GOVERNMENT OF YUKON- PROPERTY MANAGEMENT AGENCY

WELL COMPLETION REPORT
NELNAH BESSIE JOHN SCHOOL
BUILDING # 3100
BEAVER CREEK
YUKON

EBA FILE: 1260028

February 2007

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1.0 INTRODUCTION

EBA Engineering Consultants Ltd. (EBA) was retained by Government of Yukon (YTG) Property Management Agency (PMA) to co-ordinate the drilling, construction and testing of a new water supply well at Nelnah Bessie John School, Beaver Creek, Yukon (Beaver Creek School). The site location is shown in Figure 1. The Beaver Creek School's (Building # 3100) water system is currently supplied by a 21.6 m deep well (Well 3100-A) located in a pit below grade approximately 2 m north of the School. An evaluation of the well and water system completed by EBA in March 2006 titled "Small Water System Assessments- Government of Yukon Maintained Buildings- Western Region" found several high risk deficiencies with the system including poor surface completion of the well and several potential contaminant sources within 30 m of the wellhead. EBA provided several remedial options to mitigate risk associated with these deficiencies. The remedial option selected by PMA was to drill and commission a new well. EBA was authorized to coordinate the well drilling and testing program under the terms of YTG contract GN655651940319 dated October 31, 2006. The intent is to decommission Well 3100-A and Well-B, and commission the new well, Well 3100-C.

1.1 SCOPE OF WORK

The following tasks were completed as part of the above mentioned contract and in accordance with EBA's proposal dated September 6, 2006:

- Development of specifications and selection of drilling location;
- Arranging for qualified drilling and pumping test contractors;
- Co-ordinating and supervising drilling, well construction and pumping tests; and
- Preparation of this well completion report.

2.0 FIELD PROGRAM

2.1 SITE RECONNAISSANCE AND WELL LOCATION

A site reconnaissance was completed by Jennifer Kelly of EBA, on October 15, 2006. The purpose of the site visit was to select the optimal drilling location in consideration of the following:

- Potential for encountering sufficient yields and acceptable water quality;
- Proximity to potential contaminant sources and wellhead protection;

- Proximity to existing infrastructure; and
- Future development plans for the area.

The Yukon Department of Health and Social Services has outlined, in the *Draft Guidelines for Part III – Small Public Drinking Water Systems* (Government of Yukon, 2005), appropriate well construction methods for the insurance of wellhead protection. In accordance with the draft guidelines, well construction shall meet or exceed the criteria outlined in the Canadian Groundwater Association's (CGWA) Water Well Construction Guidelines. Well construction location, unless a comprehensive hydrogeological study determines otherwise, must ensure that the drinking water well is located a minimum distance of:

- 15 m from a septic tank, sewage holding tank or contained privy;
- 30 m from a soil absorption system, pit privy, or other potential sources of pollution that may pose a health and safety risk;
- 120 m from a solid waste site or dump, and cemetery; and
- 300 m from a sewage lagoon or pit.

The location of Well 3100-C shown on Figure 2 was selected based on all of the above criteria.

2.2 WELL DRILLING AND CONSTRUCTION

The well drilling and testing contract was awarded to Double D Drilling of Terrace, BC on September 21, 2006. Drilling of Well 3100-C commenced on October 16, 2006 and completed on October 17, 2006. Testing took place between October 21 and 22, 2006.

Well 3100-C was drilled using the dual air rotary drilling method. Samples were retained continuously during drilling. A summary of soils encountered and observations made during drilling is included on the Well Log 3100-C in Figure 3 and Double D's Drilling Log in Appendix A.

Near surface soils consisted of a thin fill layer of approximately half a meter in thickness. Underling this was a sandy, gravel unit to a depth of 3.7 meters below ground (m-bg). The unit progressed from sandy, gravel to a sand and gravel water-bearing aquifer unit intermitted with silty sand lenses. This unit extended to the maximum depth of the borehole, at 28.9 m-bg. A screen was designed based on the grain size analysis of the sand material and installed between 27.7 and 28.9 m-bg. The screen was developed by lifting and surging with air for 8 hours. A summary of relevant well construction details is included on Table 1 on the following page.

TABLE 1: SUMMARY OF WELL INFORMATION AND CONSTRUCTION DETAILS	
REQUIRED DETAILS	DETAILS OR REPORT REFERENCE
Date of construction:	From October 16th to 17th, 2006.
Name and address of the owner of the well:	Government of Yukon- Department of Education – Public Schools Branch – Box 2703, Whitehorse, Yukon, Y1A 2C6
Description of the property:	Nelnah Bessie John School, km 1933 Alaska Highway, Beaver Creek, Yukon
UTM Co-ordinates(± 8 m):	UTM Zone 7 E 506098 N 6916860
Location of the well on the property:	See Figure 2.
Method of construction:	Drilled using the dual air rotary drilling method.
Description, depth and thickness of geologic materials encountered during construction:	See Figure 3 Well log 3100-C. Double D Drilling Log is also included in Appendix A.
Depth and diameter of the well:	The well construction details are provided on Well Log 3100-C in Figure 3 and drillers log in Appendix A. Total depth of well completion is 28.9 m-bg.
Type of casing materials and thickness:	Steel Casing – 0.250 inches (6.35 mm) thick.
Static water level:	12.12 m-bg
Type, size, length and location of screen:	Stainless steel V-wire 60 slot (0.060") Johnson screen. Total screen length is 1.2 m., set between 27.7 m and 28.9 m-bg.
Location of major water-bearing zones:	Water bearing sand zone from 25.9 to 28.9 m-bg.
Location, type and thickness of grout sealant placed around the well:	Bentonite seal was placed between annulus of the casing and native sand and gravel. Seal is completed from grade to 6.0 m-bg.

2.3 WELL AND AQUIFER TESTING

A temporary submersible pump was installed in the well at a depth of 27.7 m–bg. Flow was monitored during the pumping test with a totalizer and flow meter located near the wellhead, and checked using a graduated barrel and stopwatch. Water from the pumping well was conveyed to a location 30.5 m away from the well and disposed of by infiltration.

A step rate test was first conducted to determine the optimal rate at which to perform the constant rate pumping test. The step rate test was initiated on October 21, 2006 at 7:00 AM. Three 60 min steps were completed at rates of 1.5, 3.0 and 5.8 L/s (20, 40, 75 IGPM, respectively). Based on the step rate test, a rate of 3.8 L/s (50 IGPM) was chosen for the 24 hours constant rate test.

The constant rate pumping test was initiated on October 21, 2006 at 11:00 AM. The water level and flow rate were monitored on specified intervals during the constant rate pumping test. The constant rate pumping test was concluded at 11:00 AM on October 22, 2006, and recovery was monitored for 2 hours following termination of pumping. Data collected during the step test, constant rate test and recovery interval is included as Appendix C.

2.4 WATER QUALITY ANALYSIS

Water samples were collected from a sample port located at the wellhead at the end of the constant rate pumping test. Samples were collected in laboratory supplied sample containers in accordance with laboratory sampling procedures. Samples were shipped by air cargo to ALS Environmental in Vancouver, B.C. for detailed potability analysis; including the following parameters: physical tests, dissolved anions, nutrients, total metals, and total organic carbon. ALS is an accredited member of the Canadian Association of Environmental Analytical Laboratories (CAEAL).

Analytical results are summarized in Table 4, attached. Laboratory reports and certificates are included as Appendix D.

3.0 HYDRAULIC TESTING RESULTS

3.1 PUMPING TEST

Step Test

A plot of observed drawdown in Well 3100-C during the step rate pumping test is included as the upper graph in Figure 4. The lower graph details specific capacity and drawdown verses pumping rate observed at 60 min into each step. As the flow rate increased from 1.54 to 5.8 L/s, the specific capacity decreased from 1.5 to 0.6 L/s/m.

Constant Rate Test

Drawdown observed in Well 3100-C during the constant rate pumping test is plotted on Figure 5. To facilitate pumping test analysis, the drawdown data has been plotted against elapsed time (log) since the beginning of the constant rate pumping interval. Also included on Figure 5 is residual drawdown vs. the log of the residual time factor (t/t')[1] as observed during the recovery interval.

[1] t/t'= (time since pump started)/ (time since pump stopped)

The maximum drawdown observed during the constant rate pumping test was 5.2 m. As indicated on a plot of drawdown vs. log time (Figure 5) the steepening of the drawdown curve at approximately 500 minutes likely indicates that the expanding zone of depression encountered negative boundaries (i.e. less permeable sediments) where a change in slope is observed.

The plot of log t/t' verses residual drawdown during the recovery period illustrates instantaneous recovery; indicating some type of mechanical failure (such as a failing check valve) resulting in incorrect recovery data. Therefore, reference to the aquifers hydraulic properties are taken only from the pumping test data.

The observed drawdown was analyzed using the Cooper-Jacob straight-line method, which assumes the following:

- The aquifer is infinite in areal extent, and uniform in thickness;
- The aquifer is homogeneous and isotropic;
- The formation receives no recharge from any source;
- The pumping well fully penetrates the aquifer thickness, and pumps at a constant rate;
- The piezometric surface was horizontal prior to pumping;
- The pumping well is 100-percent efficient;
- Water is released instantaneously from storage with a decline in head;
- The well diameter is small such that well storage in negligible; and
- Flow is laminar

The straight line approximation was applied separately for the early, mid and late pumping intervals. Summarized in Table 2 are the transmissivity and hydraulic conductivity values calculated from the constant rate pumping test data. Also included in Table 2 is the hydraulic conductivity value calculated based on grain size analyses on the sample collected from 28.9 m. The Hazen formula was used to determine the hydraulic conductivity from the grain size analysis;

$$K\ (m/s) = d^2_{10} \times 10^{-2}$$

where d_{10} (in mm) represents the grain size at which 10% of the particles have passed through the sieve in the grain size analysis.

TABLE 2: AQUIFER TRANSMISSIVITY AND HYDRAULIC CONDUCTIVITY				
CONDUCTIVITY BASED ON PUMPING TEST RESULTS			CONDUCTIVITY BASED ON GRAIN SIZE ANALYSIS	
INTERVAL	T TRANSMISSIVITY	K CONDUCTIVITY	SAMPLE DEPTH	K CONDUCTIVITY
EARLY PUMPING (T_1,K_1)	182 m^2/day	1 x 10^{-4} m/s	28.9 m	**2 x 10^{-4} m/s**
MID PUMPING (T_2K_2)	**956 m^2/day**	**7 x 10^{-4} m/s**		
LATE PUMPING (T_3,K_3)	**430 m^2/day**	**3 x 10^{-4} m/s**		

Conductivity results shown in **bold** above (from the mid to late pumping) are more representative of aquifer characteristics than earlier interpretations (due to the effects of well casing storage). The conductivity results interpreted from the grain size analysis are similar to the conductivity results from the pumping test, therefore indicating a representative sample recovery of the aquifer material.

3.2 WELL CAPACITY

To calculate the safe yield of the well, the 100-day specific capacity was multiplied by the safe available drawdown. The 100-day specific capacity of the well (at a given pumping rate) is based on the projection of the constant rate drawdown to 100 days as shown on Figure 5. This conservatively assumes that Well 3100-C would be continuously pumped at the same rate for 100-days with no recharge to the aquifer. The safe available drawdown of the well is determined by applying a safety factor of 70% of the physical available drawdown after an allowance has been made for seasonal fluctuations in static water level. For a well completed in an unconfined aquifer (such as Well 3100-C), the water level should never be drawn below the top of the screen. The safe yield of a well can be limited by what the well screen is capable of delivering based on the maximum recommended screen entrance velocity. Table 3 on the following page provides the details of the safe yield calculations for Well 3100-C.

TABLE 3: SAFE YIELD CALCULATIONS			
WELL PARAMTER	VALUE	UNIT	KEY
Constant Rate Pumping Test Discharge Rate	3.8	L/s	a
Projected 100-Day Drawdown	5.2	m	b
100-Day Specific Capacity	0.7	L/s/m	c
Lowest Expected Seasonal Water Table (1.0 m fluctuation) (m-bg)	13.1	m	d
Depth to top of Screen Interval	27.7	m	e
Available Drawdown	14.6	m	f = e-d
Safety Factor	70	%	g
Safe Available Drawdown	10.2	m	h = f x g
Safe Yield Based on Constant Rate Pumping Test			
Safe Estimated Sustainable Yield	7.5	L/s	c x h
Safe Estimated Sustainable Yield	**99**	IGPM	
Check for Maximum Screen Entrance Velocity			
Recommended Maximum Screen Entrance Velocity	0.03	m/s	k
Intake Area (m^2/ m of 0.060" Well Screen)	0.19	m^2/m	l
Maximum Yield per m screen	5.7	L/s	k x l
Maximum Yield for Screen Interval (1.2 m)	6.9	L/s	
Maximum Well Yield	**90**	IGPM	m
Check: Greater than Safe Estimated Sustainable Yield?	**NO – Limits Well Capacity**		

Well 3100-C is limited by the well screen entrance velocity, which limits the maximum flow to 6.9 L/s (90 IGPM). Therefore, the estimated long term well capacity is 6.9 L/s.

3.3 GROUNDWATER UNDER THE DIRECT INFLUENCE OF SURFACE WATER (GUDI) ASSESSMENT

Well water or groundwater under the direct influence of surface water (GUDI) refers to groundwater supply sources that are hydraulically connected to nearby surface water sources and are thus vulnerable to contamination by surface water organisms. The implication of a well being classified GUDI means that the well water source requires water treatment equivalent to that required for surface water sources.

The Yukon Department of Health and Social Services has prepared a draft document titled "Assessment Guideline for Well Water or Groundwater Under the Direct Influence of Surface Water" (GUDI) to determine if a well is potentially under the influence of surface water (Government of Yukon, 2005). It is understood that these guidelines are under review and subject to change.

Based on the Yukon GUDI guidelines, Well 3100-C screen interval is completed within an unconfined aquifer production zone and therefore it meets one of the four criteria for being potentially GUDI, thus requiring a Phase 2 assessment as presented below:

The regional groundwater flow regime is interpreted to consist of groundwater recharge occurring in the upland areas to the west of Beaver Creek, and discharge occurring to the Beaver Creek drainage to the east. A Phase 2 travel time assessment has been completed below:

$$v = (K \times i) / n$$

where: v = Groundwater Flow Velocity based on Darcy's Equation
K = Hydraulic conductivity of aquifer (5×10^{-4} m/s)
i = Hydraulic gradient (0.0008, based on EBA's 2007 report for the White River First Nation community)
n = Porosity of aquifer (typically about 0.3)

Substituting well and aquifer parameters into the above equation yields an average groundwater velocity of 0.12 m/day. The nearest upgradient surface water body is approximately 1100 m from the well. Therefore, a conservative estimate of the travel time between the surface water body and the well would be in the order of 25 years. The general rule of thumb is that travel times greater than 90 days would provide sufficient removal of potential surface water organisms. Therefore, Well 3100-C can be considered NON-GUDI.

4.0 RESULTS OF LABORATORY ANALYSIS

Groundwater analytical results from Well 3100-A, Well 3100-C are presented in Table 4, attached. Laboratory results and certificates can be found in Appendix D. The following key observations have been summarized based on the groundwater analysis conducted on Well 3100-C.

- Water from Well 3100-C met all Guidelines for Canadian Drinking Water Quality (GCDWQ) for health based and aesthetic parameters on the date sampled;

- Water quality indicates high hardness, calcium and magnesium parameters thus identifying the water in the aquifer as a hard calcium-bicarbonate type water; and
- Bacteriological testing was not conducted due to the time constraints during the drilling and pumping test programs. EBA recommends that bacteriological analysis be conducted prior to commissioning the well.

5.0 WELL COMMISSIONING, OPERATION AND MAINTENANCE

It is EBA's understanding that YTG-PMA will be coordinating the commissioning of Well 3100-C in 2007. Proper well commissioning, operation and maintenance are fundamental to ensuring a reliable drinking water source. Recommendations pertinent to the commissioning and operation of Well 3100-C are presented below:

- In accordance with CGWA well construction guidelines the casing of the well should project at least 0.50 m above ground surface upon final completion (it is currently 0.65 m above grade);
- A submersible pump should be installed at approximately 1.5 m above the top of screen (approx. 26 m below grade) to maximize drawdown and well performance. Pump sizing will be dependant on the required demand, and should account for a pumping water level of up to 26 m-bg.
- After extended periods of non-pumping the well should be allowed to discharge to waste until the water runs clear. Pumping of small amounts of sand or discoloured water is normal after extended periods of non-pumping;
- The pump should not be continuously turned off and on as this can severely decrease the lifetime of the pump, and promote sand build up within the casing thereby increasing the need for re-development of the well;
- The water level and specific capacity in a water supply well should be routinely monitored over time to facilitate evaluation of well performance;
- The well should be "shock chlorinated" (disinfected) prior to commissioning, and bi-annually with a 200 mg/L sodium hypochlorite solution; and,
- Any alterations to Well 3100-C should be in compliance with the Draft Guidelines for Part III – Small Public Drinking Water Systems, or the final document when in effect.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions are based on the information presented in this well completion report:

- In October 2006, a new drinking water well (Well 3100-C) was drilled at Nelnah Bessie John School (Building # 3100) in Beaver Creek, YT. The well was drilled to a depth of 29 m-bg, and a screen was set from 27.7 to 28.9 m below ground within an unconfined sand and gravel aquifer;
- The new well was constructed in accordance with proposed Government of Yukon Public Drinking Water System Regulations (Government of Yukon, 2005);
- The new well is sited at a location ensuring compliance with current and proposed guidelines for setback distances from existing and potential sources of contamination;
- The maximum drawdown observed during the constant rate pumping test was 5.2 m-bg. A steepening slope on the plot of drawdown vs. log time (Figure 5) at approximately 500 minutes likely indicates that the expanding zone of depression encountered a negative boundaries (i.e. less permeable sediments) where a change in slope is observed;
- The hydraulic conductivity results interpreted from the grain size analysis are similar to the hydraulic conductivity results from the pumping test, therefore indicating a representative sample was recovered from the aquifer;
- The aquifer at Well 3100-C is limited by the well screen entrance. The well is rated at 6.9 L/s (90 IGPM);
- Based on the YTG draft GUDI assessment guidelines, the well is not considered to be under the direct influence of surface water and can be considered as a groundwater source (NON-GUDI);
- Water from Well 3100-C met all GCDWQ for health based and aesthetic parameters. Water Quality indicates the water to be a hard calcium-bicarbonate type water;
- To date, well construction and water quality results are in compliance with the Draft Guidelines for Part III – Small Public Drinking Water Systems

Recommendations resulting from this study are:

- Bacteriological testing should be completed prior to commissioning of the new well; and
- Well 3100-A and Well 3100-B should be decommissioned in accordance with CGWA guidelines for well decommissioning.

7.0 CLOSURE

Conclusions and recommendations in this report are based upon the Hydrogeological Investigations as described in the previous sections. This report has been prepared for the use of the Government of Yukon's Property Management Agency. It has been prepared in accordance with generally accepted hydrogeological practices. For further limitations regarding the use of the report, reference should be made to the EBA Environmental Report – General Conditions (attached), which form a part of this report.

EBA trusts that this report satisfies your present requirements. Should you have any questions or comments please do not hesitate to contact the undersigned.

Respectfully submitted,

EBA Engineering Consultants Ltd.

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ENVIRONMENTAL REPORT – GENERAL CONDITIONS

This report incorporates and is subject to these "General Conditions".

1.0 USE OF REPORT

This report pertains to a specific site, a specific development, and a specific scope of work. It is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site or proposed development would necessitate a supplementary investigation and assessment.

This report and the assessments and recommendations contained in it are intended for the sole use of EBA's client. EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA's client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 LIMITATIONS OF REPORT

This report is based solely on the conditions which existed on site at the time of EBA's investigation. The client, and any other parties using this report with the express written consent of the client and EBA, acknowledge that conditions affecting the environmental assessment of the site can vary with time and that the conclusions and recommendations set out in this report are time sensitive.

The client, and any other party using this report with the express written consent of the client and EBA, also acknowledge that the conclusions and recommendations set out in this report are based on limited observations and testing on the subject site and that conditions may vary across the site which, in turn, could affect the conclusions and recommendations made.

The client acknowledges that EBA is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the client.

2.1 INFORMATION PROVIDED TO EBA BY OTHERS

During the performance of the work and the preparation of this report, EBA may have relied on information provided by persons other than the client. While EBA endeavours to verify the accuracy of such information when instructed to do so by the client, EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

3.0 LIMITATION OF LIABILITY

The client recognizes that property containing contaminants and hazardous wastes creates a high risk of claims brought by third parties arising out of the presence of those materials. In consideration of these risks, and in consideration of EBA providing the services requested, the client agrees that EBA's liability to the client, with respect to any issues relating to contaminants or other hazardous wastes located on the subject site shall be limited as follows:

1. With respect to any claims brought against EBA by the client arising out of the provision or failure to provide services hereunder shall be limited to the amount of fees paid by the client to EBA under this Agreement, whether the action is based on breach of contract or tort;
2. With respect to claims brought by third parties arising out of the presence of contaminants or hazardous wastes on the subject site, the client agrees to indemnify, defend and hold harmless EBA from and against any and all claim or claims, action or actions, demands, damages, penalties, fines, losses, costs and expenses of every nature and kind whatsoever, including solicitor-client costs, arising or alleged to arise either in whole or part out of services provided by EBA, whether the claim be brought against EBA for breach of contract or tort.

4.0 JOB SITE SAFETY

EBA is only responsible for the activities of its employees on the job site and is not responsible for the supervision of any other persons whatsoever. The presence of EBA personnel on site shall not be construed in any way to relieve the client or any other persons on site from their responsibility for job site safety.

5.0 DISCLOSURE OF INFORMATION BY CLIENT

The client agrees to fully cooperate with EBA with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The client acknowledges that in order for EBA to properly provide the service, EBA is relying upon the full disclosure and accuracy of any such information.

6.0 STANDARD OF CARE

Services performed by EBA for this report have been conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Engineering judgement has been applied in developing the conclusions and/or recommendations provided in this report. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of this report.

7.0 EMERGENCY PROCEDURES

The client undertakes to inform EBA of all hazardous conditions, or possible hazardous conditions which are known to it. The client recognizes that the activities of EBA may uncover previously unknown hazardous materials or conditions and that such discovery may result in the necessity to undertake emergency procedures to protect EBA employees, other persons and the environment. These procedures may involve additional costs outside of any budgets previously agreed upon. The client agrees to pay EBA for any expenses incurred as a result of such discoveries and to compensate EBA through payment of additional fees and expenses for time spent by EBA to deal with the consequences of such discoveries.

8.0 NOTIFICATION OF AUTHORITIES

The client acknowledges that in certain instances the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by EBA in its reasonably exercised discretion.

9.0 OWNERSHIP OF INSTRUMENTS OF SERVICE

The client acknowledges that all reports, plans, and data generated by EBA during the performance of the work and other documents prepared by EBA are considered its professional work product and shall remain the copyright property of EBA.

10.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA's instruments of professional service), the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by EBA shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancies, the hard copy versions shall govern over the electronic versions. Furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed version archived by EBA shall be deemed to be the overall original for the Project.

The Client agrees that both electronic file and hard copy versions of EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. The Client warrants that EBA's instruments of professional service will be used only and exactly as submitted by EBA.

The Client recognizes and agrees that electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

EBA FILE: 1260028
February 2007

TABLES

TABLE 4
Laboratory Analytic Results for Wells 3100-A and 3100-C
Nelnah Bessis John School, Beaver Creek, YT

	Well	Nelnah Bessie John School, Beaver Creek (Well 3100-A)			Nelnah Bessie John School, Beaver Creek (Well 3100-C)	Canadian Drinking Water Quality Guidelines [1]	
	ALS Report				L448094-1		
	Date	21-Sep-04	15-Jun-05	27-Jul-05	22-Oct-06		
	Sampled by:				EBA	MAC [2]	AO [3]
Physical Tests							
Colour	CU	<5.0	<5.0	-	<5.0	-	15
Conductivity (Field)	uS/cm	-	-	460	-	-	-
Conductivity (Lab)	uS/cm	-	456	-	333	-	-
Total Dissolved Solids (Field)	mg/L	-	-	230	-	-	-
Total Dissolved Solids (Lab)	mg/L	265	296	-	210	-	500
Hardness (CaCO3)	mg/L	<0.9	<0.66	-	163	-	-
pH (field)	pH units	-	-	8.12	-	-	-
pH (lab)	pH units	8.08	7.87	-	7.81	-	6.5-8.5
Turbidity	NTU	0.2	0.41	-	0.43	1	5
UV Abosrbance (254 nm)	Abs/cm-1	-	-	-	0.0065	-	-
Temperature (Field)	°C	-	-	6	-	-	-
Free Available Chlorine	mg/L	-	-	0.07	-		
Dissolved Anions							
Alkalinity-Total CaCO3	mg/L	164	174	-	163	-	
Chloride	mg/L	2.4	2.24	-	1.68	-	250
Fluoride	mg/L	0.05	0.076	-	0.082	1.5	-
Sulphate	mg/L	24.6	26	-	26.5	-	500
Nutrients							
Ammonia Nitrogen N	mg/L	-	-	-	-	-	-
Nitrate Nitrogen N	mg/L	0.5	0.8	-	0.617	10	-
Nitrite Nitrogen N	mg/L	<0.05	<0.1	-	<0.0010	3.2	-
Total Phosphate	mg/L	-	-	-	-	-	-
Total Organic Carbon (TOC)	mg/L	-	-	0.84	0.58	-	-
Total Metals							
Aluminum	mg/L	<0.005	<0.01	-	<0.010	-	-
Antimony	mg/L	<0.0002	<0.0005	-	<0.00050	0.006	-
Arsenic	mg/L	0.0004	0.00028	-	0.00020	0.01	-
Barium	mg/L	0.001	<0.02	-	<0.020	1	-
Boron	mg/L	0.005	<0.1	-	<0.10	5	-
Cadmium	mg/L	<0.00001	<0.0002	-	<0.00020	0.005	-
Calcium	mg/L	-	<0.1	-	52.2	-	-
Chromium	mg/L	<0.005	<0.002	-	<0.0020	0.05	
Copper	mg/L	0.016	0.0265	-	<0.0010	-	1
Iron	mg/L	<0.01	<0.03	-	<0.030	-	0.3
Lead	mg/L	<0.0001	<0.001	-	<0.0010	0.01	-
Magnesium	mg/L	-	<0.1	-	8.01	-	-
Manganese	mg/L	<0.005	<0.002	-	<0.0020	-	0.05
Mercury	mg/L	-	<0.0002	-	<0.00020	0.001	-
Potassium	mg/L	-	154	-	1.43	-	-
Selenium	mg/L	-	<0.001	-	<0.0010	0.01	-
Sodium	mg/L	-	<2	-	3.4	-	200
Uranium	mg/L	<0.0005	<0.0001	-	0.00040	0.02	-
Zinc	mg/L	0.003	<0.05		<0.050	-	5

Notes:
"-" indicates not analyzed.

Bold - indicates parameter above proposed CDWQG MAC.
Underline - indicates parameter above CDWQG AO.

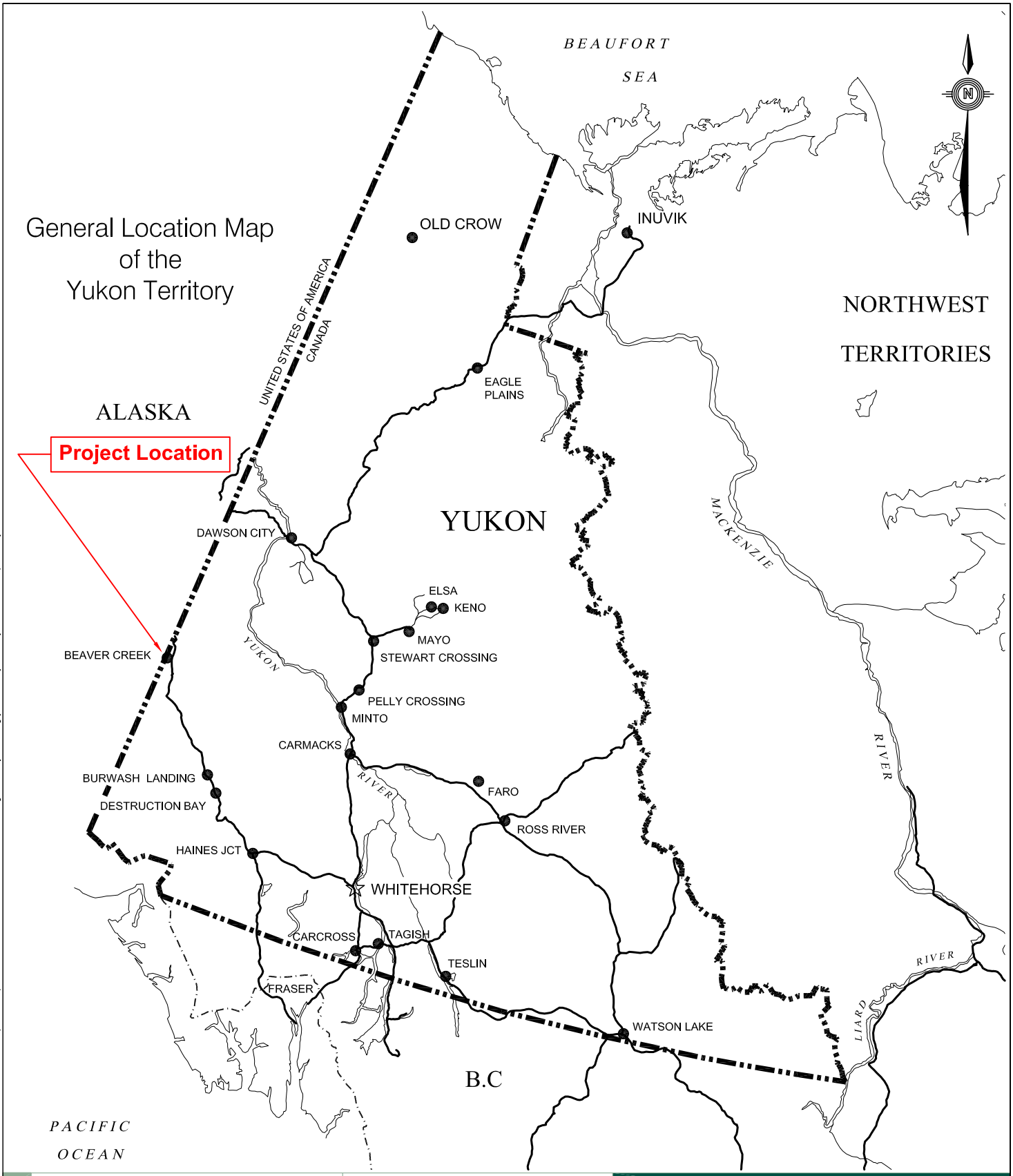
[1] CDWQG criteria are taken from the " Canadian Drinking Water Quality Guidelines, April 2004."

[2] MAC refers to the Maximum Acceptable Concentration according to the CDWQG criteria.

[3] AO refers to the Aesthetic Objective according to the CDWQG criteria.

EBA FILE: 1260028
February 2007

FIGURES



CLIENT

Yukon
Property Management Agency

WELL COMPLETION REPORT
NELNAH BESSIE JOHN SCHOOL - BEAVER CREEK, YT.

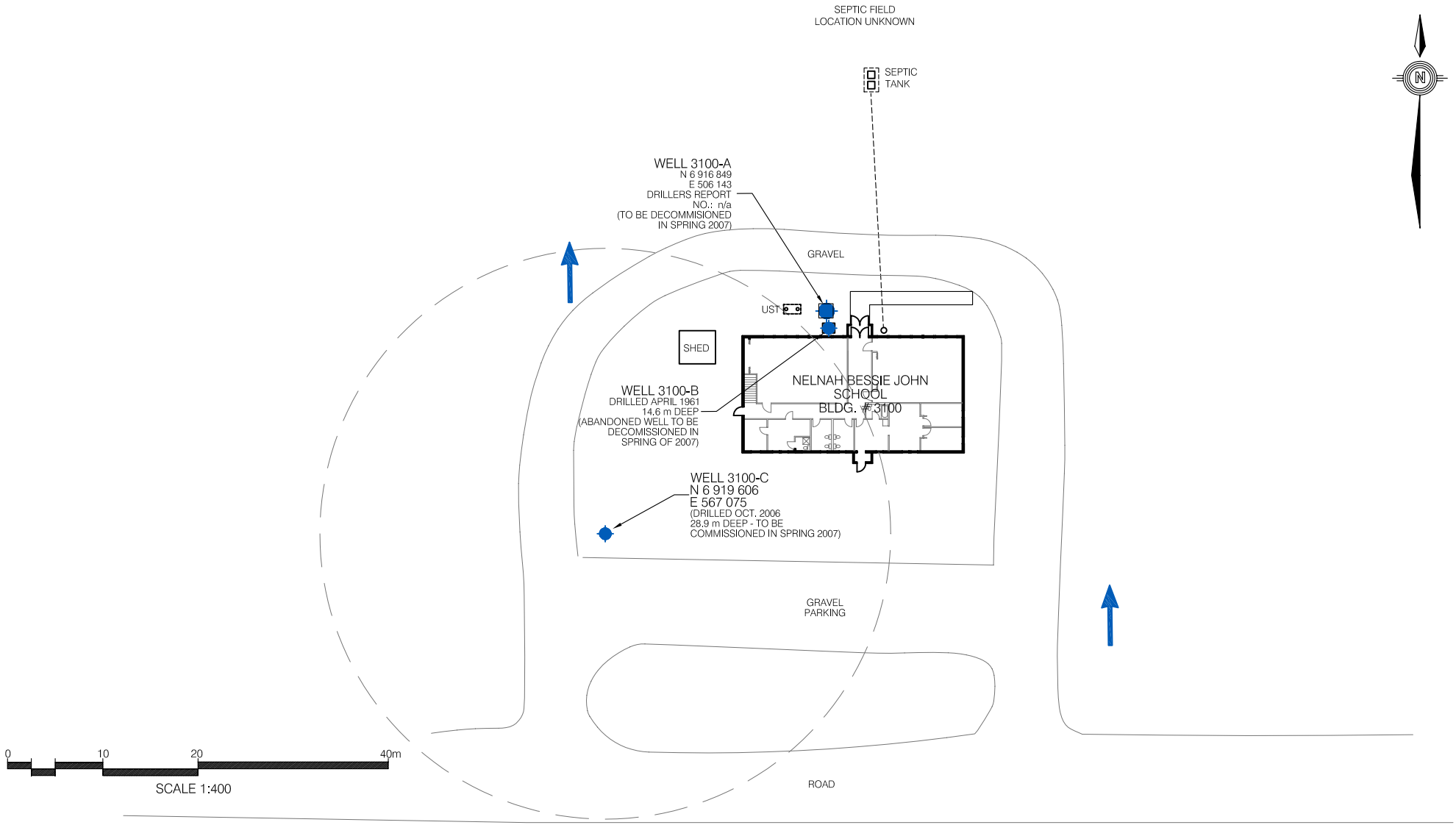
SITE LOCATION MAP

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
1260028	JSB	TAK/RMM	0
OFFICE: EBA-WHSE	DATE: January 9, 2007		

Figure 1

\\eba.local\corp\Whitehorse\Data\0201drawings\Beaver Creek\1260028 Water Well Completion Report\1260028 Nelnah Bessie School\1240256 Figure 1_Key Plan.dwg [KEY PLAN] February 15, 2007 - 3:50pm kostya



LEGEND:

INFERRED GROUNDWATER FLOW DIRECTION

30 m RADIUS FROM WATER WELL FOR CONSIDERATION OF PROXIMITY TO POTENTIAL CONTAMINANT SOURCES.

NOTES:

1. UTM COORDINATES OBTAINED WITH A HAND HELD GPS USING NAD83 SYSTEM AND ARE CONSIDERED TO BE ACCURATE TO 10.0 m, APPROXIMATELY.

CLIENT

Yukon
Property Management Agency

EBA Engineering Consultants Ltd.

WELL COMPLETION REPORT
NELNAH BESSIE JOHN SCHOOL - BEAVER CREEK, YT.

SITE PLAN AND WELL LOCATION
BUILDING # 3125
WELL ID: 3125-C

PROJECT NO.	DWN	CKD	REV
1260028	JSB	TAK/RMM	0

OFFICE	DATE
EBA-WHSE	January 30, 2007

Figure 2

HYDROGEOLOGIC LOG

BOREHOLE NO. WELL 3100-C

PURPOSE OF HOLE:	Water Supply Well	CASING STICK UP:	1.0 m -agl.
DRILLING METHOD:	Air Rotary	DEPTH TO STATIC:	12.12 m-bgl.
DRILLING DATE:	October 20, 2006	DEPTH TO SCREEN (m):	27.7 m
SCREEN INSTALLED:	October 21, 2006		
CONTRACTOR:	Double D Drilling Ltd.		

Lithology

Depth (m)

0m

FILL — 0.6 m

GRAVEL - some coarse sand, subangular to angular, damp, grey

3.7 m

SAND & GRAVEL - some silt, fine to medium grained, sub-angular to angular, moist, brown

5m

10m

- sand lens between 9.7 m to 10.4 m

- silty sand lens between 13.7 m to 16.8 m

15m

20m

25m

- wet below 25.0 m

28.9 m

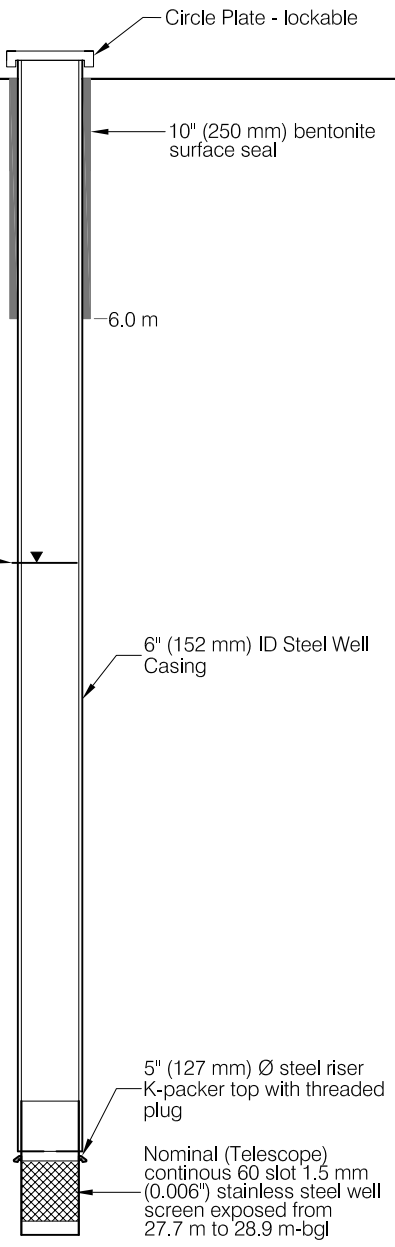
END OF BOREHOLE

30m

Comments

Static Water Level = 12.12 m-bgl

Well Installation Summary



CLIENT

Yukon Property Management Agency

EBA Engineering Consultants Ltd.

WELL COMPLETION REPORT
NELNAH BESSIE JOHN SCHOOL - BEAVER CREEK, YT.

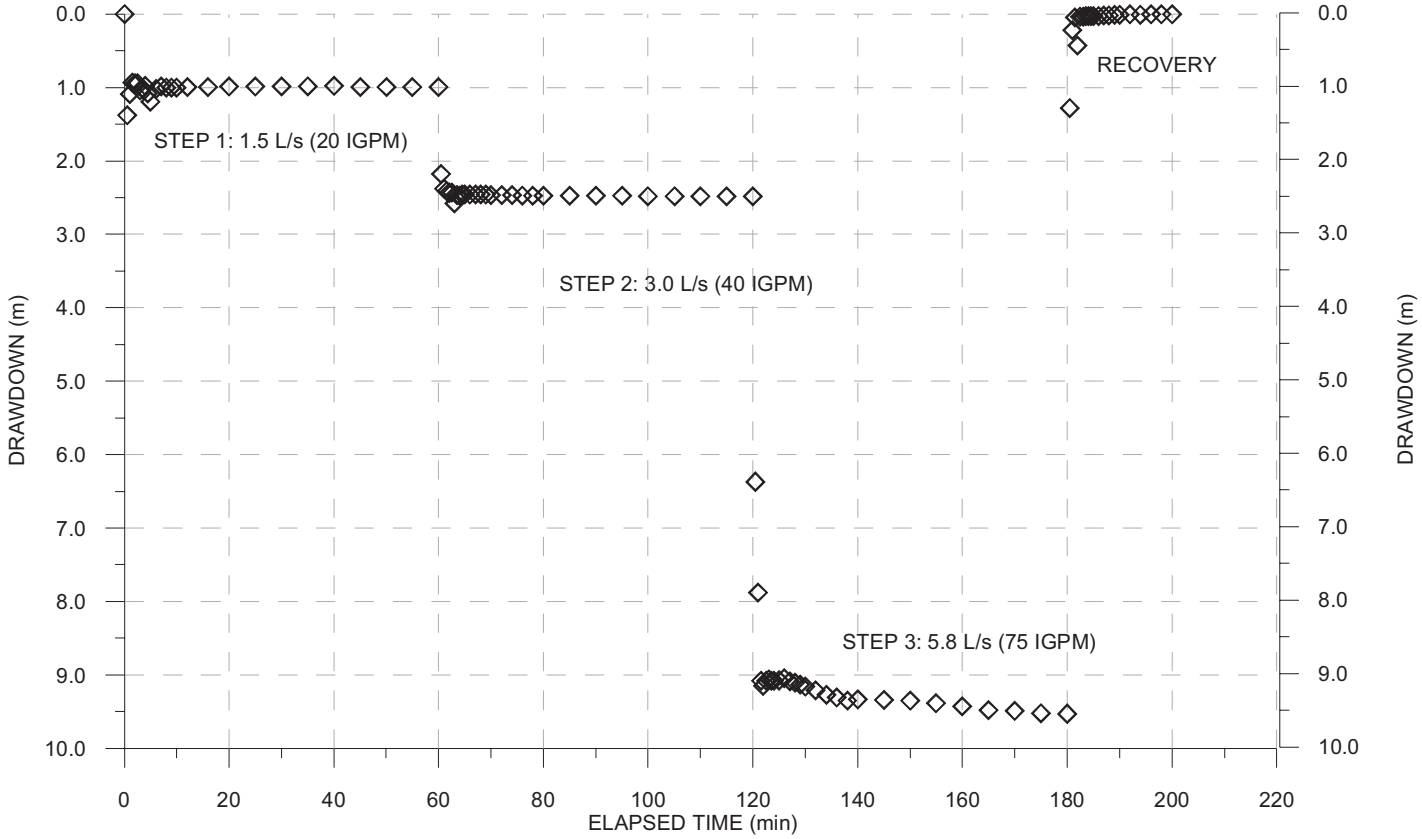
WELL LOG 3100-C

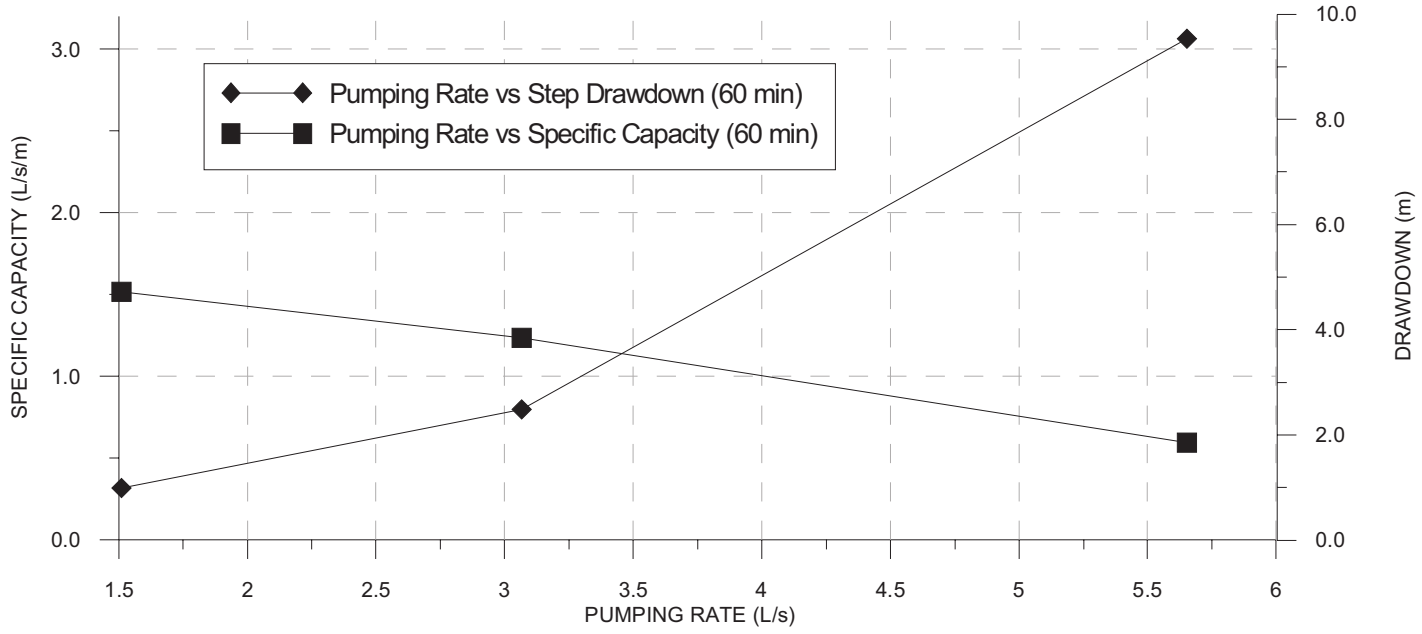
PROJECT NO.	DWN	CKD	REV
1260028	JSB	TAK/RMM	0

OFFICE	DATE
EBA-WHSE	January 30, 2007

Figure 3

\\eba.local\corp\Whitehorse\Data\0201drawings\Beaver Creek\1260028 Water Well Completion Report\1260028 Nelnah Bessie School\1260028 Figure 1 Well Log_3100.dwg [WELL 3100] February 15, 2007 - 3:53pm tkostya





CLIENT

Yukon Highways and Public Works Property Management Branch

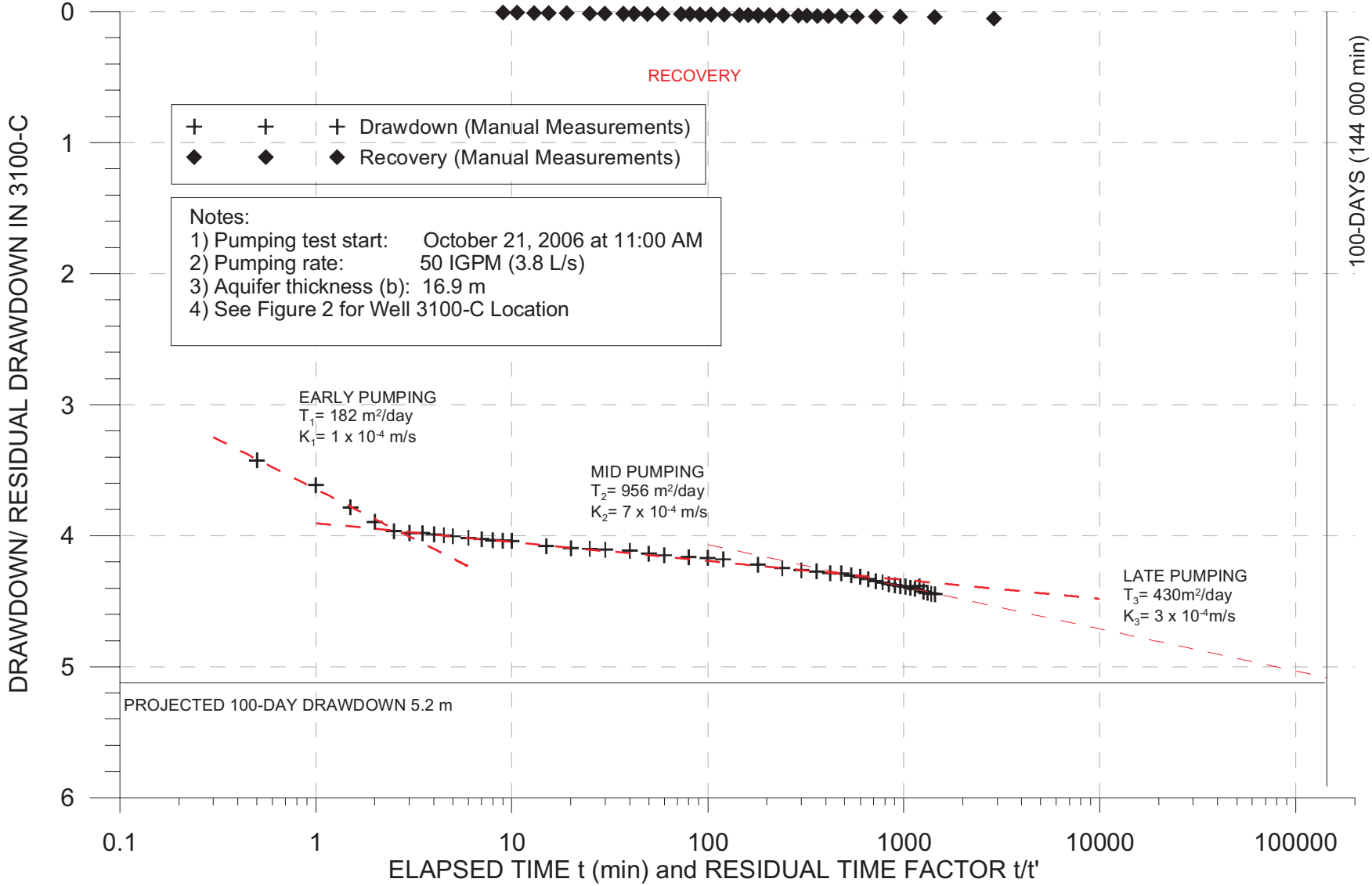
WATER WELL COMPLETION REPORTS, NELNAH BESSIE SCHOOL, BEAVER CREEK, YUKON

STEP RATE PUMPING TEST

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
1260028	TAK	RMM	1
OFFICE: EBA-Whitehorse	DATE: February, 2007		

Figure 4



CLIENT

Yukon Highways and Public Works Property Management Branch

EBA Engineering Consultants Ltd.

WELL COMPLETION REPORT, NELNAH BESSIE JOHN SCHOOL, BEAVER CREEK, YUKON

CONSTANT RATE PUMPING TEST

PROJECT NO.	DWN	CKD	REV
1260028	TAK	RMM	1

OFFICE	DATE
EBA-WHITEHORSE	February 2007

Figure 5

APPENDIX

APPENDIX A DRILLERS WELL LOG

BRITISH COLUMBIA — BC Environment — Water Management Branch

WATER WELL RECORD

Date L

BCGS MAP ____ WELL No. ____ ELEV ____ Location Accuracy C

UTM Z ____ E ____ N ____ UTM Date 19__ Well Type ____

Owners Name & Address ____

Legal Description & Address ____

Descriptive Location BESSY JOHN SCHOOL BEAVER CR 41

1. TYPE OF WORK 1 ☑ New Well 2 ☐ Reconditioned 3 ☐ Deepened 4 ☐ Abandoned

2. WORK METHOD 1 ☐ Cable tool 2 ☐ Bored 3 ☐ Jetted 4 ☑ ~~Rotary~~ a ☐ mud b ☑ ~~air~~ c ☐ reverse ☐ Other ____

3. WATER WELL USE 1 ☑ ~~DW~~ Domestic 2 ☑ ~~Municipal~~ 3 ☐ Irrigation 4 ☐ Comm. & Ind. ☐ Other ____

4. DRILLING ADDITIVES NONE

5. MEASUREMENTS from 1 ☐ ground level 2 ☐ top of casing

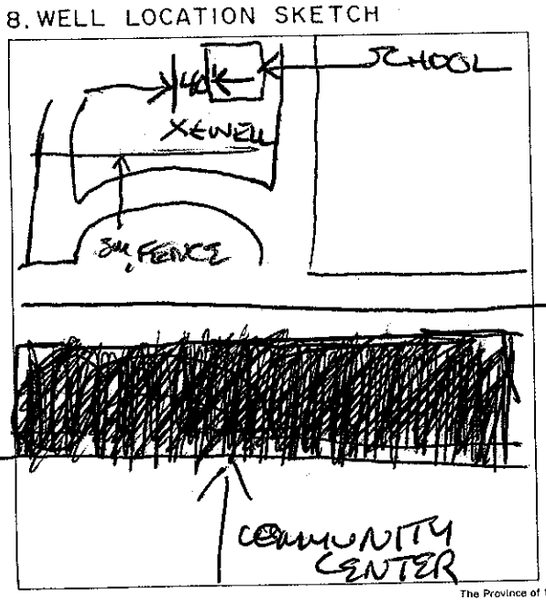
casing height above ground level 3.28 ft.

FROM ft	TO ft	6. WELL LOG DESCRIPTION	SWL ft
0	2	FILL	
2	5	TOPSOIL, SAND + GRAVEL	
5	12	COARSE GRAVEL	
12	16	FINE GRAVEL + SAND	
16	32	MIXED GRAVEL + SAND.	
32	34	SAND	
34	39	SAND + MED. GRAVEL	
39	41	BRN, TILL	
41	95	SAND + MIXED MED - COARSE GRAVEL WTR @ 45 FT	
		* 10" SURFACE SEAL FROM 0-20 FT.	
		GPS READING: 62° 22.962N 140° 52.907W	

7. CONSULTANT ____

Address ____

8. WELL LOCATION SKETCH



9. CASING: Materials 1 ☑ Steel 2 ☐ Galvanized 3 ☐ Wood 4 ☐ Plastic 5 ☐ Concrete ☐ Other ____

							units
Hole Diameter	6 5/8						ins
Diameter	6						ins
from	0						ft
to	90						ft
Thickness	.250						ins
Weight							lb/ft

Pitless unit ____ ft 1 ☐ above 2 ☐ below ground level

1 ☐ Welded 2 ☐ Cemented 3 ☐ Threaded | 1 ☐ New 2 ☐ Used

Perforations: ____

Shoe(s): BARBER DRIVE SHOE

Open hole, from ____ to ____ ft Diameter ____ ins

Grout: ____

10. SCREEN: 1 ☑ ~~Nominal~~ (Telescope) 2 ☐ Pipe Size

Type 1 ☑ ~~Continuous~~ Slot 2 ☐ Perforated 3 ☐ Louvre ☐ Other ____

Material 1 ☑ ~~Stainless~~ Steel 2 ☐ Plastic ☐ Other ____

Set from 91 to 95 ft below ground level

RISER, SCREEN & ~~BLANKS~~							units
Length	2.5		4				ft
Diam. I D	5		5				ins
~~Slot~~ Size	0		.060				ins
from	88.5		91				ft
to	91		95				ft

Fittings, top KNOCKER bottom THREADED PLUG

Gravel Pack ____

11. DEVELOPED BY: 1 ☑ ~~Surging~~ 2 ☐ Jetting 3 ☑ ~~Air~~ 4 ☐ Bailing 5 ☐ Pumping ☐ Other ____

12. TEST 1 ☑ ~~Pump~~ 2 ☐ Bail 3 ☐ Air Date ____ (YR MO DY)

Rate 50 ~~IG~~ gpm Temp ____ °C SWL before test ____ ft

Water Level ____ ft after test of ____ hrs

☐ DRAWDOWN in ft				☐ RECOVERY in ft			
mins	WL	mins	WL	mins	WL	mins	WL

13.

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING ft	RECOMMENDED PUMPING RATE USgpm

14. WATER TYPE: 1 ☑ ~~fresh~~ 2 ☐ salty 3 ☑ ~~clear~~ 4 ☐ cloudy

colour NO smell NO ; gas 1 ☐ yes 2 ☐ no

15. WATER ANALYSIS: 1 Hardness ____ mg/L 2 Iron ____ mg/L 3 Chloride ____ mg/L 4 pH ____ Field Date ____ Lab Date ____ (YR MO DY)

SITE I D No ____

16. FINAL WELL COMPLETION DATA

Well Depth 95 ft Well Yield 50 ~~IG~~ gpm

Static Water Level 43 @ T.O.C. ft Artesian Flow ____ US gpm Pressure Head ____ ft

~~Back filled~~ ____

Well Head Completion 6" LOCKABLE HINGE PLATE.

17. DRILLER PLEASE PRINT SURNAME STANWICK FIRST NAME ROBERT

Signature ____

18. CONTRACTOR, DOUBLE D DRILLING LTD.

Address BOX 766 TERRACE B.C. V8G 4R1 (250) 635-7874 DOUG STANWICK

Member, B C G W A ☑ yes ☐ no ; ____

EBA FILE: 1260028
February 2007

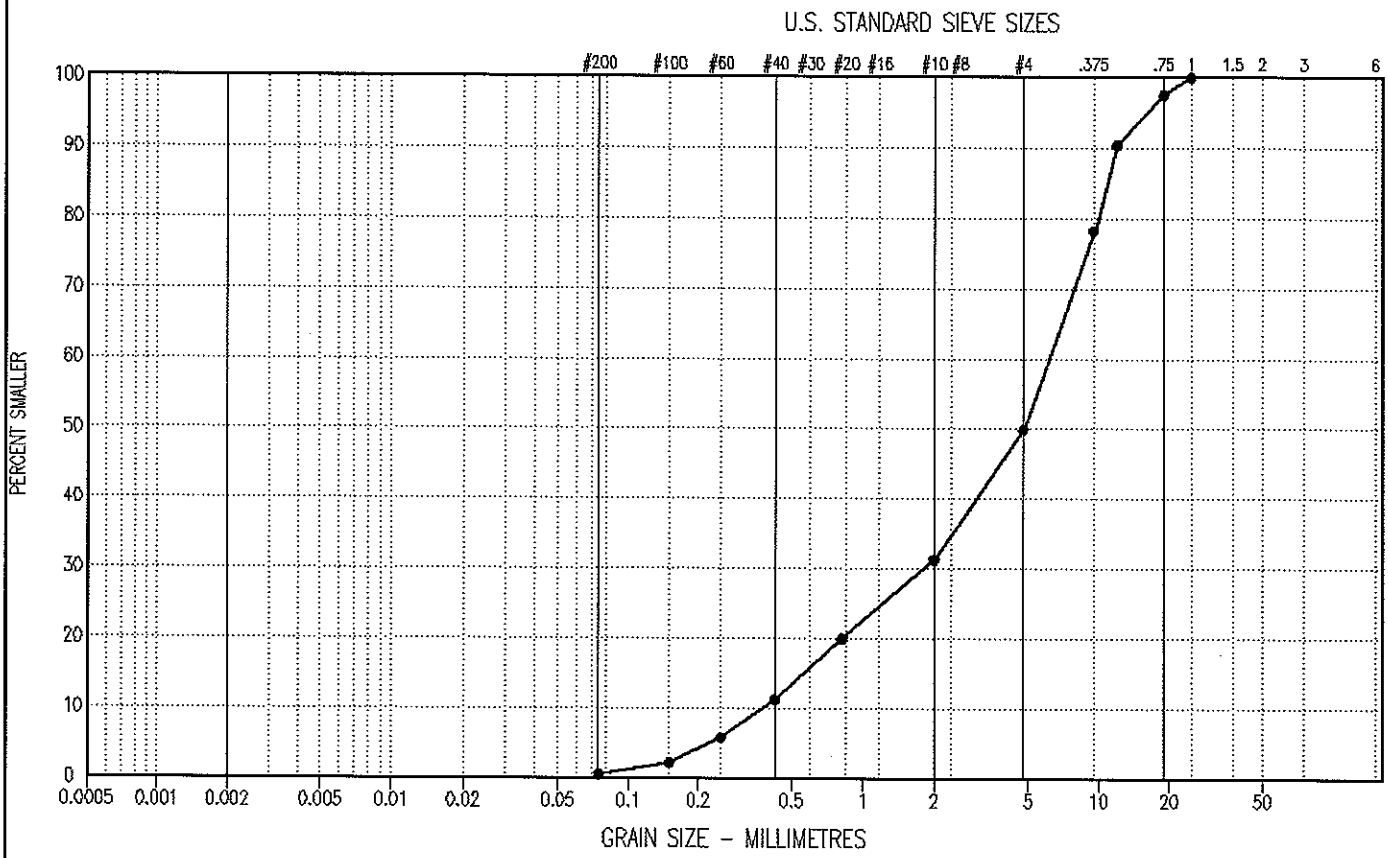
APPENDIX

APPENDIX B WELL 3100-C GRAIN SIZE ANALYSIS

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (ft)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	3100-C-95	95.00	---	0 ---	49	51	16.6	1.4	GW

Project: 0201-1260028 Date Tested: 01/09/07 BY: JP

Tested in accordance with ASTM D422 unless otherwise noted.

EBA FILE: 1260028
February 2007

APPENDIX

APPENDIX C WELL 3100-C PUMPING TEST DATA

APPENDIX B1: STEP-RATE PUMPING TEST DATA

EBA PROJECT NUMBER:	1260028	PROJECT LOCATION:	Beaver Creek School
WELL NAME:	Nelnah Bessie John School (# 3100)	PUMP INTAKE DEPTH (m):	28 m (91.84 ft)
STATIC WATER LEVEL (m):	12.12 m (43 ft)	SCREEN INTERVAL:	27.7 - 28.9 m (91 - 95 ft)
DATUM DESCRIPTION:	Top of Sounding Tube	SLOT SIZE (''):	0.06
DATUM STICK-UP(m):	1.04 m above ground level	SAFE AVAILABLE DRAWDOWN(m):	14.6 m (47.9 ft)
WELL DIAMETER:	152 mm (6 in)	SCREEN DIAMETER (mm):	127 mm (5 in)
TOTAL WELL DEPTH:	28.9 m (95 ft)	OBSERVER'S NAME:	Jennifer Kelly

DATE	TIME	ELAPSED TIME (min)	DEPTH TO WATER (m)	DRAWDOWN (m)	METER READING [3] (Total IG)	FLOW RATE (USGPM)	FLOW RATE (IGPM)	FLOW RATE (L/s)	SPECIFIC CAPACITY (L/s/m)	COMMENTS
21-Oct-06	7:00:00	0	12.120	0.000	-	-	-	-	-	START STEP 1
21-Oct-06	7:00:30	0.5	13.500	1.380	-	28.82	24	1.818	1.318	73913.3 ft^3
21-Oct-06	7:01:00	1	13.210	1.090	-	23.42	19.5	1.477	1.355	
21-Oct-06	7:01:30	1.5	13.050	0.930	-	23.42	19.5	1.477	1.589	
21-Oct-06	7:02:00	2	13.060	0.940	-	24.62	20.5	1.553	1.652	
21-Oct-06	7:02:30	2.5	13.060	0.940	-	25.82	21.5	1.629	1.733	
21-Oct-06	7:03:00	3	13.160	1.040	-	26.60	22.15	1.678	1.614	
21-Oct-06	7:03:30	3.5	13.140	1.020	-	23.42	19.5	1.477	1.449	
21-Oct-06	7:04:00	4	13.100	0.980	-	23.78	19.8	1.500	1.531	
21-Oct-06	7:04:30	4.5	13.200	1.080	-	24.62	20.5	1.553	1.438	
21-Oct-06	7:05:00	5	13.310	1.190	-	24.62	20.5	1.553	1.305	
21-Oct-06	7:06:00	6	13.140	1.020	-	24.50	20.4	1.546	1.515	
21-Oct-06	7:07:00	7	13.105	0.985	-	24.38	20.3	1.538	1.562	
21-Oct-06	7:08:00	8	13.120	1.000	-	24.39	20.31	1.539	1.539	
21-Oct-06	7:09:00	9	13.120	1.000	-	24.32	20.25	1.534	1.534	
21-Oct-06	7:10:00	10	13.120	1.000	-	24.20	20.15	1.527	1.527	
21-Oct-06	7:12:00	12	13.115	0.995	245	24.18	20.13	1.525	1.533	
21-Oct-06	7:16:00	16	13.115	0.995	-	23.99	19.98	1.514	1.521	
21-Oct-06	7:20:00	20	13.110	0.990	-	24.09	20.06	1.520	1.535	
21-Oct-06	7:25:00	25	13.110	0.990	504	24.01	19.99	1.515	1.530	
21-Oct-06	7:30:00	30	13.105	0.985	605	23.99	19.98	1.514	1.537	
21-Oct-06	7:35:00	35	13.102	0.982	708	23.99	19.98	1.514	1.542	
21-Oct-06	7:40:00	40	13.100	0.980	-	24.07	20.04	1.518	1.549	
21-Oct-06	7:45:00	45	13.115	0.995	-	24.12	20.08	1.521	1.529	
21-Oct-06	7:50:00	50	13.115	0.995	-	24.07	20.04	1.518	1.526	
21-Oct-06	7:55:00	55	13.115	0.995	-	24.08	20.05	1.519	1.527	
21-Oct-06	1:00:00	60	13.115	0.995	1205	23.92	19.92	1.509	1.517	
21-Oct-06	8:00:30	60.5	14.300	2.180	-	48.03	39.99	3.030	1.390	STEP 2
21-Oct-06	8:01:00	61	14.500	2.380	-	48.03	39.99	3.030	1.273	
21-Oct-06	8:01:30	61.5	14.530	2.410	-	48.31	40.23	3.048	1.265	
21-Oct-06	8:02:00	62	14.555	2.435	-	47.94	39.92	3.025	1.242	
21-Oct-06	8:02:30	62.5	14.550	2.430	-	48.46	40.35	3.057	1.258	
21-Oct-06	8:03:00	63	14.700	2.580	-	48.66	40.52	3.070	1.190	
21-Oct-06	8:03:30	63.5	14.588	2.468	-	48.37	40.28	3.052	1.237	
21-Oct-06	8:04:00	64	14.590	2.470	-	48.30	40.22	3.047	1.234	
21-Oct-06	8:04:30	64.5	14.575	2.455	-	48.58	40.45	3.065	1.248	
21-Oct-06	8:05:00	65	14.580	2.460	1404	48.47	40.36	3.058	1.243	
21-Oct-06	8:06:00	66	14.582	2.462	-	48.48	40.37	3.059	1.242	
21-Oct-06	8:07:00	67	14.575	2.455	-	48.46	40.35	3.057	1.245	
21-Oct-06	8:08:00	68	14.575	2.455	1525	48.40	40.3	3.053	1.244	
21-Oct-06	8:09:00	69	14.580	2.460	1566	48.55	40.43	3.063	1.245	
21-Oct-06	8:10:00	70	14.585	2.465	1605	48.60	40.47	3.066	1.244	
21-Oct-06	8:12:00	72	14.585	2.465	1687	48.48	40.37	3.059	1.241	
21-Oct-06	8:14:00	74	14.588	2.468	1770	48.49	40.38	3.060	1.240	
21-Oct-06	8:16:00	76	14.590	2.470	1847	48.59	40.46	3.066	1.241	
21-Oct-06	8:18:00	78	14.592	2.472	1930	-	-	-	-	
21-Oct-06	8:20:00	80	14.594	2.474	2011	48.51	40.39	3.060	1.237	
21-Oct-06	8:25:00	85	14.595	2.475	-	-	-	-	-	pH-6.95, EC-314, T-4.7, ppm-159
21-Oct-06	8:30:00	90	14.596	2.476	-	-	-	-	-	
21-Oct-06	8:35:00	95	14.595	2.475	-	48.42	40.32	3.055	1.234	
21-Oct-06	8:40:00	100	14.598	2.478	-	48.46	40.35	3.057	1.234	
21-Oct-06	8:45:00	105	14.598	2.478	-	48.39	40.29	3.053	1.232	
21-Oct-06	8:50:00	110	14.600	2.480	-	48.30	40.22	3.047	1.229	
21-Oct-06	8:55:00	115	14.602	2.482	3422	48.58	40.45	3.065	1.235	

APPENDIX B1: STEP-RATE PUMPING TEST DATA

EBA PROJECT NUMBER:	1260028	PROJECT LOCATION:	Beaver Creek School
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TOTAL WELL DEPTH:	28.9 m (95 ft)	OBSERVER'S NAME:	Jennifer Kelly

DATE	TIME	ELAPSED TIME (min)	DEPTH TO WATER (m)	DRAWDOWN (m)	METER READING [3] (Total IG)	FLOW RATE (USGPM)	FLOW RATE (IGPM)	FLOW RATE (L/s)	SPECIFIC CAPACITY (L/s/m)	COMMENTS
21-Oct-06	9:00:00	120	14.602	2.482	3624	48.59	40.46	3.066	1.235	
21-Oct-06	9:00:30	120.5	18.490	6.370	-	103.34	86.05	6.520	1.024	STEP 3
21-Oct-06	9:01:00	121	20.000	7.880	-	102.68	85.5	6.478	0.822	
21-Oct-06	9:01:30	121.5	21.200	9.080	-	98.48	82	6.213	0.684	
21-Oct-06	9:02:00	122	21.270	9.150	-	93.67	78	5.910	0.646	
21-Oct-06	9:02:30	122.5	21.200	9.080	-	91.75	76.4	5.789	0.638	
21-Oct-06	9:03:00	123	21.180	9.060	-	91.75	76.4	5.789	0.639	
21-Oct-06	9:03:30	123.5	21.200	9.080	-	91.63	76.3	5.781	0.637	
21-Oct-06	9:04:00	124	21.202	9.082	-	91.03	75.8	5.743	0.632	
21-Oct-06	9:05:00	125	21.195	9.075	-	90.22	75.12	5.692	0.627	
21-Oct-06	9:06:00	126	21.165	9.045	4092	90.41	75.28	5.704	0.631	
21-Oct-06	9:07:00	127	21.210	9.090	-	90.59	75.43	5.715	0.629	
21-Oct-06	9:08:00	128	21.227	9.107	-	90.25	75.15	5.694	0.625	
21-Oct-06	9:09:00	129	21.255	9.135	-	90.44	75.31	5.706	0.625	
21-Oct-06	9:10:00	130	21.282	9.162	-	90.34	75.22	5.699	0.622	
21-Oct-06	9:12:00	132	21.330	9.210	4693	89.96	74.91	5.676	0.616	
21-Oct-06	9:14:00	134	21.392	9.272	-	90.12	75.04	5.686	0.613	
21-Oct-06	9:16:00	136	21.430	9.310	-	90.11	75.03	5.685	0.611	
21-Oct-06	9:18:00	138	21.470	9.350	-	89.96	74.91	5.676	0.607	
21-Oct-06	9:20:00	140	21.455	9.335	-	89.76	74.74	5.663	0.607	
21-Oct-06	9:25:00	145	21.460	9.340	5522	89.47	74.5	5.645	0.604	pH-6.17, EC-307, T-6.1, ppm-157
21-Oct-06	9:30:00	150	21.474	9.354	5889	89.48	74.51	5.645	0.604	
21-Oct-06	9:35:00	155	21.508	9.388	-	89.47	74.5	5.645	0.601	
21-Oct-06	9:40:00	160	21.548	9.428	6635	89.17	74.25	5.626	0.597	pH-5.98, EC-308, T-5.3, ppm-159
21-Oct-06	9:45:00	165	21.603	9.483	7006	89.41	74.45	5.641	0.595	
21-Oct-06	9:50:00	170	21.613	9.493	7377	88.86	73.99	5.606	0.591	
21-Oct-06	9:55:00	175	21.640	9.520	-	89.01	74.12	5.616	0.590	
21-Oct-06	10:00:00	180	21.648	9.528	8121	89.58	74.59	5.652	0.593	75201.1 ft^3
21-Oct-06	10:00:30	180.5	13.400	1.280	-	-	-	-	-	START RECOVERY
21-Oct-06	10:01:00	181	12.340	0.220	-	-	-	-	-	
21-Oct-06	10:01:30	181.5	12.167	0.047	-	-	-	-	-	
21-Oct-06	10:02:00	182	12.550	0.430	-	-	-	-	-	
21-Oct-06	10:02:30	182.5	12.154	0.034	-	-	-	-	-	
21-Oct-06	10:03:00	183	12.153	0.033	-	-	-	-	-	
21-Oct-06	10:03:30	183.5	12.149	0.029	-	-	-	-	-	
21-Oct-06	10:04:00	184	12.149	0.029	-	-	-	-	-	
21-Oct-06	10:04:30	184.5	12.148	0.028	-	-	-	-	-	
21-Oct-06	10:05:00	185	12.147	0.027	-	-	-	-	-	
21-Oct-06	10:06:00	186	12.145	0.025	-	-	-	-	-	
21-Oct-06	10:07:00	187	12.140	0.020	-	-	-	-	-	
21-Oct-06	10:08:00	188	12.135	0.015	-	-	-	-	-	
21-Oct-06	10:09:00	189	12.132	0.012	-	-	-	-	-	
21-Oct-06	10:10:00	190	12.128	0.008	-	-	-	-	-	
21-Oct-06	10:12:00	192	12.125	0.005	-	-	-	-	-	
21-Oct-06	10:14:00	194	12.127	0.007	-	-	-	-	-	
21-Oct-06	10:16:00	196	12.125	0.005	-	-	-	-	-	
21-Oct-06	10:18:00	198	12.125	0.005	-	-	-	-	-	
21-Oct-06	10:20:00	200	12.125	0.005	-	-	-	-	-	End of Test

Notes:

1) Depth to Water below top of sounding tube. Steel casing stick-up approximately 1.2 m.

2) "-" indicates no data or not applicable

3) May be a flow tototalizaer, instantaneous flow meter or other method of flow rate monitoring

APPENDIX B2: CONSTANT RATE PUMPING TEST DATA

EBA PROJECT NUMBER:	1260028	PROJECT LOCATION:	Beaver Creek School
WELL NAME:	Nelnah Bessie John School (# 3100)	PUMP INTAKE DEPTH (m):	28 m (91.84 ft)
STATIC WATER LEVEL (m):	12.12 m (43 ft)	SCREEN INTERVAL:	27.7 - 28.9 m (91 - 95 ft)
DATUM DESCRIPTION:	Top of Sounding Tube	SLOT SIZE (''):	0.06
DATUM STICK-UP(m):	1.04 m above ground level	SAFE AVAILABLE DRAWDOWN(m):	14.6 m (47.9 ft)
WELL DIAMETER:	152 mm (6 in)	SCREEN DIAMETER (mm):	127 mm (5 in)
TOTAL WELL DEPTH:	28.9 m (95 ft)	OBSERVER'S NAME:	Jennifer Kelly

DATE	TIME	ELAPSED TIME (min)	DEPTH TO WATER (m)	DRAWDOWN (m)	METER READING [3] (Total IG)	FLOW RATE (USGPM)	FLOW RATE (IGPM)	FLOW RATE (L/s)	SPECIFIC CAPACITY (L/s/m)	pH	EC	TEMP	COMMENTS
21-Oct-06	11:00:00	0	12.125	0.000	-		-	-	-	-	-	-	
21-Oct-06	11:00:30	0.5	15.550	3.425	-	56.46	47.01	3.56	1.04	-	-	-	75201.1 ft^3
21-Oct-06	11:01:00	1	15.740	3.615	-	58.95	49.09	3.72	1.03	-	-	-	
21-Oct-06	11:01:30	1.5	15.910	3.785	-	60.19	50.12	3.80	1.00	-	-	-	
21-Oct-06	11:02:00	2	16.020	3.895	-	60.84	50.66	3.84	0.99	-	-	-	
21-Oct-06	11:02:30	2.5	16.090	3.965	134	60.71	50.55	3.83	0.97	-	-	-	
21-Oct-06	11:03:00	3	16.105	3.980	-	60.67	50.52	3.83	0.96	-	-	-	
21-Oct-06	11:03:30	3.5	16.106	3.981	-	60.61	50.47	3.82	0.96	-	-	-	
21-Oct-06	11:04:00	4	16.115	3.990	205	60.79	50.62	3.84	0.96	-	-	-	
21-Oct-06	11:04:30	4.5	16.122	3.997	-	60.62	50.48	3.82	0.96	-	-	-	
21-Oct-06	11:05:00	5	16.130	4.005	-	60.36	50.26	3.81	0.95	-	-	-	
21-Oct-06	11:06:00	6	16.142	4.017	306	60.66	50.51	3.83	0.95	-	-	-	
21-Oct-06	11:07:00	7	16.152	4.027	358	60.82	50.64	3.84	0.95	-	-	-	
21-Oct-06	11:08:00	8	16.160	4.035	408	60.76	50.59	3.83	0.95	-	-	-	
21-Oct-06	11:09:00	9	16.162	4.037	459	60.97	50.77	3.85	0.95	-	-	-	
21-Oct-06	11:10:00	10	16.165	4.040	-	60.67	50.52	3.83	0.95	6.63	308	8.1	
21-Oct-06	11:15:00	15	16.205	4.080	761	60.55	50.42	3.82	0.94	-	-	-	
21-Oct-06	11:20:00	20	16.220	4.095	-	60.59	50.45	3.82	0.93	-	-	-	
21-Oct-06	11:25:00	25	16.225	4.100	1267	60.77	50.6	3.83	0.94	6.51	303	8.2	
21-Oct-06	11:30:00	30	16.232	4.107	1520	60.73	50.57	3.83	0.93	-	-	-	
21-Oct-06	11:40:00	40	16.240	4.115	2024	60.59	50.45	3.82	0.93	-	-	-	
21-Oct-06	11:50:00	50	16.262	4.137	2530	60.65	50.5	3.83	0.92	-	-	-	
21-Oct-06	12:00:00	60	16.275	4.150	3036	60.80	50.63	3.84	0.92	5.96	312	7.4	
21-Oct-06	12:20:00	80	16.290	4.165	4044	60.48	50.36	3.82	0.92	-	-	-	
21-Oct-06	12:40:00	100	16.295	4.170	5058	60.60	50.46	3.82	0.92	-	-	-	
21-Oct-06	13:00:00	120	16.305	4.180	6064	60.71	50.55	3.83	0.92	6.14	307	8.1	
21-Oct-06	14:00:00	180	16.346	4.221	9093	60.59	50.45	3.82	0.91	6.4	311	7.4	
21-Oct-06	15:00:00	240	16.373	4.248	12120	60.60	50.46	3.82	0.90	6.87	312	7.3	
21-Oct-06	16:00:00	300	16.388	4.263	15150	60.48	50.36	3.82	0.90	6.83	306	7.7	
21-Oct-06	17:00:00	360	16.398	4.273	18170	60.34	50.24	3.81	0.89	6.14	304	5.9	
21-Oct-06	18:00:00	420	16.411	4.286	21195	60.53	50.4	3.82	0.89	6.21	310	5.9	
21-Oct-06	19:00:00	480	16.414	4.289	24215	60.17	50.1	3.80	0.89	-	-	-	79046 ft^3
21-Oct-06	20:00:00	540	16.429	4.304	27234	60.31	50.22	3.81	0.88	6.48	308	5.9	
21-Oct-06	21:00:00	600	16.440	4.315	30251	60.34	50.24	3.81	0.88	-	-	-	80002 ft^3
21-Oct-06	22:00:00	660	16.457	4.332	33269	60.43	50.32	3.81	0.88	6.25	310	5.4	
21-Oct-06	23:00:00	720	16.472	4.347	36284	60.59	50.45	3.82	0.88	-	-	-	80958 ft^3
22-Oct-06	0:00:00	780	16.483	4.358	39298	60.48	50.36	3.82	0.88	6.37	308	5.9	
22-Oct-06	1:00:00	840	16.495	4.370	42313	60.72	50.56	3.83	0.88	-	-	-	81914 ft^3
22-Oct-06	2:00:00	900	16.503	4.378	45333	60.44	50.33	3.81	0.87	6.33	313	5.7	
22-Oct-06	3:00:00	960	16.510	4.385	48351	60.59	50.45	3.82	0.87	-	-	-	82861 ft^3
22-Oct-06	4:00:00	1020	16.514	4.389	51370	60.49	50.37	3.82	0.87	6.33	310	5.9	
22-Oct-06	5:00:00	1080	16.523	4.398	54387	60.23	50.15	3.80	0.86	-	-	-	83827 ft^3
22-Oct-06	6:00:00	1140	16.531	4.406	57412	60.70	50.54	3.83	0.87	6.82	308	7.7	
22-Oct-06	7:00:00	1200	16.510	4.385	60442	60.43	50.32	3.81	0.87	-	-	-	84772.9 ft^3
22-Oct-06	8:00:00	1260	16.551	4.426	63443	60.66	50.51	3.83	0.86	6.95	314	7.6	
22-Oct-06	9:00:00	1320	16.562	4.437	66464	60.36	50.26	3.81	0.86	-	-	-	85731 ft^3
22-Oct-06	10:00:00	1380	16.567	4.442	69484	61.06	50.84	3.85	0.87	6.23	315	7.6	
22-Oct-06	11:00:00	1440	16.571	4.446	72508	60.32	50.23	3.81	0.86	-	-	-	86708 ft^3
22-Oct-06	11:00:30	1440.5	12.180	0.055	-		-	-	-	-	-	-	Start Recovery
22-Oct-06	11:01:00	1441	12.169	0.044	-		-	-	-	-	-	-	
22-Oct-06	11:01:30	1441.5	12.165	0.040	-		-	-	-	-	-	-	
22-Oct-06	11:02:00	1442	12.164	0.039	-		-	-	-	-	-	-	
22-Oct-06	11:02:30	1442.5	12.162	0.037	-		-	-	-	-	-	-	
22-Oct-06	11:03:00	1443	12.160	0.035	-		-	-	-	-	-	-	
22-Oct-06	11:03:30	1443.5	12.159	0.034	-		-	-	-	-	-	-	
22-Oct-06	11:04:00	1444	12.158	0.033	-		-	-	-	-	-	-	
22-Oct-06	11:04:30	1444.5	12.157	0.032	-		-	-	-	-	-	-	
22-Oct-06	11:05:00	1445	12.156	0.031	-		-	-	-	-	-	-	

APPENDIX B2: CONSTANT RATE PUMPING TEST DATA

EBA PROJECT NUMBER:	1260028	PROJECT LOCATION:	Beaver Creek School
WELL NAME:	Nelnah Bessie John School (# 3100)	PUMP INTAKE DEPTH (m):	28 m (91.84 ft)
STATIC WATER LEVEL (m):	12.12 m (43 ft)	SCREEN INTERVAL:	27.7 - 28.9 m (91 - 95 ft)
DATUM DESCRIPTION:	Top of Sounding Tube	SLOT SIZE (''):	0.06
DATUM STICK-UP(m):	1.04 m above ground level	SAFE AVAILABLE DRAWDOWN(m):	14.6 m (47.9 ft)
WELL DIAMETER:	152 mm (6 in)	SCREEN DIAMETER (mm):	127 mm (5 in)
TOTAL WELL DEPTH:	28.9 m (95 ft)	OBSERVER'S NAME:	Jennifer Kelly

DATE	TIME	ELAPSED TIME (min)	DEPTH TO WATER (m)	DRAWDOWN (m)	METER READING [3] (Total IG)	FLOW RATE (USGPM)	FLOW RATE (IGPM)	FLOW RATE (L/s)	SPECIFIC CAPACITY (L/s/m)	pH	EC	TEMP	COMMENTS
22-Oct-06	11:06:00	1446	12.155	0.030	-		-	-	-	-	-	-	
22-Oct-06	11:07:00	1447	12.154	0.029	-		-	-	-	-	-	-	
22-Oct-06	11:08:00	1448	12.153	0.028	-		-	-	-	-	-	-	
22-Oct-06	11:09:00	1449	12.152	0.027	-		-	-	-	-	-	-	
22-Oct-06	11:10:00	1450	12.151	0.026	-		-	-	-	-	-	-	
22-Oct-06	11:12:00	1452	12.149	0.024	-		-	-	-	-	-	-	
22-Oct-06	11:14:00	1454	12.148	0.023	-		-	-	-	-	-	-	
22-Oct-06	11:16:00	1456	12.148	0.023	-		-	-	-	-	-	-	
22-Oct-06	11:18:00	1458	12.146	0.021	-		-	-	-	-	-	-	
22-Oct-06	11:20:00	1460	12.145	0.020	-		-	-	-	-	-	-	
22-Oct-06	11:25:00	1465	12.144	0.019	-		-	-	-	-	-	-	
22-Oct-06	11:30:00	1470	12.143	0.018	-		-	-	-	-	-	-	
22-Oct-06	11:35:00	1475	12.142	0.017	-		-	-	-	-	-	-	
22-Oct-06	11:40:00	1480	12.142	0.017	-		-	-	-	-	-	-	
22-Oct-06	11:50:00	1490	12.141	0.016	-		-	-	-	-	-	-	
22-Oct-06	12:00:00	1500	12.140	0.015	-		-	-	-	-	-	-	
22-Oct-06	12:20:00	1520	12.138	0.013	-		-	-	-	-	-	-	
22-Oct-06	12:40:00	1540	12.138	0.013	-		-	-	-	-	-	-	
22-Oct-06	13:00:00	1560	12.136	0.011	-		-	-	-	-	-	-	
22-Oct-06	13:30:00	1590	12.134	0.009	-		-	-	-	-	-	-	
22-Oct-06	14:00:00	1620	12.133	0.008	-		-	-	-	-	-	-	End of Test

Notes:
1) Depth to Water below top of sounding tube. Steel casing stick-up approximately 1.2 m.
2) "-" indicates no data or not applicable
3) May be a flow tototalizaer, instantaneous flow meter or other method of flow rate monitoring

APPENDIX

APPENDIX D LABORATORY REPORTS AND CERTIFICATES

ANALYTICAL REPORT

EBA ENGINEERING CONSULTANTS LTD.

ATTN: KATHERINE JOHNSTON

Reported On: 08-NOV-06 06:55 PM

CALCITE BUSINESS CENTRE
UNIT 6 - 151 INDUSTRIAL ROAD
WHITEHORSE YT Y1A 2V3

Lab Work Order #: L448094 **Date Received:** 26-OCT-06

Project P.O. #:
Job Reference: PMA REPLACEMENT 1260028
Legal Site Desc:
CofC Numbers: 36760

Other Information:

Comments:

Joyce Chow
General Manager, Vancouver

For any questions about this report please contact your Account Manager:

CAN DANG

ALS LABORATORY GROUP ANALYTICAL REPORT

		Sample ID	L448094-1	L448094-2	L448094-3		
		Description					
		Sampled Date	20-OCT-06	22-OCT-06	23-SEP-06		
		Sampled Time	14:30	10:30			
		Client ID	BC AIRPORT	BC SCHOOL	DBAY CREEK		
Grouping	**Analyte**						
WATER							
Physical Tests	Hardness (as CaCO3) (mg/L)		142	163			
	Colour, True (CU)		<5.0	<5.0	8.6		
	Conductivity (uS/cm)		295	333	942		
	pH (pH)		8.05	7.81	8.20		
	Total Dissolved Solids (mg/L)		194	210	692		
	Turbidity (NTU)		1.08	0.43	1.61		
	UV Absorbance (254 nm) (Abs/cm-1)		0.0032	0.0065	0.0799		
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)		129	163	319		
	Chloride (Cl) (mg/L)		0.85	1.68	<0.50		
	Fluoride (F) (mg/L)		0.057	0.082	0.115		
	Sulfate (SO4) (mg/L)		34.2	26.5	251		
	Nitrate (as N) (mg/L)		0.257	0.617	<0.0050		
	Nitrite (as N) (mg/L)		<0.0010	<0.0010	<0.0010		
Total Metals	Aluminum (Al)-Total (mg/L)		<0.010	<0.010			
	Antimony (Sb)-Total (mg/L)		<0.00050	<0.00050			
	Arsenic (As)-Total (mg/L)		0.00073	0.00020			
	Barium (Ba)-Total (mg/L)		<0.020	<0.020			
	Boron (B)-Total (mg/L)		<0.10	<0.10			
	Cadmium (Cd)-Total (mg/L)		<0.00020	<0.00020			
	Calcium (Ca)-Total (mg/L)		46.0	52.2			
	Chromium (Cr)-Total (mg/L)		<0.0020	<0.0020			
	Copper (Cu)-Total (mg/L)		<0.0010	<0.0010			
	Iron (Fe)-Total (mg/L)		<0.030	<0.030			
	Lead (Pb)-Total (mg/L)		<0.0010	<0.0010			
	Magnesium (Mg)-Total (mg/L)		6.54	8.01			
	Manganese (Mn)-Total (mg/L)		<0.0020	<0.0020			
	Mercury (Hg)-Total (mg/L)		<0.00020	<0.00020			
	Potassium (K)-Total (mg/L)		1.12	1.43			
	Selenium (Se)-Total (mg/L)		<0.0010	<0.0010			
	Sodium (Na)-Total (mg/L)		3.9	3.4			
	Uranium (U)-Total (mg/L)		0.00031	0.00040			
	Zinc (Zn)-Total (mg/L)		<0.050	<0.050			
Organic Parameters	Total Organic Carbon (mg/L)		<0.50	0.58			

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	APHA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

ANIONS-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions are determined by filtering the sample through a 0.45 micron membrane filter and injecting the filtrate onto a Dionex IonPac AG18 anion exchange column with a hydroxide eluent stream. Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-F-IC-VA	Water	Fluoride by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions are determined by filtering the sample through a 0.45 micron membrane filter and injecting the filtrate onto a Dionex IonPac AG18 anion exchange column with a hydroxide eluent stream. Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-NO2-IC-VA	Water	Nitrite by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions are determined by filtering the sample through a 0.45 micron membrane filter and injecting the filtrate onto a Dionex IonPac AG18 anion exchange column with a hydroxide eluent stream. Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-NO3-IC-VA	Water	Nitrate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions are determined by filtering the sample through a 0.45 micron membrane filter and injecting the filtrate onto a Dionex IonPac AG18 anion exchange column with a hydroxide eluent stream. Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions are determined by filtering the sample through a 0.45 micron membrane filter and injecting the filtrate onto a Dionex IonPac AG18 anion exchange column with a hydroxide eluent stream. Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". All fractions of carbon are determined by the combustion-infrared method. Total carbon includes organic carbon (covalently bonded in organic molecules) and inorganic carbon (carbonate, bicarbonate and dissolved carbon dioxide). Total organic carbon is the calculated difference between the total carbon and the inorganic carbon determination. Dissolved carbon fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

COLOUR-TRUE-VA	Water	Colour (True) by Spectrometer	APHA 2120 "Color"

This analysis is carried out using procedures adapted from APHA Method 2120 "Color". Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Aparent Colour is determined without prior sample filtration. Colour is pH dependent. Unless otherwise indicated, reported colour results pertain to the pH of the sample as received, to within +/- 1 pH unit.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

HARDNESS-CALC-VA	Water	Hardness	CALCULATION

HG-TOT-DW-CVAFS-VA	Water	Total Mercury in Water by CVAFS	EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).

Reference Information

MET-TOT-DW-ICP-VA Water Total Metals in Water by ICPAES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-TOT-DW-MS-VA Water Total Metals in Water by ICPMS EPA SW-846 3005A/6020

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020).

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

TDS-VA Water Total Dissolved Solids by Gravimetric APHA 2540 Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TURB-MET-VA Water Turbidity by Meter APHA 2130 "Turbidity"

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

UV-ABS-VA Water UV Absorbance by Spectrometry APHA 5910B "UV Absorption Method" and EP

This analysis is carried out using procedures adapted from APHA Method 5910B "Ultraviolet Absorption Method" and Method 415.3 "Determination of Total Organic Carbon and Specific UV Absorbance at 254nm in Source Water and Drinking Water", published by the United States Environmental Protection Agency (EPA). The sample is filtered through a 0.45um filter and measured for absorbance in a quartz cell at 254nm and reported as absorbance per cm (i.e. cm-1). The analysis is carried out without pH adjustment. Alternatively, results can be reported as % Transmittance (over one cm) where the absorbance result is converted to % Transmittance by the following calculation: %T = 100(10 to the power of -A).

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

36760

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA		

Reference Information

GLOSSARY OF REPORT TERMS
Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.
The reported surrogate recovery value provides a measure of method efficiency. The Laboratory control limits are determined under column heading D.L.
mg/kg (units) - unit of concentration based on mass, parts per million
mg/L (units) - unit of concentration based on volume, parts per million
< - Less than
D.L. - Detection Limit
N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
UNLESS OTHERWISE STATED, SAMPLES ARE NOT CORRECTED FOR CLIENT FIELD BLANKS.
Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

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CHAIN OF CUSTODY FORM

PAGE 1 OF 1

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☐ FAX ☐ EXCEL ☐ PDF ☐ OTHER:

ANALYSIS REQUESTED:

L448094	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	TIME	MATRIX	Full DW Package	UV Absorbance	TOC	Physical Tests (from DW Package)		Dissolved Anions (from DW Package)									NOTES (sample specific comments, due dates, etc.)
	BC AIRPORT	2006-10-20	1430	GW	X	X	X												
	BC SCHOOL	2006-10-22	1030	GW	X	X	X												
	DBAM CREEK	2006-07-23	—	GW				X		X									

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TURN AROUND REQUIRED: ☐ ROUTINE ☐ RUSH - SPECIFY DATE: _____ (surcharge may apply)

SEND INVOICE TO: ☐ SAME AS REPORT **INVOICE FORMAT:** ☐ HARDCOPY ☐ PDF ☐ FAX
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	TIME		TIME 1:18
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	TIME		TIME

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COOLER SEAL INTACT?	SAMPLE TEMPERATURE: 6 °C	COOLING METHOD?
☒ YES ☐ NO ☐ N/A	FROZEN? ☐ YES ☒ NO	☒ ICEPACKS ☐ ICE ☐ NONE

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