Regular Council Meeting ADDENDUM to the
May 19th 2021 Electronic Meeting

https://us02web.zoom.us/j/88474231717?pwd=UjJ0QmtBQWxBenhvaG5ldHJlWDNpUT09

1. CALL TO ORDER: Minutes of _____
2. DISCLOSURES OF PECUNIARY INTEREST: Statements for the Month of _____
3. DELEGATIONS:
4. STAFF AND COMMITTEE REPORTS:
5. ADOPT ADDENDUM:

A. 6. OLD BUSINESS:
1.

B. 7. NEW BUSINESS:
4. Required revision of the Water Financial Plan reporting

C. 8. INFORMATION:

1a. Additional information regarding lagoon cleanout
4. Facility Condition Assessment for Municipally owned buildings *Due to size of file see link on website*

D. 9. MEETINGS/WORKSHOPS:
1.
10. NOTICE OF MOTION:

11. CLOSED SESSION:

12. ADJOURNMENT:

The Corporation of the Township of Johnson

DECLARATION OF PECUNIARY INTEREST – Municipal Conflict of Interest Act

I, Council member (print) _____, declare a potential (deemed/direct/indirect) pecuniary interest on Council Agenda (check) ____ Committee Agenda (check) ____

Dated _____ Agenda Item Number _____

Agenda description of item _____ for the following reason:

_____

_____

_____

_____

_____ _____

Signature of member of council or committee print name

NOTE: To be recorded in a registry along with the associated Minutes and available upon request for public inspection

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Definition of interests:

Indirect pecuniary interest

2 For the purposes of this Act, a member has an indirect pecuniary interest in any matter in which the council or local board, as the case may be, is concerned, if,

(a) the member or his or her nominee,

(i) is a shareholder in, or a director or senior officer of, a corporation that does not offer its securities to the public,

(ii) has a controlling interest in or is a director or senior officer of, a corporation that offers its securities to the public, or

(iii) is a member of a body,

that has a pecuniary interest in the matter; or

(b) the member is a partner of a person or is in the employment of a person or body that has a pecuniary interest in the matter. R.S.O. 1990, c. M.50, s. 2.

Interest of certain persons deemed that of member

3 For the purposes of this Act, the pecuniary interest, direct or indirect, of a parent or the spouse or any child of the member shall, if known to the member, be deemed to be also the pecuniary interest of the member. R.S.O. 1990, c. M.50, s. 3; 1999, c. 6, s. 41 (2); 2005, c. 5, s. 45 (3).

Agenda Item B4-Add.
Date: 5-19-21

Est.1889
Township of
JOHNSON

Hamlet of Desbarats
Drinking Water System

Financial Plan

Prepared by:

The Corporation of the Township of Johnson

Introduction to Legislation,

The Drinking water licensing program was developed by the Province of Ontario based on Justice O'Connor's Part II Walkerton 2000 Report issued as a result of his inquiry following the Walkerton Ontario Drinking Water incident. The Licensing program was required by Regulations under the promulgation of the Safe Drinking Water Act in 2002. The program includes several elements which are pre-requisites to formal issuance of a Drinking Water License by the Ministry of the Environment. These elements include:

- Receipt of a Drinking Water Works Permit, (DWWP) which replaces the Certificate of Approval formerly issued
- A Permit to Take Water – required under the Ontario Water Resources Act for daily water taking in excess of 50,000 litres per day
- An approved Operational Plan (OP) - in compliance with the Drinking Water Quality Management Standard, (DWQMS)
- An approved Financial Plan – as required under the Financial Plans Regulation (O. Reg. 453/07)
- Accreditation of the Drinking Water Operating Authority – based on the acceptance of an audited OP by the Canadian General Standards Board

The requirement for the Financial Plan for the Township of Johnson since it is an existing water works system is included as a condition for the renewal of the License for the water works. The License condition requires that the Financial Plan be submitted with the Drinking Water License renewal application. The original License was issued on August 23, 2011. The content of the Financial Plan must be prepared in accordance with the requirements outlined in the Financial Plans Regulation (O Reg 453/07).

The Financial Plan must include a statement that the financial impacts of the drinking water system have been considered, and apply for a minimum of six (6) years and outline details of the proposed or projected revenues and expenses. The Financial Plan must also identify all assets and liabilities.

Background

The Hamlet of Desbarats is the commercial hub for the Township of Johnson and has a population of approximately 93 homes and 15 commercial and institutional buildings. The Township of Johnson is responsible for the water distribution and billing within the Hamlet of Desbarats.

The water treatment plant which is located on Kensington Point near the marina was commissioned in 1986. The raw surface water is drawn from Lake Huron through a 170 meter, 114 millimeter intake extending 70 meters from the shore. Treatment consists of coagulation, flocculation and sedimentation followed by dual media filtration. Following filtration, disinfection is provided by a duplex hypochlorite (chlorine) disinfection system. Treated water is stored in six pre-charged pressure tanks. Treated and disinfected water is directed by force main to the Hamlet.

The Hamlets existing Drinking Water License expires June 2021, therefore, this financial plan will serve to meet the licensing requirement, and must be approved by Council by way of resolution no later than May 2021.

Water Financial Plan requirements

The Financial Plan Regulation O.Reg 453/07 requires the Drinking Water System Financial Plan to have the following statements:

1. Details of the proposed or projected financial position of the drinking water system itemized by:
    a. Total financial assets
    b. Total liabilities
    c. Net debt
    d. Non-financial assets that are tangible capital assets, tangible capital assets under construction, inventories of supplies and prepaid expenses, and
    e. Changes in tangible capital assets that are additions, donations, write downs and disposals.

2. Details of the proposed or projected financial operations of the drinking water system itemized by:
    a. Total revenues, further itemized by water rates, user charges and other revenues
    b. Total expenses, further itemized by amortization expenses, interest expenses and other expenses,
    c. Annual surplus or deficit, and
    d. Accumulated surplus or deficit.

3. Details of the drinking water system's proposed or projected gross cash receipts and gross cash payments itemized by:
    a. Operating transactions that are cash received from revenues, cash paid for operating expenses and finance charges
    b. Capital transactions that are proceeds on the sale of tangible capital assets and cash used to acquire capital assets
    c. Investing transactions that are acquisitions and disposal of investments
    d. Financing transactions that are proceeds from the issuance of debt and debt repayment
    e. Changes in cash and cash equivalents during the year
    f. Cash and cash equivalents at the beginning and end of the year.

Note: Not all requirements will apply in all situations and only the requirements known to the owner at the time the Financial Plan is prepared are reported.

1. Proposed or Projected Financial Position

The statement of the Proposed or Projected Financial Position describes the assets, liabilities, net financial assets and accumulated Surplus (Deficit).

As at December 31, 2019 the Audited Financial Statements show the Cash and Cash Equivalents (Reserves) for the Water System at $134,742.47. A Bylaw that was passed in 2017 added a Capital Improvement Reserve amount to each user of $100.00 per year and $3,000.00 per year for the School. These funds are added to the Reserve Year over Year. A review of the balance in the General Reserve for the Municipality has allowed for a transfer to, and an increase of, the Reserves for Water; of about $310,000.00. With this increase the balance in the Reserves for Water to a total of $361,762.43 in 2021.

Financial Assets	Forecast Period						
	2021	2022	2023	2024	2025	2026	2027
Cash & Cash Equivalents	361,762.43	375,262.43	388,762.43	402,262.43	415,762.43	429,262.43	442,762.43
Capital Improvement Res.	13,500.00	13,500.00	13,500.00	13,500.00	13,500.00	13,500.00	13,500.00
Total Financial Cash & Equity Reserves	375,262.43	388,762.43	402,262.43	415,762.43	429,262.43	442,762.43	456,262.43
Total Tangible Capital Assets	398,525.20	398,045.47	391,851.16	392,492.29	389,248.36	396,854.14	375,078.75
Total Forecasted Assets and Reserves	1,172,312.83	1,184,853.37	1,185,964.75	1,200,747.01	1,207,759.15	1,236,470.71	1,206,419.93

2. Proposed or Projected Financial Operations

Water Rate Types

The Township measures water consumption by way of water meters. Many of the water meters were installed in 1986. Water meters requiring replacement are done on an 'as needed' basis. The cost of the meters is borne by the Township and only by the customer if it is found to have been damaged by abuse or neglect.

Revenues are made up of a basic water service flat rate with an up-charge rate of $5.00 per cubic meter over 15 cubic meters as set out in By-Law No. 2017-858. The school is charged $5.00 per cubic meter plus the monthly flat rate.

Meters are read on a quarterly basis and invoices are sent to residences each March, June, September and December month end.

A Capital Improvement Charge is levied each June in the amount of $100.00 for each Residential and Commercial user and $3,000.00 for the School. The past 5 years these funds were used to offset the costs of O & M expenditures and emergency repairs.

Although there has not been an increase in the last 5 years the current pricing has allowed the Water System to be remain self-sustaining.

Historical Rates and Expenses

Residential & Multi Residential						
Year		2017	2018	2019	2020	2021
Rate	101	55.00	55.00	55.00	55.00	55.00
Increase		0.00	0.00	0.00	0.00	0.00
Increase%		0.00	0.00	0.00	0.00	0.00
	Over 15 cu mtrs $5.00/cu mtr					
Commercial						
Rate	19	65.00	65.00	65.00	65.00	65.00
Increase		0.00	0.00	0.00	0.00	0.00
Increase %		0.00	0.00	0.00	0.00	0.00
	Over 15 cu mtrs $5.00/cu mtr					
Schools						
Rate	1	600.00	600.00	600.00	600.00	600.00
Increase		0.00	0.00	0.00	0.00	0.00
Increase %		0.00	0.00	0.00	0.00	0.00
	Over 1 cu mtr $5.00/cu mtr					

Historical Expenses					
Year	2017	2018	2019	2020	2021
Replacement / Operating	57,513.50	24,924.39	2,388.11	615.00	8,234.02
Contract	78,500.00	80,462.50	82,474.06	84,535.91	86,649.31
Total Expenses	136,013.50	105,386.89	84,862.17	85,150.91	94,883.33

Currently, The Township of Johnson has a contract with PUC Services in Sault Ste. Marie. It is PUC responsibility to monitor the entire water system, perform routine maintenance, respond to the site when required and assist in any distribution repairs ensuring conformance with MOECC Drinking Water License and the Safe Drinking Water Act.

The cost of the 'Contract' with PUC is outlined in the Historical Expenses. This contract is for 5 years and will expire in March 2022. At that time the Township will be in a position to renegotiate for another 5 years. The O&M 'Replacement' costs are based on the Capital and Asset Replacement dates as Estimated by PUC Services.

Projected Rates and Expenses

The flat rates have not increased over the last 5 years yet costs have increased by at least the 'cost of living'. It is anticipated that the monthly rates will have to be increased by 2.5-3.0 percent per year going forward.

Projected Residential & Multi Residential							
Year		2022	2023	2024	2025	2026	2027
Rate	101	55.00	56.65	58.35	60.10	61.90	63.76
Increase		0.00	1.65	1.70	1.75	1.80	1.86
	Over 15 cu mtrs $5.00/cu mtr						
Commercial							
Rate	19	65.00	66.95	68.96	71.03	73.16	75.35
Increase		0.00	1.95	2.01	2.07	2.13	2.19
	Over 15 cu mtrs $5.00/cu mtr						
Schools							
Rate	1	600.00	618.00	636.54	655.64	675.31	695.56
Increase		0.00	18.00	18.54	19.10	19.67	20.26
	Over 1 cu mtr $5.00/cu mtr						
Avg Consum. over min		$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00	$2,200.00

Total Expenses include the sum of the O&M Replacement, Operating, and Contract expenses. Operating expenses include the cost for wages, materials, supplies and equipment incurred by the Townships own forces.

Projected Expenses						
Year	2022	2023	2024	2025	2026	2027
Replace/Operating	25,152.60	22,629.00	16,554.81	23,427.47	19,354.08	30,645.35
Contract	86,649.31	88,815.54	91,035.93	93,311.83	95,644.63	98,035.74
Total Exp	111,801.91	111,444.54	107,590.74	116,739.30	114,998.71	128,681.09

Full Cost Recovery Methodology

Going forward the Capital Improvement Levy will continue to be used in addition to Projected Rate Revenue and Usage over the minimum to offset the costs of O & M expenditures and emergency repairs.

The Hamlet's projected water rate structure expects to fully recover the costs for the water services. The Township of Johnson will have a zero base budget whereby all surplus revenue is transferred into the Water Reserve at the end of each year. In the event of a deficit the amount of the deficit will be financed from the Water Reserve. Therefore there will be no additional accumulated surplus or deficit year over year and the water system will continue to be self-sustaining.

Additional Requirement for Reporting on Financial Plan

1. Under the Act the Township must show whether or not there is Lead within the Township Water System and what the proposed plans are for replacement is, if needed. Testing on the system is carried out every 3 years for the period of month between Dec and Mar and between Jun and Oct. Under the DWAMS Form 05-17 Report for 2020 as carried out by PUC Services, the Desbarats Water System reported less than <1 ug/L in the Winter and Summer test.

2. This Water Financial Plan is approved by resolution of Council on {date} and with Resolution Number {number}

3. The Financial Plan runs from the expiry date of December 2021 to and including December 2027.

4. The Financial Plan must be made available, on request, to members of the public who are served by the drinking water system without charge. The Plan will be posted on the Municipal Website at johnsontownship.ca and notice will be provided advising the public that a copy of the Financial Plan is available for pickup at the Municipal Office.

5. The Township will provide a copy of the Financial Plan and Council Resolution to the Ministry of Municipal Affairs and Housing.

Bishop Solids Management Solutions

Low-energy, easy-to-operate dewatering and containment

Agenda Item C 1(A) - ADD.
Date: 5-19-21

BISHOPWATER

Bishop Solids Management Solutions:
Cost-effective, onsite solids dewatering and containment

Reduce the cost and complexity of solids collection, dewatering and containment with easy-to-operate, low-energy **Bishop Solids Management Solutions**.

Unlike complex, energy-intensive mechanical dewatering equipment, Bishop approach utilizes a passive tering process that achieves a high level of dry solids using only specially selected polymers, Geotube® filtration and gravity.

Bishop Solids Management Solutions, with Geotube® dewatering containers, can accept and dewater solids as fast as they can be pumped in, which eliminates the additional time that some conventional settling processes require. These advantages enable **Bishop Solids Management Solutions** to perform faster, more efficiently and at lower cost than alternative systems.

Proven solutions designed and installed by an experienced team

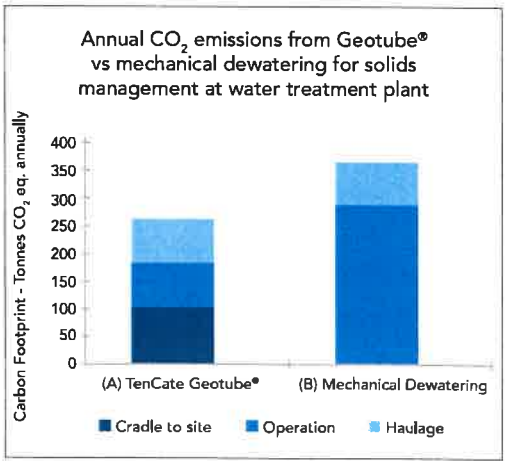
Bishop Solids Management Solutions are ideal to collect and dewater virtually any type of organic or granular slurry material, including fines, silts and clays. Systems that are permanently installed, or operating on a temporary basis, are proven to provide consistent results and reliable, cost-effective dewatering performance, odour control and containment for a wide range of demanding applications.

Precise, automated polymer dosing with Bishop Water's Venturi Emulsified Polymer Activation System (VEPAS) accelerates dewatering and ensures that fine solids are bound together and remain in the container.

An optimized polymer regime, combined with Geotube® containers, aids in the removal and retention of contaminants such as BOD, TSS, phosphorus, nitrogen and even metals, including lead, copper, nickel, chromium, cobalt and more. In many cases, this treatment process can produce filtrate that meets regulatory requirements for discharge into sanitary sewers or directly into receiving bodies.

Low lifecycle costs

With few components, low energy requirements and little operator oversight required, lifecycle costs are a fraction of alternative dewatering systems. Superior performance also helps significantly reduce hauling costs to dispose of sludge and contributes to a dramatic reduction in overall greenhouse gas emissions compared to mechanical alternatives.



A system for all dewatering and containment projects

Modular **Bishop Solids Management Solutions** are fully customizable to fit any dewatering and containment parameters with a compact site footprint. This versatility, combined with robust performance, has led to rapid adoption for challenging solutions throughout Canada including:

Municipal

Sludge dewatering, lagoon cleanout, septage management, water treatment residuals.

Stormwater ponds

Restore storage capacity without decommissioning ponds.

Commercial, industrial and agricultural

Expand lagoon capacity, dewater and contain process waste material.

Environmental remediation

Dredging and dewatering of contaminated sediment from rivers, lakes and other waterways.

Construction

Onsite collection and dewatering of excess soils for reuse or removal.

Shoreline protection and marine structures

Protect and reclaim land, create wetlands, build offshore structures.

Mobile systems for emergency or temporary dewatering needs

Bishop Water's Mobile Dewatering System provides a rapidly deployable, compact solution to efficiently and cost-effectively handle the collection and dewatering of materials from virtually any site.

Whether handling wastewater sludge or contaminated sediments, the mobile system can often be commissioned within a day and provides the same high level of reliability, automation and performance as a full-scale installation. The system is certified to meet environmental compliance standards for contaminant removal and the safe discharge of treated filtrate.

Ask us about simple, low-energy nutrient removal with Bishop BioCord™ Reactors.

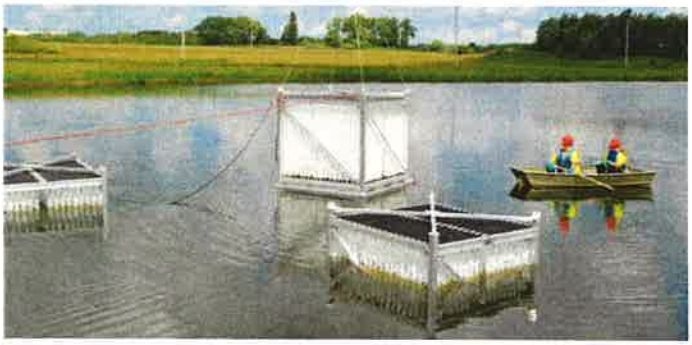
Bishop BioCord™ Reactors provide a simple, low-energy, fixed-film biological treatment process to dramatically increase the capacity and performance of wastewater lagoons and conventional activated sludge systems. This modular, customizable technology can be installed directly into an existing treatment system, avoiding expansion to plant footprint and minimizing capital costs.

BioCord Reactors provide self-regulating and self-cleaning operation that responds quickly to variable influent or upset conditions and require little operator attention or maintenance. An optimized BioCord Reactor system is capable of significantly reducing target nutrients and other constituents including ammonia, nitrogen and BOD – even in cold-weather or high-strength loading conditions.

Evaluate system performance with onsite or bench-scale testing

Simple dewatering tests can demonstrate the anticipated full-scale dewatering performance of a **Bishop Solids Management Solution**. Performed under passive or pressurized conditions, the tests verify the effectiveness of selected polymers and Geotube® filtration.

The data enables Bishop Water to select the best possible polymer, optimize the dose rate, and propose the design, equipment selection and construction of a full-scale system. The team can also calculate potential long-term savings that the Solids Management System will provide through ...uced energy use, chemical consumption and solids ...uling.



Comprehensive services and support for the life of each Bishop Solids Management Solution

Bishop Water's highly experienced and capable teams support every aspect of system engineering, manufacturing and delivery of a **Bishop Solids Management Solution**, ensuring the highest level of quality and performance for each site.

Our team works closely with each client to assess site conditions and treatment requirements, design the appropriate Solids Management Solution and manufacture the system at our headquarters in Renfrew, Ontario. We incorporate the highest quality structural, process and control components to ensure that each Solids Management Solution delivers reliable, trouble-free operation and continually meets performance requirements.

Once on site, Bishop Water's skilled field technicians efficiently install and commission the Solids Management Solution and ensure that operators are fully trained to operate, maintain and optimize the system. Our team also strives to uphold our high standards and industry-leading reputation for responsive, customer-focused support.

BISHOPWATER

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Bishop Water Technologies

September 21, 2009

Lagoon Dewatering Solutions Case Study: The Municipality of Arran-Elderslie

The Municipality of Arran-Elderslie operates three sewage lagoons, located in the town of Chesley, Ontario. In 2009, the Municipality sought a solution for cleaning up the newest of the towns three lagoons, for the first time in it's twenty five year history.

Having used mechanical methods to clean its lagoons in the past, the Municipality wanted a solution which was effective, low cost, odorless and would work with the limited footprint available. After evaluating several options they chose Bishop Water Technologies to undertake the lagoon cleanup project, using Geotube® dewatering containers.

In August 2009, Six Geotube® units were used to dewater and contain sludge pumped from one of the three sewage lagoons operated by The Municipality of Arran-Elderslie.

Geotube® containers are constructed of a special woven polypropylene material which is extremely efficient at retaining solids and producing a clear, cleaner effluent. The Geotube® is basically a large dewatering bag which retains a high percent of solids while dispersing a clear effluent.

In August of 2009, and in partnership with Geo-Dredging and Dewatering Solutions Inc, the lagoon cleanup using the Geotube® dewatering technology commenced.

A temporary dewatering cell consisting of a geo-membrane and crushed stone was constructed along the edge of the lagoon. The dewatering cell was constructed to allow clear filtrate dispersing from the tubes to be directed via gravity back into the lagoon. Six Geotube® units measuring thirty feet in circumference by one hundred feet in length were brought on site to dewater and contain the lagoon sludge.

A dredge was used to blend the sludge in the lagoon, and transfer it to the Geotube® units. Sludge was pumped through a mobile PVC mixing chamber where it was injected inline with polymer. The injection of polymer creates a flocculation in the sludge, causing the solids to bind together and separate from the liquid.

Crews were onsite for seven days, during that time approximately one hundred and ten dry tons of solids were contained by the Geotube® technology.

Grab samples of dewatered solids indicated that the sludge which had been pumped from the lagoon at about 3%, had dewatered to 31.6% solids over the eight day period.

Arran-Elderslie Water Works Manager, Scott McLeod immediately identified benefits of the Geotube® technology, he said, the process "builds capacity in the lagoon." In addition, instead of trucking sludge at 98% water "we'll be trucking solid sludge, and at a time when the farmer really needs it, not when we want to get rid of it."

Mayor Ron Oswald added "We are really pleased with the results."

Not only was the Township pleased with the results of the project but also the cost savings they realized through choosing the Geotube® dewatering technology. The total project was about one third cheaper than methods they had used in the past.

Every lagoon cleanout is unique, with each presenting a different set of challenges. Lowering transportation costs, on site storage, reducing odor, retention of valuable solids, quick mobilization and meeting stringent environmental protocols are just a few. The Geotube® dewatering technology is the only dewatering technology that provides a solution to all these challenges and does so with simplicity and affordability.

For More Information Contact:
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Phone: 613 628 5266 **Fax: 613 628 5978** **Email: kevin@bishopaquatic.com**
www.bishopaquatic.com

Bishop Water Technologies Inc.

Municipal Sewage Lagoon Dewatering Case Study:

June 10, 2011

Parry Sound Uses Geotube® Technology to Dewater Sewage Lagoon Sludge

THE CHALLENGE

The Municipality of McDougall operates a four lagoon cell system close to Parry Sound, Ontario for the management of sewage sludge. The four cells were in need of major rehabilitation which included the replacement of the cell liners and the repair of the cell walls. In order to perform the rehabilitation the sludge from the lagoon cells would need to be removed, dewatered and transported offsite. The township intended to landfill the material, and in order to do so would require a dewatering technology which could not only produce a material that would pass the slump test, but a technology which could be deployed quickly and economically.

THE SOLUTION

Geo-Dredging and Dewatering Solutions Inc, was contacted by Fowler Construction, who served as the General Contractor for the project, and were asked to undertake the dewatering portion of the project using the Geotube® dewatering technology. Before undertaking the project representatives of Geo-Dredging and Dewatering Solutions Inc. made a visit to the lagoon cell to collect representative samples of sludge contained in the lagoon After bench testing several representative samples collected from the lagoon it was determined that the sludge contained in the lagoon was approximately 5-6% solids and was optimally flocculated using 4.7 kg of polymer per Bone Dry Ton of material.

THE CONSTRUCTION

A dewatering cell was constructed in close proximity to the Lagoon cells in order to transfer the filtrate produced through the dewatering process back to the lagoon as simply as possible. Fowler Construction undertook the construction of the dewatering cell which measured 120' in width x 200' in length and was designed to accommodate 4 Geotube® units measuring 60' in circumference x 200' long. Berms were constructed around the perimeter of the dewatering cell in order to limit the risk of filtrate being discharged to the environment. The area was sloped at approximately 1% so that filtrate could be discharged to a collection trench located at the end of the cell

Once the base of cell was constructed an impermeable geo-membrane liner was installed to control the flow of filtrate from the Geotube® units On top of the liner a non-woven geo-synthetic was installed to protect the liner from incurring any damage over the course of the project. Finally a drainage media was installed, in order to promote dewatering from the bottom of the Geotube® unit. After the completion of the dewatering cell, the Geotube® units were deployed and connected to a manifold system capable of feeding all the units simultaneously, or one at a time.

Geotube® units were deployed atop a dewatering cell constructed of an impermeable geo-membrane material designed to collect the filtrate pouring from the bags. Collected filtrate was discharged to the .....

THE PERFORMANCE

Sludge was pumped to the Geotube® units by a PTO driven manure pump. As the sludge was transferred to the bags it was conditioned inline by Geo-Dredging and Dewatering Solutions custom designed mobile polymer injection system. The automated nature of the system ensured optimal flocculation over the course of the project by reading the percent solids of the sludge every 15 seconds and automatically adjusting dosage rates.

During the course of the project it became apparent that the original volume of

Bishop Water Technologies Inc.

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FOWLER CONSTRUCTION COMPANY LIMITED

TENCATE Geotube®

16,000m³ originally thought to be contained in the lagoon had been underestimated. Geo-Dredging responded to the unanticipated increase in volume by expediting an additional two 60' circumference x 100' long and two 45' x 100' long Geotube® units to the site to ensure sufficient capacity to dewatered the volume. Because the dewatering cell had been constructed for the four original Geotube® units, Geo-Dredging and Dewatering had to innovative and strategic in their placement of the additional Geotube® units. The Geotube® units were stacked on top of the original bags, allowing the project to continue without additional lay down area being constructed, maintaining the original footprint.

Pumping continued until the lagoons had been emptied. The dewatering aspect of the project concluded on October 27, 2010.

The Municipality of McDougal commissioned the removal of solids from the Geotube® units in April of 2011. Geo-Dredging and Dewatering was onsite to collect samples of the dewatered material to be analyzed for total solids content. Although it was raining heavily during the solids removal, samples collected were analyzed at approximately 30% solids. Easily passing the slump test, allowing the township to haul the material offsite to the landfill.

The custom chemical conditioning system used by Geo-Dredging and Dewatering not only adjusts dosage rates to ensure proper flocculation, it records detailed data pertaining to every project undertaken. At the completion of the project approximately 30,000m³ of material at an average of 5.5% solids had been pumped to and dewatered by the Geotube® units, leaving approximately 8,000m³ of dewatered material to be transported offsite.

The use of the Geotube® technology for the dewatering aspect of this project allowed the municipality to pump the sludge during 2010 and dispose of the dewatered material in 2011, allowing them to spread the cost of the project over two years. Additionally, the municipality did not have to dispose of a liquid material, but an odorless material which more resembled black earth than sewage sludge.

Geo-dredging and Dewatering Solutions custom designed mobile chemical conditioning system onsite at the McDougal Lagoon Project

How Geotube® Dewatering Technology Works

Dewatering with Geotube® technology is a three-step process.

In the *confinement* stage, the Geotube® container is filled with dredged waste materials. The Geotube® containers unique fabric confines the fine grains of the material.

In the *dewatering phase*, excess water simply drains from the Geotube® container. The decanted water is often of a quality that can be reused or returned for processing or native waterways without additional treatment.

In the final phase, *consolidation*, the solids continue to densify due to desiccation as residual water vapor escapes through the fabric. Volume reduction can be as high as 90 percent.

Step 1: Filling

Step 2: Dewatering

Step 3: Consolidation

Bishop Water Technologies Inc.

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