

AGENDA REPORT

TO: Mayor & City Commission
FROM: Ken Hibl, City Manager
DATE: January 27, 2010
RE: Funding of Pilot Study – Waste Water Treatment Plant Project

For the Agenda of February 1, 2010

Background. The City has been directed by the Michigan Department of Environmental Quality (MDEQ) to reduce the ammonia discharge levels from the City's waste water treatment plant. We have obtained approval for a United States Department of Agriculture (USDA) loan to fund this required system upgrade of our plant. MDEQ has provided us an extension of our deadline to commence work on the plant upgrade to facilitate the conduct of a pilot study (see copy of att'd proposal and cost estimates) to ensure that the system process selected will accomplish the desired effect of reducing our ammonia discharge levels. The City Commission is requested to approve the expenditure of funds to allow the conduct of the pilot study.

Issues & Questions Specified. Should the City Commission approve funding for the pilot study?

Alternatives.

1. Approve funding for the study.
2. Do not approve funding for the study.
3. Set aside decision regarding this matter to a later date.

Financial Impact. The total cost of the City could be as much as \$35K, dependent upon the length of the pilot study (\$7.5K for initial mobilization and \$7.5K per month of the study thereafter); 75% of the study costs can be applied to purchase and installation of the total system. The USDA loan funds will be used to offset all of these costs.

Recommendation. I recommend that the City Commission approve the funding of the pilot study by adoption of Resolution 2010-006 (*copy att'd*).

Attachments.

1. Study proposal and cost estimates.
2. Resolution 2010-006.



Engineering a Clear Water Environment

October 28, 2009

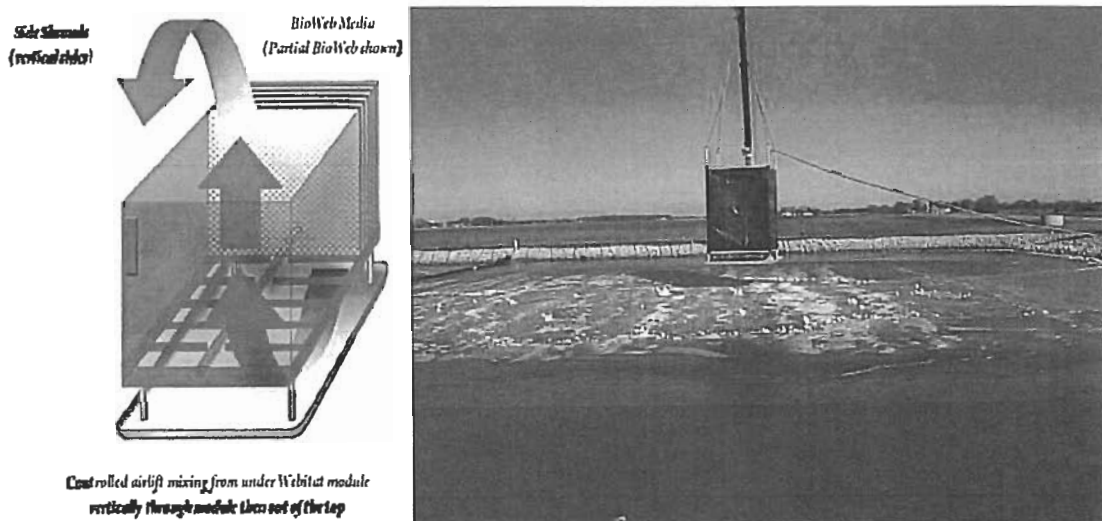
Jason Borchert, P.E.
Gourdie-Fraser, Inc.
123 West Front Street
Traverse City, Michigan 49684

Dear Jason:

On-Site Pilot Testing of Entex Webitat™ for Lagoons system for nitrification

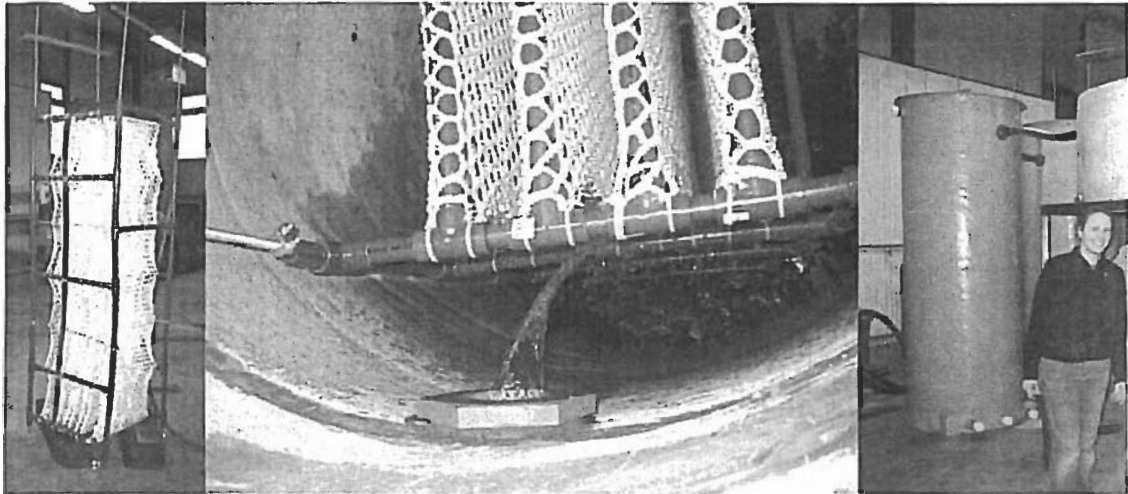
Introduction

The Entex Webitat for Lagoons system uses BioWeb™ patented media to grow attached biomass on high-strength polyester, knitted hexagonal media suspended in the lagoon on stainless steel frames. Integral aeration is attached to the Webitat frames. This process is effective for BOD removal and nitrification.



For your application at Clare, Michigan, Entex proposes to provide a custom designed single stage system to provide pilot scale data to approximate the recommended design for Clare. The aerobic stage uses a single once through solid fiberglass tanks with an included frame with BioWeb fixed media and a single coarse bubble diffuser. Delivery is 2 to 3 weeks from notice to proceed.

400 Silver Cedar Court, Suite 260, Chapel Hill, NC 27514
919.933.2770 phone 919.287.2258 fax www.entexinc.com



General Conditions

The equipment identified in this proposal will be supplied by Entex and is similar to that shown above from a previous pilot study. Other items required to complete the pilot facilities such as electrical service, wiring and conduit and air supply will be provided by the purchaser unless otherwise specified.

Scope of Supply

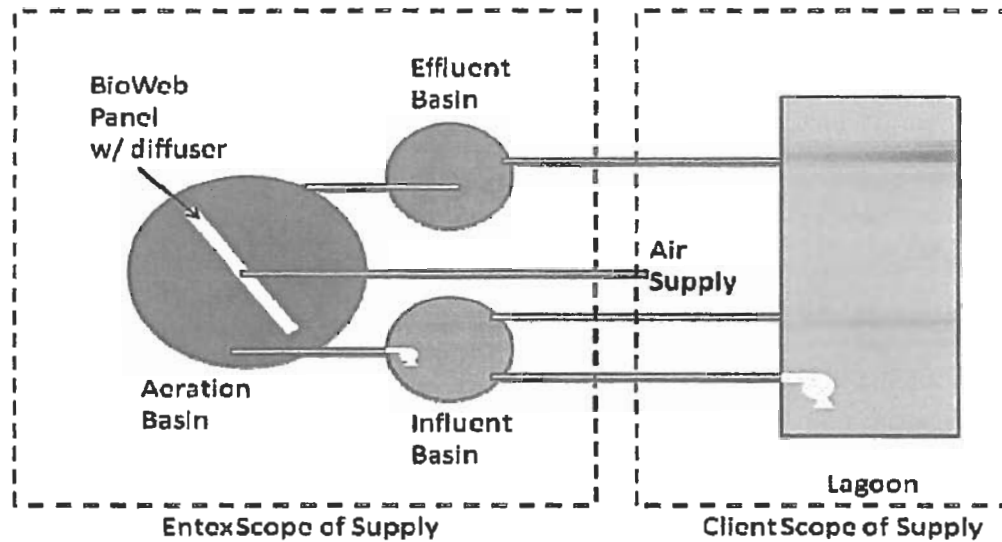
The work will generally consist of supply of one pilot system for demonstration of the Entex BioWeb process with field services as specified below.

Description

As shown generally in the diagram below, the Client will pump influent from the lagoon into a recirculating influent basin provided by Entex. The lines into and out of this basin and the lagoon may require heat tracing in winter to prevent freezing. The higher flow rate of this line will assist in preventing freezing. A smaller influent pump supplied by Entex will pump a small portion of the influent basin into the aeration tank at 0.65 gallons per hour. After treatment in the aeration basin, the effluent will gravity feed into the effluent basin. The effluent basin will either gravity feed into the lagoon, or if necessary, a liquid level sensing sump pump will drain this basin to the lagoon. Again, heat tracing on the lines to the lagoon may be required.

All tanks will have cam lock connections, and flexible hose will be used where possible. The diffuser will need to be provided with continuous air.

The following schematic diagrammatically shows the layout and breakout of the scope of supply.



Design Summary

Influent Flow Rate (g/hr)	0.64
Volume of Tanks	Volume (gal)
1. Aerobic	370
Total Volume per Train	370
Media Fill per Tank	Fill (ft ²)
1. Aerobic	15
Total Media Volume per Train (ft ³)	15
Aeration System	Coarse bubble

Equipment and Site Requirements

Space Needed	area for pilot tank (3 ft. dia. x 8 ft. H) area for influent basin (2 ft. dia x 5 ft. H) area for effluent basin (2 ft. dia x 5 ft. H) Total area = approx. 7 ft. x 7 ft.
Pilot Plant Influent	0.64 gph
Influent Pump to Supply Wastewater	By Client Sized for 5-10 gpm Continuous feed to influent basin
Influent Pump to aeration basin	By Entex Sized for 0.65 gph Continuous feed to aeration basin

Influent/Effluent/ hose	By Client
Electrical Connections/Requirements:	Standard 110 v outlet for Entex pump
Air Supply Requirements	By Client
Effluent Disposal	By Client
Laboratory Analysis & Waste Disposal	By Client
Treatment Chemicals	By Client

Pilot Study Program

The pilot study program will be conducted to verify the nitrification capabilities of the Entex BioWeb processes with the primary objective being confirmation of the nitrification rate used for design of the proposed Webitat for Lagoons upgrade for Clare. The data generated will be used to confirm the full-scale treatment system design for that facility. The estimated duration of the pilot study program will be 2 to 4 months from startup through completion. This will consist of a start-up phase followed by a main testing phase.

The pilot study is based on the following:

- a. Design requirement is to reduce 22 mg/l of influent NH₃-N to less than 11 mg/l at 9° C.
- b. Webitat proposal is for 16 Webitat modules with a total of 59,290 ft² of BioWeb.
- c. Total volume of lagoons with Webitat (lagoons 1 & 3) is 14.4 MG (7.2 MG each).
- d. Assume all NH₃-N to be removed must be removed by BioWeb influencing the immediate vicinity of the Webitat modules.
- e. Assume that only the volume in the immediate vicinity (2 x) of the Webitat modules (7.5 ft. long x 6.5 ft. wide) are effective in promoting nitrification (32.5 ft x 37.5 ft). With 16 modules at a 10 ft. swd, there are 1,458,600 gallons working with the 59,290 ft² of BioWeb. This assumes the remaining 12.9 MG are not contributing to nitrification (therefore, the assumption is conservative).
- f. Therefore we need a BioWeb to volume ratio in the pilot tank of approximately 24.6 gallons per ft² of BioWeb (1.46 MG / 59,290 ft²). The tank holds 370 gallons, so we need 15 ft² of BioWeb in the tank.
- g. At 14.4 MG lagoon volume treating a flow of 0.6 MGD, the hydraulic retention time is 24 days. 370 gallons at 24 days HRT give us a flow rate for the pilot plant of 15.4 gallons per day, or 0.64 gallons per hour.

The objective of the pilot study is:

- a) Verify design nitrification rate at 0.93 lbs NH₃-N removed per 1,000 ft² of BioWeb at a minimum water temperature of 9 degrees C. (11 mg/l NH₃-N removed at 0.6 MGD by 59,290 ft² of BioWeb).

Overall criteria to be followed during the pilot study for are:

- a) Operation of a 1 stage Webitat system with BioWeb fixed media
- b) Startup and biomass growth is estimated to take 4 – 6 weeks. Once steady state conditions are achieved, sample in order to determine ammonia removal efficiencies.

Recommended Analytical Program (By Client)

- a) The minimum analyses to be performed will be: BOD, TSS, TKN, NH₃-N. BOD will be analyzed on both filtered and unfiltered samples.
- b) Manual readings of dissolved oxygen, temperature and pH will be performed on the raw wastewater and in the reactor during the day throughout the study.
- c) The start-up and acclimation period for the pilot will be 4 to 6 weeks, with the main testing phase to start after stable results are obtained.

TABLE 1: SAMPLING SUMMARY

ANALYSIS		BOD	TSS	NH ₃ -N	NO ₂	NO ₃	TKN
Influent	Total	1	1	N/A	N/A	N/A	1
	Soluble	1	N/A	1	N/A	N/A	N/A
Aerobic Reactors	Total	N/A	1	N/A	1	1	1
	Soluble	1	N/A	1	N/A	N/A	N/A
Effluent	Total	1	1	N/A	1	1	1
	Soluble	1	N/A	1	N/A	N/A	N/A
Frequency / Week		3	3	3	3	3	3
Total # of Samples		180	144	108	72	72	108

The on-site operator(s)' daily routine would consist of the following:

1. Record the flow, time, system temperature, DO and pH.
2. Prepare samples for analysis – 30 minutes (estimated time).
3. Run TSS analyses. Estimated analytical time is 1 ½ hours total.
4. Send samples to laboratory for soluble and total BOD₅ analyses.
5. Run Ammonia analyses. – 20 minute test
6. Run Nitrate and Nitrite analyses - 5 minute tests
7. Perform second reading of systems Temp, DO and pH.
8. Record any problems during the day or anything out of the ordinary that happened during the day.

On sampling/analytical days (recommended 3x per week), the total operator time is estimated to be 2 hours.

On system monitoring days (e.g. no sampling or analytical labor – system checks and sludge wasting labor) the total operator time is estimated to be 1/2 hour.

Materials of Construction

Materials used in fabrication of equipment proposed herein will be as follows:

<u>Equipment Item</u>	<u>Material</u>
1. Biofilm media	BioWeb knitted polyester web
2. Aeration piping	PVC / flexible hose
3. Diffuser	Stainless Steel
4. Aeration tankage	Fiberglass tank
5. Interconnecting piping	PVC / flexible hose
6. Influent/effluent basins	Poly

Field Services

Technical support by a qualified Entex field representative is included at the customer's site:

- | | |
|--|--|
| 1. Installation, start-up and training | - 1 trip/5 man-days per trip |
| 2. Monthly site consultations | - 1 trip per month/2 man-days per trip |

If requested by the customer and subject to availability, additional field services may be purchased by the customer at Entex's Standard Rate for Field Services

Pilot Completion

Entex will provide a study report with all raw data within four (4) weeks of the completion of the pilot study program.

TERMS OF PAYMENT: (as follows, subject to Condition 2 of Entex Conditions of Sale):

The pilot rental fee is \$7,500.00 due with PO for mobilization, plus \$7,500.00 per month invoiced at the beginning of each month.

75% of pilot costs will be credited to the Purchaser of full-scale system

F.O.B.: Round-trip freight/mobilization to and from SITE included. ENTEx to be responsible for freight charges for shipment of the pilot plant to and from site.

PURCHASER'S ACCEPTANCE: BY ITS SIGNATURE BELOW OR ISSUANCE OF ANY PURCHASE ORDER OR OTHER DOCUMENT, NOTWITHSTANDING ANY STATEMENT OR PROVISION CONTAINED THEREIN TO THE CONTRARY, PURCHASER AGREES TO ALL THE CONDITIONS AND PROVISIONS OF THIS PROPOSAL AND CONTRACT. NO OFFER BY PURCHASER TO ALTER, AMEND, LIMIT OR DELETE ANY CONDITION OR PROVISION OF THIS PROPOSAL AND CONTRACT SHALL BE BINDING UPON ENTEX UNLESS EXPRESSLY ACCEPTED IN WRITING BY ENTEX.

Entex Technologies (Entex) offers to furnish the following described materials and equipment ("Products") and/or services at the prices ("Purchase Price") stated herein and in accordance with the Conditions of Sale and other provisions contained or referenced herein. This Proposal shall remain in effect for 30 days from the date hereof and shall expire at that time unless extended in writing by Entex. The Purchase Price is based upon only the Conditions of Sale and other provisions specifically contained or referenced herein. Purchaser's acceptance of this Purchase Price, whether by issuance of a purchase order or otherwise, or acceptance of delivery of the Products and/or services furnished hereunder, shall be considered acceptance by the Purchaser of all the Conditions of Sale and other provisions contained or referenced herein, notwithstanding any statement in Purchaser's acceptance or order to the contrary. Entex hereby objects to and rejects any proposal by Purchaser to modify, amend, limit, add to or delete any of the Conditions of Sale or other provisions contained or referenced herein unless expressly accepted in writing by Entex.

This Proposal and any resulting contract shall be referenced to hereinafter as "this Contract."

PURCHASER'S ACCEPTANCE:

Company Name: _____

Name: _____

Title: _____

Signature: _____

Date: _____

ENTEX TECHNOLOGIES PILOT STUDY CONDITIONS

1. **GENERAL:** Sales by ENTEX, are made solely under the conditions expressly set forth herein. Any proposed changes or exceptions to these conditions, or additional terms and conditions, included or referenced in Purchaser's order or acceptance of this offer, are hereby rejected by ENTEX, and shall be of no force or effect upon ENTEX unless expressly accepted in writing by ENTEX. This Contract shall bind and inure to the benefit of Purchaser and ENTEX, as well as their respective successors and assigns; however, neither party may assign this Contract without the prior written consent of the other. Neither party shall be deemed to have waived its rights by failing to enforce any particular provision of this Contract. If a court invalidates any portion of this Contract, the rest of this Contract shall remain valid and be construed as if not containing the invalidated provision. Delaware law shall govern the rights and obligations of the parties.

2. **EXCUSABLE DELAY:** ENTEX shall not be liable for failure to perform or for delay in performance due to fire, flood or any other act of God, strike or other labor difficulty, act of any civil or military authority or of Purchaser, embargo, riot, delay in or shortage of transportation facilities, or any other delay beyond ENTEX reasonable control. In the event ENTEX performance is delayed by any such cause, ENTEX schedule for performance shall be extended accordingly. If Purchaser delays shipment of Products, or any part thereof, Purchaser shall pay for the Products or the parts on the date ENTEX is prepared to make shipment.

3. **PROPRIETARY INFORMATION:** All information, data, drawings, instruction and operation manuals furnished by ENTEX with this Contract are proprietary to ENTEX submitted in strict confidence, and are to be used by Purchaser solely for the purposes of this Contract, and shall not be transmitted, disclosed, reproduced or used in any other manner without ENTEX written authorization.

4. **CREDIT APPROVAL:** If at any time information available on Purchaser's financial condition or credit history, in ENTEX judgment, does not justify the terms of payment specified herein, ENTEX may require full or partial payment in advance, or an acceptable form of payment guarantee such as a bank letter of credit, or other modifications to the terms of payment.

5. **WARRANTY:** ENTEX warrants the Products shall conform to the description contained in this Contract and be free from defects in material and workmanship for the duration of this contract provided that the Products are maintained and operated in accordance with ENTEX written instructions and not subjected to misuse, neglect or accident. Upon prompt written notice of and determination that such defect is covered under the foregoing warranty, ENTEX responsibility is limited to correction of the defect by, at ENTEX option, repair or replacement of the defective part or parts. **UNLESS STATED ELSEWHERE HEREIN, ENTEX PROVIDES NO WARRANTY OF PRODUCT PERFORMANCE OR PROCESS RESULTS. THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF ANY KIND, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

6. **TAXES:** The Purchase Price does not include any State or local taxes of any kind applicable to the sale, use or delivery of the Products or services covered under this Contract. Purchaser shall pay direct or reimburse ENTEX for any such taxes that ENTEX or ENTEX subcontractors or suppliers are required to pay.

7. **BACKCHARGES:** ENTEX shall not be liable for any charges incurred by Purchaser for work, repairs, replacements or alterations to the Products, without ENTEX prior written authorization, and any adverse consequences resulting from such unauthorized work shall be Purchaser's full responsibility.

8. **LIMITATION OF LIABILITY; ENTEX SHALL NOT BE LIABLE TO PURCHASER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING FROM ENTEX' OBLIGATIONS UNDER THIS CONTRACT, WHETHER SUCH DAMAGES ARE BASED UPON BREACH OF CONTRACT, BREACH OF WARRANTY, TORT, STRICT LIABILITY OR OTHERWISE. IN ANY EVENT, ENTEX' LIABILITY TO PURCHASER SHALL NOT EXCEED THE PURCHASE PRICE OF THE PRODUCTS OR PARTS OF THE PRODUCT ON WHICH SUCH LIABILITY IS BASED.**

9. **DEFAULT BY PURCHASER:** Without incurring any liability or waiving any claim for damages ENTEX may have against Purchaser, ENTEX may refuse to withhold any service if (a) Purchaser breaches this or any contract with ENTEX (b) ENTEX becomes aware of facts which, in its judgment, render Purchaser's financial condition unsatisfactory or cast doubt on Purchaser's willingness or ability to pay for the Products and/or services; or (c) Purchaser engages in or consents to liquidation, commission of any act of insolvency, appointment of a receiver of assets or assignment for the benefit of creditors, or if Purchaser becomes the subject of any bankruptcy or insolvency proceeding.

If Purchaser is late in pay the Purchase Price or any partial payment due under this Contract, or otherwise breaches this Contract, ENTEX shall be entitled to interest at the legal rate on overdue amount, and on its damages, calculated from the date of default in payment or other breach, plus court costs, reasonable attorney's fees and other expenses incurred in any effort to collect.

12. **CANCELLATION BY PURCHASER:** If Purchaser cancels this Contract, Purchaser shall be liable to ENTEX for reasonable cancellation charges, including administrative costs, costs incurred by ENTEX for all work performed or in process up to the time of cancellation or refusal to accept delivery, and any other expenses incurred by ENTEX in connection with Purchaser's cancellation or refusal to accept delivery.

RESOLUTION 2010-006

A RESOLUTION OF THE CLARE CITY COMMISSION APPROVING THE FUNDING OF AN ON-SITE PILOT TESTING OF THE ENTEX WEBITAT SYSTEM.

WHEREAS, the Michigan Department of Environmental Quality (MDEQ) has mandated that the City of Clare reduce its ammonia discharge levels or suffer the consequences of withdrawal of the City's waste water treatment plant discharge permit, thereby essentially requiring the City to cease operation of its plant; and

WHEREAS, Gourdie Fraser & Associates, the City's engineer of record for water and sanitary sewer systems, has recommended and requested on behalf of the City that the MDEQ permit the conduct of a pilot study to ensure that the system improvements proposed to reduce said ammonia discharge levels are feasible; and

WHEREAS, MDEQ has approved the conduct of said pilot study; and

WHEREAS, the City has applied for and received approval for a loan from the United States Department of Agriculture (USDA) to fund necessary system upgrades to the City's Waste Water Treatment Plant to lower said ammonia discharge levels.

NOW THEREFORE BE IT RESOLVED THAT the Clare City Commission hereby approves the funding of an on-site pilot study of the Entex Webitat System, the cost of said study not to exceed \$36K.

BE IT FURTHER RESOLVED THAT the costs of said study will be funded or refunded by loan proceeds approved by the United States Department of Agriculture, said loan proceeds approved for the purpose of upgrading the City's Waste Water Treatment Plant to eliminate current ammonia discharge levels.

ALL RESOLUTIONS AND PARTS OF RESOLUTIONS INsofar AS THEY CONFLICT WITH THE PROVISIONS OF THIS RESOLUTION BE AND THE SAME ARE HEREBY RESCINDED.

The Resolution was introduced by Commissioner _____ and supported by Commissioner _____. The Resolution declared adopted by the following roll call vote:

YEAS:

NAYS:

ABSENT:

Resolution approved for adoption on this 1st day of February 2010.

Diane Schmidt, City Clerk