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AGRICULTURAL ASSESSMENT

**Lot 11 DP 1134229, Lot 1 DP 1165676, Lot 1 DP 210674
Pacific Highway, Chinderah**

Prepared by:

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1 EXECUTIVE SUMMARY

1. Jim Glazebrook & Associates Pty Ltd have requested an agricultural assessment of 3.9 hectares of land situated at the junction of the Tweed Valley Way and the Pacific Highway, Chinderah. The agricultural report is to accompany a development application which is proposing to develop a highway service centre on the subject land. As a part of this development application a subdivision is also proposed so as to create a separate lot for the service centre.
2. This report has shown that the 3.9 hectares of land is classified as Class 4 land; that is land that is of a low agricultural value. Issues of practical and economic land use management were major considerations in this classification. The parcel of land is of an inconvenient shape, is in an inconvenient location and is of insufficient size to enable its purposeful and long term agricultural use. The Northern Rivers Farmland Protection Project has previously mapped the land as regionally significant farmland. However this mapping project was done at a scale of 1:100,000 as opposed to an individual property scale, and also during the mapping process gave considerable weight to soil landscape data in contrast to the major agricultural limiting factors that are inherent to this instance.
3. The existing and previous owners of the studied land have since 1992 utilised the majority of the land (with the exception of the 3.9 hectare study area and also land for housing, farm roads and infrastructure) for commercial tea tree and sugar cane production. More recently the 3.9 hectares of land (study area) has been removed from agricultural operation due to issues of low productivity and practical land use management and is currently maintained (slashing) purely for aesthetic purposes and weed control only.
4. Development of the 3.9 hectares of land to a non-agricultural use will not therefore detract in any significant way from the existing agricultural production potential of remainder of the land involved with this subdivision and nor of the wider region. Furthermore approval of the development will take pressure off surrounding lands that are of a higher agricultural value for developments of a similar nature.
5. From an agricultural perspective therefore, it is considered that there should be no reason why Council and the State Government should not approve the application.

2 INTRODUCTION

6. Allen & Associates have been requested by Jim Glazebrook & Associates Pty Ltd to undertake an agricultural assessment and to prepare an associated agricultural report in relation to land that is described as Lot 11 DP 1134229, Lot 1 DP 1165676 and Lot 1 DP 210674. In particular the assessment and report concentrates on a 3.9 hectare portion of land that is situated at the junction of the Tweed Valley Way and the Pacific Highway in the northern portion of Lot 11 DP 1134229.

7. The agricultural report is to accompany a development application for a highway service centre to be constructed within the assessed area. As a part of this development application a subdivision is also proposed so as to create a separate lot for the service centre. The objectives of the agricultural report are therefore to identify the agricultural values of the studied land; identify any potential impacts these values will have on the future use of the land for non-agricultural purposes; provide an assessment of what effect the construction of the service centre will have on agriculture in the wider region and; to provide suitable recommendations to alleviate any potential land use conflicts that may be identified.

8. The subject site was inspected on the 26th of August 2011 by the writer in order to prepare this report.

3 PROPERTY DESCRIPTION

3.1 General

9. Appendix 1 shows the location of the proposed site for the service centre. The area of land concerned is approximately 3.9 hectares in area and forms part of a larger Lot 11 which is 50.84 hectares in area. Refer to Appendix 2 for a site plan of the proposed service centre. Refer also to Appendix 3 for a plan of the proposed subdivision.

10. Currently the proposed development area is not being utilised for any agricultural purpose. General maintenance operations in the form of slashing of the area are undertaken as required. The remainder of the Lot 11 is been utilised for the commercial production of tea tree (with associated infrastructure – dam, distillery) and this land use has been in place since 1992. Prior to 1992 the land was utilised for sugar cane production.

11. Situated directly adjacent (south) of the proposed development area is the Melaleuca Station Crematorium. Other land uses surrounding the site are predominantly sugar cane enterprises. Refer to Appendix 4.

12. Presently the site according to the Tweed LEP 2000 is zoned 1(b2) Agricultural Protection. Refer to Appendix 5 for further details.

13. The site is situated approximately ten kilometres south of Tweed Heads. The site and surrounding areas therefore have excellent infrastructural services already established including capital city air services at Coolangatta, education facilities including University facilities on the Gold Coast, national road transport works, post and telephone services, electricity supply and excellent goods and services suppliers in all the adjacent major centres etc.

3.2 Soil Type

14. Due to the small scale of the study area and also the uniformity of the terrain only three test holes were dug throughout the 3.9 hectares so as to access soil profiles and to determine soil types. The test holes were dug using a 100 * 1500mm hand auger. Refer to Appendix 6 for locations of

each test site that are delineated H1, H2 and H3. Also refer to Appendix 10 which shows details for each individual soil profile excavated throughout the site.

15. Soils throughout the site are identified as being Humic Gleys. Humic Gleys are characterised by a dark A horizon of varying depth and texture; commonly being peaty sands, loams and clay loams. The dark colour of the A horizon is indicative of varying levels of organic matter. The upper part of the subsoil or B horizon is generally a pale grey sandy to clayey material that is mottled while the lower portion of the subsoil is a grey to bluish grey material that is permanently waterlogged by a fluctuating water table. Nutritionally these soils have moderate levels of fertility although nitrogen and phosphorus are generally low and trace element deficiencies are common¹. Additionally due to the shallow nature of the water table that is associated with these soils and the resultant waterlogging, the installation of drainage systems is normally required for agricultural operations.

16. In this instance there is approximately 35cm of dark, silty loam surface soil overlying a subsoil which is a greyish sand that is heavily mottled. Soil structure was moderate in the surface soil and massive (apedal) in the subsoil. The water table was found at a depth of between 68 and 85cm.

17. The findings of this soil survey agree with those of the Department of Land and Water Conservation (DLWC) whom similarly classify the soils within the site as Humic Gleys².

3.2.1 Acid Sulfate Soils

18. Appendix 8 shows that the soils inherent to the site and much of the surrounding region have a high probability of occurrence of acid sulphate material. Drainage of these areas would therefore present a high probability of acid sulphate oxidation and production of low pH drainage water. Dependent on the land use adopted then a more intensive soil study of the site would be necessary so that an appropriate acid sulfate soil management plan could be designed.

3.3 Topography

19. Appendix 6 shows the general topography of the site. The predominant landform pattern is classified as Flood Plain; that is an alluvial plain that is characterised by frequently active (frequency of occurrence of 50 years or less) erosion and aggradation by channelled or overbank stream flow³. As is characteristic to landform patterns of this nature, the degree of slope with which they are associated is minimal and this is confirmed in this instance by the absence of contour lines throughout the site as shown in Appendix 6.

20. Being part of a larger flood plain, the site and surrounding lands are prone to flooding from the nearby Tweed River. Refer to Appendix 7 that shows that the design flood level for the site with relevance to a 100 year average recurrence interval flood is 3.5 metres.

21. Previous to 1992 the land was utilised for sugar cane production. After 1992 the 3.9 hectares of land was utilised for Sugar Cane and some Tea Tree although the present situation is that this land; due to its small size, previous poor productivity, shape and location with respect to adjacent land uses, has no purposeful agricultural land use. Sugar Cane and also Tea Tree are crops commonly grown on surrounding lands that have similar physical characteristics (lower lying, flood

¹ Charman P.E.V., Murphy B.W. ed (1991) Soils Their Property and Management. A Soil Conservation Handbook for New South Wales, Sydney University Press, Sydney.

² Morand, D.T. (1994) *Soil Landscapes of the Murrumbidgee-Tweed Heads 1:100000 Sheet*. Department of Conservation and Land Management.

³ McDonald R.C., Isbell R.F., Speight J.G., Walker J. and Hopkins M.S. (1990) *Australian Soil and Land Survey Field Handbook*. Second Edition, Inkata Press, Sydney.

prone, minimal slope, poorly drained subsoil) and indeed Sugar Cane is a major agricultural land use of the surrounding region. As is indicative of this previous land use a number of manmade drains had been installed at regular intervals through the land in an attempt to improve the internal surface drainage characteristics. Appendix 6 does depict the more major or primary artificial drains that are characteristic to this system. Not visible at the mapping scale shown is a similar network of smaller, secondary artificial drains that are also present and that which were arranged in a manner to service the shown primary drains.

22. The minimal degree of slope throughout the site means that there is a low associated soil erosion risk and on the basis of slope therefore the land is suited to regular and or continuous cultivation. While this is the case, there is a known flooding risk (Appendix 7) to the land and this would need to be taken into account prior to any land use decision been made.

3.4 Climate

23. A significant matter in this report is that rainfall intensity in the area can be extremely high and this along with factors already mentioned (flood prone nature of the land and potential erosion risk) combine to make the land within the site vulnerable to erosion because of high potential volumes of surface runoff. Soil erosion conservation measures are essential therefore in regards to any agricultural enterprise that may potentially be adopted within suitable land.

24. Temperatures are warm to hot in summer and this allows a long pasture and crop growing season when moisture levels permit. Due to the proximity of the site to the ocean, it is considered that the site would be frost free except in the coldest of growing seasons.

25. Proximity of the site to the ocean also mitigates extremely hot summer temperatures and enhances rainfall. The climate is therefore suitable for a large range of agricultural enterprises including the production of frost sensitive crops in the winter.

3.5 Aspect

26. Aspect is often a very important consideration when considering land use as aspects which are unduly exposed to prevailing winds or aspects which are southerly or westerly are considered unfavourable for agricultural and horticultural purposes.

27. In this instance, the area of the subject site which has a landform pattern described as being a plain has no definable aspect and aspect is therefore of no significance to agricultural land use decisions of this area of the site.

4 AGRICULTURAL CLASSIFICATION

The agricultural classification of the land within the site has been done according to the guidelines presented in the Rural Land Evaluation Manual⁴. This system is recognised as providing a standard system for land classification, thereby allowing comparisons between lands throughout the state of NSW to be undertaken.

28. The Rural Land Evaluation Manual (RLEM) classifies agricultural land into six separate classes according to various inherent characteristics that include for instance climate, topography, soil type (comprising rootable depth, drainage, surface and subsoil rock), cultural and physical requirements and, socio-economic factors etc. The six classes of the RLEM are outlined below.

Class 1

⁴ New South Wales Department of Planning (1988), RLEM. *Rural Land Evaluation Manual*, Sydney.

Arable land suitable for intensive cultivation where constraints to sustained high levels of agricultural production are minor or absent.

Class 2

Arable land suitable for regular cultivation for crops but not suited to continuous cultivation. It has a moderate to high suitability for agriculture but edaphic (soil factors) or environmental constraints reduce the overall level of production and may limit the cropping phase to a rotation with sown pastures.

Class 3

Grazing land or land well suited to pasture improvement. It may be cultivated or cropped in rotation with pasture. The overall production level is moderate because of edaphic or environmental constraints. Erosion hazard, soil structural breakdown or other factors including climate may limit the capacity for cultivation and soil conservation or drainage works may be required.

Class 4

Land suitable for grazing but not for cultivation. Agriculture is based on native pastures or improved pastures established using minimum tillage techniques. Production may be seasonally high but the overall production level is low as a result of major environmental constraints.

Class 5

Land unsuitable for agriculture or at best suited only to light grazing. Agricultural production is very low or zero as a result of severe constraints, including economic factors, which preclude land improvement.

Specialist Class

Land which, because of a combination of climate and soil, is well suited to intensive production of a crop or a narrow range of crops whose special requirements limit their successful culture to such land. This class may include some lands formerly described as unique.

29. Using the classification system outlined above, all of the land within the study area is classified into Class 4 land. In this instance, the principle determining factors in land class determination were the landform pattern and soil types inherent to the site as well as issues of practical and economical land use management.

4.1 Class 4

30. The Class 4 land has certain attributes such as Flood Plain landform pattern and a Humic Gley soil type that may in other situations attract a Special Class classification. That is the less than ideal drainage of the land inhibits the intensive cultivation of most crops, however these are also conditions in which Sugar Cane and Tea Tree are well suited due to the tolerance of these crops to restricted drainage conditions. Notwithstanding this, issues of practicality and poor economics of production are major restraints to the adoption of these land uses.

31. The 3.9 hectares of land forms part of the larger lot 11 which is 50.84 hectares in area. Other than the 3.9 hectares in question and other areas that are utilised for housing and infrastructure the majority of the land within the 50.84 hectares is utilised for commercial tea tree production. Since 1992 the land use of the lot as a whole has been a combination of sugar cane and tea tree and up until 2009 a similar pattern of land use was adopted within the 3.9 hectares of land. In 2009 the 3.9 hectares was removed from agricultural production due to its inconvenient location and shape, its poor productivity with respect to other areas of the lot 11, the inherent difficulty with designing an appropriate drainage system due to existing slope values, and the practical issue of land area available – that is it is not large enough to justify its development to tea tree production.

32. With the Pacific Highway exit to the Tweed Valley Way situated directly to the north the land would need to be planned in a manner to allow drainage from north to south; that is to the existing dam that is located directly to the north of the crematorium and tea tree distillery shed. There is no discernable slope within this land at present and subsequently land planing operations in order to

achieve an appropriate degree of fall would be extensive and difficult and for the small area of land involved not easily justified.

33. The small area of land available and its inherent shape will naturally result in short rows. With the added requirement of a 10 metre headland at the end of each row (for machinery access) this further reduces both the length of the rows and the area of land available for production. Furthermore the situation of the dam directly to the south of the 3.9 hectares also presents difficulties with row length. The ability to practically manage this portion of land then is significantly less than other tea tree producing areas of the Lot 11 that are characterised by significantly longer rows.

4.2 Northern Rivers Farmland Protection Mapping

34. Appendix 9 shows a copy of the Northern Rivers Farmland Protection Project mapping and indicates that the 3.9 hectares of land is classified under the Regionally Significant Farmland Protection category. The underlying aim of the Farmland Protection Project is to protect important agricultural land from the encroachment of non-agricultural land uses. Under the Project, important agricultural lands have been classified as significant farmland at either a regional or state level.

35. In order to identify and map the better quality agricultural lands at a regional and state level, information from a variety of sources was analysed. These sources include: Rural Land Capability mapping (SCS/DLWC), Agricultural Land Classification/Suitability Mapping (DLWC), Soil Landscape Mapping, Agricultural Industry Mapping and Multi-attribute mapping (DLWC)⁵. After analysis of these datasets, it was concluded that the soil landscape data and mapping was the most suitable dataset available for identifying broad farmland protection areas⁶. That is the mapping of land within the subject site as Regionally Significant Farmland has been done according to existing soil landscape mapping and in particular the Soil Landscapes of the Murwillumbah – Tweed Heads 1:100 000 Sheet.

36. Following on from the above it is unlikely then that issues such as practical land use management and in particular those that occur at an individual property scale such as in this instance were given the same level of consideration in the mapping process as existing soil landscape data.

4.2.1 Farmland Protection Project Mapping Methodology

37. The Draft Farmland Protection Project Mapping has been prepared using a 1:100 000 scale and the use of soil landscapes information as the primary data source. The mapping methodology acknowledges that limitations are associated with this process, that inconsistencies are likely and that inaccuracies at a property scale are expected⁷. Furthermore, the project concedes that the maps may have unintentionally included inferior quality lands in the state or regional classifications⁸.

38. The Farmland Protection Project is seeking to protect important or the more productive farmland areas from the encroachment of non-agricultural land uses. This report has shown that the land within the site has a low agricultural productivity potential. The land is not therefore

⁵ Department of Infrastructure, Planning and Natural Resources and NSW Department of Primary Industries, 2004, Northern Rivers Farmland Protection Project – Proposals for Protecting Farmland.

⁶ *ibid*.

⁷ Department of Infrastructure, Planning and Natural Resources and NSW Department of Primary Industries, 2004, Northern Rivers Farmland Protection Project – Mapping Methodology.

⁸ Department of Infrastructure, Planning and Natural Resources and NSW Department of Primary Industries, 2004, Northern Rivers Farmland Protection Project – Proposals for Protecting Farmland.

important farmland and it is considered that as per the above paragraph, the land has unintentionally been included in the category of Regionally Significant Farmland.

4.3 Value of Land for Agricultural Purposes

39. The 3.9 hectares of land that is the subject of this study has a low agricultural value or rating and this is due to inherent physical site characteristics and issues of practical land use management.

40. As a comparison with other lands of the region and associated potential or existing agricultural uses the following general ratings are given as examples:

- *Low value* – grazing on poor soils (Podzols, poorly drained Prairie Soils, Humic Gleys, Gleyed Podzolics, shallow Podzolics).
- *Moderate value* - large scale sugar cane and more marginal (poorer soils such as shallower Krasnozems, elevated Chocolate soils, slopes of greater than 15% but less than 20%) horticultural areas – e.g. bananas, large scale grazing operations on better quality soils (Krasnozems, well drained Prairie Soils, well drained Black Earths, Chocolate soils, deep well drained Podzolics);
- *High value* – intensive cropping on Class 1-2 land (vegetables, grain crops), intensive horticulture on good quality Special Class land (deep, well drained Krasnozems, slopes of less than 15%) and elevated Class 1-2 land.

5 THE APPLICATION AND RELEVANT ISSUES

5.1 Objectives of Zone 1(b2) Agricultural Protection – Tweed LEP 2000

- **Primary Objective**

To protect identified prime agricultural land from fragmentation and the economic pressure of competing land uses.

41. This report has shown that the 3.9 hectares of land is not prime agricultural land. It is known that there is a definite demand for the situation of a service centre on the western side of the Pacific Highway to service north bound traffic and to complement the existing BP that services south bound traffic and that is further to the north of the site.

42. The 3.9 hectares of land is of a low agricultural value and is situated in a location that is well suited to the development. Approval of the application will take pressure off other land in the locality that is of a higher agricultural value for similar developments.

- **Secondary Objective**

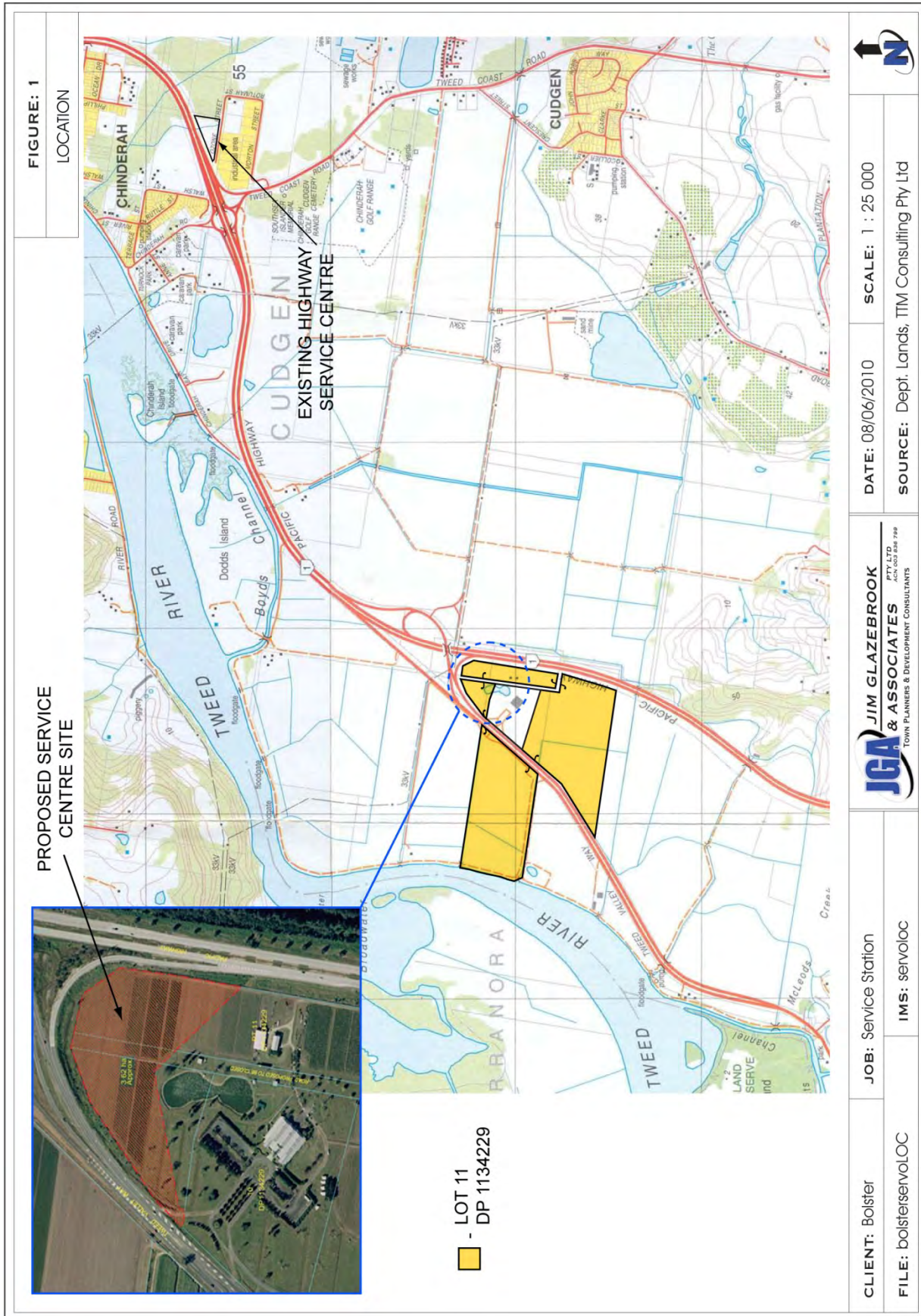
To allow other development that is compatible with agricultural activities.

43. The proposed development is considered to have the same level of compatibility with surrounding agriculture as the Melaleuca Station Crematorium that is situated directly adjacent to the site.

5.2 Loss of Agricultural Land

44. Development of the subject land would result in the removal of this land from future agricultural production. It is not believed that this will have a significant effect on the long term agricultural production potential of the wider region. That is the report has shown that the land is of an inconvenient shape, size and location to allow for purposeful and practical agricultural land use/s to occur.

Appendix 1: Site location



Appendix 2: Site Plan

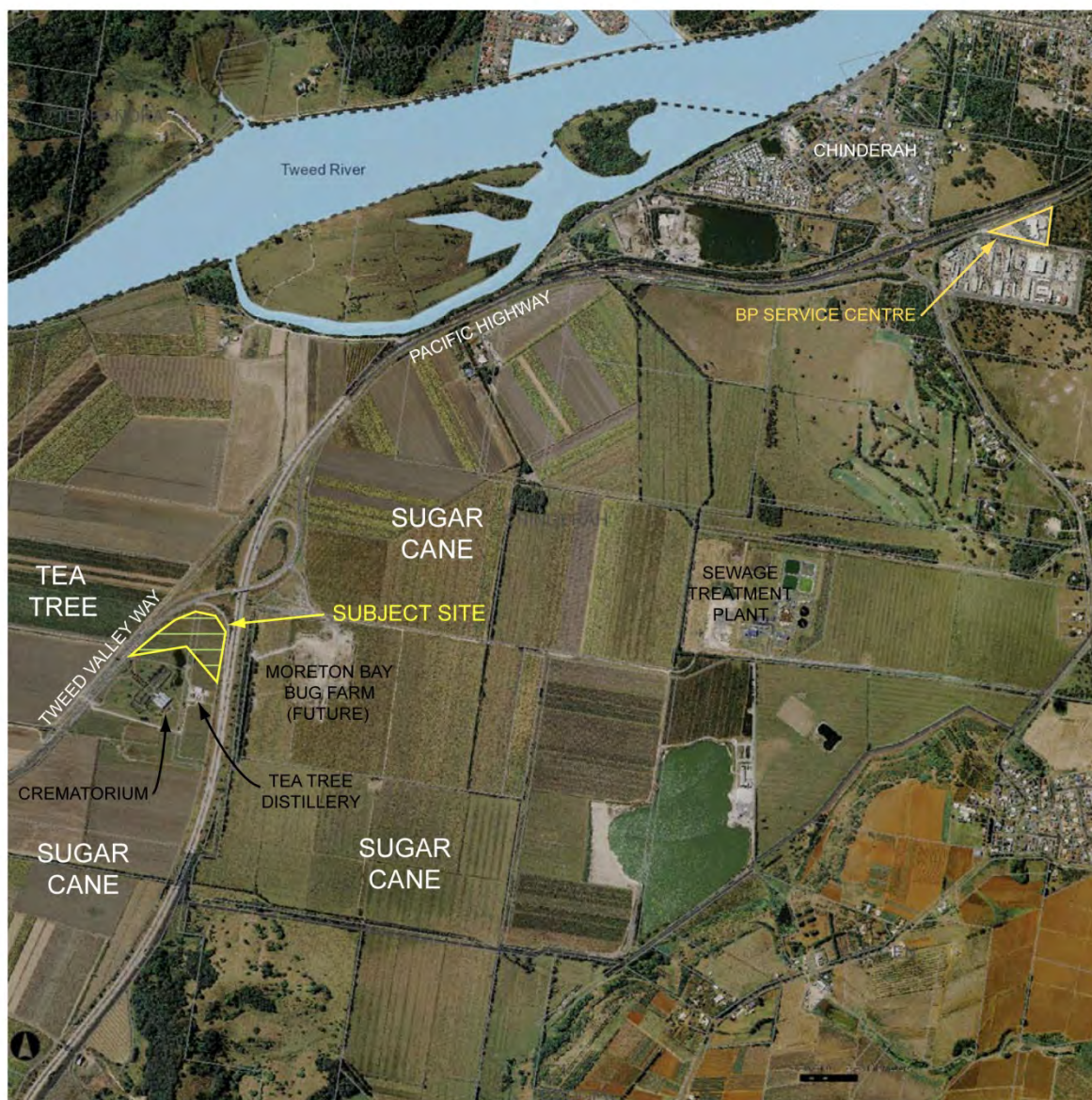




Appendix 4: Surrounding Land Uses

FIGURE: 2

SURROUNDING LAND USES



CLIENT: Bolster

JOB: Service Station

DATE: 09/06/2011

SCALE: not to scale

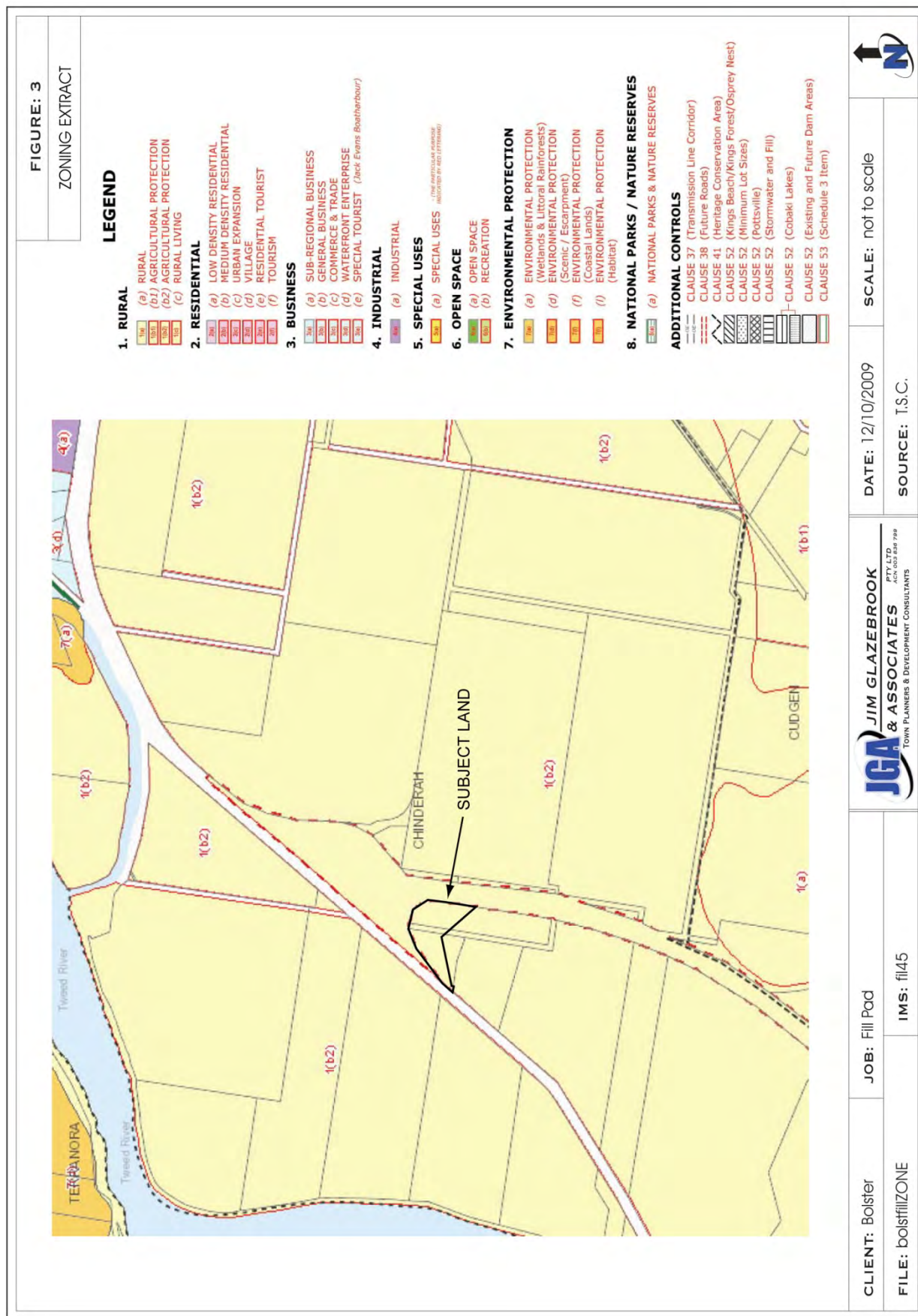
FILE: BolstLand

IMS: bolsterlanduse

SOURCE: T.S.C.



Appendix 5: Land Zoning



CLIENT: Bolster

FILE: bolstfilZONE

JOB: Fill Pod

IMS: fil45

DATE: 12/10/2009

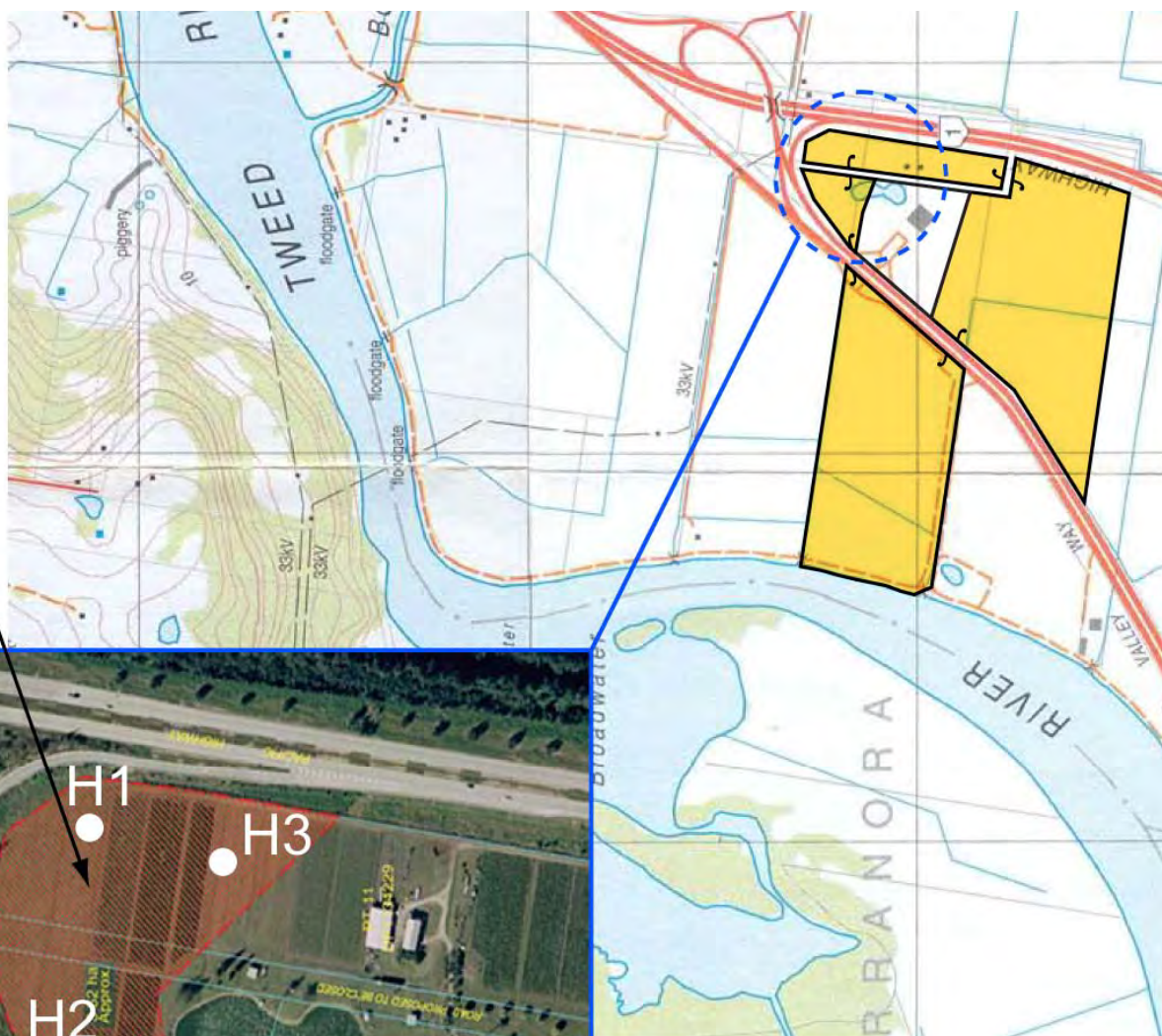
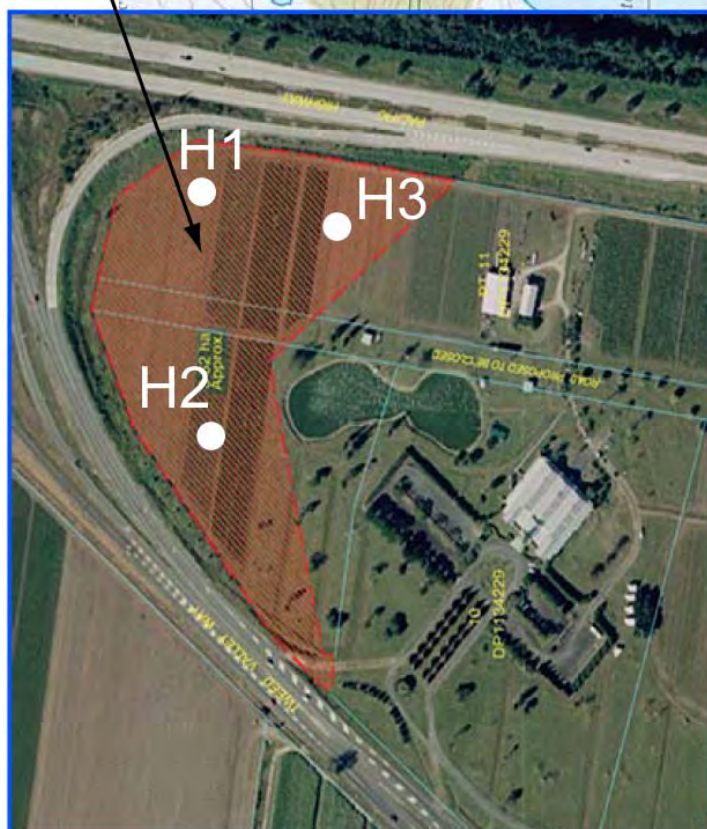
SOURCE: I.S.C.

SCALE: not to scale

JGA JIM GLAZE BROOK & ASSOCIATES PTY LTD
ACN 002 828 798
TOWN PLANNERS & DEVELOPMENT CONSULTANTS

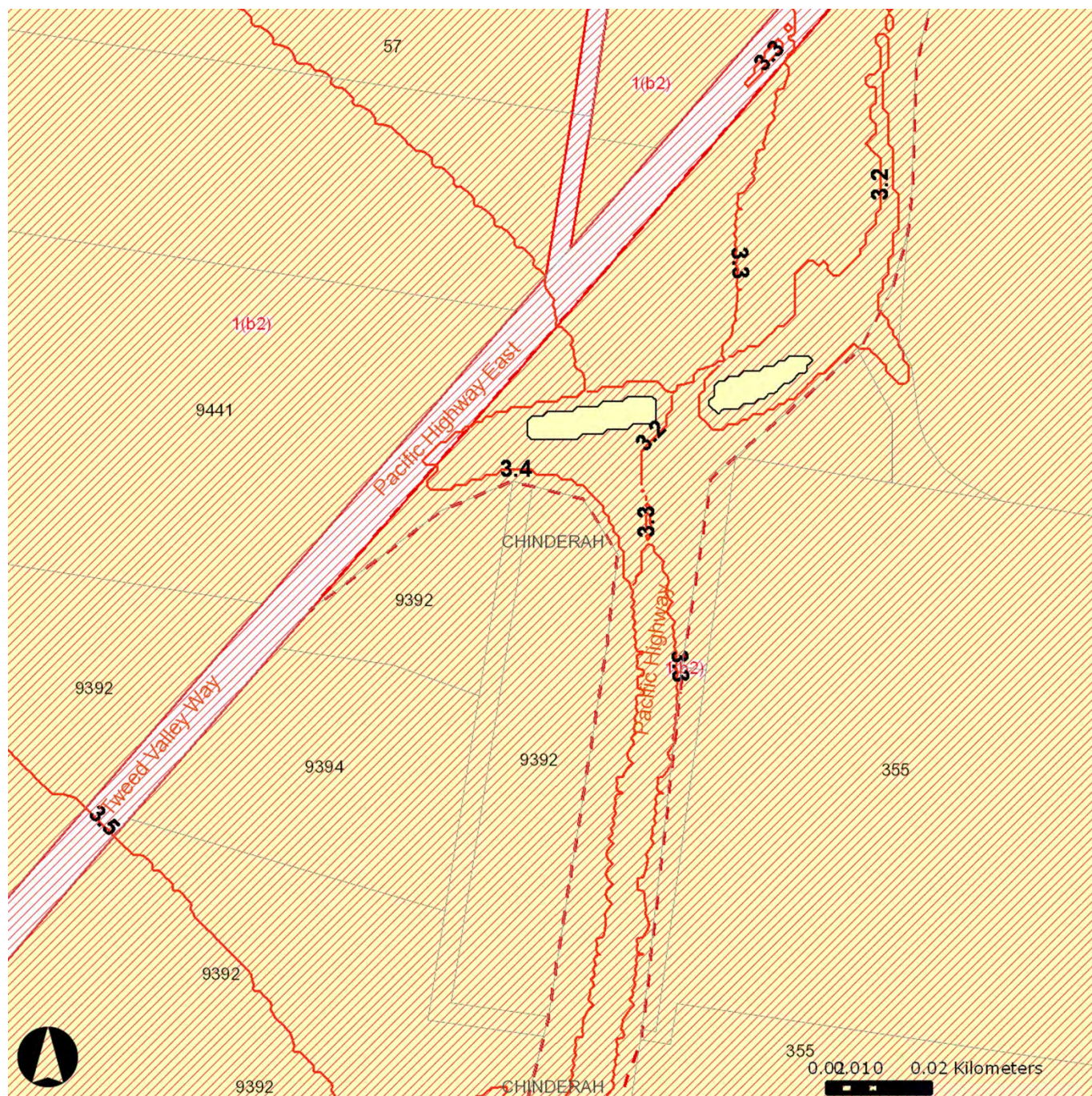
Appendix 6: General topography and soil test sites

PROPOSED SERVICE
CENTRE SITE

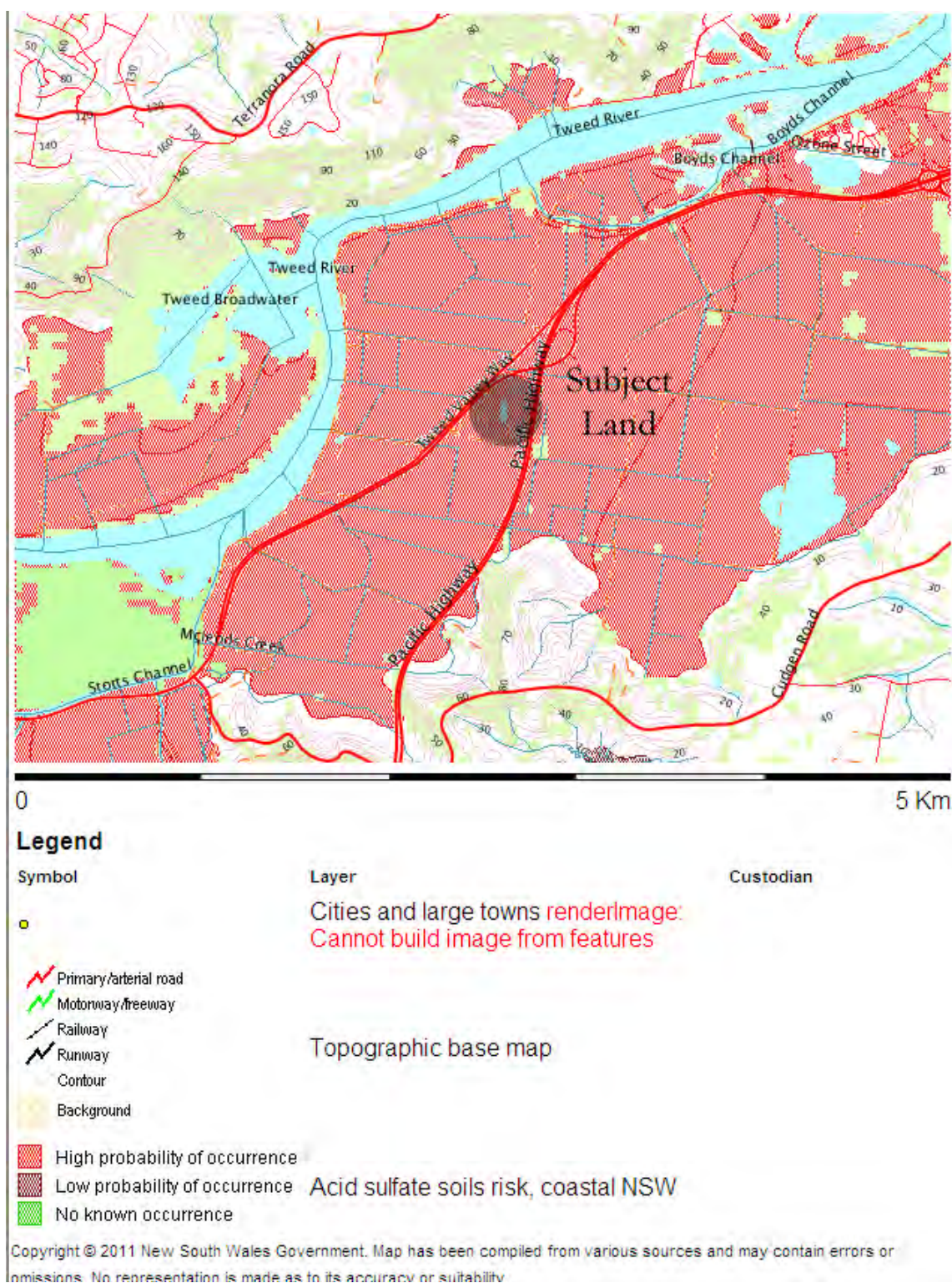


 - LOT 11
 DP 1134229

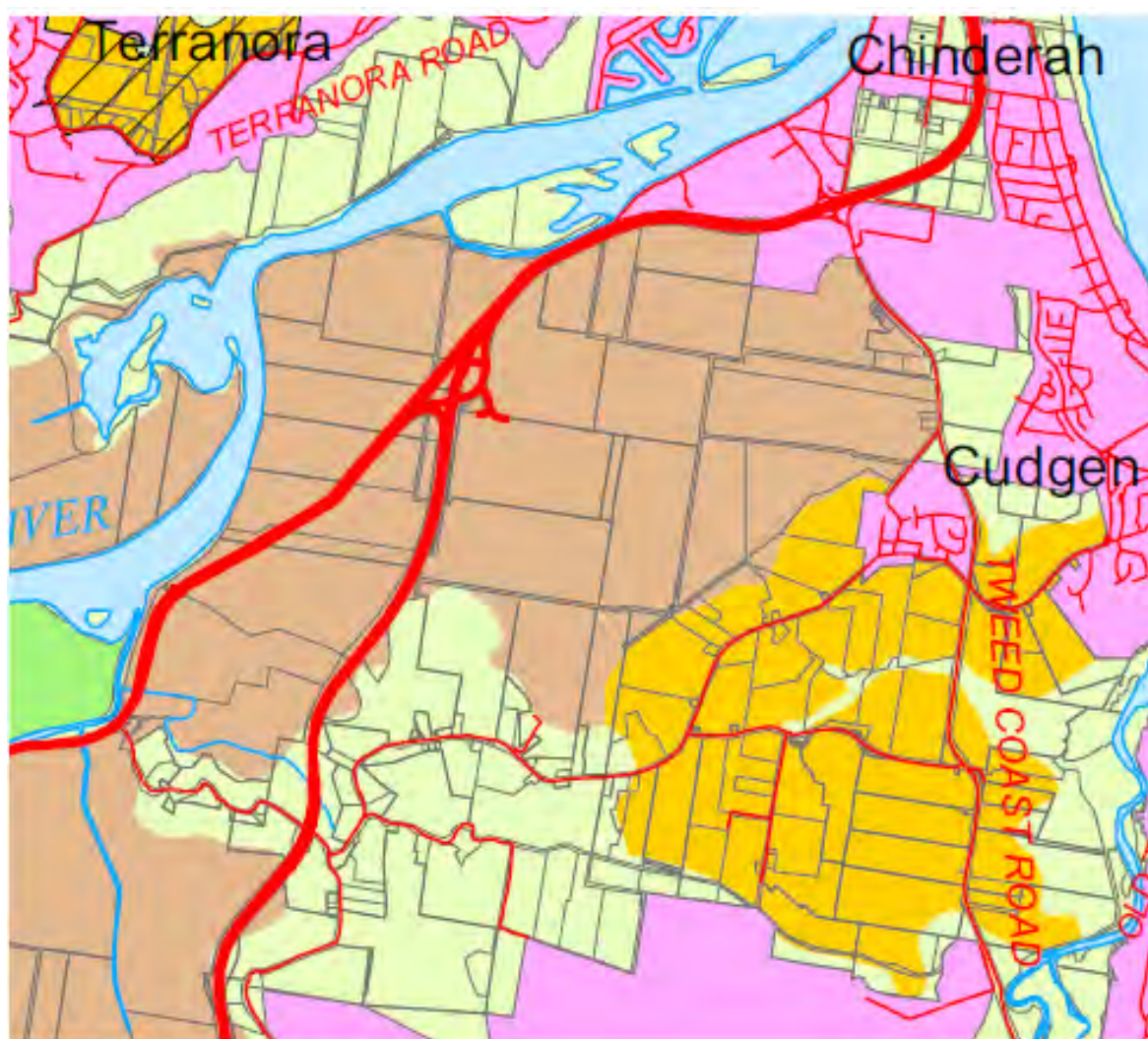
Appendix 7: Design flood level mapping



Appendix 8: Acid Sulfate Risk Mapping



Appendix 9: Farmland protection mapping



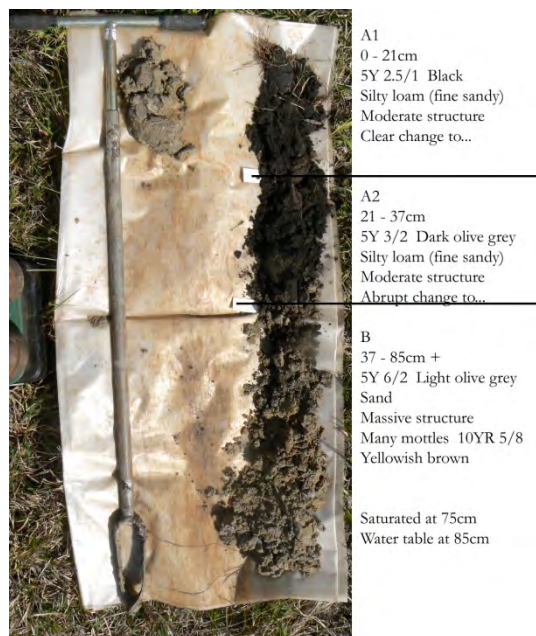
LEGEND

- | | |
|---|--|
|  | State Significant Farmland |
|  | Regionally Significant Farmland |
|  | Significant Non-Contiguous Farmland |
|  | Other Rural Land |
|  | Committed Urban Uses and Rural-Residential Zones |
|  | National Parks, State Forests |
|  | Land outside Northern Rivers Catchment Management Area |
|  | Highways |
|  | Major Roads |
|  | Railways |
|  | Watercourses |
|  | Land Parcel Boundary |
|  | Catchment Management Board Boundary |
|  | Local Government Boundary |

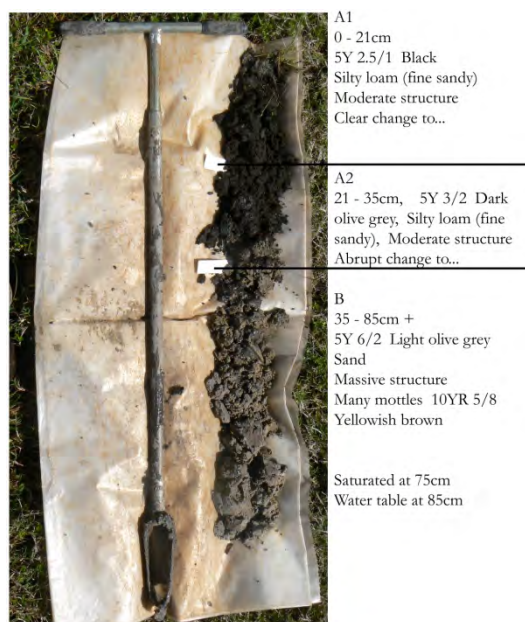
Appendix 10: Soil profiles

Depth (cm)	Horizon	Horizon Boundary	Colour	Texture	Structure	Mottles	Notes
H1 - Humic Gley							
0-21	A1	Clear	5Y 2.5/1 Black	Silty loam (fine sandy)	Moderate	N/A	
21-37	A2	Abrupt	5Y 3/2 Dark olive grey	Silty loam (fine sandy)	Moderate	N/A	
37-85+	B		5Y 6/2 Light olive grey	Sand	Massive	Many, Yellowish Brown	Profile saturated at 75cm Water table at 85cm
H2 - Humic Gley							
0-21	A1	Clear	5Y 2.5/1 Black	Silty loam (fine sandy)	Moderate	N/A	
21-35	A2	Abrupt	5Y 3/2 Dark olive grey	Silty loam (fine sandy)	Moderate	N/A	
35-85+	B		5Y 6/2 Light olive grey	Sand	Massive	Many, Yellowish Brown	Profile saturated at 75cm Water table at 85cm
H3 - Humic Gley							
0-18	A1	Clear	5Y 2.5/1 Black	Silty loam (fine sandy)	Moderate	N/A	
18-31	A2	Abrupt	5Y 3/2 Dark olive grey	Silty loam (fine sandy)	Moderate	N/A	
31-68+	B		5Y 6/2 Light olive grey	Sand	Massive	Many, Yellowish Brown	Profile saturated at 55cm Water table at 68cm

H1



H2



H3

