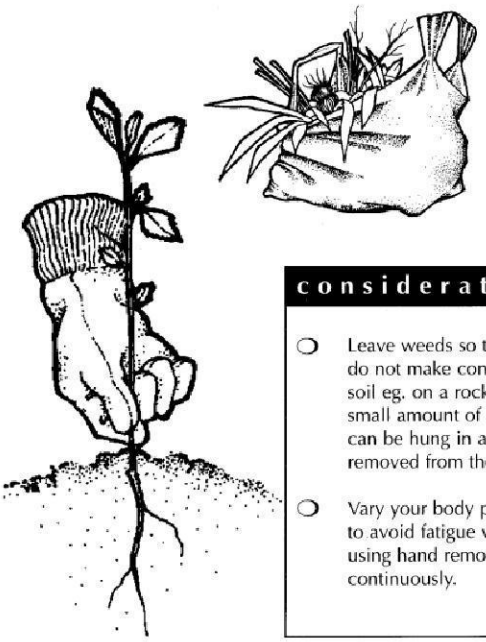
1 *HAND REMOVAL (Minimal Disturbance)*

STEP 1 Gently remove any seeds or fruits and carefully place into a bag.

STEP 2 Grasp stem at ground level.

STEP 3 Rock plant backwards and forwards to loosen roots, and pull out gently.

STEP 4 Carefully tap the roots to dislodge any soil. Replace disturbed soil and pat down.



considerations

- Leave weeds so that roots do not make contact with soil eg. on a rock - a small amount of debris can be hung in a tree or removed from the site.
- Vary your body position to avoid fatigue when using hand removal continuously.

BUSH REGENERATION INFORMATION SHEET

Control of Vines and Scramblers

Examples of vines include:
- **balloon vine, morning glory, honeysuckle, cape ivy, jasmine, madeira vine, blackberry**

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AABR Australian Association of Bush Regenerators

Illustrations: V.Bear

METHODS OF REMOVAL

1 *HAND REMOVAL*

STEP 1 Take hold of one runner and gently pull it along the ground towards you.

STEP 2 Check points of resistance where fibrous roots grow from the nodes. Cut roots with a knife or dig out with a trowel and continue to follow the runner.

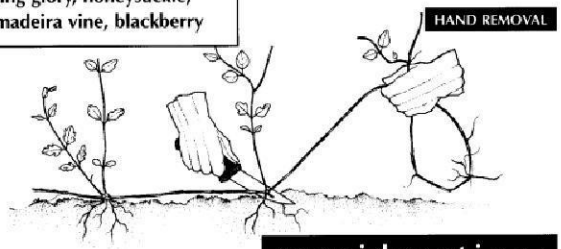
STEP 3 The major root systems need to be removed manually or scrape/cut and painted with herbicide.

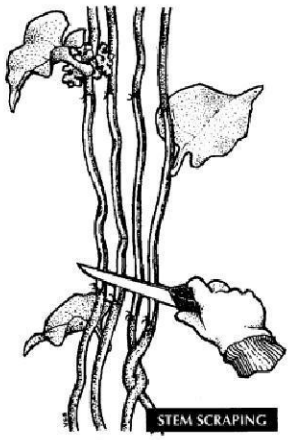
STEP 4 Bag any reproductive parts.

2 *STEM SCRAPING*

STEP 1 With a knife, scrape 15 to 30 cm of the stem to reach the layer below the bark/outer layer.

STEP 2 Immediately apply herbicide along the length of the scrape.





considerations

- A maximum of half the stem diameter should be scraped. Do not ring bark.
- Larger stems (>1cm) should have two scrapes opposite each other.
- Aerial tubers on madeira vine should die with the plant when stem scraping is used. Those that fall from the plant in the scraping process need to be bagged.
- Vines can be left hanging in trees after treatment.

Diocese of Parramatta

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20/11/2013
007: C: PCC

The General Manager
Penrith City Council
PO Box 60
PENRITH NSW 2751

Attn: Ms Hanna Van de Werff

Dear Madam,

DA 13/0288
OFFER OF CONTRIBUTION
PROPOSED RESIDENTIAL SUBDIVISION (21 LOTS)
LOT 1 DP 1144668 ANDROMEDA DRIVE & CASSAR CRESCENT CRANEBROOK

Further to recent discussions, we understand that Council are generally supportive of the current proposal to include a bio-retention basin within proposed residential subdivision of that portion of Lot 1 DP 1144668 which fronts Cassar Crescent, Cranebrook.

Following issue of the final Subdivision Certificate, it is intended that the basin will transfer to the ownership of Council as public reserve, being adjacent to the proposed additional dedicated widening of Cassar Crescent. In relation to this proposed land dedication, we now write to formally confirm the offer to make a contribution to Council to cover the long-term maintenance of the bio-retention basin, following issue of the final Subdivision Certificate.

Two options are presented for Council's consideration.

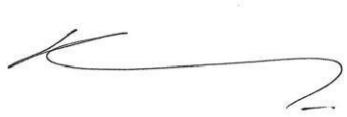
Option 1 provides a contribution of **$70,238.00**, payable prior to issue of the Subdivision Certificate, at which time Council would assume responsibility for ongoing basin maintenance.

Option 2 provides a contribution **of $25.644.09**, again payable prior to issue of the Subdivision Certificate (at which time land ownership would transfer to Council), but with the Developer to retain responsibility for basin maintenance for a period of four years. Under this option, it is understood that appropriate bonding arrangements would be put in place.

We confirm that our preference is to proceed in accordance with Option 1, and would be most appreciative if you could advise if this option, with payment of an associated up-front contribution of $70,238.00, will be acceptable. Subject to such acceptance, we understand that appropriate arrangements may be embodied within relevant future conditions of development consent.

We look forward to Council's further advice.

Yours Faithfully,
Kieran Lahey



Property Manager
The Trustees of the Roman Catholic Church
Diocese of Parramatta

Diocese of Parramatta

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ATTACHMENT 1

DA 13/0288 - OFFER OF CONTRIBUTION
FOR MAINTENANCE OF BIO-RETENTION BASIN
NATURE AND DESCRIPTION OF PROPOSED WORKS

Rationale

In conjunction with proposed residential subdivision of land at Cassar Crescent, Cranebrook, it is proposed to install a bio-retention basin to provide improved downstream water quality. It is proposed that this bio-retention basin be constructed as part of the subdivisional works, and then transferred to the ownership of Council in conjunction with adjacent road dedications. It is also proposed that an up-front payment be made to Council, to cover the cost of ongoing basin maintenance.

Two options are provided for Council's consideration, both of which would be acceptable to the applicant.

Option 1

Option 1 provides for the payment to Council of an up-front contribution which covers the cost of maintenance of the stormwater treatment measures, being the Gross Pollutant Trap (GPT) and the bio-retention basin, for 10 years. The contribution also covers the cost, at Year 4, of the clean out of sediment from the bio-retention basin, and the placement of filter soil and macrophyte planting in accordance with the previously submitted design. The proposed contribution is calculated at Net Present Value.

The maintenance costs for the 10 year period (calculated at NPV) would be paid as an up-front contribution to Council. During the first four years of operation, it is anticipated that the house building phase within the subdivision will generate some sediment, during which time the basin will function as a sediment trap. Following the completion of home building works, cleaning (silt removal), placement of filter soil and planting would be carried out to fully support the permanent bio-retention function of the basin in accordance with the specified design.

Option 1 provides for an up-front contribution to Council of $70,238.00 to cover the cost of the residual works involved in establishing the basin in its final form, as well as the ongoing cost of maintenance.

The advantages in providing for Council to control and manage works associated with basin maintenance, and the cleaning of sediment and permanent planting proposed at Year 4, (but with these items being funded by an up-front contribution paid by the developer) include:

- The runoff contributing to the Gross Pollutant Trap (GPT) and basin will be from a Public Road, under the control of Council.
- The building activity within the catchment area contributing runoff to the trap will be under the control of the Council. That is, all building sites are required to have properly installed and functioning sediment control measures for which Council retains the primary monitoring and policing function.
- The bio-retention basin will be located within a drainage reserve or public reserve, under the control of Council.
- The developer would have neither rights to insist on proper catchment management measures within the building sites, nor any rights with respect to the management of vehicles on the public

road. Both of these issues have the potential to affect the amount and nature of sediment deposited.

- Cleaning out of the bio-retention basin and GPT would require works by private contractors within Council's land.
- The maintenance of the measures would be an extension of Council's street maintenance staff usual duties.
- Council Parks and Gardens staff would be able to complete the bio-retention planting works, at Year 4, in accordance with the approved plans.

Calculations for net present value of Contributions to Council

Option 1: Developer to pay contribution to Council for 10 years

	Bio-retention Basin			GPT		
Year	**Present Value costs**	**Future Value costs**	**Remaining funds**	**PV costs**	**FV costs**	**Remaining funds**
0	$0.00	$0.00	$62,856.02	$0.00	$0.00	$7,382.26
1	$6,300.00	$6,426.00	$60,107.55	$909.00	$927.18	$6,890.37
2	$6,300.00	$6,554.52	$57,077.78	$909.00	$945.72	$6,352.52
3	$6,300.00	$6,685.61	$53,748.30	$909.00	$964.64	$5,765.73
4*	$28,843.94	$31,221.61	$26,175.79	$909.00	$983.93	$5,126.87
5	$4,641.00	$5,124.04	$22,631.22	$909.00	$1,003.61	$4,432.62
6	$4,641.00	$5,226.52	$18,785.91	$909.00	$1,023.68	$3,679.46
7	$4,641.00	$5,331.05	$14,620.84	$909.00	$1,044.16	$2,863.68
8	$4,641.00	$5,437.67	$10,115.90	$909.00	$1,065.04	$1,981.33
9	$4,641.00	$5,546.42	$5,249.81	$909.00	$1,086.34	$1,028.24
10	$4,641.00	$5,657.35	$0.01	$909.00	$1,108.07	$0.00
Total			**$62,856.02**			**$7,382.26**

The base year for costing is 2013 with an annual inflation rate of 2% and a 5.5% nominal interest rate.
* Sediment trap cleaned out and bio-retention basin constructed to specifications
(Source: e Water MUSIC modelling Life Cycle Costing of Treatment Measures)

Option 2

Alternative Option 2 entails had-over of the bio-retention basin to Council on issue of the Subdivision Certificate, but with the developer to subsequently retain responsibility for maintenance in the initial four-year period, and then also complete the cleaning (silt removal) and placement of filter soil and planting works for conversion to the final bio-retention state at Year 4.

Under this option, the developer would pay an up-front contribution to Council for the cost of maintenance of the GPT and the bio-retention basin for years 5 to 10 of its subsequent operation. It is envisaged that Council would also require the developer to lodge a Bond to cover the cost of carrying out the maintenance of the GPT and bio-retention to Year 4, and the cost of subsequent silt removal and permanent planting. Upon completion of these items in Year 4 the bond would be returned.

Option 2: Developer to pay all costs for maintenance and reconstruction of trap until Year 4.

	Bio retention Basin			GPT		
Year	**PV costs**	**FV costs**	**Remaining funds**	**PV costs**	**FV costs**	**Remaining funds**
0	$0.00	$0.00	$21,444.01	$0.00	$0.00	$4,200.08
1	$0.00	$0.00	$22,653.62	$0.00	$0.00	$4,437.00
2	$0.00	$0.00	$23,931.46	$0.00	$0.00	$4,687.28
3	$0.00	$0.00	$25,281.38	$0.00	$0.00	$4,951.68
4	$0.00	$0.00	$26,707.45	$0.00	$0.00	$5,231.00
5	$4,641.00	$5,124.04	$23,089.93	$909.00	$1,003.61	$4,522.46
6	$4,641.00	$5,226.52	$19,165.86	$909.00	$1,023.68	$3,753.88
7	$4,641.00	$5,331.05	$14,915.91	$909.00	$1,044.16	$2,921.47
8	$4,641.00	$5,437.67	$10,319.62	$909.00	$1,065.04	$2,021.23
9	$4,641.00	$5,546.42	$5,355.30	$909.00	$1,086.34	$1,048.90
10	$4,641.00	$5,657.35	$0.03	$909.00	$1,108.07	$0.00
			$21,444.01			**$4,200.08**