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PLANNING PROPOSAL

'SITES 2 – 14' GRANUAILLE ROAD, BANGALOW

Prepared for Instant Steel Pty Ltd

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INTRODUCTION

Kate Singleton Pty Ltd has been engaged to prepare a planning proposal for land identified as 'Sites 2-14', Granuaille Road, Bangalow. The purpose of the planning proposal is to rezone land presently zoned 1(b1) (Agricultural Protection (b1) Zone) to 2(a)(Residential Zone) in accordance with the provisions of Byron Local Environmental plan 1988 (BLEP 1988).

The proposal was subject to a report to Council's Ordinary Meeting of 24 June 2010, at which it was resolved:

10-490 Resolved that Council resolve the Bangalow request for Sites 1 to 15 as follows:

- a) That Site 1 (Lot 101 DP 1127017 Granuaille Crescent) be deferred for future consideration as further land releases in Bangalow are unnecessary due to current planning proposals for residential land now being considered by Council.
- b) That before Site 1 is considered for inclusion in a future planning proposal to rezone the land to residential negotiations are held with Council to determine the most feasible outcome in respect of part of the site being used for a public lookout.
- c) That a detailed geotechnical and landslip assessment be undertaken to assess the Site's potential for rezoning, particularly in relation to on-site water storage.
- d) That a site specific DCP be developed in tandem with the planning proposal to ensure development impacts related to aesthetics, drainage, and slope are minimised and issues such as public open space and connectivity are addressed.
- e) That Sites 2 to 14 (as per addresses listed below) proceed (following a preliminary contamination survey), as a separate planning proposal through the gateway process as they will be rezoned for residential purposes as part of the 1988 Shirewide LEP.

Addresses:

Site 2 - Lot 2 DP 556714 - 55 Granuaille Road
Site 3 - Lot 14 DP 5938 - Granuaille Road
Site 4 - Lot 13 DP 5938 - Granuaille Road
Site 5 - Lot 12 DP 5938 - Granuaille Road
Site 6 - Lot 11 DP 5938 - Granuaille Road
Site 7 - Lot 1 DP 29127 - Granuaille Road
Site 8 - Lot 1 DP 556714 - 57 Granuaille Road
Site 9 - Lot 15 DP 853050 - 11 Hanlon Court
Site 10 - Lot 14 DP 853050 - 9 Hanlon Court
Site 11 - Lot 23 DP 801442 - Granuaille Crescent
Site 12 - Lot 19 DP 853050 - 12 Hanlon Court
Site 13 - Lot 88 DP 1011009 - 11 Barby Crescent
Site 14 - Lot 18 DP 853050 - Hanlon Court

- f) That on the basis of the initial land contamination evaluation for Sites 7 to 10 they be included in the Shire-wide LEP to rezone from 1(b1) Agriculture Protection Zone to a residential zone and that the findings of this initial evaluation be noted in Councils Land Contamination Register.
- g) That the appropriate zoning for Site 15 (PT99 DP 1016338 - Granuaille Crescent) be deferred in line with the future consideration of Site 1. (Woods/Staples)

The motion was put to the vote and declared carried.

Cr Cameron voted against the motion.

The sites as referred to in the above resolution, are identified in the following plan from the report to Council:



Figure 1.1: Lands in Bangalow requested to be rezoned from 1(b1) Agriculture to 2(a) Residential

The subject land is generally referred to as 'Sites 2-14' and comprises the following land parcels:

Site	Property Description	Property Address
Site 2	Lot 2 DP 556714	55 Granuaille Road, Bangalow
Site 3	Lot 14 DP 5938	Granuaille Road, Bangalow
Site 4	Lot 13 DP 5938	Granuaille Road, Bangalow
Site 5	Lot 12 DP 5938	Granuaille Road, Bangalow
Site 6	Lot 11 DP 5938	Granuaille Road, Bangalow
Site 7	Lot 1 DP 29127	Granuaille Road, Bangalow
Site 8	Lot 1 DP 556714	Granuaille Road, Bangalow
Site 9	Lot 15 DP 853050	11 Hanlon Court, Bangalow
Site 10	Lot 14 DP 853050	9 Hanlon Court, Bangalow
Site 11	Lot 23 DP 801442	Granuaille Road, Bangalow
Site 12	Lot 19 DP 853050	12 Hanlon Court, Bangalow
Site 13	Lot 88 DP 1011009	11 Barby Crescent, Bangalow
Site 14	Lot 18 DP 853050	Hanlon Court, Bangalow

In addition to the above properties, part of 'Site 1' (Lot 101 DP 1127017) is also included in the planning proposal as identified on the Proposed Rezoning Plan provided at Appendix A. The land included comprises:

- Part Lot 101 DP 1127017 to reflect an approved boundary adjustment with 'Site 2' (Lot 2 DP 556714) approved in accordance with Development Consent No. 10.2010.175.1; and
- Part Lot 101 DP 1127017 to the rear of 'Site 11' (Lot 23 DP 801442) to provide an additional depth of a maximum of approximately six (6) metres to 'Site 11'.

The proposed additional portions of 'Site 1' are not considered to be inconsistent with the Council resolution and represent a 'tidying up' and rounding off of the proposed 2(a) lands. The sites while presently zoned 1(b1)(Agricultural Protection (b1) Zone) are presently used for



residential purposes and are indistinguishable from the 2(a) land to the south in terms of their current land use characteristics.

This planning proposal is accompanied by a Preliminary Site Contamination Report prepared by Tim Fitzroy & Associates provided at Appendix B, in accordance with the requirements of Council's resolution.

PART 1 PROPOSAL OBJECTIVE

To rezone the subject land from 1(b1)(Agricultural (b1) Zone) to 2(a)(Residential Zone) to reflect its current use.

PART 2 EXPLANATION OF PROVISIONS

Amend the Byron Local Environmental Plan 1988 Zoning Map to zone the land identified as Sites 2 to 14 in the Proposed Rezoning Plan provided at Appendix A, 2(a)(Residential Zone).

PART 3 JUSTIFICATION

Section A Need for Planning Proposal

1. Is the planning proposal a result of any strategic study or report?

The Planning Proposal is a result of the *Byron Shire Local Environmental Study 2008*, and a report to Council dated 24 June 2010 dealing with a request for Council to consider an amendment to BLEP 1988 to rezone the subject land from 1(b1)(Agricultural Protection (b1) Zone) to 2(a)(Residential Zone).

In relation to sites 2 to 6, the Draft Shire-wide LEP presently proposes the zoning of this land as R2 Residential:





Development application (10.2008.170.1) for subdivision – boundary adjustment has received development consent. This consent provides for Site 11 to be subdivided to a 1,560m² lot that includes the existing dwelling and for the remainder of the site to be included with Site 1, refer to Figure 1.7.



Figure 1.7: DA for subdivision- boundary adjustment

Whilst the land is mapped as Regionally Significant Farmland, the size of the land and its location near residential land makes it unviable for agricultural production. Although this Site is outside the 'Town and Village Growth Boundary' as defined in the *Far North Coast Regional Strategy*, there is provision for this site to be included within the Boundary as discussed for Sites 7 to 10 above. However, as this Site does not adjoin Sites proposed to be rezoned and that under the approved DA it would be surrounded by Site 1, that consideration to rezone for residential purposes be deferred in line with Site 1.

Notwithstanding the staff recommendation to defer Site 11, Council resolved to enable the inclusion of Site 11 in the subject planning proposal.

Sites 12, 13 and 14 are predominantly zoned 2(a)(Residential Zone) in accordance with the provisions of BLEP 1988, however they contain a small portion of land zoned 1(b1)(Agricultural Protection (b1) Zone). The following extract from the report to Council's Ordinary Meeting of 24 June 2010 is provided:



Sites 12, 13 & 14 are predominately zoned 2(a) Residential with a small portion of their lot included in 1(b1) Agricultural Protection Zone. Sites 12 and 13 have a residential dwelling. Site 14 and adjoining land (Lot 17 DP 853050) is designated Community Land with primary use for park and secondary use as drainage, refer to Figure 1.8.



Figure 1.8: Community Land

The inclusion of a small portion of these Sites land within 1(b1) Agricultural Protection Zone is illogical and will be rectified in the Shire-wide LEP.

The subject planning proposal seeks to rezone the subject land to residential to conform with the existing surrounding land in the immediate vicinity. The proposal represents a rounding off of the urban boundaries and the subject land is presently utilised for residential purposes.

2. *Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?*

The proposed planning proposal is considered to be best means of achieving the objectives and intended outcomes. Some of the land affected (Sites 2 and 11) has been subject to recent approvals for the creation of 'residential' lots and the planning proposal will provide the opportunity to correct the existing inconsistency in the zoning of the land.

3. *Is there a community benefit?*

The planning proposal does not include Site 1 as Council resolved to defer this land however it is considered that the consideration of Site 1 at a later stage will result in direct benefits to the community (e.g. provision of public walking track).

Section B Relationship to Strategic Planning Framework

4. *Is the planning proposal consistent with the objectives and actions contained within the applicable regional or subregional strategy?*

The planning proposal is consistent with the Far North Coast Regional Strategy. As detailed in the report to Council's Ordinary Meeting of 24 June 2010, while some of the subject land lies outside the 'Town and Village Growth Boundary' as defined in accordance with the Far North Coast Regional Strategy, the Department of Planning has advised that there is provision for the subject land to be included within the boundary.

The planning proposal represents a minor adjustment to the Town and Village Growth Boundary to incorporate land that is effectively residential in terms of its land use and characteristics.

5. *Is the planning proposal consistent with the local council's Community Strategic Plan, or other local strategic plan?*

The planning proposal is consistent with the aims, objectives and guiding principles of the Bangalow Settlement Strategy 2003 (BSS 2003). The subject land is effectively illustrated as part of the existing urban settlement in the mapping accompanying the BSS 2003.

6. *Is the planning proposal consistent with applicable State Environmental Planning Policies?*

The planning proposal is considered to be consistent with relevant State Environmental Planning Policies (SEPPs), including the following:

- State Environmental Planning Policy No. 14 – Coastal Wetlands (SEPP No. 14)

The subject land is not identified as containing SEPP No. 14 coastal wetlands.

- State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP No. 44)

The subject land does not contain potential koala habitat as identified in accordance with SEPP No. 44.

- State Environmental Planning Policy No. 55 – Remediation of Land (SEPP No. 55)

In accordance with Council's resolution in relation to the preparation of a planning proposal for the subject land, a Preliminary Site Contamination Report has been prepared to accompany this planning proposal and is provided at Appendix B to this report. The report notes that the issue of potential land contamination regarding Sites 2, 3, 4, 5 and 6 was dealt with in the recently approved subdivision of that land.

The assessment provided by Tim Fitzroy & Associates deals with Sites 7 to 14 and concludes on the basis of site history, site inspections, and laboratory analysis of soil

samples,"... there is a low level risk that the subject site is contaminated with residual chemicals from activities associated with current or past land use".

- State Environmental Planning Policy Rural Lands (Rural Lands SEPP)

The Rural Lands SEPP provides provisions for the assessment of development applications in relation to rural land. While no specific provisions apply to the rezoning of land, it is considered that the proposed zoning of the land is generally consistent with the rural planning principles identified in the SEPP, and that given the location of the subject land the proposal is unlikely to result in significant impacts on existing agricultural land use in the locality.

- State Environmental Planning Policy (North Coast Regional Environmental Plan) (NCREP SEPP)

As previously noted, the North Coast Regional Environmental Plan is now a deemed SEPP. The NCREP SEPP contains a number of provisions relevant to the proposed development. The relevant provisions are addressed in the following table:

Clause	Provision	Consideration
Clause 7 - Plan preparation - prime crop or pasture land	Clause 7 contains the following provisions in relation to the preparation of a draft LEP applying to prime crop or pasture land: A draft local environmental plan applying to prime crop or pasture land should: (a) identify and include land in an agricultural protection zone and contain provisions that: (i) prevent the subdivision of land within the zone for purposes other than commercial farming, (ii) set minimum allotment sizes which maintain the concept of a minimum area capable of efficient, sustainable agricultural production in the long term, (iii) separate land zoned for residential use from land zoned or used for agricultural use or for intensive animal industries, and (iv) prohibit development which is incompatible with the objectives of this Division, and	The site is not considered appropriate for agricultural land uses, particularly having regard for the site of the subject allotments and the residential zoning of the adjacent land.



Clause	Provision	Consideration
	(v) rezone prime crop or pasture land for purposes other than agricultural only after a detailed analysis of the agricultural capability of the land and adjoining land has been carried out, and (b) in relation to any prime crop or pasture land not identified and included in an agricultural protection zone in paragraph (a): (i) include provisions that retain the land for commercial farming purposes, and (ii) set minimum lot sizes which are sufficient to maintain commercial farming in the long term.	
Clause 38 – Plan preparation - urban land release strategy	Clause 38 requires that council should not prepare a draft local environmental plan which permits development that, in the opinion of the council, constitutes significant urban growth unless it has adopted an urban land release strategy for the whole of its local government area. The clause also states that a draft LEP should be generally consistent.	The subject planning proposal will not result in "significant urban growth". As previously noted it comprises the rezoning of land that is presently used for residential purposes.
Clause 40 – Plan preparation – principles for urban zones	Clause 40 provides as follows: A draft local environmental plan applying to urban areas should adopt the following principles: (a) zoning should be simple and flexible, (b) provisions for flexible zone boundaries may apply to any zones except environmental protection zones, (c) detailed guidelines within the broad zone parameters should be identified in a development	The proposed amendment to BLEP 1988 is consistent with the principles provided in Clause 40.



Clause	Provision	Consideration
	control plan, and (d) the principle of minimising energy use, in particular in the design of buildings and effective transport systems.	
Clause 42 – Plan preparation – principles for housing	Clause 42 provides that a draft LEP to permit dwellings in urban areas should incorporate provisions that: (a) allow the alteration or addition of a dwelling so as to create 2 dwellings in either attached or detached form, (b) allow a wide range of housing types and densities, (c) separate residential development from other incompatible development, including agricultural activity on adjoining land, (d) require that development for residential purposes should not take place until the council is satisfied that the land on which any dwellings are to be erected is adequately serviced with water and sewage disposal facilities, (e) retain existing provisions to enable a dwelling to be erected on an existing allotment, and (f) permit the use of manufactured home estates for permanent	The proposed amendment to BLEP 1988 is consistent with the provision of Clause 42. The subject land is able to be adequately serviced.



Clause	Provision	Consideration
	occupation. (2) A draft local environmental plan that will permit dwellings to be erected in urban areas should not: (a) require development consent for a dwelling-house in a residential zone, except where there are special environmental or hazard considerations, or (b) specify a minimum allotment size for residential zones.	
Clause 45 – Plan preparation - hazards	Clause 45 contains the following provisions in relation to the preparation of an LEP permitting housing on land subject to hazards. A draft local environmental plan should not permit development for tourism, rural housing or urban purposes on land subject to the following hazards, namely: (a) coastal processes, (b) flooding or poor drainage, (c) dangers arising from potential or actual acid sulphate soils, (c1) dangers arising from contaminated land, (c2) geological or soil instability, (d) bush fire, (e) aircraft noise at levels of more than 25 (measured according to the Australian Noise Exposure Forecast), (f) air or water pollution, or airborne pollution, within 400 metres of sewage treatment works,	The land proposed to be rezoned to 2(a)(Residential Zone) is not subject to hazards.



Clause	Provision	Consideration
	(g) disposal of septic effluent, (h) existing offensive or hazardous industries, and (i) high tension electrical power lines, unless the council has made an assessment of the extent of the hazard and included provisions in the plan to minimise adverse impact. Subclause (3) provides: (3) In the event of a bush fire hazard being identified for land on which dwellings are proposed to be permitted, the council shall not permit development unless it is satisfied that arrangements where appropriate have been made to: (a) require the creation of a perimeter road or reserve which circumscribes the hazard side of the land intended for that development, (b) require the creation of a fire radiation zone located on the bushland side of the perimeter road, (c) specify minimum building setbacks for buildings that will be erected on allotments adjoining the perimeter road, (d) set standards for the use of fire retardant materials for buildings and building construction, and (e) provide fire trails which link with individual access roads or a through road.	
Clause 45A – Plan preparation – flood liable land	Clause 45A relates to flood liable land and provides as follows: (1) This clause applies to flood	The land to which the planning proposal relates is not subject to flooding.



Clause	Provision	Consideration
	liable land within the meaning of the Floodplain Development Manual. (2) A draft local environmental plan should: (a) not alter the zoning of flood liable land the zoning of which is described as special use—flood liable, rural, open space, scenic protection, conservation, environment protection, water catchment or coastal lands protection, or similarly described, to a zone described as residential, business, industrial, special use, village or similarly described, and (b) not contain provisions which apply to flood liable land and which: (i) permit an intensification of development on that land, or (ii) are likely to result in an increase in the need for flood mitigation measures (including emergency measures), infrastructure or services, or (iii) permit development to be carried out without development consent, except development for the purpose of agriculture which does not include landfill, drainage canals, fences, buildings or structures in the following places: • floodways, • high hazard flood fringe, • high hazard flood storage areas, as defined in the Floodplain Development Manual, unless justified by a floodplain management plan prepared by the council in accordance with the Floodplain Development Manual.	



Clause	Provision	Consideration
	(3) A draft local environmental plan should: (a) zone land identified in accordance with the principles contained in the Floodplain Development Manual as high hazard flood liable or as floodway so as to reflect its potential for flooding, and (b) provide that the erection of new buildings on any such land be restricted.	
Clause 56A – Plan preparation - bus Services	Clause 56A provides: In the preparation of a draft local environmental plan involving an alteration to the zoning of land which could give rise to the need for bus services or the revision of existing bus services, the council should take into consideration the guidelines in <i>Technical Bulletin 19—Planning for Bus Services</i> (published in 1989 by the Department of Planning and the Ministry of Transport at that time) to ensure that the draft plan allows for the provision of an adequate and efficient bus route system.	The proposed alteration to the existing zoning of the land is not considered to give need to the provision of a bus service.
Clause 58 – Plan preparation – servicing urban areas	Clause 58 provides: A draft local environmental plan should not permit development for urban purposes unless the council is satisfied that: (a) the proposed development will make the most economic use of existing services, (b) where the proposed development is adjacent to an existing urban area and that urban area will be substantially increased, the provision of a reticulated water and sewer system will be provided at reasonable cost to each	The proposed development is able to be adequately serviced in accordance with the provisions of Clause 58.



Clause	Provision	Consideration
	lot, (c) the proposed development is located in an area which is consistent with the findings of any urban land release strategy prepared for the local government area or, where no such strategy has been prepared, the proposed development is located in the area to which services can be provided most readily, (d) consideration has been given to the identification of effluent disposal and discharge points, (e) domestic water catchment areas and water storage areas are not likely to be polluted as a result of the proposed development, and (f) consideration has been given to the provision of public transport facilities, pedestrian and cycleways.	
Clause 61 – Plan preparation - health and education facilities	Clause 61 provides: A draft local environmental plan should not zone land for residential purposes on either urban or rural land unless: (a) the council is satisfied that: (i) there is adequate access available from the proposed development to both health and education facilities, and (ii) the proposed development is so located as to make the best use of existing health and education facilities, and (b) where the expected future population is unable to be accommodated by the existing health and educational facilities in the region, the council:	The subject site is located within close proximity to existing services in Bangalow and access to higher order services in Byron Bay, Mullumbimby, Lismore and Tweed Heads.



Clause	Provision	Consideration
	(i) has identified, in a draft local environmental plan, sites for the location of health and education facilities, or (ii) identifies such sites in a subsequent development control plan.	
Clause 65 – Plan preparation – provision of community, welfare and child care services	Clause 65 provides: (1) A draft local environmental plan should: (a) not zone land for residential purposes (including rural residential) unless the council has made an assessment of the need for additional community and welfare services and is satisfied that the plan contains adequate provisions to enable the provision of those services, and (b) include child care centres as a land use which is permissible with the council's consent in all rural, residential and business zones.	The proposed rezoning of the subject land is not considered to trigger the need for additional community services in the context of the Bangalow land release strategy as a whole.
Clause 78 – Plan preparation - public recreation areas	The provisions of Clause 78 are provided as follows: (1) A draft local environmental plan should include provisions which: (a) identify areas of potential active or passive recreational use in both urban and rural areas, (b) identify a range of recreational environments located in the vicinity of existing and proposed residential development, (c) permit recreational uses in a wide range of zones and not only in open space zones, (d) identify land for use by the general public to gain	The site is located within appropriate proximity to active and passive recreation areas.



Clause	Provision	Consideration
	access to water bodies and foreshores, and (e) manage access to water bodies or foreshores where the environmental features of the area are likely to be damaged by increased public access.	

7. Is the planning proposal consistent with applicable Ministerial Directions (s.117 directions)?

The following provides a summary of the Section 117 Directions issued on 1 July 2009 in accordance with the provisions of the Environmental Planning and Assessment Act, 1979, relevant to the subject planning proposal.

Direction No.	Provisions	Consideration
No. 1.2 – Rural Zones	What a relevant planning authority must do if this direction applies (4) A planning proposal must: (a) not rezone land from a rural zone to a residential, business, industrial, village or tourist zone. (b) not contain provisions that will increase the permissible density of land within a rural zone (other than land within an existing town or village). Consistency (5) A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Director-General of the Department of Planning (or an officer of the Department nominated by the Director-General) that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy which:	The subject land is presently zoned rural however the proposed rezoning is considered to be of minor significance. The proposed rezoning is also considered to be consistent with a minor amendment to the 'Town and Village Growth Boundary' identified in the Far North Coast Regional Strategy.



Direction No.	Provisions	Consideration
	(i) gives consideration to the objectives of this direction, (ii) identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), and (iii) is approved by the Director-General of the Department of Planning, or (b) justified by a study prepared in support of the planning proposal which gives consideration to the objectives of this direction, or (c) in accordance with the relevant Regional Strategy or Sub-Regional Strategy prepared by the Department of Planning which gives consideration to the objective of this direction, or (d) is of minor significance.	
No. 1.5 – Rural Lands	When this direction applies (1) This direction applies when: (a) a relevant planning authority prepares a planning proposal that will affect land within an existing or proposed rural or environment protection zone (including the alteration of any existing rural or environment protection zone boundary) or	The proposal is consistent with the Rural Planning Principles and Rural Subdivision Principles contained in the Rural Lands SEPP. As noted above, given the context of the existing site and the small number of allotments involved it is considered that the



Direction No.	Provisions	Consideration
	(b) a relevant planning authority prepares a planning proposal that changes the existing minimum lot size on land within a rural or environment protection zone. What a relevant planning authority must do if this direction applies (4) A planning proposal to which clauses 3(a) or 3(b) apply must be consistent with the Rural Planning Principles listed in <i>State Environmental Planning Policy (Rural Lands) 2008</i>. (5) A planning proposal to which clause 3(b) applies must be consistent with the Rural Subdivision Principles listed in <i>State Environmental Planning Policy (Rural Lands) 2008</i>. Consistency (6) A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Director-General of the Department of Planning (or an officer of the Department nominated by the Director-General) that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy which: - gives consideration to the objectives of this direction, - identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites, and	proposal is of minor significance.

Direction No.	Provisions	Consideration
	iii. is approved by the Director-General of the Department of Planning and is in force, or (b) is of minor significance.	
No. 3.1 Residential Zones	When this direction applies (2) This direction applies when a relevant planning authority prepares a planning proposal that will affect land within: (a) an existing or proposed residential zone (including the alteration of any existing residential zone boundary), (b) any other zone in which significant residential development is permitted or proposed to be permitted. What a relevant planning authority must do if this direction applies (3) A planning proposal must include provisions that encourage the provision of housing that will: (a) broaden the choice of building types and locations available in the housing market, and (b) make more efficient use of existing infrastructure and services, and (c) reduce the consumption of land for housing and associated urban development on the urban fringe, and (d) be of good design. (4) A planning proposal must, in relation to land to which this direction applies: (a) contain a requirement that residential development is	The proposal will provide for an increase in the choice of housing available in the locality. The planning proposal provides for the efficient use of existing infrastructure and services. The proposal is consistent with the provisions of this S117 Direction.



Direction No.	Provisions	Consideration
	not permitted until land is adequately serviced (or arrangements satisfactory to the council, or other appropriate authority, have been made to service it), and (b) not contain provisions which will reduce the permissible residential density of land.	
No. 3.4 – Integrating Land Use and Transport	When this direction applies (5) This direction applies when a relevant planning authority prepares a planning proposal that will create, alter or remove a zone or a provision relating to urban land, including land zoned for residential, business, industrial, village or tourist purposes. What a relevant planning authority must do if this direction applies (6) A planning proposal must locate zones for urban purposes and include provisions that give effect to and are consistent with the aims, objectives and principles of: (a) <i>Improving Transport Choice – Guidelines for planning and development</i> (DUAP 2001), and (b) <i>The Right Place for Business and Services – Planning Policy</i> (DUAP 2001).	The site is located on the fringe of the existing urban area of Bangalow which is serviced by public transport and a pedestrian and cycleway system.
No. 4.3 – Flood Prone Land	When this direction applies (7) This direction applies when a relevant planning authority prepares a planning proposal that will create, alter or remove a zone or a provision relating to urban land, including land zoned for residential, business, industrial, village or tourist purposes.	The land which is proposed to be zoned for urban purposes is not subject to flooding.



Direction No.	Provisions	Consideration
	What a relevant planning authority must do if this direction applies (8) A planning proposal must locate zones for urban purposes and include provisions that give effect to and are consistent with the aims, objectives and principles of: (c) <i>Improving Transport Choice – Guidelines for planning and development</i> (DUAP 2001), and (d) <i>The Right Place for Business and Services – Planning Policy</i> (DUAP 2001).	
No. 4.4 – Planning for Bushfire Protection	When this direction applies (9) This direction applies when a relevant planning authority prepares a planning proposal that will affect, or is in proximity to land mapped as bushfire prone land. What a relevant planning authority must do if this direction applies (10) In the preparation of a planning proposal the relevant planning authority must consult with the Commissioner of the NSW Rural Fire Service following receipt of a gateway determination under section 56 of the Act, and prior to undertaking community consultation in satisfaction of section 57 of the Act, and take into account any comments so made, (11) A planning proposal must: (a) have regard to <i>Planning for Bushfire Protection 2006</i>, (b) introduce controls that avoid placing inappropriate developments in hazardous areas, and (c) ensure that bushfire hazard reduction is not prohibited	The land proposed to be rezoned for residential purposes is not identified as subject to bushfire hazard. A small portion of Lot 101 (Site 1) to the north-east is identified as subject to bushfire hazard however this land is not proposed to be rezoned for residential purposes.



Direction No.	Provisions	Consideration
	within the APZ. (12) A planning proposal must, where development is proposed, comply with the following provisions, as appropriate: (a) provide an Asset Protection Zone (APZ) incorporating at a minimum: (i) an Inner Protection Area bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and (ii) an Outer Protection Area managed for hazard reduction and located on the bushland side of the perimeter road, (b) for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service. If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the <i>Rural Fires Act 1997</i>), the APZ provisions must be complied with, (c) contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks, (d) contain provisions for	



Direction No.	Provisions	Consideration
	adequate water supply for firefighting purposes, (e) minimise the perimeter of the area of land interfacing the hazard which may be developed, (f) introduce controls on the placement of combustible materials in the Inner Protection Area. Consistency (13) A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Director-General of the Department of Planning (or an officer of the Department nominated by the Director-General) that the council has obtained written advice from the Commissioner of the NSW Rural Fire Service, to the effect that, notwithstanding the non-compliance, the NSW Rural Fire Service does not object to the progression of the planning proposal.	
No. 5.1 – Implementatio n of Regional Strategies	What a relevant planning authority must do if this direction applies (14) Planning proposals must be consistent with a regional strategy released by the Minister for Planning.	The planning proposal is considered to be consistent with the Far North Coast Regional Strategy, as it represents a minor amendment to the 'Town and Village Growth Boundary'.
No. 5.3 – Farmland of State and Regional Significance on the NSW Far North Coast	When this direction applies (15) This Direction will apply when a relevant planning authority prepares a planning proposal for land mapped as: (a) State significant farmland, or (b) regionally significant	While the subject land is identified as regionally significant farmland, the planning proposal is considered to be consistent with the Far North Coast Regional Strategy as discussed in this



Direction No.	Provisions	Consideration
	farmland, or (c) significant non-contiguous farmland, on the set of four maps held in the Department of Planning and marked "Northern Rivers Farmland Protection Project, Final Map 2005 (Section 117(2) Direction)". What a relevant planning authority must do if this direction applies (16) A planning proposal must not: (a) rezone land identified as "State Significant Farmland" for urban or rural residential purposes. (b) rezone land identified as "Regionally Significant Farmland" for urban or rural residential purposes. (c) rezone land identified as "significant non-contiguous farmland" for urban or rural residential purposes. Consistency (17) A planning proposal may be inconsistent with the terms of this direction only if council can satisfy the Director-General of the Department of Planning or (an officer of the Department nominated by the Director-General) that the planning proposal is consistent with: (a) the Far North Coast Regional Strategy, and (b) Section 4 of the report titled <i>Northern Rivers Farmland Protection Project - Final Recommendations, February 2005</i>, held by the Department of Planning.	submission.



Section C Environmental, Social and Economic Impact

- 8. *Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the proposal?***

The subject land is presently used for residential purposes and the proposed rezoning of the land is unlikely to adversely affect critical habitat or threatened species, populations or ecological communities, or their habitats.

- 9. *Are there any other likely environmental effects as a result of the planning proposal and how are they proposed to be managed?***

The planning proposal is not likely to result in any significant environmental effects. As previously noted a preliminary site contamination report has been prepared for the land, and the land is not subject to any constraints such as flooding or bushfire hazard.

- 10. *How has the planning proposal adequately addressed any social and economic effects?***

The proposed rezoning of the subject land to residential is not considered likely to result in significant social impacts on the locality.

Section D State and Commonwealth Interests

- 11. *Is there adequate public infrastructure for the planning proposal?***

The planning proposal involves the rezoning of existing allotments and the development potential of the allotments resulting from the rezoning will not result in a significant increase in the demand for infrastructure in the locality.

- 12. *What are the views of State and Commonwealth public authorities consulted in accordance with the gateway determination?***

The issues raised by State and Commonwealth public authorities will be addressed following consultation with them.

PART 4 COMMUNITY CONSULTATION

It is anticipated that given the relatively minor nature of the planning proposal that the application of a standard consultation process should be sufficient in the circumstances.

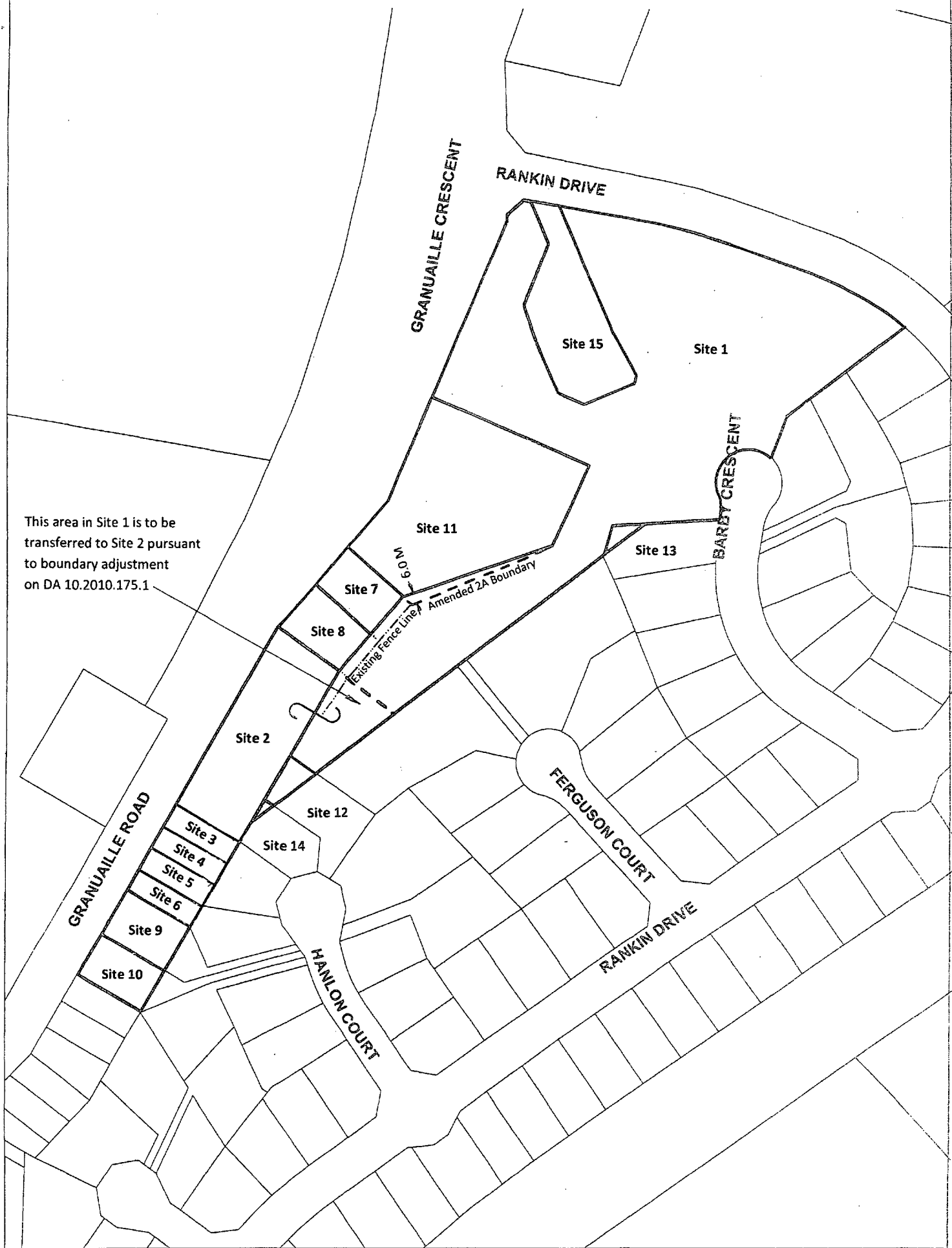
CONCLUSION

Kate Singleton Pty Ltd has been engaged to prepare a planning proposal for land identified as 'Sites 2-14', Granuaille Road, Bangalow. The purpose of the planning proposal is to rezone land presently zoned 1(b1) (Agricultural Protection (b1) Zone) to 2(a)(Residential Zone) in accordance with the provisions of Byron Local Environmental plan 1988 (BLEP 1988).

The subject planning proposal seeks to rezone the subject land to residential to conform with the existing surrounding land in the immediate vicinity. The proposal represents a rounding off of the urban boundaries and the subject land is presently utilised for residential purposes.

This planning proposal is accompanied by a Preliminary Site Contamination Report prepared by Tim Fitzroy & Associates provided at Appendix B, in accordance with the requirements of Council's resolution.

Appendix A
Proposed Rezoning Plan



Instant Steel Pty Ltd
95 Coopers Shoot Road
Coopers Shoot NSW 2479

Proposed Rezoning Plan
for Sites 2 to 14, showing
amended area for site 11.

Scale: 1:2000 @ A4 size
Date: 14th December 2010
Max Campbell. Drwg #107

Proposed Rezoning
Site 7 to 14
Granuialle Road Bangalow



HEALTH SCIENCE ENVIROMENTAL EDUCATION
ENVIRONMENTAL AUDITOR

Proposed Rezoning
Site 7 to 14
Granuialle Road Bangalow

Prepared for: Instant Steel Pty Ltd

Date: December 2010
Job No. 0201
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1. Introduction

Tim Fitzroy & Associates has been engaged by Instant Steel Pty Ltd to undertake a preliminary site investigation under State Planning Policy No.55 for a proposed rezoning for Sites 7 to 14 Granuaille Road, Hanlon Court and Barby Crescent, Bangalow. This report has been prepared to accompany a rezoning from 1(b1) agricultural land to 2(a) residential under the Byron Local Environment Plan (LEP) 1988.

We note that the proposed rezoning from 1(b1) agricultural protection zone to 2(a) residential purposes includes sites 2 to 14 as listed below:

- Site 2 - Lot 2 DP 556714, 55 Granuaille Road Bangalow;
- Site 3 - Lot 14 DP 5938, Granuaille Road Bangalow;
- Site 4 - Lot 13 DP 5938, Granuaille Road Bangalow;
- Site 5 - Lot 12 DP 5938, Granuaille Road Bangalow;
- Site 6 - Lot 11 DP 5938, Granuaille Road Bangalow;
- Site 7 - Lot 1 DP 29127, Granuaille Road Bangalow;
- Site 8 - Lot 1 DP 556714, Granuaille Road Bangalow;
- Site 9 - Lot 15 DP 853050, 11 Hanlon Court Bangalow;
- Site 10 - Lot 14 DP 853050, 9 Hanlon Court Bangalow;
- Site 11 - Lot 23 DP 801442, Granuaille Road Bangalow;
- Site 12 - Lot 19 DP 853050, 12 Hanlon Court Bangalow;
- Site 13 - Lot 88 DP 1011009, 11 Barby Crescent Bangalow;
- Site 14 - Lot 18 DP 853050, Hanlon Court

In addition, although not included in the current rezoning application Tim Fitzroy & Associates was requested to include site 1 (Lot 101 DP 1155344) which is to be the subject of a future rezoning application, in this preliminary contaminated land assessment.

A previous contamination assessment entitled *Preliminary Investigation of Potential Site Contamination – SEPP 55 Assessment Bangalow Settlement Strategy Areas 1, 2 & 3 Rankin Drive/Granuaille Crescent Bangalow* (Balanced Systems Planning Consultants March 2007) was prepared to accompany a preliminary rezoning application to Council. The Balanced Systems Report (2007) (see **Appendix A**) provides a land use history of the subject and adjoining site (known as Areas 2 and 3 in the Bangalow Settlement Strategy). It appears that previous use of the land was limited to dairy and beef cattle grazing.

A Preliminary Contaminated Land Assessment (Fletcher 2009) was prepared to accompany a development application lodged by Stephen McElroy and Associates for the consolidation and re-subdivision of five (5) existing lots (Lots 11-14 DP 5938 & Lot 2 DP 556714) in Granuaille Street Bangalow.

The proposal involves the re-subdivision of the lots so as to create:

- Proposed Lot 21 containing an existing dwelling, curtilage and shed
- Three proposed vacant lots (Lots 22, 23 and 24) with areas of 621 m², 621m² and 807 m².

Our review of Fletcher 2009 concludes that the report does not meet a suitable level of rigor required for a Preliminary Contaminated Land Assessment in accordance with SEPP 55. Nevertheless the assessment has been previously accepted by Byron Shire Council at subdivision.

As a consequence of the above review and as directed by Max Campbell on behalf of Instant Steel Pty Ltd sites 2, 3, 4, 5 and 6 have been excluded from this Preliminary Site Investigation (PSI) under SEPP 55.

Therefore this PSI is limited to sites 1 and 7 to 14 which encompass a total area of 2.184 hectares. Given the variety of current land uses and owners it is our view that a combination of a site history coupled with broad scale, judgemental soil sampling pattern at rezoning stage is the most appropriate strategy for a preliminary contaminated site assessment of the subject sites.

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) relates to contaminated land issues. Clause 7(1) of SEPP 55 requires that a Council cannot approve a rezoning application unless it has duly considered whether such land is contaminated.

This report has been prepared to assist Council in making that decision.

1.1 Summary

An site history combined with a review of *Preliminary Investigation of Potential Site Contamination – SEPP 55 Assessment Bangalow Settlement Strategy Areas 1, 2 & 3 Rankin Drive/Granuialle Crescent Bangalow* (Balanced Systems Planning Consultants March 2007) and discussions with the current owner, Mr Max Campbell confirm that the subject site was previously used for agricultural activities including dairy and beef cattle grazing.

The proposed development application seeks approval to rezone the subject site/s from 1(b) agriculture to 2(a) residential. Soil sampling was undertaken to ensure that if contamination was contained within the soils it would be identified prior to rezoning.

A total of thirty one (31) soil samples were taken from the proposed residential area. Analysis of the samples show all contaminant levels assessed as well below the relevant Australian and New Zealand Environment and Conservation Council (ANZECC) and National Environment Protection Council (NEPC) guideline limits for residential use with the exception of naturally occurring manganese and chromium.

Based on the site history, site inspections and the laboratory results from soil sampling; there is a low level of risk that the subject site is contaminated with residual chemicals from activities associated with current or past land use.

Following a review of the results of laboratory analysis of soil samples taken from the subject site and the soil stockpile it is our considered view that there would appear to be little environmental or health hazard associated with the development approval being granted for the proposed rezoning from 1(b) agriculture to 2(a) residential as nominated in **Illustration 3.1**.

1.2 Scope of Works

This assessment has been undertaken to determine the relative risk associated with the rezoning of land from agriculture to residential use with respect to soil contamination. The tasks involved in undertaking this assessment were to:

- identify the land use history of the site, with particular attention to any uses that may have led to potential contamination;
- assess the site condition and surrounding environment to determine any visual signs of contamination, sensitive local environments or potential contamination "hot spots";
- design a soil sampling pattern for the subject site; and
- analyse individual samples for a range of potential contaminants in relation to the environmental and health investigation levels recommended by the ANZECC guidelines (ANZECC, 1992) in addition to those recommended by NEPC guidelines (NEPC, 1999) to confirm if the presence of any contaminants represents a risk for the proposed rezoning to residential use.

2. Site Description and History

2.1 Site Location

The subject sites are described in Real Property terms as either the whole or a portion of:

- Site 7 – Lot 1 DP 29127, Granuaille Road Bangalow;
- Site 8 – Lot 1 DP 556714, Granuaille Road Bangalow;
- Site 9 – Lot 15 DP 853050, 11 Hanlon Court Bangalow;
- Site 10 – Lot 14 DP 853050, 9 Hanlon Court Bangalow;
- Site 11 – Lot 23 DP 801442, Granuaille Road Bangalow;
- Site 12 – Lot 19 DP 853050, 12 Hanlon Court Bangalow;
- Site 13 – Lot 88 DP 1011009, 11 Barby Crescent Bangalow;
- Site 14 – Lot 18 DP 853050, Hanlon Court

that are currently zoned 1(b) agriculture under Byron LEP 1988.

While not part of the current rezoning proposal, Site 1 (Lot 101 DP 1155344 Granuaille Road) has been assessed under SEPP 55, as part of a potential future rezoning application to Council.

Site 1 and sites 7 to 14 encompass a total area of 2.184 hectares. The property slopes to the south, south-west.

The site includes residual parcels and portions of agriculturally zoned land following the creation of the adjoining residential subdivision.

The site has been completely cleared in the past (Balanced Systems 2007), with a recent history of residential development and both cattle grazing.

A site locality diagram shows the subject site is provided in **Illustration 2.1**. Site photographs are located in **Appendix B**.

2.2 Topography, Soils and Geology

The relief of the majority of the site varies between 100 and 50 m AHD. Slopes on the site are in the range of 5% to 30%.

The soils of the site are described as the Bangalow soil landscape group by Morand (1994). The soils within the subject site are generally red basaltic – landscape variant. They are generally deep well drained alluvial krasnozems (Morand 1992). The actual soils on the site reflect Morand's descriptions.

2.3 Site History

Information on the past use of the subject site is limited to the account of long term local neighbouring residents (see **Appendix A** Balanced Systems (2007)).

It appears that the site was used for dairy and beef cattle grazing, however no dairy bales were located on site.

Photographic evidence indicates that from 1947 the subject site has been cleared. It should be noted that the photographic evidence is unclear.

Sites 7, 8, 9, 10, 12 and 13 are urban style allotments with existing dwellings onsite, while site 11 is a larger allotment with a residence on site and site 1 is cleared land, unencumbered by any structures and previously used for cattle grazing. Site 14 is a vegetated Council reserve.

Site 1 is a vacant rural allotment.

2.4 Previous Contaminated Site Investigations

A previous contamination assessment entitled *Preliminary Investigation of Potential Site Contamination – SEPP 55 Assessment Bangalow Settlement Strategy Areas 1, 2 & 3 Rankin Drive/Granuialle Crescent Bangalow* (Balanced Systems Planning Consultants March 2007) was prepared to accompany a preliminary rezoning application to Council. The Balanced Systems Report (2007) provides a land use history of the subject and adjoining site (known as Area 2 and 3 in the Bangalow Settlement Strategy). It appears that previous use of the land was limited to dairy and beef cattle grazing.

A Preliminary Contaminated Land Assessment (Fletcher 2009) was prepared to accompany a development application lodged by Stephen McElroy and Associates for the consolidation and re-subdivision of five (5) existing lots (Lots 11-14 DP 5938 & Lot 2 DP 556714) in Granuaille Street Bangalow.

The proposal involves the re-subdivision of the lots so as to create:

- Proposed Lot 21 containing an existing dwelling, curtilage and shed
- Three proposed vacant lots (Lots 22, 23 and 24) with areas of 621 m², 621m² and 807 m².

No site sampling was undertaken as part of the previous preliminary investigations for potential site contamination.

2.5 Contaminated Land Record Search

2.5.1 Contaminated Land Record

A search of the Contaminated Land Record (EPA 2010b) for the Byron Shire Council Local Government Area (LGA) did not identify any notices on or near the subject site.

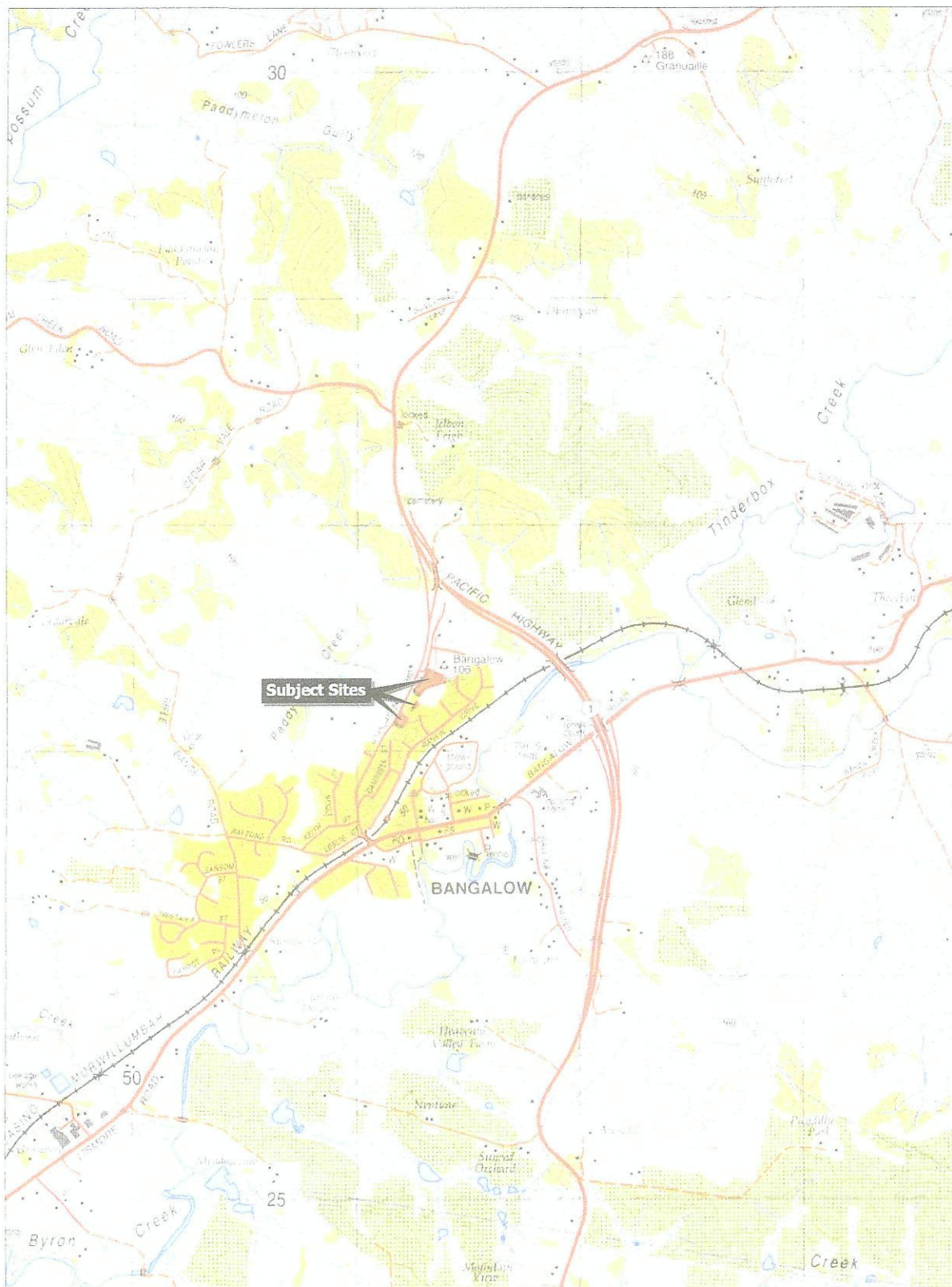
2.5.2 Protection of the Environmental Operations Act Licenses

A search of the current list (EPA 2010c) of licensed activities as per Schedule 1 of the Protection of the Environment Operations Act 1997 identified thirteen (13) licensed activities in the Byron Shire. No current licenses were identified pertaining to the site or lands adjoining the site.

2.5.3 Cattle Tick Dip Sites

A search of the NSW Department of Primary Industries (DPI) Cattle Dip Site Locator tool (<http://www.agric.nsw.gov.au/tools/dipsite-locator/>) indicated that the closest dipsite is located approximately 1.2km downslope and south of the subject site (see **Appendix C**).

The cattle dip site exceeds the EPA investigation zone from the subject site and offers negligible risk to the proposed rezoning to residential use.



SCALE: 1:25,000 (A4)
 DRAWN: azaCAD
 BASE SOURCE: DEPT OF LANDS
 DATE: DECEMBER 2010
 REFERENCE: 22-73-A

Illustration 2: Site Locality

Rezoning Application • Campbell • Sites 7 to 14 • Granuville Road, Bangalow

3. Site Soil Investigations

3.1 Site Inspection

3.1.1 General

A site inspection conducted on 25 November 2010 revealed a mixture of existing residential allotments, landscaped gardens, regenerated native vegetation and cleared grass land (see photographs **Appendix B**).

The majority of sites were in good order with the exception of the rear and side yard of Site 7 where building renovations are underway. As a consequence there was evidence of building rubble and corrugated iron roof sheeting on site.

3.1.2 Visible Signs of Contamination/Plant Stress

Site inspections did not reveal any obvious physical signs of contamination, or any signs of plant stress that may indicate contamination.

3.1.3 Odours

There were no obvious odours akin to contamination observed during site inspections.

3.1.4 Flood Potential

The majority of the site varies between 100 and 50 m AHD. There appears to be negligible risk of flooding.

3.1.5 Presence of Drums, Wastes and Fill Material

There was evidence of fill material across the site. No areas of waste disposal were evident. There was no evidence of used drums or containers on the site.

3.1.6 Local Usage of Groundwater and Surface Waters

A search of existing licensed groundwater bores within relative close proximity of the subject site was conducted. Four groundwater bores were identified within 2km of the subject site (see **Appendix C**).

The closest groundwater bore is located approximately 1.2km to the south of the subject site.

3.1.7 Local Metrology

The average annual rainfall recorded at Byron Weather Station is 1,742.2mm, with the highest rainfall falling in February to March, while the driest months are from August to October. Temperatures range from a lowest average minimum 14.2 C to a highest average maximum of 24.4 C.

3.2 Soil Sampling and Analysis and Data Quality Objectives

The following sampling, analysis and data quality objectives have been adopted for this site investigation:

- to confirm the soils on the subject site do not pose a risk to human health or the environment through soil contamination.
- to employ quality assurance when sampling, assessing and during evaluation of the subject soils.
- to ensure that decontamination techniques are applied during the sampling procedure and that no cross contamination of samples occurs.

Table A of the Contaminated Sites Sampling Design Guidelines (NSW EPA 1995) was taken into consideration when designing the sampling program.

This site contamination assessment included the analysis of one (1) composite sample formed from either three (3) or four (4) sub-samples from the subject property.

Table 3.1 below provides a reference of the sub-samples composited together to constitute the corresponding composite sample for subsequent analysis.

Table 3.1 Constitution of Composite Sample

Composite Sample No.	Sub-samples
TFA 1	1A to 1D
TFA 2	2A to 2D
TFA 3	3A to 3D
TFA 4	4A to 4D
TFA 5	5A to 5D
TFA 6	6A to 6D
TFA 7	7A to 7C
TFA 8	8A to 8D

A combination of a systematic and judgemental soil sampling pattern was adopted, concentrating on an even distribution of samples across the subject sites whilst avoiding existing structures, driveways and vegetation (shrubs, trees etc.).

Soil sampling was undertaken using 70mm hand auger. For a total area of 2.184 hectares, 31 individual samples were collected, providing which is well in excess of the NSW EPA Contaminated Soil Sampling density guidelines (see **Illustration 3.1**).

Soil sampling was conducted at the surface (0-75mm) across the site. The sampling pattern and density adopted is in accordance with the NSW EPA Contaminated Soil Sampling Guidelines and is considered sufficient to ensure that should soil contamination be present on the site, it will be detected.

The soil investigation was undertaken on the 25 November 2010. The weather was fine.

In accordance with the Sampling Design Guidelines, the following sampling method was used:

- Eight (8) sub – samples (1A - 1D; 2A – 2D, 3A – 3D, 4A – 4D, 5A – 5D, 6A – 6D, 7A – 7C, 8A – 8D,) were taken from the surface soil horizon between 0 and 75 mm from across the site and combined to form 8 composite samples.
- All thirty one (31) samples were transported in an esky filled with cooler bricks to the Environmental Analysis Laboratory, Southern Cross University, Lismore. The samples nominated for compositing were thoroughly mixed by EAL to form eight (8) composite samples in accordance with the Chain of Custody documentation. Analysis and determination of metals and pesticides were sent to the Environmental Analysis Laboratory; for analysis and determination while organo-chlorines, were sub contracted by EAL to LABMARK, an allied NATA approved laboratory.

Our experience in site contamination is that organo-phosphate pesticides are rarely identified in soil sampling as they breakdown readily in the environment. This view is supported by Graham Lancaster (Manager Environmental Analysis Laboratory, Southern Cross University, Lismore) who confirmed that organophosphate pesticides do not persist for more than a couple of months in local soils, hence they were not included in this investigation.

Results are provided in **Section 3.4**.

3.3 Quality Assurance

The following basic measures were undertaken by *Tim Fitzroy & Associates* to conform to the minimum standards for sampling and quality control procedures:

- Sampling was undertaken by Tim Fitzroy, with experience in site contamination investigations.
- Soil samples were collected following manual extraction with a 70mm auger using a stainless steel trowel with the soils being placed in hexane rinsed clean glass bottles.
- Sampling equipment (stainless steel trowel) was decontaminated between samples by rinsing thoroughly with de-mineralise water, scrubbing with cleanser (Decon 90), and finally re-rinsing with de-mineralised water.

- Chain of Custody forms, which identified the sample identification codes, the collection dates and the type of analysis to be undertaken were fully completed and delivered with the samples (**Appendix D**).
- Residual samples were stored, frozen and retained by *Environmental Analysis Laboratory* pending the need for additional or repeat analysis.
- Laboratory Results are available in **Appendix E**.

3.4 Assessment Criteria

The ANZECC Guidelines are the accepted guidelines in Australia and New Zealand for establishing "threshold" levels in relation to soil contamination. These threshold levels suggest further investigation is required if levels are exceeded. The NEPC guidelines further expand on the ANZECC threshold limits based on health and environmental risk assessments for a variety of land uses including residential with varying levels of accessible soil risks, open space, commercial and industrial.

The investigation threshold levels identified by "ANZECC Guidelines for the Assessment and Management of Contaminated Sites" 1992 are provided below and were used to identify if high levels of contaminants exist at the site:

▪ Lead	300 mg/kg
▪ Arsenic (total)	100 mg/kg
▪ Cadmium	20 mg/kg

In addition, the results were compared to the following Health-Based investigation levels identified by "Soil Investigation Levels" National Environment Protection Council, 1999:

▪ OC (DDT+DDD+DDE)	200 mg/kg
--------------------	-----------

3.5 Results

The laboratory soil analysis reports containing the full results are provided in **Appendix E**.

A summary of the results and comparison to the guideline limits is provided below in **Table 3.2**. A full suite of heavy metals were tested for and results are provided in full in **Appendix E**.

Only those heavy metals considered relevant to the subject site have been reported in the main body of this report. Similarly, the 22 most commonly used chemical that form organochlorine pesticides were tested for. Full results of each chemical constitute are provided in **Appendix E**. A summary of all OC's is reported within the main body of this report.

In accordance with the NSW EPA Sampling Design Guidelines, the acceptable threshold concentration values for the suspected contaminants were adjusted either by (x3) or (x4);

to resolve the problem of hot spot dilution.

The adjusted laboratory results for all contaminants of concern are provided in **Table 3.2** were below the Health-Based investigation levels identified by "NEPC Guideline on Health Based Investigation Levels" for residential areas with gardens, as provided in the Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites and 'Schedule B (1) guideline on the Investigation Levels for Soil and Groundwater' (NEPC 1999) with the exception of:

- Elevated chromium and Manganese in all samples

Elevated chromium and manganese are common in local krasnozerm soils. The levels are not indicative of contamination. This view is supported by research undertaken by the Environmental Analysis Laboratory (see **Appendix F**).

Table 3.2 Sampling Results

	Analyte	Lead	Arsenic	Cadmium	OC's (DDT+DD D+DDE)
Sample ID	Single Sample Threshold (mg/kg)	<300	<100	<20	<200
	Composite Sample (4) Threshold (mg/kg)	<75	<25	<5	<50
	TFA 1	10	2	0.1	<0.2
	TFA 2	13	2	0.1	<0.2
	TFA 3	8	2	0.2	<0.2
	TFA 4	13	2	0.3	<0.2
	TFA 5	26	2	0.2	<0.2
	TFA 6	32	2	0.2	<0.2
	TFA 7	28	3	0.8	<0.2
	TFA 8	22	2	0.2	<0.2

As can be seen from the above table, and **Appendix E** no exceedances of threshold values for any of the tested chemicals and/or heavy metals were detected. All samples returned results are well below the threshold investigation limits.



N

0 40m

SCALE: 1:2000 (A4)
DRAWN: azaCAD
BASE SOURCE: DCDB
DATE: DECEMBER 2010
REFERENCE: 22-73-A

Illustration 3: Soil Sampling Locations

Rezoning Application • Campbell • Sites 7 to 12 & 14 • Granville Road, Bangalow

4. Conclusions and Recommendations

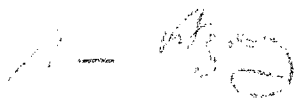
Based on the site history, site inspections and the laboratory results from soil sampling; there is a low level of risk that the subject site is contaminated with residual chemicals from activities associated with current or past land use.

Following a review of the results of laboratory analysis of soil samples taken from the subject site it is our considered view that there would appear to be little environmental or health hazard associated with development approval being granted for the

- **proposed rezoning** (from 1(b) agricultural to 2(a) residential under Byron LEP 1988) for sites 7 to 14; and
- **future rezoning** (from 1(b) agricultural to 2(a) residential under Byron LEP 1988) for site 1

as nominated in **Illustration 3.1**.

This report has been prepared by Tim Fitzroy of *Tim Fitzroy & Associates*.



Tim Fitzroy
Environmental Health Scientist

References

Australia and New Zealand Environment and Conservation Council (ANZECC), 1992, Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites, Australia and New Zealand Environment and Conservation Council.

Balanced Planning Systems Planning Consultants, 2007, Preliminary Investigation of Potential Site Contamination – SEPP 55 Assessment Bangalow Settlement Strategy Areas 1, 2 & 3 Rankin Drive/Granuialle Crescent Bangalow

D. T. Morand, 1994. Soil Landscapes of the Lismore/Ballina 1:100,000 Sheet.

Environment Protection Authority, 1995, Contaminated Sites Sampling Design Guidelines, Environment Protection Authority, Sydney.

National Environment Protection Council (NEPC), 1999, National Environment Protection (Assessment of Site Contamination) Measure 1999, National Environment Protection Council.

National Environment Protection Council (1999) 'Schedule B (1) Guideline on the Investigation Levels for Soil and Groundwater'

Personal Communication Max Campbell 2010

Personal Communication 2010, Graham Lancaster, Environmental Analysis Laboratory, Southern Cross University, Lismore NSW

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Tim Fitzroy and Associates declares that does not have, nor expects to have, a beneficial interest in the subject project.

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A Preliminary Contamination Assessment Balanced Systems (2007)

Appendix B

Preliminary Site Contamination Report

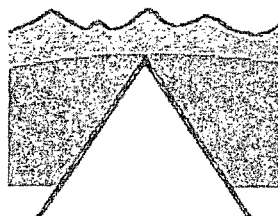
**Preliminary Investigation of Potential
Site Contamination - SEPP 55
Assessment**

4

Bangalow Settlement Strategy Areas 1, 2 and 3

Rankin Drive/ Granuaille Crescent, Bangalow

by



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March 2007

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Executive Summary

A Stage 1 Preliminary Investigation for potential site contamination was undertaken for the subject lands to meet preliminary site investigation requirements of State Environmental Protection Policy 55.

The objectives of this preliminary investigation were:

- Describe historic land use in sufficient detail to identify the presence or absence of uses listed in Table 1 of Council's Guidelines Contaminated Sites (Preliminary investigation guidelines)
- Identify any past or present potentially contaminating activities on the subject land, which if they are or potentially exist, will require a further detailed investigation.
- Reconstruct historic land use activities on the property from the project information.
- Previous land ownership was reconstructed from parish maps and discussions with previous neighbours, owners or their descendants.
- Land use history was reconstructed from:
 - air photos
 - conversations with previous neighbours, owners or their descendants
 - and site inspections.
- The property was visually assessed for signs of contamination during site visits during February 2011.
- Potential sites for contamination that were targeted in this investigation included both broad area and concentrated hot spot sites.

The historical record of land use was regarded as being comprehensive and accurate. Evidence from the three different methods employed showed good correlation and suggested that the site has not been used for manufacturing.

The most common land use in recent decades up to the present time has been grazing of cattle. In earlier decades the land was a rear clearing farm grazing paddock.

There was no evidence that cultivation of crops has ever been carried out on the site which is consistent with the site's topographical characteristics such as slope.

There was no evidence of hot spots located within the site, including sheep or cattle dips, machinery or storage sheds, farm dumps, a landfill areas, dunnies or areas where contaminated runoff may have been concentrated. The land use of surrounding properties was similar and it is unlikely that air or water borne contaminants could have entered the site from activities on adjoining or nearby land.

From the above it is concluded that there is negligible risk of contamination within the site and that no further investigation, including soil sampling, is warranted.

1. Introduction

1.1 Aims and Objectives

The subject property contains Areas 1, 2 and 3 of the Bangalow Residential Strategy located at Parkin Drive, Granville Crescent, Bangalow, is currently subject to a preliminary rezoning application for residential and open space use. This report is an assessment of the land use history for the property to meet Stage 1 Preliminary Site Investigation requirements of State Environmental Protection Policy 55.

The objectives of this preliminary investigation were to:

- Describe historic land uses in sufficient detail to identify the presence or absence of uses listed in Table 1 of Council's undated - Contaminated Sites (Preliminary Investigation Guidelines)
- Identify any past or present potentially contaminating activities on the subject land, which if they exist or potentially exist, will require a further detailed investigation.

1.2 SEPP 55 Guidelines

The following guidelines were used to direct this preliminary investigation:

- Dept. Environment & Conservation (NSW), 2005, Contaminated Sites - Guidelines for Assessing Former Orchards and Market Gardens
- Department of Urban Affairs and Planning - Environment Protection Authority - 1998, Managing Land Contamination - Planning Guidelines, SEPP 55 Foundation of Land
- Environment Protection Authority, 1997, Contaminated Sites - Guidelines for Assessing Banana Plantation Sites
- Byron Shire Council, undated, Contaminated Sites (Preliminary Investigation Guidelines)

SEPP 55 - Contaminated Sites Assessment and Management

- **Stage 1 Preliminary Investigation** looks at historic and current evidence (inter alia aerial photographs and visual site inspection) to look for potential broad area or concentrated ("hot spot") sources of contamination. It may include preliminary soil sampling of suspect sites if required to confirm that contamination is present. Sampling may not be required if the documentation of historic land use is comprehensive and complete, and both the historic evidence and current site inspection suggest that there is negligible risk of site contamination.
- **Stage 2 Detailed Investigation** may only be required if the preliminary investigation has confirmed the presence of one or more contaminated sites. It involves a detailed sampling and analysis program to determine the lateral and vertical extent and the nature of contamination.
- **Stage 3 Remedial Action Plan** involves remediation of the contaminated sites.

- Stage 4 Validation and Monitoring will assess whether that remediated conditions have been achieved.

The EPA (1998) Planning Guidelines SEPP 55 lists the following activities that may cause contamination:

air conditioning formation
air conditioning plant and
air conditioning
air conditioning and disposal
air conditioning and foundation
air conditioning
air conditioning work
air conditioning establishments
air conditioning manufacturing
air conditioning and heat treatment processes
air conditioning
air conditioning industry
air conditioning
air conditioning work
landfill sites
landfill treatment
landfill and extraction industries
oil production and storage
paint formulation and manufacture
pesticide manufacture and formulation
power stations
power yards
power yards
service stations
sheep and cattle dips
smelting and refining
tanning and associated trades
waste storage and treatment
waste processing

The EPA (1998) Guidelines for Orchards & Market Gardens and the EPA (1997) Guidelines for Banana Plantations discuss the following potential sources of contamination applicable to former horticultural sites:

- broad area contamination associated with former areas of cultivation including broad area and regional application of chemicals including herbicides, insecticides, fungicides, soil fumigants and herbicides. Insecticides and herbicides are also used in the use of chemicals.

Organic compounds: organochlorines, organophosphates, carbamates, synthetic pyrethroids, thionamides, phosphorothioates, sulfonamides and plant hormones.

Inorganic compounds: arsenicals (which also often have a lead component), copper and mercury-based products and fertilisers.
- Localised contamination from: High Nitrogen, associated with:

houses and other structures (lead based paints) rain from galvanized iron roofs or cladding, water treatment or other household chemicals.

Farm sheds storage and possible leakage of farm chemicals as well as fuel & lubricants for tractors & other farm machinery.

Chemical storage, mixing or equipment wash-down areas.

Landfill sites or on farm dumps which may contain old chemical drums.

Farm tanks or drums which may have collected and concentrated contaminated runoff from cultivated areas or other hot spots.

1.3 Investigation Methodology

From this guidance, the following potential sources of contamination relevant to the site and Pyron, some in general, were targeted for investigation:

- Concentrated industrial, commercial or military activities, especially associated those associated with the Second World War.
- Areas of road area cultivation, especially urban areas.
- Potential hot spots for concentrated contamination, including dairies, sheep/cattle dips, structures (especially farm sheds & storage areas), landfill or dump sites and areas of concentrated runoff from cultivated areas.

The following research and assessment methodology were used to carry out the preliminary investigation:

- Previous land ownership was reconstructed from past maps and discussions with current and previous owners and with neighbours.
- Previous land use was reconstructed from air photos, discussions with current and previous owners and with neighbours and site inspections.
- The property was visually assessed for signs of contamination during site visits on 12/02/07 and 26/03/07.
- No soil sampling was undertaken as part of this investigation, as the evidence from interviews, aerial photography and site inspection did not indicate that there were any land uses or potential hot spots on the site that warranted a more detailed investigation.

2. Site Description

The subject lands for this investigation is Areas 1, 2 and 3 of the Bangalow Settlement Strategy, and is located at Rankin Drive, Grenada/Crescent, Bangalow. The land is currently subject to a preliminary rezoning application for residential and open space use. The following illustration depicts the subject site.

The subject site is 1.7748 ha, and is vacant, and without any buildings upon it. The land is divided by Rankin Drive and various water easements. The site is the residual parcel of land following creation of the adjoining residential estate.

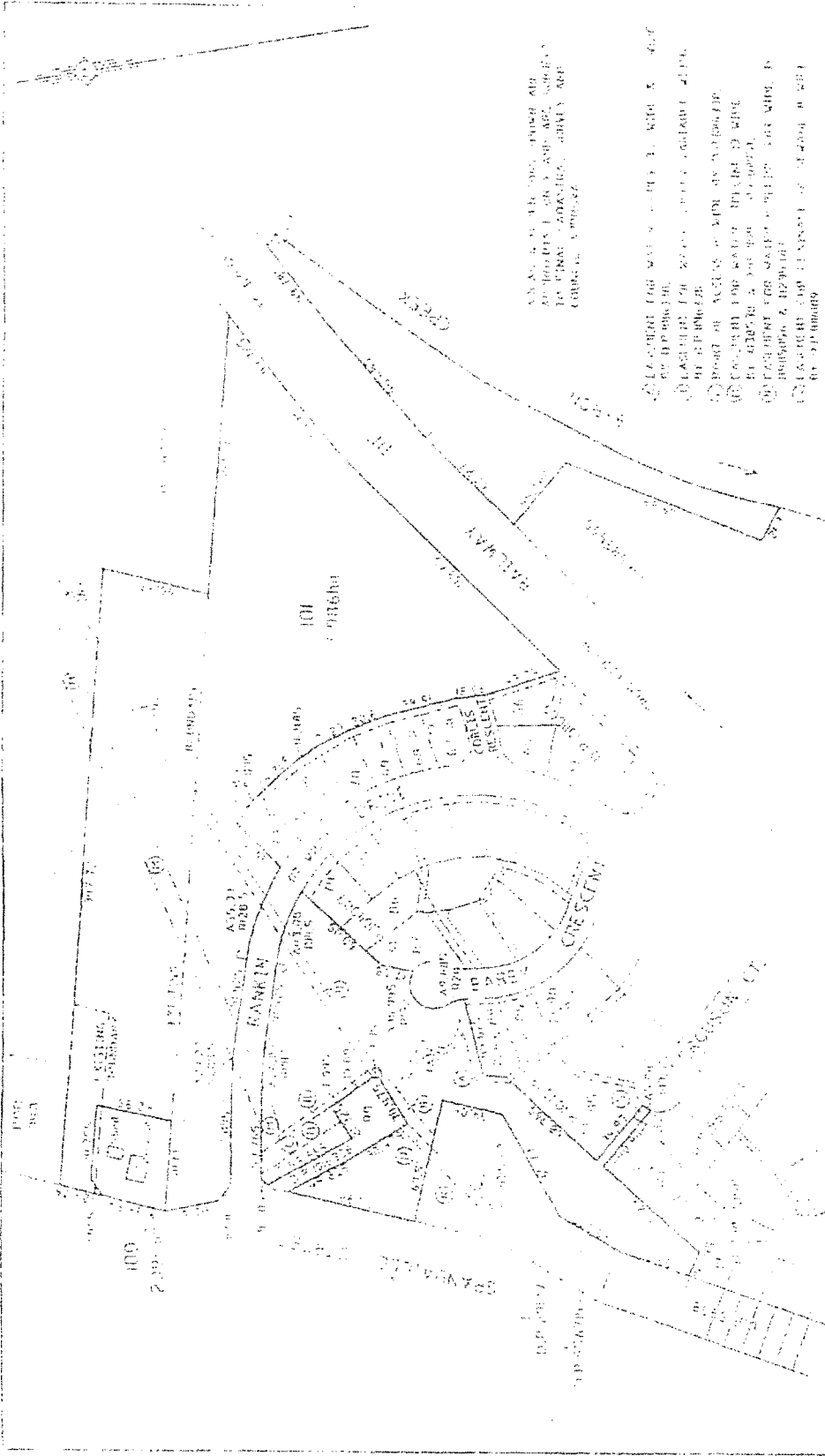
The railway line also dissects the site running north east to south west, and the Pacific Highway lies to the north east, though does not adjoin the site. Byron Creek forms the eastern boundary.

The site includes the crown of a hill, soft sanding, but not including a water tower, while other lands west of the railway line slope gently to moderately with WSW and include a minor drainage line. The section of the site east of the railway line consists of a narrow creek flat confined between Byron Creek and the line. Creek frontage measures approximately 350 m.

The site has apparently been completely cleared in the past, with a recent history of grazing. Regrowth, largely exotic, has been allowed to develop on creek banks and fence lines, and over much of the northern section of the site. Lands surrounding the water tower lot are almost completely cleared.

Soils in the area occupied by the property have been mapped by Moland (1994) as follows:

Bangalow Soil Landscape (Dissectional Landscape Group) - These soils are on low rolling hills on basalt. Soils are moderately deep to deep krasnozems, strongly acid and moderately erodible.



ALL RIGHTS RESERVED AND
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 MAY BE REPRODUCED
 WITHOUT PERMISSION
 OF THE SURVEYOR

- (1) LOTS 1 TO 100
- (2) LOTS 101 TO 200
- (3) LOTS 201 TO 300
- (4) LOTS 301 TO 400
- (5) LOTS 401 TO 500
- (6) LOTS 501 TO 600
- (7) LOTS 601 TO 700
- (8) LOTS 701 TO 800
- (9) LOTS 801 TO 900
- (10) LOTS 901 TO 1000

Instant Steel Pty Ltd		Canty's Surveyors		Plan of Proposed Subdivision of Lot 1	
100 Coopers Street West Melbourne 2000		100 Coopers Street West Melbourne 2000		D.P. 1003689 & Lot 100	
100 Coopers Street West Melbourne 2000		100 Coopers Street West Melbourne 2000		D.P. 1003689 & Lot 100	
100 Coopers Street West Melbourne 2000		100 Coopers Street West Melbourne 2000		D.P. 1003689 & Lot 100	
100 Coopers Street West Melbourne 2000		100 Coopers Street West Melbourne 2000		D.P. 1003689 & Lot 100	
100 Coopers Street West Melbourne 2000		100 Coopers Street West Melbourne 2000		D.P. 1003689 & Lot 100	
100 Coopers Street West Melbourne 2000		100 Coopers Street West Melbourne 2000		D.P. 1003689 & Lot 100	
100 Coopers Street West Melbourne 2000		100 Coopers Street West Melbourne 2000		D.P. 1003689 & Lot 100	
100 Coopers Street West Melbourne 2000		100 Coopers Street West Melbourne 2000		D.P. 1003689 & Lot 100	
100 Coopers Street West Melbourne 2000		100 Coopers Street West Melbourne 2000		D.P. 1003689 & Lot 100	

3. Land Use of the Site and Surrounding Locality

The following land use history was obtained from interviews with the following neighbors: former owners and/or residents (Appendix 1):

Mrs. Elaine Parks. The Parks family owned a nearby farm and residence in Bangalow. Mrs. Parks is a resident of the Bangalow village for over 40 years and is familiar with the land, its owners and history.

Mrs. Marge Buckley. Mrs. Buckley is a long-term Bangalow resident whose family farm was in the immediate locality and is familiar with the land, its owners and history.

Mrs. Jan Hulbert. Mrs. Hulbert is a long-term Bangalow resident and a historian and is familiar with the land, its owners and history.

The site appears to have been used for extensive grazing.

Historic aerial photographs (Section 4) show that the site was largely cleared at or prior to 1947. Some intensive timber planting would have been carried out in the early part of the 1900s or the late 1950s.

From the early 1900s through to the present day, the property appears to have been used only for cattle grazing. None of the owners appeared to undertake any form of pasture improvement and no cattle dips were located on or near the site.

None of the interviewees mentioned the location of any structures being related to the subject site or of any other potential spot activities such as farm camps, cattle dips or race site.

No dairy or milking hales were operated on the site as the Holmes dairy was located at the other end of the Holmes farm to the south-east.

The independent interviews of the nearby residents show good correlation.

The evidence from historic aerial photographs (Section 4) strongly supports the information obtained in interviews.

4. Evidence from Historic Aerial Photography

Copies of three historic aerial photographs were obtained for the site and surrounding locality, dated 1947, 1958, and 1971. Excerpts from these photographs are included in Appendix 2.

Historical aerial photos show that as of 1947, most of the property was cleared of forest. Subsequent aerial photos show some creek lines recolonized by trees. The areas were grazed throughout this time.

4.1 1947 Photograph

The site was totally cleared of vegetation as of 1947.

There is no evidence of cultivation in the photograph.

There is no evidence of structures.

4.2 1958 Photograph

A small amount of regrowth that is occurring along the creek corridor in the south-east corner of the site. The watercourse is open, with the exposed banks on site.

Again, there is no evidence of cultivation, structures, roads or other disturbance within the site or immediate surrounds.

4.3 1971 Photograph

Vegetation regrowth in 1971 appears to have thickened along the creek corridor and in the eastern portion of the site. The vegetation is assumed to be non-haemlock forestation. Similar canopy layer vegetation can be seen throughout the locality.

As with the two older photographs there is no evidence of cultivation, and no evidence of structures, roads or disturbance.

4.4 Summary of Photographic Evidence

The historic aerial photographs strongly correlate with the land use evidence obtained from interviews (see table).

The site does not appear to have ever been used for cultivation. Apart from fencing and possible minor vehicle tracks, no structures or other disturbances are evident. The property appears to have only been used for passive grazing, at least since 1947.

5. Visible Signs of Contamination

Signs of contamination that were targeted for investigation by the assessment team on 12/02/17 were:

Inside signs of contamination that were targeted included:

- Piles of other farm waste or dumps or scattered around
- Piles of other waste from nearby or other landfills or waste burial sites
- Piles of old machinery
- A pile of unplanned plant growth or areas of soil denudation
- Soil staining or odour

None of these signs were found on the site.

6. Conclusions

Three investigation methodologies were used in this preliminary investigation:

- Aerial land use history;
- Analysis of historical aerial photographs;
- Field visual site inspection.

Potential sites for contamination that were targeted in this investigation included both, broad area and concentrated hot spot sites, as described in Section 4.2.

The historical record of land use compiled in this investigation was regarded as being comprehensive and accurate. There was good correlation in evidence obtained from the three different methodologies.

All of the evidence available suggests that the site has not been used for industrial activities.

The most common land use prior to subdivision and sale has been passive grazing of cattle.

No contamination has been turned out on the site. There was no evidence of hot spots located within the site, including sheep or cattle dips, machinery or storage sheds, farm dumps or landfill areas, dairies or areas where contaminated runoff might have been concentrated. The land use of surrounding properties indicated that it is unlikely that surface water borne contaminants could have entered the site from outside.

From the above it is concluded that there is negligible risk of contamination within the site and no further investigation, including soil sampling is warranted.

References and Sources

Prior Title Search and Parish Maps

Land & Property Information Department of Lands (NSW)
www.lpi.nsw.gov.au
www.lpi.nsw.gov.au/landusehistory

Historic Air Photos

The Sydney Map Shop, Department of Lands, NSW www.mapshop.nsw.gov.au/

Land Use History (pers. comm.)

Soils Description

Morand, D.F. 1996, Soil Landscapes of Lismore & Bulahia 1:100,000 Sheet Report, DLW, Sydney.

Climatic Data

Australian Bureau of Meteorology, Climate Average, Cape Byron, Lismore, Weather Station, 1971-2000, <http://www.bom.gov.au/climate/averages/tables/1971-2000/1360101.shtml>

Guidelines & Methodologies:

Dept. Environment & Conservation (NSW), 2005, Contaminated Sites - Guidelines for Assessing Former Orchards and Market Gardens

Department of Urban Affairs and Planning, Environment Protection Authority, 1998, Managing Land - Contaminated Planning Guidelines SHEP, State Government of Lismore

Environment Protection Authority, 1997, Contaminated Sites - Guidelines for Assessing Former Pasture and Soils

Byron Shire Council, (undated), Contaminated Sites - Preliminary Investigation Guidelines

Appendix 1 - Record of Interviews

Interviews with former neighbours, owners or their descendants

Record of interview with Mrs. Elaine Parks

20th March 2007

The Parks family is a long term farm and residence in Bangalow. Mrs Parks has lived in the Bangalow village house for 60 years and is familiar with the land, its owners and history.

She was a neighbour of the Holmes farm of which Lot 100 of the subject lands formed part of. Mrs Parks advised that Lot 100 was part of the rear paddock of the Holmes dairying farm. She stated that it was only used for grazing by dairy cattle at no time were bananas grown on the site. Mrs Parks confirmed the site is not used for any cultivation due to the slope and aspect of the land and the Holmes farm had no reserved land elsewhere on their farm.

Record of interview with Mrs. Marge Buckley

14th February 2007

Mrs. Buckley is a long term Bangalow resident whose family farm was in the immediate locality and is familiar with the land its owners and history.

Mrs. Buckley confirmed that Lot 100 of the subject land was the back paddock of the Holmes farm. The farm was previously owned by Bill Parkin. His son, Arden, sold the farm in 1968.

The Holmes farm used either the dip in town at the showground or at the Coopers Shoot Pond dip site. She confirmed there was no dip on the site.

Mrs. Buckley confirmed that no bananas or cultivation occurred on lot 100 of the site.

Record of interview with Mrs. Jan Hulbert

14th February 2007

Mrs. Jan Hulbert, Mrs. Hulbert is a long term Bangalow resident and historian and is familiar with the land its owners and history.

Mrs. Hulbert confirmed that lot 100 of the subject land was a back paddock of the dairying farm of the Holmes family. She confirmed the paddock was not used for bananas or cultivation.

Appendix 2 - Historic Aerial Photographs

The Site and Surrounds from the Air 1947, 1958 and 1971



The Site

1947

The Site



1958

The Site



1971

B Site Photographs



Photograph 1 Site 9 Rear Yard



Photograph 2 Site 14 Council reserve



Photograph 3 Site 7 Building Rubble (Rear of site)

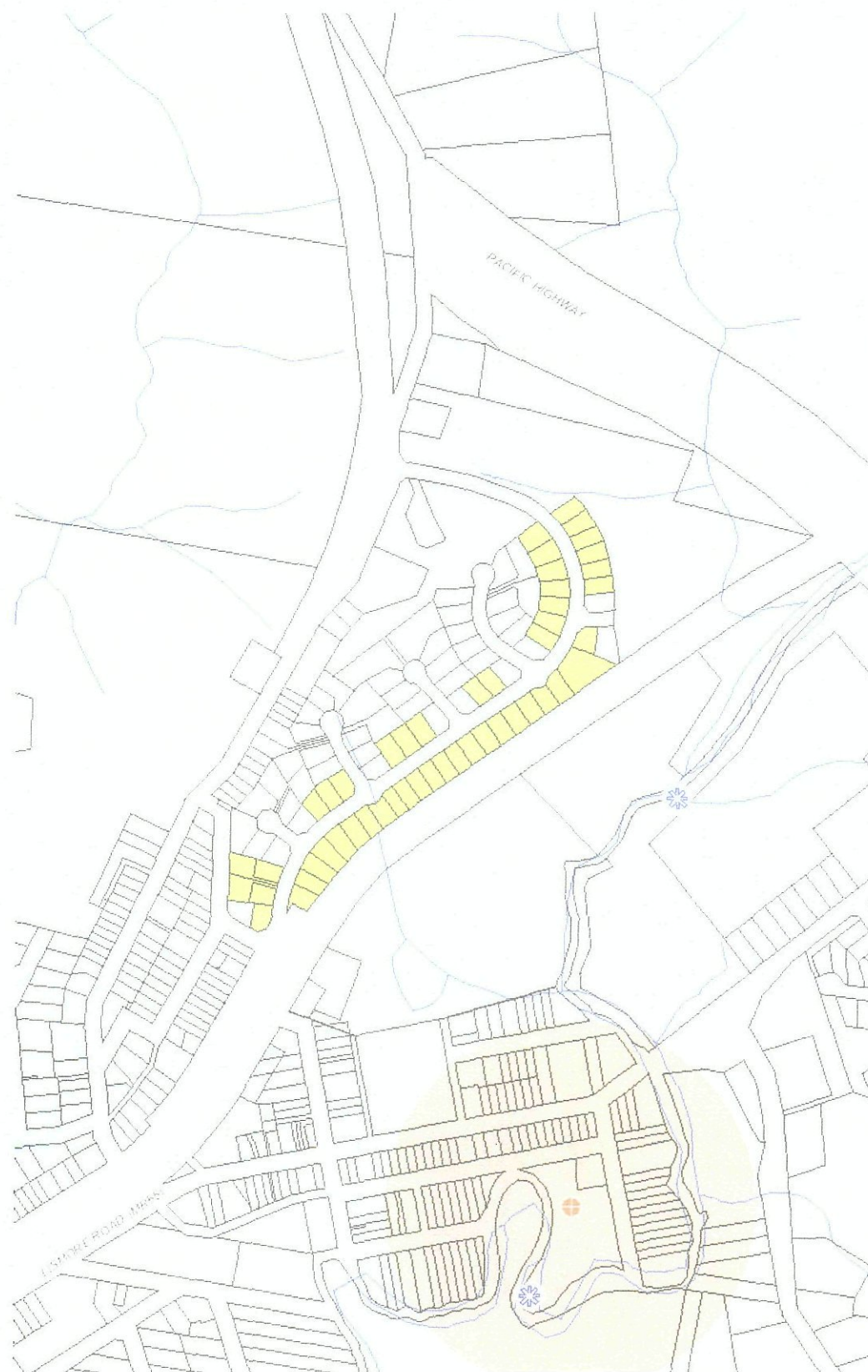


Photograph 4 Site 11 Looking East

C Cattle Dipsite and Groundwater Bores

Legend

-  Water License Ground
-  Water License Surface
-  Dip Sites
-  Land Parcels (-150k)
-  Drainage
-  Dip Buffer
-  Unhealthy Build Land
-  Unstable Land
-  Acid Sulfate Soil Class
-  1 - All works highly likely to have impact on ASS
-  2 - Works below the natural ground surface, or where the watertable is likely to be lowered, likely to have ASS impact
-  3 - Works more than 1 metre below the natural ground surface, or where the watertable is likely to be lowered by more than 1 metre below the natural ground surface likely to have ASS impact
-  4 - Works more than 2 metres below the natural ground surface, or where the watertable is likely to be lowered more than 2 metres below the natural ground surface may have ASS impact
-  5 - Works within 500 metres of adjacent Class 1, 2, 3 or 4, where the watertable is likely to be lowered below 1 metre AHD on the adjacent Class 1, 2, 3 or 4 land



Disclaimer: While all reasonable care has been taken to ensure the information contained on this map is up to date and accurate, no warranty is given that the information contained on this map is free from error or omission. Any reliance placed on such information shall be at the sole risk of the user. Please verify the accuracy of the information prior to using it.
 Note: The information shown on this map is a copyright of the Byron Shire Council and the NSW Department of Lands.

Scale = 1:7,017
 Metres 100 200 300 400

(Scale correct at A4 size)

29/11/2010

D Chain of Custody

B1794

Investigator: Tim Fitzroy
Tim Fitzroy & Associates
52 Alston Ave
Alstonville NSW 2477
Ph 02 66283837/ Mobile 044 848 3837
Fax 02 6628 1349
Email: tim@timfitzroy.com.au

CHAIN OF CUSTODY FORM
Water, Soil or Sludge Samples for Laboratory Analysis

Project No. Name & Location: PN 0201A Max Campbell Site 1, 7 to 14 Granuialle Cres
Bangalow,

Date of Sampling:
26 November 2010

Name & Signature of Sampling Personnel:
TimFitzroy.....

Name of Courier: Tim Fitzroy.....

Sample Identification Code	Sample Type	Preservation Method	Laboratory Analysis Required
TFA 1 (1A, 1B, 1C, 1D Inclusive)	Soil (Composite) Sample Depth 0-75mm	Chilled	Contaminated Soil Analysis Metal Screen & Organics Screen (OC's)
TFA 2 (2A, 2B, 2C, 2D Inclusive)	Soil (Composite) Sample Depth 0-75mm	Chilled	Contaminated Soil Analysis Metal Screen & Organics Screen (OC's)
TFA 3 (3A, 3B, 3C, 3D Inclusive)	Soil (Composite) Sample Depth 0-75mm	Chilled	Contaminated Soil Analysis Metal Screen & Organics Screen (OC's)
TFA 4 (4A, 4B, 4C, 4D Inclusive)	Soil (Composite) Sample Depth 0-75mm	Chilled	Contaminated Soil Analysis Metal Screen & Organics Screen (OC's)
TFA 5 (5A, 5B, 5C, 5D Inclusive)	Soil (Composite) Sample Depth 0-75mm	Chilled	Contaminated Soil Analysis Metal Screen & Organics Screen (OC's)
TFA 6 (6A, 6B, 6C, 6D Inclusive)	Soil (Composite) Sample Depth 0-75mm	Chilled	Contaminated Soil Analysis Metal Screen & Organics Screen (OC's)
TFA 7 (7A, 7B, 7C) 7D	Soil (Composite)	Chilled	Contaminated Soil Analysis Metal Screen & Organics Screen (OC's)



B1794

Inclusive)	Sample Depth		
TFA 8 (8A, 8B,	0-75mm		
8C, 8D	Soil	Chilled	Contaminated Soil Analysis Metal Screen &
Inclusive)	(Composite)		Organics Screen (OC's)
	Sample Depth		
	0-75mm		

Investigator: I attest that the proper field sampling procedures were used during the collection of these samples: (Investigator signature required)

Laboratory Name & Address: Environmental Analysis Laboratory, Southern Cross University, Lismore.....

Relinquished By: Name (Print) (signature)

TIM ATZEL T. Atzel

Date & Time Delivered:

Received By: Name & Signature of Laboratory Staff:

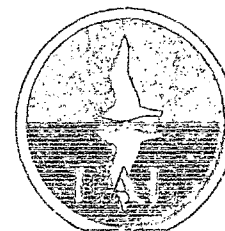
Dylan Goodman Sharpe

Date & Time Received

25-11-2010 5.00pm

DG Sharpe

Sample Receipt Notification (SRN)



Environmental Analysis
Laboratory

Environmental Analysis Laboratory

PO Box 157

Lismore NSW 2480

ABN: 41 995 651 524

Tel: (02) 6620 3678 Fax (02) 6620 3957

Email: eal@scu.edu.au

Project: EAL/B1794
Customer: **Tim Fitzroy & Associates**
Contact: Tim Fitzroy
Client Job ID: PN 0201A Max Campell Site
No. of Samples: 31 samples; 8 composites
Date Received: 26/11/2010 9:14:14AM
Comments: Standard Request

Bill: **Tim Fitzroy & Associates - Tim Fitzroy - 02 66 283837**

Test Request

Sample Text ID	Client Sample ID	SS-PACK-08	SS-PREP-04
		Contaminated Site Assessment 3	Soil Compositing
EAL/B1794/(C)001	Samples (1,2,3,4)	1	0
EAL/B1794/(C)002	Samples (5,6,7,8)	1	0
EAL/B1794/(C)003	Samples (9,10,11,1)	1	0
EAL/B1794/(C)004	Samples (13,14,15,	1	0
EAL/B1794/(C)005	Samples (17,18,19,	1	0
EAL/B1794/(C)006	Samples (21,22,23,	1	0
EAL/B1794/(C)007	Samples (25,26,27)	1	0
EAL/B1794/(C)008	Samples (28,29,30,	1	0
EAL/B1794/001	TFA 1 - A	0	1
EAL/B1794/002	TFA 1 - B	0	1
EAL/B1794/003	TFA 1 - C	0	1
EAL/B1794/004	TFA 1 - D	0	1
EAL/B1794/005	TFA 2 - A	0	1

Sample Receipt Notification

(SRN) for EAL/B1794

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Environmental Analysis
Laboratory

		SS-PACK-08	SS-PREP-04
		Contaminated Site Assessment 3	Soil Compositing
EAL/B1794/006	TFA 2 - B	0	1
EAL/B1794/007	TFA 2 - C	0	1
EAL/B1794/008	TFA 2 - D	0	1
EAL/B1794/009	TFA 3 - A	0	1
EAL/B1794/010	TFA 3 - B	0	1
EAL/B1794/011	TFA 3 - C	0	1
EAL/B1794/012	TFA 3 - D	0	1
EAL/B1794/013	TFA 4 - A	0	1
EAL/B1794/014	TFA 4 - B	0	1
EAL/B1794/015	TFA 4 - C	0	1
EAL/B1794/016	TFA 4 - D	0	1
EAL/B1794/017	TFA 5 - A	0	1
EAL/B1794/018	TFA 5 - B	0	1
EAL/B1794/019	TFA 5 - C	0	1
EAL/B1794/020	TFA 5 - D	0	1
EAL/B1794/021	TFA 6 - A	0	1
EAL/B1794/022	TFA 6 - B	0	1
EAL/B1794/023	TFA 6 - C	0	1

Thank you for choosing Environmental Analysis Laboratory to analyse your project samples.

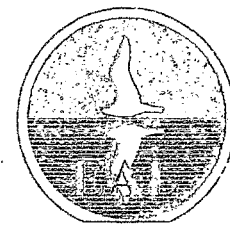
Page 2 of 3

Additional information on www.scu.edu.au/eal

Sample Receipt Notification

(SRN) for EAL/B1794

Page 3 of 3



Environmental Analysis
Laboratory

		SS-PACK-08	SS-PREP-04
		Contaminated Site Assessment 3	Soil Compositing
EAL/B1794/024	TFA 6 - D	0	1
EAL/B1794/025	TFA 7 - A	0	1
EAL/B1794/026	TFA 7 - B	0	1
EAL/B1794/027	TFA 7 - C	0	1
EAL/B1794/028	TFA 8 - A	0	1
EAL/B1794/029	TFA 8 - B	0	1
EAL/B1794/030	TFA 8 - C	0	1
EAL/B1794/031	TFA 8 - D	0	1
Total		8	31

E Laboratory Results

ANALYTE	METHOD	Composite Sample 1 TFA1 (1A, 1B, 1C & 1D)	Composite Sample 2 TFA2 (2A, 2B, 2C & 2D)	Composite Sample 3 TFA3 (3A, 3B, 3C & 3D)	Composite Sample 4 TFA4 (4A, 4B, 4C & 4D)	Composite Sample 5 TFA5 (5A, 5B, 5C & 5D)	Composite Sample 6 TFA6 (6A, 6B, 6C & 6D)	Composite Sample 7 TFA7 (7A, 7B, 7C & 7D)	Composite Sample 8 TFA8 (8A, 8B, 8C & 8D)	Composite Acceptable Limit	Individual Acceptable Limit	Background
REFERENCE	Job No.	B1794/C1	B1794/C2	B1794/C3	B1794/C4	B1794/C5	B1794/C6	B1794/C7	B1794/C8	Column 1	Column 1	Range
										See note 1	See note 2	See note 2
MOISTURE %	c	43	46	36	41	37	28	36	33	..	..	..
SILVER (mg/Kg DW)	a	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	na	na	na
ARSENIC (mg/Kg DW)	a	2	2	2	2	2	2	3	2	<25	<100	0.2-30
LEAD (mg/Kg DW)	a	10	13	8	13	26	32	28	22	<75	<300	<2-200
CADMIUM (mg/Kg DW)	a	0.1	0.1	0.2	0.3	0.2	0.2	0.8	0.2	<5	<20	0.04-2.0
CHROMIUM (mg/Kg DW)	a	35	35	33	47	31	26	37	36	<25	<100	0.5-110
COPPER (mg/Kg DW)	a	26	27	27	41	27	24	33	36	<250	<1000	1-190
MANGANESE (mg/Kg DW)	a	1288	1341	927	538	540	365	675	531	<375	<1500	4-12,600
NICKEL (mg/Kg DW)	a	27	27	34	20	20	23	29	36	<150	<600	2-400
SELENIUM (mg/Kg DW)	a	1.7	2.0	2.0	1.6	1.3	1.6	1.5	1.4	na	na	na
ZINC (mg/Kg DW)	a	103	115	112	153	156	139	195	165	<1750	<7000	2-180
MERCURY (mg/Kg DW)	a	0.10	0.11	0.11	0.10	0.12	0.10	0.08	0.07	<3.75	<15	0.001-0.1
IRON (% DW)	a	9.50	9.03	9.28	9.56	8.50	7.46	10.13	9.02	na	na	na
ALUMINIUM (% DW)	a	4.53	4.70	5.41	3.30	3.55	3.74	4.01	3.95	na	na	na
PESTICIDE ANALYSIS SCREEN												
4, 4 DDT (mg/Kg)	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<50	<200	<0.2
Methoxychlor (mg/Kg)	c	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2.5	<10	<0.2
Other Organochlorine Pesticides (mg/Kg)	c	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<2.5	<10	<0.05

a. ¹³Nitric/HCl digest - APHA 3120 ICPMS
b. ¹³Nitric/HCl digest - APHA 3120 ICPOES
c. Analysis sub-contracted - results attached

1. Column 1: Residential with gardens and accessible soil including childrens daycare centres, preschools, primary schools, town houses or villas' (NSW EPA 1998).

2. Environmental Soil Quality Guidelines, Page 40, ANZECC, 1992.

DW = Dry Weight

(Aldrin, Cis-chlordane, Trans-chlordane, HCB, DDD, DDE, DDT, Alpha-BHC, Beta-BHC, Delta-BHC, Lindane, Dieldrin, Endrin, Heptachlor, Heptachlor epoxide, Alpha-endosulfan, Beta-endosulfan, Endosulfan sulfate, Methoxychlor)

na = no guidelines available

Environmental Analysis Laboratory, Southern Cross University,
Tel. 02 6620 3678, website: scu.edu.au/eal

checked:.....



ENVIRONMENTAL LABORATORIES



NATA

Accreditation No. 1045

Accredited for compliance with ISO/IEC 17025. The results of tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the APLAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

CUSTOMER CENTRIC - ANALYTICAL CHEMISTS

FINAL CERTIFICATE OF ANALYSIS - ENVIRONMENTAL DIVISION

Laboratory Report No: E051162
Client Name: Environmental Analysis Laboratory
Client Reference: B1794
Contact Name: Environmental Analysis Laboratory
Chain of Custody No: na
Sample Matrix: SOIL

Cover Page 1 of 3
plus Sample Results

Date Received: 26/11/2010
Date Reported: 04/12/2010

This Final Certificate of Analysis consists of sample results, DQI's, method descriptions, laboratory definitions, and internationally recognised NATA accreditation and endorsement. The DQO compliance relates specifically to QA/QC results as performed as part of the sample analysis, and may provide an indication of sample result quality. Transfer of report ownership from Labmark to the client shall only occur once full & final payment has been settled and verified. All report copies may be retracted where full payment has not occurred within the agreed settlement period.

QUALITY ASSURANCE CRITERIA

Accuracy: matrix spike: 1 in first 5-20, then 1 every 20 samples
lcs, crm, method: 1 per analytical batch
surrogate spike: addition per target organic method

Precision: laboratory duplicate: 1 in first 5-10, then 1 every 10 samples

laboratory triplicate: re-extracted & reported when duplicate RPD values exceed acceptance criteria

Holding Times: soils, waters: Refer to LabMark Preservation & THT table
VOC's 14 days water / soil
VAC's 7 days water or 14 days acidified
VAC's 14 days soil
SVOC's 7 days water, 14 days soil
Pesticides 7 days water, 14 days soil
Metals 6 months general elements
Mercury 28 days

Confirmation: target organic analysis: GC/MS, or confirmatory column

Sensitivity: EQL: Typically 2-5 x Method Detection Limit (MDL)

QUALITY CONTROL

GLOBAL ACCEPTANCE CRITERIA (GAC)

Accuracy: spike, lcs, crm surrogate: general analytes 70% - 130% recovery
phenol analytes 50% - 130% recovery
organophosphorous pesticide analytes 60% - 130% recovery
phenoxo acid herbicides, organotin 50% - 130% recovery

anion/cation bal: +/- 10% (0-3 meq/l), +/- 5% (>3 meq/l)

Precision: method blank: not detected >95% of the reported EQL
duplicate lab 0-30% (>10xEQL), 0-75% (5-10xEQL)
RPD (metals): 0-100% (<5xEQL)
duplicate lab 0-50% (>10xEQL), 0-75% (5-10xEQL)
RPD: 0-100% (<5xEQL)

QUALITY CONTROL

ANALYTE SPECIFIC ACCEPTANCE CRITERIA (ASAC)

Accuracy: spike, lcs, crm surrogate: analyte specific recovery data <3xsd of historical mean

Uncertainty: spike, lcs: measurement calculated from historical analyte specific control charts

RESULT ANNOTATION

Data Quality Objective s: matrix spike recovery p: pending bcs: batch specific lcs
Data Quality Indicator d: laboratory duplicate lcs: laboratory control sample bmb: batch specific mb
Estimated Quantitation Limit t: laboratory triplicate crm: certified reference material
not applicable r: RPD relative % difference mb: method blank

Laura Schofield
Quality Control (Report signatory)
laura.schofield@labmark.com.au

Laura Schofield
Authorising Chemist (NATA signatory)
laura.schofield@labmark.com.au

Ryan Hamilton
Authorising Chemist (NATA signatory)
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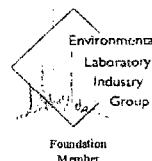
mgt LabMark Environmental Laboratories ABN 50 005 085 521
SYDNEY Unit 1, 8 Leighton Place Asquith NSW 2077
Telephone: (02) 9476 6533 Fax: (02) 9476 8219
MELBOURNE 1868 Dandenong Road, Clayton VIC 3168
Telephone: (03) 9265 9300 Fax: (03) 9265 2278

Form QCS085_R0, Issue Date: 9 September 2010.



ENVIRONMENTAL LABORATORIES

CUSTOMER CENTRIC - ANALYTICAL CHEMISTS



Laboratory Report: E051162

Cover Page 2 of 3

NEPC GUIDELINE COMPLIANCE - DQO

1. GENERAL

- A. Results relate specifically to samples as received. Sample results are not corrected for matrix spike, lcs, or surrogate recovery data.
- B. EQL's are matrix dependant and may be increased due to sample dilution or matrix interference.
- C. Laboratory QA/QC samples are specific to this project.
- D. Inter-laboratory proficiency results are available upon request. NATA accreditation details available at www.nata.asn.au.
- E. VOC spikes & surrogates added to samples during extraction, SVOC spikes & surrogates added prior to extraction.
- F. Recovery data outside GAC limits shall be investigated and compared to ASAC (historical mean +/- 3sd). If recovery data <20%, then the relevant results for that compound are considered not reliable.
- G. Recovery data (ms, surrogate, crm, lcs) outside ASAC limits shall initiate an investigative action. Anomalous QC data is examined in conjunction with other QC samples and a final decision whether to accept or reject results is provided by the professional judgement of the senior analyst. The USEPA-CLP National Functional Guidelines are referred to for specific recommendations.
- H. Extraction (preparation) date refers to the date that sample preparation was initiated. Note that certain methods not requiring sample preparation (eg. VOCs in water, etc) may report a common extraction and analysis date.
- I. LabMark shall maintain an official copy of this Certificate of Analysis for all traceable reference purposes.

2. CHAIN OF CUSTODY (COC) & SAMPLE RECEIPT NOTICE (SRN) REQUIREMENTS

- A. SRN issued to client upon sample receipt & login verification.
- B. Preservation & sampling date details specified on COC and SRN, unless noted.
- C. Sample Integrity & Validated Time of Sample Receipt (VTSR) Holding Times verified (preservation may extend holding time, refer to preservation chart).

3. NATA ACCREDITED METHODS

- A. NATA accreditation held for each in-house method and sample matrix type reported, unless noted below (Refer to subcontracted test reports for NATA accreditation status).
- B. NATA accredited in-house laboratory methods are referenced from NEPC, ASTM, modified USEPA / APHA documents. Corporate Accreditation No. 1645.
- C. Subcontracted analyses: Refer to Sample Receipt Notice and additional DQO comments.

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mgt LabMark Environmental Laboratories ABN 50 005 085 521
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Form QS3085_R0, Issue Date: 9 September 2010.

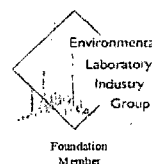


ENVIRONMENTAL LABORATORIES

CUSTOMER CENTRIC - ANALYTICAL CHEMISTS

Laboratory Report: E051162

Cover Page 3 of 3



4. QA/QC FREQUENCY COMPLIANCE TABLE SPECIFIC TO THIS REPORT

Matrix: **SOIL**

Page:	Method:	Totals:	#d	%d-ratio	#t	#s	%s-ratio
1	Organochlorine Pesticides (OC)	8	1	13%	0	1	13%
3	Moisture	8	--	--	--	--	--

GLOSSARY:

- #d number of discrete duplicate extractions/analyses performed.
%d-ratio NEPC guideline for laboratory duplicates is 1 in 10 samples (min 10%).
#t number of triplicate extractions/analyses performed.
#s number of spiked samples analysed.
%s-ratio USEPA guideline for laboratory matrix spikes is 1 in 20 samples (min 5%).

5. ADDITIONAL COMMENTS SPECIFIC TO THIS REPORT

A. All tests were conducted by mgt LabMark Environmental Sydney, NATA accreditation No. 13542, unless indicated below.

Laboratory QA/QC data shall relate specifically to this report, and may provide an indication of site specific sample result quality. LabMark DOES NOT report NON-RELEVANT BATCH QA/QC data. Acceptance of this self assessment certificate does not preclude any requirement for a QA/QC review by a accredited contaminated site EPA auditor, when and wherever necessary. Laboratory QA/QC self assessment references available upon request.

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SYDNEY: Unit 1, 8 Leighton Place, Asquith NSW 2077
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MELBOURNE: 1868 Dandenong Road, Clayton VIC 3168
Telephone: (03) 9265 9300 Fax: (03) 9265 2278

Laboratory Identification		284712	284713	284714	284715	284716	284717	284718	284719	284712d	284712r
Sample Identification		B1794/C1	B1794/C2	B1794/C3	B1794/C4	B1794/C5	B1794/C6	B1794/C7	B1794/C8	QC	QC
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		26/11/10	26/11/10	26/11/10	26/11/10	26/11/10	26/11/10	26/11/10	26/11/10	1/12/10	2/12/10
Laboratory Extraction (Preparation) Date		1/12/10	1/12/10	1/12/10	1/12/10	1/12/10	1/12/10	1/12/10	1/12/10	1/12/10	1/12/10
Laboratory Analysis Date		2/12/10	2/12/10	2/12/10	2/12/10	2/12/10	2/12/10	2/12/10	2/12/10	2/12/10	2/12/10
Method : E013.2											
Organochlorine Pesticides (OC)											
a-BHC Hexachlorobenzene b-BHC g-BHC (Lindane) d-BHC Heptachlor Aldrin Heptachlor epoxide trans-chlordane Endosulfan I cis-chlordane Dieldrin 4,4-DDE Endrin Endosulfan II 4,4-DDD Endosulfan sulphate 4,4-DDT Methoxychlor DBC (Surr @ 0.2mg/kg)	EQL										
	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	--	100%	95%	109%	92%	91%	98%	84%	94%	92%	8%

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

E013.2: 8-10g soil extracted with 20ml DC/MAcetone/Hexane (10:45:45). Analysis by GC/dual ECD.

Laboratory Identification		284713s	lcs	mb					
Sample Identification		QC	QC	QC					
Depth (m)		--	--	--					
Sampling Date recorded on COC		--	--	--					
Laboratory Extraction (Preparation) Date		1/12/10	1/12/10	1/12/10					
Laboratory Analysis Date		2/12/10	2/12/10	2/12/10					
Method : E013.2									
Organochlorine Pesticides (OC)		EQL							
a-BHC		0.05	101%	103%	<0.05				
Hexachlorobenzene		0.05	101%	105%	<0.05				
b-BHC		0.05	98%	96%	<0.05				
g-BHC (Lindane)		0.05	102%	104%	<0.05				
d-BHC		0.05	118%	115%	<0.05				
Heptachlor		0.05	104%	103%	<0.05				
Aldrin		0.05	100%	101%	<0.05				
Heptachlor epoxide		0.05	107%	102%	<0.05				
trans-chlordane		0.05	100%	103%	<0.05				
Endosulfan I		0.05	96%	103%	<0.05				
cis-chlordane		0.05	100%	103%	<0.05				
Dieldrin		0.05	78%	84%	<0.05				
4,4-DDE		0.05	100%	105%	<0.05				
Endrin		0.05	101%	102%	<0.05				
Endosulfan II		0.05	112%	103%	<0.05				
4,4-DDD		0.05	109%	106%	<0.05				
Endosulfan sulphate		0.05	93%	100%	<0.05				
4,4-DDT		0.2	109%	89%	<0.2				
Methoxychlor		0.2	96%	90%	<0.2				
DBC (Surr @ 0.2mg/kg)		--	96%	96%	98%				

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

E013.2: 8-10g soil extracted with 20ml DCM/Acetone/Hexane (10:45:45). Analysis by GC/dual ECD.

Laboratory Report No: E051162

Page: 3 of 3

Final

Client Name: Environmental Analysis Laboratory

Certificate
of Analysis

ENVIRONMENTAL LABORATORIES

Contact Name: Environmental Analysis Laboratory

Date: 04/12/10

Client Reference: B1794

This report supersedes reports issued on: N/A

Laboratory Identification	284712	284713	284714	284715	284716	284717	284718	284719	284712d	284712r
Sample Identification	B1794/C1	B1794/C2	B1794/C3	B1794/C4	B1794/C5	B1794/C6	B1794/C7	B1794/C8	QC	QC
Depth (m)	--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC	26/11/10	26/11/10	26/11/10	26/11/10	26/11/10	26/11/10	26/11/10	26/11/10	1/12/10	2/12/10
Laboratory Extraction (Preparation) Date	1/12/10	1/12/10	1/12/10	1/12/10	1/12/10	1/12/10	1/12/10	1/12/10	1/12/10	1/12/10
Laboratory Analysis Date	2/12/10	2/12/10	2/12/10	2/12/10	2/12/10	2/12/10	2/12/10	2/12/10	2/12/10	2/12/10
Method : E005.2										
Moisture	43	46	36	41	37	28	36	33	42	2%
Moisture										

Results expressed in % w/w unless otherwise specified

Comments:

E005.2: Moisture by gravimetric analysis. Results are in % w/w.



Environmental Analysis Laboratory
Environmental Analysis Laboratory

Report Date : 30/11/2010
Report Time : 2:55:39PM

Sample
Receipt
Notice (SRN) for E051162



Quality, Service, Support

Client Details		Laboratory Reference Information	
Client Name: Environmental Analysis Laboratory Client Phone: 02 6620 3678 Client Fax: 02 6620 3957 Contact Name: Environmental Analysis Laboratory Contact Email: eal@scu.edu.au Client Address: Southern Cross University Military Rd East Lismore NSW 2480 Project Name: B1794 Project Number: - Not provided - CoC Serial Number: - Not provided - Purchase Order: - Not provided - Surcharge: No surcharge applied (results by 6:30pm on due date) Sample Matrix: SOIL		Please have this information ready when contacting MGT Labmark. Laboratory Report: E051162 Quotation Number: - Not provided, standard prices apply Laboratory Address: Unit 1, 8 Leighton Pl. Asquith NSW 2077 Phone: 61 2 9476 6533 Fax: 61 2 9476 8219 Sample Receipt Contact: Leanne Knowles Email: leanne.knowles@labmark.com.au Reporting Contact: Leanne Knowles Email: leanne.knowles@labmark.com.au	
Date Sampled (earliest date): 26/11/2010 Date Samples Received: 26/11/2010 Date Sample Receipt Notice issued: 30/11/2010 Date Preliminary Report Due: 07/12/2010 Client TAT Request Date: 07/12/2010		NATA Accreditation: 13542	

Reporting Requirements: Electronic Data Download required: No

Invoice Number: 10EA12498

Sample Condition: COC received with samples. Report number and lab ID's defined on COC.
Samples received in good order.
Samples received with cooling media: Ice bricks.
Samples received chilled.
Security seals not used.
Sample container & chemical preservation suitable.

Comments:

Holding Times: Date received allows for sufficient time to meet Technical Holding Times.

Preservation: Chemical preservation of samples satisfactory for requested analytes.

Important Notes:

MGT LabMark shall responsibly dispose of spent customer soil and water samples which includes the disintegration of the sample label. A sample disposal fee of \$1.00 is applicable on all samples received by the laboratory regardless of whether they have undergone analytical testing. Sample disposal of environmental samples shall be 31 days (water) and 3 months (soil, HN03 preserved samples) after laboratory receipt, unless otherwise requested in writing by the client. Samples requested to be held in non-refrigerated storage shall incur \$5.00/ sample/ 3 months. Additional refrigerated storage shall incur \$30/ sample/ 3 months. Combination prices apply only if requested. Transfer of report ownership from MGT LabMark to the client shall occur once full and final payment has been settled and verified. All report copies may be retracted where full payment does not occur within the agreed settlement period.

Analysis comments:

Subcontracted Analyses:

Thank you for choosing MGT Labmark to analyse your project samples.
Additional information on www.mgtlabmark.com.au



MGT Labmark
Environmental Analysis
P.O. Box 100, Bayswater, Vic 3009
Tel: 03 9450 1000 Fax: 03 9450 1001

Report Date : 30/11/2010
Report Time : 2:55:39PM

Sample Receipt



Notice (SRN) for **E051162**

Quality, Service, Support

The table below represents LabMark's understanding and interpretation of the customer supplied sample COC request (refer to SRN comments section on first page for external subcontracting method details). Please confirm that your COC request has been entered correctly. Due to THT and TAT requirements, testing shall commence immediately as per this table, unless the customer intervenes with a correction prior to testing.

GRID REVIEW TABLE				Requested Analysis															
No.	Date	Depth	Client Sample ID	Moisture	Organochlorine Pesticides (OC)	PREP Not Reported													
284712	26/11		B1794/C1	☉	☉	☉													
284713	26/11		B1794/C2	☉	☉	☉													
284714	26/11		B1794/C3	☉	☉	☉													
284715	26/11		B1794/C4	☉	☉	☉													
284716	26/11		B1794/C5	☉	☉	☉													
284717	26/11		B1794/C6	☉	☉	☉													
284718	26/11		B1794/C7	☉	☉	☉													
284719	26/11		B1794/C8	☉	☉	☉													
Totals:				8	8	8													

'PREP Not Reported' refers to an internal laboratory instruction - client confirmation of this parameter is not required.

Thank you for choosing MGT Labmark to analyse your project samples.
Additional information on www.mgtlabmark.com.au

☐ MELBOURNE

Ph: (03) 9265 9300 Fax: (03) 9265 9355
1888 Dandenong Road Clayton VIC 3168
E: enviro.melbourne@labmark.com.au

☐ BRISBANE

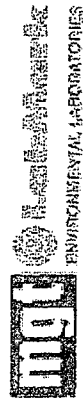
Ph: (07) 3902 4600 Fax: (07) 3902 4646
1/21 Smallwood Place Murarrie QLD 4172
E: enviro.brisbane@labmark.com.au

☐ SYDNEY

Ph: (02) 9476 6533 Fax: (02) 9476 8219
Unit 1/8 Leighton Place Asquith NSW 2077
E: enviro.sydney@labmark.com.au

Call:

1300 0 LABMARK



Environmental Analysis Request - Chain Of Custody (COC)

Company: ENVIRONMENTAL ANALYSIS LABORATORY
Address: SCU MILITARY RD
EAST LISMORE NSW 2480
Contact: CRAHAM LANCASTER
Telephone: 02 6620 8678 Fax: 02 6620 3957
Email: ral@scu.edu.au

COC Number:

#The COC number will act as a purchase order number if not supplied

Purchase Order No:

(email)

Send Results to: 24 hrs ☐ 48 hrs ☐ 5 Day ☐ Other ☐

*Note: TAT of less than 5 days must be pre-arranged with the laboratory and surcharges may apply.

SAMPLE DESCRIPTION

ANALYSIS REQUIRED

Lab ID	Sample ID	Date & Time Sampled	Soil / Water Other	Comments	COMPOSITE	TPH - C6-C9	TPH - C10-C36	MAHS	BTEX	PAHS	PCBs	OCs	Ops	Total Phenolics	Speciated Phenols	Metals - Std 17	Metals - Specify **	Mercury	VicePA 448.3 Screen
284712	B1794/C1	20/11	S																
284713	B1794/C2	20/11	S																
284714	B1794/C3	20/11	S																
284715	B1794/C4	20/11	S																
284716	B1794/C5	20/11	S																
284717	B1794/C6	20/11	S																
284718	B1794/C7	20/11	S																
284719	B1794/C8	20/11	S																
# Please Provide Field PID Readings where possible					Totals:		8												

** METALS (Please circle): Al; Sb; As; Ba; Be; Bi; B; Cd; Ca; Cs; Cr; Co; Cu; Fe; Pb; Li; Mg; Mn; Mo; Ni; Pd; P; Pt; K; Se; Si; Ag; Na; Sr; S; Ti; Th; Sn; Tl; W; U; V; Zn

Chain of Custody

Relinquished by:

Received by:

Relinquished by:

Received by:

Relinquished by:

Received by:

Date/Time:

Date/Time:

Date/Time:

Date/Time:

Date/Time:

Date/Time:

Special Requirements (eg. OHS issues etc.)

Sample Receipt Advice (Lab Use Only)

All Samples Received in Good Condition ☒

All Documentation in Proper Order ☒

Samples Received with an Attempt to Chill ☒

Samples Received Within Holding Times ☒

Average sample temp on receipt: (°C) 17.5

For enquires please quote Ref. No. E051162

F Environmental Analysis Laboratory Research

**ASSESSMENT OF TOTAL SOIL MANGANESE AND
CHROMIUM IN BASALTIC SOILS
OF THE NORTH COAST, NSW**

An assessment of Manganese and Chromium possible soil contamination
as required for State Environmental Planning Policy 55

PREPARED BY: GRAHAM LANCASTER
SOUTHERN CROSS UNIVERSITY A.B.N. 41 995 651 524
SCHOOL OF ENVIRONMENTAL SCIENCE AND MANAGEMENT
ENVIRONMENTAL ANALYSIS LABORATORY

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FOR: NEWTON DENNY CHAPELLE
REPORT NO.: Contamination Reports
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EXECUTIVE SUMMARY

The objective of the investigation is to assess typical and average soil total manganese (Mn) and chromium (Cr) concentrations in North Coast soils, NSW (ie. Grafton to the south, Kyogle to the west, Mullumbimby to the North and Ballina to the east). These soils are typically of a basaltic origin and these volcanic soils are shown to be naturally elevated in some metals.

The assessment of Mn and Cr assessment in North Coast soils has been conducted on a random 200 composite soil samples, which is equivalent to 800 individual soils. This number of soils is considered representative of North Coast soils and for the assessment of average metal concentrations.

The results of the soil analysis were compared with Column 1 of the NSW EPA (1998) *'Contaminated Sites – Guidelines for the NSW Site Auditor Scheme'*. Column 1 presented Human - Based Investigation Levels (HBIL) for developments being 'residential with gardens and accessible soil'. The guidelines are also typically modified by dividing them by the number of samples that make up the composite sample (ie. typically the guideline divided by four).

The average Mn in the 800 soils is 1800ppm Mn with a standard deviation of 1162ppm. These levels are 'naturally' well above the guideline level of 1500ppm or 375ppm Mn for composite samples (ie. 92% of the 200 composite soils analysed exceed the 375ppm guideline).

The average Cr in the 800 soils is 56ppm Cr with a standard deviation of 32ppm. These levels are 'naturally' well above the composite guideline level of 25ppm Cr (ie. 91% of the 200 composite soils analysed exceed the 25ppm guideline).

The background levels of metals analysed, obtained from ANZECC and NHMRC (1992) Table 3 'Environmental Soil Quality Guidelines' page 40, state that background levels of Mn range from 4 – 12,600ppm and total Cr from 0.5 – 110ppm. This large range for background Mn and Cr in soils further confirms the results obtained for naturally elevated Mn and Cr in North Coast soils.

All Mn and Cr analysis results in North Coast soils need to be disregarded unless an identifiable source of Mn or Cr soil contamination has been identified. The Contaminated Land Management Act 1997 clearly identifies contamination as 'above the concentration at which the substance is normally present in, on or under land in the same locality' and hence confirming that the elevated naturally occurring Mn and Cr concentrations in North Coast soils is not identified as 'contamination' and hence does not warrant further investigation or remediation.

1.0 INTRODUCTION

The Environmental Analysis Laboratory has been commissioned by Newton Denny Chappelle to undertake a investigation for Contaminated Lands in regard to soil total Mn and Cr concentrations.

The objective of the investigation is to assess typical and average soil total Mn and Cr concentrations in North Coast soils, NSW (ie. Grafton to the south, Kyogle to the west, Mullumbimby to the North and Ballina to the east). These soils are typically of a basaltic origin and these volcanic soils are shown to be naturally elevated in some metals.

The purpose of this report is to determine if north coast soils are contaminated from current or past land usage or have 'naturally' occurring Cr and Mn. To determine if a site has been contaminated, soil samples have been collected and analysed for a range of contaminants. A large number of soil composite samples from random sites were collated for this assessment. If contaminated, the results of the analysis are required to be higher than that of the relevant EPA acceptable levels. Most of the contamination reports involve residential and hence the soil analysis results are compared with the NSW EPA (1998) Columns 1 of the Table "Soil Investigation Levels for Urban Redevelopment Sites in NSW" page 30 and ANZECC and National Health and Medical Research Council (1992) Table 2 "Environmental Soil Quality Guidelines" page 40.

This investigation is Stage 1 of the *Managing Land Contamination Planning Guidelines* (DUAP and EPA, 1998). If contamination levels exceed the EPA acceptable levels, a detailed investigation is then required in accordance with DUAP and EPA (1998), being Stage 2. If the contamination levels are below the relevant acceptable levels and information gathered as part of the investigation also supports that contamination was unlikely to have occurred, Stage 1 would only be required.

2.0 METHODOLOGY

The assessment of Mn and Cr in North Coast soils has been conducted on a random 200 composite soil samples, which is equivalent to 800 individual soils. This number of soils is considered representative of North Coast soils and for the assessment of average metal concentrations.

Samples were analysed for a full range of heavy metals and the data analysed in this review is the total Mn, Cr, iron (Fe) and aluminium (Al).

2.1 Sampling Methodology

Samples were collected using a hand auger and spade, with soil being placed in plastic sample bags.

All soil samples were placed into an esky with ice bricks, and delivered to the Environmental Analysis Laboratory at Southern Cross University, Lismore. Metals analysis was conducted by the Environmental Analysis Laboratory (EAL) and quality control included blanks, duplicates and certified NIST reference soil in every batch. Analysis is conducted using a Perkin Elmer DV4300 ICPOES (Inductively Coupled Plasma Optical Emission Spectrometry) with confirmation and level analysis of all samples using a Perkin Elmer ELAN6000 ICPMS (Inductively Coupled Plasma Mass Spectrometry).

Chain of custody forms, laboratory quality assurance and laboratory quality control documentation are available on request.

3.0 BASIS FOR ASSESSMENT CRITERIA

The acceptable limits of the parameters tested are based on the NSW EPA (1998) *Contaminated Sites - Guidelines for the NSW Site Auditor Scheme*. In particular Column 1 of table "Soil Investigation Levels for Urban Redevelopment Sites in NSW" page 30. Column 1 relates to "Residential with gardens and accessible soil including children's daycare centres, preschools, primary schools, town houses or villas". The tested parameters are presented in Table 1.

Table 1: Soil Investigation Levels for Urban Redevelopment Sites in NSW: Column 1 "Residential with gardens and accessible soil including children's daycare centres, preschools, primary schools, town houses or villas" (NSW EPA 1998)

Substance	Acceptable Limit Column 1 (mg/kg)	Modified Acceptable Limit Column 1 (mg/kg) (divided by 4 for composites of 4 samples)
Arsenic	100	25
Cadmium	20	5
Chromium (VI)	100	25
Copper	1000	250
Manganese	1500	375
Nickel	600	150
Lead	300	75
Zinc	7000	1750
Mercury	15	3.75
OC's (aldrin and dieldrin)	10	2.5
OC's (DDT)	200	50

Background Levels

Metals occur naturally within soils and are a natural constituent of geological materials that erode and assist in the formation of soils. The background levels of metals analysed, obtained from ANZECC and NHMRC (1992) Table 3 "Environmental Soil Quality Guidelines" page 40, are presented in Table 2.

Table 2: Background Ranges for Potential Contaminants

Pollutant	Background Range (mg/kg)
Arsenic	0.2 – 30
Lead	<2 – 200
Cadmium	0.04-2
Copper	1-190
Nickel	2-400
Zinc	2-180
Manganese	4 – 12,600
Chromium	0.5 – 110 (possible underestimate)
Mercury	0.001-0.1

Table 3: Average Abundance of Manganese and Chromium in Basalt and other minerals

AVERAGE ABUNDANCE OF ELEMENTS IN THE EARTHS CRUST AND IN THREE COMMON ROCKS
(IN PARTS PER MILLION) (10,000ppm = 1%)

ELEMENT	CRUST	GRANITE	BASALT (Crusher Dust)	SHALE	ELEMENT	CRUST	GRANITE	BASALT (Crusher Dust)	SHALE
O	464,000	485,000	441,000	495,000	Pr	8	10	4	9
Si	282,000	323,000	230,000	238,000	Sm	7	9	5	7
Al	81,000	77,000	84,000	92,000	Gd	7	8	6	6
Fe	54,000	27,000	86,000	47,000	Dy	6	6.5	4	5
Ca	41,000	16,000	72,000	25,000	Er	3.5	4.5	3	3.5
Na	24,000	28,000	19,000	9,000	Yb	3.5	4	2.5	3.5
Mg	23,000	4,000	45,000	14,000	Be	3	5	0.5	3
K	21,000	32,000	8,000	25,000	Cs	3	5	1	7
Ti	5,000	2,100	9,000	4,500	Hf	3	4	1.5	4
H	1,400	..	..	..	U	2.7	5	0.5	3.5
P	1,100	700	1,400	750	Br	2.5	0.5	0.5	5
Mn	1,000	500	1,700	850	Sn	2.5	3	2	6
F	650	800	400	600	Ta	2	3.5	1	2
Ba	700	700	300	600	As	1.8	1.5	2	10
Sr	375	300	450	400	Ge	1.5	1.5	1.5	1.5
S	300	300	300	2,500	Mo	1.5	1.5	1	2
C	220	320	120	1,000	Ho	1.5	2	1	1.5
Zr	165	180	140	180	Eu	1.2	1	1.5	1.4
Cl	130	200	60	170	W	1.2	1.5	0.8	1.8
V	110	50	250	130	Tb	1	1.5	0.8	1
Cr	100	20	200	100	Tl	0.8	1.2	0.2	1
Rb	90	150	30	140	Lu	0.6	0.7	0.5	0.6
Ni	75	0.8	150	80	Tm	0.5	0.6	0.5	0.6
Zn	70	50	100	90	Sb	0.2	0.2	0.2	1.5
Ce	70	90	30	70	I	0.2	0.2	0.1	1
Cu	50	12	100	50	Cd	0.15	0.1	0.2	0.3
Y	35	40	30	35	Bi	0.15	0.2	0.1	0.2
La	35	55	10	40	In	0.06	0.05	0.07	0.06
Nd	30	32	20	30	Ag	0.07	0.04	0.1	0.1
Co	22	3	48	20	Se	0.05	0.05	0.05	0.6
Li	20	30	12	60	Hg	0.02	0.03	0.01	0.3
N	20	20	20	60	Au	0.003	0.002	0.004	0.003
Sc	20	8	35	15					
Nb	20	20	20	15					
Ga	18	18	18	25					
Pb	12.5	20	3.5	20					
B	10	15	5	100					
Th	8.5	20	1.5	12					

Reference: Krauskopf, K, 1996. Introduction to Geochemistry, McGraw-Hill International.

4.0 RESULTS

The results from the soil testing regime are graphically represented on the following pages.
The raw data table with over 200 entries and identifiable job numbers is presented in Exhibit 1.

Figure 1- Graphical presentation of Manganese Soil Results

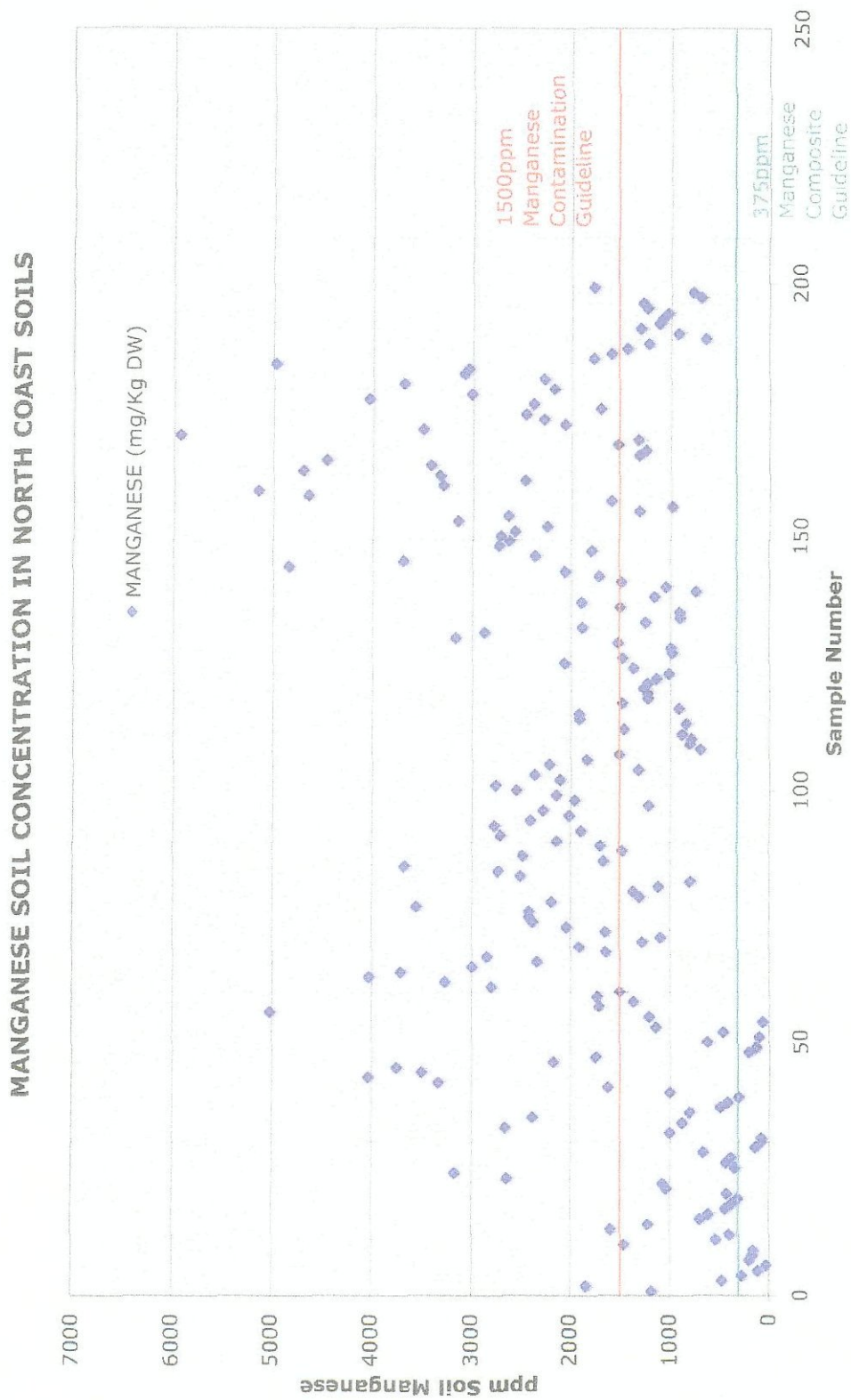


Figure 2- Graphical presentation of Chromium Soil Results

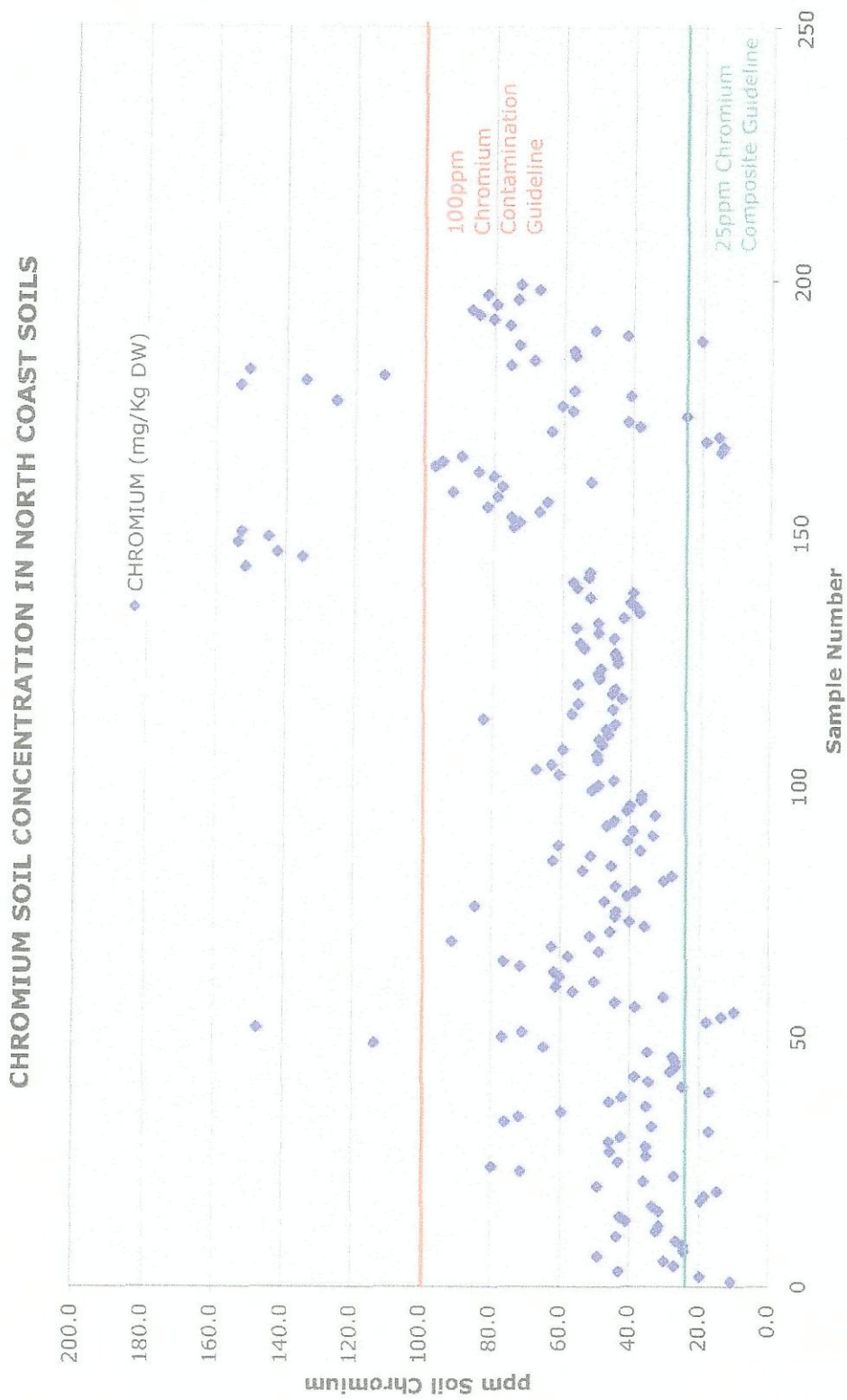


Figure 3- Relationship between Iron and Manganese in North Coast Soils

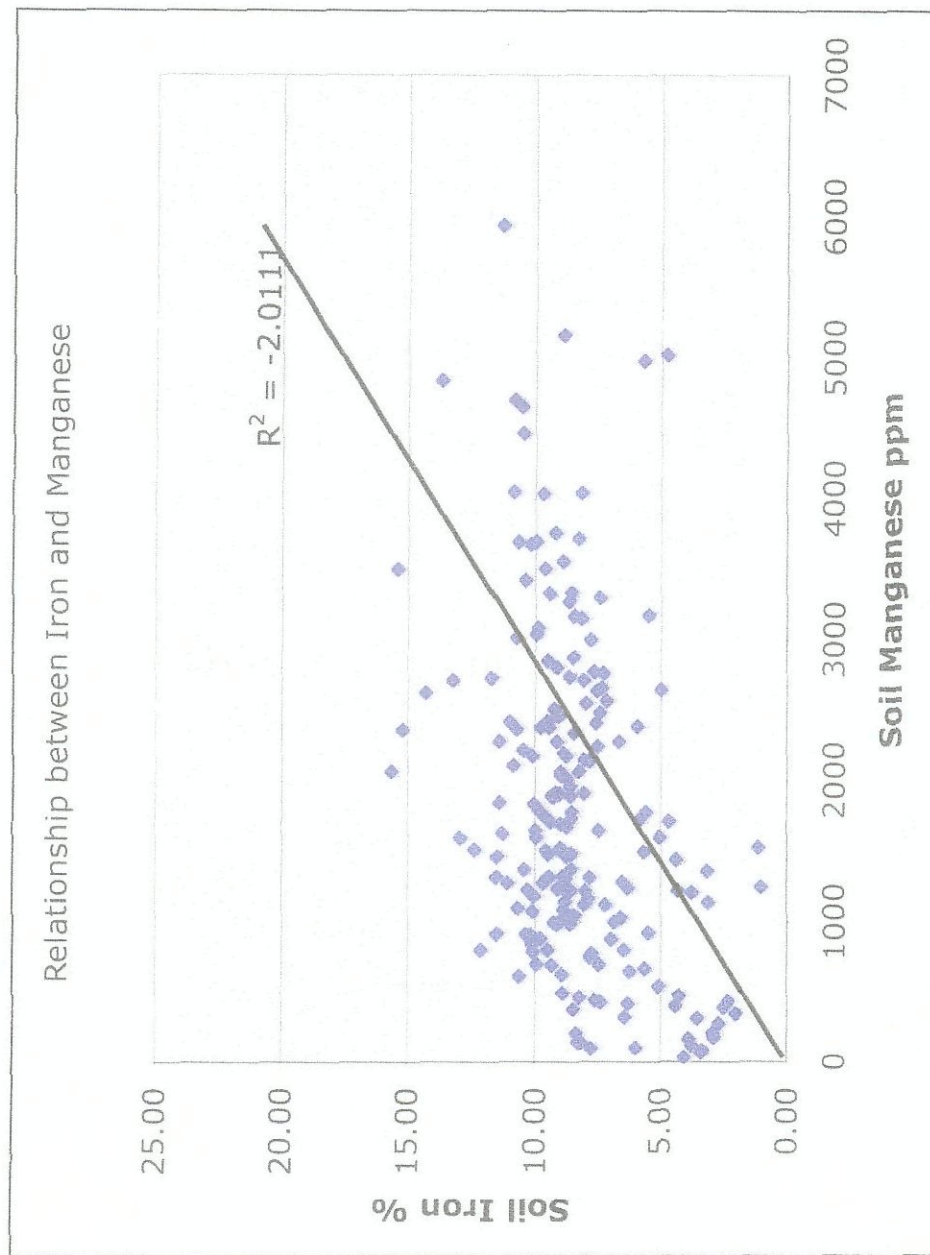
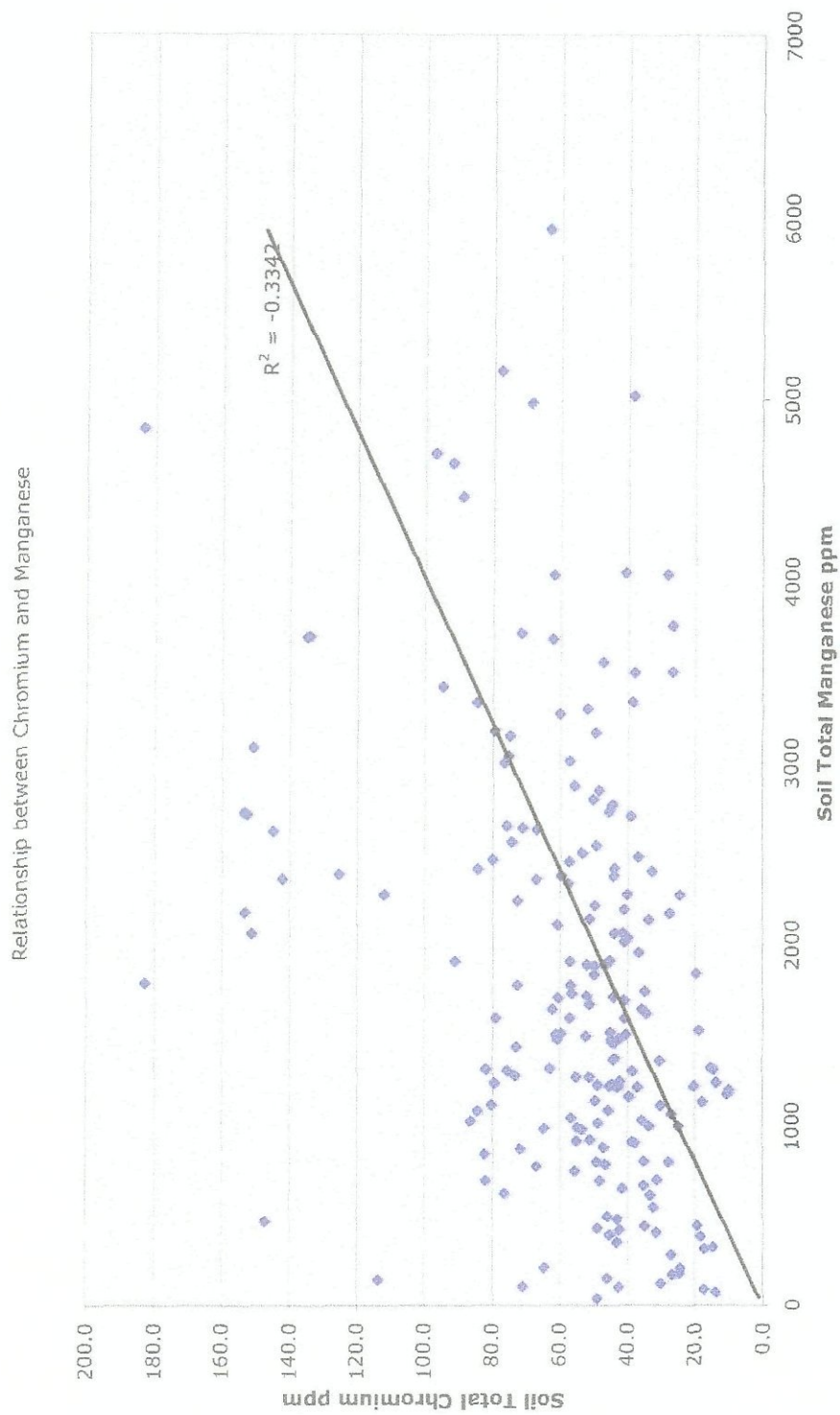


Figure 4- Relationship between Chromium and Manganese in North Coast Soils



5.0 DISCUSSION

The assessment of Mn and Cr assessment in North Coast soils has been conducted on a random 200 composite soil samples, which is equivalent to 800 individual soils. This number of soils is considered representative of North Coast and for the assessment of average metal concentrations.

The results of the soil analyses were compared with Column 1 of the NSW EPA (1998) '*Contaminated Sites – Guidelines for the NSW Site Auditor Scheme*'. Column 1 presented Human - Based Investigation Levels (HBIL) for developments being 'residential with gardens and accessible soil'. The guidelines are also typically modified by dividing them by the number of samples that make up the composite sample (ie. typically the guideline divided by four).

The average Mn in the 800 soils is 1800ppm Mn with a standard deviation of 1162ppm (refer Figure 1). These levels are 'naturally' well above the guideline level of 1500ppm or 375ppm Mn for composite samples (ie. 92% of the 200 composite soils analysed exceed the 375ppm guideline). Table 3 provides the average Mn in basalt rock at 1700ppm Mn. Basalt is the bedrock mineral for the formation of most North Coast soils. The Mn ranges from 37 to 5934ppm in the soils analysed and hence an explanation for the elevated Mn in some soils is required.

The physical features of Mn oxides and hydroxides, such as small size of crystals and large surface area has important geochemical implications. Mn^{2+} is known to replace the sites of some divalent cations (Fe^{2+} , Mg^{2+}) in silicates and oxides. Also, during weathering Mn compounds are oxidised and the released Mn oxides are reprecipitated and readily concentrated in the form of secondary Mn minerals (Alina Kabata-Pendias, 1985). Both of these processes account for the accumulation of Mn at various sites on the North Coast. Higher Mn levels are often reported in soils rich in iron and/or organic matter, which is also characteristic of North Coast soils (refer Figure 3). Mn is detected in the field by the presence of small, hard, characteristically dark-coloured nodules and identified by a vigorous effervescence with hydrogen peroxide.

The average total Cr in the 800 soils is 56ppm Cr with a standard deviation of 32ppm (refer Figure 2). These levels are 'naturally' well above the composite guideline level of 25ppm Cr (ie. 91% of the 200 composite soils analysed exceed the 25ppm guideline). The Cr ranges from 10 to 183ppm in the soils analysed. No data is available for hexavalent Cr (Cr (VI)) in North Coast soils but this valiancy of Cr is expected to show much lower concentrations than total Cr. The guidelines do relate to the Cr (VI) hence total Cr analysis is a 'worst case' scenario for contamination. Accumulation of total Cr in soils can occur with similar reasons to above but to a far lesser extent. A relationship between Mn and Cr is evident (refer to Figure 4).

The background levels of metals analysed, obtained from ANZECC and NHMRC (1992) Table 3 "Environmental Soil Quality Guidelines" page 40, state that background levels of Mn range from 4 – 12,600ppm and total Cr from 0.5 – 110ppm. This large range for background Mn and Cr in soils further confirms the results obtained for naturally elevated Mn and Cr in North Coast soils.

The Mn and Cr in North Coast soils are considered to be tightly bound to the clays and organic matter, which typically have very high cation exchange. The soils of the North Coast are typically acidic and hence lithiophorite $(Al,Li)MnO_2(OH)_2$ is the most likely Mn mineral present in the soils (Alina Kabata-Pendias, 1985). Human health impacts from total Mn and Cr have not been clearly identified and if this was considered an issue, than a very large percentage of the North Coast including all towns and residential areas would need to be assessed and investigated. Human health effects from Mn are historically from breathing airborne particles of Mn ores during mining ores such as pyrolusite, MnO_2 , and causing acute respiratory disease and a severe chronic neurotoxicity ("manganism") (Crosby, 1998). Manganism also resulted from drinking water that contained 16-18ppm of dissolved Mn.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The average Mn in the 800 soils is 1800ppm Mn with a standard deviation of 1162ppm. These levels are 'naturally' well above the guideline level of 1500ppm or 375ppm Mn for composite samples. The average Cr in the 800 soils is 56ppm Cr with a standard deviation of 32ppm. These levels are 'naturally' well above the composite guideline level of 25ppm Cr.

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All Mn and Cr analysis results in North Coast soils need to be disregarded unless an identifiable source of Mn or Cr soil contamination has been identified. The Contaminated Land Management Act 1997 clearly identifies contamination as 'above the concentration at which the substance is normally present in, on or under land in the same locality' and hence confirming that the elevated naturally occurring Mn and Cr concentrations in North Coast soils is not identified as 'contamination' and hence does not warrant further investigation or remediation.

The Mn and Cr in North Coast soils are considered to be tightly bound to the clays and organic matter which typically have very high cation exchange. Human health impacts from total Mn and Cr have not been clearly identified and if this was considered an issue, then a very large percentage of the North Coast including all towns and residential areas would need to be assessed and investigated.

7.0 REFERENCES

- Alina Kabata-Pendias, (1985). *Trace Elements in Soils and Plants*. CRC Press, Florida, USA.
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- NSW EPA (1993) *Environmental Guidelines for Cattle Tick Dip Sites*. NSW EPA, Chatswood.
- NSW EPA (1994). *Service Station Guidelines for Sensitive Landuse – Soils*
- NSW EPA (1995). *Contaminated Sites – Sampling Design Guidelines*. NSW EPA, Chatswood, 35p.
- NSW EPA (1997) *Guidelines for Consultants Reporting Contaminated Sites*. NSW EPA, Chatswood, 22p.
- NSW EPA (1998) *Contaminated Sites – Guidelines for the NSW Site Auditor Scheme*. NSW EPA, Sydney South, 57p.

Summary of Experience and Qualifications.

The Environmental Analysis Laboratory, which is part of Southern Cross University, consists of a large range of analysts, chemists, environmental managers and scientists. The qualifications, held by the persons of the company, include:

- Doctorate of Applied Science (Environmental Management)
- Bachelor of Applied Science (Coastal Management)
- Honours in Applied Science
- Diploma in Chemistry

We have a wide range of experience and worked on a number of varied projects, which include:

- Contamination Assessment Reports for Residential, Industrial and Commercial Sites
- Acid Sulfate soil assessment and management
- Petrochemical assessment and rehabilitation
- Analysis and Rehabilitation of dipsites
- Assessment of former banana plantations
- Assessment of disposal and reuse of Biosolids
- Assessment of general agricultural and residential sites.

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The work was conducted, and the report has been prepared, in response to specific instructions from the client or a representative of the client to whom this report is addressed, within the time and budgetary requirements of the client, and in reliance on certain data and information made available to EAL. The analysis, evaluations, opinions and conclusions presented in this report are based on that information, and they could change if the information is in fact inaccurate or incomplete.

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