Agri*biz* Consulting

Final Report

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Commercial in Confidence

Agricultural Assessment of Proposed Agricultural School at 2964 Wisemans Ferry Road, Mangove Mountain, N.S.W.

Prepared for:
Ghazi al ali Architects.

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1. Introduction

1.1 Outline of the Consulting Brief

AgriBiz Consulting was asked by Ghazi al ali Architects on behalf of the owner (S.R. Tariq) to make an assessment of the agricultural activities to be carried at a proposed new agricultural high school to built on Lot 87 DP 755253, a 25.5 hectare (ha.) property at 2964 Wisemans Ferry Road, Mangrove Mountain. The agricultural activities will be primarily carried out as demonstration units for the educational purposes of the school, but may also supply the school with produce, or operate as small scale commercial enterprises that provide some income for the school from the sale of produce. This report assesses the suitability of the site for the agricultural activities that will be conducted by the school and looks at the resource needed for these activities. As well the report will examine the compatibility of the agricultural school's activities with the current land use on neighbouring properties and the impact the current land use on neighbouring properties may have on the proposed agricultural school.

This report also will comment on agriculture related issues raised by Gosford City Council (GCC) and other interested parties with respect to the clients Development Application (DA).

2. Location and Description of the Property

The property is known as "Coolamatong". Like many Mangrove Mountain properties it was formerly a citrus orchard planted, I was told, with 40,000 trees. However all the citrus trees on the property have now been pulled. I was also told the property has not operated as a commercial citrus farm for more than 13 years[1]. As mentioned above, the street address is 2964 Wisemans Ferry Road, which is approximately 5 km south of the Mangrove Mountain village store and some 20 kms or so from the city of Gosford.

The property is surrounded by Crown Land on the southern and western sides. Mangrove Mountain Pony Club operates on an area of cleared Crown Land adjacent to the southern boundary of the property. The Crown Land to the rear of the southern boundary and along the western boundary is uncleared bush. A dirt fire trail runs along the entire length of the western boundary of the property set 10 -20 metres into the Crown Land. Ikara Road (which is only a dirt track) runs along the northern boundary of the property. A number of agricultural activities were observed on the neighbouring properties including a wholesale nursery, a citrus orchard and a beef cattle property.

The citrus industry around Mangrove Mountain has been in decline for a number of years. Disruptions to the market for citrus fruit and juice in Australia have severely impacted the industry. Initially the development of large scale irrigated citrus farms along the inland rivers of south eastern Australia, with lower production costs than the small coastal farms, made it difficult for the typical Mangrove Mountain citrus farm to compete on both price and also on quality. With less pests and diseases to contend as a result of the long hot dry summers, the inland farmers were able to provide the market with more attractive and blemish free fruit better suited to supermarket trade. On the coast, the high rainfall, humid sub-tropical climate resulted in more blemished second grade fruit. This traditionally went

[1] Yusof Tariq, the son of the owner of the property and Mark O'Mally-Jones the next door neighbour, provided some of the background information about "Coolamatong".

into the juicing market, but this market has also been in decline and all but ceased to exist on the Central Coast with the closure of the Just Juice business in Gosford. The demise of the packaged fruit juice market as a result of concentrate imports from low cost producers like Brazil, has meant that only the high end fresh juice market exists for the coastal producers and despite some growth in this segment in recent years, supply capacity to this market well and truly outstrips demand.

In the past, coastal producers were the main source of Valencia oranges for the fresh table fruit market. The Valencia season (through the summer and autumn months) coincides with the northern hemisphere navel market season. Since the US Free Trade Agreement was signed, imported Navel oranges from the US have largely displaced the local Valencia's in the supermarkets. While the Valencia is an excellent fruit for the table, it has less visual appeal to consumers because of the greenish tinge to the rind, and many consumers assume (wrongly) that the fruit is not ripe. Imported Navels, particularly those from the US, are very uniform in size, rind thickness and flavour. They are also a uniformly bright orange colour, which consumers prefer. As a result the imported Navel fruit has taken a predominate market share from the local Valencia's. The combined impact of all of these factors has led to a significant loss of demand for the coastal fruit and as a consequence many traditional citrus producing orchards in the Mangrove Mountain region have ceased production over the past twenty years. As the plantings aged it became uneconomic to replace the trees, production declined and eventually the tree's were pulled, with many farms switching to alternative enterprises.

Some of the alternative enterprises are evident in the surrounding area, in particular; wholesale nursery businesses; stone fruit and other orcharding (with some retaining a small plot of citrus); field crops; intensive vegetable production; as well, horses for small hobby type businesses and recreational purposes abound. Some properties have simply reverted to low level economic activities like the extensive grazing of cattle.

Since orcharding ceased on " Coolamatong" a range of activities have been carried out on the property including the production of field crops (as evident by the cultivation patterns in some of the aerial photographs) and the grazing of livestock. None of these activities appears to have been commercially successful. The only activity carried out on the property now is the grazing of about a half dozen Suffolk ewes and one ram on a small plot on the southern side of the property adjacent to the pony club.

2.1 Site Inspection

The author inspected the property in the company of Mr Yusof Tariq, the son of the owner, on the 19th June 2012. The property is run down and in a state of disrepair. It will require a considerable investment to "clean up" the land, rebuild the fences and repair or rebuild other infrastructure before any agricultural activities of any commercial significance can be carried out. Many of the exotic trees on the property, such as the rows of radiata pine (*Pinus radiata*) trees situated either side of the entrance driveway, are now so old and termite ridden that they need bulldozing and burning. The Travers Ecological Assessment identified only one native tree, a Red Bloodwood (*Corymbia gummifera*) within the previously cleared areas of the farm that had been used for agriculture in the past and concluded that there was no threatened flora habitat and only low level foraging habitat for any fauna. There appears to be no impediment from an ecological perspective to "cleaning up" the former farmland to make it suitable once again for agriculture. (Travers pp 4 and 9)

The majority of the land (estimated to be approximately 80% of the total area or 20.4 ha.) is cleared of native vegetation and as mentioned above, was planted to citrus trees for many

years. Some of remnants of the citrus orchard and other introduced tree species have been pushed up into heaps that now need burning. The old orchard land is mainly covered in grasses such as kikuyu (*Pennisetum clandestinum*), pasture species like white clover (*Trifolium repens*) and broadleaf weeds like wild radish (*Raphanus raphanistrum*). Blackberry (*Rubus spp*) has also invaded much of this land, although the owner has slashed and sprayed the weed to try and get on top of it[2]. Photo 1, taken from the centre of the property looking east towards Wisemans Ferry Road, shows the cleared land that was formerly planted to citrus trees in the background, with the blackberry that has invaded this land clearly seen across the foreground. As can be seen in Photo 1 the spray has turned the blackberry brown and appears to have killed it, but because of its rambling nature it may require further sprays to control all re-growth.

To restore the land so that it is fit for agricultural use once again, the old exotic trees will have to be felled and burnt, then the main areas of land suitable for cultivation will need to be sprayed with a knockdown herbicide mixture and cultivated with an offset disc to smooth and level out the fields. It may require further cultivation by rotary hoe or harrows etc. to make a suitable seed bed for sowing improved pastures or field crops, but once this done the land can be brought back into production.

Photo 2 shows the cleared former orchard land in the background, looking west from the centre of the property where the proposed school building will be built, with some old radiata pines in the foreground and two piles of pushed up trees that need burning.

Photo 1 and 2
View of the Cleared Former Orchard Land on "Coolamatong

There are piles of old irrigation pipe left over from the orchard sprinkler system that will need to be removed, old sheds and buildings that are beyond repair that also need dismantling and removal. The boundary fence will need to be replaced before livestock can be introduced to any of the land apart from the small sheep enclosure that is currently the only area adequately fenced. This will require bulldozing along the northern, western and southern boundaries to clear a fence line, as these are all badly overgrown by shrubs and trees. Sub-division fences will also need to be built to separate animal activities from horticulture or field crop activities.

2.2 Topography

[2] Yusof Tariq informed me he had sprayed the blackberry with a mixture of Roundup (Glyphosate) and Brush-Off (600g/kg Metsulfuron-Methyl) plus a surficant. Brush-Off is recommended for control of blackberry at the rate of 10g/ha with glyphosate at 200ml/ha. .

The land is relatively flat across the front of the block from the midway point to Wisemans Ferry Road. From the midway point to the rear of the block the land slopes gently to the west. Douglas Partners estimated the surface gradients in the eastern portion of the site generally "*do not exceed about 6% whilst slopes to the west of the proposed school facilities range between 6%-10%. Slopes in areas adjacent to the western site boundary range between 10%-15%."* (Douglas p 2)

There are no watercourses within the property and it appears to drain towards the south west corner where there is ostensibly a partially filled dam. This was not visible to the author at the site inspection because of the dense bush on this part of the property. The property drains into Crafts Creek which forms part of the Mangrove Creek catchment. The property is within the Mangrove Weir Water Catchment Area (See Gosford City Council Water Catchment Map reproduced in Cardno p 12). A detailed run-off water management plan including an onsite pond in the middle of the property and a series of open drains or "grassed swales" to run the water into the pond, has been prepared for the client, by Cardno ITC. (Cardno p 11) The open drains should not impose any significant impediment to the planned agricultural activities as the cultivation areas can work around the drains and presumably because they are "grassed swales" livestock grazing will not damage the drains. Livestock may have to be excluded form the pond but this can be easily fenced off.

2.4 Soils

The underlying rock on the Mangrove Mountain escarpment is Hawkesbury Sandstone. This weathers to form a range of sandy soils and loams. The surface soil at "Coolmatong" is a mid-brown coloured sandy clay loam, typical of the escarpment and well suited for a range of agricultural activities including, obviously given the history of the farm, citrus growing, but it is also well suited to other forms of horticulture, field crops and for pasture for livestock.

Douglas Partners took a number of soil core tests and reported "*Subsurface conditions encountered in the bores generally comprised light brown silty sand to approximately 0.4 m depth, underlain by orange brown clayey sand to termination depth (1.1 m –1.5 m). Some ironstone gravels were typically encountered from 0.9 m – 1.2 m depth."* (Douglas p 3)

The soil on "Coolamatong" is relatively free draining, which makes it well suited to citrus, which do no like "wet feet" , however in places the underlying clay will hold back water penetration at times of high rainfall. Douglas reported that no ground water was encountered in any of their bore holes. (Douglas p 3) It was noted at the site inspection the land behind the house on the northern side sloping towards the rear of the property was saturated, but this was after some exceptionally heavy rainfall of recent times. However this area of land, which appears to be designated for the native food production in the Master Plan (See Figure 2), may not be as well drained as other parts of the property and if the native species prefer well drained soils, which is likely, the location of this activity may have to be reconsidered. Further observation through more normal seasonal conditions would be advisable to assess if this is the best area for the native plantings before proceeding with this part of the agricultural plan.

A detailed analysis of the soils was undertaken by Douglas Partners for their Effluent Disposal Assessment. This included measuring the pH of the surface and sub –soil as well as other measures useful to assessing the suitability of the soils for agriculture. This information was judged to be sufficient at this stage for assessing the feasibility of the agricultural demonstration units that are proposed, so no further soil tests were done (Douglas Table 1 p4). At some later stage prior to planting either crops or pastures, soil fertility tests should be undertaken to assess the fertilizer requirements for the plantings.

Soil pH measured in CaCl was 5.4 in one bore hole and 4.8 in another. (Douglas Table 1 p4) This indicated the soil is acidic and while quite suited to citrus which prefer acidic soils would benefit from application of lime to make it less acidic and more suitable for other crop and pasture species. A single application of 1-2 tonnes of lime to ha. should raise the pH into the region of 6, which would make it suitable for most field crops and pasture species. The cost of liming is between $60-$100 /ha. and would only need to be carried out once every 6-8 years. Gypsum may be an alternative to liming as it will also raise pH and given the low cation exchange capacity (CEC) observed by Douglas of 1.9, gypsum may improve the ability of soils to hold onto nutrients (Douglas Table p4). It is suggested that prior to undertaking the spreading of lime or gypsum and any plantings standard agricultural field soil tests be undertaken to determine pH, CEC and nutrient levels. From these tests an agronomist would be able to make recommendations as to the best method of soil amelioration, either lime or gypsum, and the rate of fertilizers to apply to insure the plants have an adequate nutrient balance.

In summary the soils are well suited to most forms of agriculture, however they require some moderate amelioration, which is now routine with most Australia agricultural soils, through the application of either lime or gypsum, and the usual application of fertilizer to enhance nutrient balances before sowing crops or pastures.

2.4 Pastures

As mentioned above, kikuyu (*Pennisetum clandestinum*) has taken over most of the agricultural land while it has not been cultivated. This is not unusual, as kikuyu is a vigorous growing plant, that propagates by stolons (that is putting down roots from stem nodes so that it has the effect of creeping across the landscape as a thick carper of grass), and thrives in the high rainfall, sub-tropical Central Coast climate. While a useful pasture for grazing cattle especially through the summer and autumn, kikuyu ceases to be very productive in the colder months. Kikuyu is a perennial tropical species introduced from East Africa, and does not perform well when soil temperatures are low. As a result feed production through the winter and spring can often be severely constrained. Vital to remediation of the land for crop production and the establishment of more nutritious pasture species, will be removing the kikuyu. This can be done by spraying and cultivation, especially discing, which will cut up the kikuyu. Kikuyu is an impediment to the use of tyned implements so makes sowing new pastures difficult unless it can be cut up to pass through the seeder, which is why cultivation by disc, or rotary hoe, is necessary.

Other pasture species observed were White Clover (*Trifolium repens),* subterraneum clover *(Trifolium subterraneum*) and hayed off Paspalum *(Paspalum dilatatum*). A wide variety of minor crop weed species were also found in the pasture sward such as Wild Radish (*Raphanus raphanistrum*), Wild Geranium (*Erodium spp*) and Plantain (*Plantago spp*) . Photo 3 shows the pasture sward in its current state across much of the property – a mixture of kikuyu, clovers and other grasses and broadleaf weeds. These broadleaf species all make excellent feed for livestock and the sheep that are present on the farm would thrive on them, but will have to be sprayed out for cropping. This is not difficult and a range of broadleaf herbicides, such as Metsulphoron-Methyl can control them.

Photo 3
Pasture Sward on "Coolamatong"

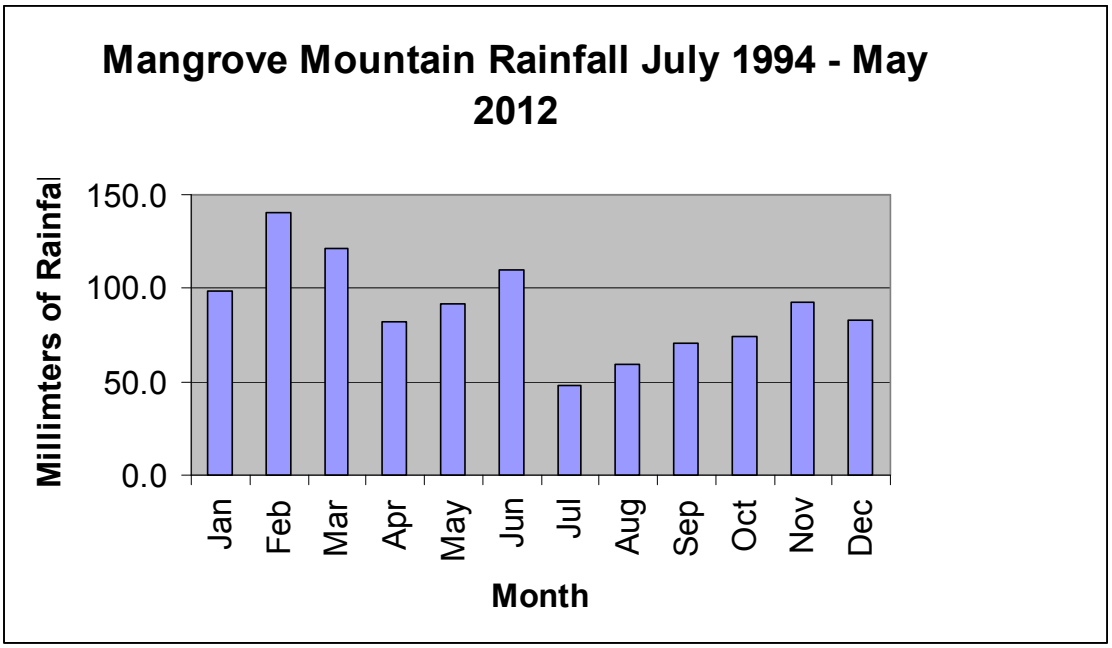
2.5 Climate

The Bureau of Meterology's (BOM) rainfall records for Mangrove Mountain weather station only go back to July 1994. As a result, with only 18 years of data, the data may be insufficient to determine true rainfall averages for Mangrove Mountain, as a longer data series is needed for absolute confidence in the accuracy of the average rainfall figures[3]. Longer data series are available for weather stations that are more distant to the farm but because of the significant variation in rainfall averages on the escarpment compared to lower altitude stations, they are also unlikely to be any more accurate with regard to getting an understanding of the farms average rainfall. So the decision was made to use the available 17-18 years of data measured at the Mangrove Mountain P.O. which is only 5 kms away rather that a longer data series from a weather station quite distant from the property. According to the BOM the average annual rainfall (a.a.r.) for Mangrove Mountain over the past 18 years is 1072.1 mm. The range varied from 724.6 mm to 1917.8 mm.

Graph 1 below shows the average monthly rainfall distribution for Mangrove Mountain. It can be seen from Graph 1 the highest average rainfall months are in summer and early autumn and the lowest average monthly rainfall occurs through the late winter spring. This is a fairly typical coastal rainfall distribution and from it can be inferred that the most likely period of seasonal feed shortage for livestock as a result of low pasture production will be the period from July –October.

Graph 1
Mangrove Mountain Seasonal Rainfall Distribution

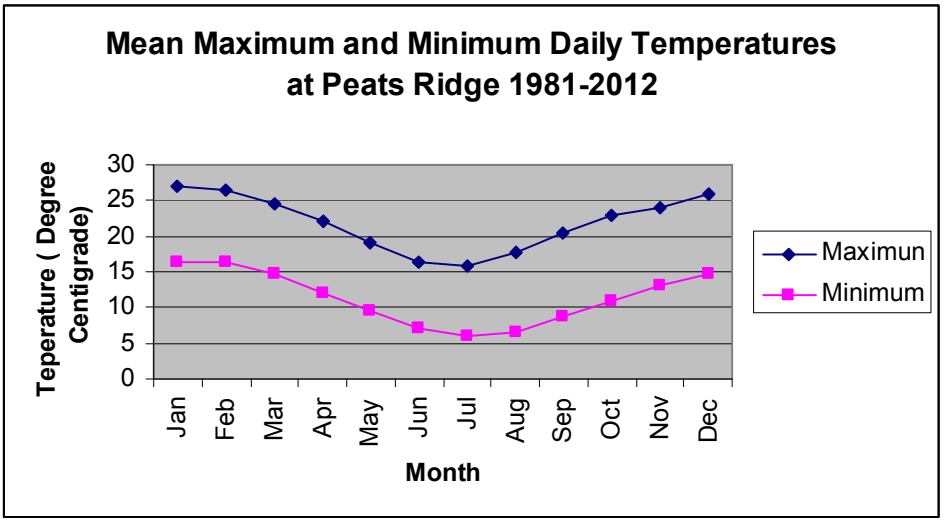
[3] Because at the time of writing the June 2012 rainfall total is incomplete the data series only include 17 observation for month of June and 18 observations for all other months.



Source: Bureau of Meteorology (June 2012)

Graph 2 shows the mean monthly maximum and minimum temperatures measured at Peats Ridge over 31 years from 1981 to 2012. The coldest month is July, which also corresponds with the lowest rainfall month as can be seen in Graph 1. As a result plant growth is limited by both cold and lack of moisture most years and this imposes some constraints on livestock feed supply from pastures, possibly requiring a winter active fodder crop to plug the seasonal feed gap. Alternatively some supplementary feeding may be required for livestock through the period of low pasture growth. The low winter spring rainfall also makes the Mangrove Mountain area unsuited to growing some winter cereal, pulse or oilseed crops.

Graph 2
Average Monthly Minimum and Maximum Temperatures at Peats Ridge N.S.W.



Source : Bureau of Meteorology

2.6 Water Resources

Currently only a small dam in the south west corner retains any run –off on the property. This dam will need to be enlarged to provide water for stock and other agricultural uses. The property has an entitlement under the NSW Water Management Act 2000 to retain a certain amount of run-off water that falls on the property for stock and agricultural purposes. This is known as the Harvestable Right and is calculated using a dam capacity multiplier factor provided by the Department of Land and Water Conservation. Mangrove Mountain is situated on the Department's Map 4 within 0.9 multiplier zone. To calculate the amount of water the property can retain the area of the property, (25.5 ha.), is multiplied by 0.9 to calculate the permitted dam capacity in megalitres (ML) (Farm Dam Assessment Guide p2) A dam with a capacity of 22.95 (say 23) ML can be built on the property to contain the harvestable right run-off. This would provide adequate year round water for the livestock the property is capable of carrying on an extensive grazing basis.

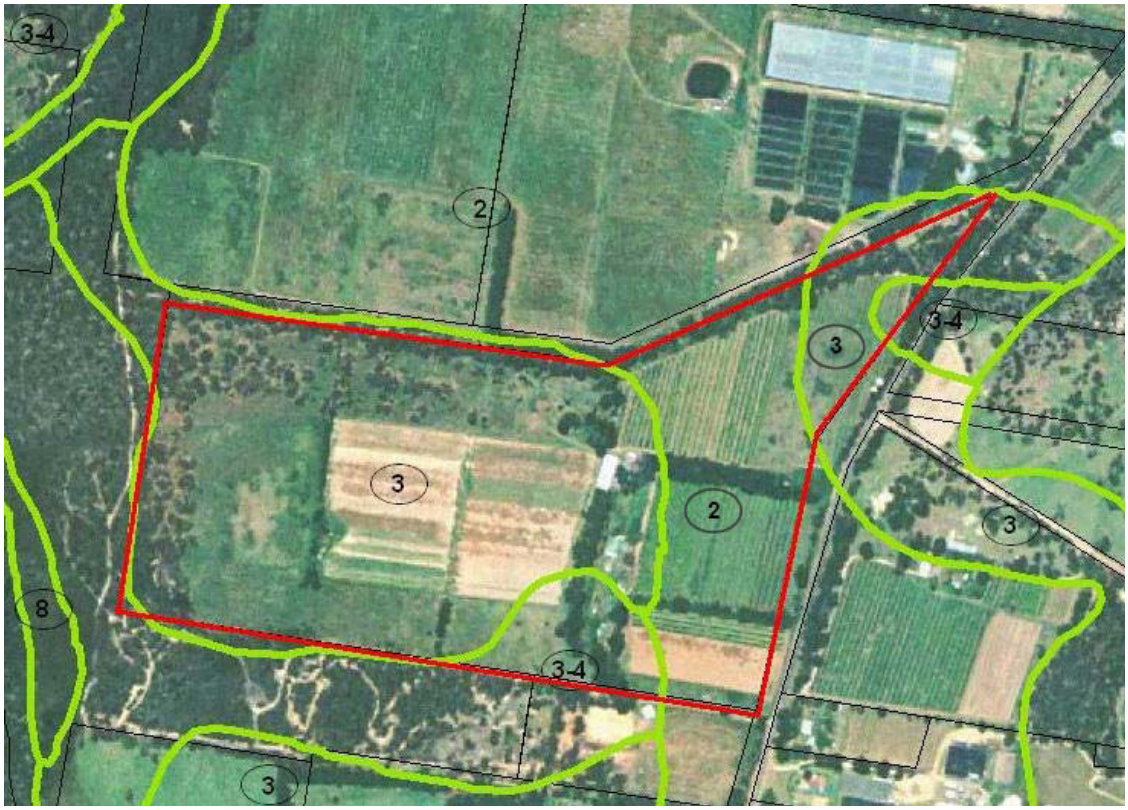
The property has licensed bore. Details of which will be appended to this report.

The feasibilty of further treatment of the effluent water so that it can be utilized for agricultural purposes such as micro-irrigation of fruit trees under mulch is also being investigated. Approximately 4.8 ML of treated effluent will be generated each year. If the use of effluent water is feasible, an agricultural plan to use the available water will be developed.

2.7 Agricultural Classification of the Land

In a letter to Gosford City Council Richard Carter, Manager of Resource Planning and Development, Department of Primary industries (DPI) indicated that the DPI classified the land as predominantly Class 3, with an area of Class 2 land extending east from the base of a triangle formed by Wiseman's Ferry Road and Ikara Road. Two small areas of land were designated Class 3-4, one on the eastern side of the triangle mid way between the main entrance and the tip of the triangle, and the other area south of the house and sheds, adjacent to the boundary with the Pony Club (See Figure 1 Agricultural Land Classification Map).

Figure 1
Agricultural Land Classification Map



This consultant concurs generally with the DPI assessment of the land classification, although the precise reason for the distinction between the Class 3 and Class 4 land on this particular property is unclear and probably has more to do with the scale of the maps used to plot the land classifications than any real distinction between the actual land on "Coolamatong".

N.S.W. DPI (formerly N.S.W. Agriculture), use a classification system to rank land according to its suitability for agriculture use (Riddler 1996). The most valuable agricultural land is Class 1 land, which is described as *"Arable land suitable for intensive cultivation where constraints to sustained high levels of agricultural production are minor or absent"* (Ridder 1996 p.1). That is, land that can be used to grow winter crops in rotation with pastures for livestock production *"without any significant constraints to sustained production"*. This property is probably not capable of "*sustained high levels of agricultural production*", because of limitations imposed mainly by the soils, but also to some extent by the climate and topography, as discussed above, so could not be classified as Class1. But it does meet the criteria for Classes 2 and 3 as discussed below.

The next category is Class 2, "*arable land suitable for regular cultivation for crops but not suited to continuous cultivation*" (Ridder 1996 p1). The land on the eastern side of the block and classified as Class 2 would appear to meet this criteria, so in the opinion of this author is correctly classified. It might be argued that some of the land on the western side of the house and sheds is little different to that which has been classed as Class 2 on the eastern side, so the rationale for the distinction is a little ambiguous in the eyes of this author.

Ridder (1996) defines Class 3 land as *"Grazing land or land well suited to pasture improvement. It may be cultivated or cropped in rotation with pastures. The overall production level is moderate because of edaphic or environmental constraints".* Apart from the uncleared land around the perimeters of the western half of the block, the remainder of the land would appear to fit the criteria for Class 3 land and be suitable for pasture improvement and cropping in rotation with pastures.

Ridder further describes Class 3 land as:
"Includes all lands which can be safely cultivated for crops and establishment of pasture without degradation of the soil and excessive erosion. This usually contains a maximum of 10% slope. Contains areas of isolated out crops of rock. Includes contour banked areas with moderate limitations for growth. Cropping frequency may be 4 crops in ten years or less."
While no rocky outcrops were observed on the property, the slope on may exceed 10% in a few places near the western boundary as identified by Douglas (Douglas p 2).

2.8 Farm Infrastructure

The house was not inspected but appears to be in a state of some disrepair. Likewise were a number of sheds and other buildings. However since these are all marked for demolition to make way for the new school buildings their condition is therefore somewhat superfluous. They were not inspected.

A secure, steel framed, corrugated iron machinery shed, in good condition housed a new Kubota 95 hp Tractor with a rotary hoe and bucket attached. A slasher, a spray unit, a fertilizer spreader and numerous other pieces of equipment were observed and appeared to be in good working order. A Mercedes Benz M Track vehicle was also in the shed.

The boundary fence consists of one or two barbs, three wires with rusty hinge joint attached. The uprights consist of star pickets with timber strainers and various intermediate posts, many in disrepair. As mentioned above the fence needs replacing. Much of the hinge joint has rusted out and the barbs are broken in places and would not be stock proof. A small plot was newly fenced (although rather unprofessionally) in order to create an enclosure to contain the sheep.

There are no cattle or sheep yards or other facilities suitable for handling livestock.

2.9 Surrounding Land Use

As mentioned above Mangrove Mountain has traditionally been a citrus growing region but this has declined in recent years. However there are still a number of citrus orchards in the locality and now a diverse range of alternative agricultural activities. Tim Kemp, Chairman of the Central Coast Branch of N.S.W. Farmers in his submission to GCC with regard to this proposed development, stated there were 20 rural businesses within a 1.5 km radius. These included; hydroponics; field and greenhouse vegetables; nursery ornamental; advanced trees; poultry for meat; cattle; goats and fish. Horses could also be added to this list.

The immediate neighbour on the northern side of Ikara Road, at 2924 Wisemans Ferry Road, operates a wholesale nursery business. This property is known as "Marion Grove". The business has a website http://www.mariongrovenursery.com.au which offers a full description of the types of plants grown in the nursery. The plants are grown both under shade cloth and in open fields. The owner, Mr Mark O'Malley Jones expressed some concern that having the proposed school next door could interfere with the routine spraying of pesticides that he has to undertake in order to keep his plants healthy and to meet the quality requirements of his retail customers. Spraying is done every week using a 400L blast sprayer mounted on a small tractor. Photo 4 shows Mr O'Malley Jones blast spray unit and Photo 5 shows the wholesale nursery plants under shade cloth.

Photo 4 and 5
Blast Spray Unit and Shade House on "Marion Grove" Nursery

On the eastern side of Wisemans Ferry Road is a property at 2931 running beef cattle. Further south along Wisemans Ferry Road is a citrus orchard and what appears to be rural residential property at 2985 Wisemans Ferry Road.

Adjacent to the south eastern corner of the property at 2991 Wisemans Ferry Road, Scotts Tubes Pty. Ltd. operate another wholesale nursery. The owner Greg Scott was also interviewed. He was less concerned about spray drift issues because his plants are contained within hot houses and he is further away from the where the proposed school will be built, however he did have some concern about traffic movements on Wisemans Ferry Road.

3. Demonstration Agricultural Activities of the School

3.1 The Agricultural School Proposal

Details of the proposed school are provided in the Ingham Report (Ingham p5), so the focus of this section will be solely on the agricultural aspects of the school plan. The agricultural curricula will be based on the NSW Department of Education curricula for years 10, 11 and 12. A former Head Teacher in Agriculture at James Ruse Agricultural High School and author of the HSC textbook has been approached to advise on the content of the agriculture curricula. A feature of this course will be the provision of practical agriculture. As mentioned above many of the State High Schools that offer agriculture in the Sydney metropolitan area have limited land and other resources to enable them to offer students a satisfactory agricultural experience on campus.

The underlying philosophy of the agricultural education program will be a learning model based around practical experience. Educational research has shown that the experiential learning model is far superior to the classical didactic class room teaching of theory alone, and this is especially so in an applied technology subjects like agriculture. Without exposure to the practical situation, students have little appreciation of the knowledge they are given in the class room. As a result they have less motivation to learn. Giving students exposure to the complexity of agriculture practice makes them more inquisitive to find out how things work, i.e. explore the literature to learn the theory, so that they might apply it to solving a practical problems. My own background includes many years of teaching at the University of Western Sydney – Hawkesbury in an experientially based agricultural education program where student learning was based around group and individual projects. This model will be adopted to fit the secondary school curriculum and applied at the proposed school.

Another educational innovation that will be attempted at the school is for the students to run the farm enterprises. While the enterprises will be small scale, they will be designed to emulate commercial farming businesses as far as practically possible. The incoming students will choose an enterprise to become engaged in and will form the basic labour force for the farming enterprise. The senior students with more experience of the enterprise will fulfill the managerial roles, shaping the business strategy and preparing the business plan for year ahead. An outstanding senior student from each enterprise will be elected as the Managing Director to report to the agricultural master. Each year the enterprises will be assessed against various commercial and educational criteria to determine the best performing enterprise, so an element of competition will be introduced to the program to encourage student performance. I have seen a similar model to this working very successfully in the Philippines. It has significant advantages over the old style school practical agricultural enterprises, where staff were employed under government conditions to run the enterprises and students merely worked on the farm as unpaid labour and derived little learning from the experience. Under this model students had little insight into how the enterprise performed and in fact they generally performed poorly and were poor examples for student learning, primarily because the employed staff running the enterprises had little interest in the enterprise's performance. On the other hand the Philippine model was commercially successful and an excellent case study for student learning.

The actual enterprises to be developed will be determined after more detailed study of the educational needs of the students and the economics of the various enterprises at the Mangrove Mountain site. At this stage it is anticipated they will include an orchard, field cropping, a native food crops section, and one or two small specialist livestock venture such as a cattle stud or goat breeding enterprise etc. It is anticipated that four or five enterprises will be run on the property and the areas designated for these are shown in the Master Plan Figure 2 below.

3.2 The Farmland Master plan

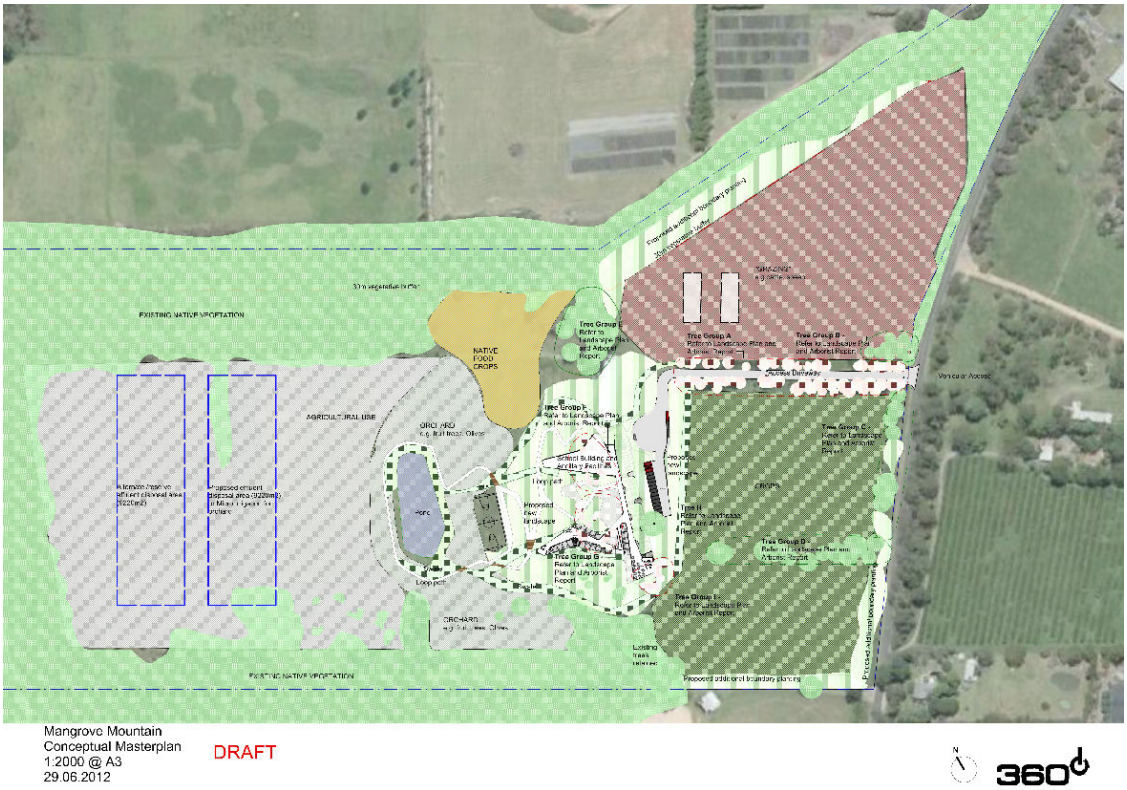
The Master Plan in Figure 2 below shows the four key agricultural enterprise areas; the orchard, field crop area, native foods production area and the livestock paddocks.

The area set aside for effluent disposal may also become an agricultural production area subject to the feasibility of further treatment of the effluent so that it is suitable for agricultural use. Douglass Partners are currently investigating this and an addendum to this report will be prepared outlining a proposed micro irrigation scheme to use the treated effluent on orchard trees or other forms of agricultural production, if Douglass Partners report finds that it is technically feasible. Under the existing plan land around the effluent

treatment area will be used for small scale experimental plots, for teaching and agricultural research projects, not for food production.

The agricultural production area assuming the effluent disposal area is used for agricultural purposes and the native vegetation area, cover approximately 80% of the site. So, quite clearly the greater part of the site conforms in every way to the land uses that are envisaged in the objectives of the GCC Rural 1(a) zone.

Figure 2
Agricultural School Masterplan



Also marked on the Master plan is a vegetative buffer zone 30 metres wide, between the proposed school and the "Marion Grove" nursery. A small section of the buffer zone will require further plantings, but for the most part the existing native vegetation along the northern boundary is adequate.

On the eastern side of Wisemans Ferry Road there is an existing tree barrier around the neighbouring citrus orchard approximately 25 metre wide. Together with the vegetation along the roadside verges and a low planting of native species and some trees, as indicated on the Master Plan on the eastern boundary, should provide an adequate spray drift buffer with the citrus orchard.

4. Discussion of the Issues Raised by Council and Other Interested Parties

The issues discussed below are those considered relevant to this consultant's expertise and relate primarily to agriculture, educational and rural character of the property. Gosford City Council has raised a number of other issues with regard to assessing the application, such as water run-off quality within the Mangrove Weir Catchment, effluent treatment, traffic etc. but these are outside the scope of this report and the expertise of this consultant, so will only be discussed where they have some relationship to the proposed agricultural activities.

4.1 The Need for Investment in Agricultural Education

Agricultural education in Australia is in trouble. The current estimated demand for tertiary agriculture graduates in Australia is around 2000 per year, the current supply is only around 800. Only 7% of the agricultural workforce has a degree, compared with 22% of the overall workforce (Pratley, 2008). Declining university enrolments are a major issue for the agricultural sector with the potential for significant impacts on productivity if the issue is not addressed. It should be noted that the agricultural sector for many years led the economy in terms of productivity[4]. The failure of the agricultural education sector to supply trained graduates and other tertiary skilled personnel threatens the future performance of the sector.

Evidence from the United States indicates that improved secondary curriculum has lead to an increase in tertiary enrolments, particularly for students from urban or non-farming backgrounds. In Australia, the next generation, especially city kids, have limited knowledge about significance of agriculture to the Australian economy, or the scope of agricultural careers. The 30% decline in tertiary agriculture graduates observed from 2001 to 2006 is expected to continue unless there is a significant increase in enrolments (Pratley & Copeland, 2008). With the global demand for food predicted to increase by 110% as the population grows towards 9.1 billion in the next 40 years the current state of tertiary agricultural education can only be considered to be at a crisis point (Cribb, 2008).

About seven years ago I undertook some research into the size of the agribusiness sector in the Sydney area and discovered that 74 of the top 200 agribusiness firms had their headquarters in the greater Sydney area, representing 47% of the total turnover of agribusinesses throughout Australia. 31 had operations located in Western Sydney. Eleven key industry personnel were interviewed to canvas their views across a wide range of issues. From these interviews, it was determined that there is a clearly defined agribusiness career;

[4] Beare (1999) reprted that agricultural productivity for the 20 years up to 1996-7 was 2.5% per annum compared with the rest of the economy with productivity of 1.0% on average.

that industry is seeking graduates with a mix of business skills, technical knowledge and an understanding of farming; that many of the current graduates in the field fail to meet industry expectations often because of inadequate personal and professional development.

The situation of agriculture in the secondary school sector is also in crises. Specialist agricultural high schools like James Ruse and Hurlstone are no longer channeling students into tertiary agricultural course as they once did. Instead, because they are selective schools, most the students completing the higher school certificate attain high TER's and choose to go into other tertiary courses, such as Medicine, Law etc. High Schools that were once on the fringe of Sydney and had land for agricultural plots are now land locked in suburbia, and many have sold off their agricultural land (e.g.the Catholic Oakhill College at Castle Hill). As a result the opportunity for suburban Sydney secondary students to study agriculture, is greatly diminished.

One group that finds it particularly difficult to enter agriculture are the sons and daughters of recent immigrants. Many of these families come from a farming background in their country of origin and retain a strong interest in agriculture. With different culinary traditions and sometimes religious requirements for the preparation of food (such as halal food, kosher food etc.), these communities create demand for farming and downstream food processing businesses that are able to supply their special food needs. To do this they need to educate the next generation in agriculture and food production.

Consider the enormous contribution immigrants from Italy, Greece, Malta and other Mediterranean countries have made to agricultural production in Australia since WW2, (e.g the wine, olive, vegetables and even citrus industries etc) and the culinary diversity of food in Australia that has resulted from the business activities of these immigrants. In my generation many of the agricultural students were the sons and daughters of such immigrants and they went on to help build a diverse range of agricultural businesses from wine making to pasta manufacturing. Australia risks missing altogether the contribution this next wave of immigrants can make, unless opportunities are made available for their sons and daughters to study agriculture.

This proposal therefore to build a secondary school focused on training students in agriculture is an important addition to the agricultural education field and should be given support.

Another issue is the gradual withdrawal of governments from involvement in the agricultural sector, in all aspects; research, extension and education. The industry can no longer expect cash strapped governments to fund such activities and must look to the private sector to undertake such investments. It is projects such as this that will provide for the future of agriculture and it ought to be incumbent on governments since they can no longer afford to make the investment themselves, to at least do their best to facilitate such private sector initiatives.

4.2 Land Zoning

The land on which the proposed school is to be built in zoned Rural 1(a). While the zone is primarily designed to identify land for agricultural use and protect it for that use, educational establishments are a permitted use. Because this school will be focussed on teaching agriculture the greater proportion of the site, estimated by Ingham Planning as 80% of the land area, or some 20 ha., will be remain in agricultural use as demonstration units to support the practical agricultural education of the students (Ingham p8). In other

words 20 ha. of the land out of a total of 25.5 will remain in agricultural production the purpose for which it is zoned.

Some of the comments put to Council have suggested that this is not an appropriate site for an agricultural high school, because it is a school in the Rural 1(a) zone. But they forget this is an agricultural high school. Where should an agricultural school be built? Surely not in an urban zone? Imagine the potential for conflict if the agricultural demonstration plots were built in an urban zone, let alone the cost factor and the likelihood that within a few years the school grounds would be sold off to realize the underlying urban value of the land. The logical place to locate an agricultural high school is in a rural zone.

4.3 NSW Department of Primary Industries

A letter from Richard Carter of NSW DPI was received. The DPI's letter first suggests that the school should be located east of the Pacific Highway, which infers it should be in the urban area surrounding Gosford. As pointed out above this it is illogical to build an agricultural high school, with a range of agricultural activities that are essential to teaching practical agriculture, in an urban environment. This can only lead to land use conflict and pose constraints on the schools capacity to operate practical agricultural demonstration units. This is one of the problems faced by agricultural schools such as James Ruse which is land locked into urban Carlingford and one the causes of the demise of agricultural secondary education around Sydney.

The DPI letter goes onto say that under "*the draft Gosford Development Control Plan for Mangrove Mountain the primary focus for development in this location is agricultural development – an educational establishment may be contrary to that vision/goal*". This statement completely neglects to point out this is an **agricultural school** , not just any "*educational establishment*", and surely the development of an agricultural school is consistent with "*agricultural development…. in this location*".

The DPI's next point seems rather confused. The letter says "*The only proposal to use the land commercially for agriculture is for educational purposes."* Yes, the proposal is to use the land to build an agricultural high school, but 80% of the land area will be used for agricultural demonstration plots; that is **agricultural production**, to facilitate the students' practical agricultural learning. This use is entirely consistent with the provisions of the zone, which does not specify that the agricultural activity must be commercial. Given this is a private agricultural school that will no doubt charge students fees, it will be a commercial business anyway, even if some of the agricultural demonstration plots are not individually commercial enterprises.

The history of the applicant should not be relevant as it may be the applicant first venture into this field. The proposal should be judged on its merits and if the applicant fails to carry out the conditions of the DA if granted, then the Council has the power close down the activity for non-compliance.

The issue of potential land use conflict is a real one and I think the only issue the DPI raises that the client needs to address. I discuss below in Section 4.4 how to mitigate any potential conflict in more detail.

With regard to the issue of biosecurity management, if a poultry disease outbreak occurs, as has happened in the past in the Mangrove Mountain area, then the DPI has the power to take whatever steps it needs to eradicate the disease. This may include quarantine of properties and destruction of the birds on the property. The agricultural school if

quarantined, like all other agricultural establishments effected in the district, would have to abide by whatever measures the DPI required them to take. It is my understanding however, that in view of the previous experiences of disease outbreaks in the Mangrove Mountain area and the potential impact any new disease outbreak could have on poultry producers in the district, that the applicant has no intention of engaging in any poultry production.

With regard the DPI's final point, that the "*Rural 1(a) Zone is not an equivalent to the prescribed zones for educational establishments in the Infrastructure SEPP*", the apparent conflict between the planning instruments, does not take away from the fact that educational establishments are a permitted use in the Rural 1(a). In the notes attached to the DPI letter it is suggested that the agricultural school should be established in RU2 Rural Landscape, RU4 Primary Production Small Lots, RU5 Village and RU6 Transition. Again the DPI seems to assume this is an ordinary school, not an agricultural high school. It takes no account of the need for practical agricultural demonstration plots and the land area these would require to be a meaningful educational experience for students, or the setbacks etc. (which are discussed below) to prevent land use conflict. If an agricultural school is sited in a village for example, the land use conflicts will be similar to that of an urban area. Rural residential areas would pose similar problems.

Then there is the issue of when these zones will come into effect in Gosford Shire. Currently the zone is Rural 1(a) and the applicant has to operate under that zoning if the investment is to go ahead now. What the DPI propose is impractical. All in all the DPI's response is quite disappointing. One would think that they would be supportive of any proposal to build a secondary school which has as its express pupose the teaching of agriculture.

4.4 Land Use Conflict

As this is a small agricultural high school located in an agricultural locality some aspects of the commercial agricultural operations on surrounding farms may impact in a minor way on the amenity of the staff and students. This must be expected, and accepted, by the school members if they choose to operate in the Rural Zone 1(a), which has as its key objective the preservation of agricultural activities. I would put into this category occasional noise from tractors and other agricultural implements, the possibility of some raised dust from cultivation and traffic movements, dust from broadcast fertilizers, vehicle movement and reversing noises, livestock noises such as cattle mooing etc., security lights. These are things that can be normally be expected in a Rural Zone, where the land is used for farming and are seldom more than a minor irritant at worst.

A number of submissions received by GCC in response to this DA application raise a range of these concerns. Letters from Dunwoodny, Boskos, Watson, Ralph, Burrell, Hunt and Marsh mention many of these issues, which as said above, would impose minor amenity constraints on the school staff and students. A number of them also mention the issue of spray drift and bird scaring devices which are discussed in more detail below. Some of the other issues, such as vandalism, which should it occur would be a police matter, are beyond the scope of this study and not issues that will be dealt with in this report. Another issue mentioned by some respondents is the call to prayer, but there appears to be a misunderstanding with some in the community about the nature of the proposal school. This will be a **non-denominational private agricultural high school** and there will not be a call to prayer.

Two possible impacts that may be more serious are the bird scaring devises and spray drift as mentioned by both Richard Carter of the DPI and Tim Kemp of the Central Coast Branch of the NFF. Bird scaring devices are used by stone fruit growers to ward off birds when the fruit ripen, so they are used only seasonally and for relatively short periods of time during

daytime when the birds threaten to damage the fruit. While loud, like a shotgun report and fired off frequently in season, the noise should not disrupt the school to the extent that it would prevent any normal activities.

I was unable to determine if any of the surrounding farmers use bird scaring devices, the two I interviewed don't. I suspect there are no such devices in the immediate surrounding area, but may be some in the wider locality. Tim Kemp is making inquiries of his members to see how many stone fruit farms are in a 1.5 kilometre radius of the proposed school so that the impact on the school of such devices might be more accurately assessed.

The potential for spray drift is likely to be the most important issue regarding the neighbouring farms because chemical sprays are used extensively on at least one neighbouring property, the wholesale nursery on "Marion Grove".

In the interview with Mr Mark O'Malley Jones, the owner of the nursery, he mentioned some of the chemicals he used on a regular basis. The list included insecticides, fungicides and herbicides with a wide range of toxicities. When approached by phone later to verify the brand names of the chemicals used, Mr O'Malley Jones said he did wish to co-operate any further with this investigation, but that he would be willing to provide the information to GCC. If GCC is able to obtain this information at a later date I am prepared to examine the chemicals and provide advise on the range of toxicities and the precautions that need to be taken, including the adequacy of the provisions for setbacks and buffers, to ensure his operations are not compromised, or that of safety of the school students and staff.

It is likely the chemicals used on the "Marion Grove" nursery will range in toxicity from relatively benign chemicals that have been used for many years with little known toxicity problems for humans, such as glyphosate, to some potentially harmful chemicals such as the fungicides and insecticides which will be more highly toxic. The setbacks and buffers suggested below have been designed with this range of toxicities in mind.

When diluted for spraying the likelihood of human exposure to toxic levels of the chemicals is remote, however the spray operators would need to take precautions to ensure that spraying does not take place during adverse weather conditions when spray could drift towards the school. As discussed below the existing setbacks should, with an additional buffer zone, prevent any spray drift onto the school.

The decision to release a pesticide into the environment rests with the person with the most control over the situation, that is, the person carrying out the spray application. There may be a number of individuals involved in a decision to apply a pesticide such as advisor agronomist, State Government Departmental advisors etc. but the ultimate control of the situation falls back on the person applying the pesticide as only they have the ability to judge if the application conditions are suitable and that application machinery is set up and calibrated and adjusted to suit the application that it is to be used for. It is a requirement in NSW that people applying pesticides in a commercial operation are required to undertake a competency based training program in the use of pesticides - (known as Chemsert). Only holders of a current Chemcert certificate should apply pesticides. It should be noted that people applying pesticides are also required to keep and maintain records of any spraying of chemicals. The records include the type of pesticide, how much was applied, where it was applied who applied it, when it was applied, how it was applies and under what weather conditions it was applied.

4.4.1 Setbacks and Buffer Zones to Improve School Amenity

Guidelines for the separation and buffering of the agricultural activities from residential sites have been developed by Cessnock City Council (CCC), in the Hunter Valley. These detailed planning guidelines were developed to address the issue of housing amenity within vineyard developments (Cessnock City Council (1999).

CCC recommends 80 metres separation of housing from vineyard plantings, with a 30 metre vegetative buffer. As this guideline was prepared specifically for the vineyard industry, which use blast sprayers that deliver spray to trellised grape vines at a similar height to the blast sprayer used by Mr O'Malley-Jones to spray his nursery tables, it should be adequate to protect the school residential area from any spray drift from the "Marion Grove" nursery. The school residential buildings are more than twice the set back from the boundary with "Marion Grove" than the distance recommended by CCC as sufficient and the road and vegetative buffer of 30 metres which is discussed below, add to the protection measures.

The Master Plan in Figure 2 shows the 30 m buffer zone along the northern boundary.

Along much of the boundary a sufficient buffer zone of native vegetation already exists. Where it is deficient, new plantings consisting of a selection of native vegetation to a height of at least 20 metres when fully grown, will be made. The buffer zone should contain a random planting of native shrubs and trees with a range of heights and differing growth habits to ensure a complete foliage barrier. It should contain some fast growing species so that a barrier of at least 2 metres in height will be in place prior to occupancy of the school. The buffer will provide a permeable barrier, allowing air to move through it, but disrupting the uniformity of any breezes likely to carry spray drift. This will shield the school from any spray drift from the north.

Little spraying is likely to be undertaken on the beef property across Wisemans Ferry Road and the set back from this property plus existing roadside vegetations should be adequate to control any adverse effects of spray drift from this source. A 25metre wide vegetative buffer of fully grown trees already surrounds the citrus orchard next to the south on Wisemans Ferry Road and in conjunction with the existing vegetation along the roadside verges and tree planting along the boundary as well as the set back of the school buildings etc. well exceeds the minimum protections recommended by CCC. Similarly with Scotts Tubes wholesale nursery. As well Greg Scott indicated that their plants were all housed within hot houses so there was little or no spray drift emitted from the hot houses.

The south and west of the property are the Pony Club and Crown Land which are unlikely to be sprayed with anything other than an occasional benign herbicide like Roundup and so are unlikely to cause any spray drift problems because of the vegetative barriers that already exist.

4.5 Impact of the School On the Agricultural Activities of Neighbours.

It is hard to conceive of many situations where the school is likely to have a significant impact on the activities of the surrounding neighbours, if normal care and diligence is exercised when undertaking all agricultural operations.

The only comment I have received was that it may cause the neighbours to be a bit more cautious when spraying, but the legislation is very clear point, it is the onus of the operator to make sure that they only spray when conditions are safe.

Part 2 Division 2 Section 10 Pesticide Act 1999 no 80 states:

10 Injury to persons or damage to property resulting from pesticide use.
1) A person must not use a pesticide in a manner that;
a) Injures or is likely to injure any other person, or
b) Damages or is likely to damage any property of another person.

3)"Due Diligence" defence
It is a defence in any proceedings against a person for an offence under this section if the person establishes
a) That the commission of the offence was due to causes over which the person had no control, and
b) That the person took all reasonable precautions and exercised all due diligence to prevent the commission of the offence.

So if the operator abides by the requirements of the Act they should have nothing to fear and there should be no limitation placed on them carrying out their normal spray routines.

Noise from the school and outdoor class room activity may create a minor disturbance to the amenity of the neighbours, but this would be insignificant compared with the normal agricultural related noise, such as tractor engine noise etc. that are to be expected in a rural zone.

The agricultural activities carried on the school land, such as occasional dust from cultivation, animal noises, tractor noise etc., will all be similar in every respects to the activities that are carried out on the surrounded land and as mentioned above, are to be expected in a rural zone.

Conclusion

This report has assessed the proposal to build an agricultural high school on the property at 2964 Wisemans Ferry Road and concludes;

- that it is a permitted use under the current Rural 1(a) zoning;
- that the bulk of the land (80%) would be used for practical agricultural activities associated with the teaching of agriculture at the school and hence would be similar in nature to those activities carried out on surrounding farms; and
- that the school is unlikely to interfere with the agricultural activities of the immediate neighbours, or other farms in the surrounding area, in any significant way.

The incorporation into the Master Plan of 30 metre buffer zones and setbacks in excess of 80 metres for all school buildings and residences, will insure that spray drift from neighbouring properties does not impact the school.

From an agricultural perspective there are no legitimate reasons why the school should not be able to operate successfully on this site. The land area is large enough for the school to carry out all the activities it needs in terms of teaching and practical agricultural activities. The land itself is fertile enough and the climate conducive to the range of agricultural activities that are needed to provide students with a diversity of agricultural experiences. If the school did go ahead it would contribute to the local community and the broader agriculture sector, by the provision of a scarce private educational resource with flow on economic benefits to both.

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Appendix 1

SENIOR CONSULTANT
Robert Nicholls (Nick) Truelove

EXPERTISE

- Agricultural Marketing.
- Agribusiness Management.
- Farm Management.
- Land Capability Assessments.
- Agricultural Economics.
- Agricultural Project Management.
- Innovative Agricultural Product Development.
- Agricultural and Food Exporting.
- Meat Processing.
- Grains Industry Policy
- Wool Production and Marketing

CAPABILITIES

- **Marketing Strategy.**
- **Feasibility Studies.**
- **Business Plans.**
- **Rural Property Management.**
- **Financial Analysis of Agricultural Businesses.**
- **Property Development Plans**
- **Agricultural Expert Witness.**

CONSULTING REFERENCES:

Roger Gain - Managing Director Don Fox Consulting Pty. Ltd. ph: 02-9980 6933

David Tayler – Former Manager. Hawkesbury Technologies Pty. Ltd. ph: 04 1346 6989

Appendix 2

Consultants CuriculumVitae.

EDUCATION:
B. Sc. Agric. (University of Sydney)
M. Econ. (University of New England)

Post Tertiary:

1985 N.S.W. ENTERPRISE WORKSHOP Business Plan for a Revolving Building System. (Second in the N.S.W.)
1990 AUSMEAT - Sheep Meats Specifications Course.
1999 Company Director Training Course. (Conducted by Henry Bosch former Chairman of ASIC for possible future directors of AWB Limited).

Awards and Scholarships:

1966 Martin MacIlrath Scholarship Univ. of Sydney.
1973-74 Australian Wool Board Post Graduate Scholarship.
1994 Rural Media Association of W.A. C.S.B.P. Award for best feature.
1995 Rural Media Association of W.A. C.S.B.P. Award for best feature.
1996 Rural Media Association of W.A. C.S.B.P. Award for best feature.

CAREER:

- (1971-79) Lecturer - Agricultural Economics and Marketing

Hawkesbury Agricultural College. Richmond N.S.W.

- (1990- 05) Lecturer Rural Enterprise (part time)

Faculty of Environmental management and Agriculture
University of Western Sydney. Hawkesbury. Richmond N.S.W.

Private Business:

- Director (1984-) - Kingsway Leathergoods Pty. Ltd. - Manufacturer of belts and buttons.
- Director (1988-) - True Foods Corporation Pty Ltd. t/as Agribiz Consulting
- Director (1997-) - Larribain Pty. Ltd t/as Downunda Souvenirs – Manufacturer and distributor
- Farm (1985 -) - 820 ha. livestock and cropping farm business at Cootamundra N.S.W.

RECENT RELEVANT CONSULTANCIES:

- (1993)Agricultural Consultant. Acquisition New Sydney Airport Badgery's Creek. Client: Perich Farms, Leppington Pastoral Company, Leppington.

- (1994) Agricultural Consultant. Acquisition North West Sydney Development Corporation . Client: Glenmore Dairy, Kellyville.
- (1997) Consultant - Feasibility Study for Horticultural Export Centre for North West Sydney. Client: North West R.D.O., Hassall and Associates.
- (1999) Agricultural Consultant – Agricultural Assessment of Two Orchards. Pittown N.S.W. Client: Don Fox Planning
- (1999) Agricultural Consultant – Farm Capability and Agricultural Assessment. Cattai. N.S.W. Client: Mr Brian Sherman
- (2000) Agricultural Consultant – Agricultural Assessment Rural residential Subdivision "Royalla" Queenbeyan. N.S.W. Client: Don Fox Planning
- (2001) Agricultural Consultant – Agricultural Assessment Small Landholdings Kemps Creek N.S.W. Client: Rhodes, Thompson and Associates
- (2001) Agricultural Consultant – Agricultural Assessment Rural Residential Subdivision "Royalla Stage 4" Queenbeyan. N.S.W. Client: Don Fox Planning
- (2002) Agricultural Consultant – Agricultural Assessment of Property at 607 Glenhaven Road Glenhaven N.S.W. To support Appeal for SEPP 5 D.A. to Land and Environment Court by Glenhaven Propoerty Holdings Pty. Ltd.
- (2003) Agricultural Consultant – Agricultural Assessment of Property at 599-601 Glenhaven Road Glenhaven N.S.W. To support Appeal for SEPP 5 D.A. to Land and Environment Court by M & R Civil Pty. Ltd.
- (2003) Agricultural Consultant – Consolidation and re sub-division Clarence Peak Station, McClean N.S.W. Client : Dr George Jacob and Mr Richard Scheinberg
- (2003) Agricultural Consultant – Agricultural development of property at Townson Road, Marsden Park. Client : Mr David Scheinberg
- (2003) Investigation into the Feasibility of a 4 year Agribusiness Degree at UWS-Hawkesbury Client: University of Western Sydney
- (2004) Vineyard Development "Sunnyside", Cudal. Client: Highfield Property & Development Co. Pty. Ltd., Northern Managers & Construction Pty. Ltd., and Mevale Pty. Ltd.
- (2006) Agricultural Land Classification and Assessment of the Agricultural Capability of "Taliesin", Queanbeyan, N.S.W. Client: Auscorp Limited & Country Landmark (Taliesin) Pty. Ltd.
- (2006) Assessment of the Impact of the Yarraman Vineyard and other Agricultural Activities on a Proposed Housing Development on "Wirilla" Jugiong, N.S.W. Client: Delta Dawn Pty. Ltd., Yarraman Developments and Don Fox Planning.
- (2007) Property Development Plan for Proposed Olive Grove on "Wonalabee", Bathurst, N.S.W. Client: Rohan Youngman, Jaynerees Services Pty. Ltd.
- (2007) Liverpool City Council Rural Lands Study. Client: Adan Davis, Liverpool City Council and Don Fox Planning
- (2007) Agricultural Assessment of Lot 19 Willowtree Place Wagga Wagga. Client: Mr Trevor Allen
- (2008) Agricultural Assessment of a Dairy Farm, Toolijooa, Kiama, N.S.W. Client: Wygerin Pty. Ltd.

COURT EXPERIENCE EXPERT WITNESS

- (1997) Appeal Land & Environment Court. Commercial and Residential Developments vs Armidale City Council. Rejection of Development Application "Palmerston" Armidale N.S.W. Appeal to the Land and Environment Court. Clients: Pike, Pike and Fenwick acting for Commercial and Residential Developments.
- (2003) Appeal Land & Environment Court. Momentum Architects vs Hornsby Council. Rejection of D.A. 607-609 Old Northern Road, Glenhaven. Hannaford Lawyers acting for Richard Walsh.
- (2007) Appeal Land & Environment Court. Trevor Collins vs. Wagga City Council. Rejection of D.A. Lot 19 Willowtree Place Wagga Wagga N.S.W. Storey and Gough acting for Trevor Collins
- (2008) Appeal Land & Environment Court. Wygerin vs Kiama Shire Council. Rejection of D.A. for Caravan Park Toolijooa Road, Toolajooa. RMB Lawyers with Kearns & Garside acting for Lawrence Gill of Wygerin Pty. Ltd.

OTHER PROFESSIONAL ACTIVITIES:

- (1994) Review Panel. Prime Lamb Program. Meat Research Corporation.
- (1994) Committee Member. Lamb Industry Strategic Planning Group. Meat Research Corporation.
- (1995 - 2003) Judge for the Agriculture Entries. NesCafe Big Break Competition.
- (1996) Guest Speaker Murray Grey Beef Cattle Society AGM and Forum Panel Member Wodonga
- (1996) Guest Speaker Angus Society Executive Council Meeting Toowoomba Qld.
- (1996) Invited Panellist Wool International - Profarmer Risk Management Conference Perth WA
- (1997) Invited Member with Special Expertise - Meat Inspection Reform - Communications Task Force. Joint Committee Meat Industry Council and AQIS.
- (1997-2005) Guest Lecturer on Australian Agricultural Economy to Numerous Visiting Chinese Delegations.
- (2004) Development of a Proposed Undergraduate Degree in Agribusiness at the University of Western Sydney.