

ENVIRONMENT ACT PROPOSAL

**Proposed Two-Cell Wastewater Treatment Lagoon
for Rock Lake Holding Ltd. (SE 1-13-1 WPM)**

Prepared by:



**12 Aviation Boulevard
St. Andrews, Manitoba R1A 3N5**

Contact: Charles Liu, P.Eng.

Table of Contents

1.0 Introduction and Background1

2.0 Environment Act Proposal Required Information2

 2.1 Certificate of Title and Owner of the Land2

 2.2 Existing Land Use and Land Use Designation2

 2.3 Schedule and Funding2

 2.4 Existing Lagoon Facility2

 2.5 Lagoon Design Criteria3

 2.6 Proposed Lagoon4

 2.7 Decommission the Existing Lagoon5

3.0 Site Conditions6

 3.1 Topography of the Site6

 3.2 Geotechnical Investigation6

4.0 Environmental Impact

 4.1 Lagoon Effluent Discharge7

 4.2 Odour7

 4.3 Aquifer Protection8

5.0 Operational Protocol9

Appendix A – Location of Lagoon, Status of Title

Appendix B – Lagoon Drawings

Appendix C – Borehole Logs and Lab Results

Appendix D – Environmental Act Proposal Form

1.0 Introduction and Background

Rock Lake Holding Ltd. (Rock Lake Colony) is located on south half of 1-13-1 WPM in the Rural Municipality of Woodlands, Manitoba. Currently, the colony has a wastewater collection system that empties into a three-cell treatment lagoon which was built in late 1960s. The treated wastewater is discharged into a drain ditch, Colony Creek, which goes through SE 1-13-1 W.

Upon the request of Manitoba Conservation and Water Stewardship, Rock Lake Colony proposed to build a new two-cell lagoon to replace the existing lagoon. The proposed lagoon is to be located on SE 1-13-1 W.

The proposed development includes the construction of a two-cell lagoon, the installation of a new lift station and the installation a new pressure pipeline from the lift station to the proposed lagoon. The existing lagoon will be decommissioned after the new lagoon is put into operation.

Rock Lake Colony was established in 1947. The current population of the colony is 132. The proposed lagoon is designed to serve 140 people.

2.0 Environment Act Proposal Required Information

2.1 Certificate of Title and Owner of the Land

The proposed two-cell wastewater treatment lagoon is to be built on SE 1-13-1 W. The Status of Title shows that Rock Lake Holding Ltd. is the owner of the land. A copy of Status of Title can be found in Appendix A.

2.2 Existing Land Use and Land Use Designation

The site for the proposed lagoon and the land adjoining it are designated as Agricultural General Zone. Annual crops, including wheat, barley and canola are grown on the proposed site and adjoining land.

The residential area for Rock Lake Colony is located on SW 1-13-1 W, west of the proposed site.

2.3 Schedule and Funding

The design of the lagoon facility has been completed. The lagoon will be constructed once the licence is granted and weather conditions are suitable. The existing lagoon will be decommissioned in a year after the proposed lagoon in operation.

All funding for the project will be by Rock Lake Colony.

2.4 Existing Lagoon Facility

The existing lagoon at Rock Lake Colony consists of three cells operating in series.

The first cell is a treatment cell with a surface area of approximately 2,000 m². The top dimensions of the first cell are approximately 250 feet (76 m) by 105 feet (32 m). The organic loading rate is approximately 54 kg BOD₅/hectare/day.

The second cell and the third cell are storage cells. The top dimensions of the cells are 201 feet (61 m) by 72 feet (22 m) and 240 feet (73 m) by 103 feet (31 m), respectively. The volume of the second cell and the third cell is approximately 4,000 m³.

The treated wastewater is discharged twice a year into the ditch east of the cell. The ditch is named Colony Creek. In SE 1-13-1W, Colony Creek is an Order 2 drain. The annual wastewater discharge of Rock Lake Colony is estimated to be 8,000 m³.

2.5 Lagoon Design Criteria

2.5.1 Scope of Service

The scope of this project is to design and construct a two-cell wastewater treatment lagoon for Rock Lake Colony. The current population of Rock Lake Colony is 132. The maximum projected population of the colony is 140. There are no records of water consumption or wastewater discharge available at the colony.

2.5.2 BOD₅ Generation

The BOD₅ generation rate from the residents is estimated to be 77 grams per person per day. Based on this generation rate, the daily domestic BOD₅ is estimated to be 10.78 kg per day.

2.5.3 Wastewater Generation

On the basis of 180 litres per person per day and 140 people, the wastewater generation rate is estimated to be 25.2 m³ per day and the total annual wastewater generation is approximately 9,200 m³.

An annual wastewater volume of 9,200 m³ was used for the lagoon design.

2.5.4 Requirements of Manitoba Conservation and Stewardship

The following requirements were considered in the design of the proposed lagoon:

- Minimum set back from property boundary: 100 feet (30 m);
- Maximum organic loading rate: 56 kg BOD₅/hectare/day;
- Maximum of hydraulic conductivity of clay liner: less than 1X10⁻⁹ meters/second;
- Maximum water depth: 1.5 m;
- Minimum water depth: 0.3 m;
- Freeboard: 1.0 m; and
- Minimum holding period: 257 days (November 1st to June 15th).

2.6 Proposed Lagoon

2.6.1 Primary Cell

The primary cell is a treatment cell. The top dimensions of the primary cell are designed to be 440 feet by 100 feet (134 m X 30 m). The effective surface area is to be 2,835 m². The operational organic loading rate is to be 38 kg BOD₅/hectare/day. This loading is approximately 68% of the maximum allowable loading rate of 56 kg BOD₅ per hectare per day.

The effective volume of the primary cell is approximately 2,560 m³.

2.6.2 Secondary Cell

The secondary cell is a storage cell. The top dimensions of the primary cell are designed to be 440 feet by (average width of) 260 feet (134 m X 79 m).

The effective volume of the secondary cell is to be 9,590 m³. The holding capacity of the secondary cell is to be 380 days. This cell will be discharged once a year.

2.6.3 Clay Liner

A one metre thick clay liner will be installed to retain the wastewater. The test results of the soils to be used for the clay liner are attached in Appendix C. The liner is to be compacted to reach 95% of maximum dry density at plus or minus 2% of optimum moisture content.

2.6.4 Other Design Issues

The interior slopes for both cells are to be 4 (horizontal) to 1 (vertical). The exterior slopes are to be 5 (horizontal) to 1 (vertical).

The elevation of the floors of both cells is to be approximately 1.2 m (4 feet) below the grade. This elevation is approximately the same as the elevation of the bottom of Colony Creek, into which the lagoon is charged.

The inlet pipe to the lagoon is to be 6" HDPE pipe installed by directional drilling. A valve is to be installed near the lagoon.

A 10" PVC cross-over pipeline with a valve is to be installed to link the primary cell and secondary cell.

A 12" PVC SDR35 discharge pipeline with a valve is to be installed from the secondary cell to Colony Creek. Stone Rip-Rap is to be installed in Colony Creek at the discharge location to protect the ditch from erosion.

A 1.2 m 5-barbed wire fence is to be installed on the top (or at the toe) of the berms of the lagoon. An access gate is to be installed in the fence.

2.6.5 Designed Quality of Effluent

The effluent from the lagoon will reach the following requirements:

- BOD₅: not excess of 25 mg/L;
- Total suspended solids: not excess of 25 mg/L;
- Fecal coliform content: not excess of 200 MPN/100 mL; and
- Total coliform content: not excess of 1500 MPN/100 mL.

2.7 Decommission the Existing Lagoon

When the proposed lagoon is constructed, licensed, and placed in to operation, the existing lagoon will be decommissioned. The accumulated organic sludge at the bottom will be transferred to the primary cell of the proposed lagoon to seed and start up the operation.

If the sludge volume exceeds that needed for the new lagoon, Rock Lake Colony will file an application with Manitoba Conservation and Water Stewardship for an approval to apply the sludge on the crop land owned by the colony.

Upon completion of the activity aforementioned, the existing lagoon site will be levelled. The site will be resumed for crop growing.

3.0 Site Conditions

3.1 Topography of the Site

The proposed lagoon will be located on the northwest corner of SE 1-13-1 WPM west of Colony Creek. The land slopes gently west toward east to the ditch.

3.2 Geotechnical Investigation

A geotechnical investigation was undertaken by DGH Engineering Ltd. on November 22nd, 2012 to determine the existing soil conditions in the area where the lagoon is to be built. Three boreholes were drilled in the proposed area (BH#1, BH#2 and BH#3). Refusal was encountered at 17, 26 and 21 feet, respectively. Borehole logs detailing the lithology encountered can be found in Appendix C.

The soil stratigraphy was consistent and is best described as approximately one to two feet of black topsoil overlying high plastic clay to approximately 10 feet below grade.

Lab analysis was conducted on grab samples collected from the boreholes to determine the suitability of the soils for lagoon construction. The test report prepared by Eng-Tech Consulting Ltd. concluded that the soil would be expected to achieve hydraulic conductivity values in the order of 1×10^{-9} m/s when remoulded and compacted to ninety-five percent of maximum dry density at plus or minus two percent of optimum moisture content. This value will comply with the value set out in the Manitoba Conservation guidelines for compacted clay liners.

Construction details for the clay liner can be found in Appendix B, sheet L1, under the "Earthworks and Specifications".

4.0 Environmental Impact

4.1 Lagoon Effluent Discharge

It is proposed that the effluent from the proposed lagoon be discharged to Colony Creek on an annual basis, through a discharge pipe that will be located on the ditch bank, connecting from the lagoon. The discharge valve on this pipe will be equipped with a lock to prevent possible tampering. Colony Creek is an Order 2 drain at the lagoon discharge point and changes to an Order 3 drain downstream from Rock Lake Colony. Colony Creek flows into Sturgeon Creek, an Order 4 drain. Sturgeon Creek is a tributary of the Assiniboine River.

The effluent from the Rock Lake lagoon does not pose a risk to surface water because of its low BOD₅ and fecal/total coliform populations. The effluent quality should be well within the limits set by Manitoba Conservation and Water Stewardship. As per the prescribed operating procedures outlined in this proposal, wastewater quality will be tested before discharge. The lagoon operator will not be allowed to proceed with discharge unless the wastewater quality in the secondary cell meets Manitoba Conservation's limits as set forth in the licence.

The proposed lagoon discharge method and receiving water course is the same as the existing lagoon discharge practice. No change in hydraulic loading to Colony Creek will be caused by the proposed lagoon.

The surface area and volume of the proposed lagoon are larger than the existing lagoon. The effluent quality from the proposed lagoon can be expected to be better than the existing lagoon. The environmental effect of the proposed lagoon is positive.

4.2 Odour

The design organic loading rate of the primary cell is 38.0 kg BOD₅/hectare/day, is within the limits that Manitoba Conservation requires of 56.0 kg BOD₅/hectare/day, which was established to minimize odour.

As stated earlier in this report, this lagoon replaces a smaller existing one. This replacement is positive in improving the environment related to odour issues.

The existing lagoon is located closer to residences and work areas. The location of the proposed lagoon allows for a greater separation distance between it and the living/working space of the colony, which will further mitigate any odours that may emanate from the lagoon. The nearest potential off-colony odour receptors are neighbours located approximately 670 m (2200 feet) from the proposed lagoon to the south. Compared to the existing lagoon's setback of 400 m (1300 feet) from the nearest neighbour, the impact of the proposed lagoon on potential odours experienced by the neighbours is positive.

Additionally, a wind break of trees planned north and west of the lagoon will act to mitigate wind sweep, further reducing odour.

4.3 Aquifer Protection

The existing lagoon was constructed in 1968/1969 prior to any licence requirements.

The proposed lagoon will be a clay liner type lagoon. The construction material is to be confirmed be consistent with the sample tested. The compaction of clay liner will be monitored and tested to verify the hydraulic conductivity is less than 1×10^{-9} m/s. The impact of the proposed lagoon on aquifer protection is positive.

5.0 Operational Protocol

Rock Lack Colony will assign individuals to be certified for the lagoon operation in accordance with Manitoba Regulation 77/2003 respecting Water and Wastewater Facility Operators.

The two-cell lagoon is designed to hold 380 day worth of wastewater. The lagoon will be emptied at least once per year. The timing of the discharge must not be within the winter months, when the lagoon may be ice covered; nor directly after the ice break-up in the spring when it is stabilising. This is interpreted to mean between the dates of November 1st and June 15th, in a normal year. In any case, wastewater must not be discharged unless it meets the discharge requirements listed in the licence issued Manitoba Conservation and Stewardship.

The following steps detail the method of discharge:

- Two weeks before wastewater quality samples are taken, the valve which connects the primary and secondary cells must be closed.
- Two weeks after the valve is closed, take a sample from the secondary cell, and have it tested at an accredited laboratory for BOD₅, total suspended solids (TSS), Fecal coliform and Total coliform. The test results need to be submitted to Manitoba Conservation and Water Stewardship for discharge approval.
- If the BOD₅ does not exceed 25 mg/L, the TSS does not exceed 25 mg/L, Fecal coliform does not exceed 200 MPN/100 mL and Total coliform does not exceed 1,500 MPN/100 mL, the cell may be discharged.
- If the coliform index exceeds the limit, dry chlorine may be applied at a rate of 100 kg/ha. This disinfection needs to be approved by Manitoba Conservation and Water Stewardship in advance. Dechlorination is required after disinfection if the residual chlorine of the wastewater is higher less than 0.02 mg/L.
- After the secondary cell is discharged, the valve linking the primary and secondary cells may be opened, allowing the water levels to equalise. Most of the time, there is sufficient room in the lagoon to simply allow it to operate until the next scheduled emptying.

Appendix A

- Location of Lagoon
- Status of Title



Location of Domestic Lagoon at Rock Lake Colony

DATE: 2011/09/12
TIME: 13:59

WINNIPEG LTD
MANITOBA

FAX 2043602140

TITLE NO: 2147000

PAGE: 1

STATUS OF TITLE

STATUS OF TITLE.....	ACCEPTED	PRODUCED FOR..	2147000
ORIGINATING OFFICE...	WINNIPEG	ADDRESS.....	
REGISTERING OFFICE...	WINNIPEG		
REGISTRATION DATE....	2006/03/27		
COMPLETION DATE.....	2006/04/04		
		CLIENT FILE...	NA
		PRODUCED BY...	K.BERG

LEGAL DESCRIPTION:

ROCK LAKE HOLDING LTD.

IS REGISTERED OWNER SUBJECT TO SUCH ENTRIES RECORDED HEREON
IN THE FOLLOWING DESCRIBED LAND:

S 1/2 OF SECTION 1 AND THE E 1/2 OF SE 1/4 2-13-1 WPM
EXC FIRSTLY OUT OF SE 1/4 OF SAID SECTION 1 DRAIN PLAN 5447 WLTO
AND SECONDLY: WATER CONTROL WORKS PLAN 9986 WLTO
AND EXC OUT OF SW 1/4 OF SAID SECTION 1 AND
SE 1/4 SECTION 2 DRAIN PLAN 12550 WLTO

ACTIVE TITLE CHARGE(S):

2337141	WPG ACCEPTED DESCRIPTION: FROM/BY: TO: CONSIDERATION:	CAVEAT RIGHT-OF-WAY AGREEMENT MTS COMMUNICATIONS INC. WILLIAM F. JOHNSTONE, AS AGENT	REG'D: 1998/12/24 NOTES:
3268452	WPG ACCEPTED FROM/BY: TO: CONSIDERATION:	MORTGAGE ROCK LAKE HOLDING LTD. ROYAL BANK OF CANADA \$3,500,000.00	REG'D: 2006/03/27 NOTES:
3303974	WPG ACCEPTED DESCRIPTION: FROM/BY: TO: CONSIDERATION:	CAVEAT RIGHT OF WAY ROCK LAKE HOLDING LTD.	REG'D: 2006/06/12 NOTES: DOMINANT, PART

ADDRESS(ES) FOR SERVICE:
EFFECT NAME AND ADDRESS

POSTAL CODE

ACTIVE ROCK LAKE HOLDING LTD.
C/O 1700-360 MAIN ST.
WINNIPEG MB

R3C 3Z3

CERTIFIED TRUE EXTRACT PRODUCED FROM THE LAND TITLES DATA
STORAGE SYSTEM ON 2011/09/12 OF TITLE NUMBER 2147000

***** STATUS OF TITLE 2147000 WPG CONTINUED ON NEXT PAGE *****

DATE: 2011/09/12
TIME: 13:59

MANITOBA
STATUS OF TITLE

TITLE NO: 2147000
PAGE: 2

STATUS OF TITLE.....	ACCEPTED	PRODUCED FOR..	2147000
ORIGINATING OFFICE...	WINNIPEG	ADDRESS.....	
REGISTERING OFFICE...	WINNIPEG		
REGISTRATION DATE....	2006/03/27		
COMPLETION DATE.....	2006/04/04		
		CLIENT FILE...	NA
		PRODUCED BY...	K.BERG

ORIGINATING INSTRUMENT(S):

REGISTRATION NUMBER	TYPE	REG. DATE	CONSIDERATION	SWORN VALUE
3268453	WPG	EREQ 2006/03/27	\$0.00	\$0.00
PRESENTED BY: FILLMORE RILEY LLP				
FROM: ROCK LAKE HOLDING LRD.				
TO:				

FROM TITLE NUMBER(S):

A38860 WPG PART

LAND INDEX:

LOT	QUARTER SECTION	SECTION	TOWNSHIP	RANGE
	SE	1	13	1W
NOTE:	EX DR PL 5447 & WCW PL 9986			
	SW	1	13	1W
NOTE:	EX DR PL 12550			
	SE	2	13	1W
NOTE:	E 1/2 EX DR PL 12550			

ACCEPTED THIS 27TH DAY OF MARCH, 2006
BY A. GNIZON FOR THE DISTRICT REGISTRAR OF
THE LAND TITLES DISTRICT OF WINNIPEG.

CERTIFIED TRUE EXTRACT PRODUCED FROM THE LAND TITLES DATA
STORAGE SYSTEM ON 2011/09/12 OF TITLE NUMBER 2147000.

***** END OF STATUS OF TITLE 2147000 WPG *****

Appendix B

- Lagoon Drawings

Appendix C

- Borehole Logs
- Lab Results



BORE HOLE SOIL PROFILE

PROJECT:	Rock Lake Holding Ltd. Two Cell Wastewater Treatment Lagoon
LOCATION:	SE 01-13-01 WPM
PERFORMED BY:	Charles Liu, P.Eng.
DRILLER:	Paddock Drilling Ltd.
DATE:	November 22, 2012

Bore Hole #1: Location: UTM14 609519E, 5547343N

Depth	Soil Description
0 - 2.5'	Clay, high plastic, black
2.5' - 5'	Clay brownish w/ tiny silt pockets, high plastic
5' - 9'	Clay till, w/ tiny silt pocket w/ stone, medium plastic (Clay 43.6%, Silt 36.6%, Sand 19.1%, Gravel 0.7%, LL 45% and PI 31)
9' - 10'	Clay, more silt, colour getting lighter
10' - 12.5'	Clay soft, wet
12.5' - 15'	Silty clay, soft, wet
15' - 17'	Silt w/ stone, damp
17'	Refusal

Bore Hole #2: Location: UTM14 609968E, 5547534N

Depth	Soil Description
0 - 5'	Clay, high plastic, black
5' - 7'	Brown clay w/ tiny silt pocket
7' - 10'	Clay, colour getting lighter, & softer
10' - 16'	Light brown clay w/ tiny silt pocket, high plastic (Clay 60.2%, Silt 27.9%, Sand 11.4%, Gravel 0.4%, LL 68% and PI 50)
16' - 21'	Grey clay soft
21' - 26'	Silty clay light brown w/ stone, soft wet
26'	Refusal

Bore Hole #3: Location: UTM14 609634E, 5547636N	
Depth	Soil Description
0 - 1'	Topsoil
1' - 4'	Clay, high plastic, colour from black to brown as getting deeper (Clay 60.4%, Silt 33.6%, Sand 5.9%, Gravel 0.1%, LL 68% and PI 57)
4' - 5'	Brown clay w/ stone
5' - 9'	Brown clay w/ tiny silt pocket
9' - 10'	Clay, getting lighter in colour & softer as getting deeper
10' - 14'	Clay, soft light, brown
14' - 21'	Silty clay w/ stone, soft
21'	Refusal



Unit 6 - 854 Marion Street, Winnipeg, Manitoba, R2J 0K4
Phone: (204) 233-1694 Fax: (204) 235-1579
E-mail: eng_tech@mts.net
www.eng-tech.ca

December 11, 2012

File No.: 12-030-01

DGH Engineering Ltd.
12 Aviation Blvd.
St. Andrews, Manitoba
R1A 3N5

ATTENTION: Charles Liu

RE: ROCK LAKE COLONY DOMESTIC WASTEWATER TREATMENT LAGOON:
File No. 1047-009

Dear Mr Liu,

ENG-TECH Consulting Limited (ENG-TECH) has completed the requested analyses of 3 (Three) soil samples from the above project. The laboratory soil analyses consisted of the following:

- Particle Size Analysis (3)
- Atterberg Limits (3)
- Moisture Content (3)

The above tests were conducted in accordance with the current ASTM Standard Test Methods D 422, D4318; method B and D 2216.

The results of the Atterberg Limits and insitu moisture contents are shown on Table 1. Also attached are the grain size distribution results shown on the Particle Size Analysis Reports (Ref. No. 12-30-1-25, 26, 27).

Soils with index properties such as the samples submitted, would be expected to achieve hydraulic conductivity values in the order of 1×10^{-7} cm/sec when remoulded and compacted to 95 percent of maximum dry density at plus or minus two percent of optimum moisture content.

ENG-TECH trusts this is all the information you require. If you have any questions, please contact the undersigned.

Sincerely,
ENG-TECH Consulting Limited

A handwritten signature in black ink, appearing to be "Sunny Deboch".

Sunny Deboch, EIT
Materials Engineer

Sincerely,
ENG-TECH Consulting Limited

A handwritten signature in black ink, appearing to be "Danny Holfeld".

Danny Holfeld, Principal
Manager of Operations

Email: cliu@dghengineering.com

Attachments: Table 1
Particle Size Analysis Reports (Ref. No. 12-30-1-25, 26, 27)

P:\2012\Projects\030\01 (2012 Material Testing Services (Various))\Estimation of Hydraulic Conductivity Cover letter, december 11, 12.doc

**TABLE 1
SOIL SAMPLE ANALYSES**

Test Hole	Sample No.	Ref. No.	Depth (ft.)	Classification	Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
-	1	12-30-1-25	5'-9'	Cl, clay, medium plastic, brown, and silt, some sand	24.1	45	14	31
-	2	12-30-1-26	10'-15'	CH, clay, high plastic, light brown, with silt, some sand	51.9	68	18	50
-	3	12-30-1-27	0'-5'	CH, clay, high plastic, dark brown, with silt, trace sand	31.9	82	25	57



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**PARTICLE SIZE
 ANALYSIS REPORT**

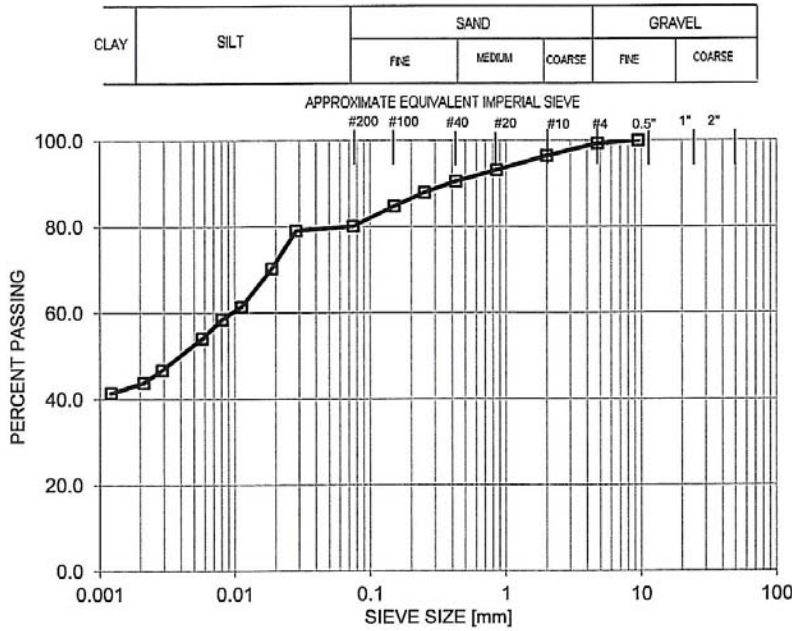
DGH Engineering Ltd.
 12 Aviation Blvd.
 St. Andrews, Manitoba
 R1A 3N5

File No.: 12-030-01
 Ref. No.: 12-30-1-25

ATTENTION: Charles Liu

PROJECT: ROCK LAKE COLONY DOMESTIC WASTEWATER TREATMENT LAGOON; File No.1047-009

Test Hole No.: - **Sample No.:** 1 **Depth:** 5'-9'
Sampled By: Client **Type of Sample:** Grab **Source:** Project site
Date Sampled: Nov 22/12 **Date Received:** Nov 30/12 **Date Tested:** Dec 5/12



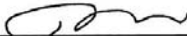
SIEVE SIZE (mm)	PERCENT PASSING
9.500	100.0
4.750	99.3
2.000	96.5
0.850	93.1
0.425	90.5
0.250	87.9
0.150	84.8
0.075	80.2
0.028	79.1
0.019	70.3
0.0112	61.5
0.0081	58.5
0.0057	54.1
0.0029	46.8
0.0021	43.8
0.0012	41.5

Percent of: GRAVEL (0.7 %), SAND (19.1 %), SILT (36.6 %), CLAY (43.6 %)
Sample Description:

COMMENTS: Insitu Moisture content is 24.1%.

Email: cliu@dghengineering.com

ENG-TECH Consulting Limited

per 
 Contact: Danny Holfeld, Principal
 Ph: (204) 233-1694 Fax: (204) 235-1579



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**PARTICLE SIZE
 ANALYSIS REPORT**

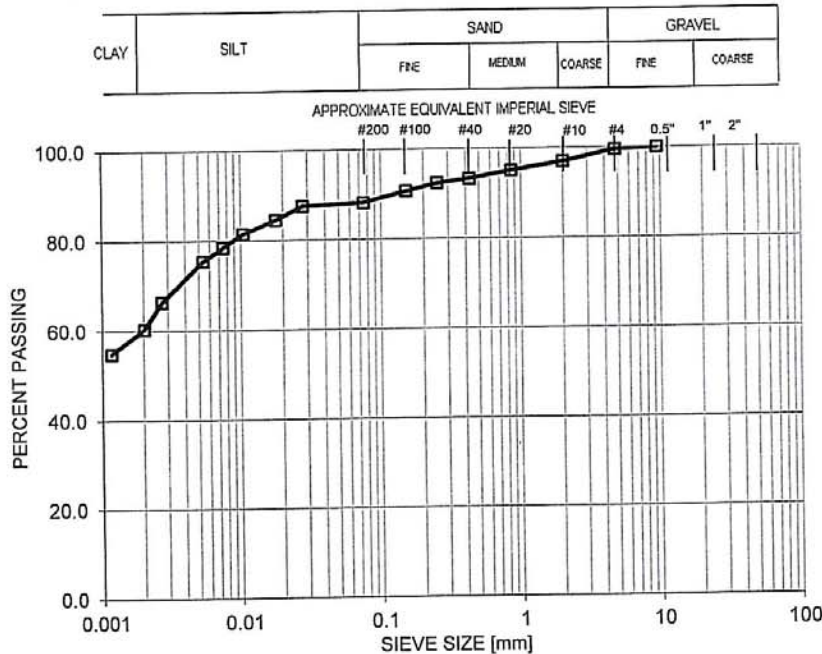
DGH Engineering Ltd.
 12 Aviation Blvd.
 St. Andrews, Manitoba
 R1A 3N5

File No.: 12-030-01
 Ref. No.: 12-30-1-26

ATTENTION: Charles Liu

PROJECT: ROCK LAKE COLONY DOMESTIC WASTEWATER TREATMENT LAGOON; File No.1047-009

Test Hole No. - Sample No. 2 Depth: 10'-15'
 Sampled By: Client Type of Sample: Grab Source: Project site
 Date Sampled: Nov 22/12 Date Received: Nov 30/12 Date Tested: Dec 5/12



SIEVE SIZE (mm)	PERCENT PASSING
9.500	100.0
4.750	99.6
2.000	97.0
0.850	95.1
0.425	93.3
0.250	92.4
0.150	90.7
0.075	88.2
0.028	87.6
0.018	84.5
0.0104	81.5
0.0075	78.5
0.0054	75.5
0.0027	66.4
0.0020	60.3
0.0012	54.8

Percent of: GRAVEL (0.4 %), SAND (11.4 %), SILT (27.9 %), CLAY (60.2 %)

Sample Description:

COMMENTS: Insitu Moisture content is 51.9%.

Email: cliu@dghengineering.com

ENG-TECH Consulting Limited

per
 Contact: Danny Hoffeld, Principal
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**PARTICLE SIZE
 ANALYSIS REPORT**

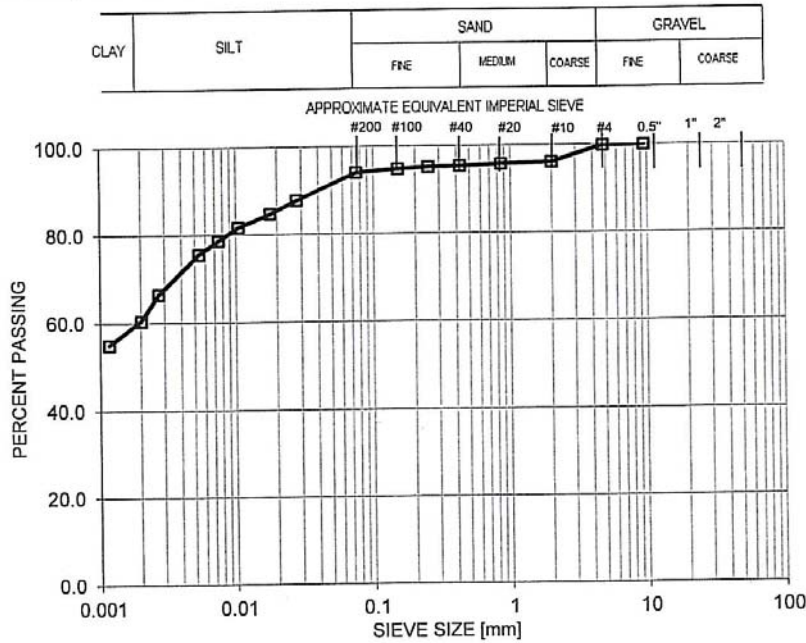
DGH Engineering Ltd.
 12 Aviation Blvd.
 St. Andrews, Manitoba
 R1A 3N5

File No.: 12-030-01
 Ref. No.: 12-30-1-27

ATTENTION: Charles Liu

PROJECT: ROCK LAKE COLONY DOMESTIC WASTEWATER TREATMENT LAGOON; File No.1047-009

Test Hole No. - Sample No. 3 Depth: 0'-5'
 Sampled By: Client Type of Sample: Grab Source: Project site
 Date Sampled: Nov 22/12 Date Received: Nov 30/12 Date Tested: Dec 5/12



SIEVE SIZE (mm)	PERCENT PASSING
9.500	100.0
4.750	99.9
2.000	96.1
0.850	95.7
0.425	95.3
0.250	95.2
0.150	94.8
0.075	94.0
0.028	87.8
0.018	84.7
0.0104	81.7
0.0075	78.7
0.0054	75.6
0.0027	66.5
0.0020	60.4
0.0012	55.0

Percent of: GRAVEL (0.1 %), SAND (5.9 %), SILT (33.6 %), CLAY (60.4 %)
 Sample Description:

COMMENTS: Insitu Moisture content is 31.9%.

Email: cliu@dghengineering.com

ENG-TECH Consulting Limited
 per
 Contact: Danny Holfeld, Principal
 Ph: (204) 233-1694 Fax: (204) 235-1579

Appendix D

- Environment Act Proposal Form

Environment Act Proposal Form

Name of the development: Rock Lake Colony Two Cell Wastewater Treatment Lagoon <i>ROCK LAKE HOLDING LTD</i>	
Type of development per Classes of Development Regulation (Manitoba Regulation 164/88): Class 2, waste treatment and storage	
Legal name of the proponent of the development: Rock Lake Colony <i>ROCK LAKE HOLDING LTD</i>	Mailing address: Box 10, Grosse Isle, MB R0C 1G0
Location (street address, city, town, municipality, legal description) of the development: SE 1-13-1 W	
Name of proponent contact person for purposes of the environmental assessment: Charles Liu	
Phone: 204-334-8846 Fax: 204-334-6965	Mailing address: 12 Aviation Boulevard., St. Andrews, MB R1A 3N5
Email address: cliu@dghengineering.com	
Webpage address:	
Date: <i>Dec 14 / 2012</i>	Signature of proponent, or corporate principal of corporate proponent: <i>Ben Hofer</i> Printed name: <i>BEN HOFER</i>

A complete **Environment Act Proposal (EAP)** consists of the following components:

- **Cover letter**
- **Environment Act Proposal Form**
- **Reports/plans supporting the EAP** (see "Information Bulletin - Environment Act Proposal Report Guidelines" for required information and number of copies)
- **Application fee** (Cheque, payable to Minister of Finance, for the appropriate fee)

Submit the complete EAP to:

Director
Environmental Assessment and Licensing Branch
Manitoba Conservation
Suite 160, 123 Main Street
Winnipeg, Manitoba R3C 1A5

For more information:

Phone: (204) 945-7100
Fax: (204) 945-5229
Toll Free: 1-800-282-8069, ext. 7100
<http://www.gov.mb.ca/conservation/eal>

Per Environment Act Fees Regulation (Manitoba Regulation 168/96):	
Class 1 Developments	\$500
Class 2 Developments	\$5,000
Class 3 Developments:	
Transportation and Transmission Lines.....	\$5,000
Water Developments	\$50,000
Energy and Mining.....	\$100,000