

# **Preliminary Site Investigation SEPP 55 – Contamination Assessment**

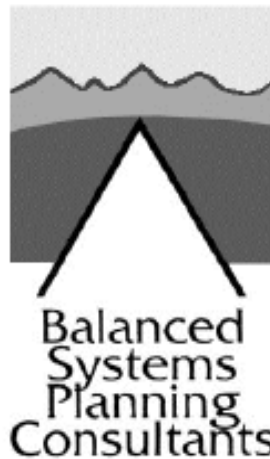
for a

## **Proposed Relocated Rural Dwelling**

at

163 The Saddle Road, Brunswick Heads  
Lot 1 DP 631177

by



P.O. Box 36 Bangalow 2479

Email: [planners@balancedsystems.com.au](mailto:planners@balancedsystems.com.au)

Ph. 0428895301

**Date: June 2019**



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**DOCUMENT CONTROL**

<b>TITLE</b>	SEPP55 - Preliminary Site Investigation
<b>LOCATION</b>	163 The Saddle Road, Brunswick Heads
<b>PROPERTY</b>	Lot 1 DP 631177
<b>LGA</b>	Byron Shire Council
<b>PROPOSAL</b>	Proposed Relocated Rural Dwelling
<b>AUTHOR</b>	Balanced Systems Planning Consultants
<b>CLIENT</b>	V. Ulrick

<i>VERSION</i>	<i>DATE</i>	<i>TYPE</i>	<i>MEDIA</i>
1.0	20/05/2019	DRAFT	DOC
1.1	31/06/2019	FINAL	PDF



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## 1. INTRODUCTION

Balanced Systems Planning Consultants has been commissioned by the owner of the property at 163 The Saddle Road, Brunswick Heads, described as Lot 1 DP 631177, to undertake a SEPP 55 – Preliminary Site Investigation.

This SEPP 55 contamination assessment accompanies a development application for a relocated rural dwelling to Byron Shire Council. The preliminary investigation utilises land use history and soil testing to determine if the site is subject to any potential land contamination. Results of these analyses are considered to be satisfactory for the requirements of Byron Shire Council.

### 1.1 Aim and Objectives

The **aim** of this Stage 1 - Preliminary Site Investigation is to:

- Assess the site of the proposal to determine potential sources of land contamination adhering to the requirements of NSW SEPP 55 provisions and guidelines.

The **objectives** of this preliminary contaminated land assessment are to:

- Identify and describe past and present land uses in adequate detail to determine their contamination potential;
- Identify potential sources and types of land contamination that may impact the subject site;
- Conduct preliminary soil testing for contaminants at the location of the proposal and compare to NEPM health investigation levels (HIL);
- Discuss the contamination status of the site as a result of acquired information; and
- Provide an assessment of site contamination risk and the requirement for further investigations and/or remediation works.

### 1.2 Scope of Work

A preliminary site investigation of possible land contamination is to be undertaken in accordance with *NSW SEPP 55 – Remediation of Land* legislation (Appendix A) as mandated by the *NSW EP&A Act 1979* and Byron Shire Council's relevant policies and guidelines.

A SEPP 55 – Contaminated Site Assessment is conducted and reported in four stages:

1. Preliminary site investigation
2. Detailed site investigation
3. Site remedial action plan
4. Site validation and ongoing monitoring

The preliminary site investigation focused on the site of the proposal; however, the entire property was also considered in terms of past and present land uses.

This preliminary site investigation was completed in accordance with the following documents:

- OEH (NSW), 2011. Contaminated Sites – Guidelines for Consultants Reporting on Contaminated Sites.
- DEC (NSW), 2005. Contaminated Sites – Guidelines for Assessing Former Orchards and Market Gardens.
- EPA (NSW), 2000. Guidelines for Consultants Reporting Contaminated Sites.
- NEPM 1999. National Environment Protection (Assessment of Site Contamination) Measure. *Amended 2013*.
- DUAP, EPA (NSW), 1998. Managing Land Contamination - Planning Guidelines SEPP 55-Remediation of Land
- EPA (NSW), 1997. Contaminated Sites – Guidelines for Assessing Banana Plantation Sites
- EPA (NSW), 1995. Contaminated Sites – Sampling Design Guidelines.
- Byron Shire Council, (undated). Contaminated Sites (Preliminary Investigation Guideline)



### 1.3 Methodology

The investigation area was targeted for any potential sources of land use contamination by using the following research methodology:

- Desktop analysis of property and land use history; and
- Site assessment including soil sampling was undertaken on 20/06/2019.

#### 1.3.1 Site Assessment

The preliminary site assessment involved a visual inspection for signs of contamination and initially a preliminary soil sampling regime. The site was visually inspected for any potential land use contamination sources that included:

- concentrated industrial activities;
- certain agricultural land uses such as cattle dip sites, dairies, bananas, market gardens, orchards, and broad cultivation of crops;
- structures including farm sheds and storage areas; and
- dumps or landfill sites.

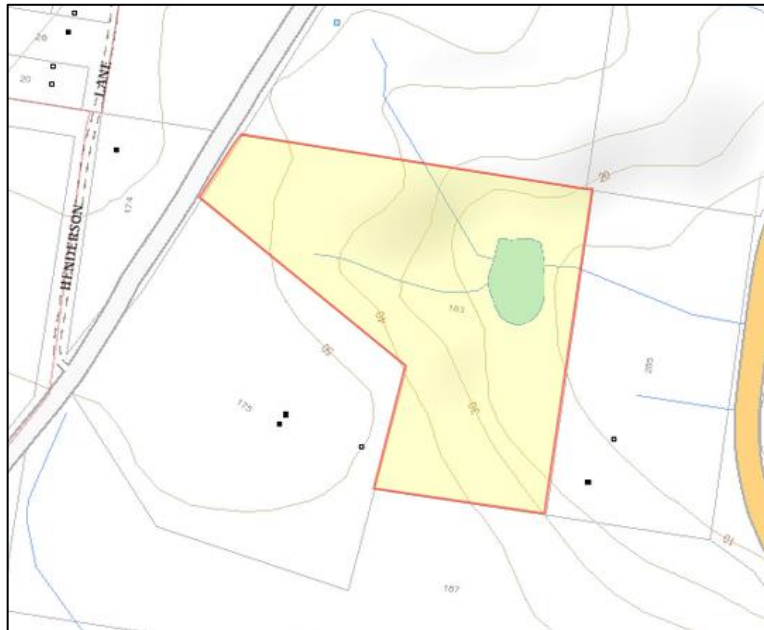
The following techniques were employed for the preliminary soil sampling regime:

- Utilising the NSW EPA (1995) soil sampling guidelines, an appropriate soil sampling regime was extrapolated;
- A Soil Sampling Plan utilising a suitable analytical configuration was prepared.
- Soil sampling was undertaken by a suitably qualified professional employing a composite soil sampling technique.
- Soil samples were collected using a measuring tape, GPS, hand shovel and 50mm soil auger, placed in labelled sterile plastic sample bags, stored in an eski with ice blocks, and transported to Environmental Analysis Laboratory (EAL) at Southern Cross University, Lismore.
- Laboratory analysis tested for heavy metals, organochlorines and organophosphorus.
- Analysis of results were compared with health investigation levels (HIL) outlined in NEPM (1999) and EPA (2000).



## 2. SITE IDENTIFICATION

The vacant rural property is Lot 1 DP 631177 located at 163 The Saddle Road, Brunswick Heads. The property is zoned as RU2 - Rural landscape and Deferred Matter under the Byron LEP 2014 and subsequently zoned as Zone 1 (d) Investigation Zone.





### 3. ENVIRONMENTAL CHARACTERISTICS

#### 3.1 Topography and Drainage

The site of the proposed relocated dwelling is on an elevated portion of the subject property, in the western portion of the site, well above any drainage lines and a large dam. The site is located on the elevated Saddle Road escarpment.

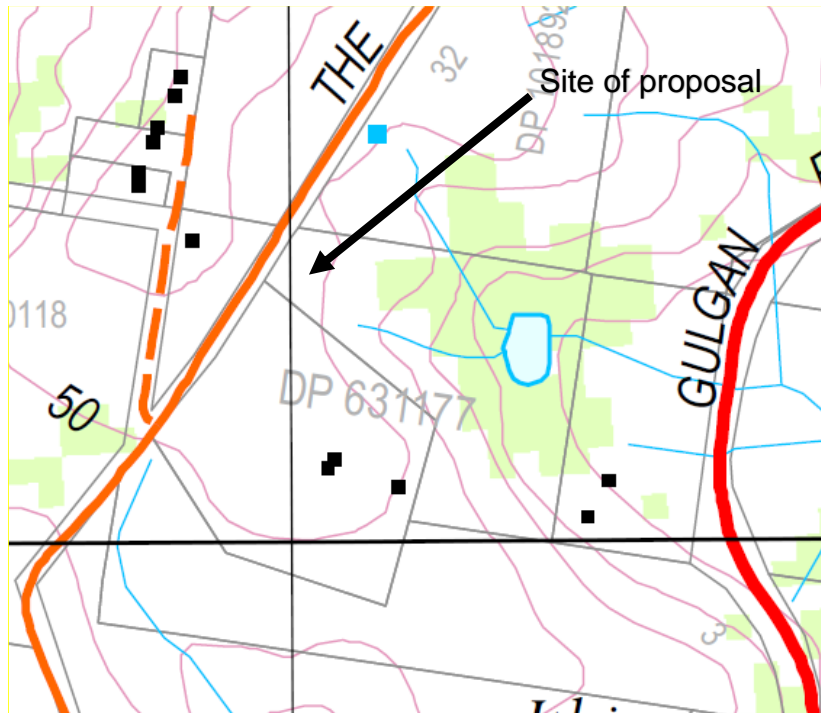


Figure 3: Site topography and drainage (NSW e-Topo. Maps)

#### 3.2 Geology and Soils

The geology at the site of the proposal, according to 'NSW Tweed Heads 1:100,000 Coastal Quaternary Geology' mapping, consists of:

**Tv** – Tertiary volcanic rocks: basalt, rhyolite, trachyte, gabbro, syenite

The site assessment showed a dominance of red-brown clay loams which is consistent with published works by D. Morand titled 'Soil Landscapes of the Murwillumbah – Lismore – Ballina 1:100 000 Sheet' (Table 1).

Table 1: Soil Landscape

Grouping	Ba - Bangalow
Landscape	low rolling hills on Basalt
Soil Description	moderately deep to deep well-drained Krasnozems.
Limitations	strongly acid, moderately erodible soils with high aluminium toxicity potential. Localised stony, shallow and waterlogged soils.



## 4. SITE LANDUSE HISTORY

### 4.1 Property History

A prior title search was undertaken for the subject property (Appendix B) which produced the following history of title:

- Lot 1 DP 631177 previous Title Reference of 15026 - 27

A search of the EPA Contaminated land record and EPA POEO Public Register did not result in any contamination source on or adjacent to the site. Parish maps within Appendix C depict the site's historical format as part of a larger rural holding.

### 4.2 Aerial Photographs

The subject property is depicted within aerial photographs obtained from NSW Spatial Services and Google Earth from multiple years demonstrating the land use history (Appendix D).

The photograph from 1966 show that the site of the proposed relocated dwelling did not contain any banana growing areas, and was likely used for grazing paddocks as part of the larger dairy farm holding. The main farm dwelling, dairy bails and piggery was located on the adjacent property to the south, being currently owned by a fellow family member.

More recent aerial photographs from 2006 and 2019 show the approximate boundary of the current property, where the site of the proposed relocated dwelling remains as open paddock area.

### 4.3 Land Use Description

The site was historically a part of a larger dairy farm, that cleared most of the original vegetation to establish grazing pastures. The original farm operated until the late 1900s when it closed down and became a rural lifestyle property. The subject site has no dwellings or other buildings on the site.

#### 4.3.1 Local Cattle Dip Sites

The Saddle Road Dip Site is the closest historic dip site nearby to the property, which is approximately 680 meters north-east of the site as depicted below.

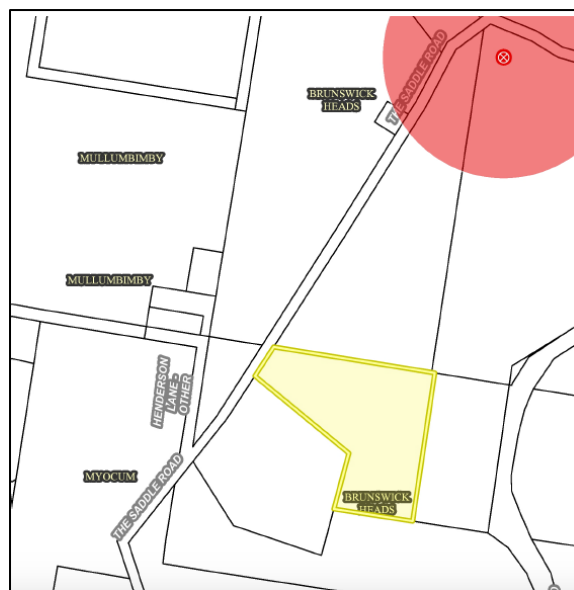


Figure 4: Cattle dip sites (Source: Byron Shire Council)



## 5. SITE ASSESSMENT

### 5.1 Site Condition

A site inspection was conducted on 20/06/2019 to investigate the location of the proposed relocated dwelling.

#### 5.1.1 Signs of Contamination

The site was investigated for any signs of physical contamination that included:

- Drums or other farm waste in dumps or scattered around;
- Disturbed areas which may have been landfill or waste burial sites;
- Evidence of dumped chemical storage containers;
- Remains of structures;
- Areas of unexplained plant stress or areas of soil denudation;
- Soil staining or odours; and
- Plant stress or dieback.

The site of the proposed dwelling showed no signs of waste material or disturbance that may indicate potential soil contamination. The site demonstrated characteristics of a typical grazing paddock.

### 5.2 Soil Contamination Analysis

The Soil Sampling Plan, Chain of Custody and EAL results are shown in Appendix F.

#### 5.2.1 Sampling Plan

A systematic soil sampling plan was developed to target possible contamination at the site of the proposed relocated dwelling, for a range of potential contaminants, as recommended by the NSW EPA (1995) guidelines.

A total of eight (8) individual soil samples were collected from the site of the proposal, resulting in two composite samples.

#### 5.2.2 Soil Sampling

Soil samples were collected on 20<sup>th</sup> June 2019 from each of the sampling points using a 50mm soil auger and hand spade from the top 150mm, that was cleaned in between each sample collected. A handheld GPS and measuring tape were used to locate and verify the sample locations. Soil samples (1a-1d, 2a-2d) were placed in sterile plastic sealable bags, labelled and stored in an esky with ice blocks. The soil samples were transported to Environmental Analysis Laboratory, Lismore (EAL, SCU). In the case of there being elevated contaminants within the composite soil samples, sufficient quantities of soil were obtained for further detailed analysis.

#### 5.2.3 Assessment Criteria

The Health Investigation Levels (HILs) applied to the investigation are the HIL A – Residential thresholds. HIL A is defined as the standard residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake (no poultry).

#### 5.2.4 Chain of Custody

The chain of custody document shows the handling of soil samples, date of transfer and delivery condition.



### 5.2.5 Laboratory Analytical Results

Two composite soil samples (C1 and C2) were created from eight (8) individual soil samples, with mixing undertaken by SCU EAL (SS-PREP-004). The composite soil samples were submitted for laboratory analysis for heavy metals, organochlorines and organophosphates (SS-PACK-005).

#### Composite Soil Tests (2)

**SCU EAL reference number:** EAL/i3007

A summary of soil analysis results is provided in Table 2, while the complete *EAL Results of Soil Analysis* is located within Appendix F of this report.

**Table 2: Composite Soil Testing Results**

Contaminant	Composite 1 (1a-1d)	Composite 2 (2a-2d)	Residential A Threshold* (ppm)	Background Range (ppm)
Arsenic	1.8	2.1	25	0.2-30
Lead	11	11	75	<2-200
Chromium	19	14	<25	0.5-110
Manganese	1892	1577	950	4-12,600
Nickel	16	21	100	2-400
Zinc	89	118	1850	2-180
Mercury	0.14	0.17	10	0.001-0.1
Cobalt	16	12	25	na
Pesticides (OC/OP)	< thresholds	< thresholds	Variable	Variable

\* As per NEPM (1999) Recreational A Guidelines: Composite (4)

ppm = parts per million

### 5.2.6 Interpretation of Results

The laboratory soil analysis results show that the two composite samples were all below the NEPM (1999) recreational thresholds except for Manganese within both Composite 1 and Composite 2. The elevated levels of manganese are attributed to natural geological origins, as referenced by EAL's previous investigations (Lancaster, 2006).

**In summary, the composite soil samples were below the NEPM HIL adjusted thresholds.**



## 6. DISCUSSION

The following discussion points summarise the findings of the SEPP 55 – Preliminary Site Investigation:

- The desktop assessment shows that the land of the proposed relocated dwelling has historically been used primarily for dairy farming grazing.
- There is no historical or aerial photographic evidence of banana growing or other commercial orchards at the site of the proposal.
- There are no nearby historic cattle dip sites within close proximity to the site.
- The subject site has not been used for industrial land uses that constitutes a possible source of land contamination.
- A preliminary soil testing regime of site shows that all heavy metals and pesticides were recorded below the applicable NEPM HILs, excepting for Manganese which is at naturally occurring levels.
- A site inspection exhibited no signs of contamination at the site of the proposal.

## 7. CONCLUSIONS AND RECOMMENDATIONS

### 7.1 Conclusion

The site of the proposed relocated dwelling was investigated for possible sources of land use contamination that utilised both an analysis of land use history and a preliminary soil sampling regime. The historical investigation utilised parish maps, property plans and aerial photographs.

A systematic soil sampling method was used to identify any potential contamination on the subject site. The information collected is of high accuracy and of satisfactory detail to achieve the aim and objectives of the report. All applicable guidelines have been utilised in the generation of the report.

The investigation indicated with a high level of confidence that the proposed site of the proposal has been solely used for agricultural land uses that have low risk of land contamination.

Soil contamination analysis shows levels of contamination detected below adjusted NEPM (1999) health investigation levels and consideration of geological sources.

### 7.2 Recommendations

The following recommendations have been concluded from the investigation:

- ❖ The preliminary site investigation concludes that there is negligible risk of significant land contamination at the site of the proposal and no further detailed investigation or soil testing is warranted.
- ❖ In accordance with the Byron Shire Council Contaminated Sites Guidelines, NSW EPA Guidelines and SEPP55 provisions, the site is suitable for the proposed Relocated Rural Dwelling House.



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This report has been prepared by:

**Luke J Houghton**

**Balanced Systems Planning Consultants**

Qualifications:

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and

*Master of Urban and Environmental Planning*

*Member of Planning Institute of Australia.*

**Insurances**

*Public Liability Insurance - \$10 million*

*Professional Indemnity Insurance - \$2 million*



## REFERENCES

- Australian Standard (AS4482.2)**, 1999. Guide to the investigation and sampling of sites with potentially contaminated soil – Volatile substances, Standards Australia, Sydney.
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- Lancaster, Graham**. 2006. An assessment of Manganese and Chromium possible soil contamination as required for State Environmental Planning Policy 55. Environmental Analysis Laboratory, Southern Cross University.
- Morand D.T.** 1996, Soil Landscapes of the Lismore-Ballina 1:100,000 Sheet report, NSW Department of Land and Water Conservation, Sydney.
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- NSW Land and Property Information's (LPI)**. 2017. Historical Land Records Viewer. <http://images.maps.nsw.gov.au>
- NSW Land and Property Information's (LPI)**. Map Sales - Aerial Imagery. [mapsales@lpi.nsw.gov.au](mailto:mapsales@lpi.nsw.gov.au)
- Office of Environment and Heritage (NSW)**, 2011. Contaminated Sites – Guidelines for Consultants Reporting on Contaminated Sites
- Contaminated Land Management Act 1997 (CLM Act)**
- Environmental Planning and Assessment Act 1979 (EP&A Act)**
- State Environmental Planning Policy No 55 – Remediation of Land (SEPP55)**
- National Environmental Protection (Assessment of Site Contamination) Measure (NEPM) 1999. Amended 2013.**



## APPENDIX A: SEPP55 Extracts

### State Environmental Planning Policy No 55 – Remediation of Land

The object of this Policy is to provide for a State-wide planning approach to the remediation of contaminated land.

#### Clause 7

Contamination and remediation to be considered in determining development application

(1) A consent authority must not consent to the carrying out of any development on land unless:

- (a) it has considered whether the land is contaminated, and
- (b) if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and
- (c) if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.

(2) Before determining an application for consent to carry out development that would involve a change of use on any of the land specified in subclause (4), the consent authority must consider a report specifying the findings of a preliminary investigation of the land concerned carried out in accordance with the contaminated land planning guidelines.

(3) The applicant for development consent must carry out the investigation required by subclause (2) and must provide a report on it to the consent authority. The consent authority may require the applicant to carry out, and provide a report on, a detailed investigation (as referred to in the contaminated land planning guidelines) if it considers that the findings of the preliminary investigation warrant such an investigation.

(4) The land concerned is:

- (a) land that is within an investigation area,
- (b) land on which development for a purpose referred to in Table 1 to the contaminated land planning guidelines is being, or is known to have been, carried out,
- (c) to the extent to which it is proposed to carry out development on it for residential, educational, recreational or child care purposes, or for the purposes of a hospital—land:
  - (i) in relation to which there is no knowledge (or incomplete knowledge) as to whether development for a purpose referred to in Table 1 to the contaminated land planning guidelines has been carried out, and
  - (ii) on which it would have been lawful to carry out such development during any period in respect of which there is no knowledge (or incomplete knowledge).



## APPENDIX B: LPI Prior Title Search



## Prior title search

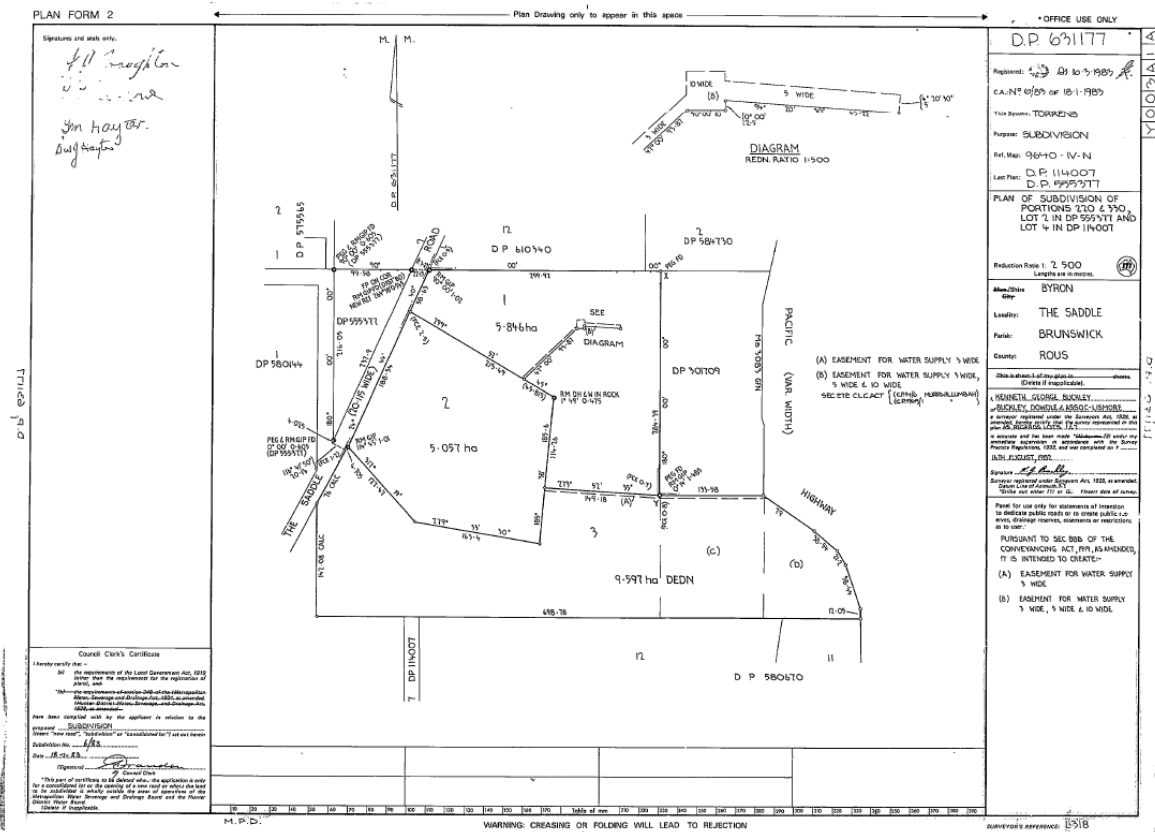
Provides the most recent prior title reference for the current title.

The following prior titles were found for your search for title reference 1/631177

## Prior Title Reference

15026-27

The following extract from the Deposited Plan shows the larger property was subdivided in 1983.





## APPENDIX C: Extracts from Parish Maps

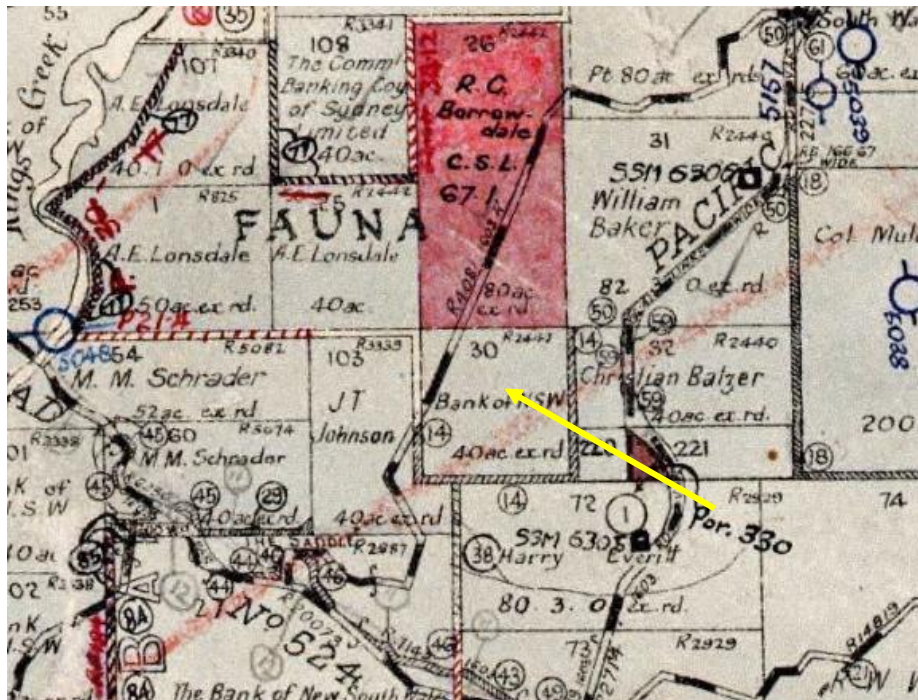
The current property at can be identified as being part of Portion 30 Plan 2442.

### Parish of Brunswick: Early 1900s (Edition 4)



Source: NSW Historical Lands Viewer

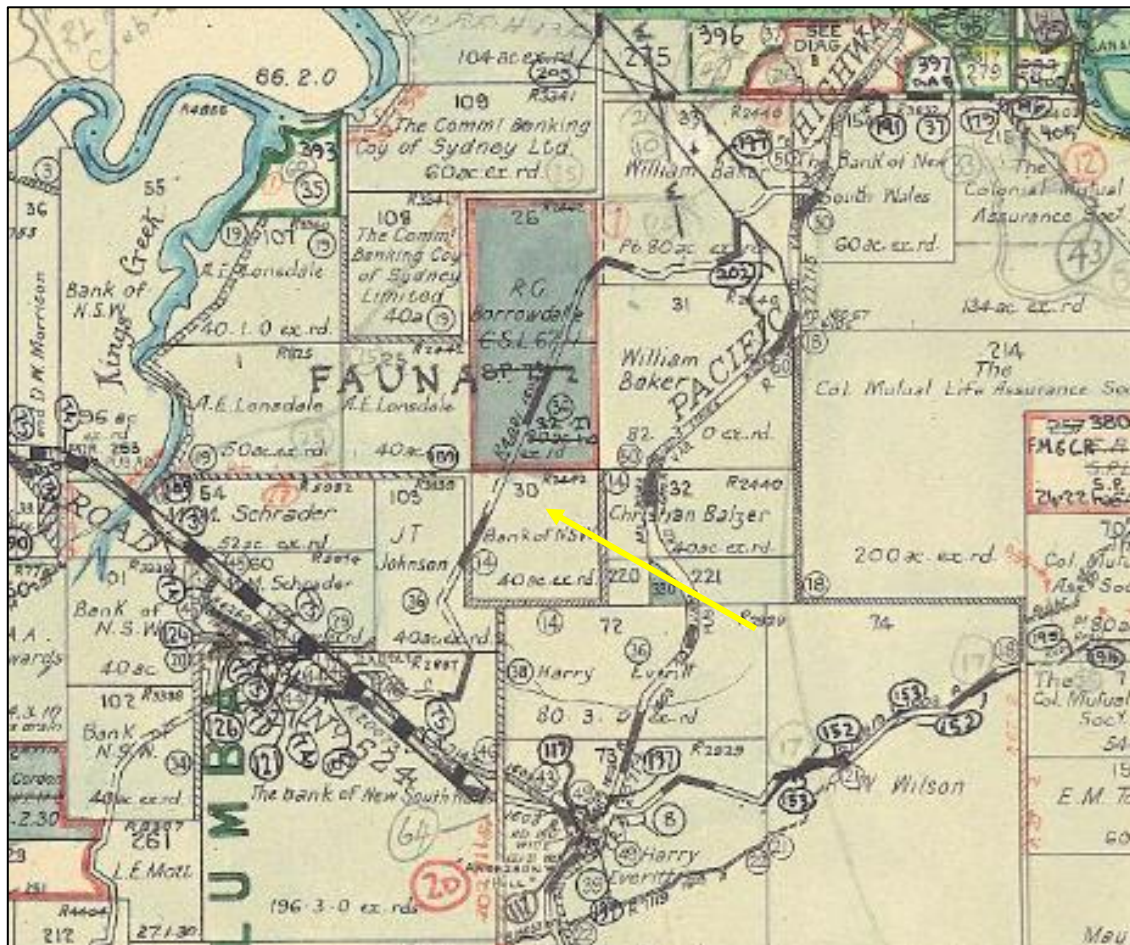
### Parish of Brunswick: Mid 1900s (Edition 9)



Source: NSW Historical Lands Viewer



## Parish of Brunswick: 1970's (Edition 12)

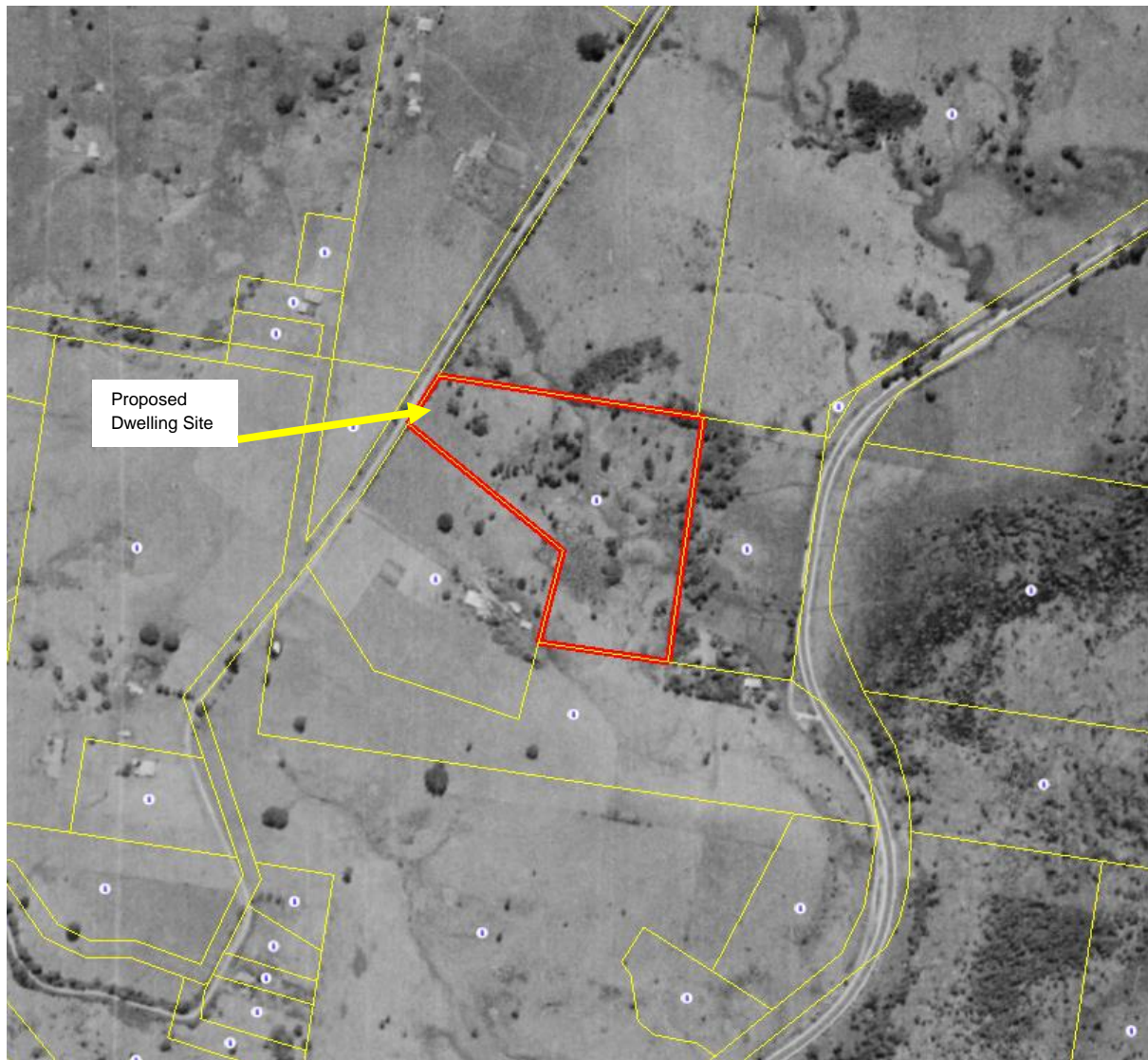


Source: NSW Historical Lands Viewer



## APPENDIX D: Aerial Photographs

Note: Boundaries and aerial photography approximate.



**1966 Aerial Photograph**





**2006 Aerial Photograph**



**2019 Aerial Photograph**



## APPENDIX E: Site Photographs



**Site of Proposed Dwelling**






## **APPENDIX F: Soil Contamination Analysis**

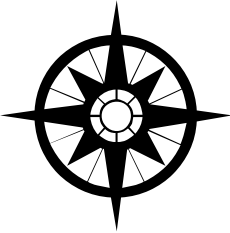




**Lot 1 DP 631177**  
**163 Saddle Road**  
**Brunswick Heads**

**Illustration:**  
**SEPP 55**  
**Sampling Plan**

-  Subject Site
-  Sampling Point
-  Sample Grid 40m x 50m (2000 sqm)



**1:500**  
Scale: A3  
Datum: GDA94  
Projection: MGA Zone 56

28 June 2019  
Version 1.0  
LGA: Byron  
Locality: Brunswick Heads

Data Source:  
Cadastral, Topographic Data: LPI NSW 2017  
LiDAR Data: NSW Spatial Services  
Imagery: Nearmap 2019



**DISCLAIMER**  
This map was produced for the client for planning purposes and should not be used for any other purpose. The information shown in this figure should not be assumed to be completely accurate for detailed design purposes. Balanced Systems hereby disclaims liability for the use of information obtained from this figure for any purpose. This note is an integral part of this plan.





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#### Submitting Client Details

Quote Id:  
Job Ref: *Ulrick*  
Company: Balanced Systems Planning Consultants  
Contact: Luke Houghton  
Phone:  
Mobile: 0428895301  
Email: planners@balancedsystems.com.au  
Postal address: PO BOX 36 Bangalow NSW 2479

#### Billing Client Details

x Tick if same as submitting details  
ABN:  
Company:  
Contact:  
Phone:  
Mobile:  
Email:  
Postal address:

#### Payment Method:

- ☐ Purchase Order  
☐ Cheque  
☐ Credit/Debit Card (EAL staff will phone for details)  
☒ Invoice (prior approval)

Relinquished: *Luke J Houghton LSH* Date: *20.06.19*  
Received: *lg* Date: *20.6.19*

Preservation: none - freezer bricks - ice - acidified - filtered - other  
Condition on receipt: ambient - cool - frozen - other

In submitting samples, the Client agrees to the EAL Laboratory Services Terms and Conditions. These Terms and Conditions are available on the EAL website: scu.edu.au/eal, or on request.

#### Comments:

SEPP 55 - Soil contamination assessment

*URGENT DUE FRIDAY 28th*

#### Likelihood and nature of Hazardous material:

Lab ID	Sample ID	Sample Depth	Sampling Date	Sampler	Your Client	Crop ID	Sample Type (e.g. water, leaf, soil)	Sample Analysis Request					
								Price list code (e.g. SW-PACK-06)					
								SS - PREP - 004	SS - PACK - 005				
1	1A	0-15cm	19/06/2019	LJH	Ulrick	-	soil	x					
2	1B							x					
3	1C							x					
4	1D							x					



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[illegible]





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## Sample Receipt Notification (SRN)

Project: **EAL/I3007**  
 Customer: **Balanced Systems Planning Consultants**  
 Contact: **Luke Houghton**  
 Client Job ID: **Ulrick**  
 No. of Samples: **8 x Soil; 2 x Composites.**  
 Date Received: **20 JUN 2019**  
 Comments: **URGETN due Friday 28th 5day = no surcharge. C1 = 1-4 and C2 =**

5-8  
 Biller: **Balanced Systems Planning Consultants - Luke Houghton**

Page 1 of 3

		Test Request	
Sample Text ID	Client Sample ID	SS-PACK-005	SS-PREP-004
		Contaminated Site Assessment 1a	Sample Compositing
I3007/(C)001	Samples(1,2,3,4)	1	0
I3007/(C)002	Samples(5,6,7,8)	1	0
I3007/001	1A	0	1





## Sample Receipt Notification (SRN)

for EAL/I3007

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		SS-PACK-005	SS-PREP-004
		Contaminated Site Assessment 1a	Sample Compositing
I3007/002	1B	0	1
I3007/003	1C	0	1
I3007/004	1D	0	1
I3007/005	2A	0	1
I3007/006	2B	0	1
I3007/007	2C	0	1
I3007/008	2C	0	1
<b>Total</b>		2	8



## Sample Receipt Notification (SRN)

for EAL/I3007

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### Test Descriptions

Test List Item	Item Description
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<b>SS-PACK-005</b>	<b>Contaminated Site Assessment 1a</b> Dry and Grind Basic Texture Metals (Cu, Pb, Cd, Zn, As, Se, Fe, Mn, Ag, Cr, Ni, Al, Hg, B, Co, Be) Pesticides (OPs, OCs) SUBCONTRACTED
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<b>SS-PREP-004</b>	<b>Sample Compositing</b> EAL can composite samples and store the individual samples for at least 2 months to allow for individual testing if required. Charge per individual sample used in the composite.
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RESULTS OF SOIL ANALYSIS

8 soil samples supplied by Balanced Systems Planning Consultants on 20th June, 2019 - Lab Job No. i3007

Soil samples supplied were composited by EAL into 2 composite samples for analysis

Analysis requested by Luke Houghton. Your Job: Ulrick

300 Whian Whian Road WHIAN WHIAN NSW 2480

ANALYTE	METHOD	Composite Sample 1	Composite Sample 2	MAX	RESIDENTIAL A Guideline Limit		COMMERCIAL/ INDUSTRIAL D Guideline Limit		Background
	REFERENCE	C1 (1A - 1D)	C2 (2A - 2D)	LEVELS	Composite -Column A	Individual -Column A	Composite -Column D	Individual -Column D	Range
	Job No.	i3007/C1	i3007/C2		See note 1a	See note 1a	See note 1d	See note 1d	See note 2
TEXTURE (SAND, CLAY, SILT)	** inhouse	Silt	Silt	..	..	..	..	..	..
MOISTURE %	** c	32	42	..	..	..	..	..	..
SILVER (mg/kg DW)	a	<1	<1	<1	na	na	na	na	na
ARSENIC (mg/kg DW)	a	1.8	2.1	2.1	25	100	750	3,000	0.2-30
LEAD (mg/kg DW)	a	11	11	11	75	300	375	1,500	<2-200
CADMIUM (mg/kg DW)	a	<0.5	<0.5	<0.5	5	20	225	900	0.04-2.0
CHROMIUM (mg/kg DW)	a	19	14	19	(<25)	(<100)	(<900)	(<3,600)	0.5-110
COPPER (mg/kg DW)	a	20	20	20	1,500	6,000	60,000	240,000	1-190
MANGANESE (mg/kg DW)	a	1892	1577	1892	950	3,800	15,000	60,000	4 - 12,600
NICKEL (mg/kg DW)	a	16	21	21	100	400	1,500	6,000	2-400
SELENIUM (mg/kg DW)	a	<1	1	1	50	200	2,500	10,000	na
ZINC (mg/kg DW)	a	89	118	118	1,850	7,400	100,000	400,000	2-180
MERCURY (mg/kg DW)	a	0.14	0.17	0.17	10	40	183	730	0.001-0.1
IRON (% DW)	a	8.14	7.88	8.14	na	na	na	na	na
ALUMINIUM (% DW)	a	5.29	6.56	6.56	na	na	na	na	na
BERYLLIUM (mg/kg DW)	a	<1	<1	<1	15	60	125	500	na
BORON (mg/kg DW)	a	4	5	5	1,125	4,500	75,000	300,000	na
COBALT (mg/kg DW)	a	16	12	16	25	100	1,000	4,000	na
PESTICIDE ANALYSIS SCREEN									
DDT+DDE+DDD (mg/kg)	c	<0.1	<0.1	<0.1	60	240	900	3,600	<0.1
Aldrin + Dieldrin (mg/kg)	c	<0.2	<0.2	<0.2	2	6	11	45	<0.1
Chlordane (mg/kg)	c	<0.1	<0.1	<0.1	13	50	133	530	<0.1
Endosulfan (mg/kg)	c	<0.2	<0.2	<0.2	68	270	500	2,000	<0.1
Endrin (mg/kg)	c	<0.2	<0.2	<0.2	3	10	25	100	<0.1
Heptachlor (mg/kg)	c	<0.1	<0.1	<0.1	2	6	13	50	<0.1
HCB (mg/kg)	c	<0.1	<0.1	<0.1	3	10	20	80	<0.1
Methoxychlor (mg/kg)	c	<0.1	<0.1	<0.1	75	300	625	2,500	<0.1
Other Organochlorine Pesticides (mg/kg)	c	<0.1	<0.1	<0.1	..	..	..	..	<0.1
Chlorpyrifos (mg/kg)	c	<0.1	<0.1	<0.1	40	160	500	2,000	<0.1
Other Organophosphate Pesticides (mg/kg)	c	<0.5	<0.5	<0.5	..	..	..	..	<0.1

METHODS REFERENCE:

a. <sup>1-3</sup>Nitric/HCl digest - APHA 3125 ICPMS

b. <sup>1-3</sup>Nitric/HCl digest - APHA 3120 ICPOES

c. Analysis sub-contracted - SGS report no. SE 194470

\*\* denotes these test procedure or calculation are as yet not NATA accredited but quality control data is available

NOTES:

1a. HIL A ⌘ Residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake (no poultry), also includes childcare centres, preschools and primary schools.

1b. HIL B ⌘ Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.

1c. HIL C ⌘ Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths. This does not include undeveloped public open space.

1d. HIL D ⌘ Commercial/industrial, includes premises such as shops, offices, factories and industrial sites.

(REFERENCE: Health Investigation Guidelines from NEPM (National Environmental Protection, Assessment of Site Contamination, Measure), 2013; Schedule B1).

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

3a. Table 1 Maximum values of specific contaminant concentrations for classification without TCLP (NSW EPA 2014, Waste Classification Guidelines Part 1: Classifying Waste)

3b. Table 2 Maximum values for leachable concentrations and specific contaminant concentrations when used together (NSW EPA 2014, Waste Classification Guidelines Part 1: Classifying Waste)

4. Analysis conducted between sample arrival date and reporting date.

5. \*\* NATA accreditation does not cover the performance of this service.

6. .. Denotes not requested.

7. This report is not to be reproduced except in full.

8. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions (refer scu.edu.au/eal or on request).

9. Results relate only to the samples tested.

10. This report was issued on 05/07/2019.

Additional NOTES:

DW = Dry Weight. na = no guidelines available

Organochlorine pesticide (OC's) screen:

(HCB, alpha-BHC, Heptachlor, delta-BHC, Aldrin, Heptachlor Epoxide, gamma-Chlordane, alpha-chlordane, Lindane, trans-Nonachlor, Endrin Ketone, Isodrin, Mirex

Alpha Endosulfan, p,p'-DDE, Dieldrin, Endrin, p,p'-DDD, Beta Endosulfan, p,p'-DDT, Endrin Aldehyde, Endosulfan Sulphate, Methoxychlor)

Organophosphorus pesticide (OP's) screen:

(Diazinon, Dimethoate, Chlorpyrifos-methyl, Chlorpyrifos, Fenitrothion, Bromophos-ethyl, Ethion,Dichlorvos, Malathion, Parathion-Ethyl (Parathion), Methidathion and Azinphos-methyl (Guthion))

