

ASSESSMENT OF REMNANT BUSHLAND & TREE SURVEY FOR 2 CHRISTINA STREET, VILLAWOOD

PREPARED FOR

ORICA AUSTRALIA PTY LTD.

MAY 2000



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1.0 INTRODUCTION

1.1 BACKGROUND INFORMATION

Orica Ltd (hereafter referred to as Orica) is the current owner of property at 2 Christina Road, Villawood, in Bankstown Local Government Area (see *Figure 1*). While undertaking a review of property assets, the landowner was notified by Bankstown Council of the presence of remnant native vegetation on the property which is protected under Schedules 2 of the *Threatened Species Conservation Act 1995* (TSC Act 1995).

Subsequent investigations (James 1997) indicated that approximately 0.2 ha of Shale / Gravel Transition Forest was located on the Christina Road property -- an endemic vegetation type of the Cumberland Plain that is considered to be inadequately conserved (NPWS 1997). The remnant bushland on the Orica site (the study area) is concurrent with a larger (~2 ha) of similar vegetation in the Taubmans property to the north. Together these two (2) areas comprise some 0.08% of the Shale / Gravel Transition Forest remaining in Western Sydney (NPWS 1997). In view of the rarity of this specialized vegetation community both sites have been identified by the National Parks & Wildlife Service (NSW) as 'significant' at local, regional and state levels (James 1997).

In addition to the survey and assessment of the site's remnant bushland, Orica has requested a survey of trees on the Christina Road property. This survey has identified all mature trees on the property, including remnant native trees, non-indigenous (planted) native trees, and introduced horticultural specimens.

1.2 REPORT PURPOSE

The current report -- *A Survey of Remnant Bushland & Tree Survey at 2 Christina Road, Villawood* -- has been commissioned by Orica to assess the conservation status of the remnant bushland to identify any significant trees on its property, and to advise the landowners of their environmental responsibilities with respect of the current legislation.

It is anticipated that this report will be utilised as an integral part of the planning process, and will assist the landholder to:

- Retain and manage the most significant areas of remnant bushland and/or any significant trees occurring on the property; and
- Comply with the requirements of current state and federal environmental legislation.

The *Bushland Assessment & Tree Survey* will also develop an integrated and consistent approach to management, and provide Orica with a clear set of best practice guidelines for the rehabilitation and future management of those areas of bushland which are to be retained. Implementation of the recommendations contained herein will ensure that the biological integrity and associated values of this important bushland remnant will be conserved and retained for present and future generations



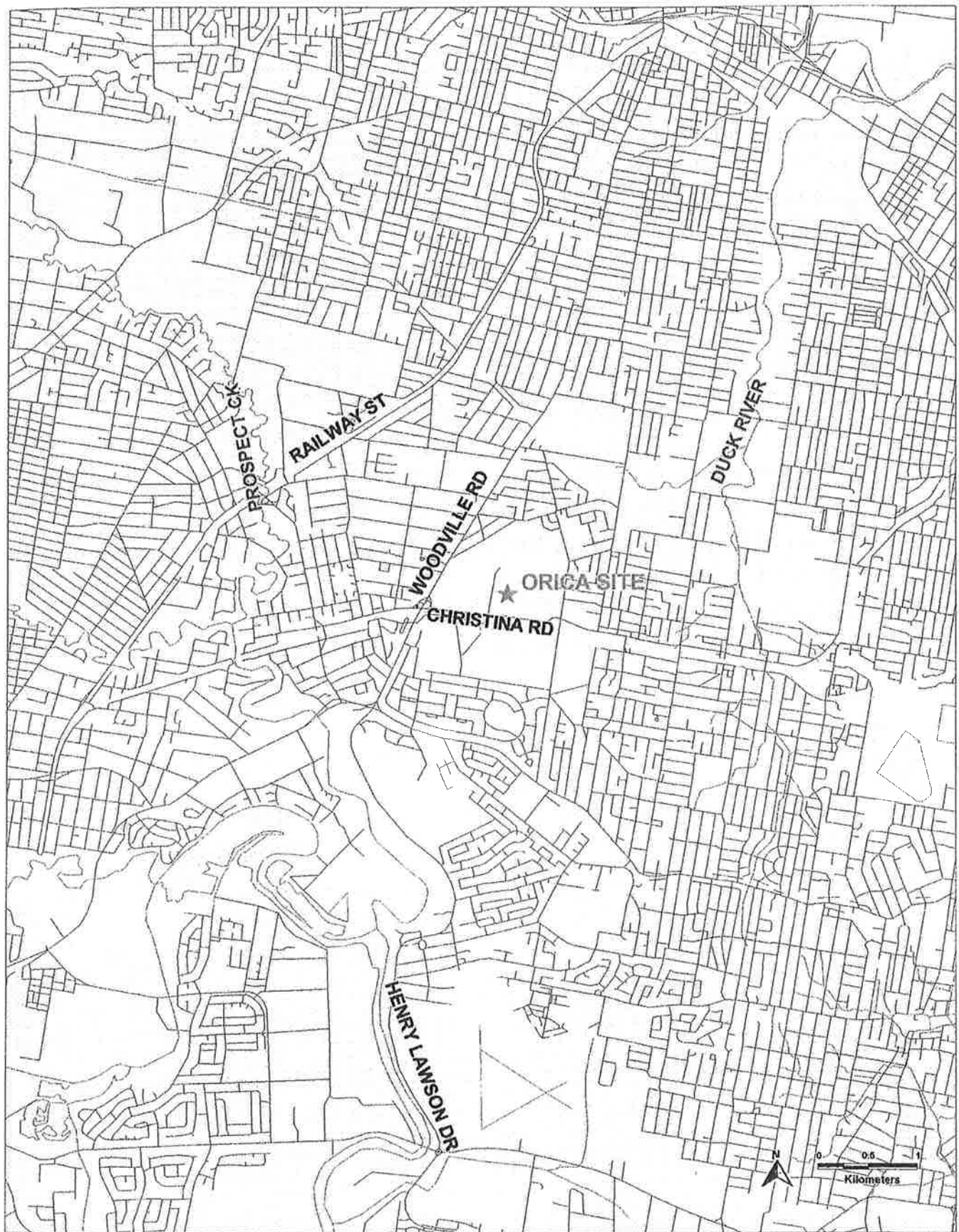


Figure 1
Site Location

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1.3 REPORT OBJECTIVES

The objectives of the *Bushland Assessment & Tree Survey* are as follows:

- To ensure the continuing survival of the 'endangered ecological community', the Shale / Gravel Transition Forest (as listed under the Schedules of the *Threatened Species Conservation Act 1995*);
- To provide guidelines for the mitigation of weed invasion and other degrading impacts in the areas of high conservation value;
- To assist the landholders to maximise property values, while at the same time conserving and managing the remnant bushland; and
- To advise the landowners of their environmental obligations under the terms of the current legislation.

1.4 REPORT FORMAT

The Report has been divided into four (4) sections. These are:

Part A – Introduction, which provides background information, including:

- Report Purpose and Outcomes
- Report Objectives
- Environmental and Statutory Responsibilities
- Review of Previous Studies

Part B – Field Investigations, including

- Site Description
- Identification of Conservation Areas and Significant Trees
- Assessment of Conservation Values
- Conclusions and Preliminary Recommendations

Part C – Appendices, including

- Bibliography
- Literature Review
- Flora List
- Noxious Weeds List and Responsibilities
- Supporting Documentation



1.5 PLANNING AND LEGISLATIVE FRAMEWORK

1.5.1 Local and Regional Planning Instruments

A number of local and regional policies and plans have relevance to the current and ongoing management of remnant bushland in the study area. The most relevant items are summarised below:

Bankstown Planning Scheme Ordinance

Bankstown Planning Scheme Ordinance controls the zoning of land and land uses within Bankstown City. The Ordinance was gazetted on the 21st September 1979 will remain the primary zoning resource until it is replaced by the consolidated Bankstown Local Environment Plan, currently being prepared under the *Environmental Planning and Assessment Act 1979*.

Tree Preservation Order – Development Control Plan No 8 1998

The Tree Preservation Order aims to secure and preserve the existing amenity and enhance the environment of Bankstown City by providing a regulatory framework for the preservation and management of trees. An application must be made to Council to remove any tree, whether endemic, exotic or introduced species which has:

- a height exceeding 3 metres, and/or
- a branch spread exceeding 3 metres

The removal of any tree (as above) as part of the proposed redevelopment will require permission from Bankstown City Council.

Greater Metropolitan Regional Environmental Plan No. 2 – Georges River Catchment

The Greater Metropolitan REP No. 2 applies to land within the Georges River Catchment Area. The REP aims to

- to maintain and improve the water quality and river flows of the Georges River and its tributaries and ensure that development is managed in a manner that is in keeping with the national, State, regional and local significance of the Catchment,
- to protect and enhance the environmental quality of the Catchment for the benefit of all users through the management and use of the resources in the Catchment in an ecologically sustainable manner,
- to ensure consistency with local environmental plans and also in the delivery of the principles of ecologically sustainable development in the assessment of development within the Catchment where there is potential to impact adversely on groundwater and on the water quality and river flows within the Georges River or its tributaries,
- to establish a consistent and coordinated approach to environmental planning and assessment for land along the Georges River and its tributaries and to promote integrated catchment management policies and programs in the planning and management of the Catchment,
- to encourage more effective consultation between Local Government and State Government agencies in executing the responsibility for environmental planning within the Catchment,
- to provide a mechanism that assists in achieving the water quality objectives and river flow objectives agreed under the Water Reform Package.



1.5.2 State Planning Controls

A number of state government acts and policies have relevance to current and on-going management of native vegetation (bushland) in Bankstown City. The most significant of these are:

Threatened Species Conservation Act 1995

The *TSC Act 1995* is designed to conserve threatened species, populations and ecological communities of animals and plants, to promote their recovery, and to manage the processes that threaten or endanger them. It outlines the legislative requirements for the consideration of threatened species, populations or ecological communities listed by the Act.

The objects of the Act are as follows:

- To conserve biological diversity and promote ecologically sustainable development;
- To prevent the extinction and promote the recovery of threatened species, populations and ecological communities;
- To protect the critical habitat of those threatened species, populations and ecological communities that are endangered;
- To eliminate or manage certain processes that threaten the survival or evolutionary development of threatened species, populations and ecological communities;
- To ensure that the impact of any action affecting threatened species, populations and ecological communities is properly assessed; and
- To encourage the conservation of threatened species, populations and ecological communities by the adoption of measures involving co-operative management.

The NSW Scientific Committee established by the *TSC Act 1995* has listed a number of endangered species, populations and ecological communities (flora and fauna) under Schedule 1 of the Act, and species considered to be vulnerable under Schedule 2 of the Act. Schedule 3 of the Act provides for the listing of 'key threatening processes' – those processes which do, or may, cause species, populations or ecological communities to become vulnerable or threatened.

Any species, population, or ecological community listed on Schedules the Act that occur, or are likely to occur near any proposed development, requires both the consent and determining authorities to determine whether a significant impact will be caused under Part 1 Section 5A of the *Environmental Planning and Assessment Act (EP&A Act) 1979*. This will determine if the proposal is likely to significantly affect any threatened species, populations, ecological communities, or their habitats. Prior to making this determination, the Eight-Part Test must be undertaken.

The Eight-Part Test (within Part 1 Section 5A of the *EP&A Act*) consists of eight (8) factors which need to be addressed to allow informed decisions to be made regarding the effect of a proposed development or activity on threatened species, populations or ecological

Should the 'Eight-part test' determine that the development will have a significant negative impact upon a species, population or ecological community, the undertaking of a Species Impact Statement (SIS) will be recommended. An SIS requires submission to the Director-General of the NSW National Parks and Wildlife for specific points regarding each development application, to further assess in detail the impact a proposed development may have upon species, populations or ecological communities listed under the Schedules of the Act.



The Cumberland Plain Woodland is listed under the Schedules of the *TSC Act 1995* are the Shale / Gravel Transition Forest occurring at the Orica Property is considered to be a variant of the Cumberland Plain Woodland. In light of Orica's intention to dispose of the property for development, it is anticipated that some or all of the endangered bushland may be cleared. Accordingly, the Eight-part Test was carried out. Test results are discussed in *Appendix 6*.

Environmental Planning and Assessment Act 1979

The *EP&A Act 1979* is intended provide a legislative system for environmental planning and assessment in the state of New South Wales. The stated objects of the Act are to encourage:

- Proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment;
- Promotion and co-ordination of the orderly and economic use and development of land;
- Protection, provision and co-ordination of communication and utility services;
- Provision of land for public purposes;
- Provision and co-ordination of community services and facilities;
- Protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats;
- Ecologically sustainable development;
- Promotion of shared responsibility for environmental planning between different levels of government in the state; and
- Increased opportunity for public involvement and participation in environmental planning and assessment.

Since the introduction of the *TSC Act 1995*, the *EP&A Act 1979* has been amended to include provision for the protection of endangered species, populations or ecological communities, or their habitats. This is done through the requirement to undertake the '8-Part Test', and a subsequent Species Impact Statement, should one be required.

Noxious Weeds Act 1993

The Noxious Weeds Act 1993 (*NW Act 1993*) replaces weed control legislation dating from the early part of the century (*Local Government Act 1919*). The Act brings important changes that are designed to streamline administration and improve the implementation of noxious weed control. There is an increased emphasis on urban and environmental weeds. It encourages community co-operation and promotes a coordinated approach to the control of noxious weeds throughout the State. The Act applies equally to all private landholders, state and federal government agencies.

Noxious plants are declared in four (4) categories (W1 to W4) and grouped according to the *specific action required to control them*. The categorisation system does not imply a ranking of importance, but rather defines the practicability of eradicating the weed species within each Local Government Area (LGA).



The Act states that all private and public landowners must take appropriate action to control noxious weeds on land under their control, and to take action to the extent necessary to prevent the weeds spreading to adjoining land.

On land in the study area at 2 Christina Road, there are four (4) weed species declared in two (2) categories (W2 and W3). As the landholder, Orica is required to take action to continuously suppress and destroy declared noxious weeds on the property. Noxious weeds in the study area have been listed in Appendix No 5.

State Environmental Planning Policy No 19 – Bushland in Urban Areas

SEPP-19 aims to protect and preserve bushland within the Sydney Metropolitan area, and in other areas of the State which nominate for inclusion under the terms of the Policy.

For the purposes of SEPP-19, urban bushland is defined as:

land on which there is vegetation which is either a remainder of the natural vegetation of the land or, if altered, is still representative of the structure and floristics of the natural vegetation.

The Policy has a number of specific aims. These include:

- The protection of remnant plant communities which were once characteristic of land now within an urban area;
- The protection of habitat, wildlife corridors and vegetation links; and
- The protection of existing landforms, drainage lines, watercourses and foreshores.

Clause 6 (1) of the Policy states that: "A person shall not disturb bushland zoned or reserved for public open space purposes without the consent of Council" and further, Clause 7 (2) states that "a public authority shall not disturb bushland for a purpose referred to in Clause 6 (2) unless it has first had regard to the aims of the Policy".

Clause 9 requires that where development is to be carried out on land which adjoins bushland protected by SEPP-19, the Consent Authority (usually Council) must consider the need to retain any bushland on the land and the impact of the proposed development on the adjacent, protected bushland.

The bushland within the study area is *not* land in public ownership (i.e. community land), and as such is not protected by SEPP-19. However, SEPP-19 is currently under review by the Department of Urban Affairs and Planning (DUAP), and although new determinations have not yet been made, it is likely that DUAP will recommend the extension of SEPP-19 to protect remnant bushland in private ownership. For this reason, and because it is considered that the spirit of the Act should apply to all landholders, regardless of land tenure, a summary of the aims and philosophy of SEPP-19 has been included.

1.5.3 Other Relevant Legislation

There are a number of other legal instruments which may have relevance to management of vegetation and other natural area (wetlands, watercourses) on private and public lands. A number of these apply to the management of bushland in the study area. These are:

- Environmental Planning and Assessment Act, 1979 - parts 4 & 5;
- Local Government Act 1993;



- State Environmental Planning Policies (SEPPs) - various;
- Protection of The Environment Operations Act 1997;
- Rural Fires Act 1997;
- Occupational Health and Safety Act, 1983;
- Pesticides Act, 1978;
- Poisons Act, 1966;
- Public Health Act, 1902;
- Protection of the Environment Operations Act 1997 (amends the Pollution Control Act 1970 and the Soil Conservation Act 1938); and
- Australian Agricultural and Veterinary Chemicals Council (established by
- Act of Parliament, 1989).

1.6 REVIEW OF PREVIOUS STUDIES

There are a number of studies which describe the native bushland of the Bankstown area. These are presented and summarised in Appendix 1.

Two (2) previous studies/reports deal specifically with the remnant bushland at the Orica Property at Villawood. These are:

- The Urban Bushland Biodiversity Survey (1997). T. James (editor). NSW National Parks and Wildlife Service, Sydney; and
- A Preliminary Survey of Bushland at the ICI Property, Villawood. S. Burke (NPWS) and D. Little (Bankstown City Council), April 1996.

The Urban Bushland Biodiversity Study (James 1997) comprised a comprehensive study of all remnant bushland areas in the Western Sydney Region. As a result of that study, numerous previously unknown bushland remnants were identified and described. The ICI (now Orica) remnant and the adjoining Taubmans remnant were two (2) such sites.

Remnants of the 'endangered' Shale / Gravel Transition Forest were identified at both the ICI / Orica site and the Taubmans site (see *Section 3*). In the small strip of bushland on the western perimeter of the ICI / Orica site, some 50 native plant species were listed. Although no species recorded from the site were considered to be 'endangered' or 'vulnerable' at a national or state level, one (1) plant (*Dillwynia parviflora*) considered 'rare' in Western Sydney was recorded, along with another five (5) species listed as 'vulnerable' in the Western Sydney context. The NPWS describes the *conservation significance* of the ICI bushland as 'high' at both national and state levels.

Preliminary Survey of Bushland at the ICI Property, Villawood (Burke & Little 1996) reports on a site visit to the property in which thirty-eight different species of local native plants were identified. The results of this survey, forwarded to ICI Pharmaceuticals by Bankstown City Council (letter 2 May 1996) advises the landowner of the site's conservation significance and cautions that weed invasion (particularly by the woody weed *Chrysanthemoides monilifera* ssp. *monilifera* – Boneseed) threatens the integrity of the remnant bushland.



2.0 THE STUDY AREA

2.1. SITE DESCRIPTION

2.1.1 Location and Setting

The Orica Property at 2 Christina Road comprises an area of approximately 12.6 ha located east of Woodville Road and south of Miowera Road, Villawood. The site was formally operated by a pharmaceutical company (Astra Zenica) and Crop Care Australasia a manufacturer of agrochemicals, whilst the land is owned by Orica.

The remnant bushland within the Orica Property within the study area occurs in a narrow strip measuring some 20m wide x 100m long on the western boundary of the property. The bushland strip is concurrent with a larger (2 ha) patch of bushland in the Taubmans property to the north, and forms part of a discontinuous fauna corridor through the Villawood area east of Woodville Road (see Figure 2).

Significant areas of disturbance arising from placement of fill material and previous land uses include a raised, level area directly to the east of the bushland strip. The bushland is separated from the fill area by a steep embankment and a shallow ditch, which serves as a drainage channel paralleling the property fence. Weed invasion is generally concentrated on the embankment and in the bushland immediately adjacent to the drainage channel.

2.1.2 Topography, Geology and Soils

Most of Bankstown's landscape is gently undulating with a general slope from the highest parts in the north, south towards the Georges River. The terrain in the vicinity of the study area is flat to gently undulating, and forms part of the Blacktown Soil Landscape Unit.

Wianamatta Shale is the dominant geological unit in the Western Sydney Region. The study area at Christina Road is located on the Ashfield Shales, which comprises a sub-unit of the Wianamatta Group, which dominates over most of the South Bankstown region.

The soil derived from the shale parent rock is a deep, red podsolic, with a high clay content. Despite the dry conditions (800 mm pa. or less), the soils are fertile and suitable for agriculture. As a result, most of the native vegetation in the Bankstown area was cleared in the early days of settlement.

2.1.3 Climate

Sydney is part of the subtropical east coast climatic group, experiencing a warm, wet summer-autumn and a cool drier winter-spring. Local climatic conditions vary according to topographical conditions and distance from the sea.

Bankstown lies between the moderation of the coast and the extremes of the west. Average maximum summer (January) temperature is 27°C, with a summer average minimum of 18°C. Average winter (July) temperatures are: maximum: 17°C, minimum 5°C. Average annual rainfall is 905 mm, falling throughout the year, but with a wetter period from January to July (McLaughlin 1994).



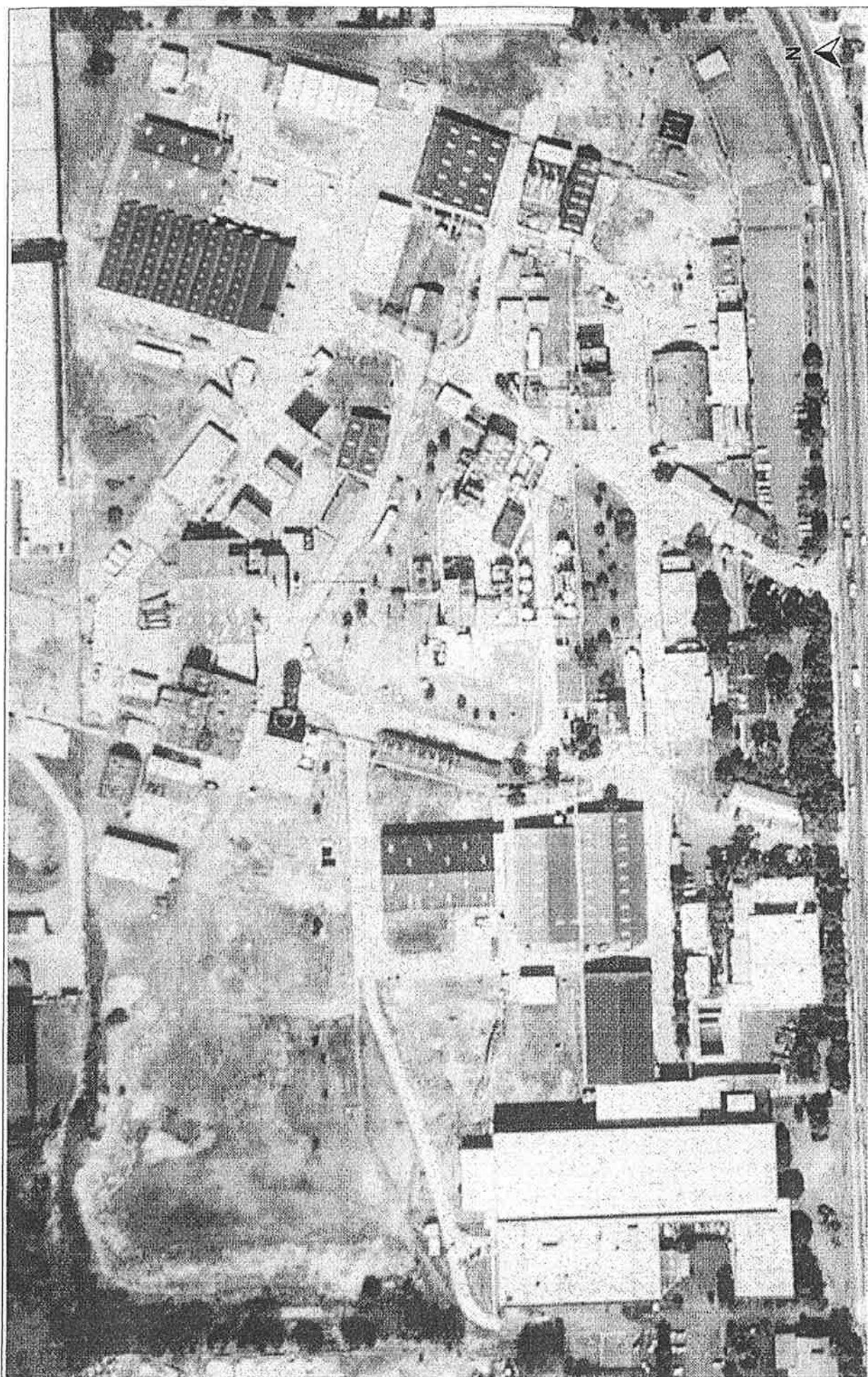


Figure 2
Site Details

Source: Urban Bushland Management Consultants Pty Ltd



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2.1.4 Vegetation Communities

The original vegetation of the Bankstown district appears to have mainly been an woodland dominated by *Eucalyptus moluccana* (Grey Box) and *Eucalyptus tereticornis* (Forest Red Gum) with a grassy understorey and thickets of *Bursaria spinosa* (Blackthorn) (Benson & Howell, 1990). This type of vegetation is known generically as 'Cumberland Plain Woodland', and comprises a number of different sub-units or plant associations which vary somewhat in both floristics and structure.

While most of the richer shale-soil areas in the region were cleared many years ago for agriculture, and latterly for development, the UBBS (1997) has identified three (3) distinct vegetation communities / associations in the Villawood area. These are described as follows:

- *Eucalyptus moluccana* Woodland (Grey Box Woodland), occurring on Wianamatta Shale (Blacktown Soil Landscape) and Quaternary alluvium.
- *Shale-Sandstone Transition Forest* - comprising a disturbed form occurring on geology which appears to be transitional between Wianamatta Shale and Tertiary Alluvium (Figure 3).
- *Riparian Forest* – highly disturbed forms of this plant community occur along the drainage lines in the area.

Two (2) distinct vegetation units occur within the Orica site:

- Woodland dominated by indigenous species
- Landscaped zones

The woodland plant community is comprised of three strata: scattered individual and small groups of canopy species, a generally dense shrub layer, and a variable groundcover layer. Typical canopy species include *Melaleuca decora* and *Eucalyptus fibrosa* with a shrub layer dominated by *Dillwynia sieberi*, *Daviesia ulicifolia* and *Bursaria spinosa*. The groundcover is typically *Paspalidium distans* although *Themeda australis*, *Aristida* spp. and *Goodenia* spp. are also common.

The landscaped zones are located outside the woodland area. These generally comprise non-indigenous Australian species planted for landscape amenity.





Figure 3: Location of Shale / Gravel Transition Forest (NPWS 2000)

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3.0 FIELD INVESTIGATIONS

3.1 OVERVIEW

Previous reports and surveys with relevance to the native vegetation of the Bankstown region was reviewed and all material specific to the Orica Property at 2 Christina Road was identified. The literature review was undertaken in order to assess the known or likely occurrence of species or communities of conservation significance on the study site. The literature review has been included in the current report as Appendix 1.

3.2 METHODOLOGY

The purpose of the flora survey and assessment was to:

- Determine the extent of bushland existing on the site;
- Assess the condition, viability and conservation significance of the bushland; and
- Comment on the relevance of previous NPWS and other surveys of the site.

The site was inspected by David Thomas and Judith Rawling on 19 April, 2000. Initially the whole property was inspected and an overview of the vegetation was obtained.

A local occurrence of bushland occurred at the western boundary of the property. . As the bushland component of the site is relatively small (< 0.2 ha), all parts were fully accessible, except for tiny areas of impenetrable scrub in the north-western corner. This was surveyed by an extensive random transect as described by Cropper (1993).

The property was again inspected on 12th May by Adele Crane and Bronwen Bowskill who mapped all native and introduced trees in the landscaped zone of the property. The vegetation in the remainder of the property mainly comprised introduced trees that had been planted for landscape amenity value. A search for significant plant species was made during the preliminary inspection and survey work.

The plant community was defined by observation of the dominant (tree) canopy species and by vegetation structure (Specht 1970). Plant species nomenclature accords with Harden (1990-1993). Conservation significance was assessed using the *TSC Act 1995*, Briggs and Leigh (1995), and the Urban Bushland Biodiversity Study (James / NPWS 1997).

Assessment of conservation significance (bushland) was undertaken in order to select those areas of highest quality bushland. This assessment was based upon a number of criteria, including:

- Species diversity;
- Structural integrity (3 strata present);
- Presence of species listed under the schedules of the TSC Act 1995;
- Presence or evidence of original (parent) soils;
- Extent and degree of weed invasion; and
- Connectivity to other bushland areas.



Bushland is defined in this report as vegetation that comprised scattered native tree cover with an understorey of two strata that was dominated by locally indigenous species, or which locally contained a high proportion of introduced species in one stratum, but was practicable to be restored to a predominantly natural condition.

Aerial photographs and site plans were used to identify the extent of the area remaining under native vegetation. Each part of the study site was then surveyed on foot in order to determine the bushland boundaries more exactly. Each part of the remnant was assessed individually and impacts noted. The size of the proposed conservation zone was measured and boundaries recorded on the site map (see Figure 2).

Following the field investigations, detailed flora lists were prepared. Site floristics includes both local native (indigenous) and introduced species, i.e. exotic and non-indigenous natives (see Appendix 2).

All native (indigenous and non-indigenous) and introduced trees over 3 metres in height or with a canopy width greater than 3 metres were recorded and mapped. The list of tree species recorded outside the bushland remnant is included as Appendix 3 and illustrated on Figure 4.

3.3. RESULTS AND DISCUSSION

The vegetation represented on the site comprised two (2) main units:

- Woodland dominated by indigenous species; and
- Landscaped or garden areas.

3.3.1 Woodland

The native plant community was located at the western boundary of the property and covered an estimated 2,200 square metres (0.22 ha). A larger area (approx. 2 hectares) of contiguous similar woodland occurred to the north in the Taubmans property. Land on the remaining three (3) sides of the bushland had been cleared of all natural vegetation.

The woodland comprised three (3) strata: scattered individual and small groups of trees; a generally dense shrub layer; and a variable ground cover. The herb layer or ground cover tended to be dense in open situations but sparse under shady canopy or shrub strata.

Typical tree species recorded were *Melaleuca decora* and *Eucalyptus fibrosa* (Broad-leaved Ironbark). *Eucalyptus sideroxylon* (Mugga Ironbark), *Allocasuarina littoralis* (Black She-oak) and *Acacia parramattensis* (Parramatta Wattle) were represented by a few immature specimens only. The largest of the trees formed a very open canopy, 10- 15 metres in height.

Dillwynia sieberi (Prickly Parrot-Pea), *Daviesia ulicifolia* (Gorse Bitter Pea) and *Bursaria spinosa* (Blackthorn) were generally the main shrubs. *Kunzea ambigua* (Tick Bush) was locally dominant in the northern section. Shrub height varied from 0.5 - 3 metres.

The ground cover was typically *Paspalidium distans* (Panic Grass). Other common species included: *Themeda australis* (Kangaroo Grass); *Aristida* spp. (Three-awned Grasses) and *Goodenia* spp.

Much of the bushland was in a viable (healthy) condition. Weeds tended to be concentrated at the margins, especially on the steep fill batter on the eastern side of the small ditch, from which they were observed to be spreading into the bushland. Unless these weeds are controlled, it is



likely that they will have a serious long-term impact on the viability of this largely intact bushland area.

The most common weed species recorded were: *Chrysanthemoides monilifera* ssp. *monilifera* (Boneseed), *Lantana camara* (Lantana), *Pennisetum clandestinum* (Kikuyu), *Conyza albida* (Tall Fleabane), *Paspalum dilatatum* (Paspalum) and *Cynodon dactylon* (Couch Grass).

Other environmental weeds present included woody weeds such as *Ligustrum* spp. (Privet); *Olea europaea* var. *africana* (African Olive), *Rubus fruticosus* (Blackberry); vines and scramblers such as *Araujia sericifera* (White Moth Plant), *Protasparagus aethiopicus* (Ground Asparagus) and *Myrsiphyllum asparagoides* (Bridal Creeper), and perennial herbs such as *Cortaderia selloana* (Pampas Grass) and *Juncus acutus* (Spiny Rush).

3.3.2 Landscape Zones

An inspection was made of trees on the entire property, outside the bushland described above. These generally comprised introduced Australian species that had been planted for landscape amenity (Appendix 3).

Six (6) individuals and one (1) small group were remnants of the original bushland that had been incorporated into the landscaped areas. These were:

- Five (5) *Eucalyptus fibrosa* and one (1) *Eucalyptus longifolia* between the Laboratory and Christina Road;
- One (1) *Eucalyptus longifolia* in the north-eastern corner of the property; and
- A small group of *Acacia parramattensis* on the southern side of the road from Gate 2.

The vegetation has been previously surveyed during the NPWS Urban Bushland Biodiversity Survey (James, 1997) and was described as being Shale/Gravel Transition Forest. Two (2) other communities have been mapped in the vicinity: Cooks River Clay Plain Scrub Forest and River Flat Forest (NPWS, 2000) and Castlereagh Ironbark Forest (James, pers.comm). These bushland fragments were too small to be mapped at 1:100000 scale by Benson (1990).

Indicative site geology is deep shale of the Wianamatta Group. Small to pea-sized lateritic gravel was observed during the survey. The bedrock had weathered to a moderately gravelly clay soil which is consistent with that of Shale/Gravel transition Forest and Cumberland Plain Woodland.

Shale/Gravel Transition Forest and Cumberland Plain Woodland generally have high proportions of *Eucalyptus moluccana*, however no specimens were recorded in the study area. A previous survey of an adjacent property at 25 Miowera Road recorded *Eucalyptus moluccana* as the dominant species, with many of the associated species being common to that site and the current study area. Owing to the proximity of *Eucalyptus moluccana* to the study area and the similarity of soils in both sites, it is likely that the Christina Road site previously contained *Eucalyptus moluccana* and possibly the same type of plant community as in nearby Miowera Road.

The bushland adjoining the northern side of the study area (Taubman property) bushland is however different to the Miowera Road vegetation, having been categorised as Castlereagh Ironbark Forest (James, pers.comm). The eastern forms of this community (as in the Taubman property) have been included in Cooks River Clay Plain Scrub Forest by NPWS (2000).



It is therefore difficult to categorise the vegetation in the current study site, however based on the:

- Shale geology of the site, with no indication of proximate sandstone substrate;
- Recorded plant species on site;
- Modification of the plant community by previous clearing;
- Complexity and overlap of plant communities in the local area;
- Inclusion of small areas of *Shale/Gravel Transition Forest* in *Cumberland Plain Woodland* (NPWS, 1998);

It is considered that the community in the present study area is part of a local ecotone or intergradation of Cumberland Plain Woodland, Shale/Gravel Transition Forest and Cooks River Clay Plain Scrub Forest.

The ditch adjoining the bushland currently has no exit point and periodically causes flooding of the low parts of the bushland. In some locations this appears to have favoured the establishment of herbaceous weeds in the bushland. Nearly all of the inundation zone and eastern fill batter was dominated by introduced plant species which provide a close source of propagules that could easily establish or spread into the bushland area.

Of the introduced species recorded some potentially represent a major future threat to the bushland: *Chrysanthemoides monilifera* ssp. *monilifera*, *Lantana camara*, *Pennisetum clandestinum*, *Myrsiphyllum asparagoides* (Bridal Veil Creeper), *Olea europaea* ssp. *africana*, *Ligustrum* spp. (Privets), *Rubus fruticosus* (Blackberry), *Protasparagus aethiopicus* (Fern Asparagus) and *Cotoneaster pannosus*. The last six (6) of these occurred in small numbers at the time of this survey but have the potential to spread through the bushland and replace native species.

It is unclear whether one native species (*Pittosporum undulatum*) is natural to the vicinity. If is naturally-occurring, and not a garden escape, it is likely that periodic fire would have controlled it to individuals or seedlings. In the absence of fire this species could threaten the future viability of species that are dependant on high levels of sunlight, which includes most of the naturally-occurring species on site.

3.4 CONSERVATION SIGNIFICANCE

3.4.1 Plant Community

Cumberland Plain Woodland and Cooks River Clay Plain Scrub Forest are listed in the TSC Act as being endangered ecological communities.

The significance of the bushland on the subject site is enhanced by the contiguous bushland to the north (Taubmans property). The subject bushland similarly adds to the conservation value of the northern bushland.

3.4.2 Plant Species

No species recorded in this or previous surveys has been listed in the TSC Act or by Briggs & Leigh (1995) as being threatened or significant at a national level.



Nine (9) species have been listed by James (1997) as having special significance in Western Sydney (see Table 1). Two (2) of these are considered to be 'regionally significant'.

The mature, long-lived remnant native trees (that is, the eucalypts) are significant elements of the landscaped zones and are representative of the original forest prior to clearing. The small *Acacia parramattensis* stand is not considered to be especially significant.

Some of the larger planted trees have landscape value, in particular, many of the trees near Christina Road that are more than ten (10) metres in height and 300 millimetres stem diameter (eg. some *Eucalyptus citriodora* and *Corymbia maculata*).

Table 1 - Plant species that have conservation significance and are inadequately conserved in Western Sydney

Regionally significant

Dillwynia parvifolia var. *parvifolia*

Suada australis

Vulnerable

Amyema gaudichaudii

Amyema miquelii

Atriplex semibaccata

Dendrophthoe vitellina

Eucalyptus sideroxylon

Melaleuca erubescens

Oxalis perrenans

(Source: James, 1997)

3.5 CONCLUSION AND RECOMMENDATIONS

3.5.1 Environmental Obligations

In most of the site at 2 Christina Road the natural vegetation has been cleared and replaced by introduced ornamental and/or non-indigenous native species. Most of this replacement vegetation comprises trees, large shrubs and turf grasses. Seven (7) mature trees recorded in the landscaped zone were considered to comprise locally indigenous remnant trees from the original bushland of the area (see Figure 4).

Approximately 0.2 hectares of bushland remains at the western boundary of the property. This community is considered to be a composite of Cumberland Plain Woodland, Shale/Gravel Transition Forest and Cooks River Clay Plain Scrub Forest. The first and last of these are endangered plant communities listed in Schedule 3 of the *TSC Act 1995*.

Although no plants were recorded that are listed in the *TSC Act*, two (2) species are considered to have 'regional conservation significance', and another seven (7) species are listed as 'vulnerable' in Western Sydney. All of these species are considered to be inadequately conserved in the region (James, 1997).

The remnant bushland on the site is currently in viable condition, however its long-term viability may be under threat from existing populations of noxious and environmental weeds.



Application of the Eight-Part Test to determine the significance of the potential total loss of the plant community indicated that the loss would be 'significant' in terms of the Environmental Planning & Assessment Act, Section 5A (see Appendix 7).

Should any future use of the site require clearance or other disturbance to the bushland area, it will be necessary to prepare a Species Impact Statement (SIS). Guidelines for the preparation of the SIS must be obtained from the Director General of the NPWS. As the preparation of an SIS is generally expected to take several months, application to the Director General should be made well in advance of any planned clearing/construction works on the site.

The small number of remnant (indigenous trees) on the site and the larger number of mature horticultural specimens planted over time (ex-bushland), are subject to Bankstown Council's Tree Preservation Order. Application to remove or lop any of the mature trees on the Orica Property must be made to Bankstown Council.

The control of noxious weeds on the property (see Appendix 6) is the responsibility of the landholder. As such, all declared noxious weeds present should be eradicated.

3.5.2 Recommendations

Owing to the significant conservation value of the bushland remnant within the property, it is recommended that:

1. The full area of bushland (0.22 ha) be permanently preserved and managed to maintain its conservation values;
2. A Vegetation Management Plan (including management of fire hazard) be prepared and implemented for the bushland sector of the property;
3. Any future remedial works on adjacent land be carried out to have no negative impact on the bushland remnant;
4. No additional stormwater runoff or overland drainage be directed into the ditch adjoining the bushland, and that earthworks on the adjoining remediation land should be contoured to direct water away from the bushland;
5. No fill soil or other material should be deposited or allowed to spill over into the bushland remnant;
6. Noxious weed control should be undertaken within the remnant as a matter of urgency; and that
7. The potential for establishing a Voluntary Conservation Agreement (VCA) with the NPWS should be investigated to allow the bushland to be preserved and effectively managed.

A VCA is a joint agreement between a landholder and the Minister for the Environment which allows the landholder to conserve the natural, cultural and/or scientific values of an area of land. It is intended to provide permanent protection for the special features of an area, and will remain in place if the land is sold or leased.

A VCA would enable the Service to provide assistance for management and enable exemption of land rates for the area covered by the Agreement to be obtained. It is probable that the Service would be more interested in a VCA that included the combined bushland in the subject site and Taubmans property. A VCA can be established at no cost to the landowner, and there are financial benefits to be gained.



Alternatively, consideration could be given to determining whether a reassessment by the Valuer-General's Department would result in a reduction of the potential property value and rates payable, due to the constraint caused by retention of the bushland.

For more information on the opportunities offered by the VCA, please see Appendix 6.

8. It is also recommended that Orica seek grant monies through special state and federal government environmental enhancement programs to support an on-going bush regeneration program (eg. Environmental Trusts, National Heritage Trust).



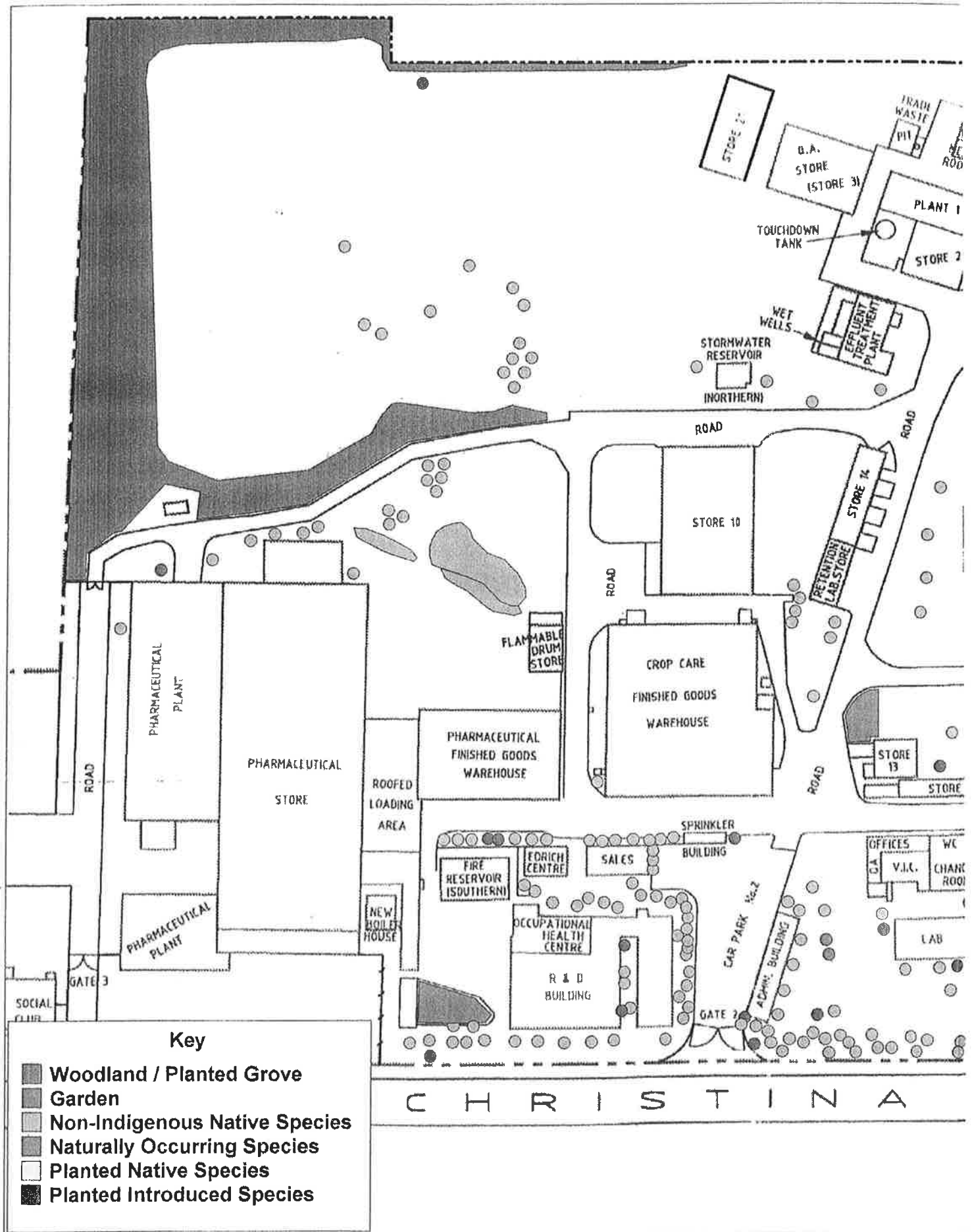
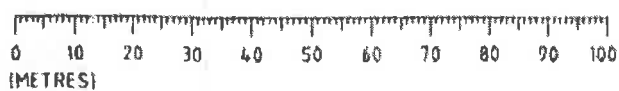


Figure 4
Location of Trees and Gardens



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5.0 APPENDICES



APPENDIX 1: LITERATURE REVIEW

The literature covered in this review discusses the distribution and occurrence of Cumberland Plain Woodland, an 'endangered ecological community' listed under Schedule One (1) of the TSC Act 1995, and its associated plant communities, including the Shale / Gravel Transition Forest.

Author	Publication	Contents and Comments
Baker, M, Corringham, R. and Dark, J.	<i>Native Plants of the Sydney Region.</i> Three Sisters Publications, Winnalee (1986).	This book discusses common plants of the Sydney region, breaking down the Sydney Basin into broad vegetation communities. Woodlands on Shale and Alluvium are discussed, and <i>Acacia pubescens</i> is described. General information is provided on woodlands dominated by <i>Eucalyptus fibrosa</i> .
Benson, D. and Howell, J.	<i>Taken For Granted: the Bushland of Sydney and its Suburbs</i> Kangaroo Press (1990).	Discusses the nature of pre - European Settlement vegetation within the Sydney region, by LGA. While the study site is not noted specifically, larger remnants in the Bankstown LGA are discussed. The Bankstown LGA was considered to be mainly Cumberland Plain Woodland, with occurrences of other variants - notably Grey Box - Ironbark Woodland, with an understorey of shrubs including rare plants such as <i>Acacia pubescens</i> .
Benson, D. and McDougall, L.	<i>Rare Bushland Plants of Western Sydney.</i> Published by Royal Botanic Gardens Sydney, (1991).	Discusses the distribution and occurrence of rare floral species in the Western Sydney region. Each species considered by the author to be regionally significant is listed, and a brief description and sketch provided. <i>Acacia pubescens</i> – a plant considered likely to have once occurred on the Orica site, is discussed.



Author	Publication	Contents and Comments
Benson, D.H.	The natural vegetation of the Penrith 1:100 000 map sheet. <i>Cunninghamia</i> 2 (4): 541-596	The composition and extent of the present natural vegetation of the Penrith 1:100 000 map sheet is mapped, and described in vegetation units. The soil types, and conservation significance, of each community is presented. <i>Study Site</i> The study site conforms to the Map Unit 9d – Transition Forest, although key species – <i>Eucalyptus fibrosa</i> – is now rare on the site. This is found on the reddish, gravely, sandy-clay typical of soils derived from Tertiary alluvium. Open woodland dominated by <i>Melaleuca decora</i>, with occasional trees of <i>Eucalyptus sideroxylon</i>.
Herbert C. (Editor).	Geology of the Sydney 1:100 000 9130 Map Sheet (1983)	Discusses the geological units of the Sydney 1:100 000 Map Sheet. The Bankstown area is dominated by members of the Wianamatta Shale Group. The Wianamatta Shale Group is discussed, and its fertility and popularity for urban development noted. The study site is located on the Ashfield Shales, a sub-unit of the Wianamatta Group. The features of this sub-unit are discussed.
James, T.	<i>Urban Bushland Biodiversity Survey of Western Sydney, Flora Appendices 1.</i> Published by NSW National Parks and Wildlife Service, 1997.	This report details surveys of remnant bushland throughout Western Sydney by Local Government Area (LGA). Discusses the species found to be present, plant communities present, bushland remnants, conservation needs of each LGA and the existing reserve system for each LGA. <i>Study Site</i> The area under study is listed as non-council bushland on tertiary alluvium. Considers the site to be Shale / Gravel Transition Forest, of high state and national conservation significance. The Orica bushland is complemented by a larger (2 ha) area of similar bushland directly north.



**APPENDIX 2 - PLANT SPECIES RECORDED IN BUSHLAND REMNANT AT ORICA PROPERTY,
2 CHRISTINA ROAD, VILLAWOOD**

Plant Community: *Melaleuca decora-Eucalyptus fibrosa* woodland

Trees

Casuarinaceae	<i>Allocasuarina littoralis</i>
Fabaceae	<i>Acacia parramattensis</i>
Myrtaceae	<i>Eucalyptus fibrosa</i> * <i>E. ?saligna</i> <i>E. sideroxylon</i> <i>Melaleuca decora</i>
Oleaceae	* <i>Ligustrum lucidum</i> * <i>Olea europaea</i> ssp. <i>africana</i>
Pittosporaceae	<i>Pittosporum undulatum</i>

Shrubs

Asteraceae	* <i>Chrysanthemoides monilifera</i> spp. <i>monilifera</i> <i>Olearia microphylla</i> <i>Ozothamnus diosmifolius</i>
Dilleniaceae	<i>Hibbertia aspera</i>
Epacridaceae	<i>Astroloma humifusum</i> <i>Lissanthe strigosa</i>
Fabaceae	<i>Daviesia ulicifolia</i> <i>Dillwynia parvifolia</i> <i>D. sieberi</i> <i>Pultenaea villosa</i>
(Mimosoideae)	<i>Acacia falcata</i> <i>A. suaveolens</i>
Malaceae	* <i>Cotoneaster pannosus</i>
Myrtaceae	<i>Callistemon pinifolius</i> <i>Kunzea ambigua</i> <i>Melaleuca erubescens</i> <i>M. nodosa</i>
Oleaceae	* <i>Ligustrum sinense</i>
Pittosporaceae	<i>Bursaria spinosa</i>
Plumbaginaceae	* <i>Plumbago</i> sp. cv.
Rutaceae	<i>Correa reflexa</i>
Sapindaceae	<i>Dodonaea triquetra</i>
Thymeliaceae	<i>Pimelea linifolia</i>
Verbenaceae	* <i>Lantana camara</i>

Herbs

Ferns

Sinopteridaceae	<i>Cheilanthes sieberi</i>
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Dicots

Asteraceae	* <i>Bidens pilosa</i> * <i>Cirsium vulgare</i> * <i>Conyza albida</i> * <i>Hypochaeris radicata</i> * <i>Senecio madagascariensis</i> <i>S. sp.</i> * <i>Sonchus oleraceus</i>
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Chenopodiaceae	Atriplex semibaccata Einadia hastata Suada australis
Goodeniaceae	Goodenia bellidifolia G. hederacea
Lobeliaceae	Pratia purpurascens
Oxalidaceae	Oxalis perrenans
Plantaginaceae	*Plantago lanceolata
Rubiaceae	Opercularia aspera Opercularia ?varia Pomax umbellata
Solanaceae	*Solanum nigrum
Monocots	
Anthericaceae	Laxmannia gracilis
Asparagaceae	*Protasparagus aethiopicum
Cyperaceae	*Cyperus eragrostis Lepidosperma laterale ?Ptilothrix deusta
Juncaceae	*Juncus acutus
Lomandraceae	Lomandra longifolia L. multiflora
Phormiaceae	Dianella revoluta
Poaceae	Aristida ramosa A. vagans *Briza subaristata *Bromus catharticus *Cortaderia selloana *Cynodon dactylon Danthonia sp. Dichelachne micrantha Echinopogon caespitosus Entolasia stricta Eragrostis leptostachya Microlaena stipoides Paspalidium distans *Paspalum dilatatum *Pennisetum clandestinum ?Poa sieberiana *Setaria gracilis Stipa sp. Themeda australis
Vines	
Asclepiadaceae	*Araujia sericifera
Fabaceae	Hardenbergia violacea Kennedia rubicunda
Lauraceae	Cassytha glabella
Rosaceae	*Rubus fruticosus
Asparagaceae	*Myrsiphyllum asparagoides
Mistletoes	
Loranthaceae	Amyema gaudichaudii A. ?miquelii Dendrophthoe vitellina



APPENDIX 3 - TREES IN LANDSCAPED ZONE AT ORICA PROPERTY, VILLAWOOD

(excluding native trees in bushland remnant)

BOTANIC NAME	COMMON NAME	COMMENTS
Naturally Occurring (Remnant) Trees		
<i>Eucalyptus fibrosa</i>	Broad-leaved Ironbark	
<i>Eucalyptus longifolia</i>	Woollybutt	Main stand near laboratory
Planted Native Species (probably non-local provenance)		
<i>Eucalyptus sideroxylon</i>	Mugga Ironbark	
Planted Introduced or Non-Indigenous Native Trees		
<i>Acacia ?baileyana</i>	Cootamundra Wattle	
<i>A. decurrens</i>	Sydney Green Wattle	
<i>A. parramattensis</i>	Parramatta Green Wattle	
<i>A. prominens</i>	Gosford Wattle	
<i>A. saligna</i>	Golden Wreath Wattle	
<i>Callistemon ?harkness</i>		
<i>C. pinifolius</i>	Pine-leaved Bottlebrush	
<i>C. viminalis</i> cv.	Weeping Bottlebrush CV.	
<i>C. sp.</i>	Unidentified Callistemon	
<i>Camellia</i> sp.	Camellia	
<i>Casuarina cunninghamiana</i>	River She-oak	
<i>C. glauca</i>	Swamp She-oak	
<i>Corymbia ficifolia</i>		
<i>C. maculata</i>	Spotted Gum	
<i>Eriobotrya japonica</i>		
<i>Erythrina X sykesii</i>	Indian Coral Tree	
<i>Eucalyptus bicostata</i>	Eurabbie	
<i>E. botryoides</i>	Bangalay	
<i>E. cinerea</i>	Argyle Apple	
<i>E. citriodora</i>	Lemon-scented Gum	2 specimens near front gate
<i>E. crebra</i>	Narrow-leaved Ironbark	
<i>E. elata</i>	River Peppermint	
<i>E. ?grandis/saligna</i>	Flooded Gum / Blue Gum X	Possible hybrid
<i>E. leucoxylon</i>		



Assessment of Remnant Bushland & Tree Survey – Orica Property, Villawood

<i>E. melliodora</i>	Yellow Box	
<i>E. microcorys</i>	Tallowwood	
<i>E. nicholii</i>	Narrow-leaved Black Peppermint	
<i>E. punctata</i>	Grey Gum	
<i>E. robusta</i>	Swamp Mahogany	
<i>E. scoparia</i>		
<i>Hakea salicifolia</i>	Willow-leaved Hakea	
<i>Jacaranda mimosifolia</i>	Jacaranda	
<i>Largerstroemia indica</i>		
<i>Leptospermum polygalifolium</i>		
<i>L. sp.</i>	Unidentified Leptospermum	
<i>Lophostemon confertus</i>	Queensland Brush Box	Major feature of landscaping
<i>Melaleuca armillaris</i>	Bracelet Honeymyrtle	
<i>M. styphelioides</i>	Prickly-leaved Paperbark	
<i>M. quinquenervia</i>	Broead-leafed Paperbark	
<i>M. sp.</i>	Unidentified Melaleuca	
<i>Morus alba</i>	Mulberry	
<i>Notelaea longifolia</i>	Mock Olive	
<i>Olea europea ssp. africana</i>	African Olive	
<i>Pinus radiata</i>	Monterey Pine	
<i>Pittosporum eugenoides</i>		
<i>Toona ciliata</i>	Red Cedar	

NB: Because of their height (> 3m) these trees are protected by Bankstown Council's Tree Preservation Order.

NNB: see Figure 4 for location of significant trees



APPENDIX 4 - KEYSTONE WEEDS SPECIES FOR ORICA BUSHLAND

Botanic Name	Common Name	Status
Woody Weeds:		
<i>Chrysanthemoides monilifera</i> ssp. <i>monilifera</i>	Boneseed	Noxious W3
<i>Cotoneaster pannosus</i>	Cotoneaster	
<i>Lantana camara</i>	Lantana	Noxious W2
<i>Ligustrum lucidum</i>	Large-leaved Privet	
<i>Ligustrum sinense</i>	Small-leaved Privet	
<i>Olea europaea</i> var. <i>africana</i>	African Olive	
<i>Plumbago</i> sp. cv.	Plumbago	
<i>Rubus fruticosus</i>	Blackberry	Noxious W2
Herbaceous Weeds:		
<i>Briza subaristata</i>	Briza / Shivery Grass	
<i>Bromus catharticus</i>	Brome / Oat Grass	
<i>Cirsium vulgare</i>	Spear Thistle	
<i>Cortaderia selloana</i>	Pampas Grass	Noxious W2
<i>Cynodon dactylon</i>	Couch Grass	
<i>Cyperus eragrostis</i>	A sedge	
<i>Hypochoeris radicata</i>	Flatweed	
<i>Juncus acutus</i>	Spiny Rush	
<i>Paspalum dilatatum</i>	Paspalum	
<i>Pennisetum clandestinum</i>	Kikuyu Grass	
<i>Plantago lanceolata</i>	Ribwort	
<i>Setaria gracilis</i>	Pigeon Grass	
<i>Senecio madagascariensis</i>	Fireweed	
<i>Solanum nigrum</i>	Deadly Nightshade	
<i>Sonchus oleraceus</i>	Sow Thistle	
Vines & Scramblers:		
<i>Araujia sericifera</i>	White Moth Plant	
<i>Myrsiphyllum asparagoides</i>	Bridal Creeper	
<i>Protasparagus densiflorus</i>	Ground or Fern Asparagus	



APPENDIX 5: LIST OF NOXIOUS WEEDS DECLARED IN BANKSTOWN LOCAL CONTROL AREA (NOXIOUS WEEDS ACT, 1993)

Category	Action	Botanical Name	Common Name
W1	Private landholders and public authorities must notify the LCA within three days of detecting a W1 noxious weed on their land. Private landholders must fully and continuously suppress and destroy W1 weeds. Public authorities must fully and continuously suppress and destroy W1 weeds which are likely to spread to other land. An LCA must ensure that action is undertaken as soon as possible to fully and continuously suppress and destroy all W1 weeds on private land within its area. Where a W1 weed occurs on private land it is expected that the LCA will either control the weed itself without delay, or direct and supervise the landholder to do so.	<i>Acacia karoo</i> <i>Alternanthera philoxeroides</i> <i>Chromolaena odorata</i> <i>Eichhornia crassipes</i> <i>Equisetum arvense</i> <i>Gymnocoronis spilanthoides</i> <i>Lagarosiphon major</i> <i>Parthenium hysterophorus</i> <i>Pistia stratiotes</i> <i>Salvinia molesta</i>	Karoo Thorn Alligator Weed Siam Weed Water Hyacinth Horsetails Senegal Tea Plant Lagarosiphon Parthenium Water Lettuce Salvinia
W2	Private landholders must fully and continuously suppress and destroy all W2 weeds. Public authorities must fully and continuously suppress and destroy all W2 weeds which are likely to spread to other land. An LCA must fully and continuously suppress and destroy all W2 weeds growing on its land and, ensure that private landholders carry out their duties with regard to W2 weeds.	<i>Cestrum parqui</i> <i>Cortaderia</i> spp. <i>Hypericum perforatum</i> <i>Lantana camara</i> <i>Ludwigia peruviana</i> <i>Lycium ferocissimum</i> <i>Ricinus communis</i> <i>Rubus fruticosus</i> <i>Toxicodendron</i> <i>succedaneum</i>	Green Cestrum Pampas Grass St Johns Wort Lantana Ludwigia/Cape Primrose African Boxthorn Castor Oil Plant Blackberry Rhus Tree



Category	Action	Botanical Name	Common Name
W3	Landholders must prevent the spread and reduce the numbers and distribution of W3 weeds to the satisfaction of the LCA. Public Authorities must prevent the spread and reduce the numbers and distribution of those W3 weeds likely to spread to other land. An LCA must prevent the spread and reduce the numbers and distribution of W3 weeds growing on its own land and, ensure that private landholders carry out their duties with regard to W3 weeds. Shall not be sold, propagated or knowingly distributed. No part of plant can grow within 3m of boundary.	Chrysanthemoides monilifera <i>Parietaria judaica</i>	Bitou Bush/Boneseed Pellitory
W4a	Shall not be sold, propagated or knowingly distributed. No part of plant can grow within 3m of boundary.		
W4b	Shall not be sold, propagated or knowingly distributed. Established plantings must be prevented from flowering and fruiting.		
W4c	Shall not be sold, propagated or knowingly distributed. Occupier must prevent spread to adjoining property.		
W4d	Shall not be sold, propagated or knowingly distributed. Any tree three (3) metres in height or less must be removed. Any tree within half a kilometre (0.5km) of remnant urban bushland, as defined by SEPP 19 and not deemed by Council as having historical or heritage significance shall be removed.		
W4f	Shall not be sold, propagated or knowingly distributed. Occupier must implement biological control or other control program directed by the Local Control Authority.	<i>Harrisia</i> spp. <i>Opuntia</i> spp.	Harrisia cactus Prickly Pears
W4g	Shall not be sold, propagated or knowingly distributed.	<i>Cabomba</i> spp. <i>Salix</i> spp. Other than <i>S. babylonica</i> , <i>S. calodendron</i> , <i>S. x reichardtii</i>	<i>Cabomba</i> Willows other than Weeping Willow, Pussy Willow & a sterile hybrid willow

NB: Declarations as of 1 October 1998
Species occurring within Orica Property at Villawood are bolded.



APPENDIX 6 - VOLUNTARY CONSERVATION AGREEMENTS (NPWS)

A landholder whose property contains populations of significant native plants or animals, rare and endangered species, plant communities or sites of environmental and/or cultural significance, may wish to protect those items in perpetuity by entering into a Voluntary Conservation Agreement (VCA).

A VCA is a joint agreement between a landholder and the Minister for the Environment which allows the landholder to conserve the natural, cultural and/or scientific values of an area of land. It is intended to provide permanent protection for the special features of an area, and will remain in place if the land is sold or leased.

The terms of a VCA are negotiated between the landholder and the NPWS, which works on behalf of the Minister. There are special benefits available to landholders who enter into a VCA, including assistance to meet the cost of fencing, weed and pest control, plant and animal surveys, stabilisation of works on Aboriginal site and historic places, and specialist advice. Landholders may also be eligible for a rates exemption from the Council for the area covered by the VCA. It is not known if Bankstown Council is party to such an agreement with the NPWS at this time.

While there are some 55 VCAs signed and another seven (7) pending in NSW, there are only eight (8) VCAs plus two (2) pending in the Sydney Basin. Of these, eight (8) are at the Farmborough Heights development near Wollongong. T

The NPWS would no doubt be very interested in establishing a VCA in an endangered plant community such as the bushland area at Christina Road, and particularly one in an urban area such as Villawood. The signing of a VCA would also provide an ideal public relations opportunity for Orica and/or any other subsequent owner.

Details relating to the establishment of a VCA, as well as contacts within the NPWS' Environment Protection Unit are available from the district office of the NPWS at Botany Bay National Park.



APPENDIX 7 – APPLICATION OF THE EIGHT PART TEST OF SIGNIFICANCE IN RESPECT OF POTENTIAL TOTAL CLEARANCE OF VEGETATION AT 2 CHRISTINA ROAD, VILLAWOOD

The Eight-Part Test of Significance has been carried out to assess the potential impact of total clearing of the extant bushland at 2 Christina Road. It is understood that as yet, no application to clear the bushland has been made to Bankstown Council.

- a) *"in the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction"*

Not applicable to plant community.

- b) *"in the case of an endangered population, whether the life cycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised"*

Not applicable to plant community

- c) *"in relation to the regional distribution of the habitat of a threatened species, population of ecological community, whether a significant area of known habitat is to be modified or removed"*

The area of bushland is approximately 0.2 hectares. All of this would be lost as bushland.

- d) *"whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community"*

The habitat at the subject site is connected to other bushland at its northern end. Relatively large areas of native tree cover occur in the vicinity but are connected to the subject area only at its northern boundary.

Other fragments of bushland occur in the local area, and each is likely to contribute to the conservation value of the others.

- e) *"whether critical habitat will be affected"*

The area has not been identified by the NPWS as critical habitat.

- f) *"whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region"*

Neither Cumberland Plain Woodland nor Cooks River Clay Plain Scrub Forest is adequately represented in National Parks or other conservation reserves (James, 1997).



Some Cumberland Plain Woodland is conserved in Scheyville National Park. Additional small areas occur in some Council reserves including: Nurrungy, The Crest and Noorumba Reserves (NPWS, 2000).

Tiny amounts of Cooks River Clay Plain Scrub Forest are retained in Council reserves at Norfolk, Duck River and Louisa Reserves.

- g) *"whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process"*

The proposed work has not been listed in the Act as threatening process.

- h) *"whether any species, population or ecological community is at the limit of its known distribution"*

Cumberland Plain Woodland occurs further south in Wollondilly Local Government Area (LGA), further east in Holroyd (LGA), further north in Hawkesbury LGA and west in Penrith LGA.

Cooks River Clay Plain Scrub Forest occurs further south and west in Liverpool LGA, east in Strathfield LGA and north in Auburn LGA.

Conclusion of eight-part test

Owing to the:

- relatively viable condition of the ecological community
- inadequate protection of the community in conservation reserves
- connectivity to bushland at its northern side and proximity to other bushland

it is considered that any impact, such as clearing or direction of urban runoff into the bushland remnant, would be "significant" in terms of the Threatened Species Conservation Act 1995.

