

SUMMARY OF COMMENTS/RECOMMENDATIONS

PROPONENT: Village of Dunnottar
PROPOSAL NAME: Village of Dunnottar Wastewater Treatment Lagoon Expansion
CLASS OF DEVELOPMENT: 2
TYPE OF DEVELOPMENT: Waste/Scrap Wastewater Treatment Lagoons
CLIENT FILE NO.: 914.20

OVERVIEW:

On February 14, 2005, the Department received a Proposal from Dillon Consulting on behalf of the Village of Dunnottar for a Development to construct and operate an expansion of the existing Village of Dunnottar wastewater treatment lagoon. The proposed development consists of the construction of an additional secondary cell, located directly north of the existing secondary cell of the lagoon located in the northwest quarter of section 8-17-4 EPM in the R.M. of St. Andrews. The treated wastewater from the lagoon will be discharged between September 15th and November 1st of any year and proceed east in the ditch along P.R. 225, then north along PTH 9 to Tugela Creek. Tugela Creek discharges into Lake Winnipeg.

The Department, on March 15, 2005, placed copies of the Proposal in the Public Registries located at 123 Main St. (Union Station), the St. James-Assiniboia Public Library, the Manitoba Eco-Network and the Selkirk and St. Andrews Regional Library. Copies of the Proposal were also provided to the Technical Advisory Committee (TAC) members. The Department placed a public notification of the Proposal in the Interlake Spectator on Friday, March 18, 2005. The newspaper and TAC notification invited responses until April 19, 2005.

Additional information, required for the environmental assessment was received by the Department from Dillon Consulting on June 16, 2005, July 19, 2005, August 2, 2005 and August 15, 2005. All additional information necessary for the review was provided to the TAC, as well as placed in the Public Registries.

COMMENTS FROM THE PUBLIC:

No responses were received from the public notification.

COMMENTS FROM THE TECHNICAL ADVISORY COMMITTEE:

Agriculture and Food

- *According to the EAP, Dillon also proposed to remove and replace the sand and gravel layer that was encountered in the existing eastern secondary cell wall. The proposal does not indicate whether sludge removal will be required in order to do this, nor where the sludge will be deposited if removal is required. We support his*

proposal for renovation provided that any sludge removed from the existing secondary cell is placed in a suitable disposal site. If the intent is to apply the sludge to land, we would like further information as to where the sludge is intended to be applied.

Proponent Response (June 14, 2005):

- The sand and gravel layer that was encountered in the existing eastern secondary cell wall as seen in the soil log from MW-18 on Figure 3, attached, will be removed and replaced. This work will be done when the secondary cell is drained down in the fall. The depth of the sludge accumulation in this existing secondary cell is measured by the Village to be typically 50 mm. It is not anticipated that sludge removal will be required to complete this repair. This sand gravel lens will be completely removed and replaced with recompact low permeability clay to meet the hydraulic conductivity requirements of the existing lagoon.

Disposition:

After receiving the additional information from the proponent, these comments were satisfied and are no longer of concern.

Conservation - Sustainable Resource Management

- *The Consultant should provide the results of the investigation for cell leakage (Page 6, Item 1.7).*
- *It is recommended that the internal walls of the existing secondary cell be reconstructed of materials with a hydraulic conductivity similar to the cells of the proposed secondary cell.*
- *The Licence for the operations for the proposed expansion should contain requirements that are compatible with Manitoba Guidelines for wastewater treatment lagoons.*
- *The Licence should maintain the requirements for the installation of up gradient and down gradient monitoring wells to determine any impairment to the groundwater sources so that remedial action may be taken quickly.*
- *The proponent need to implement sediment and erosion control measured during and after construction of the additional secondary cell until the site is stabilized to ensure no sediment enters the Tugela Creek and ultimately Lake Winnipeg.*
- *The proposal lacks detail on the discharge routine to the implemented and clarification should be provided regarding the discharge process. It appears that all three cells could be active rather than transferring waste from one cell to another and closing off until the effluent meets Manitoba Water Quality Guidelines and Objectives.*

Proponent Response (June 14, 2005):

- Two monitoring wells were installed with approval by Manitoba Conservation to monitor the operation of the lagoon and ensure there is no impact to groundwater due to lagoon operations. Groundwater flows to the east in the vicinity of the wastewater lagoon. Groundwater from the wells is sampled annually in the fall for nitrate and chloride concentrations, which indicate lagoon performance. The lagoon has

demonstrated over the past 20 years to be competent. There have been no confirmed reports of leaks or seepage from the walls of the existing holding cells. The quarterly water results from the two monitoring wells on-site (wells OB-1 and OB-2) have indicated peaks of chloride in the groundwater samples from OB-1, as seen in the attached results in Attachment D from November 1990, as well as recently from September 2004. Although the chloride spikes are unusual, it is unlikely that they indicate leakage from the lagoon. The nitrate and chloride numbers are not high enough to be of great concern. There also does not appear to be a relationship between water level and chloride/nitrate or the nitrate and chloride concentration trends. As a result, the source of the chloride is unclear, and suggests a non-septic source might be responsible, such as road salt or other runoff.

- As mentioned in the 2002 Dillon report, sewage seepage was suspected based on odours observed in TH-3 of the report. No suspected seepage was encountered during the August 2004 site visit and the lagoon level was in the freeboard. The odour encountered during the 2002 drilling may have been from the sand and gravel lens that was encountered on the eastern wall of the existing secondary cell as is further discussed in the section below. There have never been any exceedances of the parameters outlined in the licence (as per communication with Mitch McPherson, Dunnottar Public Works Office).
- The lagoon design and site layout are consistent with the August 2002 report by Dillon entitled Sewage Lagoon Expansion. The proposed secondary lagoon size was estimated to be 130 m by 130 m in plan dimension. To accommodate an additional 25,500 m³ of storage, the proposed secondary cell has been determined, by design, to be approximately 137 m in the east/west direction to the top inside of the dyke, 134 m in the north/south direction to the top inside face of the dyke, and have a full operating depth of 1.75 m. The operating depth of 1.75 m is provided with an additional 1m vertical dyke elevation freeboard, and additional 0.15 m vertical "dead space" below the invert of the discharge pipe.
- The proposed secondary cell is to be placed to the north of the existing secondary cell as provided in Figure 1 of the EAP document. The nearest resident is approximately 1 km to the south of the southern limit of the existing lagoon. The proposed cell is to be constructed on the north side of the existing lagoon.
- The lagoon will be discharged once per year, in the fall, between September 15 and October 31. The lagoon discharge process will be essentially the same as is currently employed, by closing the valve between the primary cell and the existing secondary cell, and now, also by closing the valve between the existing secondary cell and the new storage cell. All three cells will then be isolated. The existing storage cell and the new storage cell will then be tested and discharged. The storage cells will be discharged by opening the valve from the cell to the existing discharge ditch. The primary cell will be discharged then, by closing the valves on the secondary cell discharge pipes, and closing the valve between the two secondary cells. The valve between the primary and the existing secondary cell will then be closed and the liquid in the existing secondary cell will be tested and discharged. This final discharge will be by opening the valve from the secondary cell to the existing discharge ditch. When the existing secondary cell is discharged, the discharge valve will be closed. The lagoon will now be returned to full available storage for the next year's storage. The lagoon will operate by filling the primary cell first, then opening the valve to the

existing secondary cell. When the primary and secondary cells are "full" the valve to the new secondary cell will be opened.

The discharge ditch, which currently exists on site adjacent to the lagoon will be regarded to eliminate existing low spots, and to eliminate ponding of the effluent discharge, which currently occurs adjacent to the existing lagoon. There will be no change to the discharge route or grades of the existing discharge route off the Village property.

- Two new monitoring wells will be installed down gradient of the proposed secondary cell expansion. The wells will be constructed to meet the approval of Manitoba Conservation and will be installed following the same construction methods as the existing monitoring wells. One well is proposed at the northeast corner of the new cell and one at the northwest corner of the new cell. The two new monitoring wells will be added to the existing groundwater monitoring program for the site, which requires annual sampling in the fall for nitrate and chloride as indicators of lagoon performance.
- An erosion and sediment control plan will be implemented to include key components, such as erosion and sediment control at the site, and erosion and sediment control measures for the lagoon outflow that discharges into Lake Winnipeg approximately 5 km downstream. The purpose of the erosion and sediment control plan will be to minimize the potential for downstream aquatic habitats to be negatively impacted by sediments transported from the construction site and to ensure compliance with federal and provincial regulatory requirements.
- Sediment and erosion control measures will be used to control runoff at the site and will incorporate a variety of standard measures to avoid the potential adverse effects of construction-related activities (e.g. clearing, topsoil handling and grading at the site). Silt curtains will be incorporated to minimize the potential for surface runoff from precipitation events to be exported from the site. Regular monitoring and maintenance of all sediment and erosion control measures will occur throughout the construction phase to ensure control measures remain effective throughout the duration of the project. Following the construction phase, it will be necessary to re-vegetate exposed soils, where necessary, and stabilize the site as quickly as possible. Environmental monitoring at the site may take place, as necessary, during the construction phase, to monitor turbidity levels and total suspended sediments in downstream surface water. Samples may be collected throughout the construction phase for analysis.
- A series of sediment traps (i.e. rock check dams and straw bales) will also be incorporated at strategic locations along the lagoon outflow channel/ditch to help capture suspended sediments that reach the outflow and prevent them from being transported further downstream where they could negatively impact downstream aquatic habitats. These will be installed in the outflow prior to the clearing of the site. The rock check dams and straw bales will be maintained throughout the construction phase and until the site has been adequately stabilized after construction. (Sediment and erosion control figures are included as Attachment D).

Disposition:

After receiving the additional information from the proponent, these comments were satisfied and are no longer of concern.

Water Quality Management

- *On page 7, the proponent indicates that environmental impacts as well as potential effects to wildlife, fisheries, surface and ground water, forestry, heritage resources and social and economic conditions are not anticipated. However, this statement is not substantiated by information in the proposal and no discussion as to how this conclusion was reached is provided. Information on, and a discussion of, potential environmental impacts is required to assess this proposal.*
- *The proposal does not provide construction details. For example, how will erosion be controlled during construction of the expanded secondary cell?*
- *In Attachment B, page 5, the proponent indicates that the average BOD of the sewage trucked to the Village of Dunnottar wastewater treatment lagoon in summer is 80.5 mg/L. The size of the primary lagoon is then based on the assumption that BOD concentrations are significantly lower than the estimated organic loading for typical sewage (200 to 300 mg BOD/L). However, the average BOD of summer wastewater is calculated from only two samples collected on a single day in July 2002. It seems unreasonable to base the determination of the size of the primary cell on only two samples. However, on page 5 of the Environment Act proposal, the proponent indicated that the current and projected organic loading rates are 35.5 kg BOD/ha/day and 39.4 kg BOD/ha/day, respectively. Although no information was provided as to how these rates were calculated, they appear to represent a standard method for determining the size of the primary cell. The use of two methods of determining the size of the primary cell is confusing and the information is poorly presented.*
- *In Attachment B, page 5, the proponent indicates that ground water is infiltrating into many of the septic tanks in the Village of Dunnottar. If ground water can infiltrate into the tanks, presumably, wastewater can also leak from the tanks into the ground water and potentially into Lake Winnipeg. The environmental impacts associated with leaking septic tanks should be considered by the proponent as part of the assessment. While expanding the wastewater treatment lagoon addresses one aspect of wastewater treatment, clearly the adequacy of the collection system merits consideration.*
- *Given that the wastewater treatment facility is being expanded to increase hydraulic storage capacity, has the proponent considered methods of reducing the volume of wastewater that is trucked to the lagoon? Are volumes of wastewater generated per capita within the expected range? What incentives exist to encourage water conservation? Are residents charged a fee for having their septic tanks pumped? Does ground water infiltration significantly increase the volume of sewage that is treated by the facility? What incentives exist to encourage residents to upgrade their septic tanks and thereby limit ground water infiltration?*
- *In Attachment B, page 5, the proponent indicates that only liquids are collected from the septic tanks in the Village of Dunnottar. If this information is correct, when are the solids removed from the tanks and where are they disposed?*
- *No information is provided regarding the total phosphorus or total nitrogen concentrations of the wastewater effluent. In light of the Lake Winnipeg Action Plan, it may be prudent for the Department to consider minimizing nutrients from this*

facility. The cumulative impact of small facilities, in particular facilities that discharge directly to Lake Winnipeg, should be considered. Therefore, the Water Quality Management Section recommends that the requirement for surface water monitoring be included in the license for the Village of Dunnottar wastewater treatment lagoon. It is recommended that the proponent collect grab samples towards the end of the period of discharge. Grab samples should be collected at the point of discharge of effluent from the wastewater lagoon to the existing drainage ditch and at the point of discharge to Lake Winnipeg. Variables for analysis should include: Total kjeldahl nitrogen, Nitrate-nitrite nitrogen, ammonia nitrogen, total dissolved phosphorus, total particulate phosphorus and total inorganic phosphorus.

- *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 used 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 Lake Winnipeg, and associated waterways and watersheds.*

Proponent Response (June 14, 2005):

- Potential environmental impacts are a result of pollutants being released by the lagoon facility, as well as any potential effects to wildlife, fisheries, surface and ground water, forestry, heritage resources, and social and economic conditions are not anticipated as a result of the expansion of the existing lagoon.
- The area immediately surrounding the Village of Dunnottar has been disturbed both historically, during construction of the drainage ditch (Tegula Creek), and as a result of agricultural development. The eastern shoreline of Lake Winnipeg is an important area for waterfowl species; however, the water level fluctuations associated with the lake reduce its habitat potential (i.e. nesting success). Areas northwest and southwest of the subject site contain wooded areas. Species which a white-tailed deer, songbird species, and the occasional moose are likely found within these areas.
- A review of the Manitoba Conservation Data Centre records of endangered wildlife species indicated that the piping plover (*Charadrius melodus*) has been observed within the area. Piping plovers primarily utilize the habitat along the shores of large lakes, with Lake Winnipeg currently supporting the main breeding population in Manitoba. The main threat to this species is heavy human activity and disturbances on beaches. Due to the heavily disturbed nature of the lagoon site, it is unlikely that it supports the habitat necessary for the piping plover's survival.
- Based on correspondence with Nicole Firlotte, the Biodiversity Information Manager with the Wildlife and Ecosystem Protection Branch of Manitoba Conservation, there were no occurrences of species at risk on their database, within the vicinity of the Village's landfill and sewage lagoon. It is therefore, not anticipated that there will be any potential environmental impacts to wildlife as a result of the proposed lagoon expansion project.
- Based on the fish species inventory conducted by Manitoba Conservation, there are 54 species of fish found in Lake Winnipeg. Out of the 54 species, the silver chub is the only species of fish that was determined to be of special concern by Environment Canada's census completed in 2004. Although the silver chub is thought to be

abundant within Lake Winnipeg, it has been identified as a concern because of low dissolved oxygen levels and water temperature fluctuation in the lake within the past few years, which can potentially have negative effects on the species.

Aside from Lake Winnipeg, the only other water body within the vicinity of the subject site is Tegula Creek, which flows through the centre of the Village of Dunnottar, and into Lake Winnipeg. Flow in the creek exists only during spring runoff periods and periods of heavy precipitation. Typically, the creek is dry during the rest of the year. In view of the creek's small drainage area of 25 to 39 km² (10 to 15 square miles), flooding by the creek is negligible. Creek levels within the Village fluctuate with the Lake Winnipeg water levels.

Rob Cann, the Provincial Angling Manager for Manitoba Conservation Fisheries Branch was contacted to obtain fish species inventory information for the creek. His results indicated that there have been no fisheries studies done on the creek to date, and it can only be assumed that certain fish species may use the creek in the spring, when it is likely that lake water pools into the creek. Fish species that may inhabit the creek in the spring may include, brown bullhead, carp, freshwater drum, northern pike, sauger, walleye, white bass, and white sucker. Spring spawning species such as northern pike and white suckers may be attracted to the outflow of the creek and move up it in an attempted spawning run. These species are opportunistic spawners, and often move up small creeks searching for spawning sites. However, there does not appear to be any available spawning habitat for these species in the Tegula Creek. (The fish species list for Lake Winnipeg is included in Attachment C). It is not anticipated that there will be any potential environmental impacts to fish species or habitat as a result of the proposed lagoon expansion project.

- Groundwater flows in an eastward direction within the vicinity of the existing wastewater lagoon. Groundwater monitoring wells were installed to monitor the operation of the lagoon, and determine whether wastewater is leaching from the lagoon. The lagoon has demonstrated over the past 20 years to be competent. There have been no reports of leaks or seepage from the walls of the existing holding cells. There have never been any exceedances of the parameters outlined in the licence (as per communication with Mitch McPherson, Dunnottar Public Works Office).
- Additional groundwater monitoring wells will be constructed to meet the approval of Manitoba Conservation, and will be installed down gradient of the proposed secondary cell expansion. One is proposed at the northeast corner and one at the northwest corner of the new cell.
- The geology throughout most of the area consists of low-permeability lacustrine clays overlying tills to significant depths. Within this type of geological environment, it is not expected that significant seepage through low-permeability clays and tills into buried sewage holding tanks in the Village would occur. The aquifer in this area is relatively well protected by overlying clayey materials. As a result, any leaking from septic tanks and holding tanks into the surrounding ground is not considered to present a substantial risk to groundwater. This is however recognized as an undesirable situation in the long term. It is therefore a priority in the sewage system planning by the Village of Dunnottar to eliminate these tanks by installing a piped sewage collection system as a next stage, after the lagoon storage capacity is expanded.

- The main surface waterbodies within the vicinity of the proposed project site are Lake Winnipeg and Tegula Creek, which only have a flow during wet spring months and times of high precipitation. Concerns for surface water as a result of lagoon operations are due mainly to nutrient loadings, which occur during the annual fall discharge. Facultative sewage lagoons will provide some conversion and reduction of nitrogen, N, and removal of phosphate, P, through the facultative oxidation process and precipitation processes.
- Data presented in the "Manitoba Sewage Lagoon Process Workshop Proceedings, WCWWA, 1994" include data collected from lagoon operations across the prairies. For typical lagoons similar to the Dunnottar lagoon, with two cells of long storage time (one year), effluent quality from municipal wastewater, demonstrated effluent quality of, P=2.7 mg/L, ammonia=0.8 mg/L and NO₂/NO₃=0.4 mg/L. This would be the expected effluent quality from a 12-month storage lagoon at Dunnottar, with fall discharge.
- The Village of Dunnottar endorses the Lake Winnipeg Stewardship Board recommendations and would work with the Province of Manitoba to evaluate new technologies in the nutrient reduction treatment process.
- The lagoon site falls within the Interlake Plain Ecoregion that is mainly dominated by trembling aspen, white birch, and balsam poplar canopy. Typical shrubs found in the area include shrubby cinquefoil, bearberry, roses, red chokecherry, willows, and creeping juniper.
- Following the Species at Risk Act (SARA), and in accordance with the Committee on Status of Endangered Wildlife in Canada (COSEWIC), plants of special concern in this ecoregion include, small white lady's slipper (*Cypripedium candidum*), western prairie fringed orchid (*Plantanthera praeclara*), and the western silvery aster (*Aster sericeus*).
- Although these plant species are typically found within the region that the subject site is located in, the lagoon site as well as the area immediately surrounding the site, has been heavily disturbed as a result of past lagoon and landfill construction activities. It is therefore unlikely that the subject site provides the optimal habitat for these plant species to prosper. The area immediately surrounding the lagoon site has also been disturbed. Most of the surrounding properties are utilized as cropland, pasture land, or have been developed within the village site. Therefore, potential environmental effects to vegetation and forestry as a result of the lagoon expansion project are not anticipated.
- Gordon Hill, an Impact Assessment Archaeologist with the Manitoba Historic Resources Branch was contacted for information on heritage resources that may be located within the vicinity of the proposed lagoon expansion site. Mr. Hill was also asked whether or not the proposed lagoon expansion project could potentially impact any historical resources in the area. Mr. Hill indicated that after review of the proposed project, the Historic Resource Branch has no concerns with regards to the expansion project. (A letter response from Historic Resources Branch is included in Attachment C).
- The expansion of the lagoon will take place at the existing lagoon facility, which is located on Village-owned property that has historically been dedicated for this purpose. As an outcome of this project, the community within the vicinity of the

lagoon can expect the elimination of unplanned sewage discharges that can potentially negatively affect Lake Winnipeg and its surrounding habitat. As a result of this development, no potentially negative impacts to social economic aspects of the area within the vicinity of the lagoon are anticipated.

- Figures 5 and 6 attached show the design of the proposed secondary cell construction. Existing clay material on-site and as may be required, imported low permeability clay borrow material, will be used to construct the clay containment structure in the lagoon dyke. The objective during the construction of the expansion is to have a hydraulic conductivity of 1×10^{-7} cm/sec or less. If during the excavation for clay materials, unsuitable materials are encountered, the soils will be subcut and replaced with low permeability clay from the site excavations, or as imported clay borrow material. This construction detail is included in Figure 6. The proposed secondary cell is to be connected to the existing secondary cell via interconnecting pipe and a valve. The new secondary cell will be provided with a new discharge pipe and control valve. The existing secondary cell discharge pipe and control valve will continue to be used, as described above.
- The sand and gravel layer that was encountered in the existing eastern secondary cell wall as seen in the soil log from MW-18 on Figure 3, attached, will be removed and replaced. This work will be done when the secondary cell is drained down in the fall. The depth of sludge accumulation in this existing secondary cell is measure by the Village to be typically 50mm. It is not anticipated that sludge removal will be required to complete this repair. This sand and gravel lens will be completely removed and replaced with recompacted low permeability clay to meet the hydraulic conductivity requirements of the existing lagoon.
- No ditches in the vicinity of PR 225 will be disturbed. The contractor will as a general condition of the contract, be required to restore any damage to any property, as a result of this work.
- The future (2022) permanent or winter population is estimated at 725 persons, while the summer population remains the same at 3500 people. The future projected hydraulic loading on the lagoon is $60,000 \text{ m}^3$ for 365 days of storage (this is a correction from the original submission and is reported in the referenced and originally attached Sewage Lagoon Expansion Report, August, 2002), while the current available storage volume is $34,500 \text{ m}^3$ (this is a correction from the original submission and is as report in the referenced and originally attached Sewage Lagoon Expansion Report, August, 2002). This hydraulic loading rate is projected based on an eight week period of record, from April 15, 2002 through June 7, 2002.
- The hydraulic loading rate is estimated based on the measured volumes of sewage hauled over an eight period of operation as noted in the storage capacity discussion.
- The BOD concentration measured in composite samples were taken in June, and the maximum hauled sewage week was used to represent the loading rate on the lagoon, for design projections. Recognizing that the BOD measured concentration, at an average of 80.5 mg/L is lower than expected for raw municipal domestic sewage, a concentration of 500 mg/L was used for design purposes. Using summer design hydraulic load rate of $250 \text{ m}^3/\text{d}$, the resulting organic load is 126 kg. This is equivalent to a surface loading rate of 39 kg/ha/d. The maximum design organic

loading rate for the existing lagoon is 56 kg/ha/day. Therefore, no additional treatment surface area is considered to be required at this time.

- Refer to responses to Environment Canada and Sustainable Resource Mgmt. Branch.
- The Village of Dunnottar intends to implement a ten (10) year Wastewater Management Initiative comprised of four (4) stages, with the first stage being the current initiative to expand the wastewater treatment lagoon to increase hydraulic storage capacity. The following are the four proposed stages of the initiative:
 1. Stage 1 – Increase hydraulic storage capacity of the wastewater lagoon (represented by the EAP).
 2. Stage 2 – Implement a piped sewage collection system to eliminate holding tanks and septic fields.
 3. Stage 3 – Evaluate treatment technologies for nutrient reduction (consistent with recommendations developed by the Lake Winnipeg Stewardship Board in their January 2005 Interim report).
 4. Stage 4 – Implement wastewater treatment process to improve effluent quality.
- In addition to this EAP, to increase the wastewater treatment lagoon hydraulic storage capacity, the Village of Dunnottar has implemented other incentives to encourage water conservation and limit ground water infiltration into septic tanks. For example, residents are charged a fee for having their septic tanks pumped out once per week, which is included in their general tax assessment. If residents require additional pump outs, they are required to pay directly, in addition to their standard fee. Also, residents are required to upgrade their septic tanks to limit groundwater infiltration when damaged tanks are noted. Mandatory Repair Orders are issued to residents whose tanks are in need of repair (35 issued last fall, and 65 this spring).
- The existing Village of Dunnottar Lagoon is a non-standard, two-cell, facultative lagoon. Liquid sewage from the Village of Dunnottar is collected from local residents' sewage and septage tanks on a weekly basis and trucked to the lagoon. Solids are removed from the septic tanks every one to three years as needed, which is also taken to the lagoon for treatment.
- The Village has invested \$19,000.00 for the trial use of a product called Bio4Sewage:LagoonPlus, produced by Nordevco Associates Ltd. The product is currently being used to treat sludge from the lagoon, in place, to determine the effectiveness of the product on reducing sludge volume and the resultant nutrient load in the effluent.
- In preparation for this trial application of Bio4Sewage:LagoonPlus, Nordevco Associates Ltd. Completed a document entitled, Lagoon Treatment Proposal for the Village of Dunnottar, in November 2004, which included sampling for nutrient levels in the lagoon. Samples were taken on October 27, 2004, after the secondary cell had been emptied for the year and the primary cell discharge pipe had been opened to balance the levels in the two cells. A sample from the primary cell dump station area indicated a total phosphorus level of 6.48 mg/L, while a sample taken from the area of the primary cell discharge pipe indicated a total phosphorus level of 6.09 mg/L. The October samples also indicated that the nitrate-nitrite-N values were low, as one would expect (0.04 mg/L and 0.17 mg/L). The TKN levels at the dump station sample indicated a TKN of 25.1 mg/L and the discharge area sample measured 21.2 mg/L. These concentrations are considered to be representative of raw municipal

sewage which is typically N organic at 10 to 20 mg/L and N ammonia at 15 to 30 mg/L (reference: Sewage Treatment, Basic Principles and Trends, Bolton and Klein).

- Facultative sewage lagoons will provide some conversion and reduction of nitrogen N and removal of phosphorus P, through the facultative oxidation process and precipitation processes. Facultative lagoons are more effective in nutrient reduction when the storage period is a full year, and when the discharge is in the fall, as opposed to the spring (reference: Manitoba Sewage Lagoon Process Workshop Proceedings, WCWWA, Feb. 1994). These are the current and proposed on going operation procedures of the Dunnottar lagoon.
- Data presented in the workshop materials include data collected from lagoon operations, similar to the Dunnottar lagoon, across the prairies. For lagoons with two cells of long storage time (one year in this case), effluent quality from municipal wastewater, for an average of six sites, ten samples, demonstrated effluent quality means of:
 - P 2.7 mg/L
 - Ammonia 0.8 mg/L
 - NO₂/NO₃ 0.4 mg/L
- This would be expected effluent quality from a 12-month storage lagoon at Dunnottar, with fall discharge. With an annual design discharge volume of 60,000 m³, the total P load annually will be 162 kg P.
- The Village of Dunnottar endorses the Lake Winnipeg Stewardship Board recommendations and would work with the Province of Manitoba to evaluate new technologies in nutrient reduction treatment process, and has invested in an evaluation of an in-place sludge reduction treatment process, recognizing sludge contributes to storage volume loss and a contribution of nutrients back into the sewage effluent. Specifically, the Village has applied one year's supply of a proprietary sludge treatment material and will be receiving the results of the application with respect to sludge volume reduction in place, and primary cell nutrient level reduction, after the 2005 operating year. The Village would be pleased to share the findings of this treatment with the Province of Manitoba.
- In addition, the Village of Dunnottar supports the recommendations of the Lake Winnipeg Stewardship Board in that they will support the distribution of information to assist cottage owners in recognizing phosphate cleaning products (for example dishwasher detergents) that contain high levels of phosphates.
- The existing lagoon was constructed in 1984 and operated under Environment Act Licence 1050 issued April 2, 1992. Discharge from the lagoon is currently permitted to flow through the local ditch system along Highway 225 for approximately 2.4 km, then 1.2 km along PTH 9. At this point it flows east, under PTH 9, into Tegula Creek. It then flows approximately 1.5 km to Lake Winnipeg. There are no proposed changes to this discharge route. The lagoon is discharged once per year between September 16 and October 31.
- Surface water sampling will be included in the existing groundwater monitoring program. Surface water samples will be collected towards the end of the period of discharge from the lagoon. Samples will be collected at the point where effluent discharges from the wastewater lagoon to the existing drainage ditch, as well as at the point of discharge to Lake Winnipeg. Parameters for laboratory analysis will include:

- Total Kjeldahl nitrogen
- Nitrate-nitrite nitrogen
- Ammonia nitrogen
- Total dissolved phosphorus
- Total particulate phosphorus
- Total inorganic phosphorus

Disposition:

After receiving the additional information from the proponent, these comments were satisfied and are no longer of concern.

Culture, Heritage and Tourism - Historic Resources

- *No concerns.*

Health

- *No comments received.*

Transportation and Government Services

- *The Department has no major concerns but wishes to note the following:*
 - *If affected, all ditches, slopes and disturbed areas within Provincial Road (PR) 225 right-of-way must be restored to an acceptable condition; and*
 - *It is assumed that the additional flow into the highway ditch will not impact the hydraulic capacity of the existing culverts. However, we would like to note that any increased capacity that may be required is the responsibility of the applicant.*

Proponent Response (June 14, 2005):

- No ditches in the vicinity of PR 225 will be disturbed. The contractor will, as a general condition of the contract, be required to restore any damage to any property, as a result of this work.

Disposition:

After receiving the additional information from the proponent, these comments were satisfied and are no longer of concern.

Intergovernmental Affairs

- *The R.M. of St. Andrews Zoning By-law identifies the site as "Waste Disposal Ground" and zones it Agricultural General "A80". This zone provides for "waste disposal facility – all inclusive (may include lagoon, landfill, recycling depot and transfer station)" as conditional use. An application for approval of a conditional use must be made to the council of the R.M. of St. Andrews.*
- *Our office has no objection to this proposal, provided approval of the conditional use is granted by the Council of the R.M. of St. Andrews.*

Proponent Response (June 14, 2005):

- The property is currently owned by the Village of Dunnottar and it has the conditional use designation as required for this purpose.

Disposition:

After receiving the additional information from the proponent, these comments were satisfied and are no longer of concern.

Canadian Environmental Assessment Agency

- *Following a review by all federal departments with a potential interest in the proposed development, Western Economic Diversification (WD) has indicated that the application of the CEAA will be required.*
- *Fisheries and Oceans Canada did not provide a response.*
- *Environment Canada would be able to offer specialist advice that may assist in the environmental assessment of the proposed project.*

Disposition:

Comments received from Environment Canada (EC) were sent to the proponent for response. Following receipt of the response, EC concerns were satisfied and there were no additional concerns.

PUBLIC HEARING:

A public hearing is not recommended.

RECOMMENDATION:

The Proponent should be issued a Licence for the construction and operation of the expansion of the existing wastewater treatment lagoon in accordance with the specifications, terms and conditions of the attached draft Licence. Enforcement of the Licence should be assigned to the Environmental Assessment and Licensing Branch until the liner testing has been completed and the expansion is commissioned.

PREPARED BY:

Jennifer Smaizys
Environmental Engineer-In-Training
Municipal, Industrial and Hazardous Waste Approvals
September 23, 2005

Telephone: (204) 945-7012

Fax: (204) 945-5229

E-mail Address: jsmaizys@gov.mb.ca