The predominant trip patterns generated by the proposed Area E development are likely to occur in a north-south direction, with activity centres at Tweed Heads, Coolangatta and Broadbeach and Southport to be key destinations. Destinations south of Area E, such as Murwillumbah are likely to be secondary to those in the north. In this regard, the link from Area E to the Pacific Highway, which is the main arterial link providing north-south access along the North Coast, is essential for future viability of transport and access for the proposed development.

There are currently four possible access routes between Area E and activity centres to the north-east, which are shown in Figure 3.33.All existing routes are two-lane, two-way rural roads. Analysis of existing mid-block traffic volumes on these access routes showed that these routes currently operate well within capacity, with the exception of the section of Terranora Road between Kiora Street and the Pacific Highway, which currently has a volume capacity ratio of 60%.

Traffic generation of the fully developed Area E proposal was estimated to be 16,000 daily trips and 1,500 trips in the peak hour.

Analysis of the impact of the additional traffic volume generated by Area E on the surrounding network showed that in most cases the various routes would likely have sufficient mid-block capacity to accommodate these future traffic volumes. Notwithstanding, future road network upgrades would be favoured to reduce traffic impacts associated with the development of Area E.

There are a number of proposed road improvements, either in planning or current construction, to accommodate the future growth in traffic volumes, to serve the general area including Area E, particularly:

- duplication of Fraser Drive (Leisure Drive to Amaroo Drive and Vintage Lakes Drive to Kirkwood);
- Kirkwood Road /Pacific Highway interchange;
- Extension of Kirkwood Road to Minjungbal Drive; and
- Duplication of Leisure Drive.

Some of these improvements are required regardless of whether Area E develops.

Studies and modelling undertaken for Tweed Shire Council (Veitch Lister Consulting Pty Ltd, 2003) indicate that the development of Area E would add reasonably significant volumes to the secondary road network in the South Tweed Heads / Banora Point area. Despite this, the majority of these impacts are capable of being sustained by the local network, as exists or is planned.

The impacts of Area E on the strategic road network will be small, relative to the future base volumes and conditions. Any improvements which address the forecast base conditions should be capable of handling the additional impacts of Area E.

With respect to intersections from Area E, analysis shows the existing intersection of Maher's lane and Terranora Road should be able to operate without any additional changes.

The proposed external intersection of Area E with Terranora Road to the south of the site should be set up as and Austroads "Type B" intersection.

The proposed internal intersection of Area E internal road and the Maher's lane extension may operate as an Austroads "Type A" intersection, unless line of site issues are a factor, in which case a "Type B" should be built.

The proposed 4-way intersection at the current 3-way intersection of Amaroo Drive and Fraser Drive operationally works best as a roundabout. However, a signalised intersection will also work, with a smaller "design footprint" (Less pavement and island construction". Notwithstanding, given the operational advantages of the roundabout option over the signalised option the roundabout option is therefore considered to be the preferred option.

From the analyses of the 2 different route variations, which may be susceptible to "rat-running", the Amaroo Drive, Darlington Drive (south) and Banora Hills Drive to access Terranora Road seems unlikely to attract additional through traffic due to existing speed bumps and the steepness of Banora Hills Drive. However, it is recommended that consideration be given to further more detailed investigations to determine whether LATM treatments are suitable or required for this route.

Amaroo Drive and Darlington Drive (north) to access Leisure Drive however would appear to be an attractive route, and various means of managing traffic flow through this route should be further investigated. Various LATM options may be considered for this route, e.g. horizontal displacement devices and supporting signage. However, it is likely that any LATM treatments will require the input from the local community, in particular the residents situated along the "rat run" route, to determine if they will support the implementation of LATM treatments through their streets.

Development would be expected to contribute to the upgrading of road networks within the area in accordance with the Tweed Road Contribution Plan 2003 (as amended) which would be in the order of $5,342 per detached housing lot. However, it should be noted that this contribution does not include intersection upgrade costs at Fraser Drive and Terranora Road or the potential need for traffic calming on the adjoining local road network. Further investigations are required to establish the potential costs associated with these likely future improvements.

Within Area E a movement network will be able to be developed in accordance with the requirements set out in DCP 16 which includes road, bikeways, pedestrian ways and public transport routes. This will require the ultimate movement network design to take into account the physical and other constraints of the site as well as integration into the surrounding area.

3.9 Agricultural lands

The long-term use of Area E for agriculture has been in question for some time. Since the late 1980s, the land has been identified as an 'investigation area' (Area E) for potential residential expansion due to favourable topography, proximity to other urban areas and favourable surrounding land use (TSC, 1987). The Draft Interim Strategic Plan – Cobaki/Bilambil Heights/Terranora (TSC, 1995) also confirmed this potential by identifying limitations to cropping of the land and the erosion of any locational advantages of Area E.

NSW Agriculture has previously identified in correspondence (10 February 1995) to previous consultants dealing with the site, that it will not oppose the rezoning of lands adjoining Mahers Lane providing that it goes to a residential zoning. This correspondence indicates that the provision of Lindisfarne School within the centre of the agricultural land has created a significant point of conflict between uses.

Similarly, previous studies (Wilkie Fleming and Associates, 1994) indicate that the intrusion and encroachment by urban development, the need to employ a high level of technology to maintain productivity, the limitations placed on farming practices (by both surrounding uses and the physical constraints of the land for agricultural production) and the loss of market advantages through improved transport for other areas, has undermined the long-term viability of these lands for agricultural production.

Based on the history of this site, the continued long-term use for agriculture is in question. In order to draw conclusions on the long term viability of the land, this study has reviewed the following matters which are fundamental to Area E's future:

- agricultural land classes;
- biophysical limitations;
- land use trends;
- agricultural land use conflicts;
- farming returns; and
- sustainable farming indicators.

This study has been undertaken within the current and historical planning context for Area E and with regard to the efficient use of this land for urban purposes as opposed to other lands and settlement forms (e.g. rural residential) in other parts of the Shire.

The methodology used in preparing this assessment of agricultural matters (as part of the preparation of a Local Environmental Study and draft LEP amendment for Area E comprehensive planning framework), is itemised below:

- review of Council and NSW Agriculture's documentation relating to agricultural protection generally and to the site specifically, to ascertain current policy and expectations for agriculture in the area;
- discussion with the Agricultural Environmental Officer from NSW Agriculture, to verify this agency's current position and to identify any outstanding matters that need to be addressed in relation to the change of land use from agriculture to urban; and
- site visit site and photography of current land use activities both within Area E and on adjacent holdings to allow an assessment of land use options and potential conflicts.

3.9.1 Zoning

Area E comprises approximately 297 ha with the majority of land included in the 1(b1) Agricultural Protection Zone under the Tweed LEP 2000. This zoning is reflective of the land's general agricultural values, excepting the land in the 1(c) Zone. However, within this area, 52.3ha has been readily accepted by NSW Agriculture and Tweed Shire as not being suitable for the zoning, being a low-lying wetland area, which is also included in SEPP 14.

The remaining 245ha contain a range of Agricultural Land Suitability Classes (NSW Agriculture, 1998) as indicated in Table 3.43 nd Figure 3.37

3.9.2 North Coast Regional Environmental Plan

The North Coast Regional Environmental Plan (DUAP, 2001) includes specific provision relating to how prime crop or pasture land should be dealt with in the preparation of a Local Environmental Plan, viz:

> *"7 Plan preparation: prime crop or pasture land*

A draft local environmental plan applying to prime crop or pasture land should:

a identify and include land in an agricultural protection zone and contain provisions that:

(i) prevent the subdivision of land within the zone for purposes other than commercial farming,

(ii) set minimum allotment sizes which maintain the concept of a minimum area capable of efficient, sustainable agricultural production in the long term,

(iii) separate land zoned for residential use from land zoned or used for agricultural use or for intensive animal industries, and

(iv) prohibit development which is incompatible with the objectives of this Division, and

(v) rezone prime crop or pasture land for purposes other than agricultural only after a detailed analysis of the agricultural capability of the land and adjoining land has been carried out, and

b in relation to any prime crop or pasture land not identified and included in an agricultural protection zone in paragraph (a):

(i) include provisions that retain the land for commercial farming purposes, and

(ii) set minimum lot sizes which are sufficient to maintain commercial farming in the long term."

Of these provisions, Clause 7 (v) is relevant to this study as Area E contains prime crop land. The following sections address this clause.

3.9.3 TSC Strategic Plan (1996)

The Tweed Shire Strategic Plan (1996) contains a number of clauses relating to the future use of the Terranora Area E including:

"Clause 117 .....limiting (urban) development of Area E to the north facing slope of the Terranora Ridge, so the southern face remains as a forested backdrop to the Tweed River and agricultural land.

Clause 122..... Subject to meeting other strategic requirements for integrated planning, the detailed local area planning for Terranora (Area E) should include the following principles:

a a relatively high proportion of large residential lots (i.e., minimum size 800 m2) because of existing development and scenic values;

b defined areas of potential dual occupancy and medium density development;

c controls over clearing of vegetation on land containing vegetation with habitat significance;

d housing not located directly adjoining wetlands or other significant vegetation; buffer areas provided with these based on local characteristics of vegetation, drainage and topography; and

e houses not permitted on prominent ridgelines."

The strategic plan has not placed any importance on the retention of agricultural uses in Area E which is consistent with other Council Planning Documents, such as the Residential Development Strategy (1997) and the Draft Interim Strategic Plan – Cobaki/Bilambil Heights/Terranora (TSC 1995).

3.9.4 Farmland Protection (2003)

The Northern Rivers Farmland Protection Project (Lismore Living Centres, 2003) aims to support agriculture and agricultural lands in the Northern Rivers by protecting the land from the encroachment of urban development. The first step in this process was to identify the most important lands for agriculture. A set of draft maps has been compiled which identifies three types of important agricultural lands. In addition, a set of draft principles and draft land use codes have been compiled that set a framework for protecting agricultural land and define what may or may not be done on the land.

The Draft Northern Rivers Farmland Protection Areas Mapping (Lismore Living Centres, 2003) identifies three types of important agricultural lands. These include those of State and Regional Significance as well as those that are classified as 'Locally Important'. This 'whole of government' approach to farmland protection embraces NSW Agriculture's integrated management approach as outlined in their Policy for Sustainable Agriculture (1998).

'Locally Important' agricultural lands are identified as important for agriculture, however they are not included as Significant Farmland Protection Areas. This is usually because of their small size, isolation from other important agricultural lands, or proximity to urban areas. Councils may choose to protect these lands for agriculture under local plans'.

Area E has been classified as 'Locally Important' agricultural land and therefore subject to 'draft planning principles' but not to 'draft land use codes' specifying controls for subdivision, dwellings, permissible uses, rural workers' dwellings and boundary adjustments.

3.9.5 Agricultural Land Classes

The krasnozem (red volcanic) soils of the Tweed Shire are regarded as some of the most productive and unique agricultural lands in NSW (Smith, 1982). Like the Cudgen / Duranbah area, Terranora has a long history of high levels of agricultural productivity across a broad range of farming enterprises on these soils.

The major difference between the two areas is that the Terranora area is much smaller, contains a greater proportion of steep land and has experienced urban encroachment on 3 sides in former intensively farmed areas, as illustrated in Figure 3.37. Land within Area E falls within classes 3, 4, 5 and specialist class 6.

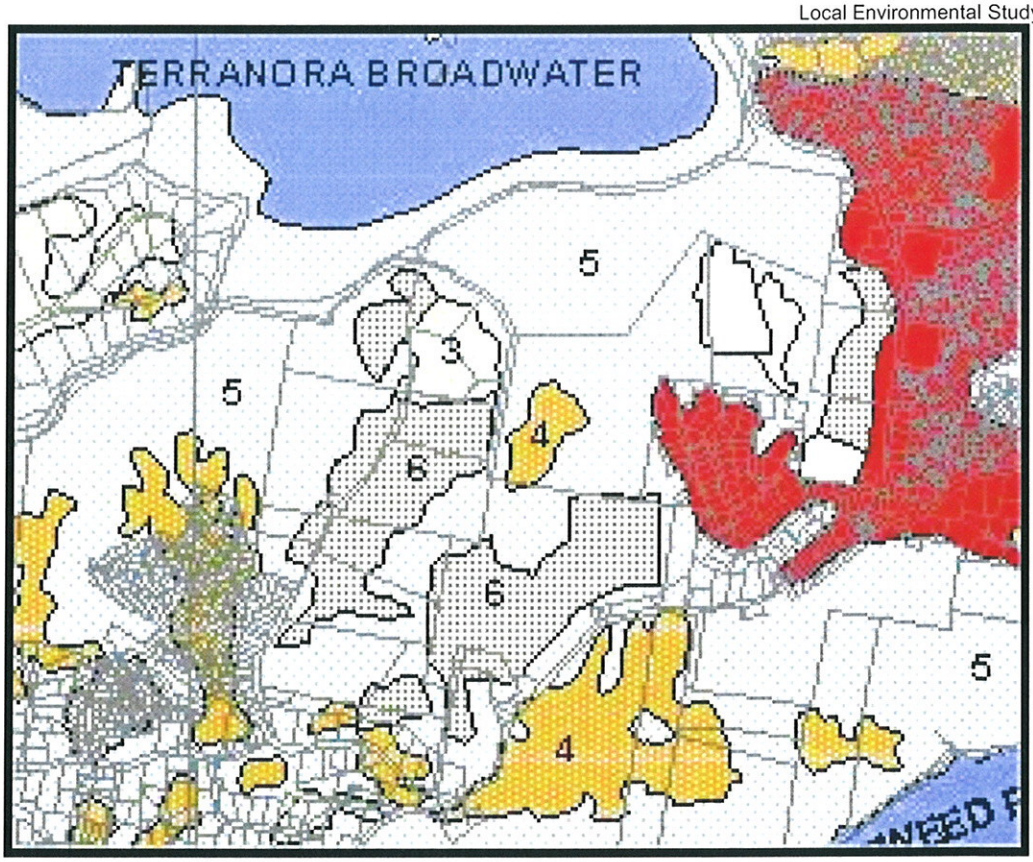

Figure 3-37: Agricultural Land Suitability Classes and Encroachment of Urban Development (Source: NSW Agriculture, 1998)

Table 3-43: Description of Agricultural Land Classifications

Class	Description
Class 3	Grazing land or land well suited to pasture improvement. It may be cultivated or cropped in rotation with sown pasture. The overall production level is moderate because of soil or environmental constraints.
Class 4	Land suitable for grazing but not for cultivation. Agriculture is based on native pastures or improved pastures established using minimum tillage techniques.
Class 5	Land generally unsuitable for agriculture or at best suitable for occasional light grazing or supporting activities related to agriculture (shelter for livestock, forestry). Agricultural production is low as a result of severe biophysical, social and economic constraints which preclude land improvements
Class 6 Specialist Use	Land which, because of a combination of soil, climate and other features, is well suited to intensive production of a crop or narrow range of crops whose special requirements limit their successful culture to such land. This class may include some lands formerly described as 'unique'.
Source: NSW Agriculture August 1998	

3.9.5.1 Area Calculations

An estimate of the area of each agricultural land class within Area E is provided in Table 3.44 below.

Table 3-44: Agricultural Land Classes within Area E

Class	Area (ha)
Class 3	14.06*
Class 4	12.23
Class 5	171.23
Specialist Class 6	80.09*
Bananas	10.97*
Urban	8.43
TOTAL	**297 ha**

* Lands of horticultural significance

3.9.5.2 Adjustments to Area Calculations

Two adjustments to these area calculations are warranted:

- Portion 227 (52.3 ha) should not be included in Class 5 as it is a wetland area and serves no value as agricultural land.
- Lindisfarne School (16.1 ha) consists of 7.2 ha of Specialist Class land and 8.9 ha of Class 5 land. 7.7 ha of this site is already used for the school (contains 3.7 ha of Specialist Class land and 4 ha of Class 5 land). Of the remainder of the site (8.4 ha) which is currently vacant, there are 3.5 ha of Specialist Class land and 4.9 ha of Class 5 land. This is summarised in Table 3.45 below.

Table 3-45: Lindisfarne School Agricultural Land Classification

	Totals (ha)	Subtotals (ha)	
		Specialist Class	Class 5
Total site	16.1	7.2	8.9
Area of site currently used for school	7.7	3.7	4
Area of site currently vacant	8.4	3.5	4.9

Based on Table 3.45, a rationalised assessment of the area is agricultural land classes within Area E is provided in Table 3.46 below.

Table 3-46: Rationalised Agricultural Land Class Area Summary

Class	Area (ha)	Comment
Class 3	*14.06**	*"....may be cultivated or cropped in rotation.....overall production level is moderate because of soil or environmental constraints".*
Class 4	12.23	"……not (suitable) for cultivation"
Class 5	110.03	Excludes Lindisfarne School and Portion 227…… *"unsuitable for agriculture"*
Specialist Class 6	*72.89**	Excludes Lindisfarne School …….. *"well suited to intensive production of a crop or narrow range of crops whose special requirements limit their successful culture to such land……"*