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## SPORTSMANS CREEK NEW BRIDGE

# Geotechnical and Environmental Desktop Study

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REPORT

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## 1.0 INTRODUCTION

### 1.1 Terms of Reference and Objectives

Golder Associates Pty Ltd (Golder) was appointed by Kellogg Brown & Root Pty Ltd (KBR) to provide geotechnical and contamination services for the Sportsmans Creek new bridge project. This bridge project is part of the state wide Bridges for the Bush Program that involves the replacement of selected timber road bridges around NSW. KBR has been appointed by NSW Roads and Maritime Services (RMS) to carry out a concept options assessment for a new bridge across Sportsmans Creek. The project also includes the demolition of the existing timber bridge at Sportsmans Creek.

Services to be provided by Golder are set out in our proposal (Doc. Ref P37622022\_001\_P\_Rev0, dated 20 February 2013). Our services include the provision of technical input during preliminary options development, which will be achieved through participation in technical and project delivery workshops with KBR and RMS and through preparation of a geotechnical and environmental desktop study report. Intrusive field investigations are to be carried out during the concept options assessment phase of the project.

This report presents the results of the desktop study. The desktop study is a combined geotechnical and environmental assessment which includes comments and observations from a site walkover on 25 June 2013, and a project team workshop on 26 June 2013.

The objective of the desktop study is to provide a review of available site information, preliminary geotechnical issues, and assessment of the likely risks associated with potential soil and groundwater contamination within the study area.

The location of the study area is on the southern outskirts of Lawrence, in northern New South Wales (shown in Figure 1).

### 1.2 Background

The Sportsmans Creek new bridge project involves the development of concept options for a new bridge (and road approaches) over Sportsmans Creek in Lawrence, and the demolition of the existing timber dare truss bridge.

A Concept Design Team workshop was held on the 25<sup>th</sup> and 26<sup>th</sup> June 2013, involving representatives from KBR, RMS, and appointed sub-consultants. At the workshop a preliminary evaluation of study area constraints was carried out.

This desktop study focuses on the six identified options within the study area.

### 1.3 Scope of Work

The desktop study includes the following scope of work:

- A review of available geological data, geotechnical investigations and relevant reports from the study area;
- Description of topography, regional geology (including identification of rock types and structural aspects, if pertinent), soils and expected geotechnical conditions;
- An assessment of commercial deposits and past and proposed mining extractive industries, based on relevant publicly available records;
- An assessment of the potential presence of contaminated soils, including agricultural chemical residues. Including;
  - A review of publicly available information (NSW EPA databases relating to the Contaminated Land Management Act, Office of Water groundwater records, soil and geological sheets and historical aerial photographs);



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- A site visit by a senior environmental scientist to observe general site characteristics;
- An assessment of the historical and current conditions of the site, which could have resulted in contamination of surface water, soil or groundwater;
- An assessment of the potential for the presence of acid sulphate soils, by undertaking a review of the acid sulphate soils risk map for the area; and,
- An assessment of pertinent geotechnical and geological risks and opportunities within the study area.



## 2.0 STUDY AREA INFORMATION

### 2.1 Site Location and Physical Description

The RMS defined study area is located on the southern side of Lawrence, NSW. A summary of site information is presented in Table 1 below.

**Table 1: Study Area Information Summary**

Site Name	Sportsmans Creek new bridge
Street Address	Approximate area bounded by Clarence River, Riverbank Road, Rutland Street, and farmland to the west.
Suburb, State, Postal Code	Lawrence, NSW, 2460
Zoning	Environmental Conservation, Public recreation, Primary Production, Neighbourhood Centre, Low Density Residential
Percentage coverage of site by buildings	Approximately 5%
Site Setting	<p>The study area comprises open spaces, including farmland, and low density residential and commercial properties, as well as transport corridors.</p> <p>Open spaces include Sportsmans Creek, the Clarence River, low lying floodplains, and areas of mature trees.</p> <p>Transport corridors comprise several roads (Bridge Street, Richmond Street, Grafton Street, Grafton-Lawrence Highway, Riverbank Road, Rutland Street, Tenterfield Street, and Weir Road).</p>
Buildings or Structures on and around the Site	<ul style="list-style-type: none"><li>■ Petrol Bowser and underground tanks at the Lawrence General Store;</li><li>■ Existing timber Dare Truss bridge over Sportsmans Creek;</li><li>■ Boat Ramp on the south bank of Sportsmans Creek, west of the existing bridge, and;</li><li>■ Residential dwellings along Bridge and Grafton Streets, north of Sportsmans Creek.</li></ul>
Topography	<p>The study area is comprised of typically flat, low lying, flood prone terrain along the southern and northern banks of Sportsmans Creek. Typical site elevation within the study area south of Sportsmans Creek is RL 3 m to RL 5 m AHD. Typical site elevation on north side of Sportsmans Creek within the study area is RL 1 m to RL 5 m AHD and includes low lying, wet areas.</p>
Site drainage and Nearest surface water body	<p>The study area drains into the Clarence River to the east of Lawrence, via Sportsmans Creek, which aligns approximately northwest-southeast through the study area.</p> <p>Sportsmans Creek is up to 100 m wide and at the time of the Coffey investigation in 2001/2002 was approximately 4 m deep (Coffey 2002).</p>
Surrounding Land Use	<p>Surrounding land use (within 200 m of the study area) includes:</p> <ul style="list-style-type: none"><li>■ North: Richmond Street, residential area and farmland</li><li>■ East: Clarence River</li></ul>



- South: Sugar cane farms and Grafton-Lawrence Road.
- West: Dairy farms, farmland, and Sportsmans Creek

## 2.2 Previous Investigations

Documents and relevant previous reports were provided to Golder by KBR for review as part of this desktop study. Reports of specific relevance to this geotechnical and environment desktop study provided by KBR included:

- Coffey Geosciences Report (NR1103/1-P) on Geotechnical Investigations, Proposed New Bridge across Sportsmans Creek, 5 July 2002.
- Maclean Shire Council/ RTA, Environmental Impact Statement, Demolition of existing bridge and construction of new bridge over Sportsmans Creek, Lawrence, May 2002.

Golder is unaware of the study area having been subject to any other extensive geotechnical or environmental investigations.

## 2.3 Soils, Geology and Hydrogeology

### 2.3.1 Geology and Topography

The 1:250 000 scale NSW Department of Mineral Resources 1970 Geological Map 'Maclean' (series sheet SH56-7) shows that the study area is underlain, at depth, by geological rock units of the Bundamba Group. The majority of the study area is underlain by rocks belonging to the Grafton Formation, of late Jurassic age. Rocks types in the Grafton Formation include interbedded sandstone, clayey siltstone, claystone, and minor coal. Bedding is thin to thick, and commonly with a ferruginous lateritic weathering profile.

The 1:100,000 Grafton Area Coastal Quaternary Geology Map indicates that the surface geology of the majority of the study area and surrounds are overlain by Holocene Alluvial Deposits, which include levee and floodplain deposits of sands, silts, clays, organic mud, and minor gravels. There is also potential for Pleistocene Beach sand deposits under the alluvial deposits, which may be indurated (cemented).

There is a small area of in-channel bar deposits near the mouth of Sportsmans Creek, consisting of fluvial sand, gravel, silt and clay. There is also indication of alluvial paleochannel (buried / in-filled river channel) and inter-levee swale deposits in the vicinity of the study area, consisting of organic mud, peat, clay, silt, and fluvial sands. There is a possibility of back-swamp deposits at the outer boundaries or just outside of the study area, consisting of organic mud, peat, silt, and clay. The Quaternary geology of the study area is presented on Figure 2.

The topography within the study area is characterised by typically low elevation flood plain terrain. The typical site elevation within the study area south of Sportsmans Creek ranges between RL3m to RL5m AHD. Elevations north of Sportsmans Creek within the study area vary laterally and range from RL1m to RL5m AHD.

Variations in topographical relief, particularly north of Sportsmans Creek within the study area, are identifiable using aerial photography. Lower lying areas within the north west quadrant of the study area are characterised by significant areas of standing water, and markedly "greener" vegetation.

### 2.3.2 Results of Previous Geotechnical Investigation

The previous Coffey investigation focussed on a new bridge following the "Grafton Street" alignment. The physical investigations carried out by Coffey included 4 boreholes, 6 test pits and 3 Cone Penetration Tests (CPTs). The Coffey investigation indicates that on the southern bank of Sportsmans Creek the subsurface soils comprise of an upper layer of stiff desiccated clay, overlying soft to firm clays to a depth of 34 m. Coffey report that the conditions at the northern approach to Sportsmans Creek consists of stiff to very stiff silty clays, and loose to medium dense clayey silty sand, to a depth of 4 m, underlain by weathered





sandstone and minor siltstone. The depth to weathered rock is relatively shallow (4 m depth) at the northern approach to the bridge, and hence falls sharply to the south (34 m depth).

### 2.3.3 Groundwater and Hydrology

The dominant surface water feature is Sportsmans Creek, which connects to the Clarence River, within the study area. Sportsmans Creek is about 100 m in width and drains in a south-east direction under the existing bridge toward the Clarence River. Under low flow conditions, Sportsmans Creek may experience an afflux of water from the Clarence River, where water from the Clarence River flows upstream into Sportsmans Creek. There is a weir installed upstream in Sportsmans Creek, to prevent incursion of saltwater into the wetlands.<sup>1</sup>

The inferred direction of surface and ground water flow is to the east along the surface and through the alluvium (charged by flow from land at higher elevations north and west of the study area).

A search of the NSW Natural Resource Atlas records performed on 20<sup>th</sup> June 2013 indicated there are no registered groundwater bores within 1 km of the study area. A copy of a figure showing the location of the nearest registered bores is shown in Appendix A.

### 2.3.4 Site Filling

It is anticipated that within the study area there will be localised areas of fill associated with construction of residential and commercial property, roads, and the abutments of the existing bridge. Localised filling associated with river bank remediation and the construction and excavation of the boat ramp on the southern bank of Sportsmans Creek may also exist within the study area.

Further comments and site observations of the performance of existing fill structures and structures on filled ground are presented in Section 4.0.

### 2.3.5 Acid Sulfate Soils

The Australian Soil Resource Information System<sup>2</sup> indicates the study area is located within an area recorded as having a high probability of the presence of acid sulfate soils (ASS). The on-line ASS map provided by Clarence Valley Council<sup>3</sup> shows the majority of the study area is located on areas mapped as either Class 2 or Class 3 ASS (Figure 3).

Sediments in Sportsmans Creek were mapped as Class 1 ASS. The Coffey site investigation (2002) indicated that samples taken from depth in the boreholes showed significant acid generating potential. A lower classification number indicates a higher relative potential for acid sulfate soils.

### 2.3.6 Soil Aggressivity

Limited soil testing was carried out by Coffey and included laboratory analyses of two soil samples. With reference to AS2159-2009 (Piling – Design and Installation) and the laboratory test results presented in the Coffey report, the following soil classifications are made for buried steel and concrete structures.

- Concrete Piles:
  - For buried concrete piles in soils, the soils are classified as non-aggressive in accordance with Table 6.4.2 (c)
  - For concrete piles in water, a moderate to severe classification is recommended in accordance with Table 6.4.2 (a)
- Steel Piles:

<sup>1</sup> M. Tulau 1999, [http://test.dnr.nsw.gov.au/care/soil/as\\_soils/pdfs/ass\\_clarence.pdf](http://test.dnr.nsw.gov.au/care/soil/as_soils/pdfs/ass_clarence.pdf)

<sup>2</sup> ASRIS, <http://www.asris.csiro.au>

<sup>3</sup> [http://mapping.clarence.nsw.gov.au/Exponare/cvc\\_mapping\\_link.html](http://mapping.clarence.nsw.gov.au/Exponare/cvc_mapping_link.html)





- For steel piles in soils, the soils are classified generally as non-aggressive, however based on soil resistivity results for one of the two samples, a mildly aggressive classification should be adopted, in accordance with Table 6.5.2 (c)
- For steel piles in water, a severe exposure classification should be adopted, in accordance with Table 6.5.2 (a)

### 2.3.7 Salinity

Sportsmans Creek, particularly at the confluence with the Clarence River, has the potential to be highly saline. A review of publicly available information suggests that under low flow conditions, an afflux of saltwater can occur up the Clarence River and into Sportsmans Creek<sup>4</sup>.

### 2.3.8 Earthquake Rating

The methods of assessing the earthquake risk classification are outlined in the Australian Standard AS1170.4 (2007) *Structural Design Actions, Part 4: Earthquake Actions in Australia*.

For the Grafton area, AS 1170.4 indicates a hazard factor of 0.05.

The governing condition for the site subsoil class is the thickness and consistency of the subsurface materials beneath the building footings. Based on the depth to rock on the southern embankment and the thickness of soft soils, a Soil Class "E" is assigned in accordance with Section 4.2 of AS1170.4 (2007).

Further assessment of the earthquake classification and appropriate design factors would be concluded following additional investigations and refinement of preferred options.

## 2.4 Location of Underground Mining

Review of the mining records held by the NSW Department of Trade and Investment indicated that there are no known recorded mine workings in close proximity to or beneath the study area.

<sup>4</sup> M. Tulau 1999, [http://test.dnr.nsw.gov.au/care/soil/as\\_soils/pdfs/ass\\_clarence.pdf](http://test.dnr.nsw.gov.au/care/soil/as_soils/pdfs/ass_clarence.pdf)



### 3.0 ENVIRONMENTAL ASSESSMENT

#### 3.1 Scope of Work

An Environmental Site Assessment (ESA) was carried out in general accordance with the principal components of NSW EPA requirements for a Phase 1 – Preliminary Site Investigation and involved the following key tasks:

- Review of selected publicly available historical information, including:
  - Historical aerial photographs from the NSW Department of Land and Property Information, to provide evidence of the history of development of the study area and indications of potential sources of contamination;
- Review of regulatory databases relating to the study area, including:
  - The NSW Environment Protection Authority (EPA) register of information on environment protection licences (including associated notices and other regulatory action) issued under the Protection of the Environment Operations Act 1997;
  - NSW EPA register list of contaminated sites notified to the EPA and records of notices issued by the EPA under Section 58 of the Contaminated Land Management Act 1997;
  - Review of the cattle tick dip database maintained by the Department of Primary Industries (DPI) to identify dips in the vicinity of the study area;
  - Details of groundwater bores registered on the groundwater bore database maintained by the NSW Department of Land and Property Information and located within 500 metres (m) of the study area (see Section 2.3), and;
- Review of relevant publicly available hydrological, geological and soils information including published topographical, geological and soil maps of the area (see Section 2.3).

#### 3.2 Historical Records Review

This section presents a summary of the historical information reviewed as part of the ESA. The historical review was completed to develop a general understanding of the study area and surrounding area with the intention of identifying previous activities on, or nearby, the study area which may indicate the potential for soil or groundwater contamination to be present.

##### 3.2.1 Document Review

A history<sup>5</sup> of the Lower Clarence Valley area was reviewed. The history reported that the bridge across Sportsmans Creek was built in 1895, and rebuilt in 1910. The history also noted the presence of a ferry across Sportsmans Creek on the Grafton Street alignment, prior to the construction of the bridge.

##### 3.2.2 Aerial Photographs

Selected historic aerial photographs for the study area and surrounding land (dated 1958, 1967, 1978, 1987, 1998 and 2004) were obtained from NSW Land and Property Information for review (copies are provided in Appendix C). In addition, imagery of the Lawrence locality from September 2012 from SixViewer was reviewed.

The aerial photograph review was conducted to develop a general history of the development of the study area and surrounding properties and is summarised in Table 2.

<sup>5</sup> <http://www.clarence.nsw.gov.au/content/uploads/LOWER%20CLARENCE%20HISTORY%20Part%201-2.pdf>



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**Table 2: Summary of Historic Aerial Photograph Review**

Date	Altitude/ Scale	Comments (Study Area and Surrounding land)
July 1958	22,000'	<p>Structures were visible along Bridge Street, generally consistent with the locations of residential buildings and the Hotel observed during the site inspection. A structure was present at the intersection of Bridge Street and Grafton Street at the location of the existing Lawrence General Store, with a number of additional structures located to the south on the western side of Grafton Street. Features were present on the eastern side of Bridge Street opposite the existing hotel, including a linear feature running toward the river. An indistinct feature was visible at the location of Lawrence Dip on Cook Street.</p> <p>The area to the west of Grafton Street had been cleared, and appeared to be used for agricultural purposes. Areas closer to Sportsmans Creek appeared to be under cultivation, possibly for sugar cane.</p> <p>The area to the south of Sportsmans Creek appeared to be under cultivation, assumed to be sugar cane based on observations made during the site inspection. A small structure, assumed to be a residential dwelling, was visible in a cane field south of the intersection of Bridge Street and Riverbank Road.</p> <p>An indistinct feature was visible at the location of McPhees Dip located on the western side of Lawrence Road further to the south.</p>
February 1967	15,500'	<p>The study area appeared similar to that shown in the 1958 aerial photograph.</p>
August 1978	4,053m	<p>The study area appeared similar to that shown in the 1958 aerial photograph. Possible paths were visible on the eastern side of Bridge Street between the residential structures on the northern side of the bridge and the current Lawrence Memorial Park. Small structures were visible on the riverbank opposite the hotel.</p> <p>Structures consistent with cattleyards were visible at the location of Lawrence Dip and McPhees Dip.</p> <p>Circular features were visible in the area of the current Flo Clark Park.</p>
August 1987	6,340m	<p>The area to the west of Grafton Street on the northern side of Sportsmans Creek no longer appeared to be under cultivation for sugar cane.</p> <p>The residential structure on the southern side of the bridge was no longer present, with sugar cane growing in the area.</p> <p>The location of Lawrence Dip was obscured in the aerial photograph, while the location of McPhees Dip had been cleared of structures with sugar cane growing in the area.</p>
September 1998	1:25,000 approx	<p>A circular structure was present on the eastern side of Bridge Street at the current location of the round residential dwelling. The current Flo Clark Park was visible, with a feature at the location of the existing boat ramp present.</p>
June 2004	1:25,000 approx	<p>The study area appeared similar to that shown in the 1998 aerial photograph, with some minor changes to structures along Bridge Street.</p>



Date	Altitude/ Scale	Comments (Study Area and Surrounding land)
September 2012	-	Cattleyards were visible to the south of the former McPhees Dip

Notes: Images taken prior to 1987 are “black and white” and photographs from 1996 onwards are “colour”.

### 3.3 Review of Regulatory Information

The following regulatory agency record sources were accessed for relevant information on potential environmental impacts, from current and historical on-site and surrounding off-site activities. Copies of relevant search results are presented in Appendix B.

#### 3.3.1 Notices issued under the Contaminated Land Management Act

A search of records held by the NSW EPA for notices issued under Section 58 of the *Contaminated Land Management Act 1997* (the *CLM Act*) was performed on 24<sup>th</sup> June 2013. The search indicated that there are no sites in the local government area which are currently being regulated by the NSW Environment Protection Authority. Two sites in the LGA were formerly regulated under the Act as follows:

- Ashby dry dock, approximately 12km to the north east of the study area; and
- Koolkhan power station, approximately 20 km to the south west of the study area.

#### 3.3.2 EPA Register of Contaminated Sites

Under Section 60 of the *CLM Act*, a person whose activities has contaminated land, or a landowner whose land has been contaminated, is required to notify the OEHL when they become aware of the contamination. The EPA maintains a register of sites of which it has been notified under Section 60 of the *CLM Act*. The register identifies sites of which the EPA is aware in its regulatory role, and is not a list of all contaminated sites in NSW. No sites in Lawrence have been notified to the EPA as of the search date of 28<sup>th</sup> June 2013.

#### 3.3.3 POEO Public Register

The EPA maintains a public register of information pertaining to Environment Protection Licences (EPLs) issued under the *Protection of the Environment Operations Act 1997* (the POEO Act). The information on the register includes current and surrendered EPLs, non-conformances with the EPLs, environment protection and noise control Notices issued by the EPA, convictions in prosecutions under the POEO Act and the results of civil proceedings.

A search performed of the public register on 28<sup>th</sup> June 2013 identified one property in Lawrence which had a clean up notice issued under the POEO Act. The site is a residential property located adjacent to the Lawrence water reservoir, approximately 1.3km north of the existing bridge.

#### 3.3.4 Department of Primary Industries

Information obtained from the NSW DPI indicates that 10 government commissioned cattle dip sites are recorded within the Lawrence locality. The majority of the dips appear to be located at distances of 3km or greater. Exceptions to this are identified in Table 3 below.

**Table 3: Summary of Cattle Tick Dip Information**

Dip	Location	Status	Chemicals used	Potential for impact on the study area
Lawrence	Cook Street, Lawrence (approx. 1.3km north of the existing bridge)	Demolished	Arsenic DDT Ethion	Low
McPhees	Lawrence Road, Lawrence (approx.	Decommissioned	Arsenic DDT	Low



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Dip	Location	Status	Chemicals used	Potential for impact on the study area
	500m SSW of the existing bridge)			

According to the DPI, a “decommissioned” dip has had all above ground items dismantled and the dip bath capped with concrete lids. The draining pen concrete floor is usually left intact so as not to disturb the possibly contaminated soil. Clean soil may be spread around the bath by the DPI to run flush with the bath edge. A dip identified as “demolished” was partially or wholly dismantled or demolished prior to the introduction of the decommissioning policy.

Independent dip sites not registered by the DPI may occur on properties in the study area. There is no database available to search for these sites, and it is advised that impacted property owners should be contacted to request information about privately commissioned dip sites existing on the property, both currently and historically.



### 4.0 SITE INSPECTION

A site inspection of the study area was conducted by Golder personnel on Tuesday 25<sup>th</sup> June 2013, following collation of desk study data. A summary of the key findings from the site inspections is provided below and pertinent photographic records are included in Appendix C.

#### 4.1 Geotechnical Observations

Key geotechnical observations from the site inspection are summarised below. The site inspection was used to confirm preliminary observations and conclusions made from existing reports and site information.

- **Geomorphology** - based on aerial photography interpretation, topography and Quaternary geological information, it is inferred that the alignment of Sportsmans Creek has shifted south to its current alignment and that the lower elevations to the north of Sportsmans Creek in the northwest quadrant of the study area may represent a previous course of the creek. The higher bedrock elevation encountered in previous investigations on the north bank of Sportsmans Creek along Grafton Street is inferred to mark an old, formerly elevated "peninsular/plateau" or rock shelf, that acted as a natural barrier to Sportsmans Creek. Holocene levee deposits subsequently filled in the original course of the river channel with Sportsmans Creek shifting to the south to essentially bypass the natural levee that the elevated rock peninsular / plateau created. The potential impact of this feature is that the depth to rock may be significantly deeper within this area and that near surface soils may have less favourable engineering properties than soils from a higher elevation within the study area.
- **Pavements** – existing pavements along local roads appear to be of relatively light duty design, particularly along Grafton Street. Pavement construction details could be confirmed by RMS and the suitability of existing pavements would need to be investigated when designing the final bridge approaches (for both southern and northern approaches). Refer to Photo 1 in Appendix C.
- **Settlement of Bridge Approaches** – there is visual evidence that the bridge approach embankments have undergone a degree of settlement, more so around the southern abutment which is consistent with the greater thickness of compressible soils and depth to bedrock. There have been several asphalt pavement lifts applied on the southern approach to the bridge and it appears from visual evidence that the first span of the timber deck has also undergone vertical displacement towards the southern abutment. Refer to Photo 2 in Appendix C.
- **Dry-stone Wall Condition** – the existing dry-stone block wall supporting the northern approach embankment, based on visual observation of its external composition, appears to be in a relatively satisfactory condition, given its age. Observations on the condition of the retaining wall were only possible along the western side of Bridge Street and in and around the northern abutment. There are signs of distress, localised bulging and cracking of the retaining wall, particularly near the abutment. Possible causes include high traffic loads and differential settlement along the retaining wall footing. Refer to Photo 3 in Appendix C.
- **River Bank Stability** – observations were made on the condition of the river bank upstream of and around the existing bridge abutments. There is evidence of river bank erosion near the abutments and upstream of the bridge slumping along the river bank was observed in several locations. Refer to Photo 4 in Appendix C.
- **Standing Water** – was observed to the west of Grafton Street, in the approximate location where the western corridor would traverse the low lying areas. Refer to Photo 5 in Appendix C.

#### 4.2 Environmental Observations

The following key observations and findings were made during the environmental site walkover:

- The Lawrence General Store is located near the intersection of Bridge Street and Grafton Street. A bowser is located at the front of the store. Based on the site inspection, the store is assumed to have two underground storage tanks as the bowser at the front of the store was labelled as dispensing petrol



and diesel. Two metal plates, assumed to be associated with a single UST, were observed between the bowser and the store building. The location of the second UST could not be ascertained during the site inspection, although the presence of a vent pipe was noted on the northern side of the store. LPG cylinders were stored at the rear of the property.

- A vacant site located at no 16 Bridge Street appeared to have been formerly used for commercial or industrial purposes. A concrete slab was located on the site, along with a small pressure vessel, associated pipework, and miscellaneous items of scrap metal. A small crane was located on the river bank in the vicinity of this site.
- A pole mounted electrical transformer was located on the southern side of the Lawrence Community Hall, with electrical infrastructure (either an air break or transformer) located on a pole on the southern side of Riverside Drive near the approaches to the bridge. An high pressure sewage pipe running along Bridge Street was also observed.
- A spoon drain on the eastern side of Grafton Street had standing water present. At the time of the site inspection there was no evidence of indicators of potential ASS impact such as milky blue/green water or iron staining.





## 5.0 POTENTIAL CONTAMINATION SOURCES AND CONTAMINANTS OF POTENTIAL CONCERN

The aim of the Environmental Assessment was to identify and summarise the areas of potential soil, groundwater and/or vapour contamination.

Based on the findings of the Environmental Assessment, Table 4 below presents a summary of the areas of potential environmental concern and the potential contaminants that may be associated with these areas. Key areas for environmental concern are also presented in Figure 4.

**Table 4: Summary of Potential Issues and Contaminants**

Key Areas of Interest	Potential Contaminants
General Store – potential impact from storage of fuel in USTs	TRH BTEX PAH Lead
Former residential dwelling south of bridge – potential impact from hazardous building materials from demolition practices	Asbestos Lead
Potential former commercial/industrial site at 16 Bridge Street	TRH BTEX PAH Metals SVOC VOC Organo tin compounds
Agricultural land use – potential for pesticide / herbicide residues	OCP OPP Herbicides
Transformers	TRH PCB
Bridge abutments – unknown fill source for abutments, potential for lead impact from maintenance works	TRH BTEX PAH Metals
Former ferry – possible workshop	TRH BTEX PAH Metals

**Notes:**

- TRH - total recoverable hydrocarbons
- BTEX - benzene, ethylbenzene, toluene and xylene
- PAH - polycyclic aromatic hydrocarbons
- OCP – organochlorine pesticides
- OPP – organophosphorus pesticides
- SVOC - semi-volatile organic compounds
- VOC - volatile organic compounds
- PCB - polychlorinated biphenyls
- Metals – arsenic, cadmium, chromium, copper, nickel, lead, mercury, zinc



### 6.0 PRELIMINARY GEOTECHNICAL ASSESSMENT

In assessing the available desktop study information and following the site walkover, the following geotechnical issues are likely to impact on all or most of the potential route options:

#### *Bridge Approaches*

- Deep compressible soils are present along the southern bank of Sportsmans Creek. Whilst previous investigations are limited to the Grafton Street alignment, it is likely that these compressible deposits would extend laterally along Sportsmans Creek. The engineering performance (strength) and long term behaviour (serviceability / settlement) of these soils will significantly impact on the design and performance of the southern bridge approach embankment. Detailed design and consideration of project costs, design requirements and construction timing constraints would confirm the requirements and suitability for berms and other ground improvement techniques that are likely required.
- Poor subgrade conditions within the western portion of the study area, and to a lesser extent along Grafton and Bridge Streets, may require some ground improvement such as cement or lime stabilisation or bridging layers or installation of geo-grids and geo-fabrics . An inferred old river channel / ox-bow lake exists within the north western portion of the study area where the depth to rock is unknown, and likely to be significantly deeper than within the central and eastern portions of the study area.
- Low lying areas, particularly within the western portion of the study area, susceptible to poor surface water drainage would require additional filling and drainage structures to allow surface water to drain.
- The southern bridge approach embankment design may require stability berms to be constructed and this would increase the overall corridor width.
- Treatment of construction water (including wick drain discharge, if adopted)
- Disturbance to near surface soils (including piling and ground improvement works) within the study area would likely require the treatment of potential acid sulphate soils.
- Temporary works, notably along the southern bank of Sportsmans Creek, could potentially be impacted by flooding.
- Visual inspection of the existing river bank of Sportsmans Creek confirms that the existing banks are susceptible to wash out, slumping and erosion. These are issues requiring consideration during detail design.
- The Sportsmans Creek and Clarence River watercourses are a flood route and structures (including approach embankments) proposed within it should be considered in terms of both scour and potential flood impact.
- Currently there is no information available on the type and nature of fill materials used within the study area. It is anticipated that fill materials would likely have been sourced locally from more elevated terrain (in the vicinity of the Lawrence township). The suitability and long term performance of existing fill materials would need to be further investigated to demonstrate that existing fill materials on site that may be traversed by the new bridge and approach alignment would meet current design criteria.
- Options that would traverse these low lying areas would require additional filling to raise the road level as well as include provisions to allow standing and flood water to drain (eg culverts and drainage blankets).

#### *Bridge Foundations*

- General comments on pile design for a new bridge crossing Sportsmans Creek, include:



- Local bedrock is likely to provide adequate capacity to 'end bearing piles'. Floating piles (eg driven piles) would not be suitable due to the low geotechnical capacity of subsurface soils.
- Lateral capacity for "short" piles would likely be governed by structural moment capacity of pile given that relatively "soft" alluvial sediments are unlikely to provide significant lateral support. Therefore piles may be required to be larger in diameter due to the unsupportive alluvial sediments.
- Pile groups, including use of "raked" piles to counter lateral loads, may be considered.
- Scour design requirements would need to be considered in the pile design. Scour design considerations effectively increase the free length of the pile which results in an increase in the moment forces within the pile.
- Negative skin friction (NSF) induced from approach embankment settlements would need to be considered. NSF effectively creates additional down drag forces on the pile, therefore the pile needs to be designed geotechnically and structurally to accommodate these additional forces.
- Lateral loads on piles – flood loads, marine vessel collision loads, embankment settlement induced lateral loads would need to be defined during detailed design and may govern the type of foundation design adopted.
- If existing building structures are required to be demolished to enable construction of the new route, they may have existing foundations which need to be removed. These will include the Sportsmans Creek bridge abutments, comprising of drystone wall, timber piles, concrete footings, caissons, and steel sheet piles.
- The variable rock head level encountered during the previous investigations for the Grafton Street alignment is likely to be present for any crossing of Sportsmans Creek. The depth to rock may vary and additional investigations would be required to confirm the rock head profile.
- Bathymetric survey carried out during previous investigations (reported in Coffey 2002) indicates that scour effects are present downstream of the existing pier structures. Scour of near surface sediments around overwater piers would need to be taken into account for all route options.
- In general accordance with AS 2159-2009, the aggressivity exposure classification is expected to be 'Moderate' for concrete structures and 'Moderate' for steel structures in soil exposed to groundwater.
- Piled foundations would need to found on competent bedrock or within dense gravels to provide sufficient end-bearing capacity. The depths of alluvial deposits within the creek are known to extend to 34 m depth. No dense gravels were apparent from available information, but if encountered driving piles may prove difficult and driven piles may refuse prematurely. Where bedrock is encountered at relatively shallow depths, such as the north bank of Sportsmans Creek, sufficient lateral support may not be provided to driven piles, and bored piles should be considered as an alternative.

### **Road Construction Materials**

- The study area is generally flat and is not expected to generate site-won material suitable for embankment construction.
- Local quarry sources for drainage blankets, working platforms and pavements would need to be investigated. However this consideration would impact more on a western corridor option that crosses green fields that require a greater quantity of imported materials for road and embankment construction.
- The suitability for re-use of the existing approach embankments would need to be investigated, however to satisfy a potential requirement for maintaining access across Sportsmans Creek during the new bridge construction, any materials won from the demolition of the existing bridge (and associated earthworks) would likely not come online within the construction timeline.



## **7.0 FURTHER GEOTECHNICAL AND ENVIRONMENTAL INVESTIGATION**

### **7.1 Geotechnical Investigations**

As part of the Concept Options delivery programme, a targeted intrusive site investigation is recommended to further characterise site conditions, to better understand the key geotechnical risks and opportunities and to enable refinement of development of the concept option(s).

Based on the current level of ground investigation data available, primary objectives of additional investigations include:

- Characterisation of the soil and rock for bridge abutments and approach embankments;
- Investigation of existing pavement and subgrade materials; and
- Characterisation of the near surface soils within the "back swamp" area within the western portion of the study area.

The scope of the intrusive investigation is likely to comprise boreholes, CPTs and test pits. Soil and rock samples would need to be collected for both geotechnical and environmental laboratory analysis.

Non-intrusive investigation techniques, such as geophysical (seismic refraction) surveys, may also be considered to provide general rock-head profiling across Sportsmans Creek.

The intrusive investigation should also obtain data to enable Earthquake Rating, potential for acid sulphate soils and soil aggressivity classifications to be confirmed.

A Geotechnical Investigation Plan (GIP) will be developed following the Internal Technical Workshop and refinement of the current options.

### **7.2 Environmental / Contamination Investigations**

Based on the areas of environmental concern identified, the expected contaminants of concern and on the proposed works, it is considered that a Phase 2 Environmental Investigation is not required. Notwithstanding this, it is recommended that environmental samples be collected during geotechnical investigations to assess the potential waste classification of potential spoil to be generated by the works and to inform management plans likely to be required by the proposed works.



## **8.0 CONCLUSIONS AND SUMMARY**

Based on the available information, the following conclusions have been made.

- Existing geotechnical information is limited within the study to the approximate alignment of the former Grafton Street option. Shallow ground conditions within the study area are likely to comprise alluvial deposits of gravel, sand, silt and clay. The depth to bedrock ranges from 4 m to 34 m.
- Sportsmans Creek presents several geotechnical constraints which should be characterised by further site investigation and assessment. They are the potential for settlement of compressible soils if loaded, the depth to bedrock and competent strata within the creek, and the potential impact on flooding from development within the creek and surrounds.
- An absence of underground mining within the study area has been confirmed by the regulator. There is no mining in close proximity to the study area.
- Potential for contaminated soils in the study area exist from agricultural residues, USTs at the general store, fill in existing bridge abutments, previous demolition of structures, and historical industrial sites.
- The results of a previous shallow investigation and review of the ASS maps indicated that the study area has a risk of ASS, showing as Class 1, 2 and 3 on the ASS risk map. There is also potential that soils at depth would like be aggressive towards buried steel and / or concrete structures.
- Geotechnical considerations are generally consistent across the study area. Until further investigations are completed it is premature to identify a preferred option from a geotechnical risk perspective.



## Report Signature Page

**GOLDER ASSOCIATES PTY LTD**

Nick Poriters  
Senior Geotechnical Engineer

Shane Doyle  
Senior Environmental Scientist

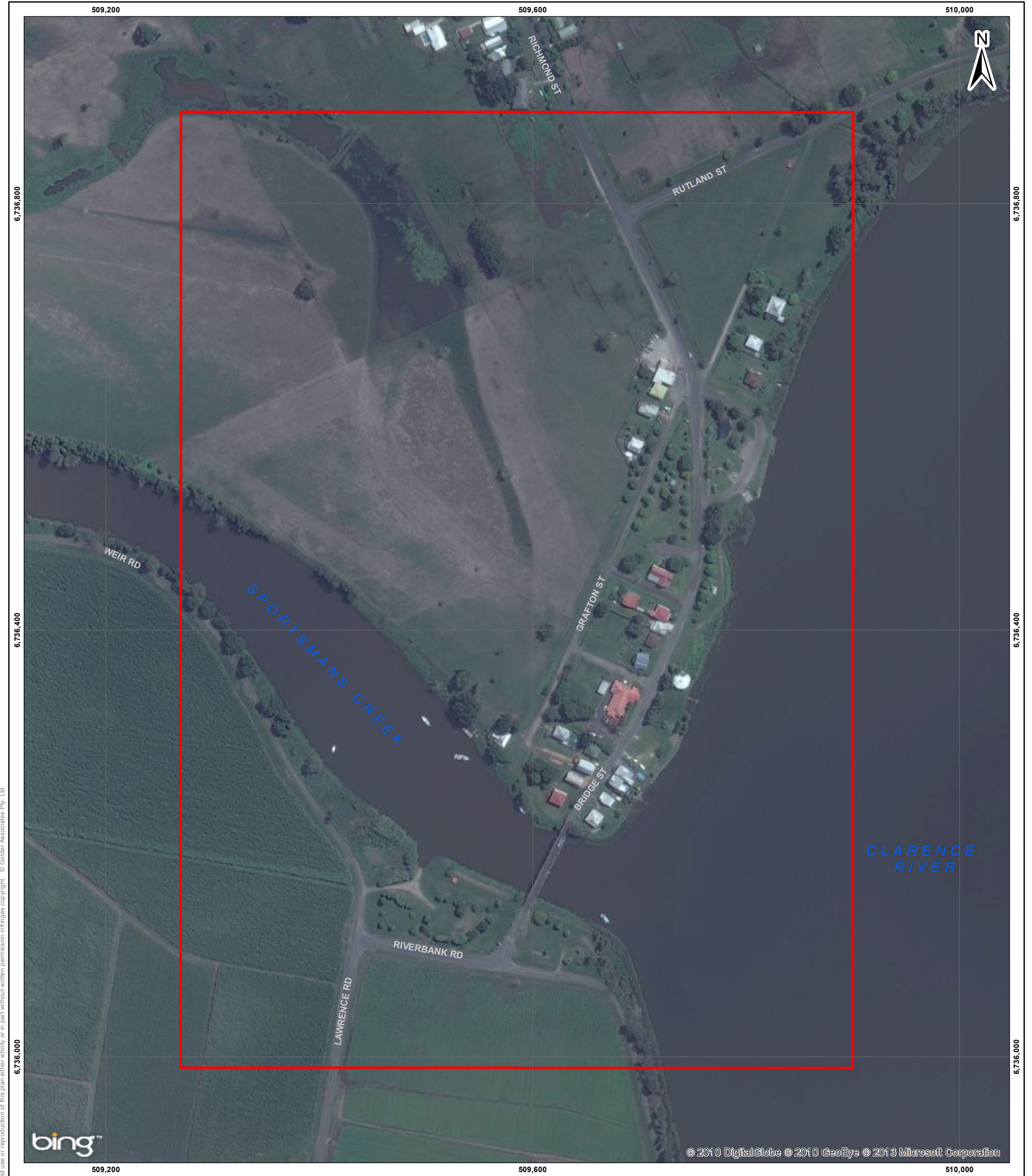
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A.B.N. 64 006 107 857

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**SPORTSMANS CREEK NEW BRIDGE**

KBR

**SITE LOCALITY**



**LEGEND**

Study Area



**SCALE (at A3) 1:3,500**  
Coordinate System: GCS GDA 1994

PROJECT: 137622029  
DATE: 11/07/2013  
DRAWN: FA  
CHECKED: NPP

**FIGURE 1**

**COPYRIGHT**

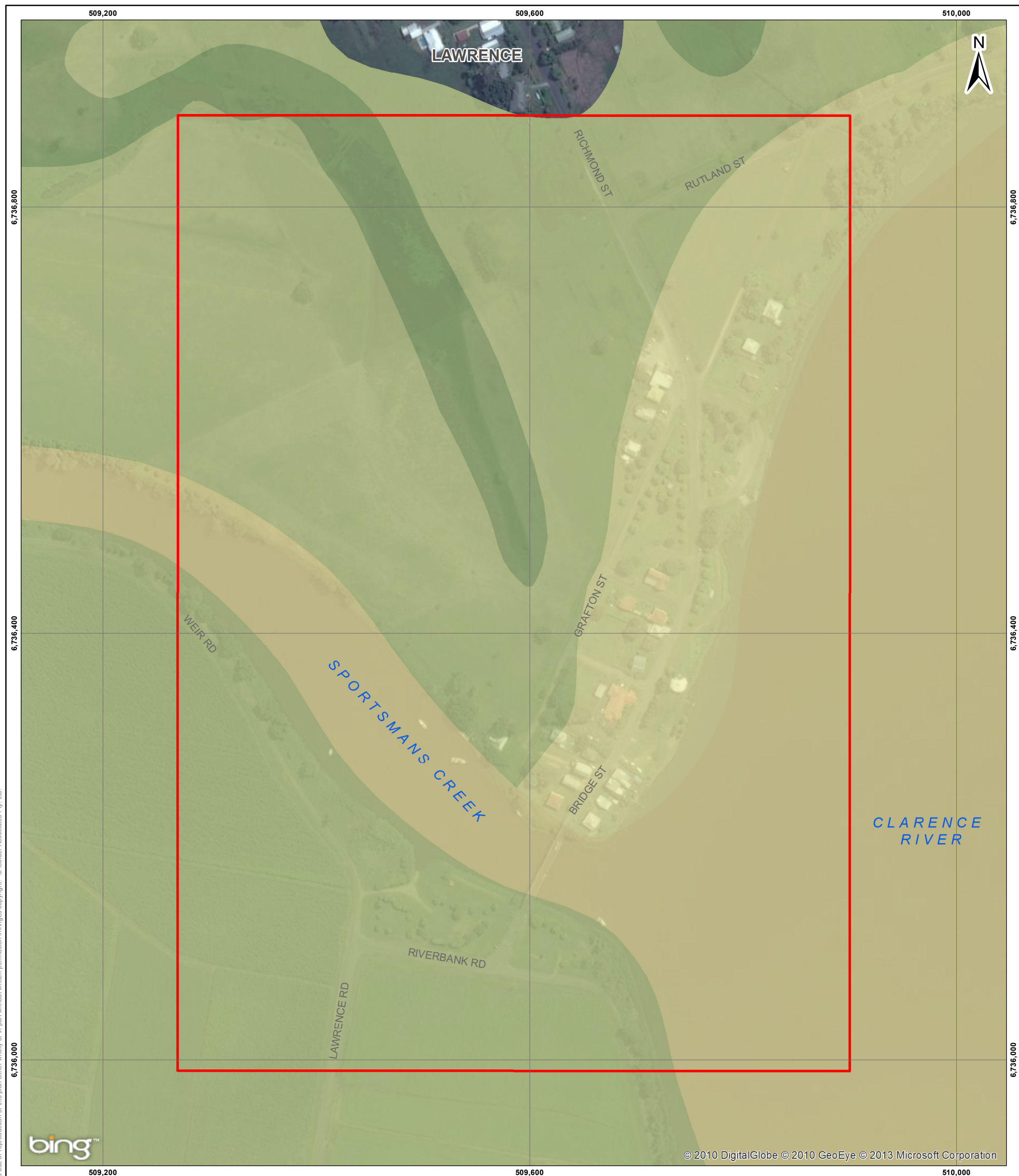
Aerial Image Service Layer Credits: © 2010 DigitalGlobe  
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Base map data copyright MapInfo Australia Pty Ltd

**NOTES**

Site location provided by client.







**SPORTSMANS CREEK NEW BRIDGE**

KBR

**ACID SULFATE SOILS WITH STUDY AREA**

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2. Acid Sulfate Soil Risk data - August 2007 copyright Department of Environment and Climate Change
3. Base map data copyright MapInfo Australia Pty Ltd



**LEGEND**

- Study Area
- High Risk 0-1m
- High Risk 1-2m
- High Risk 2-4m
- High Risk above 4m
- High Risk Bottom Sediments
- Low Risk 0-1m
- Low Risk 1-2m
- Low Risk 2-4m
- Low Risk above 4m
- Low Risk Bottom Sediments
- No Risk
- Disturbed Terrain
- Beach



**SCALE (at A3) 1:3,500**  
Coordinate System: GCS GDA 1994

**PROJECT: 137622029**  
**DATE: 11/07/2013**  
**DRAWN: FA**  
**CHECKED: NPP**

**FIGURE 2**

**NOTES**

Site location provided by client.







**SPORTSMANS CREEK NEW BRIDGE**

KBR

**SITES OF ENVIRONMENTAL CONCERN**

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 Base map data copyright MapInfo Australia Pty Ltd



**LEGEND**

Study Area

**NOTES**

Site location provided by client.

0 25 50 100 150 metres  
**SCALE (at A3) 1:3,500**  
 Coordinate System: GCS GDA 1994

PROJECT: 137622029  
 DATE: 11/07/2013  
 DRAWN: FA  
 CHECKED: NPP

**FIGURE 3**



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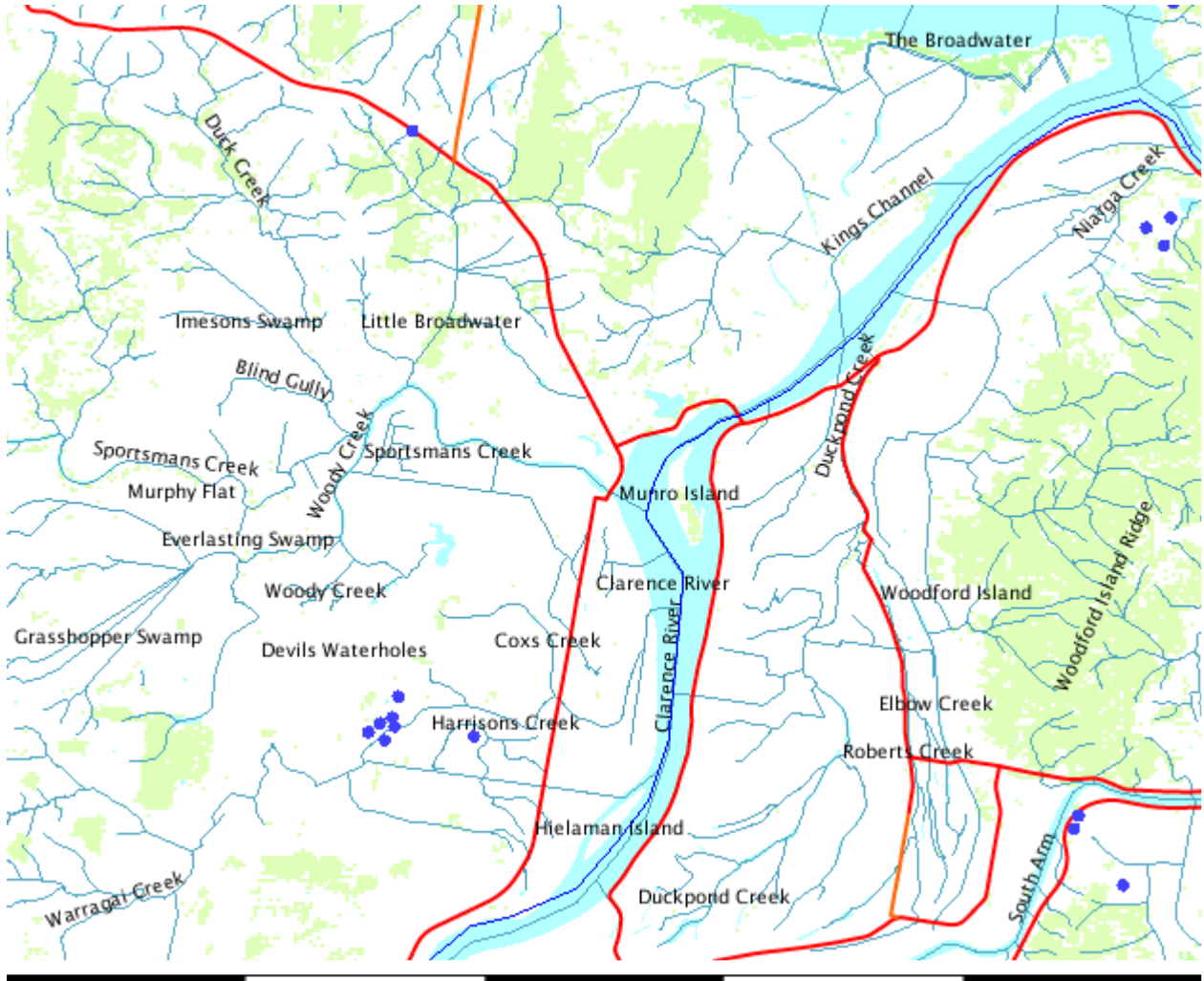
# **APPENDIX A**

## **Groundwater Bores**

# Lawrence Bore Map

Map created with NSW Natural Resource Atlas - <http://www.nratlas.nsw.gov.au>

Thursday, June 20, 2013



0 14 Km

## Legend

Symbol	Layer	Custodian
	Cities and large towns	renderImage: Cannot build image from features
	Populated places	renderImage: Cannot build image from features
	Towns	
	Groundwater Bores	
	Catchment Management Authority boundaries	
	Major rivers	

Topographic base map



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# Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)  
Document Generated on Thursday, June 20, 2013

Print Report

[Works Details](#) [Site Details](#) [Form A](#) [Licensed](#) [Construction](#) [Water Bearing Zones](#) [Drillers Log](#)

## Work Requested -- GW306376

### Works Details [\(top\)](#)

GROUNDWATER NUMBER GW306376  
 LIC-NUM 30BL185083  
 AUTHORISED-PURPOSES DOMESTIC FARMING STOCK  
 INTENDED-PURPOSES DOMESTIC FARMING STOCK  
 WORK-TYPE Well  
 WORK-STATUS Supply Obtained  
 CONSTRUCTION-METHOD (Unknown)  
 OWNER-TYPE Private  
 COMMENCE-DATE  
 COMPLETION-DATE 1900-12-01  
 FINAL-DEPTH (metres) 4.20  
 DRILLED-DEPTH (metres)  
 CONTRACTOR-NAME  
 DRILLER-NAME  
 PROPERTY N/A  
 GWMA -  
 GW-ZONE -  
 STANDING-WATER-LEVEL 1.20  
 SALINITY  
 YIELD

### Site Details [\(top\)](#)

REGION 30 - NORTH COAST  
 RIVER-BASIN 204 - CLARENCE RIVER  
 AREA-DISTRICT  
 CMA-MAP 9538-4N  
 GRID-ZONE 56/2  
 SCALE 1:25,000  
 ELEVATION  
 ELEVATION-SOURCE  
 NORTHING 6731724.00  
 EASTING 515245.00  
 LATITUDE 29 32' 39"  
 LONGITUDE 153 9' 26"  
 GS-MAP

AMG-ZONE 56  
 COORD-SOURCE GIS - Geographic Information System  
 REMARK

### Form-A [\(top\)](#)

COUNTY CLARENCE  
 PARISH TYNDALE  
 PORTION-LOT-DP 49//1103568

### Licensed [\(top\)](#)

COUNTY CLARENCE  
 PARISH TYNDALE  
 PORTION-LOT-DP 49 1103568

### Construction [\(top\)](#)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;  
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	4.20	1800			(Unknown)
1	1	Casing	Lining	0.00	4.20				

### Water Bearing Zones [\(top\)](#)

no details

### Drillers Log [\(top\)](#)

no details

---

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# Groundwater Works Summary

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[Works Details](#) [Site Details](#) [Form A](#) [Licensed](#) [Construction](#) [Water Bearing Zones](#) [Drillers Log](#)

## Work Requested -- GW306065

### Works Details [\(top\)](#)

<b>GROUNDWATER NUMBER</b>	GW306065
<b>LIC-NUM</b>	30BL183592
<b>AUTHORISED-PURPOSES</b>	DOMESTIC IRRIGATION
<b>INTENDED-PURPOSES</b>	DOMESTIC IRRIGATION
<b>WORK-TYPE</b>	Bore
<b>WORK-STATUS</b>	Supply Obtained
<b>CONSTRUCTION-METHOD</b>	Rotary Air
<b>OWNER-TYPE</b>	Private
<b>COMMENCE-DATE</b>	
<b>COMPLETION-DATE</b>	2007-03-06
<b>FINAL-DEPTH (metres)</b>	48.00
<b>DRILLED-DEPTH (metres)</b>	48.00
<b>CONTRACTOR-NAME</b>	
<b>DRILLER-NAME</b>	
<b>PROPERTY</b>	" HOLLIS "
<b>GWMA</b>	-
<b>GW-ZONE</b>	-
<b>STANDING-WATER-LEVEL</b>	17.50
<b>SALINITY</b>	120.00
<b>YIELD</b>	0.76

### Site Details [\(top\)](#)

<b>REGION</b>	30 - NORTH COAST
<b>RIVER-BASIN</b>	204 - CLARENCE RIVER
<b>AREA-DISTRICT</b>	
<b>CMA-MAP</b>	9538-4N
<b>GRID-ZONE</b>	56/2
<b>SCALE</b>	1:25,000
<b>ELEVATION</b>	
<b>ELEVATION-SOURCE</b>	
<b>NORTHING</b>	6731539.00
<b>EASTING</b>	515195.00
<b>LATITUDE</b>	29 32' 45"
<b>LONGITUDE</b>	153 9' 25"
<b>GS-MAP</b>	

AMG-ZONE 56  
 COORD-SOURCE GPS - Global Positioning System  
 REMARK

### Form-A [\(top\)](#)

COUNTY CLARENCE  
 PARISH TYNDALE  
 PORTION-LOT-DP 1//438852

### Licensed [\(top\)](#)

COUNTY CLARENCE  
 PARISH TYNDALE  
 PORTION-LOT-DP 1 438852

### Construction [\(top\)](#)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;  
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	6.00	205			Rotary Air
1		Hole	Hole	6.00	48.00	165			Down Hole Hammer
1	1	Casing	Casing Protector	-0.30	0.60	170	154		
1	1	Casing	PVC Class 9	-0.30	48.00	152	138		Glued; Seated on Bottom; Open End
1	1	Opening	Slots - Vertical	18.00	23.00	152			PVC Class 9; Mechanically Slotted; SL: 100mm; A: 2mm; Glued
1	1	Opening	Slots - Vertical	42.00	46.00	152			PVC Class 9; Mechanically Slotted; SL: 100mm; A: 2mm; Glued
1		Annulus	Bentonite/Grout	0.60	6.00	205	152		

### Water Bearing Zones [\(top\)](#)

FROM- DEPTH (metres)	TO- DEPTH (metres)	THICKNESS (metres)	ROCK- CAT- DESC	S-W- L	D- D- L	YIELD	TEST- HOLE- DEPTH (metres)	DURATION	SALINITY
18.00	23.00	5.00		17.50		0.38			100.00
42.00	46.00	4.00		17.50		0.38		2.00	120.00

**Drillers Log** [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL COMMENT
0.00	0.60	0.60	Topsoil, black	
0.60	1.50	0.90	Clay, yellow	
1.50	5.00	3.50	Sandy Clay, light grey	
5.00	6.00	1.00	Sandstone, yellow	
6.00	8.00	2.00	Sandstone, red	
8.00	18.00	10.00	Sandstone, grey, fine	
18.00	23.00	5.00	Sandstone, cracky, grey, water bearing	
23.00	42.00	19.00	Sandstone, grey, fine	
42.00	46.00	4.00	Sandstone, cracky, grey, water bearing	
46.00	48.00	2.00	Sandstone, grey	

---

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# Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)  
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[Works Details](#) [Site Details](#) [Form A](#) [Licensed](#) [Construction](#) [Water Bearing Zones](#) [Drillers Log](#)

## Work Requested -- GW304768

### Works Details [\(top\)](#)

GROUNDWATER NUMBER GW304768  
 LIC-NUM 30BL181175  
 AUTHORISED-PURPOSES DOMESTIC STOCK  
 INTENDED-PURPOSES DOMESTIC STOCK  
 WORK-TYPE Bore  
 WORK-STATUS  
 CONSTRUCTION-METHOD Rotary - Percussion (Down Hole Hammer)  
 OWNER-TYPE  
 COMMENCE-DATE  
 COMPLETION-DATE 2004-06-22  
 FINAL-DEPTH (metres) 90.00  
 DRILLED-DEPTH (metres) 90.00  
 CONTRACTOR-NAME  
 DRILLER-NAME  
 PROPERTY COLUSI  
 GWMA -  
 GW-ZONE -  
 STANDING-WATER-LEVEL  
 SALINITY  
 YIELD

### Site Details [\(top\)](#)

REGION 30 - NORTH COAST  
 RIVER-BASIN  
 AREA-DISTRICT  
 CMA-MAP  
 GRID-ZONE  
 SCALE  
 ELEVATION  
 ELEVATION-SOURCE  
 NORTHING 6741172.00  
 EASTING 507222.00  
 LATITUDE 29 27' 32"  
 LONGITUDE 153 4' 28"  
 GS-MAP

AMG-ZONE 56  
 COORD-SOURCE  
 REMARK

### Form-A [\(top\)](#)

COUNTY CLARENCE  
 PARISH LAWRENCE  
 PORTION-LOT-DP 3 259917

### Licensed [\(top\)](#)

COUNTY CLARENCE  
 PARISH LAWRENCE  
 PORTION-LOT-DP 3 259917

### Construction [\(top\)](#)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;  
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	6.00	200			Rotary Air
1		Hole	Hole	6.00	90.00	165			Rotary - Percussion (Down Hole Hammer)

### Water Bearing Zones [\(top\)](#)

no details

### Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	12.00	12.00	soil		
12.00	26.00	14.00	dec sandstone		
26.00	42.00	16.00	sandstone grey		
42.00	67.00	25.00	mudstone		
67.00	90.00	23.00	sandstone grey		

---

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# Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)  
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Print Report

[Works Details](#) [Site Details](#) [Form A](#) [Licensed](#) [Construction](#) [Water Bearing Zones](#) [Drillers Log](#)

## Work Requested -- GW303174

### Works Details [\(top\)](#)

GROUNDWATER NUMBER GW303174  
 LIC-NUM 30BL179484  
 AUTHORISED-PURPOSES DOMESTIC STOCK  
 INTENDED-PURPOSES DOMESTIC STOCK  
 WORK-TYPE Bore  
 WORK-STATUS  
 CONSTRUCTION-METHOD  
 OWNER-TYPE  
 COMMENCE-DATE  
 COMPLETION-DATE 2001-08-11  
 FINAL-DEPTH (metres) 6.00  
 DRILLED-DEPTH (metres) 6.00  
 CONTRACTOR-NAME  
 DRILLER-NAME  
 PROPERTY " MC GRATH'S "  
 GWMA -  
 GW-ZONE -  
 STANDING-WATER-LEVEL  
 SALINITY  
 YIELD

### Site Details [\(top\)](#)

REGION 30 - NORTH COAST  
 RIVER-BASIN  
 AREA-DISTRICT  
 CMA-MAP  
 GRID-ZONE  
 SCALE  
 ELEVATION  
 ELEVATION-SOURCE  
 NORTHING 6730762.00  
 EASTING 515783.00  
 LATITUDE 29 33' 10"  
 LONGITUDE 153 9' 47"  
 GS-MAP

AMG-ZONE 56  
 COORD-SOURCE Map Interpretation  
 REMARK

### Form-A [\(top\)](#)

COUNTY CLARENCE  
 PARISH TYNDALE  
 PORTION-LOT-DP LT 1 DP 883309

### Licensed [\(top\)](#)

COUNTY CLARENCE  
 PARISH TYNDALE  
 PORTION-LOT-DP 1 883309

### Construction [\(top\)](#)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;  
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	6.00	280			Rotary Air
1	1	Casing	PVC Class 9	-0.03	3.50	140			Glued; Seated on Bottom; Seated
1	1	Opening	Slots - Horizontal	1.50	3.00	140			PVC Class 9
1		Annulus	Waterworn/Rounded	1.00	3.50				(Unknown) GS: .8- 1.5mm; Q: 250m <sup>3</sup>

### Water Bearing Zones [\(top\)](#)

FROM- DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK- CAT- DESC	S- W-L	D- D- L	YIELD	TEST-HOLE- DEPTH (metres)	DURATION	SALINITY
1.50	2.00	0.50		1.00		0.40	6.00	2.00	

### Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	1.20	1.20	Soil		
1.20	2.40	1.20	Sand		
2.40	3.60	1.20	Decomposed Sandstone		
3.60	6.00	2.40	Sandstone		



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# Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)  
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## Work Requested -- GW302598

### Works Details [\(top\)](#)

GROUNDWATER NUMBER GW302598  
 LIC-NUM 30BL179450  
 AUTHORISED-PURPOSES DOMESTIC STOCK  
 INTENDED-PURPOSES DOMESTIC STOCK  
 WORK-TYPE Bore  
 WORK-STATUS (Unknown)  
 CONSTRUCTION-METHOD (Unknown)  
 OWNER-TYPE Private  
 COMMENCE-DATE  
 COMPLETION-DATE  
 FINAL-DEPTH (metres)  
 DRILLED-DEPTH (metres)  
 CONTRACTOR-NAME  
 DRILLER-NAME  
 PROPERTY ROUND MOUNTAIN  
 GWMA -  
 GW-ZONE -  
 STANDING-WATER-LEVEL  
 SALINITY  
 YIELD

### Site Details [\(top\)](#)

REGION 30 - NORTH COAST  
 RIVER-BASIN  
 AREA-DISTRICT  
 CMA-MAP  
 GRID-ZONE  
 SCALE  
 ELEVATION  
 ELEVATION-SOURCE  
 NORTHING 6733082.00  
 EASTING 506975.00  
 LATITUDE 29 31' 55"  
 LONGITUDE 153 4' 19"  
 GS-MAP

AMG-ZONE 56  
COORD-SOURCE Map Interpretation  
REMARK

### Form-A [\(top\)](#)

no details

### Licensed [\(top\)](#)

COUNTY CLARENCE  
PARISH SOUTHGATE  
PORTION-LOT-DP B 405575

### Water Bearing Zones [\(top\)](#)

no details

### Drillers Log [\(top\)](#)

no details

---

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## Work Requested -- GW302597

### Works Details [\(top\)](#)

GROUNDWATER NUMBER GW302597  
 LIC-NUM 30BL179449  
 AUTHORISED-PURPOSES DOMESTIC STOCK  
 INTENDED-PURPOSES DOMESTIC STOCK  
 WORK-TYPE Bore  
 WORK-STATUS (Unknown)  
 CONSTRUCTION-METHOD (Unknown)  
 OWNER-TYPE Private  
 COMMENCE-DATE  
 COMPLETION-DATE  
 FINAL-DEPTH (metres)  
 DRILLED-DEPTH (metres)  
 CONTRACTOR-NAME  
 DRILLER-NAME  
 PROPERTY ROUND MOUNTAIN  
 GWMA -  
 GW-ZONE -  
 STANDING-WATER-LEVEL  
 SALINITY  
 YIELD

### Site Details [\(top\)](#)

REGION 30 - NORTH COAST  
 RIVER-BASIN  
 AREA-DISTRICT  
 CMA-MAP  
 GRID-ZONE  
 SCALE  
 ELEVATION  
 ELEVATION-SOURCE  
 NORTHING 6733370.00  
 EASTING 507047.00  
 LATITUDE 29 31' 45"  
 LONGITUDE 153 4' 22"  
 GS-MAP

AMG-ZONE 56  
COORD-SOURCE Map Interpretation  
REMARK

### Form-A [\(top\)](#)

no details

### Licensed [\(top\)](#)

COUNTY CLARENCE  
PARISH SOUTHGATE  
PORTION-LOT-DP A 405575

### Water Bearing Zones [\(top\)](#)

no details

### Drillers Log [\(top\)](#)

no details

---

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# Groundwater Works Summary

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## Work Requested -- GW302596

### Works Details [\(top\)](#)

GROUNDWATER NUMBER GW302596  
 LIC-NUM 30BL179448  
 AUTHORISED-PURPOSES DOMESTIC STOCK  
 INTENDED-PURPOSES DOMESTIC STOCK  
 WORK-TYPE Bore  
 WORK-STATUS (Unknown)  
 CONSTRUCTION-METHOD (Unknown)  
 OWNER-TYPE Private  
 COMMENCE-DATE  
 COMPLETION-DATE  
 FINAL-DEPTH (metres)  
 DRILLED-DEPTH (metres)  
 CONTRACTOR-NAME  
 DRILLER-NAME  
 PROPERTY ROUND MOUNTAIN  
 GWMA -  
 GW-ZONE -  
 STANDING-WATER-LEVEL  
 SALINITY  
 YIELD

### Site Details [\(top\)](#)

REGION 30 - NORTH COAST  
 RIVER-BASIN  
 AREA-DISTRICT  
 CMA-MAP  
 GRID-ZONE  
 SCALE  
 ELEVATION  
 ELEVATION-SOURCE  
 NORTHING 6732959.00  
 EASTING 506998.00  
 LATITUDE 29 31' 59"  
 LONGITUDE 153 4' 20"  
 GS-MAP



AMG-ZONE 56  
COORD-SOURCE Map Interpretation  
REMARK

### Form-A [\(top\)](#)

no details

### Licensed [\(top\)](#)

COUNTY CLARENCE  
PARISH SOUTHGATE  
PORTION-LOT-DP 171 751386

### Water Bearing Zones [\(top\)](#)

no details

### Drillers Log [\(top\)](#)

no details

---

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# Groundwater Works Summary

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## Work Requested -- GW302595

### Works Details [\(top\)](#)

GROUNDWATER NUMBER GW302595  
 LIC-NUM 30BL179447  
 AUTHORISED-PURPOSES DOMESTIC STOCK  
 INTENDED-PURPOSES DOMESTIC STOCK  
 WORK-TYPE Bore  
 WORK-STATUS (Unknown)  
 CONSTRUCTION-METHOD (Unknown)  
 OWNER-TYPE Private  
 COMMENCE-DATE  
 COMPLETION-DATE  
 FINAL-DEPTH (metres)  
 DRILLED-DEPTH (metres)  
 CONTRACTOR-NAME  
 DRILLER-NAME  
 PROPERTY ROUND MOUNTAIN  
 GWMA -  
 GW-ZONE -  
 STANDING-WATER-LEVEL  
 SALINITY  
 YIELD

### Site Details [\(top\)](#)

REGION 30 - NORTH COAST  
 RIVER-BASIN  
 AREA-DISTRICT  
 CMA-MAP  
 GRID-ZONE  
 SCALE  
 ELEVATION  
 ELEVATION-SOURCE  
 NORTHING 6733002.00  
 EASTING 506824.00  
 LATITUDE 29 31' 57"  
 LONGITUDE 153 4' 14"  
 GS-MAP

AMG-ZONE 56  
COORD-SOURCE Map Interpretation  
REMARK

### Form-A [\(top\)](#)

no details

### Licensed [\(top\)](#)

COUNTY CLARENCE  
PARISH SOUTHGATE  
PORTION-LOT-DP 171 751386

### Water Bearing Zones [\(top\)](#)

no details

### Drillers Log [\(top\)](#)

no details

---

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# Groundwater Works Summary

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## Work Requested -- GW302594

### Works Details [\(top\)](#)

GROUNDWATER NUMBER GW302594  
 LIC-NUM 30BL179446  
 AUTHORISED-PURPOSES DOMESTIC STOCK  
 INTENDED-PURPOSES DOMESTIC STOCK  
 WORK-TYPE Bore  
 WORK-STATUS (Unknown)  
 CONSTRUCTION-METHOD (Unknown)  
 OWNER-TYPE Private  
 COMMENCE-DATE  
 COMPLETION-DATE  
 FINAL-DEPTH (metres)  
 DRILLED-DEPTH (metres)  
 CONTRACTOR-NAME  
 DRILLER-NAME  
 PROPERTY ROUND MOUNTAIN  
 GWMA -  
 GW-ZONE -  
 STANDING-WATER-LEVEL  
 SALINITY  
 YIELD

### Site Details [\(top\)](#)

REGION 30 - NORTH COAST  
 RIVER-BASIN  
 AREA-DISTRICT  
 CMA-MAP  
 GRID-ZONE  
 SCALE  
 ELEVATION  
 ELEVATION-SOURCE  
 NORTHING 6732882.00  
 EASTING 506684.00  
 LATITUDE 29 32' 1"  
 LONGITUDE 153 4' 8"  
 GS-MAP

AMG-ZONE 56  
COORD-SOURCE Map Interpretation  
REMARK

### Form-A [\(top\)](#)

no details

### Licensed [\(top\)](#)

COUNTY CLARENCE  
PARISH SOUTHGATE  
PORTION-LOT-DP 172 751386

### Water Bearing Zones [\(top\)](#)

no details

### Drillers Log [\(top\)](#)

no details

---

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# Groundwater Works Summary

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## Work Requested -- GW302593

### Works Details [\(top\)](#)

GROUNDWATER NUMBER GW302593  
 LIC-NUM 30BL179451  
 AUTHORISED-PURPOSES DOMESTIC STOCK  
 INTENDED-PURPOSES DOMESTIC STOCK  
 WORK-TYPE Bore  
 WORK-STATUS (Unknown)  
 CONSTRUCTION-METHOD (Unknown)  
 OWNER-TYPE Private  
 COMMENCE-DATE  
 COMPLETION-DATE  
 FINAL-DEPTH (metres)  
 DRILLED-DEPTH (metres)  
 CONTRACTOR-NAME  
 DRILLER-NAME  
 PROPERTY ROUND MOUNTAIN  
 GWMA -  
 GW-ZONE -  
 STANDING-WATER-LEVEL  
 SALINITY  
 YIELD

### Site Details [\(top\)](#)

REGION 30 - NORTH COAST  
 RIVER-BASIN  
 AREA-DISTRICT  
 CMA-MAP  
 GRID-ZONE  
 SCALE  
 ELEVATION  
 ELEVATION-SOURCE  
 NORTHING 6732767.00  
 EASTING 506883.00  
 LATITUDE 29 32' 5"  
 LONGITUDE 153 4' 16"  
 GS-MAP

AMG-ZONE 56  
COORD-SOURCE Map Interpretation  
REMARK

### Form-A [\(top\)](#)

no details

### Licensed [\(top\)](#)

COUNTY CLARENCE  
PARISH SOUTHGATE  
PORTION-LOT-DP 171 751386

### Water Bearing Zones [\(top\)](#)

no details

### Drillers Log [\(top\)](#)

no details

---

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# Groundwater Works Summary

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## Work Requested -- GW302592

### Works Details [\(top\)](#)

GROUNDWATER NUMBER GW302592  
 LIC-NUM 30BL179452  
 AUTHORISED-PURPOSES DOMESTIC STOCK  
 INTENDED-PURPOSES DOMESTIC STOCK  
 WORK-TYPE Bore  
 WORK-STATUS (Unknown)  
 CONSTRUCTION-METHOD (Unknown)  
 OWNER-TYPE Private  
 COMMENCE-DATE  
 COMPLETION-DATE  
 FINAL-DEPTH (metres)  
 DRILLED-DEPTH (metres)  
 CONTRACTOR-NAME  
 DRILLER-NAME  
 PROPERTY ROUND MOUNTAIN  
 GWMA -  
 GW-ZONE -  
 STANDING-WATER-LEVEL  
 SALINITY  
 YIELD

### Site Details [\(top\)](#)

REGION 30 - NORTH COAST  
 RIVER-BASIN  
 AREA-DISTRICT  
 CMA-MAP  
 GRID-ZONE  
 SCALE  
 ELEVATION  
 ELEVATION-SOURCE  
 NORTHING 6732823.00  
 EASTING 507957.00  
 LATITUDE 29 32' 3"  
 LONGITUDE 153 4' 56"  
 GS-MAP

AMG-ZONE 56  
COORD-SOURCE Map Interpretation  
REMARK

### Form-A [\(top\)](#)

no details

### Licensed [\(top\)](#)

COUNTY CLARENCE  
PARISH SOUTHGATE  
PORTION-LOT-DP 137 751386

### Water Bearing Zones [\(top\)](#)

no details

### Drillers Log [\(top\)](#)

no details

---

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# Groundwater Works Summary

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## Work Requested -- GW300321

### Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW300321
LIC-NUM	30BL151802
AUTHORISED-PURPOSES	DOMESTIC
INTENDED-PURPOSES	DOMESTIC
WORK-TYPE	Bore
WORK-STATUS	(Unknown)
CONSTRUCTION-METHOD	(Unknown)
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	1993-03-01
FINAL-DEPTH (metres)	48.00
DRILLED-DEPTH (metres)	48.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	KRATZ
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	0.25

### Site Details [\(top\)](#)

REGION	30 - NORTH COAST
RIVER-BASIN	204 - CLARENCE RIVER
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6739966.00
EASTING	516370.00
LATITUDE	29 28' 11"
LONGITUDE	153 10' 8"
GS-MAP	

AMG-ZONE 56  
 COORD-SOURCE Map Interpretation  
 REMARK

### Form-A [\(top\)](#)

COUNTY CLARENCE  
 PARISH WOODFORD  
 PORTION-LOT-DP LOT 8 DP259883

### Licensed [\(top\)](#)

COUNTY CLARENCE  
 PARISH WOODFORD  
 PORTION-LOT-DP 8 259883

### Construction [\(top\)](#)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;  
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	48.00	120			(Unknown)
1	1	Casing	P.V.C.	-0.50	48.00	120			(Unknown); (Unknown)

### Water Bearing Zones [\(top\)](#)

no details

### Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	48.00	48.00	sandstone		

---

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## Work Requested -- GW064579

### Works Details [\(top\)](#)

GROUNDWATER NUMBER GW064579  
 LIC-NUM 30BL137223  
 AUTHORISED-PURPOSES DOMESTIC STOCK  
 INTENDED-PURPOSES DOMESTIC STOCK  
 WORK-TYPE Bore  
 WORK-STATUS (Unknown)  
 CONSTRUCTION-METHOD Rotary Air  
 OWNER-TYPE (Unknown)  
 COMMENCE-DATE  
 COMPLETION-DATE 1988-01-01  
 FINAL-DEPTH (metres) 31.00  
 DRILLED-DEPTH (metres) 31.00  
 CONTRACTOR-NAME  
 DRILLER-NAME  
 PROPERTY N/A  
 GWMA -  
 GW-ZONE -  
 STANDING-WATER-LEVEL  
 SALINITY  
 YIELD

### Site Details [\(top\)](#)

REGION 30 - NORTH COAST  
 RIVER-BASIN 204 - CLARENCE RIVER  
 AREA-DISTRICT  
 CMA-MAP 9539-3S  
 GRID-ZONE 56/2  
 SCALE 1:25,000  
 ELEVATION  
 ELEVATION-SOURCE (Unknown)  
 NORTHING 6739582.00  
 EASTING 516290.00  
 LATITUDE 29 28' 23"  
 LONGITUDE 153 10' 5"  
 GS-MAP 0006A2

AMG-ZONE 56  
 COORD-SOURCE GD.,ACC.MAP  
 REMARK

### Form-A [\(top\)](#)

COUNTY CLARENCE  
 PARISH WOODFORD  
 PORTION-LOT-DP 172

### Licensed [\(top\)](#)

COUNTY CLARENCE  
 PARISH WOODFORD  
 PORTION-LOT-DP 192

### Construction [\(top\)](#)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;  
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE-NO	PIPE-NO	COMPONENT-CODE	COMPONENT-TYPE	DEPTH-FROM (metres)	DEPTH-TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1	1	Casing	P.V.C.	0.00	31.00	150			Seated on Bottom
1	1	Opening	Slots - Vertical	8.00	31.00	150		1	Oxy-Acetylene Slotted; SL: 0mm; A: 3mm

### Water Bearing Zones [\(top\)](#)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
21.00	22.00	1.00	(Unknown)			0.40			Good

### Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL COMMENT
0.00	10.00	10.00	Clay	
0.00	10.00	10.00	Sandstone Soft	
10.00	20.00	10.00	Sandstone White	
20.00	22.00	2.00	Sandstone Broken Water Supply	
22.00	31.00	9.00	Sandstone White	

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# Groundwater Works Summary

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[Works Details](#) [Site Details](#) [Form A](#) [Licensed](#) [Construction](#) [Water Bearing Zones](#) [Drillers Log](#)

## Work Requested -- GW018090

### Works Details [\(top\)](#)

GROUNDWATER NUMBER GW018090  
 LIC-NUM 30BL010194  
 AUTHORISED-PURPOSES DOMESTIC IRRIGATION STOCK  
 INTENDED-PURPOSES STOCK  
 WORK-TYPE Well  
 WORK-STATUS (Unknown)  
 CONSTRUCTION-METHOD (Unknown)  
 OWNER-TYPE Private  
 COMMENCE-DATE  
 COMPLETION-DATE  
 FINAL-DEPTH (metres) 3.00  
 DRILLED-DEPTH (metres) 3.00  
 CONTRACTOR-NAME  
 DRILLER-NAME  
 PROPERTY WOODFORD ISLAND  
 GWMA 602 - CLARENCE MORETON BASIN  
 GW-ZONE -  
 STANDING-WATER-LEVEL  
 SALINITY  
 YIELD

### Site Details [\(top\)](#)

REGION 30 - NORTH COAST  
 RIVER-BASIN 204 - CLARENCE RIVER  
 AREA-DISTRICT  
 CMA-MAP 9539-3S  
 GRID-ZONE 56/2  
 SCALE 1:25,000  
 ELEVATION  
 ELEVATION-SOURCE (Unknown)  
 NORTHING 6739828.00  
 EASTING 516075.00  
 LATITUDE 29 28' 15"  
 LONGITUDE 153 9' 57"  
 GS-MAP 0006A2

AMG-ZONE 56  
 COORD-SOURCE GD.,ACC.MAP  
 REMARK

### Form-A [\(top\)](#)

COUNTY CLARENCE  
 PARISH WOODFORD  
 PORTION-LOT-DP 124

### Licensed [\(top\)](#)

COUNTY CLARENCE  
 PARISH WOODFORD  
 PORTION-LOT-DP 124

### Construction [\(top\)](#)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;  
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1	1	Casing	Timber	-0.60	3.10	2438			(Unknown)

### Water Bearing Zones [\(top\)](#)

FROM- DEPTH (metres)	TO- DEPTH (metres)	THICKNESS (metres)	ROCK-CAT- DESC	S- W-L	D- D- L	YIELD	TEST- HOLE- DEPTH (metres)	DURATION	SALINITY
0.90	3.00	2.10	Unconsolidated	0.90		0.38			Good Stock

### Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.91	0.91	Soil		
0.91	3.04	2.13	Sand Water Supply		

---

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# **APPENDIX B**

## **Regulatory Information Search Results**

## Cattle dip site locator

### Dip site location

<b>Dipname</b>	MCPHEES	<i>Note: Map references are for 25,000 series topographic and co-ordinates are in AGD66 AMG zone 56.</i>	
<b>Road</b>	LAWRENCE ROAD	<b>Mapsheet</b>	9538-IV-N
<b>Town/Locality</b>	LAWRENCE	<b>Easting</b>	50925
<b>Shire Council</b>	CLARENCE VALLEY	<b>Northing</b>	73564
<b>Parish</b>	SOUTHGATE	<b>County</b>	CLARENCE

### Dip site status

**IMPORTANT NOTE:** Cattle dip site information provided by NSW DPI is based on our own hard copy files representing currently known data. NSW DPI is not a public consent authority for the development of land containing cattle dip sites. It is possible that the physical conditions of a cattle dip site - including soil, structures, access and usage - may have been changed due to extreme natural events or landowner and developer actions that NSW DPI cannot be aware of. For more specific and accurate status information a physical inspection should be made and enquiries should always be directed to the appropriate Shire Council.

<b>Dip Status</b>	DECOMMISSION	<b>Licence/Lease Status</b>	LAPSED
<b>Land type</b>	LEASE	<b>Licence/Lease Expiry Date</b>	10/08/1989

[Explanation of status terms](#)

### Chemical Details

**IMPORTANT NOTE:** Chemical history has been retrieved from a copied laboratory log. In some cases it may be confirmed by entries in the hard copy lease folder but generally the chemical record is based on this single lab document. It is possible that there are inaccuracies as well as errors made.

Chemicals used in dip bath	Date first used
ARSENIC	6/38
DDT	1/60

### Current Details

<b>Current Chemical</b>	NONE
<b>Dip bath status/contents</b>	CAPPED

[New search](#) | [Back](#)

The information contained in this web page is based on knowledge and understanding at the time of writing. However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of Industry & Investment NSW or the user's independent adviser.

## Cattle dip site locator

### Dip site location

<b>Dipname</b>	LITTLE BROADWATER	<i>Note: Map references are for 25,000 series topographic and co-ordinates are in AGD66 AMG zone 56.</i>	
<b>Road</b>	SPORTSMAN CREEK ROAD	<b>Mapsheets</b>	9539-III-S
<b>Town/Locality</b>	LAWRENCE	<b>Easting</b>	50717
<b>Shire Council</b>	CLARENCE VALLEY	<b>Northing</b>	73731
<b>Parish</b>	SOUTHGATE	<b>County</b>	CLARENCE

### Dip site status

**IMPORTANT NOTE:** Cattle dip site information provided by NSW DPI is based on our own hard copy files representing currently known data. NSW DPI is not a public consent authority for the development of land containing cattle dip sites. It is possible that the physical conditions of a cattle dip site - including soil, structures, access and usage - may have been changed due to extreme natural events or landowner and developer actions that NSW DPI cannot be aware of. For more specific and accurate status information a physical inspection should be made and enquiries should always be directed to the appropriate Shire Council.

<b>Dip Status</b>	DECOMMISSION	<b>Licence/Lease Status</b>	LAPSED
<b>Land type</b>	LEASE	<b>Licence/Lease Expiry Date</b>	31/05/1987

[Explanation of status terms](#)

### Chemical Details

**IMPORTANT NOTE:** Chemical history has been retrieved from a copied laboratory log. In some cases it may be confirmed by entries in the hard copy lease folder but generally the chemical record is based on this single lab document. It is possible that there are inaccuracies as well as errors made.

Chemicals used in dip bath	Date first used
ARSENIC	6/39
DDT	2/60
ETHION	11/65

### Current Details

<b>Current Chemical</b>	NONE
<b>Dip bath status/contents</b>	EMPTY

[New search](#) | [Back](#)

The information contained in this web page is based on knowledge and understanding at the time of writing. However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of Industry & Investment NSW or the user's independent adviser.

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## Cattle dip site locator

### Dip site location

<b>Dipname</b>	LAWRENCE	<i>Note: Map references are for 25,000 series topographic and co-ordinates are in AGD66 AMG zone 56.</i>	
<b>Road</b>	COOK STREET	<b>Mapsheet</b>	9539-III-S
<b>Town/Locality</b>	LAWRENCE	<b>Easting</b>	50941
<b>Shire Council</b>	CLARENCE VALLEY	<b>Northing</b>	73735
<b>Parish</b>	LAWRENCE	<b>County</b>	CLARENCE

### Dip site status

**IMPORTANT NOTE:** Cattle dip site information provided by NSW DPI is based on our own hard copy files representing currently known data. NSW DPI is not a public consent authority for the development of land containing cattle dip sites. It is possible that the physical conditions of a cattle dip site - including soil, structures, access and usage - may have been changed due to extreme natural events or landowner and developer actions that NSW DPI cannot be aware of. For more specific and accurate status information a physical inspection should be made and enquiries should always be directed to the appropriate Shire Council.

<b>Dip Status</b>	DEMOLISHED	<b>Licence/Lease Status</b>	LAPSED
<b>Land type</b>	LEASE	<b>Licence/Lease Expiry Date</b>	

[Explanation of status terms](#)

### Chemical Details

**IMPORTANT NOTE:** Chemical history has been retrieved from a copied laboratory log. In some cases it may be confirmed by entries in the hard copy lease folder but generally the chemical record is based on this single lab document. It is possible that there are inaccuracies as well as errors made.

Chemicals used in dip bath	Date first used
ARSENIC	8/59
DDT	11/60
ETHION	12/66

### Current Details

<b>Current Chemical</b>	NONE
<b>Dip bath status/contents</b>	COVER

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## Cattle dip site locator

This search retrieved 10 dip sites.

for more information about each dip site, click on the name below.

Dip name	Road	Town/Locality	Council
<a href="#">BARNIERS</a>	ROUND MOUNTAIN ROAD	LAWRENCE	CLARENCE VALLEY
<a href="#">ELLISAME</a>	LAWRENCE ROAD	LAWRENCE	CLARENCE VALLEY
<a href="#">EXCELSIOR</a>	"LAWRENCE DOWNS"	LAWRENCE	CLARENCE VALLEY
<a href="#">HARRISONS</a>	ROUND MOUNTAIN ROAD	LAWRENCE	CLARENCE VALLEY
<a href="#">KINGS CREEK</a>	KINGS CREEK ROAD	LAWRENCE	CLARENCE VALLEY
<a href="#">LAWRENCE</a>	COOK STREET	LAWRENCE	CLARENCE VALLEY
<a href="#">LAWRENCE DOWNS</a>	LAWRENCE ROAD	LAWRENCE	CLARENCE VALLEY
<a href="#">LITTLE BROADWATER</a>	SPORTSMAN CREEK ROAD	LAWRENCE	CLARENCE VALLEY
<a href="#">MCPHEES</a>	LAWRENCE ROAD	LAWRENCE	CLARENCE VALLEY
<a href="#">WHALANS</a>	MANTONS ROAD	LAWRENCE	CLARENCE VALLEY

### Find dip sites

Dip name	<input type="text"/>
Road	<input type="text"/>
Town/Locality	<input type="text" value="lawrence"/>
Council	<input type="text" value="CLARENCE VALLEY"/>

The information contained in this web page is based on knowledge and understanding at the time of writing. However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of Industry& Investment NSW or the user's independent adviser.





You are here: [Home](#) > [Environment protection licences](#) > [POEO Public Register](#) > [Search for licences, applications and notices](#)

## Search results

Your search for: **General Search** with the following criteria

**Suburb** - lawrence

returned 1 results

[Export to excel](#)

1 of 1 Pages

[Search Again](#)

<u>Number</u>	<u>Name</u>	<u>Location</u>	<u>Type</u>	<u>Status</u>	<u>Issued date</u>
<a href="#">1507626</a>	CLARENCE VALLEY COUNCIL	58 High Street, LAWRENCE, NSW 2460	s.92 Clean Up Notice	Issued	27 Aug 2012

28 June 2013



You are here: [Home](#) > [Contaminated land](#) > [Record of notices](#)

## Search results

Your search for: LGA: Clarence Valley Council

Matched 7 notices  
relating to 2 sites.

[Search Again](#)

[Refine Search](#)

Suburb	Address	Site Name	Notices related to this site
Ashby	Clarence Street	<a href="#">Ashby Dry Dock</a>	1 former
Koolkhan	Casino Road	<a href="#">Koolkhan Power Station</a>	6 former

Page 1 of 1

24 June 2013

# Clean-Up Notice

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CLARENCE VALLEY COUNCIL

ABN 85 864 095 684

LOCKED BAG 23

GRAFTON NSW 2460

Attention: Greg Meshiah

Notice Number      1507626  
File Number        FIL11/9313  
Date                 27-Aug-2012

## NOTICE OF CLEAN-UP ACTION

### BACKGROUND

- A. The Environment Protection Authority ("EPA") is responsible for the administration and enforcement of the *Protection of the Environment Operations Act 1997* ("POEO Act").
- B. Clarence Valley Council owns, operates and maintains the Lawrence Water supply reservoir located in High Street Lawrence.
- C. Masen Enterprises Pty Ltd was contracted by Council to undertake abrasive surface blasting of the water reservoir to remove past layers of paint in preparation for re-surfacing.
- D. Mr Keith Parkinson owns and occupies a residence at 58 High Street Lawrence. The Lawrence water reservoir immediately neighbours Mr Parkinson's residence, on the Northern side of the property.
- E. On the 7 May 2011 Masen Enterprises undertook the abrasive surface blasting of the water reservoir.
- F. On the 18 July 2011 the EPA 'EnviroLine' service received a report from Mr Parkinson alleging that the abrasive surface blasting of Council's water reservoir had resulted in dust impacts to his property which may have contained lead based paint. Mr Parkinson advised that he had initially attempted to resolve his concerns directly with Council.
- G. Advice obtained from Council on the 18 July 2011 indicated that lead based paint was not considered in planning the abrasive surface blasting of the water reservoir.
- H. Council subsequently engaged Cavvanba Consulting, a contaminated land consultancy, to undertake a contamination investigation of the Parkinson property. A final draft Investigation Report was provided by the consultant to Council and the EPA on 9 August 2011.
- I. The above Cavvanba Investigation Report concluded that the abrasive blasting dust plume affected the Parkinson property, with lead levels in some surface soil samples above the sensitive land-use health investigation level criterion of 300mg/kg (primary schools and residential).
- J. Given the need to identify the accurate depth of lead contamination affecting the Parkinson property, Cavvanba Consulting conducted further additional sub-surface soil investigations. Cavvanba

# Clean-Up Notice

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subsequently provided Council and the EPA with a report dated 23 January 2012 detailing the findings of the additional sub-surface sampling.

- K. The report referred to at J above confirmed that there was lead contamination above the HIL of 300mg/kg through sub-surface soil layers to depths of approximately 25cm.
- L. Given Mr Parkinson is an innocent party in the events detailed above, he has requested that his land be remediated to render it fit for residential use and to remove any need for the land title to be subject to a contaminated land notation under s.149 of the Environmental Planning and Assessment Act.
- M. You may recover the reasonable costs and expenses incurred by you in connection with the clean-up action directed in this notice from either the occupier of the premises at or from which the authority reasonably suspects the pollution incident occurred, or the person who is reasonably suspected by the authority of having caused the pollution incident.

## **DIRECTION TO TAKE CLEAN-UP ACTION**

The Environment Protection Authority (the EPA) directs CLARENCE VALLEY COUNCIL under s 92(1) of the POEO Act to take the following clean-up action:

1. To commence remediation works at the Parkinson residential property located at 58 High Street Lawrence no later than 10 days from the date of this notice.
2. The remediation works to the Parkinson property must be carried out to reduce the lead contamination levels identified by Cavvanba Consulting to below the 300mg/kg sensitive land-use health investigation trigger level and to ensure the property is rendered fit for residential use and any need for the land title to be subject to a contaminated land notation under s.149 of the Environmental Planning and Assessment Act is negated.
3. A Remediation Action Plan (RAP) that achieves the requirements detailed at 2 above is to be prepared and finalised by a suitably qualified and accredited contaminated land consultant engaged by Council.
4. The RAP referred to at 3 above is to be finalised to the satisfaction of the EPA no later than COB 7 September 2012.
5. The remediation works are to be completed in accordance with the RAP no later than COB 19 October 2012.
6. Within 1 month of completing the remediation works to the Parkinson property Council's consultant is to submit a Remediation Report to the EPA.
7. The Remediation Report is to include complete details of the remediation works, including but not limited to:
  - Confirmation of reduced lead levels;
  - Volume of material removed from the property;
  - Receipted volumes disposed of to an appropriate waste facility;
  - Works start and finish dates;
  - Confirmation from Mr Parkinson that he is satisfied with the remediation outcome; and
  - Sign-off by an Contaminated Land Management Act accredited site auditor.

## **FEE TO BE PAID**

# Clean-Up Notice

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- You are required by law to pay a fee of \$455 for the administrative costs of issuing this notice.
- It is an offence not to pay this fee. However you can apply for an extension of time to pay the fee or for the fee to be waived. At the end of this notice there is information about how and when to pay the fee and how to apply for an extension or a waiver of the fee.

.....  
**Graeme Budd**  
**Head Environmental Management Unit**  
**North East - North Coast**  
(by Delegation)

## INFORMATION ABOUT THIS CLEAN-UP NOTICE

- This notice is issued under section 92 of the Protection of the Environment Operations Act 1997.

### Cost recovery from the person who caused the incident

- If you comply with this clean-up notice but you are not the person who caused the pollution incident to which the notice relates, you have a right to go to court to recover your costs of complying with the notice from the person who caused the incident.

### Deadline for paying the fee

- The fee must be paid by **no later than 30 days after the date of this notice**, unless the EPA extends the time to pay the fee, or waives the fee.

### How to pay the fee

- Possible methods of payment are listed on the last page of the attached invoice/statement.
- Please include the payment slip from the attached invoice/statement with your payment.

### How to apply for an extension of time to pay/waive the fee

- Any application for and extension of time to pay the fee or for the fee to be waived should be made in writing to the EPA. The application should set out clearly why you think your application should be granted.

### Other costs

- The POEO Act allows the EPA to recover from you reasonable costs and expenses it incurs in monitoring action taken under this notice, ensuring the notice is complied with and associated matters. (If you are going to be required to pay these costs and expenses you will later be sent a separate notice called a "Notice Requiring Payment of Reasonable Costs and Expenses").

### Continuing obligation

- Under section 319A of the POEO Act, your obligation to comply with the requirements of this notice

# Clean-Up Notice

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continues until the notice is complied with, even if the due date for compliance has passed.

## **Variation of this notice**

- This notice may only be varied by subsequent notices issued by the EPA.



# **APPENDIX C**

## **Site Photography**





## SPORTSMANS CREEK NEW BRIDGE - GEOTECHNICAL AND ENVIRONMENTAL DESK STUDY



Photo 1: Looking north along Grafton Street showing light duty pavement construction.



Photo 2: View at southern approach pavement/embankment showing evidence of settlement of the approach embankment.





Photo 3: Dry-stone wall at northern abutment showing inferred settlement induced cracking.



Photo 4: Upstream at existing bridge, looking north west showing recent river bank instability/erosion.





Photo 5: View to west from Bridge Street, showing standing water in background of western study area.



# **APPENDIX D**

## **Limitations**



## LIMITATIONS

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