4.3.2 SHALE SANDSTONE TRANSITION FOREST WITHIN THE GROWTH CENTRES

There is a total of approximately 108 ha of Shale Sandstone Transition Forest under the "ABC" criteria within the Growth Centres. There is an additional 202 ha that meets the definition of the "Other" category. The ecological community only occurs in the North West Growth Centre.

Table 13 provides a detailed breakdown of the amount of Shale Sandstone Transition Forest within the North West Growth Centre. These areas are shown in Figure 39.

Table 13: Amount (ha) of Shale Sandstone Transition Forest within the North West Growth Centre

Area	**ABC**	**Other**
Cumberland Plain	9923.1	9429.4
NW Growth Centre	108.1	201.6
SW Growth Centre	0	0
NW Precincts		
Area 20	4.7	4.1
Box Hill	3.1	10.3
Box Hill Industrial	7.2	12.0
North Kellyville	78.0	171.5
Riverstone East	15.1	3.7
Total	**108.1**	**201.6**

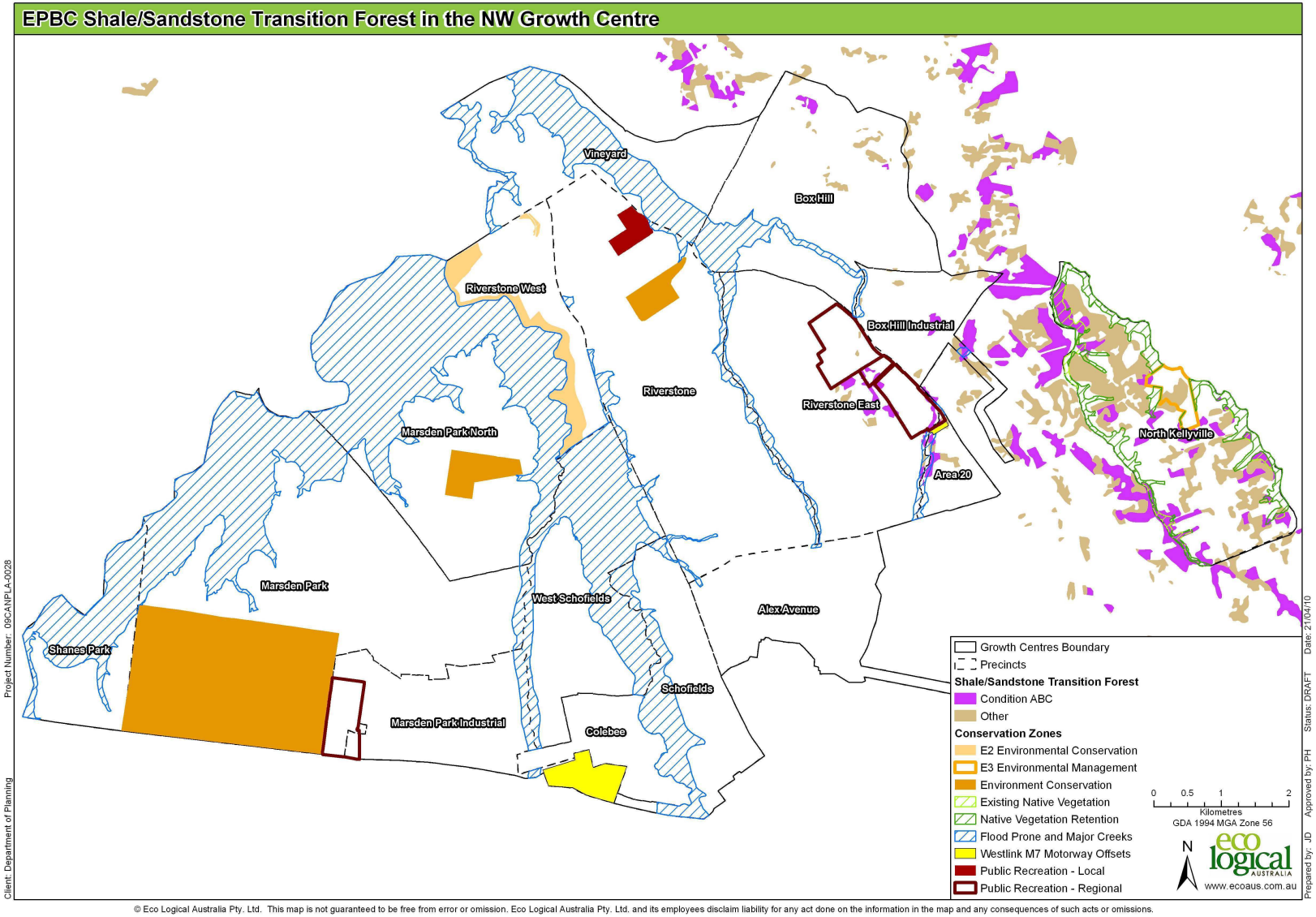

Figure 39: Distribution of Shale Sandstone Transition Forest within the North West Growth Centre.

An assessment of the biodiversity value and ecological viability of the Shale Sandstone Transition Forest within the Growth Centres has been undertaken using the criteria outlined in the introduction to this Section. The results of this assessment are presented in Table 14 and illustrated in

Figure **40**.

Table 14: Amount (ha) of HMV, MMV and LMV of Shale Sandstone Transition Forest within the Growth Centres

Area	Biodiversity Value and Ecological Viability			Total
	HMV	MMV	LMV	
NW Growth Centre	0	34.2	275.5	*309.7*
SW Growth Centre	0	0	0	*0*
North West Precincts				
Area 20	0	0	8.8	*8.8*
Box Hill	0	0	13.4	*13.4*
Box Hill Industrial	0	3.6	15.6	*19.2*
North Kellyville	0	30.5	219.0	*249.5*
Riverstone East	0	0	18.8	*18.8*
Total	0	34.2	275.5	*309.7*

The results of the biodiversity value and viability assessment found that of the 310 ha of extant Shale Sandstone Transition Forest within the Growth Centres, there are no areas of HMV. Approximately 11% of the community within the Growth Centres comprises areas of MMV and 89% comprises areas of LMV.

This analysis demonstrates that the Growth Centres generally represent areas of the listed community with reduced biodiversity value and viability compared with the Cumberland Plain as a whole. That is, while 28% of Shale Sandstone Transition Forest is of HMV across its range, none of the community is of HMV within the North West Growth Centre.

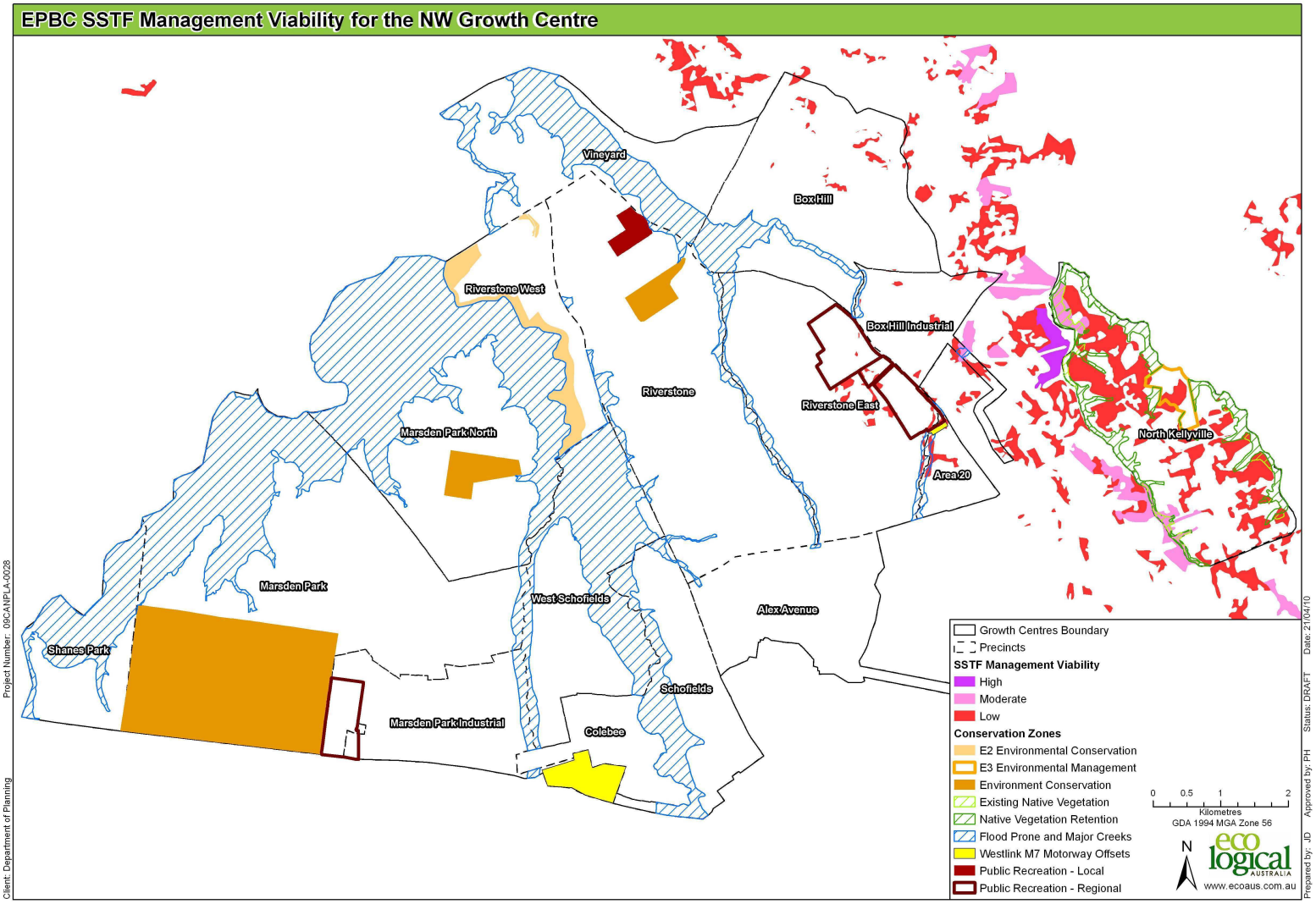

Figure 40: Management viability of Shale Sandstone Transition Forest within the North West Growth Centre

4.3.3 POTENTIAL IMPACTS TO SHALE SANDSTONE TRANSITION FOREST AS A RESULT OF DEVELOPMENT WITHIN THE GROWTH CENTRES

Development within the Growth Centres will lead to the loss of approximately 251 ha of Shale Sandstone Transition Forest. This loss comprises approximately 66 ha (or 61%) of "ABC" category vegetation and 185 ha (or 92%) of "Other". In terms of management viability, this loss equates to approximately 34% of MMV and 87% of LMV.

Potential impacts to the Shale Sandstone Transition Forest also need to be considered for areas that fall outside of the certified lands within the Growth Centres. These areas include:

- the lands identified as flood prone and major creeks land; and
- the relevant conservation zones defined in the Growth Centres SEPP, including the Public Recreation – Regional zone and the additional conservation zones and vegetation retention areas determined through detailed precinct planning of North Kellyville.

FLOOD PRONE AND MAJOR CREEKS LAND

Shale Sandstone Transition Forest is afforded protection within the areas identified as flood prone and major creeks land through the vegetation controls outlined in the Growth Centres SEPP. These controls ensure that direct impacts to the listed community will be minimised. However, there are a number of potential indirect impacts to the community which need to be considered.

In general, urban development has the potential to impact adjoining areas of bushland through various edge effects such as:

- the introduction of weeds and exotic species;
- the spread of rubbish;
- introduction of domestic animals (cats and dogs);
- increased disturbance from pedestrian access;
- runoff from construction containing nutrients, sediments and other pollutants; and
- inappropriate water, sewer and stormwater management leading to erosion.

The scale of these potential indirect impacts is expected to be minor as only a small amount of the listed community occurs within these areas.

CONSERVATION ZONES

The areas of Shale Sandstone Transition Forest that occur within the conservation zones defined through the Growth Centres SEPP and through the detailed precinct planning of North Kellyville will be managed for the retention of the listed community. Areas that are zoned through the detailed precinct planning are generally likely to remain in private ownership. Development controls relating to the removal of native vegetation and a limited range of permissible land uses in these areas will protect the conservation values. Direct impacts to the listed community will therefore be avoided within these areas. However, the same potential indirect impacts to the community as those outlined for the flood prone and major creeks land and the transitional land need to be considered.

The Program has incorporated a range of mitigation and management measures to ensure that these potential indirect impacts are adequately managed. These measures are detailed in Section 4.3.4.

4.3.4 PROPOSED MEASURES TO PREVENT, MITIGATE AND MANAGE POTENTIAL IMPACTS TO SHALE SANDSTONE TRANSITION FOREST

The key measure used to prevent, mitigate and manage potential impacts to Shale Sandstone Transition Forest involves the retention and protection of substantial areas of the community with the greatest biodiversity value and ecological viability.

Approximately 59 ha of Shale Sandstone Transition Forest will be retained within the Growth Centres. This includes 42 ha (or 39%) of "ABC" and 17 ha (or 8%) of "Other".

In terms of management viability, there is no vegetation categorised as HMV within the Growth Centres. Approximately 66% of MMV and 13% of LMV vegetation will be retained (Table 15).

Table 15: Amount of Shale Sandstone Transition Forest to be retained within the Growth Centres

Area	Biodiversity Value and Ecological Viability			Total
	HMV	MMV	LMV	
NW Growth Centre	0	22.7	36.0	*58.7*
SW Growth Centre	0	0	0	*0*
North West				
Flood Prone Land	0	1.2	4.4	*5.6*
Public Recreation - Regional	0	0	5.6	*5.6*
M7 Westlink Motorway Offsets	0	0	0.6	*0.6*
Detailed Zonings - North Kellyville	0	21.5	25.4	*46.9*
Total	0	*22.7*	*36.0*	*58.7*

The Program provides for varying levels of protection for these areas. Retention of Shale Sandstone Transition Forest is provided for through the zoning and development controls outlined in the Growth Centres SEPP and through the proposed acquisition and management of lands zoned for Public Recreation - Regional.

The majority of retained vegetation occurs within lands within the North Kellyville Precinct which have been zoned as E3 Environmental Management and to which "Existing Native Vegetation" and "Native Vegetation Retention" controls apply.

The area retained within the flood prone lands offers moderate protection, yet is still subject to some level of development impacts and potential indirect impacts. Flood prone lands will support limited development. The vast majority of vegetation in these lands will be retained.

E3 ENVIRONMENTAL MANAGEMENT ZONE

Land within this zone will generally remain in private ownership. Any development will need to be consistent with the following objectives:

- *to protect, manage and restore areas with special, ecological, scientific, cultural or aesthetic values; and*

- *to provide for a limited range of development that does not have an adverse effect on those values* (North Kellyville Precinct Plan).

Under the Growth Centres SEPP, development within this zone must not result in the clearing of any native vegetation and must be consistent with the North Kellyville Environmental Management Plan.

EXISTING NATIVE VEGETATION AREAS

Land within these areas will generally remain in private ownership. These areas include the existing native vegetation identified under the Growth Centres Biodiversity Certification. The objective for these areas is to manage existing native vegetation in accordance with the Relevant Biodiversity Measures. The controls require that the consent authority must be satisfied that any development within these areas will not result in the clearing of any native vegetation.

NATIVE VEGETATION RETENTION AREAS

Land within these areas will generally remain in private ownership. These areas include remnant native vegetation that is considered to be of conservation value, but are not identified under the Growth Centres Biodiversity Certification. The objective for this area is to prevent the clearing of native vegetation. Prior to granting consent, the consent authority must be satisfied that the proposed impact on native vegetation is minimised and any loss is compensated to avoid any net loss.

4.3.5 PROPOSAL TO OFFSET POTENTIAL IMPACTS TO SHALE SANDSTONE TRANSITION FOREST

There will be residual impacts to Shale Sandstone Transition Forest as a result of development within the Growth Centres. The key impact relates to the loss of approximately 66 ha of the community under the “ABC” criteria, none of which equates to HMV.

The Program provides for a $530 million (in 2005/06 dollars) Conservation Fund to protect high conservation value areas both within and outside the Growth Centres. 75% ($397.5 million in 2005/06 dollars) will be spent acquiring high quality vegetation remnants with similar ecological values outside the Growth Centres. 70% of the $397.5 million (in 2005/06 dollars) will be prioritised to secure the conservation of matters listed under the EPBC Act. As a first preference, these funds will be directed towards identified priority lands across the Cumberland Plain (shown in Figure 29 and Figure 30).

A conservation outcome has already been secured over 33 ha of Shale Sandstone Transition Forest using the Growth Centres Offset Program. This has been secured through a biobanking agreement over the St Marys Towers site (Refer to the case study in section 4.3 of the draft Program Report).

As outlined in section 4.2.5 in relation to Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest, there are a number of issues constraining the potential purchase of properties on the Cumberland Plain for the purpose of biodiversity offsets.

However, Shale Sandstone Transition Forest occurs on poorer soils around the fringe of the Cumberland Plain. This area is less fragmented and less disturbed than Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest. This suggests that there is a better prognosis for obtaining suitable offsets than for Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest. Further, some of the properties under consideration for the conservation of Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest also support areas of Shale Sandstone Transition Forest.

There are good prospects for fully offsetting the loss of 66 ha of "ABC" category Shale Sandstone Transition Forest at a ratio of 2:1 with areas of Shale Sandstone Transition Forest in good condition across the Cumberland Plain. The NSW Government will make every effort to ensure the protection of at least 132 ha for Shale Sandstone Transition Forest outside of the Growth Centres within the combined area of the Sydney Basin Bioregion (IBRA v6.1) and the Hawkesbury Nepean Catchment Management Authority Area.

4.3.6 CONSERVATION OUTCOME FOR SHALE SANDSTONE TRANSITION FOREST

There is a total of approximately 108 ha of Shale Sandstone Transition Forest under the "ABC" criteria within the Growth Centres. There is an additional 202 ha that meets the definition of the "Other" vegetation category, which is considered to have no long-term management viability. The community only occurs in the North West Growth Centre.

There are no areas of HMV within the Growth Centres. Approximately 11% of the community within the Growth Centres comprises areas of MMV and 89% comprises areas of LMV.

Development within the certified lands of the Growth Centres will lead to the loss of approximately 251 ha of Shale Sandstone Transition Forest. This loss comprises approximately 66 ha (or 61%) of "ABC" category vegetation and 185 ha (or 92%) of "Other". In terms of management viability, this loss equates to approximately 34% of MMV and 87% of LMV.

Approximately 59 ha of Shale Sandstone Transition Forest will be retained within the Growth Centres. This includes 42 ha (or 39%) of "ABC" and 17 ha (or 8%) of "Other". In terms of management viability, approximately 66% of MMV and 13% of LMV vegetation will be retained.

The majority of retained vegetation occurs within areas of the North Kellyville Precinct which have been zoned as E3 Environmental Management, as well as those lands to which "Existing Native Vegetation" and "Native Vegetation Retention" controls apply. Shale Sandstone Transition Forest is afforded some protection within these areas to ensure that direct impacts to the listed community will be minimised. However, there are a number of potential indirect impacts to the community which need to be considered.

There will be residual impacts to Shale Sandstone Transition Forest as a result of development within the Growth Centres. For this reason, a component of the Growth Centres Offset Program funding will be allocated to offset the loss of 66 ha of "ABC" category vegetation at a ratio of 2:1. The NSW Government will make every effort to ensure the protection of at least 132 ha for Shale Sandstone Transition Forest.

CONSISTENCY WITH THE DRAFT CUMBERLAND PLAIN RECOVERY PLAN

There is currently a draft recovery plan for the Cumberland Plain (DECCW 2009b) which addresses the EPBC listed Shale Sandstone Transition Forest community as a component of the threatened biodiversity on the Cumberland Plain.

The conservation activities and outcomes for this community that will occur as a consequence of the Program are not inconsistent with this draft recovery plan. The Program will make a substantial contribution to the delivery of the proposed recovery objectives of the Plan, "*to build a protected area network, comprising public and private lands, focused on the identified priority conservation lands."*

4.4 TURPENTINE IRONBARK FOREST IN THE SYDNEY BASIN BIOREGION

4.4.1 ECOLOGICAL COMMUNITY DESCRIPTION

Turpentine Ironbark Forest in the Sydney Basin Bioregion is listed as a critically endangered ecological community under the EPBC Act.

Turpentine Ironbark Forest is predominantly associated with the Cumberland Plain although some remnants occur to the west on shale-capped ridges in the Blue Mountains. It is restricted to areas with clay soil derived from Wianamatta shale, including clay lenses of Wianamatta shale within Hawkesbury sandstone, in moderately wet areas that generally experience annual rainfall of more 800 – 1100 mm (DEWHA 2010, DEH 2005, Threatened Species Scientific Committee 2005) but remnant patches do occur in areas receiving rainfall outside of this range (Ryan et al, 1996). The ecological community less commonly occurs on transitional areas between soils derived from Wianamatta shale and Hawkesbury sandstone, or on soils derived from Holocene alluvium or the Mittagong formation. As the parent geology is confined to the Sydney Basin Bioregion, this ecological community can only be found in this area (Threatened Species Scientific Committee 2005).

The forest has several vegetation layers in its undisturbed state, and the community structure can be described as a medium height open forest with a lower tree layer, an open low shrub layer and prominent ground layer. The tree canopy is dominated by Turpentine and a variety of eucalypt species, depending on location in the landscape. Smaller trees and shrubs grow underneath the tree canopy and the groundcover is a mix of herbs and grasses (DEH 2005). The Commonwealth Listing Advice (Threatened Species Scientific Committee 2005) describes the characteristic plant species for the community:

- Tree canopy: Turpentine (*Syncarpia glomulifera*) and Ironbarks (*Eucalyptus* spp) are dominant. Turpentine occurs throughout the ecological community but the associated tree species varies with local abiotic conditions. Grey Ironbark (*Eucalyptus paniculata*), Narrow-leaved Ironbark (*E. crebra*), Red Ironbark (*E. fibrosa*), and Grey Gum (*E. punctata*) are common tree species in the Cumberland Plain. On the plateaux shale caps, Grey Ironbark and Mountain Mahogany (*E. notabilis*) may become common in association with Turpentine. At the upper end of its rainfall/elevation range Turpentine Ironbark Forest may be dominated by Blue Gum (*E. saligna*), Mountain Grey Gum *(E. cypellocarpa*), Round-leaved Gum (*E. deanei*) or Grey Gum (NPWS 2002a, Tozer, 2003).

- Midstorey: A stratum of small trees may occur, including Sweet Pittosporum (*Pittosporum undulatum*), Native Peach (*Trema aspera*), and Parramatta Wattle (*Acacia parramattensis*). Where present, a shrub layer may include Elderberry Panax (*Polyscias sambucifolia*), Mock Olive (*Notelaea longifolia*), Prickly Beard-heath (*Leucopogon juniperinus*), Rough-fruit Pittosporum (*P. revolutum*), Breynia (*Breynia oblongifolia*), Narrow-leaved Orangebark (*Maytenus silvestris*) and White Dogwood (*Ozothamnus diosmifolius*).

- Ground layer: Where present in its natural state, the ground layer may include Basket Grass (*Oplismenus aemulus*), Pastel Flower (*Pseuderanthemum variabile*), Forest Hedgehog-grass (*Echinopogon ovatus*) Weeping Grass (*Microlaena stipoides*) and Kangaroo Grass (*Themeda triandra*).

The species composition of Turpentine Ironbark Forest at any given site will vary with factors such as the site area and past history of disturbance (including time since fire and fire frequency). Forest that has not been burnt for an extended period may have a dense understorey (NSW Scientific Committee 1998b). Vascular plant species that are absent from the above-ground vegetation may be present below the ground as part of the soil seed bank (NSW Scientific Committee 1998b, 2000). The plant species present at any one area will also be affected by geographic location, local conditions such as topography, rainfall and exposure (NSW Scientific Committee 1998b, 2000).

It is important to note that the EPBC listed ecological community is limited to remnants that are relatively intact and in good condition, as outlined below:

- The vegetation contains some characteristic components from all structural layers (tree canopy, small tree/shrub midstorey, and understorey).
- Tree canopy cover is greater than 10% and remnant size is greater than one hectare. These areas have the greatest conservation value and their high quality and size makes them most resilient to disturbance.
- However, remnants with tree canopy cover less than 10% are also included in the ecological community, if the fragments are greater than one hectare in size and occur in areas of native vegetation in excess of 5 ha in area. These areas enhance the potential for connectivity and viability of the ecological community. They support native flora and fauna species by facilitating gene flow among remnants and buffering against disturbance.

The ecological community excludes patches where either the native midstorey/understorey or native canopy trees are absent. Occurrences of isolated single trees or shrubs characteristic of the ecological community also are excluded from the ecological community. Although these degraded remnants may have some value as biodiversity reservoirs, the structure of these patches has been so severely modified, that they fall outside the definition of the ecological community.

The type 1 patches have the greatest conservation value and their size and high quality generally make them most resilient to disturbance. The type 2 patches enhance the potential for connectivity and the viability of the ecological community, act as a buffer against disturbance and support gene flow in the plant and animal species associated with the listed ecological community (Threatened Species Scientific Committee 2005).

Occurrences of Turpentine-Ironbark Forest that do not meet the above criteria, although not part of the listed ecological community, still have conservation values as biodiversity reservoirs (including of local genotypes), faunal corridors etc (Threatened Species Scientific Committee 2005).

RELATIONSHIP TO THE NSW LISTING OF THE COMMUNITY

The EPBC definition of the community generally corresponds to two threatened ecological communities listed under the NSW TSC Act). These are the “Sydney Turpentine Ironbark Forest” and the “Blue Mountains Shale Cap Forest”. Both communities are listed as endangered under the NSW TSC Act. Only the Sydney Turpentine Ironbark Forest ecological community occurs within the Growth Centres.

The floristic composition of the EPBC and NSW listings is the same. For this reason, the research undertaken in relation to the NSW listed communities is generally applicable to the EPBC listed community. However, the EPBC and NSW listings diverge in the application of condition thresholds, and these differences have led to a need to adapt some of the existing NSW information.

The Turpentine Ironbark Forest ecological community listed under the EPBC Act is narrower in scope than the Sydney Turpentine Ironbark Forest and Blue Mountains Shale Cap Forest communities listed under the NSW TSC Act. The EPBC listing only includes remnant patches that meet specific condition criteria, including patch size and canopy cover (as described above). The NSW listings include all remnants irrespective of patch size or condition (DEWHA 2010).

Throughout its range, the Turpentine-Ironbark Forest of the Sydney Basin Bioregion may intergrade with the Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest that occupies drier areas, Shale Sandstone Transition Forest where the soil intergrades from shale to sandstone, or Blue Gum High Forest that abuts the higher rainfall ridges. The area of transition (ecotone) between ecological communities is dependent on the transition from one soil type to another. Where the soils change abruptly, there may be no intergradation between adjacent ecological communities. In ecotones, the vegetation can be considered a part of the Turpentine-Ironbark Forest of the Sydney Basin Bioregion where a majority of the species are characteristic of this ecological community (Threatened Species Scientific Committee 2005).

APPROACH USED TO MAP THE COMMUNITY ACROSS THE CUMBERLAND PLAIN

The NSW Department of Environment, Climate Change and Water (DECCW) have gathered a substantial amount of data over the last 12 years which they have used to map the distribution and extent of native vegetation across the Cumberland Plain. This data has been used to identify the ecological community within the Growth Centres.

THREATS TO THE COMMUNITY AND CURRENT DISTRIBUTION ACROSS THE CUMBERLAND PLAIN

The soil on which the ecological community is found is of relatively higher fertility than the sandy soils derived from the Hawkesbury sandstone. For this reason, Turpentine Ironbark Forest has historically been selectively and intensively cleared for agriculture and urban development. Past and current management practices have resulted in the clearing and fragmentation of a considerable portion of the original distribution of Turpentine Ironbark Forest. Remnants are now dispersed, disjunct and generally small, existing as isolated patches within a developed urban or peri-urban environment. The structure of the ecological community has also become modified from that of the original forest with native understorey (Threatened Species Scientific Committee 2005). Most patches of higher quality vegetation are less than 5 ha in area, and those with a high perimeter to area ratio are susceptible to invasion by weeds (Tozer 2003).

Removal of each structural layer from the native vegetation significantly alters the structural integrity of the forest and also reduces the available habitat for native flora and fauna. Loss of understorey integrity reduces the ability of canopy tree species to regenerate. Without recruitment of canopy species into the ecological community, the existing tree canopies will eventually senesce without replacement. The loss of structural layers has a significant negative impact on the biodiversity of remnants and their ability to continue functioning as a viable forest. The end result would be degradation of existing patches, leading to the eventual loss of the ecological community from these areas (Threatened Species Scientific Committee 2005).

The modelled pre-1750 extent of Turpentine-Ironbark Forest on the Cumberland Plain is 30,339 ha (Tozer 2003). In 1997, only 1,183 ha (i.e. 3.9% of the original) remained on the Cumberland Plain, predominantly either as patches 0.5 ha or more in area with a crown cover equal to or exceeding 10%, or as patches 5 ha or more in area and with a crown cover of less than 10%. Occurrences of the community in margin areas of the lowlands (i.e. on the margin of the Cumberland Plain in higher rainfall areas near the sandstone/shale boundary) have been less severely depleted (7.3% of modelled pre-

1750 vegetation extant in 1997) than occurrences in non-margin areas there (1.4% of modelled pre-1750 vegetation extant in 1997) (Tozer 2003). No estimate has been provided for the extent of clearing of Turpentine Ironbark Forest on shale soils in the Blue Mountains, however it is considered likely that it has undergone a similar decline in extent (Threatened Species Scientific Committee 2005).

The estimated total extent of the Turpentine Ironbark Forest (that met the EPBC criteria) that remained in 2005 was 2,495 ha (Threatened Species Scientific Committee 2005). This included remnants on the Cumberland Plain and in the Blue Mountains. Less than 5% of the original forest remains intact and retains its structural integrity. Existing remnants continue to be threatened by clearing and weed invasion.

Currently there remains a total of 5,385 ha of Turpentine Ironbark Forest on the Cumberland Plain including 1,070 ha that meets the definition of the community under the EPBC Act.

Remnant patches of the community occur in the local government areas of Auburn, Bankstown, , Blue Mountains, Campbelltown, Canada Bay, Canterbury, Concord, Hawkesbury, Hills Shire, Hornsby, Kogarah, Ku-ring-gai, Lane Cove, Liverpool, Parramatta, Penrith, Ryde, Sutherland, Wingecarribee, Wollongong and Wollondilly (Threatened Species Scientific Committee 2005, DEWHA 2010).

Ongoing pressure for urban development on the Cumberland Plain, including increased housing density, new developments in peri-urban centres, and associated infrastructure such as roads and utilities, may result in the clearing of remnant patches of Turpentine Ironbark Forest (Threatened Species Scientific Committee 2005). This in turn can lead to an overall loss of floristic diversity (Tozer 2003) and to increased fragmentation.

Many of the threats to Turpentine Ironbark Forest in urban areas relate to the juxtaposition of the remnants with intensively disturbed and built over land and often arise from activities on these adjoining areas (Tozer 2003). The main threats to Turpentine Ironbark Forest on the Cumberland Plain are considered to be clearing for development, grazing, mowing, increased nutrient loads, weed invasion (including dispersal through stormwater and dumped garden refuse), pollution, rubbish dumping, physical damage through recreation activities and inappropriate fire regimes, leading to the loss of species and changes to community structure (NSW Scientific Committee 1998b and 2000, Tozer 2003, NPWS 2004b; Threatened Species Scientific Committee 2005). Salinity is a potential added threat in Western Sydney (DEC 2005p).

Nutrient-enriched runoff, changed fire regimes and changed water regimes facilitate weed invasion of remnant patches of Turpentine-Ironbark Forest (Tozer 2003). Remnants with a high perimeter to area ratio have a high risk of invasion (Tozer 2003). In the absence of natural bushfire regimes, the native plant Sweet Pittosporum (*Pittosporum undulatum*) can become dominant in the understorey, with adverse impacts on other native plant species, and thus may need to be controlled (DECC 2008c).

Other threats to the ecological community, such as lack of genetic diversity in remnants, invasion by feral and domestic animals and increased effect of wind damage are also typical of small remnants surrounded by an agricultural and urban matrix (Threatened Species Scientific Committee 2005).

Only 220 ha, or 8.8% of the current extent, of this ecological community is protected in conservation reserves. Consequently, a majority of this ecological community is subject to demonstrable and ongoing threats (Threatened Species Scientific Committee 2005).

4.4.2 TURPENTINE IRONBARK FOREST WITHIN THE GROWTH CENTRES

There is one small patch of Turpentine Ironbark Forest within the Growth Centres (see Figure 41). This patch occurs in the North Kellyville Precinct and consists of 2.2 ha. There are no further records of the ecological community within the Growth Centres.

4.4.3 POTENTIAL IMPACTS TO TURPENTINE IRONBARK FOREST AS A RESULT OF DEVELOPMENT WITHIN THE GROWTH CENTRES

All of the 2.2 ha of Turpentine Ironbark Forest within the Growth Centres occurs within the certified areas and is therefore expected to be lost. This loss represents approximately 0.26 % of the community within the Cumberland Plain that meets the definition under the EPBC Act, or 0.05 % of the community within the Cumberland Plain when considering all vegetation categories (including remnants outside of the EPBC Act definition).

Using the viability assessment methodology applied for the other two ecological communities, this patch of Turpentine Ironbark Forest is classified as having low long-term management viability due primarily to its small size. Furthermore, this patch has been recorded as being isolated, invaded by weeds and surrounded by residential and agricultural development (Cumberland Ecology 2007).

Given the size of the patch to be cleared and its low long-term management viability, impacts as a result of the Program are expected to be low. As such, mitigation and offset measures specifically targeting Turpentine Ironbark Forest are not considered necessary.

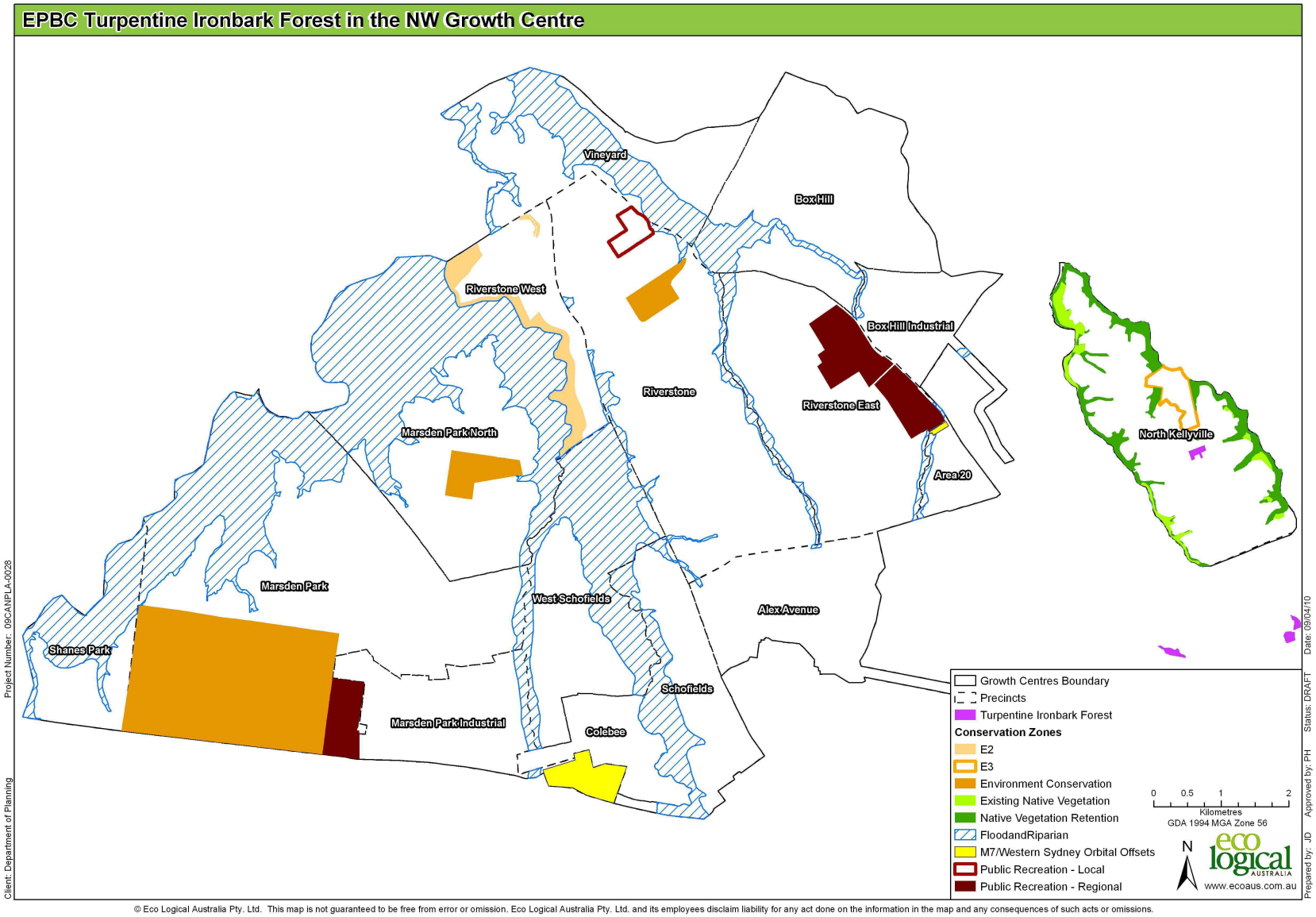

Figure 41: Distribution of Turpentine Ironbark Forest surrounding the North West Growth Centre.