GEMTEC
Consulting Engineers and Scientists

GEMTEC Limited
191 Doak Road
Fredericton, NB
E3C 2E6

tel: 506.453.1025
fax: 506.453.9470
fredericton@gemtec.ca
www.gemtec.ca

28 March 2017

File: 6990.01 – R01

Department of Environment and Local Government
Environmental Assessment Section
P.O. Box 6000
Fredericton, New Brunswick
E3B 5H1

Attention: Ms. Crystale Harty, Project Manager

Re: Water Supply Source Assessment Initial Application – Oak Point Campground
187 Oak Point Road, Oak Point, New Brunswick

Mr. Kevin Burchill has retained GEMTEC Limited (GEMTEC) to conduct an Environmental Impact Assessment (EIA) including a Water Supply Source Assessment (WSSA) for the existing Oak Point Family Campground located at 187 Oak Point Road, in Oak Point, New Brunswick (PID 40245268) (herein referred to as the "Site").

This document represents the Initial Application for the WSSA. The EIA will be provided under separate cover in early April 2017. The information, as required by the New Brunswick Department of Environment and Local Government (NBDELG), is presented below. The Site location and existing conditions are presented in Figure 1, Appendix A.

1.0 Name of Proponent

Mr. Kevin Burchill.

2.0 Location of Groundwater Wells

Currently, there are three potable groundwater wells present on the Site (Figure 1, Appendix A). Two of the wells are currently connected to the existing underground plumbing infrastructure to provide potable water to the campground operations. The third well was drilled but never connected to the underground plumbing infrastructure and has never been used to provide

potable water to the campground operations. GEMTEC is proposing that the Proponent utilize the three existing wells for the WSSA, with concurrent 48-hour constant rate pumping tests to be completed for the two operational wells. GEMTEC proposes to use the third well as an observation well during the pumping tests. This proposed approach was discussed on December 7, 2016 at the NBDELG office at Marysville Place and agreed to by the NBDELG hydrogeologist Ms. Mallory Gillis.

The purpose of the proposed WSSA is to demonstrate that there is potable water of sufficient quantity and quality to support the 108 campsites at the existing campground and to fulfill the WSSA requirement of the EIA.

3.0 Required Water Quantity

There are currently no provincial guidelines for water requirements at campgrounds. In the absence of New Brunswick guidelines, water requirements for campgrounds from the Ontario Ministry of Environment (OMOE) were used. According to Table 3-2 in the Design Guidelines for Drinking Water Systems (OMOE, 2008), the daily average water use for campgrounds is 225 to 570 litres (L) per campsite day. Based on the size of the existing campground (108 lots), it was assumed that the daily water requirement for the campground would be on the lower end of the OMOE range at approximately 275 L / day per campsite. Therefore, for the existing 108 campsites, the total daily water requirement is 29,700 L / day. To account for additional water usage from public washrooms, showers and the office building, an additional water requirement of 5,000 L / day is conservatively assumed, for a total water demand of 34,700 L / day (equivalent rate of 5.3 imperial gallons per minute (igpm)).

4.0 Alternate Water Supply Sources in Area

The proposed campground is not located within a Watershed or Wellfield Protected Area. There are no alternate water supply sources in the area. Municipal potable water infrastructure is not present in the area. No known viable potable surface water sources are available in the immediate area.

5.0 Project Hydrogeology

Surficial geology mapping indicates that the project area is covered with a blanket and plain(s) of Late Wisconsinan and / or Early Holocene age marine sediments. The marine sediments consist of sand, silt, some gravel and clay; generally 0.5 metres to 3 metres thick. Marine sediments in this area were deposited in shallow marine waters, which submerged coastal areas and sections of many valleys during and following the Late Wisconsinan deglaciation (Rampton, 1984).

Bedrock geology mapping indicates that the area is underlain by Late Carboniferous sedimentary rocks consisting of medium to fine-grained, terrestrial, clastic rock of the Pictou Group (Minto Formation) (Smith, E.A. 2005).

The surficial and bedrock geology described in the NBDELG Online Well Log System (OWLS) for a search area of 500 m from the Site PID (40245268), indicates that the bedrock in the area is predominately sandstone, overlain by clay and shale. Based on 11 well logs within the search area, the depth to bedrock ranges from 1.2 to 23.2 metres below ground surface (mbgs), with an average depth of 8.6 mbgs (OWLS, 2017). Initial water levels recorded by the well drillers ranged from 0.6 to 4.6 mbgs. The estimated safe yield of these wells ranges from 46 to 364 igpm, with an average safe yield of 88 igpm.

The area naturally slopes gently to the east / southeast towards Miramichi Bay, which adjoins the Site to the south. Local topography was observed to be relatively flat throughout the campground area with a slight sloping of the property to the east / southwest towards Miramichi Bay. It is expected that surface water will infiltrate previous surfaces or flow via overland towards this Miramichi Bay.

6.0 Proposed Hydrogeological Testing and Work Schedule

The site contains a total of 108 serviced (potable water and electricity) camper / trailer sites, four storage buildings, a pool, gardens, and recreational areas (volley ball court and playgrounds). No proposed modifications nor expansions are planned for the site. Concurrent step drawdown tests (step tests) will be completed prior to proceeding to the constant rate pumping tests. The step tests will be used to determine an appropriate pumping rate for the concurrent 48-hour constant rate pumping test.

Concurrent 48-hour constant rate pumping tests will be completed at two of the three existing wells. The two wells (Well #1 and Well #2) currently utilized for potable water on the Site will be pump tested (Figure 1). The remaining well (Well #3) will be used as observation well during the pumping test. The Proponent will retain a qualified potable well driller to complete the pumping test.

To allow for the campground to open in time for the 2017 season, the concurrent pumping tests will be completed the first week of April 2017 or the end of May 2017 (dependant on weather conditions). Pumping tests are typically not completed in the spring when water levels are high; however, as the campground has been operating with these pumping wells throughout the summer months for approximately 18 years and no water quality or quantity issues have been identified, the pumping test is proposed for the spring of 2017. If temperatures remain below zero for the first week of April, the test will be completed then. Otherwise, the test will be completed in mid to late May 2017. The pumping tests will not be completed within 10 days of 40 mm of rain.

7.0 Existing Pollution / Contamination Hazards

The Site and surrounding area have historically been used as cleared farmland or wooded land (to the north of the Site). A review of Service New Brunswick (SNB) Land Gazette information

indicates that no existing pollution or contamination hazards have been identified within 500 metres of the site.

8.0 Groundwater Use Problems

Potable wells have been drilled and utilized on the Site and in residential properties to the east and west of the Site. The well logs for the three on-site wells are presented in Appendix B. The proponent has been operating the campground for a period of 18 years and has not reported any water quantity or quality problems. GEMTEC is not aware of any groundwater quality or quantity issues in the neighbouring residential properties in the area.

A search of the NBDELG Online Well Log System (OWLS) revealed eight water quality results within 500 metres of the Site PID (40245268). Exceedances of iron, manganese and total coliforms above the Canadian Drinking Water Quality Guidelines (CDWQGs; Health Canada, 2017) were noted in three or more of the water quality results (OWLS, 2017).

9.0 Watercourses / Wetlands

According to Service New Brunswick (GeoNB), no mapped watercourses are present within 60 metres of the existing three groundwater supply wells (Well #1 to Well #3). However, two unmapped, regulated watercourses are present on the Site (Figure 1):

- A drainage ditch originates along the northwestern portion of the site and flows southeast through a wooded area between camper / trailers, approximately 20 metres west of Well #2. The ditch flows under two driveways via plastic corrugated culverts, then flows along the southwestern boundary of the property. The vegetated ditch eventually discharges into the roadside ditching along Oak Point Road.
- A man-made drainage ditch adjoins the northeastern boundary of the site and flows in a southeastern direction along the property line, eventually joining a watercourse that enters the site from the east. The flow of water continues south / southeast through the southeastern portion of the site approximately 5 metres from Well #3.

The Miramichi Bay is located 170 metres, 315 metres, and 140 metres east of Well #1, Well #2 and Well #3, respectively. An unmapped, unregulated wetland area is present in the northwestern portion of the property, approximately 60 metres west of Well #2 (Figure 1, Appendix A).

10.0 Project Personnel

GEMTEC Limited Hydrogeologist: Abigail Garnett, M.Sc.Eng., P.Eng.

11.0 Attach a 1:10 000 map and / or recent air photo

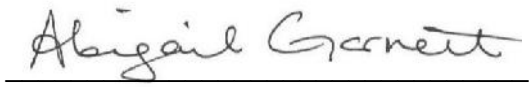
The attached map shows the location of all three existing groundwater supply wells (Well #1, Well #2 and Well#3) in the Project area. Domestic wells within 500 m of the center of the Project area are also shown on the attached Figure. As indicated in Section 7.0 of this application, there are no nearby potential hazards.

12.0 Attach a land use / zoning map of the area

The Zoning map of the area is not available. The SNB Property Assessment Number (PAN) Information Report indicates that the property type is currently recognized as “Recreational – Privately Improved Properties” and is described as a “Summer Home & Land, Park”.

13.0 Closure

If you have any comments or questions on the content of this letter, please do not hesitate to contact the undersigned.



Abigail Garnett, M.Sc.Eng., P.Eng.
Manager Environmental Services – Atlantic
Senior Environmental Engineer / Hydrogeologist

Attachments:

Appendix A - Figure 1 Site Location Plan
Appendix B – Well Logs

Cc: Mallory Gillis, Hydrogeologist, Water and Wastewater Management Section, NBDELG

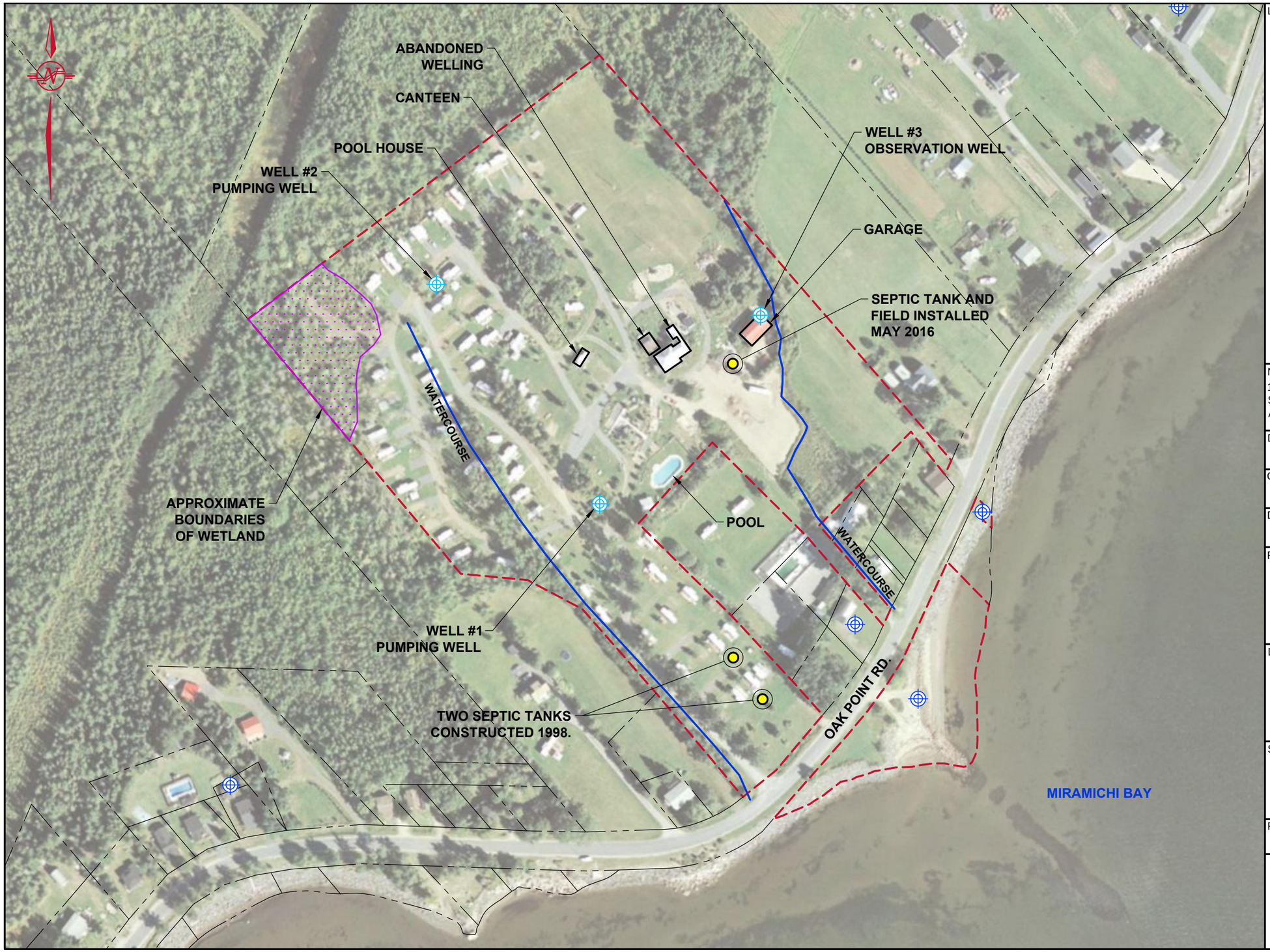
14.0 References:

Rampton, V.N. 1984. Generalized surficial geology map of New Brunswick Department of Natural Resources and Energy, Minerals, Policy and Planning Division, NR-8 (scale 1: 500 000).

New Brunswick Department of Environment (NBDE). Online Well Log System. <http://app.elg-egl.gnb.ca/0375-0001/>. Accessed: March, 2017.

Appendix A

Figures



Legend

- CAMPGROUND POTABLE WELL
- POTABLE WELL
- SEPTIC TANK
- PROPERTY LINE
- SITE
- WATERCOURSE
- UNDERGROUND LINE

Note

1. THIS DRAWING IS A SCHEMATIC REPRESENTATION. SIZES, LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

Drawn By	Checked By
CHG	JH
Calculations By	**Checked By**
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Date: FEBRUARY 2017

Project: WATER SUPPLY SOURCE ASSESSMENT
OAK POINT FAMILY CAMPGROUND
MIRAMICHI, NB

Drawing: SITE CONDITIONS

Scale: 1:2000

0 40 80 120m

File No.	Drawing	Revision No.
69900101	FIGURE 1	0

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Appendix B

Well Logs

New Nouveau Brunswick

Well Driller's Report

Environment and Local Government

Report Number **12193**
Well Tag ID **0035409**
PID **40245268**
Latitude **N/A**
Longitude **N/A**

Date printed **02-Sep-2016**

Well Owner(s)

Kevin & William Burchill

Address **202 Edward Street**
Miramichi, NB
E1V 2Y6

Telephone Nbr **(506) -**
Fax Nbr **(506) -**

Well Location **187 Shore Road, Oak Point, Kings Co., NB,**

Drilled by **JAMES E. MURRAY WELL DRILLING, Lic 213 (JAMES MURRAY, Lic. 34)**

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	**New Well**	**Cable Tool**	**05-Jun-2006**

Casing Information

Casing above ground **1ft 6in** Drive Shoe Used? **Yes**

Well Log	Casing Type	Diameter	From	To	Slotted?
12193	Steel	5 inch (5.in)	0ft	30ft	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Bailer	**8ft**	**10.0 igpm**	**1hr**	**8ft**	**10.0 igpm**	**No**	**0.0 igpm**
	(BTC - Below top of casing)						

Well Grouting

There is no Grout information.

Drilling Fluids Used
None

Disinfectant
Bleach (Javex)
Qty **0.0** igal

Pump Installed
N/A
Intake Setting (BTC)
30ft

Driller's Log

Well Log	From	To	Colour	Rock Type
12193	0ft	2ft	Brown	Topsoil
12193	2ft	26ft	Red	Clay
12193	26ft	66ft	Grey	Sandstone

Overall Well Depth
66ft

Bedrock Level
0ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
12193	45ft	3.0 igpm
12193	62ft	10.0 igpm

Setbacks

Well Log Id	Distance	Setback from
12193	50ft	Septic Tank
12193	75ft	Leach Field

Sample Information

There is no related sample information.

The information shown was entered using the Groundwater Information Management System (GWIMS)

New Nouveau Brunswick

Well Driller's Report

Environment and Local Government

Report Number **14601**
Well Tag ID **0037532**
PID **40245268**
Latitude **N/A**
Longitude **N/A**

Date printed **02-Sep-2016**

Well Owner(s)

Kevin Burchill

Address **187 Shore Road**
Oak Point, Northumb, NB
E1V 1K5

Telephone Nbr **(506) -**
Fax Nbr **(506) -**

Well Location **187 Shore Road, Oak Point, Northumb, NB,**

Drilled by **JAMES E. MURRAY WELL DRILLING, Lic 213 (JAMES MURRAY, Lic. 34)**

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	**New Well**	**Cable Tool**	**08-Jun-2008**

Casing Information

Casing above ground **2ft** Drive Shoe Used? **Yes**

Well Log	Casing Type	Diameter	From	To	Slotted?
14601	Steel	5 inch (5.in)	0ft	32ft	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated	Flowing Well?	Rate
Bailer	**6ft**	**10.0 igpm**	**0hr**	**6ft**	**10.0 igpm**	**No**	**0.0 igpm**

(BTC - Below top of casing)

Well Grouting

There is no Grout information.

Drilling Fluids Used
None

Disinfectant
Bleach (Javex)
Qty **0.0** igal

Pump Installed
N/A
Intake Setting (BTC)
40ft

Driller's Log

Well Log	From	To	Colour	Rock Type
14601	0ft	2ft	Brown	Soil
14601	2ft	8ft	Brown	Clay
14601	8ft	24ft	Grey	Slate
14601	24ft	29ft	Grey	Sandstone
14601	29ft	64ft	Grey	Sandstone
14601	64ft	76ft	Brown	Sandstone

Overall Well Depth
76ft

Bedrock Level
0ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
14601	64ft	2.0 igpm
14601	76ft	10.0 igpm

Setbacks

Well Log Id	Distance	Setback from
14601	50ft	Septic Tank
14601	75ft	Leach Field

Sample Information

There is no related sample information.

The information shown was entered using the Groundwater Information Management System (GWIMS)

New Nouveau Brunswick

Environment and Local Government

Well Driller's Report

Report Number **91499400**
Well Tag ID **0014994**
PID **40245268**
Latitude **N/A**
Longitude **N/A**

Date printed **02-Sep-2016**

Well Owner(s)

Kevin & William Burchill

Address **202 Edward Street**
Miramichi, NB
E1V 2Y6

Telephone Nbr **(0) -**
Fax Nbr **(0) -**

Well Location **187 Shore Road, Oak Point, Northumb, NB,**

Drilled by **JAMES E. MURRAY WELL DRILLING, Lic 213**

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	**New Well (NEW WELL)**	**Cable Tool (CABLE TOOL)**	**16-Jun-1999**

Casing Information

Casing above ground **2ft** Drive Shoe Used? **Yes**

Well Log	Casing Type	Diameter	From	To	Slotted?
91499400	Steel	5 inch (5.in)	0ft	32ft	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)		Flowing Well?	Rate
Bailer	**15ft**	**10.0 igpm**	**1hr**	**12ft**	**10.0 igpm**	**No**	**0.0 igpm**

(BTC - Below top of casing)

Well Grouting

Well Log	Grout Type	From	To
91499400	Clay(cuttings)	0ft	32ft

Drilling Fluids Used
None

Disinfectant
Bleach (Javex)
Qty **0.5** igal

Pump Installed
N/A
Intake Setting (BTC)
70ft

Driller's Log

Well Log	From	To	Colour	Rock Type
91499400	0ft	2ft	Brown	Topsoil
91499400	2ft	8ft	Red	Clay
91499400	8ft	15ft	Brown	Sandstone
91499400	15ft	24ft	Brown	Clay
91499400	24ft	30ft	Brown	Sandstone
91499400	30ft	70ft	Grey	Sandstone
91499400	70ft	84ft	Brown	Sandstone
91499400	84ft	90ft	Brown	Slate

Overall Well Depth
90ft

Bedrock Level
24ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
91499400	40ft	3.0 igpm
91499400	84ft	10.0 igpm

Setbacks

There is no Setback information.

Sample Information

LIMS ID	Sample Date
199912483	13-Oct-1999
29912483	13-Oct-1999

The information shown was converted from a prior version of the Well Log software. (not GWIMS)

Driller's Comments

Well Log Record created by Conversion on November 23, 2002.