Land Resource Assessment and Management Pty. Ltd.
ABN 65 446 117 882
ACN 059 780 602

4 June 2015

Concise conclusion for Olive Vale Fairview VMA Section 22 application for High Value Agriculture

The application for High Value Agriculture relevant purpose status under Section 22A of the VMA and its associated guidelines fails to meet the land suitability and financial criteria for High Value Agriculture. As a result, the proposed clearing of 33,054 ha to develop 32,400 ha of rainfed/dryland grain and forage cropping cannot be justified as being for the purposes of High Value Agriculture. The correct decision from the assessment process should have been that the purpose of the clearing could not have been High Value Agriculture.

The proposal fails under the current Section 22A and associated Guidelines when assessed solely on the basis of information supplied by the applicant.

Both Section 22A and its associated guidelines need improved definition and rigor so that in the future both applicants and assessing officers are adequately informed about what is needed to meet High Value Agriculture requirements. If this were done, it will substantially ensure that the combination of applicant submission and assessing errors does not occur again.

Whilst a classification of High Value Agriculture may ultimately result in clearing being undertaken for a particular project, there is no process in the guidelines for conditions to be imposed that ensures that the indicated use is carried out in a sustainable fashion or indeed is carried out at all post clearing. This deficiency in the guidelines should also be addressed.

W.P. Thompson

Head Office

Peter Shields
46 Hancock Rd,
Coulson, QLD 4310,
Australia
Ph. (07) 5463 5461

Bill Thompson
1569 Tarome Road
Kalbar, QLD 4309,
Australia
Ph. (07) 5463 8450

Land Resource Assessment and Management Pty. Ltd.
ABN 65 446 117 882
ACN 059 780 602

Independent Review: Olive Vale Fairview Station
Natural Resource Review

Prepared by

W.P. (Bill) Thompson

for

Department of State Development
Queensland Government

FINAL
31 May 2015

Head Office

Peter Shields
46 Hancock Rd,
Coulson, QLD 4310,
Australia
Ph. (07) 5463 5461
Fax. (07) 3103 4093

Bill Thompson
1569 Tarome Road
Kalbar, QLD 4309,
Australia.
Ph. (07) 5463 8450
Fax. (07) 3103 4093

Table of Contents

SUMMARY FINDINGS

The applicant's submission in support of clearing for the purposes of High Value Agriculture contains information on all of the criteria guidelines for determining whether the proposed use is in fact a relevant purpose. The materials in support of the application are dated 29th October 2014. On the basis of the material supplied, the application was assessed as compliant on all criteria by NRM Officers on 7th November 2014.

There are 8 criteria under the guidelines. Criteria relating to Irrigation (Criteria 6), Restricted Access (Criteria 7) and High Risk Species (Criteria 8) have not been covered in this review.

This conclusions for this review are summarised below.

Criteria 2 dealing with location details of the proposed clearing appears to be fulfilled as does Criteria 4 which deals with whether there are areas which would not require a clearing permit which could support the project.

Criteria 1 dealing with the particulars of clearing has not been met as there appears to be conflicting data on the number of years over which clearing and development is proposed. This has a major bearing on the financial viability of the proposal.

Criteria 3 which deals with land suitability has not been met. There are a number technical reasons for this failure – the main ones are that the scale of the assessment is 1:250,000, not 1:100,000 as required by the guideline and that soils which the applicant's assessment materials show as marginally suited soils (class 4) are included in the development area in contravention of what is required by the guidelines. The review notes that both the guideline and the land suitability framework may appear to be quite complex documents for readers not familiar with such frameworks, however, the point remains that the data presented in the land suitability documents if assessed properly means the project is non-compliant.

Criteria 5 which deals with financial viability is non-compliant because the mistakes noted above were not addressed before the analysis was undertaken. Essentially, the analysis models a development plan different from the clearing program for a project where there is no local market to set commodity prices adopted and for a project that is heavily reliant on an Upland Rice crop that has no commercial history of production in Queensland. The financial analysis also models an annual harvested area of 32400 ha when in fact it is likely that 7080 ha of suited land would be able to be harvested each year. The resultant very optimistic indicators of financial viability cannot be justified.

This review therefore concludes that in the absence of any further supporting technical information, that the proposed clearing to establish a large scale dryland grain enterprise on the pastoral holdings does not meet the requirements of the relevant purpose High Value Agriculture.

1 INTRODUCTION

I have been instructed to review the decision making process and determination associated with the proposal to undertake vegetation clearing for a relevant purpose (high value agriculture) on land at Olive Vale/Fairview Station and more particularly described as Lots 52 and 53 on CP887336. The review is to include the interface and correspondence exchanged between the applicant and the Department of Natural Resources and Mines in relation to the proposal, and in respect to:

- The relevant legislation being the Vegetation Management Act 1999
- The guideline for land suitability and financial viability requirements for high-value and irrigated high-value agriculture (DNRM 2013)
- The guideline for determining high-value and irrigated high-value agriculture (DNRM 2013)
- The vegetation management delegation (no. 1) and (no. 2) 2014
- The process and decision making undertaken as part of the application process

The briefing materials supplied for use in this review included:

1. Guidelines for land suitability and financial viability requirements for high-value and irrigated high-value agriculture (DNRM 2013)
2. Guidelines for determining high-value and irrigated high-value agriculture (DNRM 2013)
3. Vegetation Management Act 1999 (VMA) (available on-line at www.legislation.qld.gov.au)
4. Vegetation Management Delegation (No.1) and (No.2) 2014
5. 'Land Suitability for Proposed Dryland Cropping of forage sorghum, maize, grain sorghum, dryland upland rice and soybean at Olive Vale/Fairview, Laura' prepared by Peter Spies, dated 3 November 2014
6. 'Financial viability of business plan for Proposed Dryland Crossing of forage Sorghum, Maize, Grain Sorghum, dryland rice and soybean at Olive Vale/Fairview Laura' prepared by Peter Spies dated (unknown) – (referenced as Spies 6 in this review)
7. ArcMap output showing proposed development area on Lot 52 & 53 CP887336 (v1.10)
8. ArcMap output showing proposed development area with Soils layer provided by the applicant (v1.10)
9. Matrix of attributes for different soil types/land use limitation at Olive Vale/Fairview (extracted from the Land Suitability report) prepared by Peter Spies, dated 3 November 2014
10. ArcMap output showing proposed development area with Regulated Vegetation mapping (V1.10)

Any other materials I have accessed or used in preparing this report are referenced in the report as page footnotes. In preparing this review, I have not been given instructions and have not accepted any instructions to adopt or reject any particular opinion in preparing this report. The factual matters stated in the report are to my knowledge true.

2 METHODS USED IN THIS REVIEW

2.1 Desk Based Review

This review is a desk based review. No field inspection of the subject land has been undertaken as part of this review. The reviewer has an understanding of the soils and land use in Cape York resulting from his team leadership of a review of the Cape York Land Use Plan and more recently as the land resource specialist advising the Cook Shire Council on rural land use planning matters.

2.2 Data sources

Data sources were accessed in two stages during this review. Initially the materials listed in Section 1 above, were initially assessed (in Adobe pdf formats) along with the published CYPLUS soils and land suitability reports and maps of the then DPIF covering all of Cape York[1].

Subsequently digital data in Geographic Information System formats were requested and supplied by QDNRM in Arc Shape file formats:

- Applicant site location data supplied to QDNRM
- Applicant soil mapping of the area to be cleared supplied to QDNRM which contain soil names but no data on Land Suitability
- Applicant supplied to QDNRM land suitability mapping of the whole of Fairview and Olivevale holdings which contains a land suitability code and a map unit code.

These data sets were translated to MapInfo format and the land suitability data was updated to the soils mapping for the cleared region. During this process, the soil codes were intentionally not updated.

The number of sites inside within the proposed cleared area was then counted.

3 THE APPLICANTS PROPOSAL

This section outlines the size and scope of the project which in effect sets the physical model for how the project need for clearing and financial viability is assessed. Subsequent sections will deal with what the guidelines required as part of an assessment.

3.1 Areas to be cleared and cropped

The reports and documentation associated with the proposal indicate that 33,054 ha of land is to be cleared (see Page 3 of the land suitability report[2]) and that 32,400 ha of that area is to be dryland cropped and harvested each year to a range of crops (refer Page 8 of the financial report[3]). Page 3

[1] Biggs, A.J.W. and Philip, S.R. (1995) Cape York Peninsula Land Use Strategy (CYPLUS) Natural Resources Analysis Program (NRAP) - Soil Survey and Agricultural Suitability of Cape York Peninsula, Queensland Dept. of Primary Industries, Mareeba

[2] Spies (Nov 2014) Land Suitability for Proposed Dryland Cropping ……

[3] Spies (undated) Financial Viability ……

of the land suitability report refers to 218.6 ha of cleared land already on the holding but concludes that the most suited soil areas are within the proposed cleared area.

The proposal appears to involve 654 ha of land proposed for clearing which will not be harvested each year. Such non harvested areas within a cropped area typically include soil erosion control structures which cannot be cropped over, headlands and access tracks, fire breaks, cropped areas in fallow rotation for disease and weed control purposes etc. The proposal appears to envisage that 1.9% of the cleared and suited area will not be harvested each and every year.

Between 10 and 20% of arable farm area is normally regarded as not being harvestable in any given year – half of which is unlikely to be harvestable in any year because it is permanently locked into soil erosion and access road way uses.

Page 34 of the land suitability report lists 14 RE's with a total area of 53,300 ha on the property. Of this area, 21229 ha or 40% is indicated as being included in the area to be cleared. The applicant soil survey covered 146, 658 ha (see Table 1).

3.1.1 Review Findings

The applicant appears to overstate the area available for actual cropping in a given year from within the cleared area. A percentage of the cleared area likely not to be able to be cropped is more likely to lie between 10 and 20% (mid range say 10%) as opposed to the 1.9% indicated by the appellant.

It is unclear from the proposal as to the RE's status is of the remaining 11,825 ha of land which is to be cleared as part of the development. If all of the 33054 ha was to be cleared from the 53300 ha of the 14 RE's, then the proportion of the RE's proposed for clearing would be 60% not 40%.

3.2 Land development/clearing and phasing

Both the land suitability and financial reports cite a 10 year program of land clearing commencing at the date of approval and extending through to 2024 based on a 2014 date of approval (for example see Section Timing of Operations on Page 2 of the Land Suitability Report and top of Page 4 of the Financial Report). The financial report in its cash flow IRR tabulation (see Page 19) shows revenue and input costs peaking at Year 2 and staying consistent through to Year 20.

3.2.1 Review Findings

The 10 year clearing and land development phasing and the financial analysis which assumes a 2 year phasing are not consistent.

4 THE APPLICANT LAND SUITABILITY ASSESSMENT

4.1 Soil survey assessment in support of the land suitability assessment

The applicants land suitability assessment report uses the CYPLUS soils framework. That work mapped the soils of Cape York at a scale equivalent to 1:250,000. That work and the Atlas of Australian soils work that both preceded and informed the CYPLUS work is widely regarded as superior to the land systems work[4] which was done some 25 years earlier. None of these bodies of work are at a scale of accuracy suited to land development assessment. They are suited to broadly identifying where better quality soils may be more likely to occur, but they are not suited for implementation planning and feasibility assessment.

This limitation to the use of the existing work is acknowledged in the land suitability report. That report indicates (Table 1 and associated text on Page 5) that *"……seventy (70) soil test sites (with cores) and an additional 70+ satellite sites provided enough sampling intensity for a scale of 1:100,000 or better……."*

The location of these sites is shown in Figures 1 and 2.

Table 1 Site Data and Density

Total Soil Sites indicated in the Land Suitability Report	140 - 70 of these are satellite sites with no on ground data
Total Sites within GIS data set (T)	191 (note some of these sites may be vegetation sites)
Total Soil Survey area fcovered by Applicants rom GIS data set (S)	140,658 ha – via GIS calculation for Applicant data set
Site Density (S/T)	1 site per 736 ha
Effective Scale of Soil Survey given Site Density	1:250,000
Total Sites with area nominated for clearing (C)	56 (note some of these sites may be vegetation sites)
Total area nominated for clearing (P)	33054
Site Density (P/C)	Site per 590 ha
Effective Scale of Soil Survey given Site Density	1:250,000

[4] Galloway, R.W., Gunn, R.H. and Story, R. (1970) Land Systems of the Mitchell–Normanby area, Queensland, Australia Scale 1:1,000,000. CSIRO Land Research Series No. 26, 1970.

Figure 1 Applicant soil survey sites, survey area, crop suitability and original QDPIF/QDNRM crop suitability

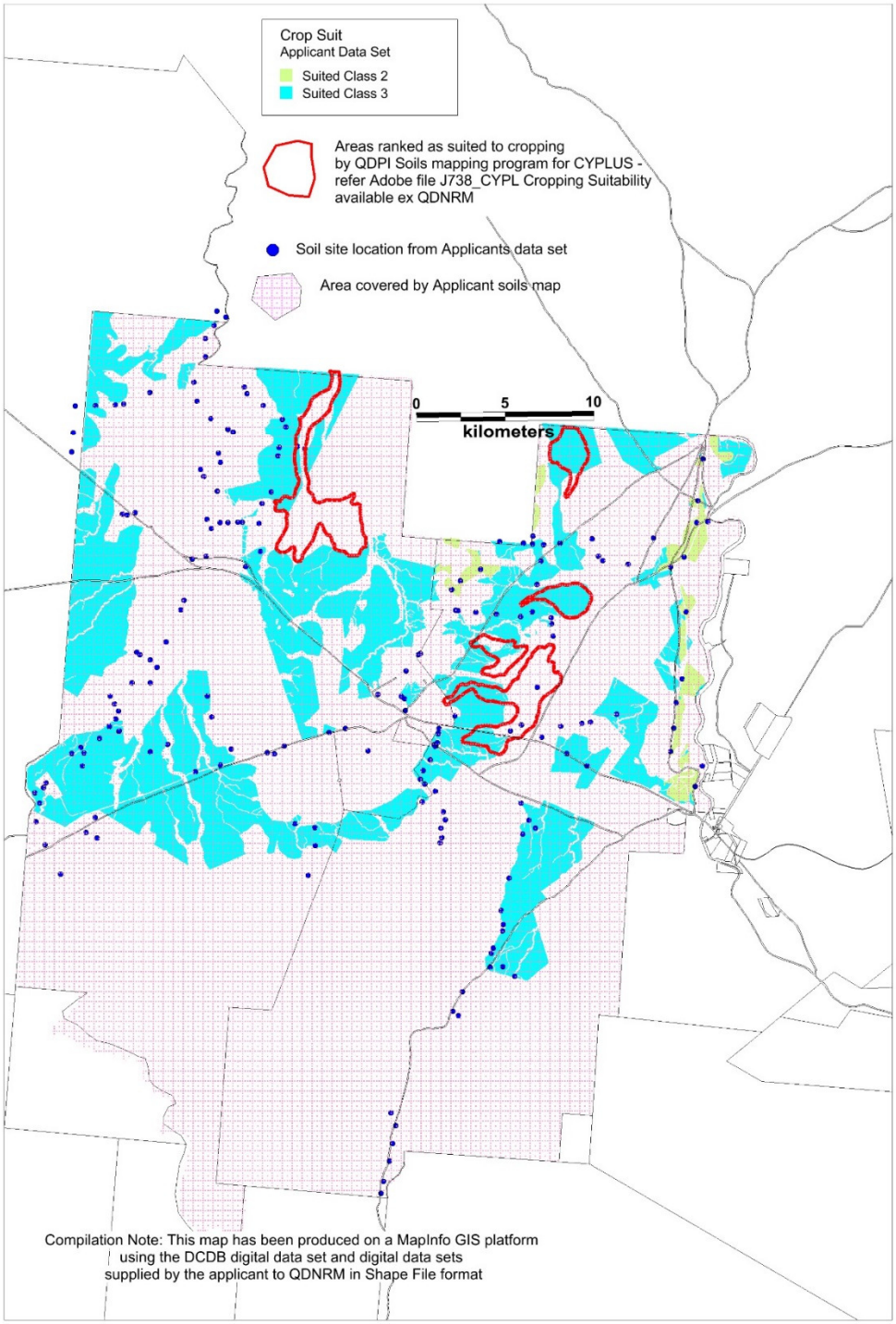
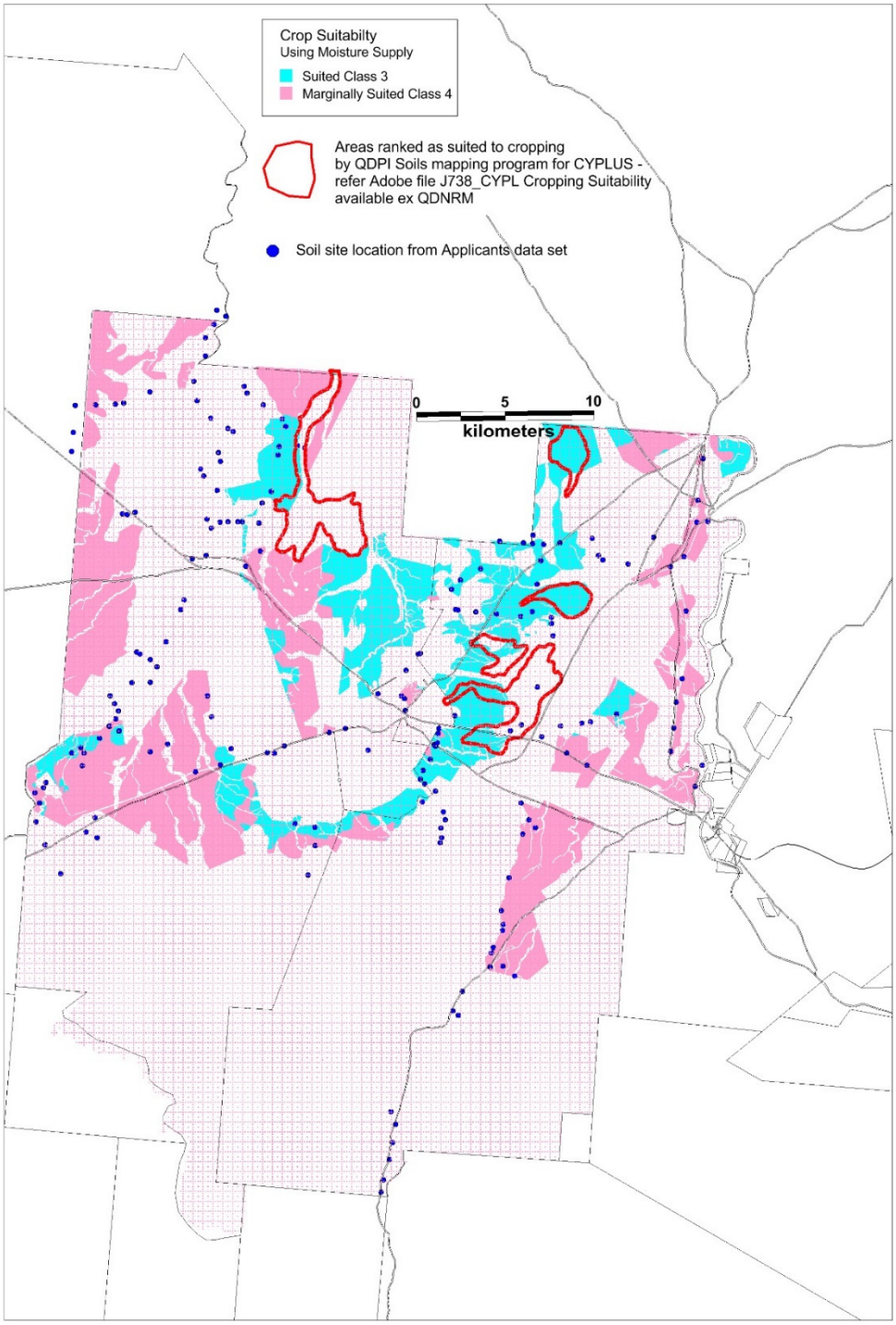


Figure 2 Same map as Figure 1, with crop suitability based on soil moisture limitations from Applicants report



If it is assumed that all sites within the GIS data set were on ground soil sites, then the scale of mapping is in fact at best 1:250,000 for both the cleared and soil survey area – not 1:100,000 as stated in the land suitability report.

Whilst data from the 70 soil test sites is provided in the report, the data from the satellite sites is not provided. The satellite sites could not have involved any on-ground data collection and it is difficult to see how these can be used to validate soil distribution.

4.1.1 Review Findings

Based only on the data supplied to this reviewer, it is difficult to reconcile the actual intensity of the soil survey undertaken to support the land suitability assessment as being consistent with what would have been required for 1:100,000 scale of intensity. The reviewer does however note that in landscape environments where there is little complexity of soil distribution, a site density that nominally conforms to 1:250,000 requirements may in fact result in 1:100,000 scale of accuracy. The inclusion of satellite non on ground data sets and vegetation sites in the soils data sets and the lack of attribute data within the digital data means it is impossible to be confident that a 1:100,000 scale of reliability applies.

Irrespective of the above, there are significant sections in the central, northern and western sections of the area nominated for clearing which have no sites located within them at all. The reasons for this are not explained in the report.

4.2 Land Suitability framework

The land suitability framework used in the report follows the Cyplus soil assessment land suitability framework. That framework along with an almost identical framework for the Lakeland Downs area are the only ones that have been used in Cape York. There are other frameworks developed for the Atherton Tableland, the Wet Tropical Coast and the Burdekin areas for both irrigated and dryland cropping assessments, however, the Cyplus system would be preferred over these other assessments for this area. The Cyplus report of 1995 contained a land suitability map which shows that 3400 ha of land within the pastoral holdings were suited (Figure 1 and 2).

Land Suitability frameworks have a superficially simple structure, but can be quite complex in the way they are applied and interpreted. Mis allocation of suitability are not unusual as a result. An example of how this system is applied is given below:

- Each soil is assigned various levels of a soil attribute. As an example the attribute for the amount of water a soil can store for a crop to use has 6 levels (M1 to M6) of soil water storage ranging from less than 40 mm to over 100mm.
- Each crop for which a soil suitability is being assessed is assigned a limitation class. There are 5 limitation classes - 1 through 5. Level 3 or lower means the soil is suited for commercial cropping using known and existing agricultural technology. Level 5 is unsuited and level 4 is marginally suited. In the case of maize (corn) and sorghum which are the main[5] crops proposed for the development, a soil water storage of at least 80 mm is required for a soil to be considered suitable (see Page 46 of the Land Suitability report).

[5] There is no suitability schema in existence for upland rice. The applicant's submission assumes that the sorghum system can be used for rice as well.

Table 3 on Pages 19 and 20 of the land suitability report, lists 11 attributes as column headings for each of the 13 soils mapped in the subject area. The cells in these tables have the limitation subclass with the attribute level. For example soil Emma has a moisture supply of 40 to 80mm and a limitation subclass of M4 is assigned to that soil. This indicates that Emma soil is at best marginally suited (class 4) for corn and sorghum. Soils Clarke and Kimba also have the same level of suitability ranking based on soil water.

Page 22 of the Lands Suitability report contains the following conclusion:

> *On the evidence provided from the land suitability assessment, a re-mapping of CYPLUS soils at closer property scale of 1:100,000 or below (Appendix F), 33,054.5 hectares, mapped as Emma, Kimba, Myall and Picanninny were considered suitable for cropping forage sorghum for green chop, maize, grain sorghum, dryland upland rice and soybean – Land suitability classes 2 & 3 (Appendix G[6]) with moderate limitations due to fertility and sodicity (<18 ESP at depth). The soils Batatvia, Clark and Wakooka were considered poorer to Emma, Kimba, Myall and Picanninny in terms of fertility but were considered suitable…….*

Emma, Kimba, Clark, Batavia and Myall are red and yellow earth and podzolics developed on strongly weathered deposits. These soils comprise approximately 20% of Cape York. These types of soils are common throughout Queensland – including many coastal areas in the 800 to 1200 mm rainfall zones. They are rarely used for rainfed grain cropping in Queensland, however, they are used for cane where supplementary irrigation is available. Picanninny is a cracking clay soil developed on clayey sedimentary rocks that are less weathered. Cracking clay soils are widely used for grain cropping throughout Queensland.

The applicants soils and land suitability data supplied to the reviewer in GIS form has been used to calculate the grain crop land suitability data for the area. Table 2 summarises this data and maps are given in Figure 1 and 2. The applicant data set shows the suitability class assigned to each soil name. All soils in the cleared 33054ha area are rated as Class 2 or 3 and hence suited. 3 soils are ranked as both Class 2 and 3. The lower half of Table 2 shows what the suitability class would be if the ranking for Soil Moisture Supply cited in Table 3 on Pages 18 and 19 of the Land Suitability report were applied to each soil. When that is done, 20,425 ha or 62% of the area nominated for clearing is marginally suited class 4.

Based on the land suitability report, 7 of 13 soils mapped in the development area and all of the soils mapped in the area proposed to be cleared, are rated as suited for the main grain crops proposed for the project area (Class 2 and 3). The land suitability schema used to arrive at this conclusion in fact shows that three of the soils are in fact Class 4 – marginally suited because of low soil moisture supply. The report does not discuss the significance or otherwise of soil moisture storage for dryland/rainfed grain and forage cropping enterprise.

[6] Reviewers Comment. Appendix G contains the land suitability map. Appendix I contains the limitation classes

Table 2 Suitable crop area

Soil Name	Grain Crop Suitability Class from Applicant Data set and map – see Map in Appendix A	Hectares	Totals
Emma Em	2	1236	
Myall Ml	2	170	
Picanninny Pn	2	256	1661
Batavia Bv	3	3028	
Clark Cr	3	6764	
Emma Em	3	3164	
Kimba Kb	3	9674	
Myall Ml	3	6695	
Picanninny Pn	3	1419	
Wakooka Wk	3	650	31393
Soil Name	**Grain Crop Suitability Class by applying only Moisture Supply Component of the framework on Page 19/20 of Applicants Land Suitability Report to applicants soil data set – see Map in Appendix A**	**Hectares**	**Totals**
Batavia Bv	3	2968	
Myall Ml	3	6678	
Picanninny Pn	3	1641	
Wakooka Wk	3	637	11925
Clark Cr	4	6630	
Emma Em	4	4312	
Kimba Kb	4	9483	20425

Note: Class 2 and 3 are suited and Class 4 is marginally suited. Data has been rounded in the table

4.2.1 Review Findings

Only 11925 ha is suitable for cropping - assuming that the reliability of the mapping is acceptable. Of that area if 10% were not available for actual cropping (see Section 3.1.1), the actual area potentially available to be cropped each year is 10,720 ha.

5 THE APPLICANT FINANCIAL REPORT

5.1 Model used in the analysis

The land development program and extent of cleared and cropped land is dealt with earlier in this report (see section 3.1).

The farming system model assumes there will be 32400 ha of crop area actually harvested each year[7]. This means that the financial analysis harvests product from every ha of land available for cropping each year. There is no allowance for the loss of crop area due to failed wet seasons, cyclones, weed, disease or pest outbreaks requiring areas to be fallowed etc. In the rest of the Queensland grain industry a cropping intensity of 2 crops in three years is commonly prudently adopted for this type of analysis – particularly where no irrigation is available.

The total grain production assumed in the model is 106,500 t comprising 30,000 t from 12,000 ha of sorghum, 63,000 t from 9,000 ha of rice, 8,500 t of maize and 5000 t of Soybean.

Sorghum, maize and soybean are crops already grown in North Queensland – the crops are grown in the Lakeland Downs area where some supplementary irrigation is available as well as the higher rainfall Atherton Tableland. The yields projected for these crop groups on these low soil water storage soils are likely to be lower than that obtained elsewhere in north Queensland.

The revenue projected for the rice crop is $22.05 million or 62% of the $36.18 million total revenue from all grain crops. The financial model outcomes are therefore likely to be strongly influenced by the rice crop and in this respect there are a number of reasons for concern as to the feasibility of this crop producing the revenue estimated.

Rainfed rice (known as upland rice) is where rice is grown without ponding in bays. The financial model assumes a yield of 7 t/ha at an on farm price of $350/t.

- Data on actual upland rice yield in Australia is limited. The crop has never been grown in Queensland[8]. In 2008, a yield of 3.46t/ha was reported from a 24 ha pilot planting in northern NSW, whilst in the Africa and Asia where most of the upland rice is produced yields range from 1t/ha to less than 5t/ha[9].
- Australia has an extensive ponded rice farming system based in southern Australia. Yield from this fully irrigated system have ranged from 6 to over 10 t/ha.

5.1.1 Review Findings

Based on the farming system model contained in the Financial Analysis, over 60% of projected revenue from grain cropping is assumed to come from a rice crop that has never been grown in northern Australia and which produces yields within the range normally associated with irrigated rice yields as well as yields greater than that recorded elsewhere in Australia from a trial planting of upland rice.

[7] The summary sheet data on Page 8 refers to a 23,052 ha enterprise however, the actual crop areas for each crop in the summary sheet sum to 32,400 ha.

[8] The first pilot size planting (<20 ha) is planned for the Mackay canelands in 2014/5.

[9] Agriculture Today (June 2008) Rice Goes upland in NSW

The actual area likely to be available for harvest each year from land which is suitability class 3 and which is not tied up in non crop uses (see Section 4.2.1) will be approximately 7080 ha allowing for one third of the available area to be not planted or harvested each year.

5.2 Commodity price assumptions

The financial report bases commodity prices on the farm gate cost of grain imported to Cape York from production areas in central Queensland. The financial report uses a commodity price for maize and sorghum which is based on a farm feedlotting end use (Page 4 of the financial report). The price for sorghum is set at $300/t and maize $280/t. The basis for selecting a rice price of $350/t is not stated. At the time of the preparation (May 2015) of this review, sorghum price delivered to Emerald was $241/t and the price for maize was $319/t. Whilst not explicitly explained in the report, it appears as if the sorghum price at the farm gate is based on the at depot cost of sorghum, plus freight costs to arrive at the farm front gate from southern depots. Such a basis would be justified if there was an existing use for the grain at the farm gate and growing grain on the property was in fact intended to replace imports from the south.

The project as modelled will produce 106,500 t of grain each year. Assuming that this grain was directed to feedlotting operations in the region, this would be sufficient to supply the grain needs of 42,000 head of 300 kg liveweight cattle on a full feedlot ration of 70% grain – assuming a 3% of liveweight as dry matter intake of the cattle. The financial analysis does not present any data that suggests such a demand exists in the Cape York area – or more widely in the Atherton Tablelands area. If an on farm or local feedlotting operation of this size is not included in the proposal, then pricing of grain (in the case of sorghum) at a price that is higher than the wholesale price at Emerald after freight costs from Laura to Emerald are deducted is not justified.

The other significant component of the project is 6,000 ha of forage producing 360,000 bales per year at 60 bales per ha[10]. Forage is a relatively low value high volume product which effectively means that freight costs quickly exceed the value of the hay – hence except in times of serious drought, hay is normally produced and consumed within the local area/region. Locally produced hay in areas where there is a market will be highly competitive with hay freighted in from other areas. 360,000 bales of hay is sufficient to feed 10- 20,000 head of cattle per year if they are exclusively fed on hay. Typically grazing holdings feed hay at weaning and when cattle are being backgrounded and handled prior to marketing (example live export). Cattle are commonly fed for weeks and not a full year, hence the herd size to absorb the hay produced from this project would in reality be far greater than that suggested above.

It is unclear from the financial report as to whether such a market actually exists in the local area. Indeed, as in the case of the grain prices, if such a demand did not exist then the price for forage should be based on the nearest production area prices less freight to get the hay to the market – for example the Atherton Tableland.

5.2.1 Review findings

The Financial report uses grain commodity prices for rice which is a crop that is not traded or used in Queensland, along with a price for sorghum which is based on a feedlot market on property when in

[10] The 60 bales per ha is assumed to come from 1 cut and the hay will be grown over the wet season when the risks of crop loss due to rainfall is high. Assuming 250kg weight round bales, the yield of 15 t/ha is in the upper range of yield expected for forage sorghum for dry land conditions

fact no such feedlot is included in the project. The commodity price for sorghum is higher than the current at depot/wholesale price for grain delivered to Emerald. In the absence of a local feedlot market, the grain commodity price more prudently should have been based on the Emerald at depot price and the freight costs to Emerald specifically included in the gross margin variable cost. It is likely that a more prudent price would have been in vicinity of $200/t.

It is also unclear as to whether markets capable of using all of the 360,000 bales of hay predicted for the project actually exist in the area.

There is insufficient information supplied with the report to suggest that a local market for the quantity of grain and forage grain produced from the proposed development can absorb the production at the commodity prices assumed in the analysis.

5.3 Financial Model Outcomes

The financial viability of the project uses Net Present Value (NPV), Internal Rate of Return (IRR) and Payback Period (PBP). Over a 20 year timeframe and using the land development, farming systems and financial model settings discussed above, a NPV of $101 million at an IRR of 29% with a payback period of 5 years is achieved.

NPV is the value of the net cash flow generated by a project over its lifetime (in this case 20 years). Apart from model assumptions discussed above, the other major input to such an analysis is discount rate at which all future cash flows are discounted to present values. If a project has a negative NPV, then the project is not feasible at the discount rate and model assumptions used.

IRR is a related assessment of the discount or interest rate at which the NPV is zero. Ideally an IRR greater than long term market interest rates is the minimum a project requires. IRR is determined by the same model settings as NPV.

PBP is a related assessment which is the number of years of operation before net cash flow equals the capital investment required to develop and operate the project.

The NPV, IRR and PBP that are cited in the report are very high and if correct would suggest a feasible project of exceptional investment returns. The level of risk in such a project would be considered very low, however, the financial model does not report any sensitivity analysis of IRR, NPV and PBP for any of the uncertainties discussed in previous sections. Pages 9 to 15 of the financial report do contain sensitivity yield and price data for the gross margin analysis (which deals only with variable and not fixed or capital costs) of sorghum and soybean. In the case of sorghum the break even yield at which variable costs will be covered if the sorghum price were $300 on farm is $2t/ha and the break even price for sorghum if the yield were 2.5 t/ha is $250/t. This indicates sensitivity to price and yield assumptions.

5.3.1 Review findings

It is highly unlikely that the NPV, IRR and PBP adequately assesses the feasibility of the project. Reasons for this conclusion are given below.

Assumptions on Project Timing Positive Cash flows early in a project contribute more to the NPV and IRR analysis because future cash flow are discounted. By assuming the project operates at full

capacity in Year 2 as opposed to year 10 as proposed by the clearing strategy, the IRR and NPV significantly over states the project NPV and IRR as well as the NPV.

Assumptions to do with gross harvested area Gross project production is essentially a combination of area harvested each year and yield. The assessment significantly overstates annual harvested area. If one assumes that 10% of cleared and cropped area is tied up in non harvestable uses (the current assessment is for <2%) and that a more reasonable cropping intensity would be 70% of the area producing a harvest each year (as opposed to the project assumption of 100%) and that marginally suited soils are not cropped in any year, then the harvested area that should have been modelled would be 7080 ha as opposed to 32,400 ha.

Crop Yield Assumptions The land suitability assessment appears to overstate the level of soil suitability for grain crops. Subject to further data being provided, it appears that a majority of the areas identified as being suited for grain crops are in fact marginally suited and not able to be reliably cropped with current levels of agricultural technologies. Limited soil water store appears to be the major constraint. Access to irrigation water supplies and/or new grain varieties adapted to low fertility low water storage soils in a tropical environment would be required.

Reliance on Rice Upland Rice is proposed to contribute over 60% of the crop revenue. This farming system has not progressed beyond pilot test plots in Queensland and the yields assumed in the financial analysis are far greater than pilot plots from Australia and that recorded overseas where upland rice is a staple crop.

Sensitivity Testing Whilst the project NPV IRR and PBP are not sensitivity test for commodity price and yield, the gross margins for sorghum show that nett revenue is very sensitive to both yield and commodity price. Given that lower yields are likely from marginally suited soils and that the commodity price assumptions are higher than depot prices for grain delivered to Emerald, It is highly unlikely that acceptable NPV, IRR and PBP outcomes can be achieved due to these factors alone.

6 COMPLIANCE ASSESSMENT

6.1 Clearing for agricultural purposes

Under the VMA Section 22A, an application to clear remnant vegetation may be made for a number of purposes including High Value Agriculture and Irrigated High Value Agriculture.

The proposed project does not involve an irrigation component hence the application has to be assessed as High Value Agriculture of which Broadacre cropping to grains is one acceptable activity under the guideline for high value activities[11]. The same guidelines defines Broadacre cropping as …… ***Broadacre cropping*** *is the commercial cultivation of plants for oil; winter and summer cereals including wheat, barley, oats, triticale, sorghum, maize and millets; pulses including lupins, chickpeas, faba beans, field peas, mung beans, soybeans, lentils, guar and dolichos; sugar cane; rice; cotton; tea; or another commercial crop as approved by the Chief Executive.* The guidelines also note that clearing for purposes to allow *landholders to grow their farm business*, may be considered a relevant purpose where it can be demonstrated that suitable land is available. Clearing of land for grazing is not considered High Value Agriculture (see Page 1 of the Guidelines) and under the VMA is therefore not a relevant purpose.

The proposed cropping activities are all within the scope of Broadacre cropping as defined above, however, whilst all of the crops listed are well established commercial crops in Australia, the Upland Rice system proposed under this project is not as yet a commercial crop of any significance. Furthermore there is no reference in the applicant documentation that suggests that the proposed cropping enterprise is in fact an expansion or growth in an existing cropping operation.

6.2 Compliance Assessment

6.2.1 Assessment Process

The Vegetation Management Delegation (NO 1 and 2) 2014, Section on Relevant Purpose Delegations delegates the assessment and approvals process. The signed decision notice[12] notes that the department had determined that the clearing met the requirements of a relevant purpose for High Value Agriculture and that following a pre-lodgement meeting an application to the State Assessment and Referral Agency (SARA) could now be submitted. The decision that the application met Relevant Purpose criteria is also noted in the approval letter as not constituting a Development Approval for Clearing and that SARA would then refer the applicant for further technical assessment relating to SDAP Module 8 performance criteria. Module 8 criteria have some degree of overlap with the Guidelines, however the matters relating to whether a use meets High Value Agriculture Criteria are not part of the Module 8 guidelines.

6.2.2 Assessment Criteria for a Relevant Purpose High Value Agriculture

The guideline for determining high value agriculture uses sets a number of compliance assessment criteria. These are listed and discussed in detail in Table 3 along with the DNRM comments and this review comments. In summary the conclusion of this review is as follows:

[11] See Table 1 in 'Guidelines for determining high-value and irrigated high-value agriculture' (DNRM 2013)

[12] Refer replies to applicant Laura Shucksmith NRM Officer 7/11/14 and decision to approve by Paul Horrocks Senior NRM officer 7/11/14.

Particulars of Clearing Clarification from the applicant would have allowed the confusion about the time line for clearing to be resolved and until that was resolved the remainder of the compliance test would be premature. If a 10 year clearing program is correct, then the Financial Analysis as presented is simply wrong.

Land Suitability On the basis of data supplied by the applicant and deemed to be compliant by DNRM, this project involves clearing of land which is at best marginally suited for cropping. Despite the uncertainty about some of the wording in the guideline, it is highly likely that this application is non-compliant on this ground alone.

No suitable alternative site Mapping supplied in support of the application and deemed to be compliant shows RE status only of those areas proposed to be cleared. In the absence of an RE map showing the RE status of areas not proposed for clearing, it cannot be determined that this application is in fact compliant.

Business Plan shows Financial Viability The business plan in effect models a land development scenario to service what amounts to a non-existent and as yet non-existent large scale feed lotting operation with the cropping operation revenue heavily dependent on revenue flow from an upland rice crop – a cropping system still in its experimental phase in Queensland and grain pricing values set by the non-existent feedlot demand. There are too many inconsistencies and untested assumptions in the business plan to conclude that viability has been demonstrated.

Table 3 Compliance assessment

Criteria	Information requirements, compliance Outcome and This reviewer assessment
1. Particulars of the clearing	**Guideline Requirements** Are you applying for high-value and/or irrigated high-value agriculture? What crops are you going to grow? When will clearing be undertaken? **Compliance Outcome**[13] The Land Suitability Report is accepted as evidence of compliance. **Reviewers Comment**[14] The land suitability report suggests a 10 year land clearing program and the Financial Assessment uses a 2 year program. The area of RE to be cleared has two different values in the report – see Sections 3.1 and 3.2 above. **Conclusion** It would appear that the list of RE to be cleared is not correct. **T**he clearing timeline response is non-compliant and a request for further information from the applicant would have been warranted
2. Location and extent of the clearing	Lot/plan information. Show where the clearing will be undertaken on a map or using GPS points. The response appears to be compliant.
3. Land suitability	**Guideline Requirement** No suitable land resource mapping available (≤1:250,000) so detailed additional information required from **suitably qualified person** confirming that land is suitable for proposed crop/s (*using Guideline – Land Suitability and Financial Viability requirements for high-value and Irrigated high-value Agriculture*). This is a category 4 scenario under the guidelines **Compliance Outcome** The Land Suitability Report is accepted as evidence of compliance. **Reviewers Comment** The land suitability appears not to comply with the requirement. The field density of soil observation appears to be at best 1:250000 and not 1:100,000 scale assessment as required by the guidelines. The compliance assessment and the Land suitability report if correctly assessed would have shown that 62% of the area proposed for clearing contains Marginally Suited soils are included in the cropping program. Whilst there is nothing in the Guideline which refers to which level of suitability would be compliant in Category 4 scenarios, Category 3 scenarios where there is existing land suitability mapping at acceptable scales clearly indicates that Marginal suitability soils are unsuited(see last dot point on Page 4[15]). It seems nonsensical that differing land suitability compliance requirements would apply between Category 3 and 4. The fact that existing published regional scale work by QDPI/QDNRM showed less than 3,500 ha as suited for Grain Cropping and that the same Soils nomenclature and suitability framework was used by the applicant to show 33054 as suited mean that a request for further information from the applicant

[13] Compliance outcome is based on the document Matters relating to a relevant purpose under Section 22A – Recommendations by Laura Shucksmith NRM Officer 7/11/14 and decision to approve by Paul Horrocks Senior NRM officer 7/11/14.

[14] Details of the basis of these comments are provided earlier in this report

[15] Guidelines for land suitability and financial viability requirements for high-value and irrigated high-value agriculture (DNRM 2013)

Criteria	Information requirements, compliance Outcome and This reviewer assessment
	would have been warranted. **Conclusion** Whilst there is some confusion about what suitability classes are compliant as a result of the way the guideline is drafted, a reasonable technical interpretation is that most of the subject soils are non complaint. The issue of marginally suited soils being included in the project was discoverable in the applicant's documentation. A request for further information on this matters may have better informed the compliance assessment process.
4. No suitable alternative site for the clearing	**Guideline Requirement** Is there any already cleared area on the property where the land is suitable for the proposed development? If so, why can't it be used? **Compliance Outcome** The Land Suitability Report is accepted as evidence of compliance and that cites less than 220 ha of already cleared land. **Reviewers Comment**[16] The project is likely to be compliant
5. Business plan showing the viability of the development	**Guideline Requirement** Signed statement from a **suitably qualified person** that a business plan has been prepared and that the development is likely to be financially viable (*using the guideline – Land suitability and financial viability requirements for high-value and irrigated high-value agriculture*) **Compliance Outcome** The Financial Report is accepted as evidence of compliance and that cites less than 220 ha of already cleared land. **Reviewers Comment**[17] Refer Section 5.3 of this report. The project clearing timelines, gross harvested areas , crop yield, commodity price assumptions as well as the reliance on a non-commercial crop (rice) and the failure to include sensitivity testing (as recommended in Page 12 of the Guidelines), means that the Financial Analysis should not have been considered compliant without extensive additional supporting documentation.

[16] Details of the basis of these comments are provided earlier in this report

[17] Details of the basis of these comments are provided earlier in this report

CV W.P. THOMPSON

Bill Thompson has provided planning and assessment services both internationally and domestically in Australia for over 30 years. The scope of these services includes both preparing project assessments and in reviewing project submissions – both in the research and in the development areas.

He has extensive experience as an expert witness in the areas of land assessment, suitability and related fields before both the Land Court and the Planning and Environment Courts in Queensland

NAME: William Patrick THOMPSON **YEAR OF BIRTH:** 1952
NATIONALITY: Australian
LANGUAGES: English, Thai (basic) **PERMANENT RESIDENCE:** Australia
RELEVANT EXPERIENCE

QUALIFICATIONS

Bachelor of Agricultural Science (Soil Science), University of Queensland, 1974

PROFESSIONAL EXPERIENCE

1993->	Director, Land Resource Assessment and Management., Brisbane.
1990->	Director, Resource Planning Services Pty. Ltd., Brisbane.
1989-90	Permanent Staff, ACIL Australia.
1982-89	Permanent Staff, McGowan International Pty Ltd (MGI).
1984-89	Senior Consultant, MGI Land Resource Unit, Brisbane Office, Qld.
1986-89	MGI - Brisbane. Land Resource Unit. Research and Development of GIS.
1974-81	QDPI Land Resources Officer, North Qld.

COUNTRIES OF EXPERIENCE

Vanuatu, Thailand, Botswana, Indonesia, Oman, Solomon Islands, Papua New Guinea, Timor, Philippines Australia.

Selected Australian Experience

2015 SEQ Water – Review and Projection of agriculture and land use changed in SEQ out to the year 20150 and analysis of technology, economic, policy and natural resource drivers.

2015 Ackland/New Hope Coal Project. Expert witness in the land court – analysis of land use, rehabilitation requirements under established guidelines and state planning policies for the Ackland Coal project.

2015 Continuing from 2010 for SEQ Catchments and Mackay Wjitsunday catchments. Identification of high priority impacts sites within the Bremer, Logan and Brisbane River catchments as well as the Pioneer and O'Connell River catchments, negotiation with land holders and assessing of remedial works requirements, sourcing of contractors and subsequent contract monitoring.

2014 North and South Burdekin Water Board – Review of potential for groundwater and soils salinization resulting from transfer of water allocation within and across the Board boundary.

2014 Rosella Industrial Land Review – for Economic Development Dept Qld. Review of 600 ha of land at Rosella/Bakers Creek in terms of its importance to the cane industry and proposed for state sponsored industrial development.

2013 Beneficial Use Applications – Ironbark for Origin/APLNG. Risk and feasibility analysis for reuse of treated CSG waters onto 1000 ha of land west of Tara.

2013 Beneficial Use Applications – Reedy Creek/7 Trees BU for Origin/APLNG. Risk and feasibility analysis for reuse of treated CSG waters onto 2500 ha of land north of Yuelba. Review of design and preparation of BU application.

2013 Beneficial Use Applications – Fairymeadow Road BU for Origin/APLNG. Preparation of BU application and assessment of water quality and soils risk for a 6,000 ha irrigation projects using treated CSG waters from Talinga and Condabri Treatment Plants.

2013 Beneficial Use Guidelines DEHP – Preparation of beneficial use guidelines for the reuse of treated CSG waters.

2012 Emerald and Cook Shire Rural Land Use Reviews – reviews of rural land use, GQAL and SCL constraints implications for rural land use and the expansion of urban areas. Prepared as input into strategic plan reviews.

2012 Beneficial Use Guidelines – for DEHP – Review of BUA conditions and various BUA applications and preparation of detailed guidelines for use by proponents and regulatory agencies in preparing and assessing projects.

2012 Elimatta Coal Project – Land, GQAL, SCL assessment of the Elimatta coal rail line corridor north of Wandoan as part of an EIS.

2012 Alpha Coal Project – Land Resource Assessment of the South Alpha Coal Project as part of an EIS.

2011 Continued into 2012 Beneficial Use Applications – SunWater – Land assessment and preparation of specific BUA application and Resource Monitoring Plans for the Chinchilla-Condamine and Wolleebee -Dawson R projects involving the irrigation allocation of up to 30,000 ML/year of Reverse Osmosis treated Coal Seam Gas water.

2011 Continued into 2012 Strategic Cropping Land Policy- DERM. LRAM initially reviewed the outcomes from a DERM technical working group and provided advice on the structure, criteria, thresholds, policies and standards for the identification and mapping of Strategic Cropping Land. LRAM also provided input into the field validation of the resultant framework and in presenting conclusions and recommendations to a multi industry stakeholder group and collated and provided input into the draft guidelines and standard codes and conditions.

2010 SEQ Catchment focal area project assistance. Identification of projects, assessing suitable designs, design and implementation supervision for projects in the Bremer and Logan River areas aimed at improved water quality and land management outcomes. Project aims to increase the on ground uptake and implementation of investment under the Healthy Waterways initiatives.

2009 Resources and Land Use Specialist. SDRC Non Urban lands study – Review of rural land use, land resources and comparative advantages and disadvantages for all rural uses in the area. Recommendations for strategic policy setting to address land use conflict and rural subdivision.

2008 Resources and Land Use Specialist. Gympie Regional Strategic Plan Review Review of rural land use, land resources and comparative advantages and disadvantages for all rural uses in the area. Recommendations for strategic policy settings to address land use conflict and rural subdivision.

2008 Natural Resources Specialist – Metgasco Casino Ipswich Pipeline EIS, Assessment of soils, geology, erosion , riparian morphology , stream profiles, land use along a 150 km corridor for the proposed

2008 Natural Resources Specialist – Metgasco Casino Ipswich Pipeline EIS, Assessment of soils, geology, erosion , riparian morphology , stream profiles, land use along a 150 km corridor for the proposed Casino Ipswich Coal Seam Gas project.

2008 Land Resources Specialist – Redlands Shire, Assessment of interaction between soils, geology, stream profiles, land use and water quality for the mainland catchments of Redlands Shire.

2007 Land Resources Specialist – Broadsound Shire, Assessment of value and economic benefits associated with Good Quality Agricultural Land subject to mining exploration and possible future mining.

2007 Project Leader – Logan Albert Catchment Erosion and Salinity Ground Truthing and Mapping Project

2006 Project Leader – Beaudesert Shire Whole of Shire Planning Study. Team Leader of a three person team undertaking a Rural Futures and Precincts Study for the whole of the shire in response to the Office of Urban Management South East Queensland Plan.

2005 Program Manager – BMRG Water Quality Improvement Plan. Project Management for the mapping and categorization of waterway units, land degradation, erosion, salinity and grazing land condition across the Baffle, Kolan Burnett and Mary Catchments.

2004 Program Manager – BMRG Priority Action Program. Contractor selection, negotiation and subsequent Program Management for 10 projects covering socio economic, indigenous, biodiversity, salinity, water quality and grazing land management with a gross budget of $1.9m and implemented by 10 separate contractors drawn from community groups, consultants, state and commonwealth agencies.

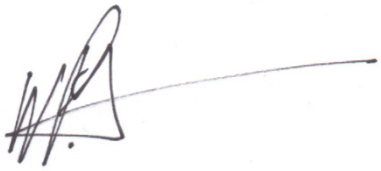
2003 Team Leader State of the Region study for Burnett Mary Natural Resources Management Group of the Burnett, Burrum, Kolan Mary and Baffle Basins – 4 person team reviewing all environment, land use and water quality issues and gaps for the region as part of NAP/NHT2 required assessments

2003 Resources Specialist Murray Darling Basin Commission – Review of Catchment Management Organizations Strategic planning process for CMA in Qld and NSW

2003 Boonah and Esk Shires – Rural Lands Study – Identification of rural land use precincts and modeling of minimum farm sizes for horticulture and grazing for defining rural land use outcomes under IPA

2003 Resource Specialist – Condamine EDROC Flow modelling project. Developing and modelling a GIS system for mapping overland flow paths and their buffer widths for use in IPA shire planning.
2003 Resources Specialist – Private Clients Identifying opportunities for improved water resource and use security within the context of Burnett ROP.
2002 Natural Resources Specialist – Condamine Floodplain and Flow Coordination Study – DLGP and EDROC. Landform element analysis, flow path and flooding assessment and development of objectives and criteria for use in local government planning
2002 Team Leader and Land Resources Planner, Nebo Broadsound Isaac Connors Study. Four person team assessing the potential and constraints for land use development in the Isaac Connors catchment of the Fitzroy Basin – for Steering Committee of Shires Industry Groups and QDNRM
2002 Accuracy Assessment, Regional Ecosystems Mapping of Nebo and Broadsound Shires – for local shires
2001 Land and Water Australia – Future Landscapes Project. Coordinator of a consortium of CSIRO AFFA/BRS and DNRM preparing a scoping study and project design for assessing future landscape scenarios in Australia
2001 Local Producers Association – Tamborine Mountain – Land Use and land use conflict assessment including economic and environmental assessment of the future of rural and peri urban uses at Mt Tamborine in relation to current planning controls and market place environments
2001 Burnett Group of Shires – Rural Land Use Specialist – Formulating an consistent NRM data set for the five shires and assessment of land use potential and use
2001 Isis Shire Woodgate STP EIS – Assessment of Disposal Area, water balance modeling for Woodgate STP disposal scheme – including negotiations with DNRM and EPA
2000 Caloundra Vegetation Mapping Project Manager - Assembling vegetation mapping to IPA frameworks
2000 Caloundra Downs Stage II Land Use Change Assessment – Detailed 100 years modeling of all catchment water balance components, frequency analysis and reporting for proposal to convert existing pine plantations comprising 4000 ha of land to a mix of urban, industrial, environmental, cropping and forestry uses.
1999 National Vegetation Information System – Business Plan. Resources Assessment Specialist for the development of a business plan for a National Audit of Vegetation by the Commonwealth Govn
1999 Boonah Shire Remnant Vegetation Management Plan – NHT funded with Local Steering Group to develop on farm management plans for management of residual forest resources
1999 Land Use Team Leader – Wetalla (Oakey and Gowrie Creek) Irrigation feasibility and impact of resource management on water use, demand and efficiency of use – Detailed Catchment modelling of runoff, deep drainage and water use
1999 South East Qld Water Board Preparation of Catchment Management Plans, Somerset, North Pine and Albert River
1998 Resources Specialist, Murgon Leather Tannery, nutrient, salt, BoD, heavy metal export modeling, runoff modeling and specification of irrigation disposal area management and upgrade. Detailed Catchment modeling of runoff, deep drainage and water use.
1998 Resources Specialist, Review of Maroochy Strategic Plan
1998 Resources Specialist, Land Disposal, Point and Diffuse Source Modelling of STP disposal scheme for Oakey Township and Agro tourism ventures on Wet Tropical Coast. Detailed Catchment modelling of runoff, deep drainage and water use.
1998 Resources Specialist, Leasing Framework and Lease land Management Plans for SEQWB lands.
1997 Resources Specialist, Mareeba Bilwon, Tinaroo and Biboohra Water Infrastructure Projects
1997 Resources Specialist, Golden Cockerel EIS/EMP wastewater disposal study
1997 Resources Specialist, SEQWB, review of town planning applications and Board leaseholds lands in SEQ
1996 Resources Specialist, Wiangaree Piggery, EIS, Kyogle
1996 Resources Specialist, KR Darling Downs Bacon Factory, Land Contamination and waste disposal assessment
1995 Study Co-ordinator, Land Resource Management Study Course, Uni Q and LRAM for AIDAB
1995 Steering Committee Member, Bremer Catchment ICM
1995 Team Leader, Meat Research Corporation R&D for an Industry Information System
1995 Resources Specialist, Lockyer Catchment Resource Management Group, LRMG
1995 Resources Specialist Lake Samsonvale Catchment Study, SEQ Water Board
1995 Resources Specialist North Pine DCP, Pine Rivers Shire Council
1995 Resources Specialist - Canegrowers Environmental Audit

1995 Resources Specialist - Shoalwater Army Training Area Strategic Plan
1994 Land Resources Specialist, Cape York Land Resources Study, Commonwealth and Sate Intergovernmental Committee.
1993 Land Resources Specialist, Gatton Integrated Catchment Study, Gatton Shire.
1993 Land Resources Specialist, Fitzroy Shire Strategic Plan.
1993 Land Resources Specialist, Teviot Brook Impact Assessment. Brisbane and Area Water Board.
1993 Land Resources Specialist, Palmwoods-Woombye Rural Lands Study. Maroochy Shire/DHLG/QDPI.
1993 Land Resources Specialist, Alton Downs Study, Fitzroy Shire.
1993 Land Resources Specialist, Banana Shire Strategic Plan.
1992 Land Resources Specialist, Redland Shire. Rural Lands Study.
1992 Land Resource Specialist, Moreton Shire. Rural Lands Study.



dated May 2015