

## **SUMMARY OF COMMENTS/RECOMMENDATIONS**

**PROPOSER:** Village of Dunnottar  
**PROPOSAL NAME:** Village of Dunnottar Wastewater Treatment Lagoon - Passive Filter Project  
**CLASS OF DEVELOPMENT:** 2  
**TYPE OF DEVELOPMENT:** Wastewater Treatment Lagoon–Waste/Scrap  
**CLIENT FILE NO.:** 914.20

### **OVERVIEW:**

On March 1, 2013 the Department received a Proposal from Dillon Consulting on behalf of the Village of Dunnottar pursuant to *The Environment Act* for the construction and operation of a full-scale passive filter system in conjunction with existing Village of Dunnottar wastewater treatment lagoon located in the northwest quarter of section 8-17-4 EPM in the Rural Municipality of St. Andrews, to reduce total phosphorus annual loading to Lake Winnipeg. The passive filter will consist of two 25 metre x 50 metre cells, an ultraviolet (UV) disinfection component and influent and effluent manholes and pumps. Treated effluent from the passive filter and UV will be discharged between June 16<sup>th</sup> and September 15<sup>th</sup> of any year directly to the existing lagoon drainage channel, which eventually flows to Lake Winnipeg. The existing lagoon consists of one primary cell and two secondary cells. Treated effluent from the lagoon is discharged between September 15<sup>th</sup> and November 1<sup>st</sup> of any year and proceeds east in the ditch along P.R. 225, then north along PTH 9 to Tugela Creek. Tugela Creek discharges into Lake Winnipeg.

On April 18, 2013, Manitoba Conservation and Water Stewardship placed copies of the Proposal in the Public Registries located at Legislative Library, 200 Vaughan St., Winnipeg; Millennium Public Library, 4<sup>th</sup> Floor, 251 Donald St., Winnipeg; Manitoba Eco-Network, 3rd Floor, 303 Portage Ave., Winnipeg; Village of Dunnottar Office, 44 Whytewold Road, Matlock; and Online Registry, <http://www.gov.mb.ca/conservation/eal/registries/index.html>. Copies of the Proposal were also provided to the Technical Advisory Committee (TAC) members. The Department placed public notification of the Proposal in the Gimli Interlake Spectator on Thursday, April 18, 2013. The newspaper and TAC notifications invited responses until May 17, 2013.

On June 4, 2013, Manitoba Conservation and Water Stewardship forwarded requests for additional information from the TAC and public to the proponent's consultant. On July 5, 2013, the consultant submitted responses to the comments and requests from the TAC and public. On July 24, 2013, consultant's responses were distributed to the participating TAC and public for review and comment.

On August 7, 2013, Manitoba Conservation and Water Stewardship received further comments from the TAC.

All additional information necessary for the review was placed in the Public Registries.

**COMMENTS FROM THE PUBLIC:**

**David and Sandra Lobban (May 13, 2013)**

- *My wife Sandra and I live in the village as permanent residents and this project is of great interest to us.*
- *The test filter system has been in use for the past four years and independent testing as conducted by Dillon Consulting Ltd., Green Manitoba, the National Research Council of Canada and ALS Environmental, has shown the system to work in reducing the outlet effluent loading when compared to that same effluent not passed through the test passive filter system.*
- *The reduction of Nitrogen and Phosphorous alone make the addition of the filter system a worthy investment. With the additional reduction in release of suspended solids and BOD is an added bonus and the UV disinfectant component, this is a cost effective method of meeting our environmental obligations.*
- *The present licence calls for effluent release to occur between the periods of September 16 to October 31. This is a batch release and the sudden large volume flow may result in erosion of the natural channel. With the lower, more controlled continuous release throughout the season, there will be a reduced tendency for erosion of the channel. The continuous reduced flow rate will enable the passive filter system to perform a more thorough job of removing harmful effluent materials.*
- *We believe that the Village should be granted a licence to proceed with the installation and operation of a fully functioning passive filtration system. The environmental advantage is the improvement of the water quality of the released water with the reduction of harmful chemicals (N and P), the reduction of heavy metals, the reduction of suspended solids and the reduction of biological and bacterial matter.*
- *When there is worldwide recognition of the effects of poor environmental practices, we feel that it would be irresponsible to prevent any endeavour that reduces our negative impact on the environment at large. We fully support the Village of Dunnottar's effort to show Environmental leadership in the extended treatment of sewage effluent.*

**Disposition:**

- No actions required

**George A. Thompson, Dunnottar (May 5, 2013)**

- *This is in response to your publically advertised invitation to make representation re above subject. I wish to make clear that I am solidly in support of the passive filter program for the following reasons,*

*The Dunnottar Passive Filter Project **DOES:***

- 1. Treats sewage lagoon effluent in a much more efficient manner at a fraction of the cost of a mechanical sewage treatment plant. This applies not only to the day to day operational requirements but also to the potential capital cost outlays required.*
- 2. The Passive Filter system makes it possible to treat and discharge effluent from the lagoon for a much extended period (now June to Sept. three months) vs a two weeks, once per year lagoon discharge as in previous years. This greatly enhances lagoon storage capacity.*
- 3. Achieved a tremendous improvement in quality of effluent discharge to Lake Winnipeg compared to previously approved procedures:*
  - a) Phosphorous discharge (responsible for algae growth in the lake) has been reduced by 77% (basically no removal by previous program).*
  - b) Nitrates discharge has been reduced by 60 to 65% (basically not treated by previous procedures).*
  - c) Bacteria counts have been dramatically reduced and are well within regulatory standards. Records show that coliform counts have been reduced by an average of 90%.*
- 4. Passive filters operate continuously at low energy input during summer months with no significant mechanical involvement. More complex mechanical sewage treatment plants operate at relatively high energy consumption and we often hear of mechanical failures and resultant discharge of raw sewage to our waterways.*
- 5. Operational and staff training requirements are minimized with this technology compared to those required in mechanical treatment plants.*
- 6. The Dunnottar Passive Filter Project has been an unqualified success during its trial operations. Further development provides the opportunity to assess and further develop its potential not only for the village of Dunnottar but also for hundreds of other small and medium size communities. Smaller communities could reap tremendous benefits from this technology, including reduced lagoon capacity, improved treatment results, reduced costs, etc.*

- *The mayor and council of the village of Dunnottar working in concert with Dillon Consulting are to be congratulated for developing this wastewater treatment concept that could have such widespread application in our province and beyond.*

Disposition:

- No actions required

**Mr. Robert Haip, President (May 15, 2013)**

Dunnottar Ratepayers Association

Public Health and Safety:

*Previously the yearly dumping schedule of Dunnottar lagoon cells through Tugela Creek took place in late September and October well after the Whytefold swimming pier was removed for the season. The proposed Passive Filtration dumping schedule will now occur daily during prime swimming and water use season:*

- *What assurance can Manitoba Conservation provide that an EXPERIMENTAL project like the Dunnottar passive filtration system will provide adequate safeguards as to water quality at the Tugela Creek Lake Winnipeg Outlet?*
- *What safeguards will be in place in the event of an adverse event involving failure of the passive filtration system considering outlet dumping will occur meters from a swimming beach and park area?*
- *Tugela creek has traditionally attracted the children of Dunnottar as a place to catch tadpoles, frogs and minnows. What measures will be implemented to prevent children from playing in the creek and coming into contact with effluent during the summer months? Previously this was not a concern as lagoon dumping occurred in late September and October well after the start of the new school year (See attachment: Tugela Creek Effluent Outlet — Whytefold Pier and Park)*
- *Considering Tugela Creek runs through the heart of Dunnottar, has the option of flowing the effluent further north of residences, cottages and beaches been explored? It would appear effluent could be flowed further north along highway 9, east along Thomas Rd and Division Rd. This route would result in effluent entering Lake Winnipeg north of Dunnottar beaches and swimming areas.*
- *If one of the many adverse events identified by Dillon Consulting occurs involving the Passive Filtration System, what assurance can be given that authorities will act expeditiously to inform the public?(See attachment: Village of Dunnottar Wastewater Passive Filter Project - Environment Act Proposal, pg. 14)*

Environment:

The Environment Act Proposal - Final Report prepared by Dillon Consulting Limited indicates the Passive Filtration System will be capable of discharging effluent at a rate of up to 500 m<sup>3</sup>/d. If 'm' equates to 'meters' and 'd' equates to 'one day', this suggests the system is capable of flowing an effluent volume equivalent to that of an Olympic size swimming pool every five (5) days:

- What impact will 500 m<sup>3</sup>/day have on the ecological integrity of the lake and coastal beaches?
- What amount of effluent from the Passive Filtration system can Dunnottar swimming, beaches and fishing areas tolerate before being deemed unsafe?
- Will the total amount of effluent released on a weekly / monthly basis be subject to limits?
- In 2010 Stantec Engineering estimated the Winnipeg Beach RV Park would generate up to 2,592 m<sup>3</sup>/day of sewage/effluent. The Environment Act Proposal — Final Report fails to recognize that Dunnottar has been receiving sewage/effluent trucked from the Winnipeg Beach RV Park since 2011. What assurance will residents have that the amount of sewage and effluent accepted from other municipalities will not increase?

Operations:

Passive filtration studies have up to now only been conducted in warm, year round climates such as Mexico and Florida for twelve consecutive months of operation:

- Will the proposed June to September passive filter usage be adequate as compared to preferred year-round operation as tested in warm climate jurisdictions?
- What is the expected life span of the current filter medium; and what are the projected long-term maintenance costs?
- What evidence exists to indicate the positive results achieved through the small-scale seasonal experimental pilot passive filtration project, will scale effectively when constructed to full-size as proposed?

Proponent Response (July 5, 2013)

Public Health and Safety:

- Effluent from the passive filter will be monitored regularly for public safety considerations. As mentioned in the filter operating procedure, any divergence from the specified effluent quality standards will result in recycling of effluent back to the lagoon, preventing lower quality effluent from being discharged

into the receiving drains during the June 16 to Sept 30 period (continuous discharge period). All testing and monitoring information will be provided in the operating reports which are submitted to Manitoba Conservation and are available to the public.

- In terms of actual risk to residents, whether swimming near the discharge point or coming into contact with the effluent along the discharge route, the UV disinfection at the filter outlet ensures that the effluent added to the discharge route will not negatively affect (i.e. increase) the background coliform levels of the water already present in the ditches along the discharge route.
- The existing lagoon discharge route, which has been operated without issues over the lifetime of the facility, will continue to be used. We will continue to monitor the discharge effluent and we have clear operational protocols for effluent recycling if quality issues are not met.

#### Environment:

- Effluent coming from the passive filter is subject to discharge limits similar to that applied to other wastewater treatment facilities, be it a facultative lagoons, aerated lagoons and mechanical treatment plants. The proposal includes the addition of a seasonal, low flow discharge, to offset and reduce the large single release event in the fall. The lagoon will be continuously discharged at a low rate (up to 500 m<sup>3</sup>/day) over the summer months.
- To operate the filter, Manitoba Conservation will specify acceptance of an operating protocol within the EA License. The purpose and goal of the passive filter is to provide the Village of Dunnottar with a nutrient reduction strategy that involves a natural wastewater treatment solution that will result in cleaner effluent.
- The Village has been fully supportive of the provincial initiatives to protect Lake Winnipeg and a passive filter is a significant part of that strategy.
- The Village of Dunnottar does accept municipal wastewater from other municipalities such as the RV Park in Winnipeg Beach. However; the Dunnottar lagoons have sufficient organic and hydraulic capacities to accommodate such loads. The lagoon operating license, as prescribed by Manitoba Conservation, limits the amount of incoming wastewater based on loading rates in order to preserve the integrity of the surrounding environment. The amount of sewage and effluent accepted by the Village from other municipalities is not proposed to increase with the construction of the passive filter.

Operations:

- The design of the filter is based on empirical data for filters operating in similar climates to Manitoba and 5 years of operation of the pilot scale test filters at Dunnottar. There is additional extensive research conducted in northern Europe, northern U.S., and Canada on the design and operation of lagoon effluent filters, which; have some similarities to the filter proposed for Dunnottar. The current pilot scale filter represents a scale model that has been shown to operate successfully in the proposed climatic and flow conditions. Hydraulic conditions, filtration and adsorption dynamics, as well as plant uptake rates will not change significantly upon scale up of the filter due to the large size (and extensive testing) of the pilot filter.
- The pilot scale filter has operated for over 4 years and no measurable clogging or reduction in hydraulic flow characteristics has been observed. The operating 'life' of the filter will be dependent on the operations and quality of the lagoon effluent introduced into the filter. However, based on the observations during the pilot scale filter operation, there are positive indications that this filter will operate well beyond conventional life cycle time frame of 20 years.
- Typically most treatment systems are developed through pilot testing, before full scale systems are developed. For small municipalities cost effective nutrient reduction has been traditionally achieved through a physical/chemical process by adding alum to the effluent. While alum addition does effectively remove P, it results in increased excess sludge production which requires removal and disposal. Additionally, the P in alum sludge is effectively unrecoverable and cannot be recycled as a plant nutrient. A full size passive filter offers a truly sustainable solution to P removal from wastewater; no excess sludge is produced, P is removed from wastewater in a recoverable form (plant biomass), and no chemical inputs are required. Based on the data from 5 years of testing, we are quite confident that a full scale passive filter will achieve the role of an active contributor to the nutrient reduction strategy to save Lake Winnipeg.

Disposition:

After receiving the additional information from the proponent, no further comments were received from Mr. Robert Haip, President, Dunnottar Ratepayers Association.

**COMMENTS FROM THE TECHNICAL ADVISORY COMMITTEE (TAC):**

**Manitoba Infrastructure and Transportation– Highway Planning and Design Branch, Environmental Services Section (May 6, 2013)**

- *No concerns*

**Manitoba Conservation and Water Stewardship - Lands Branch and Sustainable Resource and Policy Management Branch (May 23, 2013)**

- *No concerns*

**Manitoba Local Government - Community & Regional Planning (May14, 2013)**

- *No concerns*

**Manitoba Conservation and Water Stewardship – Office of Drinking Water (May 15, 2013)**

- *No concerns*

**Manitoba Conservation and Water Stewardship - Parks and Natural Areas Branch (May 6, 2013)**

- *No concerns*

**Manitoba Conservation and Water Stewardship, Regulatory Services Branch, Water Use Licensing Section (April 18, 2013)**

- *No concerns*

**Manitoba Conservation and Water Stewardship – Wildlife Branch (April 18, 2013)**

- *No concerns*

**Manitoba Conservation and Water Stewardship, Fisheries Science and Fish Culture Section, Fisheries Branch (May 5, 2013)**

- *Fisheries Branch has reviewed this proposal to construct and operate a full-scale passive filter system in conjunction with existing Village of Dunnottar wastewater treatment lagoon located in the northwest quarter of section 8-17-4 EPM in the Rural Municipality of St. Andrews, to reduce total phosphorus annual loading to Lake Winnipeg. The passive filter will consist of two 25 metre x 50 metre cells, an ultraviolet (UV) disinfection component and influent and effluent manholes and pumps. Treated effluent (discharge flows up to 500 m<sup>3</sup>/d ) from the passive filter and UV will be discharged between June 16th and September 15th of any year directly to the existing lagoon drainage channel, which eventually flows to Lake Winnipeg. The existing drainage is through the local ditch system along Highway 225 for approximately 2.4 km, then 1.2 km north 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. No change is proposed for batch discharge from the lagoon: the secondary cells would continue to be emptied directly into the drainage route (after successful compliance testing) between September 16 and October 31.*



- *The proponents have proposed a number of erosion and sediment control measures to be implemented as required along with monitoring and maintenance of measures and environmental monitoring of turbidity during construction if required.*
- *It would appear from the information provided that there will be an increased improvement in reducing the limits of a number of effluent parameters. Given the effluent will be discharged continuously and does eventually enter fish bearing waters ammonia should be included as a discharge parameter. However we defer to the expertise of our colleagues in Water Science Management regarding parameters and monitoring requirements.*

Proponent Response (July 5, 2013)

- Presently, facultative lagoons are not required to monitor ammonia discharge between June 16 and September 15 (the proposed filter operation interval).

Disposition:

- After receiving the additional information from the proponent, no further comments were received from Fisheries Branch.

**Manitoba Conservation and Water Stewardship, Water Quality Management Section, water Science and Management Branch (April 26, 2013)**

- The following effluent standards should be in place for the Village of Dunnottar as per the *Manitoba Water Quality Standards, Objectives and Guidelines Regulation* (196/2011).
  - BOD5 25 mg/L
  - Total suspended solids 25 mg/L
  - Fecal Coliforms or *Escherichia coli* 200 MPN / 100mL
  - TP <1mg/L
- The Village of Dunnottar must implement weekly monitoring at the outlet of the UV disinfection system, for *Escherichia coli*.
- The Water Quality Management Section recommends monthly monitoring at the outlet of the UV disinfection system, for BOD, TSS, and TP.
- 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.

Proponent Response (July 5, 2013)

- The full scale filter is designed to improve the effluent quality discharged from the lagoon treatment system at Dunnottar. Effluent from the filter will meet or exceed the BOD, TSS and E.Coli limits contained in the Manitoba water quality standards, objectives and guidelines regulation (196/2011) for facultative lagoons. The pilot scale filter operating objectives include maximizing TP reductions which may meet and exceed a 1 mg/L objective.
- Proposing a firm 1 mg/L TP for a system of this size is unprecedented and effectively penalizes the proactive nature of the Dunnottar passive filter project. Under the aforementioned guidelines, a community such as Dunnottar (population 750) has the option to demonstrate a nutrient reduction strategy instead of the 1 mg/L phosphorous limit. The full scale filter implementation represents a nutrient management strategy that is intended to reduce TP and effectively and permanently remove this from the effluent stream, not delay its release, as is the experience in 'wetland' treatment systems.
- TP will be monitored in the effluent and reported in year-end reports. We are quite confident that the filter will bring the phosphorous levels to within the 1 mg/L limit but we feel that the target should be written in as a reduction plan. The results will be recorded and reported as point in time results and rolling 30 day averages.
- Conventional lagoons are tested once prior to release. Continuous discharge mechanical plants with discharges equivalent to the daily sewage inflow are typically monitored for E. Coli. on a more frequent schedule; typically with weekly or rolling 30 day averages used for compliance. As the effluent flow rate is a fraction of the sewage inflow rate, it is proposed that bi-weekly monitoring during initial operation be conducted with provision to reduce the monitoring frequency to monthly should the filter demonstrate a consistent coliform reduction concentration below effluent standard requirements (200 MPN / 100 ml).
- Monthly monitoring at the outlet of the UV disinfection system for BOD, TSS are proposed and TP concentrations will also be measured monthly for regulatory reporting. It is proposed that the effluent criteria for the facility remain at the current level of 30/30, mg/L BOD and TSS, respectively and that TP be measured and reported as information demonstrating the TP concentration and total removal rates, as part of the nutrient reduction strategy. This would recognize that TP is not an effluent standard requirement for a community under 2000 people (Dunnottar population = 695; 2011 census data).
- Construction of a full scale passive filter is in fact a nutrient reduction plan that the Village is pursuing proactively.

Further Comments (August 7, 2013)

- *As per the Manitoba Water Quality Standards, Objectives and Guidelines Regulation (196/2011) and Water Quality Management Section comments of April 26, 2013 the following effluent standards should be in place for the Village of Dunnottar:*
  - *BOD5 25 mg/L*
  - *Total suspended solids 25 mg/L*
  - *Fecal Coliforms or Escherichia coli 200 MPN / 100mL*
- *In demonstrating a nutrient reduction strategy, the Village of Dunnottar must conduct monthly effluent sampling of total phosphorous and report a year-end report confirming nutrient reduction as concentration and total removal rates.*
- *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.*

Disposition:

- The draft Licence includes effluent quality discharge criteria in accordance with the Manitoba Water Quality Standards, Objectives and Guidelines Regulation (196/2011).
- The draft Licence includes a clause that requires the Licencee to implement weekly monitoring at the outlet of the UV disinfection system, for fecal coliform.
- The draft Licence includes a clause that requires the Licencee to conduct monthly effluent sampling of total phosphorous and report a year-end report confirming nutrient reduction as concentration and total removal rates.
- The draft Licence includes a clause that requires the Licencee to actively participate in any current or future watershed-based management study, plan and/or nutrient reduction program, approved by the Director, for the for Tegula Creek, Lake Winnipeg and/or associated waterways and watersheds.

**COMMENTS FROM FEDERAL REPRESENTATION:**

- The application of the *Canadian Environmental Assessment Act (the Act)* will not be required for this project.

**PUBLIC HEARING:**

- A public hearing is not recommended because no comments were received from the public for public hearing.

**CROWN-ABORIGINAL CONSULTATION:**

The Government of Manitoba recognizes it has a duty to consult in a meaningful way with First Nations, Métis communities and other Aboriginal communities when any proposed provincial law, regulation, decision or action may infringe upon or adversely affect the exercise of a treaty or Aboriginal right of that First Nation, Métis community or other Aboriginal community.

There is no aboriginal community nearby the lagoon and would be no infringement of aboriginal or treaty rights under Section 35 of the Constitution Act, 1982. Therefore, it is concluded that Crown-Aboriginal consultation is not required for the project.

**RECOMMENDATION:**

The Proponent should be issued a Licence for the construction and operation of a full-scale passive filter system in conjunction with existing Village of Dunnottar wastewater treatment lagoon in accordance with the specifications, limits, terms and conditions of the attached draft Licence. Enforcement of the Licence should be assigned to the Environmental Approvals Branch until the liner testing/inspection has been completed and the Development is commissioned.

**PREPARED BY:**

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