

SUMMARY OF COMMENTS/RECOMMENDATIONS

PROPONENT: Springfield Holding Co. Ltd.
PROPOSAL NAME: Springfield Colony Wastewater Treatment Lagoon
Expansion
CLASS OF DEVELOPMENT: 2
TYPE OF DEVELOPMENT: Wastewater Treatment Lagoon
CLIENT FILE NO.: 982.30

OVERVIEW:

On June 15, 2005, the Department received an Environment Act Proposal (EAP) on behalf of the Springfield Holding Co. Ltd. for the expansion of the Springfield Colony wastewater treatment lagoon located in NE 14-11-8EPM in the Rural Municipality of Springfield. The expansion consists of the construction of a new, additional storage cell that will be located immediately adjacent to the northwest perimeter dike of the existing wastewater treatment lagoon. Treated wastewater from the wastewater treatment lagoon will be discharged into a ravine that drains into Hazel Creek that drains into the Brokenhead River or by irrigation onto agricultural land owned by Springfield Colony between June 15th and November 1st of any year.

The Department, on June 27, 2005, placed copies of the EAP report in the Public Registries located at 123 Main St. (Union Station), the St. James-Assiniboia Public Library, the Brokenhead River Regional Library, and the Manitoba Eco-Network and provided copies of the EAP report to the Canadian Environmental Assessment Agency (CEAA), the Clean Environment Commission, and TAC members. As well, the Department placed public notifications of the EAP in the Beausejour Clipper on Monday, July 4, 2005. The newspaper and TAC notifications invited responses until August 2, 2005.

This EAP relates to expansion of an existing wastewater treatment lagoon that is currently licenced under Environment Act Licence No. 2434.

On August 9, 2005, Manitoba Conservation forwarded requests for additional information from the TAC to the proponent. The proponent's August 24, 2005 response to the requests was then provided to the TAC for review and comment on September 13, 2005. There were no additional comments from the TAC.

On June 14, 2006, the proponent forwarded revisions to the plans for the proposed supplementary secondary cell to Manitoba Conservation. The revisions were required as the Colony and the R.M. of Springfield could not agree on the terms necessary to

construct the secondary cell in the originally proposed location. The proposed secondary cell was relocated to be adjacent to the existing southwest dyke.

COMMENTS FROM THE PUBLIC:

Rural Municipality of Springfield

July 19, 2005

- *The council and planning staff of Springfield have some concerns regarding the proposal submitted on expansion of the existing wastewater treatment lagoon, and the original application of the location of said structure;*
- *On the aerial photo submitted, it appears that the existing wastewater treatment lagoon is situated within the Springfield Road 99 foot right of way. This will pose a problem if council wishes to open the road allowance for future development. I have not been able to locate a road closing bylaw nor municipal approval of the original lagoon site, if you have any related documents please send copies to the undersigned below;*
- *To ensure that the existing wastewater treatment lagoon is in the exact location as shown with the aerial photo, council would like a condition placed, prior to granting approval, in which a legal survey be conducted at the expense of the applicant to confirm the exact location of the existing wastewater treatment lagoon and future expansion.*

Proponent Response – August 24, 2005

- From the imagery attached in the letter from the RM of Springfield, it appears that the existing secondary cell encroaches on the road allowance. However, it also appears unlikely that a road will be developed along this right of way because of the need to cross both the Brokenhead River and the Hazel Creek. Regardless, at Manitoba Conservation's request a survey will be conducted to determine the exact location of the right of way and the existing lagoon. If possible, because the likelihood that the lagoon is indeed encroaching on the road allowance, it is recommended that the Springfield Colony seek permission for a road closing bylaw, which may obviate the need for a legal survey.

Input From Proponent – June 14, 2006

- Unfortunately, the Springfield Colony and the R.M. of Springfield could not agree on the terms necessary to construct the secondary cell in the originally proposed location. As a result, the proposed cell was relocated southwest and adjacent to the existing primary cell. Accordingly, drawings GO1 and G02 have been revised and are enclosed.
- Certain minor design modifications are necessary because of the repositioning of the cell. The new location of the cell is now closer to the Colony, but still remains over

460 m away from the nearest Colony residence. The cell no longer encroaches upon the road allowance between SE-23-11-08-E and NE-14-11-08-E and now meets the 30 m minimum setback distance from the property line.

- In the original design, the proposed cell discharges into the existing secondary cell, which in turn discharges into a localised ravine that drains into Hazel Creek. The relocation of the cell does not permit this same functioning. As illustrated in drawing G01 and G02, the treated effluent in the primary cell flows into the new cell and a new discharge ditch that connects with the existing discharge is now necessary for the new cell. Rip rap is proposed for the discharge pipe and where the new ditch joins the existing discharge.
- Since the new cell will now be located above a section of the 100 ϕ forcemain with a gate valve, the removal and repositioning of this gate valve is required (see drawing G01). The existing forcemain depth is approximated at 1.5 – 1.8 m below ground surface and will be confirmed when the gate valve is relocated. The bottom of the clay liner for the new cell will be 0.2 to 0.5 m above the forcemain. During construction efforts must be made to ensure the integrity of the forcemain pipe.
- New test holes are not required for the secondary cell because as proposed originally, a borrow area in SE-23-11-08-E is being used to supply the clay.
- After a lengthy delay in order to resolve the lagoon location, we look forward to receiving approval for the Springfield Colony lagoon expansion, and trust that this information is sufficient to allow the process to continue from where it left off before the delay occurred.

Comments From R.M. of Springfield – August 9, 2006

- *Council has no opposition to the location of the proposed new lagoon as long as it meets the regulations and requirements of Manitoba Conservation. However, Council remains concerned that the existing lagoon cells are on the municipal right-of-way and notes that this may be an issue to be considered at some date if and when Springfield decides to extend Springfield Road.*

Disposition:

- The draft Environment Act Licence requires that Springfield Colony provide as constructed drawings for the wastewater treatment lagoon. The as constructed drawings must include distances to property lines.
- The draft Environment Act Licence contains clauses that provide limits, terms and conditions respecting requirements for the liners of the cells of the wastewater treatment lagoon.

Dr. Eva Pip

- *I would like to register an objection to the Springfield Holding Co. Ltd. wastewater lagoon proposal (File 982.30)*

Disposition:

- On October 14, 2005, a message was returned to Dr. Pip requesting that she please submit written representation regarding the objection to this Environment Act Proposal to Manitoba Conservation not later than Friday, October 18, 2005 such that it could be included with the review. A response was not received.

COMMENTS FROM THE TECHNICAL ADVISORY COMMITTEE:

Historic Resources

- *No concerns.*

Sustainable Resource Management Branch

August 2, 2003

- *It should be noted that Hazel Creek is considered a pristine waterbody that supports a sustaining population of brook trout and provides spawning habitat for the chestnut lamprey, a species listed as special concern under COSEWIC. As ammonia levels do exceed the Manitoba Water Quality Standards , Objectives and Guidelines further effort should be made by the proponent to delineate the mixing zone to ensure it falls within the guidelines;*
- *The proposal indicates that while material at the proposed cell location will not meet specified hydraulic capacity, material from a borrow pit to the north will. Given the species that this creek supports consideration should be given to a geosynthetic liner;*
- *The proponent should incorporate erosion and sediment control measures before, during and after the construction of the additional cell until the site is stabilized and the discharge route (the ravine) is monitored on a regular basis for erosion and measures are implemented as required;*
- *The Brokenhead Restoration Committee is actively involved in enhancement and/or restoration of the Brokenhead River watershed. It is important for the Colony to actively participate in these watershed level initiatives;*
- *The consultant should provide comments on the potential for erosion in the ravine to which the effluent would be discharged;*
- *The consultant should indicate what steps have been taken to ensure the structural stability of the existing cells of the waste stabilization pond;*
- *The consultant has indicated at Page 16 of the Environment Act Proposal that the Sodium Adsorption Ratio (SAR) of the treated effluent is approximately 6.39 which is stated as only slightly higher above the Manitoba Surface Water Quality Guidelines for Irrigation. It is recommended that the Electrical Conductivity (EC) of the effluent should also be considered since this is the most important parameter in determining the suitability of the wastewater for irrigation use if*

being considered in the future. Additionally, there is a relationship between the SAR and EC since a high SAR in irrigation water or plant life along the discharge route may have a potential to impair soil structure and thus the permeability of the soil leading to a lack of soil moisture. This is particularly so when the EC of the soil water or applied water is insufficient to counteract the negative effects of the adsorbed sodium on soil structure;

- *Since there were insufficient supplies of wastewater samples of Chloride, Ammonia-N, Chloride, Nitrogen-Total Kjeldhal and Potassium submitted for analysis (Ref Foot Notes to Table 8-2 page 14), it is recommended that a sampling program be undertaken at the exit of the discharge of effluent to the Hazel Creek to determine the levels of these parameters in the effluent stream;*
- *It is assumed that requests were made for comments for the proposed development especially if the Brokenhead River traverses First Nations lands.*

Proponent Responses – August 24, 2005

- The mixing zone is based on a visual interpretation of the discharge into Hazel Creek and is supported by the sample results in Table 8.2 of the Environment Act Proposal. The Hazel Creek downstream samples (E) taken 30 m downstream of the discharge, approximately 1.5 metres from the edge of the creek, are essentially at background levels (D) for ammonia, calcium, chloride, conductivity, magnesium, nitrate-nitrite-N, nitrogen, pH, phosphorus, sodium, SAR, and sulphate. Specifically, the ammonia level has dropped to approximately 1% of the acceptable limit of 4.35 mg/L, as listed in Table 8.3. It should be noted that the discharge into Hazel Creek sample (C) was taken in the over-bank of Hazel Creek in a natural wetland type area amongst brush, willows and other small trees, which is where the mixing actually begins. The proposed expansion will have a positive affect on the effluent quality, providing additional surface area and volume for treatment and storage. On the basis of the above explanation, it is expected that the mixing zone in Hazel Creek is practicably small and allows an adequate zone of passage for the movement or drift of all stages of aquatic life.
- The proposed development complies with Manitoba Conservation guidelines on the depth and conductivity for clay lined cells. An acceptable clay source is in close proximity of the development area, and the use of this clay in the lagoon liner will be tested post construction to verify compliance.
- During the entire construction process, the contractor shall employ the necessary sediment and erosion control measures on all applicable areas. In addition, there is an existing elevated soil barrier between the development area and Hazel Creek.
- Regarding participation in the watershed initiatives, the Brokenhead Restoration Committee is welcome to contact the Springfield Colony.
- The ravine drains a small localised area and has a well established long grass cover. The potential for erosion is therefore assessed as minimal.
- The development proposes no sludge removal. The lagoon, constructed in 1994, was

originally designed for an organic loading of 35 kg-BOD₅ per hectare per day, which is 62% of the allowed design loading of 56 kg-BOD₅/h-d. The lagoon expansion does not include an expansion for the primary cell because with the new design population of 160 people, the cell at maximum loading will only operate at 82% of the available organic capacity. Since the lagoon is relatively young and has been operating well under organic capacity to date, sludge removal is not expected to become an issue in the 20-year design period. However, when sludge removal is required, the Springfield Colony will seek approval and conduct the desludging process according to the advised method.

- Before construction begins and after June 15th, the existing cells will be discharged, therefore lowering the wastewater level and decreasing the pressure exerted on the cell berms. Additionally, the soil conditions dictate that there is sufficient strength in the glacial till beneath the existing clay liner to support the existing cells during the required earthwork remediation.
- According to the USEPA Design Manual for Land Treatment of Municipal Wastewater, an SAR level of <6.0 presents no problems and levels between 6.0-9.0 have increasing problems, with levels over 9.0 listed as severe. However, these suggested values are noted to be flexible and should be modified when warranted by local experience or special conditions of crop, soil, and method of irrigation. In addition, these values are listed for arid and semiarid climates, where irrigation is a major, if not the main source of water for the crops. However, in this situation, irrigation will only be applied periodically, and not every year or in a sustained duration during the growing season. Rainfall will remain as the main source of water for the Springfield crops. Therefore, treated effluent with SAR levels of 6.0-9.0 are expected to be sustainable when used according to the irrigating practices and methods employed by Springfield Colony.
- As stated in the current Environment Act Licence, prior to each effluent discharge, grab samples of the treated wastewater are taken and analysed for BOD₅, fecal coliform, total coliform, sodium, chloride, magnesium and SAR. Additional testing will be performed as required by Manitoba Conservation.

Disposition:

- The draft Environment Act Licence contains clauses that require the licensee to obtain samples of treated wastewater prior to each effluent discharge and have them analyzed for biochemical oxygen demand, fecal coliform, total coliform, electrical conductivity, as well as sodium, chloride, and magnesium to provide a determination of the sodium adsorption ratio (SAR).
- Clause 23 of the draft Environment Act Licence requires that the Licensee obtain samples of treated wastewater prior to each effluent discharge and have them analyzed for total ammonia nitrogen, total Kjeldahl nitrogen, nitrate-nitrite nitrogen; total dissolved phosphorus; total particulate phosphorus, potassium, pH, and temperature. The results of the analyses shall be reported to the Director in accordance with the requirements of Clause 4 c) of the Licence;

- The draft Environment Act Licence contains clauses that provide limits, terms and conditions respecting the liner of the cells of the wastewater treatment lagoon.
- The draft Environment Act Licence contains Clauses that require the Licencee to construct and operate the wastewater treatment lagoon in such a manner as to prevent the disruption of natural wildlife and fish habitats.
- The draft Environment Act Licence contains a clause that requires the licencee to actively participate in any future watershed-based management study, plan and/or nutrient reduction program, approved by the Director, for Hazel Creek, the Brokenhead River and Lake Winnipeg and associated waterways and watersheds.

Transportation and Government Services

- *No concerns.*

Water Stewardship

- *Methods employed by the proponent to calculate the mixing zone in Hazel Creek are unclear. No information was provided as to the mean and minimum flows in Hazel Creek. Information on the expected flow in Hazel Creek is required to complete the assessment of impacts on water quality;*
- *Water chemistry data presented in Table 8.2 raises concerns regarding ammonia concentrations. It should be noted that no information was provided to indicate when the samples described in Table 8.2 were collected. Ammonia concentrations during the discharge described in Table 8.2 exceed the end of pipe Manitoba Water Quality Objective for acute ammonia toxicity. Given that Hazel Creek is both spawning habitat for a species of special concern and supports a self sustaining population of brook trout (it should be noted that this information that was not provided by the proponent as part of the assessment) consideration must be given to minimizing ammonia toxicity. One possible option includes delaying discharge until ammonia concentrations drop to below guidelines. The proponent should also consider reducing the rate of discharge from the facility to reduce the size of the mixing zone;*
- *The proponent has indicated that samples will be collected for fecal coliforms and BOD prior to discharge. I would recommend that the proponent be required to also measure ammonia concentrations, temperature, and pH prior to discharge to ensure that Manitoba Water Quality Objectives are not exceeded.*
- *The Water Quality Management Section is concerned with any discharges that have the potential to impact the aquatic environment and/or restrict present and future uses of the water. Therefore it is recommended that the license require the proponent to actively participate in any future watershed based management study, plan/or nutrient reduction program, approved by the Director, for Hazel Creek, Brokenhead River, Lake Winnipeg, and associated waterways and watersheds.*

Proponent Responses – August 24, 2005

- There are no historic or existing flow stations located on Hazel Creek and therefore no stream flow information is available. However, according to Bob Harrison, Senior Hydrologist from Manitoba Water Stewardship - Water Science and Management Branch, the flow can be estimated from rivers relatively close to Hazel Creek with comparable watershed areas and available flow station data. The Brokenhead River has flow station information from 1960-1997 near Vivian, Manitoba. The location of the flow station is approximately 6 km from the Springfield Colony. The Brokenhead River watershed was estimated at approximately 777 km² (300 mi²) up to the flow station, whereas Hazel Creek watershed was estimated at approximately 388 km² (150 mi²), or essentially 50%. The following table details the mean, maximum, and minimum estimated flows of Hazel Creek near the lagoon discharge area, based on 50% of the Brokenhead River flow at the above mentioned flow station.
- The effluent and Hazel Creek samples noted in Table 8.2 were collected on October 6, 2004.
- The Springfield Colony WWSP is currently operating with a 227-day storage period, which defers the first discharge of the year until June 15th and prevents discharge during critical springtime fish spawning. The proposed development already complies with Manitoba Conservation guidelines on the required storage period.
- Since the mixing zone is already practicably small, and because the samples drawn from the mixing zone (E) are essentially at background levels for the parameters tested, we believe there would be little or no gain in reducing the rate of discharge.
- Again, as stated in the current Environment Act Licence, prior to each effluent discharge, grab samples of the treated wastewater are taken and analysed for BOD₅, fecal coliform, total coliform, sodium, chloride, magnesium and SAR. Additional testing will be performed as required by Manitoba Conservation.
- Those involved in a future watershed based management study are welcome to contact the Springfield Colony.

Disposition:

- The draft Environment Act Licence contains clauses that require the licensee to obtain samples of treated wastewater prior to each effluent discharge and have them analyzed for biochemical oxygen demand, fecal coliform, total coliform, electrical conductivity, as well as sodium, chloride, and magnesium to provide a determination of the sodium adsorption ratio (SAR).
- Clause 23 of the draft Environment Act Licence requires that the Licensee obtain samples of treated wastewater prior to each effluent discharge and have them analyzed for total ammonia nitrogen, total Kjeldahl nitrogen, nitrate-nitrite nitrogen; total dissolved phosphorus; total particulate phosphorus, potassium, pH, and

temperature. The results of the analyses shall be reported to the Director in accordance with the requirements of Clause 4 c) of the Licence;

- The draft Environment Act Licence contains a clause that requires the licensee to actively participate in any future watershed-based management study, plan and/or nutrient reduction program, approved by the Director, for Hazel Creek, the Brokenhead River and Lake Winnipeg and associated waterways and watersheds.

COMMENTS FROM FEDERAL REPRESENTATION:

Canadian Environmental Assessment Agency

- *Based on the responses to the CEAA survey, application of The Canadian Environmental Assessment Act with respect to this proposal will not be required. Fisheries and Oceans, Environment Canada and Health Canada would be able to provide specialist if requested.*

Fisheries and Oceans

- *In-water construction (if necessary) will not occur during the spring spawning and incubation period between April 1st and April 15th of any year. In fact, no in-water construction is proposed for this project.*
- *The proposed facility does not require the onsite storage of gasoline or diesel fuel. During construction and upgrading, the contractor will be required to ensure that all equipment is properly maintained to prevent leaks and spills of fuel and motor fluids. Refuelling of equipment will not be within 100 metres of a water body, stream or wetland. As noted from the Department of Fisheries and Oceans (DFO), the deposit of deleterious substances into water frequented by fish is prohibited under the Fisheries Act.*
- *All rip rap used during the construction of the cell to protect against erosion will be clean, free of fine materials, and of sufficient size to resist displacement during peak storm events. As mentioned previously, the contractor shall employ the necessary sediment and erosion control measures during the entire construction process.*

Disposition:

- The draft Environment Act Licence contains a clause that requires that all fuel storage and equipment servicing areas established for the construction and operation of the Development are a minimum distance of 100 metres from any waterbody, and that compliance with the requirements of *Manitoba Regulation 188/2001* respecting *Storage and Handling of Petroleum Products and Allied Products Regulation* or any future amendment thereof is maintained.

- The draft Environment Act Licence contains Clauses that require the Licencee to construct and operate the wastewater treatment lagoon in such a manner as to prevent the disruption of natural wildlife and fish habitats;

PUBLIC HEARING:

A public hearing was not requested.

RECOMMENDATION:

Issue an Environment Act Licence in accordance with the attached draft. Enforcement of the components of the new Licence that relate to soil liner characteristics should be assigned to the Approvals Branch until all soil testing has been completed.

PREPARED BY:

Robert Boswick, P. Eng.
Environmental Engineer
Environmental Assessment and Licensing Branch
Manitoba Conservation
March 23, 2007

Telephone: (204) 945-6030
Fax: (204) 945-5229
E-mail Address: robert.boswick@gov.mb.ca