SEPTAGE MANAGEMENT PLAN
FOR THE
MUNICIPALITIES OF GREY COUNTY

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1.0 INTRODUCTION

1.1 Background and History

A delegation from the County of Grey met with the Minister of the Environment at the ROMA/Good Roads Conference in February 2003 to discuss the time frame and to obtain information about how the Ministry intended to proceed with treatment and disposal of septage in the County of Grey. It was made clear by the Minister to the delegation that the five (5) year period was not in place yet but he indicated that they were considering banning the application of septage from the land in future and that this issue should be resolved.

On June 2, 2003, a meeting was held with representatives of the County of Grey, P K Maszra, Director of Waste Management Policy Branch, Ministry of the Environment, Ms. Eileen Smith, Manager, Land Application and Policy Branch of the Ministry of the Environment, and Mr. Mohsen Keyvani, Program Support Coordinator, Environmental Assessment and Approvals Branch, Ministry of the Environment. The Ministry was interested in the County of Grey undertaking a pilot project to prepare a Septage Management Plan. During discussions it was noted that Grey County was not involved in water or wastewater treatment and that the Management Plan would be undertaken by the nine (9) lower tier municipalities within the County.

As a pilot study, the province was prepared to commit 50% funding for the project. However, their preference was that it would be a study carried out by the County of Grey, and if the County was not prepared to carry out the study, then a guarantee was to be provided indicating that all nine (9) municipalities would participate in the pilot project for the septage management plan. A Municipal Septage Management Task Force was established. Each of the lower tier municipalities appointed one (1) representative to the Task Force with the first meeting being held on August 21, 2003. At that meeting, a Resolution was passed that each Municipality would contribute financially to their portion of the 50% of the cost of the study, which would be calculated on the number of households in each municipality requiring septage systems. The Terms of Reference for the Task Force are attached in Appendix A.

The Task Force also set up a Technical Committee to assist in the study with one (1) representative each from the Grey Bruce Health Unit, the Grey Sauble, Saugeen Valley and Nottawasaga Valley Conservation Authorities, the Ministry of the Environment, as well as a representative from the septage haulers, municipal sewage disposal plant operators and representatives from each of the four (4) lower tier municipalities that

currently employ septic inspectors. The Technical Committee Terms of Reference are also attached in the Appendix A.

The second task was to develop a Terms of Reference (see Appendix B) and call for a Request for Proposal to Consultants to carry out the study and prepare the septage management plan, which was awarded on January 9, 2004 to Henderson Paddon & Associates Limited. The first meeting of the Task Force and the Consultant was held on January 12, 2004.

1.2 Nutrient Management Act

The Provincial Government passed the Nutrient Management Act on June 27, 2002. Subsequently to that, Regulation 267/03 Nutrient Management Regulation was passed under the Nutrient Management Act and came into affect on September 30, 2003. The Nutrient Management Regulation does not currently apply to land application of septage, however the requirements of the Nutrient Management Regulation may apply to septage that is treated either at a sewage works or at a treatment facility specifically designed to treat septage that is then land applied for nutrient benefit and to the treatment facility itself "the generator". The Nutrient Management Regulation phases in requirements for generators of non-agricultural nutrients such as sewage biosolids to begin preparing nutrient management strategies between 2005 and 2008. The Nutrient Management strategies account for the amount of nutrients generated and the destination of those nutrients. The land application of biosolids is subject to the following Nutrient Management Regulation requirements: winter spreading of sewage biosolids is banned from December 1st to March 31st and at anytime outside those dates when the ground is frozen or snow covered. Also Regulation 326/03 to amend Regulation 347 to ban the land application of untreated portable toilet waste was filed on August 1st, 2003 and the regulation came into force on October 30th, 2003. For more information on the Nutrient Management Act and Regulations, refer to Appendix C.

1.3 County of Grey

The County of Grey is located approximately 150 km northwest of Toronto with the north portion of the County bordering on the southern shores of Georgian Bay. The County of Grey has an estimated population of approximately 83,000. The County is composed of nine (9) municipalities as shown on attached Figure No.

1. The nine municipalities, including the original Townships and Municipalities prior to amalgamation are also shown on this Figure No. 1.

There are twelve (12) existing municipal wastewater treatment plants within the municipalities in the County of Grey and the location of these municipal wastewater treatment plants are also shown on Figure No. 1

1.4 Septage Management Plan - Committees

In 2003, a Septage Management Plan Task Force was formed to oversee preparation of the Septage Management Plan. A representative from each of the nine (9) member municipalities within the County were appointed. The following is a list of the representatives on the Septage Management Task Force Committee.

- Mr. Bob Pringle, Township of Chatsworth
- Mr. Carl Spencer, Township of Georgian Bluffs (Vice-chair)
- Mr. Brian Mullin, Municipality of Grey Highlands
- Mr. Ed Falstrem, Town of Hanover
- Mr. Wally Reif, Municipality of Meaford
- Mr. Bill Twaddle, City of Owen Sound
- Mr. Don Lewis, Township of Southgate
- Mr. Bob Gamble, The Town of the Blue Mountains
- Mr. Delton Becker, Municipality of West Grey (Chair)
- Mr. Eileen Smith, Manager Land Application Policy Branch, Ministry of the Environment
- Ms. Virginia Cook, Committee Secretary, Task Force and Technical Committee

The Septage Management Plan Task Force Committee also appointed a Technical Committee with membership from the Grey Bruce Health Unit, local Conservation Authorities and Ministry of the Environment, septage Haulers, municipal sewage disposal plant operators and representative from each of the four (4) lower tier municipalities who have septic inspectors, namely the Township of Southgate and Chatsworth, and the Municipalities of West Grey and Grey Highlands. The following persons are members of the Technical Committee:

- Mr. Ian Mitchell, P Eng., Ministry of the Environment
- Mr. Chris Munn, Grey Bruce Health Unit
- Mr. Douglas Hill, Grey Sauble Conservation Authority
- Mr. Rick Cole, Municipal Septic Inspector, Municipality of Grey Highlands
- Mr. Doug Kopp, Municipal Septic Inspector, Township of Southgate
- Mr. Les MacKinnon, Environmental Health Officer, Municipality of West Grey
- Mr. Gord Wilson, Municipal Septic Inspector, Township of Chatsworth
- Mr. Maurice Dempster, Septage Disposal Plant Operator, Municipality of Grey Highlands
- Mr. David Russell, Septic Disposal Plant Operator, Ontario Clean Water Agency
- Mr. Al Smith, Ontario Association of Sewage Industry Services (OASIS)
- Mr. Don Dillman, Septage Hauler
- Mr. Don Marshall, Septage Hauler
- Mr. Doug Wilton, Septage Hauler
- Mr. Doug Schaus, Septage Hauler
- Mr. Giles Ariel, Septage Hauler
- Mr. Roger Barrette, Septage Hauler
- Mr. Sam Luckhardt, Septage Hauler

In addition, a representative from the Ministry of Municipal Affairs has also been involved with meetings in regard to this study.

2.0 NUMBER OF SEPTIC SYSTEMS AND RAW SEWAGE HOLDING FACILITIES

The number of existing septage systems in 2003 was based on information initially received from the Municipal Property Assessment Corporation (MPAC), for each of the nine (9) municipalities within Grey County. The information was forwarded to each municipality for their review and to determine the numbers of septic systems. The properties requiring septic systems or sewage holding tanks were grouped into eight (8) categories, as follows:

- Residential
- Multi-Residential
- Commercial
- Industrial
- Farm
- Recreational
- Residential-Condos
- Institutional

The above categories were specified as each would represent a different sized septic tank for pumping by the hauler and different years for pumping each of the septic tanks, depending on the type of property use. The number of properties serviced in each municipality with a wastewater treatment plant versus those properties not serviced was also determined. The estimated number of properties requiring septic systems or sewage holding tanks are shown for each of the member municipalities on Table 1. Also included in that table is the total number of properties serviced by a wastewater treatment plant currently in the municipality. The analysis determined that the existing number of septic systems in Grey County in the year 2003 is 22,443. The number of holding tanks is estimated to be 64, as shown in Table 1, for a total number of properties requiring septic systems or holding tanks to be 22,507.

The study team was able to assess certain information from the County of Grey's GIS system including the parcel fabric data of Municipal Property Assessment Corporation (MPAC). The MPAC data does not in most cases accurately reflect the classification for services to a property and more often refer to unspecified service or non-available in the database. Therefore, this information is not useful in trying to determine the distribution of septic systems in the Municipalities in Grey County. To estimate the distribution of septic systems within

the County, water wells were plotted and shown on Figure No. 2. Generally, a septic system is situated where a water well is located. However, this map shows only general distribution of septic system areas and there are a few exceptions. It should be noted that most of core built up area of Flesherton, located within the Municipality of Grey Highlands, is now serviced by a municipal sewage system and the density of septic systems in the downtown core is not reflected in the water well location. In addition, the water wells in Neustadt, are not indicative of septic systems since a sewage system was installed to service the main core area of the hamlet in the early 1980's. In addition, there are likely many additional septic systems along the shores of Georgian Bay from Wiarton in Bruce County to the Town of The Blue Mountains along Georgian Bay. This area could have many more septic systems due to the fact it is difficult to obtain a groundwater supply in this area and we are aware that many cottages and permanent homes obtain water directly from Georgian Bay.

It should be noted that there is a high density of septic systems in the former Sarawak Township near Owen Sound in the existing Township of Georgian Bluffs, as well as in the Eugenia Lake Area northeast of Flesherton in the Municipality of Grey Highlands and other areas in the County. Water wells in the County of Grey would be a general reflection of the density and distribution of septic systems within the County.

The following indicates the total number of septic systems and holding tanks in each of the nine (9) municipalities in Grey County:

Municipality	No. of Septic Systems/Holding Tanks
Township of Georgian Bluffs	4540
Municipality of West Grey	4022
Municipality of Grey Highlands	3838
Municipality of Meaford	3048
Township of Chatsworth	2792
Town of The Blue Mountains	2286
Township of Southgate	1870
Town of Hanover	99
City of Owen Sound	12

3.0 EXISTING AND ESTIMATED 20 YEAR POPULATION

In 2003 the population in the County of Grey was 82,860 based on data from the Municipal Directory. It is important that any facility constructed or upgraded to provide treatment for septage should be designed for the year 2024. It is assumed that the number of septic systems within the nine (9) municipalities within Grey County would increase at the same rate as the population increase over the 20-year design period.

The Grey County Official Plan, was approved in August, 2000, and was reviewed regarding population projection. It is assumed the population growth rate will be higher in certain municipalities such as the Town of the Blue Mountains versus other municipalities. A considerable portion of the population growth rate in the Town of the Blue Mountains will be fully serviced thus the number of septic systems will not increase significantly in this municipality. However, the population growth rate was discussed with the Septage Management Task Force and Technical Committee during the initial meetings, and it was agreed that the annual growth rate over the 20-year design period utilized for septic systems and holding tanks would be 1.5% per year. This growth rate would represent a 34.7% increase over the 20-year period or an estimated population in the year 2024 of 111,600. The estimated number of properties that would require septic systems or holding tanks in the design year of 2024 is 22,507 x 1.347 = 30,317 properties.

4.0 QUALITY AND QUANTITY OF SEPTAGE, HAULED SEWAGE AND PORTA POTTY WASTEWATER

4.1 Estimated Quantity of Septic and Hauled Sewage

The quantity of hauled sewage and septage within the Municipalities of Grey County has been estimated for each individual property class, of which there are eight (8). The number of septic systems and holding tanks for each property class are summarized on **Table 2**.

In order to estimate the quantity of septage and hauled sewage, we have combined the number of holding tanks with the septic tanks since the number of properties requiring hauled sewage is only 0.28% of the total number of septics and holding tanks. Generally, the wastewater from the holding tanks will not be as strong as waste from septic tanks. However, it should be noted that wastewater from some holding tanks have strong wastewater such as a wine making operation in Grey County.

The size of the septic tank for each property class, is indicated on **Table 2**. Residential, farm, recreational and residential condos are estimated to have septic tank sizes of 4 m^3. Commercial, industrial and institutional properties are estimated to require septic tanks twice as large at 8 m^3 and multi-residential properties are estimated to have a septic tank size of 12 m^3. It is recommended that septic tanks be pumped out regularly. The frequency of pump out of septic tanks in years is shown in **Table 2**. Multi-residential properties should be pumped out once per year, industrial and institutional septic tanks every two (2) years and residential, commercial, farm and residential condos every three (3) years. Due to the limited usage of recreational properties, these should be pumped at a frequency of once every five (5) years. This is a reasonable frequency requirement for pumping out septic systems to maintain a properly operating septic tank. However, this does not guarantee operation of the leaching beds as this would be dependent on groundwater levels, soil conditions and type of wastewater being disposed of in the septic tank. The estimated average wastewater from septic tanks and hauled sewage generated per year for municipalities in Grey County as outlined in **Table 2** is a total of 31, 519 m^3 per year, which represents 86 m^3/day based on 365 days per year. However, it is estimated that most of the septage and hauled sewage would be disposed of during a six-month period from April 1 to October 31. Therefore, this would represent a quantity of septage and hauled sewage at 172 m^3/day every day for a six-month period.

The estimated quantity of hauled sewage and septage for each municipality in the County of Grey and for each property class is outlined on **Table 3**. The municipality with the most septage and hauled sewage is the Township of Georgian Bluffs with 6,230 m^3/year with the next largest quantity being the Municipality of West Grey at 5,817 m^3/year. The lowest quantity of septage and hauled sewage would be from the City of Owen Sound, which is 27 m^3/year.

4.2 Historical Summary of the Quality of Septage and Hauled Sewage

Grab sample analysis from septage being disposed of at the wastewater treatment plants in the Town of Meaford in the County of Grey, the Municipality of Northern Bruce Peninsula and the Town of Saugeen Shores in the County of Bruce and two (2) other areas in Ontario (City of Hamilton and the District of Muskoka) were assembled. Data was obtained based on grab samples of septage quality from five (5) different municipalities within Ontario from 2001 to 2003. A summary of the septage quality data for selected parameters is outlined in **Table 4**. **Table 4** also shows the range of concentrations for individual grab samples for different parameters, the average concentration, the number of samples, and years recorded. There is also a range for an average of all five (5) municipalities, average number of samples and recorded years. This data is important to indicate the strength of the septage for design purposes. It should be noted that parameters such as BOD_5 have been sampled as high as 40,500 mg/L, TKN at 5,020 mg/L, Total Suspended Solids at 88,500 mg/L and Total Phosphorus at 8,000 mg/L. BOD_5 and TKN have a significant oxygen demand for the treatment of sewage or septage. These parameters are some of the key design parameters for sewage treatment. BOD_5 is defined as the biochemical oxygen demand of the wastewater over a five day period when an inhibiting chemical has been added to the wastewater sample during laboratory analysis to prevent ammonia oxidation. TKN (Total Kjeldahl Nitrogen) is the organic nitrogen in the wastewater as determined by standard laboratory methods. TKN would include the total amount of ammonia in the wastewater. These parameters significantly affect the organic capacity of any wastewater treatment plant to treat this type of wastewater due to high organic strength. As well, it is noted in a previous sentence, where actual ranges are described, some parameters analysed are based on approximately 180 grab samples, which indicates the high strength of the wastewater. In addition, it indicates that although the treatment plant would be designed for a specific design concentration, it should be noted that at certain times there will be very high strength wastewater pertaining to organics and suspended solids coming into the plant for treatment of septage.

It should also be noted that in some grab samples, there were high elevated levels of metals such as copper, zinc and aluminum. Copper was reported to be as high as 290 mg/L, zinc at 750 mg/L and aluminum at 5300 mg/L. It is not known where the high levels of metals originated. These parameters may be from chemicals and cleaning products utilized in households and disposed of through plumbing to the septic tank. It should be noted that in all cases, for the selected parameters, other than pH and chloride, the average concentration of septage exceeds the Ontario Sanitary Model Sewer Use Bylaw criteria.

The U.S. EPA has suggested design concentrations for septage and these concentrations are outlined in Appendix D. The U.S. EPA recommended design concentrations for septage for key design parameters are (7000 mg/L) per BOD_5, (15,000 mg/L) for Total Suspended Solids and 700 mg/L for TKN. They also indicating that for heavy metals, a design guideline of 8 mg/L for copper, 40 mg/L for zinc and 50 mg/L for aluminum. The U.S. EPA design guidelines for selected parameters are shown in **Table 4**. As can be seen in **Table 4**, some grab samples indicate much higher levels than the design concentration listed for copper and zinc, which needs to be investigated further to ensure there is not a problem with final disposal of treated wastewater or compost on farm land in regard to heavy metals.

All hauled sewage quality data from holding tanks were obtained from grab samples in the Municipality of Grey Highlands in the County of Grey and from the Municipality of Northern Bruce Peninsula in neighbouring Bruce County. Again, the hauled sewage data was analysed for selected parameters in regard to range, average quality, number of samples and years sampled. It should be noted that some hauled sewage had high levels of BOD_5 such as 5,170 mg/L. There was also a high concentration of suspended solids of 26,100 mg/L, and TKN of 952 mg/L in hauled sewage. This data is as outlined on **Table 5**. It is therefore felt that, the small quantity of hauled sewage should be combined with septage since there is an indication that the organic quality of hauled sewage is significantly high, in some cases, which is close to the quality of hauled septage.

4.3 Porta Potty Wastewater

The amount of existing porta potty wastewater in the year 2003 was estimated from information obtained from porta potty haulers in Grey County. The existing estimated quantity of porta potty wastewater is 1.9 m^3/day over a 365-day period as shown on **Table 6** which is equivalent to a 694 m^3/year. Porta potty wastewater is presently not being approved to be spread on agricultural land and is currently being treated at existing

wastewater treatment plants. The quality of porta potty wastewater will be considered the same as septage and hauled sewage.

4.4 Design Quality of Septage and Hauled Sewage

Based on the information collected and as outlined in Section 4.2, on the quality of septage and hauled sewage and a review of the suggested design values for septage from the U.S. EPA, as outlined in Appendix D, it is suggested that the U.S. EPA design values be utilized for the quality of septage and hauled sewage and porta potty wastewater from Grey County. In general, it is recommended that for organic parameters, a design value for of 7000 mg/L for BOD_5, 15,000 mg/L for suspended solids and 700 mg/L for TKN be used. These are the key parameters that will affect the treatment of this wastewater in regard to either a privately constructed treatment facility or an existing wastewater treatment plant.

4.5 Estimated Quantity and Organic Loadings of Septage and Hauled Sewage - Existing and 20 Year Design

The estimated potential existing quantity of BOD_5 and TKN loadings for septage and hauled sewage in each of the municipalities in Grey County is outlined in **Table 7**. This table outlines the number of septic systems and holding tanks in each of the individual municipalities and the quantity of septage and hauled sewage for a six-month period, which totals 172 m^3/day. Using the U.S. EPA design, values for BOD_5, TKN and suspended solids of 7000 mg/L, 700 mg/L and 15,000 mg/L respectively, the BOD_5, TKN and suspended solids loadings for each municipality are calculated as shown on **Table 7**. The total estimated potential existing quantity of BOD_5 and TKN for septage and hauled sewage but not porta potty waste is 1204 kg/day for BOD_5 based on a six-month period, 120.4 kg/day for TKN and 2,580 kg/day for suspended solids.

The existing quantity of septage and hauled sewage is outlined in **Table 8**. The existing quantity of septage of 171.3 m^3/day. The quantity of hauled sewage is 0.7 m^3/day and the quantity of porta potty sewage is 1.9 m^3/day, for a total of 173.9 m^3/day based on a six month treatment period. The quantity of septage is 98.5% of the total quantity of septage and hauled sewage. Porta potty waste is 1.1% and hauled sewage is 0.4%. The 20-year design quantity for the year 2024 is 234.2 m^3/day based on a six-month treatment period from April 1 to October 31.

The total potential existing BOD_5 loading from the hauled sewage and septage is 1,217 m^3/day and the TKN loading would be 121.7 kg/day as shown in **Table 8**. The 20-year design value for BOD_5 loading is calculated to be 1639 kg/day and the TKN loading is calculated to be 163.9 kg/day. **Table 7** outlines the design figures that are estimated on the number of septic systems and the amount of septage and hauled sewage for the existing and design year 2024.

5.0 EVALUATION OF EXISTING MUNICIPAL WASTEWATER TREATMENT FACILITIES IN GREY COUNTY

5.1 Description of Twelve (12) Existing Wastewater Treatment Plants in Grey County

There are twelve (12) existing municipal wastewater treatment plants in the County with locations as shown on Figure No. 2. All nine (9) municipalities have at least one (1) wastewater treatment plant except the Township of Chatsworth. The Town of the Blue Mountains has two (2) wastewater treatment plants one at Craigleith and one at Thornbury. The Municipality of Grey Highlands has three (3) municipal wastewater treatment plants, located at Markdale, Flesherton and the Amik Wastewater Treatment Plant at Kimberley. The Municipality of West Grey has two (2) municipal wastewater treatment plants, one at Durham and one in the Hamlet of Neustadt. The wastewater treatment plant facilities range from a primary wastewater treatment plant for the City of Owen Sound with tertiary treatment plants located at Flesherton, Craigleith, Markdale, Amik, Dundalk, Derby, Meaford, Thornbury, Durham, Town of Hanover and Neustadt would be considered secondary wastewater treatment plants.

5.2 Existing Design Hydraulic and Organic Loadings of Wastewater Treatment Plants in Grey County

The treatment of septage from the municipalities in Grey County requires an assessment of the existing twelve (12) municipal wastewater treatment plants and whether they have the capacity to treat septage using a pre-treatment facility or treat liquid wastewater after removing biosolids, or to treat septage wastewater directly at the existing wastewater treatment plants.

The existing design hydraulic and organic capacities of the existing twelve (12) wastewater treatment plants in the municipalities in Grey County are shown on **Table 9**. The design hydraulic capacities of the plants range from 24,545 m^3/day at the Owen Sound Wastewater Treatment Plant to 57.5 m^3/day at the Derby Wastewater Treatment Plant in the Municipality of Georgian Bluffs. The design hydraulic capacity for each plant is outlined in **Table 9**. The total design hydraulic capacity of all the plants is 48,126.5 m^3/day.

The existing design organic BOD_5 and TKN capacities of the plants were determined. They range from 3,682 kg/day for BOD_5 organic design capacity at Owen Sound to 31.6 kg/day BOD_5 at the Derby Wastewater Treatment Plant. The total BOD_5 organic design capacity is 8,736.2 kg/day. The total TKN design capacity is 963.5 kg/day.

5.3 Existing Hydraulic and Organic Loading Components at the Wastewater Treatment Plants to Treat Raw Sewage and Septage

Existing average sewage flows were reviewed for varying years from 1997 to 2003 depending on the availability of data as shown on Table 9. Average sewage flow to each plant varies from 13,704 m^3/day at the Owen Sound Plant to 43.7 m^3/day at the Derby Wastewater Treatment Plant. The total existing average sewage flows to all twelve (12) plants are estimated to be 27,696 m^3/day, based on recent data, which is 57.5% of the design hydraulic capacity of all twelve (12) plants.

The existing quality of raw sewage BOD_5 and TKN is based on actual data from 1997 to 2003 depending on each of the twelve (12) wastewater treatment plants. The concentration of average raw sewage BOD_5 range from 57.3 mg/L at the Thornbury Wastewater Treatment Plant to 550 kg/L or (design value) at the Derby Plant. It should be noted that the average BOD_5 for 2003 for the Town of Hanover was 340.3 mg/L, which is in excess of the Model Sewer Use Bylaw, criteria of 300 mg/L. Based on the average raw sewage quality and average raw sewage flow for the same years, the existing average raw sewage BOD_5 loading for each plant were calculated. The total average raw sewage loadings in kg/day for all twelve (12) plants was 3,797.3. This is 43.5% of the total design BOD_5 organic design capacity. The BOD_5 loading for each of the wastewater treatment plants are outlined in **Table 9**. The same analysis was carried out in regard to TKN. The raw sewage quality for TKN ranges from 10.7 mg/L at the Thornbury plant to the design value estimated for the Derby Wastewater Treatment Plant of 85 mg/L. Based on actual sewage flows and the quality for TKN, average raw sewage TKN loadings were calculated for each plant for 2003 as outlined in **Table 9**. The total existing average raw sewage TKN loading for all twelve (12) plants is 442.9 kg/day, which is 46% of the capacity of the twelve (12) treatment plants to treat TKN. In summary the following are existing unused hydraulic and organic capacities available to treat raw sewage and septage at the existing 12 municipal wastewater treatment plants in Grey County not considering committed capacity.

- Existing unused hydraulic capacity - 20,431 m^3/day
- Existing unused BOD_5 organic capacity - 4,938.9 Kg/day

- Existing unused TKN organic capacity - 520.7 Kg/day

5.4 Uncommitted Hydraulic Reserve Capacity of Wastewater Treatment Plants

Each municipality in Grey County was asked to indicate the committed hydraulic capacity for each wastewater treatment plant within their municipality. The value in m^3/day is given for each of the twelve (12) plants in Table 9. The committed hydraulic capacity ranges from 10,841 m^3/day in Owen Sound to zero in the Neustadt, and Derby Wastewater Treatment Plants. Total committed hydraulic capacity for all twelve (12) plants within the nine (9) municipalities is 16,454 m^3/day. Therefore, the uncommitted hydraulic reserve capacity was calculated as shown in Table 9 for each of the wastewater treatment plants. The total uncommitted hydraulic reserve capacity from the wastewater treatment plants in Grey County is 3,977 m^3/day. Owen Sound, Craigleith, Thornbury and Amik Wastewater Treatment Plants have zero hydraulic reserve capacity remaining. Therefore, there are only eight (8) wastewater treatment plants having some uncommitted hydraulic capacity remaining. The largest capacity remaining is at Hanover Wastewater Treatment Plant at 1,977 m^3/day, second largest being the Durham Wastewater Treatment Plant at 972 m^3/day with the next largest being Dundalk at 342 m^3/day. It should be noted that there is interest by the private sector at Durham for a hydraulic capacity of 415 m^3/day at the wastewater treatment plant. Other wastewater treatment plants with some significant remaining capacity are Meaford at 277 m^3/day, and Flesherton at 195 m^3/day. The remaining wastewater treatment plants have a relatively low uncommitted hydraulic reserve capacity.

5.5 Assessment of Biosolids Production - County of Grey

An assessment was carried out of the existing biosolids production per year in the County of Grey at the twelve (12) wastewater treatment plants. A number of plants have lagoon facilities where biosolids are only removed approximately every 20 years and assessed estimates were made of the quantity of biosolids for these facilities. **Table 10** estimates the existing quantity of biosolids produced each year at all twelve (12) wastewater treatment plants in Grey County. The total estimated biosolids as shown on **Table 10** is 22,500 m^3/year at an estimated average solids of 4%. The amount of biosolids was evaluated since a significant amount of agricultural land must be available to dispose of the biosolids. If the biosolids are treated into compost or fertilizer material and spread on agricultural land, there would be fewer objections from neighbouring properties in regard to odours or water quality concerns with groundwater and surface water pollution. There may be some benefit in the long term to treat septage and biosolids together to reduce the dependancy on obtaining

approvals for disposal of biosolids. There is also a reluctance from farmers to take biosolids for a number of reasons considering concerns regarding water quality and objection from neighbours. Spreading of treated biosolids in a composted or fertilizer material, in a dry format, would be more acceptable both environmentally and socially.

6.0 REVIEW OF WASTEWATER TREATMENT TECHNOLOGIES FOR TREATMENT OF SEPTAGE AND HAULED SEWAGE

Wastewater treatment technologies have been reviewed for the treatment of septage and hauled sewage in Grey County include the following.

1. Using the existing capacity at existing treatment works using typical wastewater treatment technologies and pre-treatment of septage at the wastewater treatment plant.

2. Dewatering and treatment of concentrated septage solids using a privately designed and operated treatment facility with liquid wastewater going to a wastewater treatment plant.

3. A treatment facility only to treat septage and possibly biosolids in Grey County.

In addition, treatment of septage should also be considered along with treatment of biosolids in Grey County. One method of ultimate disposal is to spread the treated wastewater on agricultural lands for both biosolids and treated septage. The amount of biosolids to be treated would be 22,500 m^3 / year at approximately 4% solids. A treatment design could also include treatment of biosolids and septage at the same facility. However, there would be problems with trucking this wastewater long distances if there was only one (1) facility in Grey County. Consideration was also given to separating solids at the septic tank site using specialized trucks that cost approximately $300,000 each, which would take away the solids and leave the liquid in the septic system. However, it has been reported that local property owners may not be in agreement with this method since liquid sewage remains in the septic tank. As well, these trucks may not operate satisfactorily during the winter months. In addition, the ultimate disposal of biosolids on agricultural land in Grey County is becoming more of a problem as farmers are not allowing the spreading of biosolids on their land due to neighbours concerns regarding odours and water quality.

Lime stabilization has also been considered as an interim measure to treat septage before application on agricultural land.

Privately owned and operated dewatering and compositing facilities are being seriously considered in cooperation with treatment of liquid at a municipal wastewater treatment plant or a stand-alone facility, which

would treat and discharge to the environment, including a wastewater treatment facility for the liquid portion of the wastewater. These privately owned facilities produce a compost that could be spread on agricultural land, the same as biosolids, or in some cases, could be treated to meet agricultural standards for a fertilizer product, which in turn is sold to the fertilizer industry thus negating the site specific approvals for spreading on agricultural land. The advantages of a composted material both for septage and possibly biosolids is that the odour problem may be eliminated and the amount of water quality concerns dealing with liquid runoff with the spreading of liquid biosolids would be reduced.

Septage, which has an approximate concentration of solids of 2.5 to 3 percent can be dewatered using a polymer and centrifuge to approximately 30% solids or a 10 times reduction in volume. It is understood that the remaining liquid waste required to be treated in a wastewater treatment plant would be of a quality to meet the Sewer Use Bylaw and could be discharged without any serious problems in relation to odours into a sanitary sewer collection system. There are existing biosolids/composting treatment facilities in a few locations in Ontario with facilities in Sarnia and Leamington by N-VIRO Systems Canada Inc. to treat biosolids into a compost material (soil amendment), which can be spread as agricultural fertilizer. This fertilizer has good value and has been selling for approximately $25 to $35/tonne, although the actual value of this product is estimated to be closer to $90/ton.

There are other technologies such as presented by Mr. Don Chauvin of Environmental Treatment Services to treat septage. However, to date there are no plants in Ontario to treat the septage. Treating of biosolids and septage is similar; however, N-VIRO has not treated septage in their system for compost. It would appear that any system that would be used privately or publically to treat septage and then discharge liquid wastewater to a treatment plant, and the composted material to agricultural land would require pilot testing, either at an existing facility or at a new pilot testing facility.

Some technologies considered in this study are as follows:

1. Treatment of septage in the normal wastewater stream at the existing twelve (12) wastewater treatment plants in Grey County.

2. Construct facilities for pre-treatment of septage at one (1) or several treatment plants in Grey County.

3. Dewatering and treatment of septage by the private sector with liquid wastewater discharged to a selected treatment plant in Grey County and with the composted material being sold as either compost or as agricultural fertilizer to be spread on agricultural land.

4. Lime stabilization in trucks for spreading of septage on agricultural land as an interim measure.

5. Dewatering of septage, aeration of Biosolids and treatment of wastewater in a facultative lagoon with marsh treatment. Treated biosolids would be spread on agricultural land. This septage treatment method is further outlined under Item 1 in Appendix G.

6. Consideration of a mobile septage dewatering and treatment facility that could move to different wastewater treatment plants and treat septage into a compost material to be spread on agricultural land with the liquid portion to be returned to the local wastewater treatment plant.

7. A stand alone, privately owned and operated wastewater treatment plant that would dewater, compost and treat effluent to discharge treated liquid wastewater back to the environment to a receiving water body.

8. Separating of solids from liquids at septic tank by specialized pumper truck.

9. Separating the wastewater streams at the construction stage into toilet water, grey water, and softerner water, with modified plumbing and septic system.

There are many other septage treatment facilities and types of technologies that could be used. Refer to Appendix G for more information. The above is a review of the methods we are aware of which we feel would be reasonable to be considered for this project.

The committee could consider other technologies in the future; however, it must be established that these technologies are proven and have a reasonable chance of success. It would be necessary that a pilot study be carried out since in Ontario there has been no specialized treatment of septage other than minimal treatment carried out in the past in the District of Muskoka and treatment at existing municipal sewage treatment plants.

Presentations were made to the Septage Management Committee Meeting on February 9, 2005 by two (2) prospective private companies to build and operate privately owned and operated facility in conjunction with the Municipalities in Grey County. N-VIRO Systems Canada Inc. and Environmental Treatment Services. N-VIRO Systems Canada Inc. makes a compost material that can be used as a fertilizer in the fertilizer industry. Environmental Treatment Services reviewed a number of different technologies utilized in the United States; however, none of these technologies have been tried in Canada. Details regarding the above mentioned companies and their capabilities are contained in Appendix E. Also, we received on February 23, 2004 proposals for treatment of septage from each the companies listed above which are also in Appendix E. Costs vary widely and more detail was provided by N-VIRO Systems Canada Inc., which have up and running systems for treatment of biosolids in Sarnia and Leamington for a number of years.

The N-VIRO Systems Canada Inc. proposal is based on the assumption that the facility would be located at a site where municipal wastewater services are available and that the liquid waste, which would meet the Sewer Use Bylaw could be discharged to the sanitary sewer system to be treated at the wastewater treatment plant.

Environmental Treatment Systems (ETS) would also produce a privately constructed and operated system, which would treat the septage and produce composted treated biosolids, which could be marketed as a soil amendment. This may or may not require approval for disposal on land. Liquid wastewater could be discharged to a sanitary sewer for treatment. It is estimated that the liquid stream would be integrated so that loading to the wastewater treatment would be at periods of low flow loading during the evening hours. An alternative to construct a stand-alone treatment facility that would meet provincial environment effluent standards for discharge to a stream was also presented.

Both proposals did not include the cost of carrying out an environmental assessment, cost of land or servicing the facility. ETS's proposed stand-alone system does not include additional insurance charges required resulting from the heavy liability associated with a facility that discharges directly to the natural environment.

More details are required in regard to treatment facilities as outlined for Environmental Treatment Services with respect to costs, size of structure, etc. N-VIRO Canada Systems Inc. has indicated the size of building required of approximately 15 m x 18 m (50' x 60') process building, product storage building with an asphalt floor of 18

m x 30 m (60' x `100'). The N-VIRO System is a patented system in the United States. They are presently negotiating with other large municipalities for the treatment of biosolids.

Environmental Treatment Services needs to provide more detail in relation to types of building, detailed cost estimate, etc. Also they do not have a system in operation in Ontario and are relying on information from the United States. Both system should be considered and pilot studies would have to be carried out to prove that these facilities can adequately treat septage. A detailed review would be required to be carried out for both of the systems before recommendations for either of these systems or any other system proposed to deal with technologies for treatment of septage. A pilot plant will be necessary along with a Class Environmental Assessment, whether or not this is public/private or a private facility to review locations, public and government concerns, social, environmental and financial aspects of these projects.

7.0 ASSESSMENT OF ALTERNATIVES FOR TREATMENT OF SEPTAGE AND HAULED SEWAGE

7.1 Wastewater Treatment Alternatives

There are nine (9) wastewater treatment alternatives that are being considered to treat septage within the Grey County jurisdiction. The alternatives are described as follows:

1. Upgrade One (1) Wastewater Treatment Plant in Each Municipality

Although there are twelve (12) wastewater treatment plants within the County of Grey, not all would be required to be upgraded (see Figure 3). For example, the City of Owen Sound with just twelve (12) septic systems would probably not be required to undertake any significant measures relating to septage. The Town of Hanover, with ninety-nine (99) septic systems have capacity. Currently, the Township of Chatsworth does not have a wastewater treatment facility thus leaving the municipality in a situation whereby an arrangement would be required with another municipality.

Since a number of other municipalities have more than one (1) wastewater treatment facility, a decision would be required in relation to which facility would be upgraded in each municipality to treat the septage. Six wastewater treatment plants would be upgraded to treat septage under this alternative.

2. Upgrade One (1) Municipal Wastewater Treatment Plant Within the County of Grey to Treat All Septage

Upgrade one (1) municipal wastewater treatment plant within Grey County by conventional treatment methods. This could be undertaken by pre-treatment of septage and then proceeding to have sewage flow through the existing plant at Durham. This option could be financed and operated by one (1) municipality or under 'Joint Agreement' by all municipalities within Grey County (see Figure 4 and 5). Hanover wastewater treatment plant could also be considered as an alternative site.

3. Upgrade Three (3) Wastewater Treatment Plants to Accept and Treat All Septage Across the County

Upgrade three (3) municipal wastewater treatment plants (Flesherton, Meaford and Durham) within Grey County by conventional treatment methods, which could be undertaken by pre-treatment of septage and then proceeding to have sewage flow through existing plants. This option could be financed and operated by the host municipalities or under 'Joint Agreement' by all municipalities within the County of Grey (see Figures 4, 6, 7 and 8).

4. Privately Owned and Operated Dewatering and Compositing Facility at One (1) of the Existing Wastewater Treatment Plants Within the County of Grey

In this alternative as shown in Figure 9, in Durham, the host municipality would be reimbursed according to their Sewer Use Bylaw at the rate stipulated. The dewatering and composting portion of the treatment would not necessarily be located at an existing wastewater treatment facility, it could be located in an industrial park providing there was access to a sanitary sewer main to dispose of the hydraulic effluent. The composted biosolids would be used in a fertilizer or a soil amendment on agricultural land. The Town of Hanover could be considered as an alternative site.

A mobile dewatering unit could be purchased to dewater biosolids at other wastewater treatment facilities. This would reduce the volume of biosolids being hauled to the composting site.

Private ownership could be a corporation with a Board of Directors, or by single ownership. Possibly a number of individuals could buy into the ownership through shares. This could involve the haulers, as part owners and shareholders, in the enterprise.

5. A Privately Owned and Operated Wastewater Treatment Plant, Which Would Dewater, Compost and Treat Effluent for Discharge Back to the Environment (Receiving Water Body)

This option could be situated at any location within the County of Grey, wherever approvals could be obtained and would not be dependent on an existing wastewater treatment facility to receive the

wastewater from the process. This facility could be located anywhere within the County providing approval is obtained from the Ministry of the Environment and local planning authorities.

Private ownership could be a corporation with a Board of Directors, or by single ownership. Possibly a number of individuals could buy into the ownership through shares. This could involve the haulers, as part owners and shareholders, in the enterprise.

6. A Mobile Privately Owned and Operated Treatment Facility That Could Move from Site to Site to Treat Septage and Possibly Biosolids

This option would leave wastewater in the original plant. The mobile unit would be situated at different facilities at different times leaving hauling distances for septage variable.

7. Use of Specialized Pumper Trucks to Separate Solids and Liquid from Septage at Septic Tank Site

This alternative would require each hauler to purchase new specialized equipment, and treatment of biosolids would still be required. Also, there will still need to be upgrades carried out to wastewater treatment plant(s) to accommodate the removed biosolids.

8. A Large, Privately Owned and Operated Treatment Facility with the Capability to Service a Larger Geographic Area than the County of Grey

This alternative would give haulers from outside the County of Grey an opportunity to use the treatment facility, creating a large facility that could be more cost effective both from a capital and operating perspective.

9. Liquid Lime Stabilization in the Tanker by a Private Hauler, Followed by Spreading on Agricultural Land

This option, in its basic form, would require the hauler to add liquid lime to their tanker load at a rate of 11.4 to 22.7 litres (2.5 to 5 gallons) of lime per 4.546 m^3 (1000 gallons) of septage. This could be more sophisticated by haulers travelling to a central area to run septage through a separator, which would remove the solid waste (plastics, etc.). Lime could be metered into the septage to raise the pH level to above 12. The product would then be spread on agricultural land.

7.2 Evaluation of Wastewater Treatment Alternatives

7.2.1 Preliminary Evaluation of Alternatives

As discussed previously in Section 7.1, there are nine (9) general wastewater treatment alternatives for septage. It should be noted that the amount of septage, hauled sewage and porta potty wastewater to be treated in the 20-year design period is 234.2 m^3/day for a six month period. The uncommitted reserve hydraulic capacity is approximately 3,977 m^3/day. However the present unused hydraulic capacity is 20,431 m^3/day, which is 87 times more than the amount of septage in the year 2024 for a six-month period. The uncommitted BOD_5 loading capacity in kg/day for the twelve (12) wastewater plants is 600.3 Kg/day. The amount required in the year 2024 is 1639 Kg/day. However, the existing unused BOD_5 capacity at all plants is 4,938.9 kg/day, which is 3 times more than that required to treat septage.

The uncommitted TKN loading capacity from the twelve (12) wastewater plants is 126.3 kg/day, whereas the total TKN loading capacity required to treat septage in the year 2024 is 163.9 kg/day. Therefore, there is insufficient capacity to fully treat the TKN loadings in the 20-year design period. However, the available TKN loading capacity is 520.7 kg/day, which is 3.2 times greater than the TKN capacity required to treat septage in the year 2024.

The existing wastewater treatment plants would only be available if some municipalities were willing to relinquish some of their committed hydraulic capacity, which is significant at 16,454 m^3/day, which is 80% of the present unused hydraulic capacity.

Considering only the uncommitted hydraulic reserve capacity, there would appear to be sufficient capacity at the Hanover or Durham Wastewater Treatment Plants to accept all hydraulic capacity of liquid wastewater after pre-treatment of the septage to a compost material or biosolids since the liquid flow is only 234.2 m^3/day. However, if three (3) sites are used such as in Alternative 3, the three (3) sites would be Durham, Flesherton and Meaford based on the uncommitted hydraulic reserve capacity.

For Alternatives 2, 3 and 4, there needs to be sufficient capacity left for future development within the municipalities without a significant upgrade to the wastewater treatment plants. However, most treatment plants are well into their 20-year design period and will eventually require major upgrades.

Two (2) proposals concerning privately constructed and operated treatment of septage facilities from N-VIRO Systems Canada Inc. and Environmental Systems Services were received as outlined in Appendix E. Serious consideration should be given to using private facilities to treat septage; however, it would appear in the long term that there would need to be a commitment by the Municipalities through bylaws or a public/private agreement in order to ensure that a private facility would be adequately compensated to treat septage. The private sector is not going to construct a treatment facility without some reasonable certainty that they would receive septage wastewater for treatment.

A more detailed assessment will be given to Alternatives 1, 2, 3, and 4. Alternatives 5, 6, 7, 8 and 9 will be further discussed in this section since Alternatives 5, 6, 7, 8 and 9 require significantly more study to arrive at a cost estimate and whether or not the alternatives are feasible. Alternative 6, which is a mobile privately owned and operated treatment facility; which could move from site to site to treat septage and possibly biosolids, has been used to some extent in the United States, however, very little data is available at this time. There are no treatment facilities of this nature in use in the Province of Ontario, although if the private sector had a detailed proposal on utilization of this treatment approach, it should be seriously considered. One problem with this type of system is a septage hauler collecting septage requires a schedule for where septage is to be hauled. The other problem with a facility of this nature is, if one of the septic tanks in the southern part of Grey County requires pumping out, and the treatment facility is located in the northern part of the County for that week, there would be significant increased haulage costs. Numerous difficulties with this type of facility are evident.

In relation to Alternative 7, which is the use of a specialized pumper truck to separate solids and liquids in a septic tank at the site, the pumper trucks are available but costly at approximately $300,000 and may not be able to operate properly during freezing conditions in the winter. In addition, we have had complaints from septage haulers that once the solids have been removed and liquid remains in the septic system, the homeowner feels that the tank has not been cleaned out completely. In some cases, the leaching bed may be flooded and a significant amount of liquid would have to be removed from the leaching bed as well, should the leaching bed be plugged; therefore, showing no reduction in the liquid in the facility. This would reduce trucking costs but would still require a septage treatment facility. However, costs to dewater septage may be significantly lower.

Alternative 8 is a large private owned and operated Treatment Facility with Capability to cover a larger geographic area than Grey County. This option is not being considered in detail. We have informed neighbouring municipalities about this study and have received some response from these communities. There would need to a commitment from neighbours to service a large geographic area. There is also a problem with a reasonable distance to a treatment facility for trucking although one (1) facility to service two or three counties may be more cost effective to treat septage. The cost for hauling may increase greatly, which may be more costly than having smaller systems with significantly less distance for the hauler to travel. There is also the public concern that hauling septage more than 60 kilometres causes an increased volume of truck traffic on the roads and socially may be unacceptable, particularly if the haulage distances are high and larger trucks are required. There may also be a requirement to have septage transfer stations for this option to be feasible.

Alternative 9, which is liquid lime stabilization in the truck tanker by a private hauler followed by spreading on agricultural land may be used as a temporary measure but it is felt that this would not be a long term solution for treatment of septage. The liquid wastewater would be spread on agricultural land, which may be a social concern with respect to ground and surface water quality as well as odour problems with neighbours.

In the next section there will be a more detailed analysis of the Alternatives with regard to social and environmental aspects. Financial details will be outlined for alternatives 1, 2, 3 and 4.

7.2.2 Discussion of the Social Evaluation of Alternatives

The social assessment of the alternatives have been carried out from two (2) different perspectives - the first being the social impact of the treatment of the septage, and the second being the social impact of the disposal of the biosolids.

Treatment

The social assessment of the treatment alternatives for septage is outlined in **Table 11A.**

- Location - Conventional treatment alternatives would use existing wastewater treatment plants. A Composting facility could be located in an industrial park.

- Quality of Water - if the septage is dewatered and composted then there would be no significant effect on the quality of water, whereby conventional treatment would have the same effect on water quality as it has today with the spreading of biosolids required.
- Noise - The least number of plants receiving the septage, the larger the mechanical operation and therefore, noise could increase and may require mitigation.
- Odour - Composting would create odour due to the heating process requiring biofilters or scrubbers for mitigation. With conventional processes, the odour should be similar to what exists today.
- Dust - Dust should not be a factor with the exception of increased traffic in the area of treatment which would require paved accesses particularly in alternatives with one treatment facility.
- Traffic - As the number of treatment facilities decrease, the volume of traffic would increase.
- Ownership - In the conventional alternatives, the Municipality would own and operate the facility therefore, having control. The composting alternatives may be owned by the private sector or be a private/public ownership facility. This would require fairly detailed agreements in order to control the costs, however, the private sector does require to make a profit to remain in business.

Disposal of Treated Biosolids

The social assessment of the disposal of treated biosolids is outlined in **Table 11B.**

- Location - In the composting alternatives, the compost would become fertilizer and would be used by the agricultural community, therefore, the disposal could be wherever there was demand for the fertilizer. In the conventional alternatives, the disposal would probably be similar to what happens today which is liquid biosolids spread on agricultural land.
- Effect on Water Quality - The composting alternatives would have no significant effect on the water quality. The conventional methods would have the same effect as exist today.
- Noise - With the composting alternatives, there should be less product, therefore, there should be less noise than exists today.
- Odour - With composting, there should be no increase in odour. With conventional biosolids disposal, it should be the same as exists today.
- Dust - Composting should have less dust than exists today and the conventional method should be the same as the existing.
- Traffic - There would be less product to dispose of in the composting alternatives, therefore, there should be less traffic than exists today. With the conventional alternatives, there could be the same as existing or more traffic.
- Ownership - In all alternatives, it would be expected that disposal would be carried out by private haulers.

7.2.3 Environmental Evaluation of Alternatives

Environmental aspects of the alternatives are evaluated in two parts, firstly the treatment of septage and secondly the disposal of treated biosolids. Surface and groundwater is to be adequately protected and assessed during the detailed investigation of septage treatment alternatives. Capture zones for municipal groundwater supply wells should be given careful consideration during the detailed assessment of any alternative for the treatment of septage.

Treatment

The environmental assessment of alternatives for treatment of septage is outlined in **Table 12A.**

- Location - The conventional treatment alternatives would likely be situated at the existing wastewater treatment facilities whereby the composting alternatives would probably be situated in an industrial park.
- Effect on Water Quality - Conventional methods would have the same effect as exists today. The composting alternatives would have no significant effect on the quality of water.
- Noise - In all of the alternatives, there should be little effect on the environment.
- Odour - In conventional treatment methods, the odour would be similar to what exists today. In the composting alternatives, the odour would increase and would need to be mitigated by use of biofilters or scrubbers.
- Dust - In all the alternatives there should be little change to the impact on the environment.
- Traffic - As the number of treatment facilities decrease, the volume of traffic will increase.

Disposal of Treated Biosolids

The environmental assessment of alternatives for disposal of treated biosolids for septage is outlined in **Table 12B.** Adequate protection of surface and groundwater quality is expected to be controlled by the requirements of the Nutrient Management Act.

- Location - In conventional treatment alternatives biosolids should be diposed of similarly to how it exists now. In the composting alternatives, the compost would be turned into fertilizer and the destination would depend upon the demand for the nutrients.
- Water Quality - Conventional alternatives would be similar to what exist today. The composting alternatives should have no significant effect on water quality.
- Noise - In conventional methods, noise should be similar to what exists and in the composting methods, there should be less noise than exist today.
- Odour - Conventional methods would be similar to what exist today and composting alternatives would be less than exist today.
- Dust - Conventional methods should be similar to what happens now. With the composting alternatives, there should be less than exist today because there's less product to dispose of.
- Traffic - As the number of treatment facilities decrease, the traffic will increase in the conventional methods, however, in the composting alternatives, there should be less traffic than there is today.

7.2.4 Assessment of Comments From Public and Government Agencies

An advertisement regarding The Municipalities of Grey Septage Management Plan was placed in the Owen Sound Sun Times on February 6, 2004 advertising the study and public meeting date. Henderson Paddon & Associates Limited set up a website address for information" www.hp.on.ca - What's New" in January, 2004. The initial results in table form were posted on the website February 23rd and the Draft Report, March 3rd, 2004.

The public meeting was held at the Kinplex in Flesherton on Wednesday evening, March 3rd at 7:00 p.m. Forty two people attended and there was representation from 13 municipalities within the region. Notification was sent on March 3, 2004 to all local municipalities within Grey County, the surrounding Counties, neighbouring municipalities, and to government agencies asking for comments regarding the Draft Septage Management Plan (See Appendix H for notification list). Comments are attached in Appendix H. All comments were requested to be received by noon on Monday, March 8, 2004. The following is a list of the government agencies contacted by email for comments regarding the Draft Septage Management Plan:

- **Ministry of Environment (Toronto, Owen Sound and London)**
- **Ministry of Natural Resources (Midhurst)**
- **Ministry of Municipal Affairs (Toronto)**
- **Ministry of Agriculture and Food (Guelph)**
- **Grey Sauble Conservation Authority**
- **Saugeen Valley Conservation Authority**
- **Nottawasaga Conservation Authority**

The following is a summary of comments received:

- **Township of Georgian Bluffs** - there was a concern expressed on the frequency of septic tank pump out and stated that it should be controlled by provincial legislation not municipal bylaws.

- **Town of Hanover** - it was their feeling that the BOD_5 design capacity for Hanover was calculated improperly and the numbers in **Table 9** should be adjusted.

- **Township of Wellington North** - Gary Williamson, Works Superintendent indicated that their municipality would be interested in the Durham proposal since hauling distances would be similar to those in some areas of Grey County. The Township may be interested in being involved in the project.

- **Municipality of Arran-Elderslie** - interested in using a regional facility to treat and compost septage and sewage biosolids.

- **Town of Minto** - Council has not discussed the project, however staff of the Town of Minto are recommending the support of the Grey County Project.

- **Township of Howick** - did not receive the request to comment until March 8.

- **County of Grey** - mainly suggested some wording changes and concern that the GIS mapping to determine septic locations was not the County's responsibility since this mapping came from MPAC. Also cautioned whether the preferred option Alternative #4 had the appropriate Official Plan and zoning in place and question whether in fact haul routes should be addressed at this time.

- **Municipality of North Bruce Peninsula** -they recommend that their Municipality's Septage Study prepared and presented by Ross Slaughter, Henderson Paddon & Associates, January, 2004 be submitted to the Septage Management Plan Committee and Technical Committee to initiate discussion as per recommendation 4 which recommends discussions be held with members of the municipalities of Grey County Septage Management Task Force.

- **Ministry of Environment** - recommend information be added in regard to Reg. 326/03 (Portable Toilet Regulation) and Reg. 267/03 Nutrient Management Regulation (passed under the Nutrient Management Act 2002).

- **Ministry of Natural Resources** - have no concerns with the preferred option being Alternative 4.

- **Grey Bruce Health Unit** - need a better understanding of metal accumulation in septage biosolids and how critical volume and pump out frequency is to design of the treatment facility.

- **Saugeen Valley Conservation Authority** - requested to be kept informed as projects may have affect on the main Saugeen River and a small wetland at Durham.

- **Paul Arnill** - states that it appears that there are two primary issues, the first being choosing the best technology for the job and secondly, how would such a treatment plant and operation be paid for.

- **Carol Lawrence, Councillor for the Municipality of West Grey** - stated that the Durham system should be adequately compensated from a capital perspective for the use of existing capacity and operational costs, based on the volume of effluent flow.

- **Ron Miller** - needs more time and study regarding the problem of treatment of septage.

- **Environmental Treatment Services (ETS)** - concerned that the generic difference between ETS and N-Viro Systems, were not explained and feels a pilot in ETS case could be done with a site visit to the United States where it is proven technology.

- **The Walkerton Healthy Community Initiative** - letter on support for the project and offered to provide any assistance to aid the process.

7.2.5 Septage Haulage Assessment

For the alternative to upgrade one (1) wastewater treatment plant in Durham as shown on Figures 3, 5 and 9, the quantity of hauled septage for the 20 year design would be 234.2 m^3/day. The number of trucks 15 m^3/truck (3300 IG/ truck) would be 15.6 (see **Table 13**). The maximum hauled distance is estimated to be 70 km, the average hauled distance is estimated to be 40 km; therefore, the average septage haulage costs per day would be $3,744 or $15.98/ m^3.

If three (3) wastewater treatment plants were upgraded, located in Durham, Meaford and Flesherton, the average hauled septage would be 234.2 m^3/day and number of truckloads would be 15.6 as shown on Figure 4. However, the average haul distance would be only 22 km for a cost of $1,786/day or $7.63 m^3. The cost to calculate daily trucking cost is the number of trucks/day times the average km times 2 to cover two-way travel, times cost per kilometre.

Haul routes would be generally on provincial and county roads. However, haul routes would need to be further addressed in the vicinity of the septage treatment and disposal sites in the Environmental Assessment process.

It should be noted that there is an additional change for the Septic Tank Pumpout. This is for the work to remove the septage from the tank and load it into the wastewater truck. This cost (estimated to be between \$20 to \$50/m^3 of septage) is in addition to the septage haulage costs. For the purposes of this study, this cost is estimated to be approximately \$30/m^3 of septage pumped from the septic tank.

7.2.6 Financial Assessment of Alternatives

The financial assessment of septage treatment, and treated biosolids disposal is outlined in **Table 16**. A detailed financial assessment has been carried out for alternatives 1, 2, 3 and 4, as outlined in **Table 16** for the capital costs for treatment, annual operating cost for treatment, annual septage haulage cost, treated biosolid disposal cost and estimated cost per m^3 for hauling, treating and disposing of septage. The septic tank pumpout cost of \$30/m^3 must be added to the cost per m^3 of septage treated. Capital costs for Alternative 1 which is the treatment of septage at one wastewater treatment plant in each of 6 municipalities is \$8,200,000. Alternative 3 is the treatment of septage at three (3) upgraded wastewater treatment plants at Flesherton, Meaford and Durham is the most expensive capital cost at \$13,660,000. The estimated quantity and loadings of septage treatment at each wastewater treatment plant are outlined in **Table 14** for alternative 3. The detailed financial analysis for Alternative 3 is outlined in **Table 15**. The capital cost for treatment alternative 4, which is a privately owned and operated dewatering and composting facility with wastewater discharged to one existing wastewater treatment plant (Durham) is \$6,700,000.00. Operating costs range from a low of \$275,000 per year for alternative 2 which is upgrading one municipal wastewater treatment plant within the County of Grey, to \$600,000 per year for upgrading one wastewater treatment plant in each municipality (six (6) wastewater treatment plants). The least expensive alternative would be alternative 4 which is privately owned and operated dewatering and composting facility at one existing wastewater treatment plant which would dewater and compost the septage with the liquid portion of the wastewater being treated at the Durham wastewater treatment plant. For alternative 4, the composting facility would be located in the industrial park area in Durham or another area in close proximity to Durham. The total cost /m^3 would be approximately \$83.90 /m^3 for treatment, septic tank pumpout, haulage of septage and disposal of treated biosolids. The next least cost alternative would be alternative 1 at a total for treatment, septic tank pumpout, haulage of septage and disposal of treated biosolids of \$84.45/m^3. No adequate financial analysis was received for a privately

owned and operated wastewater treatment facility to dewater, compost and treat septage with effluent discharge back to a receiving water body which is alternative 5. For alternative 6, which is a mobile privately owned and operated treatment facility to treat septage and biosolids, significantly more information is needed, but this alternative could be utilized in conjunction with other treatment options. Alternative 7 which is specialized pumper trucks that separate solids and liquids from septage at the septage tank site appears to be not financially feasible or socially acceptable. This alternative could be further investigated if there was interest by the haulers and the Province. Alternative 8 is a privately owned and operated treatment facility covering a larger geographic area than Grey County. This alternative was not evaluated further since it would appear that hauling costs would be expensive without approval of transfer stations to transfer septage from smaller to larger trucks for long distance hauling. Alternative 9 which is liquid lime stabilization in tanker trucks by private haulers and spreading treated septage on agricultural land should be considered as an interim measure only until septage treatment facilities are in place.

7.3 Evaluation of Septage Treatment Alternatives

Alternative 1 is upgrading of one wastewater treatment plant in each municipality. This treatment alternative, requires the upgrading of six of the wastewater treatment plants within the County of Grey. The locations of the existing wastewater treatment plants are shown on Figure 3. Wastewater treatment plants most likely to be upgraded for the use of treating septage in this alternative are the following; Derby, Meaford, Thornbury, Markdale, Dundalk and Durham. Only a small portion of septage is collected in the City of Owen Sound with only 12 septic systems. Hanover with 99 septic systems could probably treat their septage in their existing wastewater treatment plant. With regard to treatment of septage, socially and environmentally, it would be similar to existing conditions at the treatment plants, however, with regard to disposal of biosolids there would be a significant increase in liquid biosolids which would be required to be disposed of on agricultural land. However, septage haulage would be a relatively short distance. Alternative 1 is the second least costly alternative of the 4 alternatives which were assessed in detail.

Alternative 2 is upgrading one municipal wastewater treatment plant within the County of Grey to treat all septage. It is proposed that the Durham Wastewater Treatment Plant would be the location of the one treatment plant to be upgraded to treat septage for the entire Grey County. The wastewater treatment plant is shown on Figures 3 and 5. This alternative is the third most expensive alternative with a capital cost of $9,900,000 and a total annual cost to haul, treat and dispose of septage of $2,073,200 per year. Operating

costs are relatively low at $275,000, septage haulage costs are high at $683,000 per year. The cost for disposal of treated biosolids is $320,600 per year. Total cost /m^3 for hauling, treating, septic tank pumpout cost, and disposing of treated septage would be $95.32. The treatment works would be located in the Durham industrial park or another nearby area to Durham with pretreatment of septage in that area since there is not sufficient room at the wastewater treatment plant site. The liquid wastewater from the pretreatment works would be required to be pumped through a forcemain to the Durham wastewater treatment plant. This is the third most expensive alternative. The Town of Hanover could also be considered as a septage treatment site for Alternative 2.

Alternative 3 is the upgrading of 3 wastewater treatment plants for septage treatment in Grey County. The three wastewater treatment plants are located at Meaford, Durham and Flesherton as shown on Figure 4. The haul area serviced by each of the upgraded wastewater treatment plants for treatment of septage is shown also on Figure 4. Alternative 3 is the most expensive capital cost for treatment at $13,660,000 and an annual operating costs of $450,000. Total annual cost to haul, treat and dispose of septage is $2,192,800. The cost per m^3 for septic tank pumpout, haulage of septage, treatment and disposal of treated biosolids is $99.09. One advantage of this alternative would be that there would be less haulage and less trucking distance to haul septage to the three treatment facilities at approximately half the annual cost of Alternatives 2 or 4. The location and size of the pretreatment facilities for Alternative 3 at Flesherton, Meaford and Durham are shown on Figures 6, 7 and 8 respectively. A pretreatment facility at Flesherton would be located at the treatment plant site, whereas in Meaford, the proposed facility would be located south of Highway 26 between Highway 26 and County Road 7. The liquid effluent decant wastewater would be trucked to the existing wastewater treatment plant in Meaford rather than constructing a forcemain. At the Durham wastewater treatment plant, a tanker truck would be utilized to take decanted wastewater from to the pretreatment septage facility, to the Durham wastewater treatment plant for treatment. This is shown on Figure 8. This is the most expensive treatment option of the four alternatives (1 to 4 inclusive). Biosolids would still have to be treated and spread on agricultural land. A significant increase in agricultural land for disposal of biosolids would be required for this alternative, similar to Alternatives 1 and 2.

Alternative 4 is a privately owned and operated dewatering and composting facility utilizing one existing water treatment plant for treatment of liquid wastewater. It is proposed that the septage dewatering and composting facility will be located in an industrial area in the southeast corner of Durham as shown on Figure 9 with discharge of the dewatered septage to the existing sanitary sewer. The site shown on Figure 9 for the

dewatering and composting of septage is an approved composting site with a Certificate of Approval (Ministry of the Environment) owned by "Waste Not Compost Inc.". Further details of this approved site are shown in Appendix F. It is anticipated the liquid discharge from the septage treatment facility will meet the sewer use Bylaw and would flow by gravity to the Durham wastewater treatment plant and to be treated as shown on Figure 9. Other sites near Durham could also be considered for the septage dewatering and composting facility. This is the least capital cost alternative at $6,700,000 and annual operating cost of $490,000 for treatment. Annual septage haulage costs are estimated to be $683,200 per year. The total annual cost to haul, treat and dispose of septage would be $1,710,600. The total cost per m^3 for septic tank pumpout, haulage of septage, treatment and diposal of treated biosolids is $83.90. This private facility would compost septage into a fertilizer product which could be approved by Agriculture Canada for fertilizer for application on agricultural land. This would thus eliminate the need for approvals for disposal of liquid biosolids on agriculture land which would significantly reduce problems regarding odours and water quality. Alternative 4 would have no cost for disposal of treated biosolids and may actually provide a net benefit. This alternative would appear to have the least social and environmental impact for treatment of septage and disposal of treated septage biosolids as a composted material. The Town of Hanover could also be considered as a septage treatment site for Alternative 4.

7.4 Environmental Assessment Requirements

It would appear that any alternative for treatment of septage whether public, private or public/private would require some form of environmental assessment to be carried out to assess the social, environmental and financial aspects of the alternatives for treating septage. Even if a private facility were constructed, this would likely require a public/private partnership in order to ensure that the septage would be treated at the facility and to make arrangements for treating of liquid wastewater at a local wastewater treatment plant. It is also anticipated that even a private facility, where it serves as a publicly used facility, could be required to be taken over by a municipal government by the province of Ontario should this facility fail to operate properly which would then make it a public facility. Thus, it would appear from a review of the legislation and the importance of treating septage, that it will likely require at least a Class Environmental Assessment to assess alternatives in order to locate and construct a septage treatment facility or facilities in the County of Grey.

7.5 Preferred Septage Treatment Alternative

Alternative 4 which is a privately owned and operated dewatering and composting facility located in the industrial park in the southeast part of Durham or another suitable location near Durham, with discharge of wastewater to the sanitary sewer to be treated at the Durham wastewater treatment plant is the recommended preferred alternative. The treated composted septage would be made into a fertilizer material acceptable to Agriculture Canada to be used as a fertilizer product on farmland. This type of facility would appear to have the least social, environmental and financial effect. The capital cost is estimated at $6,700,000 with the least annual cost to dispose of treated biosolids at zero cost per year. The total annual cost to haul, treat and dispose of septage is $1,710,600. The cost per cubic metre to pumpout the septic tank, haul the septage to the treatment facility, treat the septage and dispose of the treated biosolids is $83.90. The estimated number of septage trucks for a six month period would be approximately 16 trucks per day on average everyday for a six month period, during the period of May 1st to October 31st at the 20 year design, septage quantity. The location and description of treatment facilities is outlined on Figure 9.

8.0 CONCLUSIONS

The following conclusions are based on the study of the treatment of septage and hauled sewage in the nine (9) municipalities in the County of Grey.

1. There are estimated to be 22,443 septic systems in the municipalities in Grey County. The Township of Georgian Bluffs has the largest number of properties with septic systems at 4,522.

2. There are an estimated 64 holding tanks in the County of Grey.

3. There is a significant concentration of septic systems in the County and in particular at Shallow Lake, the former Sarawak Township, Clarksburg, the area surrounding Eugenia Lake, the many Hamlets in Grey County as well as along the shores of Georgian Bay.

4. The population of the County of Grey is approximately 83,000. It is estimated that the annual growth rate for the 20 year period would be 1.5% per year for a total increase over the 20 year period from 2004 to 2024 of 34.7%. It is anticipated the installation of septic systems will increase at a similar percentage as the population.

5. The quantity of hauled sewage and septage which should be collected over a six month period in 2004 based on the suggested frequency of septic tank pumpout in years from **Table 2** is 172 m^3/day or 31,137 m^3/year.

6. Septic systems and holding tanks are divided into eight (8) categories as follows:

    - Residential
    - Multi-Residential
    - Commercial
    - Industrial
    - Farm
    - Recreational
    - Residential Condos
    - Institutional

7. Based on grab samples taken from septage from a number of municipalities in Ontario including Grey County, it was decided that the recommended design concentrations for septage for key design parameters should be 7,000 mg/L for BOD_5, 15,000 mg/L for Total Suspended Solids and 700 mg/L for TKN which are the recommended US EPA design concentrations. Some grab samples of septage in Ontario exceeded the design values, however the average values were less than the design values.

8. The existing quantity of porta potty wastewater estimated in 2004 is 1.9 m^3/day for a six month period.

9. The 20 year design for septage, hauled sewage and porta potty wastewater is 234.2 m^3/day for a six month period which is 42,742 m^3/year.

10. The 20 year design septage BOD_5 loading is 1,639 kg/day and the 20 year design loading for TKN is 163.9 kg/day.

11. There are twelve (12) wastewater treatment plants in Grey County with a total design hydraulic capacity of 48,127 m^3/day. The present unused hydraulic capacity is 20,431 m^3/day and committed hydraulic capacity is 16,454 m^3/day. The uncommitted hydraulic reserve capacity is 3,977 m^4/day.

12. The design organic BOD_5 capacity of the twelve (12) wastewater treatment plants is 8,736.2 kg/day. The design TKN organic capacity is 963.5 kg/day. Available BOD_5 loading capacity in kg/day is 4,938.9 kg/day and for TKN is 520.7 kg/day. The uncommitted BOD_5 loading capacity is 600.3 kg/day. The TKN uncommitted loading capacity is 126.3 kg/day. The unused hydraulic capacity of all twelve (12) wastewater treatment plants is 20,431 m^3/day or 87 times the estimated septic quantity for the 20 year design period. The available BOD_5 loading capacity in kg/day is 4,938.9 or 3.0 times the BOD_5 loading capacity for the 20 year design period for septage. The available TKN loading capacity in kg/day is 520.7 in all twelve (12) wastewater treatment plants which is 3.2 times the TKN loading capacity for the estimated 20 year design septage quantity.

13. It is estimated that there is approximately 22,500 m^3 of biosolids production from the twelve (12) wastewater treatment plants annually at an average concentration of 4% solids. The cost of disposal of biosolids is estimated at \$15/m^3 for spreading on agricultural land which is equivalent to \$337,500 per year. Cost of disposal of biosolids, will likely increase significantly over the years, due to increased difficulty in obtaining farm land to dispose of biosolids.

14. Two (2) proposals were received in relation to the treatment of septage which would dewater and compost material. They would be privately constructed and operated facilities by N-VIRO Systems Canada Inc. and Environmental Treatment Services. There may be other companies with similar technologies.

15.

- Nine (9) alternatives were assessed in regard to social and environmental aspects.
  Four (4) alternatives: Alternative 1 upgrading one (1) wastewater treatment plant in each municipality (6 wastewater treatment plants); Alternative 2 to upgrade one (1) plant within the County of Grey; Alternative 3 to upgrade three (3) wastewater treatment plants to accept and treat all County septage, and Alternative 4, a privately owned and operated dewatering and composting facility at one (1) existing wastewater treatment plant within the County were financially assessed.

- The least costly and possibly the most socially and environmentally acceptable treatment system is Alternative 4, which is a privately owned and operated dewatering and composting facility at the Durham wastewater treatment plant in the County. The estimated cost of this facility is $6,700,000 with an annual operating cost of $490,000. The plant would be located in the Industrial Park in Durham and liquid wastewater would be discharged to the sanitary sewer to be treated at the Durham Wastewater Treatment Plant. Hanover is another site that could be considered for this alternative.

- Since there would be lengthy haulage distances, it is estimated that septage haulage costs would be $15.98/ m^3 or an annual septage haulage cost of $683,000.

- It is anticipated that there will be no cost to dispose of treated biosolids made into fertilizer (composted material or soil amendment).

- The estimated cost for the septic tank pump out is $30 per m^3 of septage.

- For Alternative 4, the annual cost to haul, treat and dispose of septage would be $1,710,600 including debt reduction for capital costs over a 20 year period. The total cost per cubic metre for the septic tank pumpout, haulage of septage, treatment and disposal of treated biosolids is $83.90.

16. Alternative 1, which is to upgrade one (1) wastewater treatment plant in each municipality (six (6) wastewater treatment plants) would be the next least costly alternative for septage treatment, haulage and biosolids disposal cost over the 20 year design period. The capital cost for upgrading the six (6) wastewater treatment plants would be $8,200,000 and an annual operating cost of $600,000. The total cost per cubic metre for the septic tank pumpout, haulage of sewage, treatment and disposal of treated biosolids is $84.45.

9.0 RECOMMENDATIONS

The following is recommended in regard to treatment of septage in Grey County.

1. Alternative 4 (Preferred Alternative) which is septage treatment, haulage and disposal of treated biosolids is the alternative which is a privately owned and operated dewatering and composting facility located in the Durham Industrial Park or other appropriate area near Durham with liquid wastewater treated at the Durham Wastewater Treatment Plant, as shown on Figure 9. Capital cost is estimated at $6,700,000 with an annual operating cost for treatment of $490,000. Annual septage haulage cost is estimated at $683,000 yearly since distances would be lengthy for travel to one (1) location. An advantage of this alternative would be to have no annual treated biosolids disposal costs since the product would be manufactured into a fertilizer product and sold to farmers. There may be a net return for the municipality or municipalities in Grey County. Total annual cost to haul, treat and dispose of septage including reduction of debt over a 20 year period, for a 20 year design is $1,716,600. The total cot per cubic metre for the septic tank pumpout, haulage of septage, treatment and disposal of treated biosolids is $83.90. The Town of Hanover should also be considered as an alternative site for treatment of septage for Alternative 4.

2. Alternative 1, which is the upgrading of one (1) wastewater treatment plant in each of the member municipalities, or a total of six (6) would have an estimated capital cost of $8,200,000. Total costs for septage treated is $54.45/ m^3. This alternative should also be investigated further, if an agreement cannot be negotiated with a privately owned and operated composting facility. This alternative, however, would in all probability consume a portion of the existing hydraulic and organic capacity of the existing wastewater treatment plants. Total cost per cubic metre for the septic tank pumpout, haulage of septage, treatment and dipsosal of treated biosolids is $84.45.

3. All of the above noted systems for treatment of septage should first be proceeded with a pilot treatment plant study to and demonstrate that septage can be adequately treated prior to any project being carried out.

4. A much more detailed proposal is required for a privately owned and operated wastewater treatment plant for the dewatering, composting and treatment of effluent for discharge back to a receiving body of water.

5. If available in Ontario, a mobile privately owned and operated treatment facility to treat septage and biosolids at the existing wastewater treatment plants should be further investigated should there be interest from a private operator.

6. Lime stabilization in trucks by private haulers for disposal of septage on agricultural land should only be used as an interim measure and does not provide treatment that would be as socially or environmentally acceptable as Alternatives 1, 2, 3 or 4.

7. It is recommended that a privately owned and operated treatment facility covering a larger geographic area than Grey County could be considered only if there is a process for having transfer stations since haulage costs would become excessive with having one (1) treatment plant servicing a large area. In addition, there may be significant social concerns regarding the location due to an increase volume of truck traffic and large volumes of septage treatment in one (1) area.

8. There should be an educational program developed by the Septage Management Task Force Committee to educate the public in regard to collection, treatment and disposal of treated biosolids from septage in Grey County and surrounding areas.

9. A Class Environmental Assessment to assess the alternatives and locations for a (private, public or private/public) septage treatment facility should be carried out. The Province of Ontario will likely require that a Class Environmental Assessment be carried out for a septage treatment facility in Grey County.

10. Further investigation should be carried out with regard to metals in septage in relation to disposal of treated septage on agricultural land.

11. The GIS system for properties with septic systems in Grey County should be updated to reflect existing conditions.

12. Provincial legislation and/or municipal bylaws are recommended for the control of the frequency of pumping of septic tanks, haulage of septage and treatment of septage.

13. Surface and groundwater quality is to be adequately protected and assessed during the investigation of septage treatment alternatives. Capture zones for municipal groundwater supply wells should be given careful consideration during the assessment of any alternative for treatment and disposal of septage.

14. It is recommended that the quantity of septage actually pumped in the year 2003 in Grey County be determined from the Ministry of Environment records or from the septage haulers.

15. It is recommended that consideration be given to treating biosolids (22,500 m^3 in the year 2003) from the existing wastewater treatment plants in Grey County into a compost material or soil amendment at the septage treatment facility.

Respectfully submitted,

HENDERSON, PADDON & ASSOCIATES LIMITED

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SELECTED REFERENCES

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2. "Assessment of Quality, Quantity and Treatment of Septage in the Municipality of Grey Highlands", Henderson, Paddon & Associates Limited, December, 2002.

3. "Assessment of Quality, Quantity and Treatment of Septage and Hauled Sewage in the Municipality of Northern Bruce Peninsula", Henderson, Paddon & Associates Limited, January, 2004.

4. "County of Grey Official Plan", Grey County Planning & Development Department, August 16, 1999.

5. "County of Huron - Study of Septage Treatment And Disposal Final Report", B.M. Ross and Associates Limited, August 29, 2002.

6. "County of Wellington - Biosolids and Septage Management Study", Triton Engineering Services Limited, January 2003.

7. "Guide to Septage Treatment and Disposal", United States Environmental Protection Agency, Office of Research and Development, September 1994.

8. "Guidelines for the Design of Water and Sewage Treatment Works", Ministry of Environment, April, 1982 and July, 1984.

9. "Ministry of the Environment Communal Sewage Inspection Report for Sewage Plants in Grey County", 2000 and 2002.

10. "Municipal Class Environmental Assessment", Municipal Engineers Association, June 2000.

11. "Septage Handling, WEF Manual of Practice", prepared by Septage Handling Task Force of the Water Environment Federation, Mark E. Lang, Chair, 1997.

12. USEPA Handbook entitled "Septage Treatment and Disposal", 1984, EPA-625/6-84-009.

13. "Voluntary National Guidelines for Management of Onsite and Clustered (Decentralized) Wastewater Treatment Systems", United States Environmental Protection Agency, March, 2003.

14. "Wastewater Engineering Treatment, Disposal and Reuse, Third Edition", Metcalfe & Eddy, Inc., revised by George Tchobanoglous, Professor of Civil Engineering, University of California, Davis, and Franklin L. Burton, Vice President, Retired, Metcalfe & Eddy, Inc.

15. "Water Safety for Cottage and Rural People - Grey and Bruce Counties", Grey Bruce Health Unit, 2003

APPENDIX A

Terms of Reference
Septage, Task Force and Technical Committee

APPENDIX B

Septage Management Plan Terms of Reference

APPENDIX C

Nutrient Management Act

APPENDIX D

U.S. EPA Septage Design Guideline

APPENDIX E

Private Treatment Supplier Proposals
Environmental Treatment Services (ETS) and N-Viro Systems Canada Inc.

APPENDIX F

1017853 ONT. LTD.
c/o Waste Not Compost Inc.

Provisional Certificate of Approval
for a Waste Disposal Site (Processing)

APPENDIX G

Other Relevant Septage Information

APPENDIX H

Ad in the Owen Sound Sun Times, dated February 6, 2004

Information in Regard to Public and Government Consultation

1. **Township of Georgian Bluffs**
2. **Town of Hanover**
3. **Township of Wellington North**
4. **Municipality of Arran-Elderslie**
5. **Town of Minto**
6. **Township of Howick**
7. **County of Grey**
8. **Municipality of North Bruce Peninsula**
9. **Ministry of Environment**
10. **Ministry of Natural Resources**
11. **Grey-Bruce Health Unit**
12. **Saugeen Valley Conservation Authority**
13. **Paul Arnill**
14. **Carol Lawrence**
15. **Ron Miller**
16. **Environmental Treatment Services (ETS)**
17. **The Walkerton Healthy Community Initiative**

Sign-in Sheets at the Public Meeting

Blank Copy of the Comment Sheet

Copy of the Notice Emailed to Government Agencies with a List of those who received the Email