



Alberta Septage Hauler and Receiving Facility Inventory, Needs Assessment and Best Practices Summary Report

Project conducted with the cooperation and support of
Alberta Environment, Alberta Infrastructure and
Transportation, and Alberta Municipal Affairs

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Strategic Partners:



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INTRODUCTION

Private sewage treatment systems, commonly called “septic systems”, treat sewage from homes and businesses that are not connected to a centralized wastewater treatment plant. In some areas of Alberta (particularly adjacent to lakeshores or in areas with a high water table), holding tanks are the only environmentally acceptable form of private sewage disposal. Whether a septic system or a holding tank, ongoing maintenance is required on these types of systems for them to remain functional. In the case of the septic tank, required maintenance involves the removal of scum and solids that accumulate in the primary treatment tank (septic tank) every one to two years. For holding tanks, regular pump-outs are required (once or twice a month), the frequency of which depends on the size of the holding tank, the volume of wastewater generated and/or the number of persons on the holding tank system. The liquid, solid or semisolid material removed from septic tanks, cesspools, portable toilets, holding tanks and similar devices is referred to as “domestic septage”, and is generally disposed of via hauling to a septage treatment facility/lagoon or through land application. Therefore the septage hauling industry that transports septage to a treatment facility or to a land application site is a crucial part of the overall septage management process in Alberta.

It is estimated that one in five Albertans are using private sewage treatment systems to treat and dispose of sewage. Rural subdivisions are growing and the number of homes served by these systems is increasing, resulting in greater potential impacts on public health and the environment. The use of private sewage systems will continue to increase as these land developments grow. It is not economically or environmentally feasible to connect all rural subdivision infrastructure into centralized municipal wastewater systems. As private sewage treatment systems increase, so does the need for a professional, well-equipped hauling industry and the need for adequate capacity at septage receiving facilities across the province.

Indeed, many environmental experts propose large municipal sewage system use will decrease and onsite treatment system use will increase in the future. These experts contend that effective onsite systems that provide a high degree of water re-use will become prominent as a cost-effective solution to reduce clean water usage. Therefore the private sewage industry (including site evaluators, certified installers, safety codes officers and septage haulers) is here to stay, and will likely grow in years to come.

The Onsite Industry and Development in Alberta

Alberta is currently experiencing an era of prosperity and sustained growth that is the envy of most other regions of the country. While economic prosperity provides opportunities and advantages, it also creates environmental and social challenges. In order to strengthen Alberta’s ability to respond to continued urban and rural growth, we need to not only find effective ways to manage short-term pressures, but also to chart a sustainable course for the long term.

The Alberta onsite wastewater management industry has a pivotal role to play in meeting the day-to-day challenges of growth and development as well as the larger goals of environmental sustainability and effective water stewardship. As more land is being developed, more people are relying on private

sewage systems and the onsite industry to manage waste and to protect Alberta's groundwater and surface water supplies now and in the future.

The Septage Hauling and Receiving Industries

The septage hauling industry and the municipal lagoons or treatment sites that receive the wastewater, sewage, effluent and sludge are crucial components of an effective wastewater management system. The septage hauling industry or the "rolling pipeline" is largely made up of private operators servicing a set geographic area or community. As Alberta currently does not have a certification, permit or registration system for septage haulers, there has not historically been any solid data on how many operators are working in the province, nor on the volume of septage being hauled, disposed of in treatment facilities, or spread on land.

On the receiving facility side, municipalities must go through an approval process to construct a wastewater treatment lagoon or other receiving facility, but then have the autonomy to operate the facility as they see fit within certain environmental guidelines. There are also a certain number of private receiving facilities in Alberta located on golf courses, in subdivisions, and operated by industry. With a variance in facility protocols, best practices and capacity, there also has not been enough data on septage treatment facilities in Alberta to determine whether haulers have adequate access to receiving facilities, what access protocols or restrictions exist at facilities, and whether existing facilities are close to capacity.

Septage Industry Inventory, Needs Assessment and Best Practices Project

Issues related to the hauling of septage, its disposal, and the capacity of municipal receiving facilities to accept it where the impetus for this **Septage Facility and Hauler Inventory, Needs Assessment and Best Practices Project** undertaken by the Alberta Onsite Wastewater Management Association (AOWMA) in partnership with the Alberta Association of Municipal Districts and Counties (AAMDC), Alberta Environment, and Alberta Infrastructure and Transportation. This project was designed to provide a "snapshot" of the septage hauling and receiving industry in Alberta by conducting an inventory of septage haulers operating in Alberta and the municipal receiving facilities who receive and treat the hauled wastewater. The study project was designed to create a better "picture" of the industry, the pressures it faces, and provide an assessment of current and projected needs both for the hauling industry and for municipal wastewater treatment facilities. The study also includes a jurisdictional scan on the practices, protocols, initiatives and technologies being used in other jurisdictions.

By establishing this kind of baseline information, the project proponents have established solid information on which to base future development and education initiatives for the hauling industry, future municipal planning initiatives, funding partnerships, facility assessments and capital requests.

Other Septage Initiatives and Developments

This study project has been conducted in an environment where other significant initiatives in the areas of water and septage management were also recently completed or underway. It is important to view the findings and outcomes of this project within the larger Alberta water and wastewater environment.

In November, 2003, Alberta Environment released **Water for Life – Alberta's Strategy for Sustainability**, a high-level strategic guide formulated to address water quality and quantity issues in Alberta over the short (by 2007), mid (by 2010), and long-term (by 2014). The Water for Life strategy focuses on 3 main goals (1) access to safe, secure drinking water supply (2) a healthy aquatic ecosystem, and (3) a reliable water supply for a sustainable economy. Given the impact septage disposal can have on aquatic ecosystems, water quality, and levels of water usage, any discussion of the septage industry and septage management must be done within the context of the over-arching Water for Life strategy.

The **Alberta Environment Septage Management Advisory Committee (SMAC)** issued their final report in October of 2004, with a stated vision for Alberta to "eliminate the practice of septage land application except in those cases where reasonable access to approved wastewater treatment facilities is not practical" by 2010. To achieve this vision, the SMAC report laid out a number of recommendations designed to establish "an effective septage disposal system supported by the regulators, municipalities,

septage haulers, and wastewater facility operators”. Specific SMAC recommendations regarding septage receiving facilities and the hauling industry included:

- Improved support for facilities that (a) support regional initiatives, (b) enable effective monitoring to alleviate municipal liability concerns, and (c) control septage disposal at wastewater treatment facilities
- Ensuring that existing liquid wastewater management facilities are made available to septage haulers
- Promoting the formation of an industry association that administers the registration and accreditation of haulers to improve the septage management industry
- Hauler development of an environmental management system with clear septage management requirements
- Required documentation and tracking of septage transport and disposal (ie. a manifest)
- Implementation of industry education programs and penalties for non-compliance

The **Alberta Onsite Wastewater Management Association (AOWMA)** and **Alberta Municipal Affairs (AMA)** established a very successful private sewage training course for certified installers in 2003. Since that time a total of 855 individuals have been trained and 95 individuals are waiting for the next available training session. (Source: AOWMA) This successful initiative in one sector of the private sewage industry has created an Alberta model for certification and training in the wastewater management industry.

A review of the **Alberta Private Sewage Systems Standard of Practice (1999)** is currently underway. One of the major changes expected to come out of the review process is a requirement for an increased minimum tank size for private sewage treatment systems. If this change does indeed occur, there will be associated impacts on the hauling and receiving components of the industry due to potential changes in cleaning/pumping cycles and sludge accumulation rates associated with the larger tank sizes. The required pump out intervals or frequencies would be reduced with the larger holding and septic tank sizes for private sewage treatment systems installed in the future. Existing systems, with the smaller tanks sizes would continue to operate on the current, shorter pump out intervals.

Septic tank capacity required by Alberta standards has historically been a minimum size. For a three bedroom home a septic tank capacity of 400 gallons was required by standards. With 4 people in the home, based on predicted septage accumulation rates, the tank should be checked every year and pumped at intervals of 1 to 1.5 years. People in the private sewage industry in Alberta (and elsewhere) speculate that significant numbers of tanks are not currently pumped and maintained as frequently as they should be.

PROJECT MANDATE AND SCOPE

In placing the proposed project plan and project grant request before the provincial government, the AOWMA identified the following desired outcomes for the project:

1. To support the objectives of the provincial Water for Life strategy to protect Alberta's water resources;
2. To provide municipalities with information on which to strategically plan for future developments, undertake receiving facility upgrades or construction starts, and engage other levels of government in the funding of wastewater treatment capital initiatives;
3. To create a profile of Alberta's current municipal septage receiving sites and facilities and assess any capacity issues, needs or other industry concerns;
4. To research process, protocol and technology best practices and options for maximizing facility use;
5. To scope public-private partnerships that may be used to create additional receiving facilities;
6. To explore options for achieving the recommendations made by SMAC to eliminate the spreading of septage on land by 2010;
7. To establish inventory, needs assessment and current/best practices information on the septage hauling industry in Alberta;
8. To identify public or industry education needs on the handling of septage in Alberta and to provide a basis from which to develop the necessary educational materials
9. To engage industry, build trust levels, and provide a basis for industry-led education, training and certification partnerships.

Recognizing the need to develop a clear picture of the septage hauling and receiving industry practices, facilities and needs in Alberta in order to effectively plan for the future, Alberta Infrastructure and Transportation (INFTRA) and Alberta Environment (AENV) agreed to provide funding to the Alberta Association of Municipal Districts and Counties (AAMDC) and authority to the AOWMA to undertake the project.

THE CONSULTANT TEAM

Jack Hayden (Jack Hayden Consulting Ltd.) and **Wendy Grosfield** (Grosfield and Associates) were retained by the AAMDC and AOWMA to develop and carry out the surveys, original research, jurisdictional and technology scan on municipal receiving facilities. During the latter half of the project timeline, they were also asked to develop and maintain a comprehensive hauler database, to distribute and tabulate hauler surveys, and to verify hauler information through numerous phone contacts and interviews. **Richard Zwicker**, consultant and former Executive Director of the Alberta Onsite Wastewater Management Association served on the project working team and provided background knowledge, survey drafting and formulation expertise, and technology scan information for haulers prior to his retirement in June of 2006.

THE PROJECT STEERING COMMITTEE

The consultants reported to a Steering Committee throughout the course of the research and inventory project. Steering Committee members included:

Mark Oberg, Director, AAMDC

Keith Gylander, Executive Director, AOWMA

Bruce Rowe, Director, Alberta Urban Municipalities Association (AUMA)

Dave McIntyre, Water/Wastewater Specialist, Alberta Infrastructure and Transportation (INFTRA)

Bijan Aidun, Senior Water Policy Advisor, Alberta Environment

Alf Durnie, Chief Inspector, Private Sewage Technical Services and Standards Development, Alberta Municipal Affairs

Andre Tremblay, **Izabela Ruberry** and **Michelle Hay** provided support to the Steering Committee on behalf of the AAMDC throughout the project term.

PROJECT METHODOLOGY

SURVEYS AND SITE VISITS OF MUNICIPAL FACILITIES

A survey on wastewater treatment facilities and facility relationships within the septage hauling industry was developed and distributed to both rural and urban municipalities in Alberta through their respective provincial Associations (AAMDC and AUMA). A low initial response to the survey instrument from Alberta's urban municipalities resulted in significant phone, fax, and e-mail follow-up by the consultants. One hundred sixty-three (163) completed municipal surveys were ultimately received out of a possible total of 348 municipalities, for a survey response rate of 47 per cent. To supplement the survey data, a number of facility site visits and municipal interviews were conducted (a list of site visits is available as part of the detailed survey report found in the Survey, Research, Jurisdictional and Technical Scan (Volume II) Working Paper for this project).

INVENTORY OF MUNICIPAL FACILITIES

As part of the facility survey (see above), municipalities were asked to complete a one-page wastewater facility profile for every municipal wastewater treatment system, lagoon, or lift/transfer station in their municipality. The facility profiles included information on age, location, treatment process, facility access, dumping restrictions, and shut-down, upgrade or expansion plans. Municipalities were also asked to identify septage haulers using their facility or known to operate in their municipality. Municipalities who did not respond to the survey were contacted by phone, fax or e-mail to complete (at a minimum) the one-page facility profile. Facility profile information was cross-referenced with Alberta Environment wastewater treatment license and approval information. As a result, a complete inventory of 406 municipal receiving facilities in Alberta was compiled.

HAULER INVENTORY AND DATABASE

Over five hundred possible hauler names were identified from a combination of sources that included: a dated list maintained by the AOWMA, municipal reports, on-line business databases, phone directories, and anecdotal information. Through the survey process and a comprehensive telephone campaign, haulers currently in the domestic septage business were verified and a confirmed hauler inventory and database of approximately 325 operators was developed. This database is a "snapshot in time" of Alberta's septage hauling industry.

HAULER SURVEYS

Two surveys were originally developed to gain information from domestic septage haulers. On the first survey, haulers were asked to provide identifying information along with their survey response. On the second survey, haulers were asked a series of more sensitive questions and asked to submit their answers without identifying information. As hauler response to the first two survey vehicles was limited (**note rate of response), a third, short survey form was designed for use in telephone interviews with randomly-selected haulers. As a result 64 hauler surveys were received (by the time this report was written) resulting in a response rate of 20 per cent.

JURISDICTIONAL SCAN OF SEPTAGE LEGISLATION, PRACTICES AND PROTOCOLS

A combination of library research, internet research, and telephone/personal interviews were conducted as part of a jurisdictional scan on legislation, practices and protocols for wastewater treatment facilities, the septage hauling industry and septage management in Canada and the United States.

LITERATURE REVIEW AND SCAN OF SEPTAGE TREATMENT FACILITY/HULER TECHNOLOGIES

A combination of library research, internet research, and telephone/personal interviews with septage management technology developers and facility/hauler users was conducted as part of a comprehensive scan of available and emerging septage management and treatment technologies.

PRIVATE SEWAGE SYSTEMS IN ALBERTA

ESTIMATED NUMBER OF PRIVATE SEWAGE SYSTEMS IN ALBERTA

With the continued development and subdivision of lands not economically serviceable by centralized sewage systems, Alberta is experiencing a significant increase in the installation of private sewage treatment systems. Based on the sales of major components used in private sewage treatment systems, it is estimated approximately 7,000 systems are installed or upgraded in Alberta each year. (Source: Alf Durnie and Alberta sewage treatment system manufacturers and distributors) Another indicator of a net increase in systems is the total of 19,654 rural residential building starts in Alberta over the past four years. (Source: Alf Durnie and AMA dwelling unit data)

Figure 2: Rural Residential Building Starts in Alberta Per Year (Source: AMA dwelling unit data)

Year	2002	2003	2004	2005	4-year total
Starts	4,362	4,560	4,580	6,152	19,654

By 2004, Alberta's rural population assumed to be on private sewage treatment systems was 450,095. Assuming an average of 2.1 people per residence, as of 2004 there were projected to be approximately 214,330 residential private sewage treatment systems in Alberta. Added to the estimated 5,000 systems serving commercial establishments, schools, parks, campgrounds, etc., and making allowances for an increase in rural population since 2004, we can assume there are a minimum of 230,000 private sewage treatment systems currently operating in Alberta. (Source: Alf Durnie and Local Government Services, Alberta Municipal Affairs)

Temporary work camp activity (primarily associated with Alberta's oil and construction industries) estimated to be around 1,500 camps per year (Source: Chief inspector), and the portable toilet industry also add to the septage stream generated by private or temporary sewage systems in the province.

SEPTAGE QUANTITY (PRIVATE SEWAGE TREATMENT)

Provincial government officials, industry officials and the consultants for this project worked collectively to attempt to develop a calculation for the current volume of septage generated by individuals using private sewage treatment systems on a province-wide basis. However, given the limited verifiable information available on the number of private sewage systems, tanks sizes, holding tanks versus septic tanks, and maintenance and pumping cycles of systems, etc., it was agreed any attempt to quantify the current provincial volume of septage would, at best, be a mathematical construct based on a series of assumptions. As we move forward, municipalities may be best placed to undertake a case study or audit of septage quantity versus available receiving capacity within their particular area or region. When a municipality looks at their total infrastructure needs in the future, they may want to include an assessment of wastewater receiving capacity versus the number of private sewage systems serving rural residences or commercial entities and the estimated holding tank and septic tank pump out volumes generated on an annual basis within a specified region.

SEPTAGE QUANTITY AND WASTEWATER TREATMENT FACILITIES

Given that rural residential building starts are rising (see Figure 2) and the rural population assumed to be on private sewage systems is growing (by 3.24% between 2001 and 2004), we can also assume the annual septage quantity generated by private sewage treatment systems would increase by 2010 and beyond. Therefore, if land spreading were to be totally eliminated by 2010 (as suggested in the SMAC report), and all septage generated from private sewage treatment systems in Alberta were to be hauled to municipal wastewater treatment facilities, those facilities would need to be built to a level to receive existing septage volumes (which we have been unable to quantify based on available information) and accommodate ongoing growth. Clearly more work is required to determine if a moratorium on land spreading is feasible in Alberta.

SEPTAGE MANAGEMENT IN OTHER JURISDICTIONS

The legislative and regulatory approach to municipal septage receiving facilities and the septage hauling industry varies in both the United States (US) and Canada.

In the US there is more of a federal regulatory presence for wastewater management under the United States Environmental Protection Agency (USEPA). Both state and federal regulations govern septage disposal. The federal regulations, set by the USEPA set minimum standards and state regulations, where they exist, are thus often the more stringent of the two. Within individual states, there is some variance in approaches taken at the local level in certain states. However, the majority of states centralize regulatory control over wastewater management at the state level even if regional offices or local governments actually deliver or manage the system.

The USEPA has prepared a *Guidance Manual for the Control of Wastes Hauled to Publicly Owned Treatment Works (POTWs)* to provide practical information to state and local officials on ways to control the discharge of hauled waste. The specific elements of a waste hauler control program vary for each POTW depending on a number of variables including: receiving facility capacity, flows and pollutant loadings, sensitivity of receiving facility processes, type and amounts of hauled waste accepted, funding and local issues and requirements. (Source: USEPA Guidance Manual)

In Canada septage disposal regulations are set by the provinces. Some provinces also have legislation or regulations in place governing the registration, certification and training of septage haulers. Generally, the protocols or practices at septage receiving facilities are set by the municipality. The various provincial and territorial regimes in place have evolved independently and are now at different stages of development, creating an array of management approaches for the wastewater treatment sector (more information on the regimes in each province is contained in the Survey, Research, Jurisdictional and Technical Scan (Volume II) Working Paper for this project.)

A Canada-wide strategy for the management of municipal wastewater effluent (MWWWE) is currently being developed through the Canadian Council of Ministers of the Environment (CCME). While this group doesn't deal specifically with the septage hauling industry, it does focus on the need to devote more effort and resources to wastewater management in general, and the improvement of wastewater treatment capabilities in Canada. One of the key mandates of the group is to explore strategies to better harmonize the regulatory and legislative environment for wastewater treatment across Canada.

ALBERTA'S MUNICIPAL SEPTAGE RECEIVING FACILITIES

Complete project survey reports and the comprehensive municipal wastewater treatment facilities inventory are contained in the Survey, Research, Jurisdictional and Technical Scan Working Paper (Volume II) for this project. Major attributes, findings and outcomes of the survey and inventory initiatives are outlined below.

SCOPE OF SURVEY/INVENTORY PROJECT – The survey/inventory project that is the subject of this report was confined to municipal wastewater treatment facilities, with a total of 406 facilities tracked and reported on. Of those 406, 11 report being regional or shared treatment systems between a minimum of two municipalities. A total of 119 “out of scope” receiving facilities that appear on Alberta Environment’s license/approval list (for commercial operators, provincial parks, schools, churches, airports, golf clubs, subdivisions or bareland condominiums, metis settlements and first nations etc.) where not within the scope of this project and were not targeted by the survey process.

FACILITY/PROCESS TYPE – the large majority of municipal wastewater treatment facilities in Alberta are multi-cell lagoons, with some combination of facultative cells, aerated cells and holding ponds. Some of the other technologies, features and components being used at wastewater treatment plants in Alberta include: advanced tertiary treatment, biological aerated filters (BAFs), the composting of biosolids, digesters and power generation, sequencing batch reactor technology (BRT), biological nutrient removal (BNR), ultraviolet (UV) light disinfection, and solar-powered aeration (see facility case studies and innovations highlighted on pages 11 and 12). The average age of wastewater treatment facilities in Alberta is 20 – 25 years old.

ACCESS TO FACILITIES – 148 (35%) of municipal wastewater treatment facilities report allowing access to their facility by the independent septage hauling industry. However, the majority of those who allow access do so only to specific approved haulers or, in many cases, to one approved hauler who only services residents in their municipality. 70 rural municipal receiving facilities report to allow access to at least one independent hauler. 78 urban municipal receiving facilities report they allow access to at least one independent hauler.

Of the 278 facilities reporting they do not allow access to the septage hauling industry:

- 53 indicated there is no dumping access to their facility,
- 49 indicated they don't allow access due to capacity concerns or design issues,
- 36 indicated they don't allow access due to contamination risk, liability/damage concerns,
- 34 indicated they don't allow access due to a political/policy decision by the municipality,
- 28 indicated they have never been asked to provide access,
- 19 indicated they don't allow access due to a lack of controls, monitoring ability or manpower,
- 6 indicated they don't allow access due to the availability of other facilities in the area (ie. in the rural municipality), and
- 1 indicated they had been advised by Alberta Environment in 2000 to disallow access, and
- Although the information was not formally solicited, 9 facilities reported recently limiting or barring access to their facility due to contamination incidents, capacity concerns or a municipal policy change.

The majority of wastewater treatment facilities (lagoons) in Alberta have a padlock gate as their access control. Card readers, manned monitoring or other more sophisticated access controls are rare and generally confined to the larger urban wastewater treatment systems.

Through the various project site visits and interview processes with municipalities, it was evident municipalities would support a certification and training program for the septage hauling industry. Indeed, a certification and training program for haulers may go a long ways towards address existing concerns and fears municipalities have with regard to possible contamination of their facilities from allowing more open access to the hauling industry. Ideally a certification and training program for haulers would ultimately provide enhanced access to facilities for the hauling industry.

RESTRICTIONS ON DUMPING OF SEPTAGE DUE TO SOURCE OR ATTRIBUTES - For those facilities that do permit outside dumping, most restrict the dumping of septage from light commercial or industrial sources. About one-half of the facilities that permit outside dumping also reported a restriction on dumping waste from portable toilets. The most often cited septage content concerns were over the potential for hydrocarbons or mixed loads. A majority of facilities also reported policies to restrict septage with high fat-oil-grease content or car wash/sump material content.

THE OVER CAPACITY – UNDER CAPACITY DICHOTOMY - Wastewater treatment facilities in Alberta generally fall into one of two extremes: (1) they are sufficiently built or overbuilt for the municipality's current and projected population and require only routine maintenance and upgrades; or (2) they are currently near or over design capacity and facing a need within the 1 – 5 year near-term for significant upgrade or expansion.

FACILITY EXPANSION AND UPGRADE NEEDS – With over 25% of facilities inventoried reporting the need for retrofits, upgrades or expansion, there is evidence of a significant need for future capital investment in municipal wastewater treatment. A number of municipalities in the Highway 2 corridor reported they are considering the merits of hooking up to a regional wastewater system that has been proposed for the central Alberta area. However, many of those who reported they are considering a regional hook-up (if and when a regional system is approved), also indicated their current capacity issues will require capital investment in their stand-alone wastewater treatment facility upgrade or expansion within the next 1 – 5 years, regardless of any regional initiative that may go forward over a longer timeframe.

PRIVATE/PUBLIC PARTNERSHIPS – A number of private/public partnerships for the operation of municipal wastewater treatment facilities are working well in Alberta. These tend to be in the form of “utility management agreements” where the municipality continues to own the wastewater treatment facility and enters into a multi-year management agreement with a private corporation or industry (such as Earth-Tech, EPCOR, Aquatera or others) to operate the facility (see feature box on page 12).

SOME FACILITY HIGHLIGHTS AND INNOVATIONS

Private/Public Partnerships and Utility Management Agreements

The **Town of Jasper** partnered with Earth Tech for the design, construction and operation of the new Jasper Wastewater Treatment plant. Jasper and Earth Tech entered into a 20-year operating contract for the activated sludge biological nutrient removal plant that uses the 3-stage Bardenpho process. (Source: Protecting the Athabasca)

Aquatera manages wastewater treatment facilities for the **City of Grande Prairie** and the **Town of Sexsmith** as well as certain of the **County of Grande Prairie's** facilities. The City also contracts with Aquatera for their solid waste and water utility services to residents.

EPCOR has a 10-year utility management agreement with the **Town of Canmore** which includes water and wastewater treatment, wastewater collection, biosolids composting and billing and account management.



Canmore's wastewater treatment plant is a Level IV tertiary system that is designed to treat approximately 22 ML/day. (Source: www.epcor.ca)

EPCOR also has a 5-year utility management agreement with **Red Deer County** to operate and maintain the water and wastewater systems in five communities: **Springbrook, Spruce View, Benalto, Liberty Park and Lousana**. (Source: www.epcor.ca)

In the **Town of Strathmore**, EPCOR built a tertiary system that uses **Sequencing Batch Reactor Technology (BRT)**. A portion of the treated wastewater from the Strathmore treatment plant is diverted to the local Freeman Marsh wetland project.

The **Town of Okotoks** has partnered with EPCOR to design, build, operate and maintain the Town's water and sewer utilities for 20 years. An \$11.2 million upgrade of the wastewater treatment plant was commissioned in the fall of 2006 and will allow the Town to double its current population of 15,000. The 24.5 ML/day tertiary wastewater treatment plant will use a **biological nutrient removal (BNR)** process, ultraviolet light disinfection, and composting of the biosolids sludge.

Figure 4: Sample of Integrated Wastewater Treatment Process Used at Okotoks Wastewater Treatment Plant

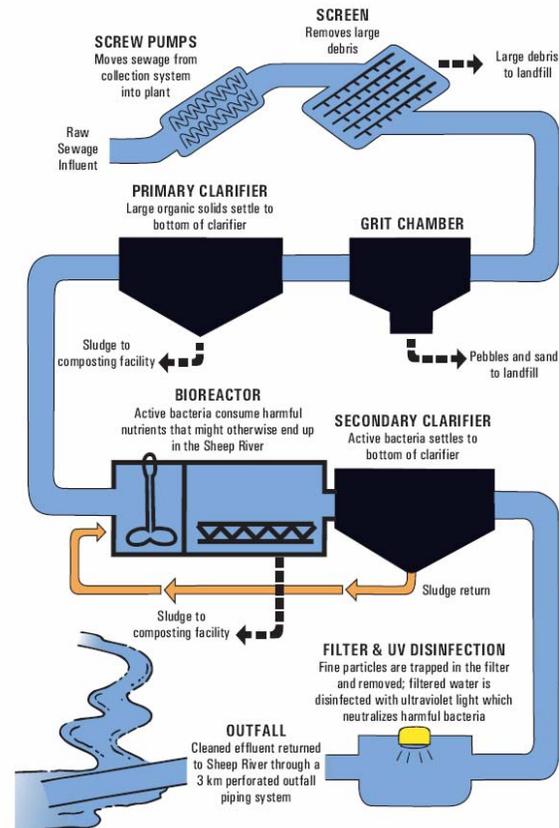


Figure 5: New Jasper Wastewater Treatment Plant Managed by Earth-Tech

Innovations...

A number of innovative wastewater treatment projects are being implemented or planned in Alberta to realize energy savings, to increase access to facilities, or to use septage and its by-products as a resource.

The **City of Lethbridge** converts sewage gas into power in its “green” wastewater treatment plant. Lethbridge uses thickened sludge, a by-product of wastewater treatment, to feed an anaerobic digester. The digestion process creates methane gas, which is collected, stored and burned in generators, producing electricity and heat at the wastewater facility. It is estimated the \$5.5 million treatment plant will take 10 – 11 years to pay back, depending on energy costs. It will also save the City an estimated \$450,000 per year and reduce greenhouse gas emissions by an equivalent of 700 cars per year. (Source: C3 Views www.climatechangecentral.com)

The **Town of Drayton Valley** added a floating solar powered aeration system to its wastewater treatment pond in 2005 for significant energy savings. Drayton Valley is also exploring the merits of incorporating bioenergy and biofuel into its wastewater treatment process. Using biofuel can not only generate heat and electricity, but it can help the municipality achieve low-cost wastewater treatment.

Ponoka County has worked closely in recent years with developers, their urban neighbours and their local septage haulers on strategies to handle growing septage volumes from acreage and subdivision developments. A septage dumping station was installed in the **Hamlet of Bluffton** for the use of a local hauler. Arrangements were made with the **Town of Rimbey** for local haulers to have access to the town’s wastewater treatment lagoon. The developers for two new subdivisions located at **Gull Lake** and at the **Wolf Creek Golf Resort** in the County were required to cover the costs of constructing a sewage treatment facility for each subdivision. Ponoka County paid for the construction of dumping stations at the two new wastewater treatment facilities to guarantee access for local haulers.

In addition to its existing Bonnybrook and Fish Creek Wastewater Treatment facilities, the **City of Calgary** is in the process of constructing an additional wastewater treatment facility (Pine Creek) to accommodate Calgary’s immediate and long-term wastewater treatment needs. The first stage of this project will include a 100 ML per day wastewater treatment plant with the capability of adding modules sequentially as required to a full build-out capacity of 750 ML per day. The project will also incorporate wastewater research facilities in collaboration with the University of Calgary. (Source: www.calgary.ca)

Regional Initiatives and Approaches...

The **City of Calgary** approved a policy in 1992 that supports the extension of wastewater services to existing urban centers in the greater-Calgary region. Wastewater service connections have been approved for the **City of Airdrie**, the **Town of Chestermere**, the **Town of Cochrane**, the Tsuu T’ina Nation, the Alberta Remand Center, the Bearspaw/Glendale School and Recreation Center, the Elbow Valley Joint Venture Utility, and the Nexen and Calpine Power Plants. (Source: Susan McFarlane, Regional Waterworks: Sharing Urban Water Resources, Western Cities Project Report, Canada West Foundation, November, 2003)

The **City of Edmonton** has a single wastewater treatment plant – the Gold Bar Wastewater Treatment Plant. All City of Edmonton wastewater is treated at Gold Bar except for an area in northeast Edmonton whose wastewater is diverted to the **Capital Region Sewage Treatment Plant**. In exchange, the Gold Bar Plant treats wastewater from the Capital Region’s southern members (Beaumont, Leduc, Nisku, and the international airport). The **Alberta Capital Region Wastewater Commission** and the City are working on a regional services plan for sewer and wastewater transmission within the capital region because the current plant does not have capacity for expansion. (Source: Susan McFarland, Regional Waterworks, Canada West Foundation)

The **Central Alberta Regional Wastewater Initiative** is still at the discussion stage. If it were to go ahead, the regional system could serve 25 communities in the central region. Capital costs for the regional initiative are estimated to be in the \$325 million range according to a report recently completed by Stantec Consulting. (Source: www.town.sylvan-lake.ab.ca)



Figure 6: Aerial View of the new Pine Creek Wastewater Treatment Facility being constructed by the City of Calgary.

THE SEPTAGE HAULING INDUSTRY IN OTHER JURISDICTIONS

In 2002, the **Ontario** government announced a plan to phase out the land application of untreated septage within five years. The new septage rules in Ontario are proving frustrating to the septage hauling industry, who are facing fewer disposal options and higher operating costs. Ontario's Ministry of the Environment estimates 1.2 to 4.2 million cubic metres of waste are pumped each year from septic systems and holding tanks in rural areas, cottage country, campgrounds and trailer parks across the province. Currently, 40% of Ontario's septage is trucked to sewage treatment plants and sewage lagoons. As land-disposal options disappear in the province, that percentage is likely to increase. However, many sewage treatment plants are refusing to accept septage, which is significantly more concentrated than municipal sewage. Many of those facilities that do accept septage are increasing their fees (fees have gone as high as \$400 per 1,000 gallons). The province's septage industry agrees land spreading of untreated waste should end, but some fear a lack of access to treatment facilities and rising disposal costs could become a recipe for illegal dumping. (Source: Stauffer, Julie, "New Septage Rules Frustrating Haulers", Business Edge, www.businessedge.ca)

In **Prince Edward Island**, land spreading of domestic septage is expected to stop in 2007 when the two main receiving stations at Summerside and Charlottetown are upgraded to a point where they can receive the province's septage. A number of the province's haulers are already using the Summerside and Charlottetown facilities. All septage haulers in PEI are licensed by the provincial government for a \$250 fee over a two-year period. Septage hauling fees in PEI tend to be in the \$75 - \$100 per load range. (Source: Delbert Reeves, Approvals/Regulatory Compliance Technologist, PEI)

In **Manitoba** haulers require registration permits (they apply every 5 years) to operate, but do not currently require the completion of training or certification (although a hauler training component is available through Red River College as part of a larger wastewater training program). Land spreading is allowed under license, otherwise haulers can only discharge into common or public sewers or approved facilities.

In **New Brunswick**, all septage handling contractors are required to have an *Approval to Operate a Septage Handling Business* and each operator is required to submit an annual *Septage Handling Report*. The annual fee for obtaining the approval is currently \$300. (Source: Septage Management in the Gulf of Maine – Workshop Papers)

In **Nova Scotia** neither the *Nova Scotia Interim Septage Handling Guidelines* or the *Atlantic Canada Standards and Guidelines Manual for the Collection, Treatment, and Disposal of Sanitary Sewage* reflect the actual field practice of septage disposal in Nova Scotia. Most of the operators are small private pumping and disposal firms. Some firms currently dispose of untreated septage on scrub brush areas and fields (Pers. Comm., MacKenzie). Others operate lagoons with a surface discharge of liquid and apply the dredged septage to fields. Halifax and Kings County's have treatment facilities at which all pumpers in those counties are required to discharge. (Source: Domestic Septage Management Review at www.centreforwaterresourcesstudies.dal.ca) Nova Scotia currently has a new draft regulation under consideration that, if approved, would require septage pumpers to hold a provincial certificate of qualification obtained on the completion of a provincially approved training course.

In **Saskatchewan**, septage haulers must obtain a provincial permit (there is no fee) and execute a *Permission to Dispose of Liquid Sewage* form under the terms of a provincial regulation to either dispose of sewage into a municipal sewage lagoon or to dispose of septage by land spreading. Best management practices for the transport and disposal of liquid domestic waste have been published by Saskatchewan Environment.

In the **United States**, 24 states currently administer certification and/or approval programs for septage haulers and pumpers. (Source: Noah, 2000). Many states that do not require formal licensing or certification track the hauling industry through other means such as registration of pumper trucks and routine inspections of pumper trucks. A number of states have also devolved the responsibility for certification and approval to municipal governments. The state of Michigan, which has a very advanced regulatory and public education program, requires haulers to pay a one-time, \$100, non-refundable fee towards a contingency fund used to clean up sites where septage was illegally discharged.

THE ALBERTA SEPTAGE HAULING/PUMPING INDUSTRY

Alberta does not currently have a registration, permitting, certification, or training system in place for the septage hauling industry. Most haulers would likely be required to hold a business license in their local area of operation, but these are not tracked on a provincial or industry basis. A relatively small number of haulers are currently members of the Alberta Onsite Wastewater Management Association, which also counts septic system installers, inspectors, safety codes officers, and other industry and government representatives amongst its membership.

For the purposes of this project, survey and interview instruments were developed to obtain feedback from the hauler industry (see project methodology section of this report). Complete reports on the outcomes of the various hauler survey and interview instruments can be found in the Survey, Research, Jurisdictional and Technical Scan (Volume II) Working Paper for this project. Major findings and outcomes of the survey/interview initiatives include the following:

THE NATURE OF SEPTAGE HAULING BUSINESSES IN ALBERTA - Based on written survey responses (which were limited), and telephone interviews with random haulers, the septage hauling industry in Alberta can generally be characterized as made up primarily of part-time operators, a year-round industry, a “thin-margin” business, and an industry that is somewhat reluctant to provide formal feedback. Of the haulers responding to the survey, the portion of their business dedicated to domestic septage ranged from less than 1% to 100%, and averaged 56%. Only 10 individuals/firms (or 16% of the survey sample) indicated that 100% of their business is dedicated to domestic septage. Indeed, 24% of the survey/interview sample indicated that only 1 – 2% of their business is dedicated to domestic septage. For those that dedicate a very small percentage of their business to domestic septage, hauling septage is generally only done for established clients who use other business services.

HAULER BUSINESS CASE - The majority of haulers interviewed indicated the septage hauling industry is a thin-margin business. For a number of the very small operators, any hint of additional regulatory requirements, certification or training costs, or other imposed/additional costs was viewed as a “last straw” that could potentially put the operator out of business. A number of haulers indicated they “cannot compete” with operators who cut corners, engage in illegal practices, or have their own property for land spreading.

DEDICATED TRUCKS VS. MULTI-PURPOSE TRUCKS - A small minority of the survey/interview sample indicated they are in a position to dedicate trucks to the domestic septage business to avoid concerns over cross-contamination with the oilfield/industrial component of their business. For some other operators, the switching of a truck between industrial use and domestic septage hauling means a

minimum of a half-day of “down time” to properly clean the vehicle, and is therefore cost-prohibitive for small operators.

ACCESS TO FACILITIES AND LAND SPREADING - Only 8% of the hauler survey/interview sample indicated they have absolutely no access to wastewater treatment facilities. In spite of this, many written comments from the haulers on returned surveys cited limited access to facilities, too few facility locations, and increased hauling distances as major industry concerns.

33% of the hauler survey/interview sample indicated they do not engage in any land-spreading of septage at the current time. The remaining 67% of the sample group either indicated they engage in land spreading or declined to comment on the land spreading issue. A number of haulers pointed out that continuing to allow “reasonable” land spreading would reduce or slow the need for capital investment in wastewater treatment facilities.

FEASIBILITY OF A MORATORIUM ON LAND SPREADING

A large majority of the hauler sample group had no knowledge of the SMAC report’s proposed moratorium on land spreading or the Alberta Environment requirement for a Letter of Authority to land spread. In spite of this, over 40% of the hauler survey/interview sample indicated they believe a moratorium on land spreading is achievable in Alberta (over 20% of the sample do not believe a land spreading moratorium is achievable).

SUPPORT FOR CERTIFICATION AND TRAINING

A majority of the hauler survey/interview sample indicated they would support a certification and training initiative for the hauling industry (33% are opposed). The support for certification and training was more likely to come from the large multi-truck operators or those operators with diversified services (ie. also serving the oilfield industry).

NEED FOR MORE PUBLIC EDUCATION

Over 90% of the hauler survey/interview sample believe homeowners have very little knowledge regarding their septic systems and support the need for enhanced public education on septage systems and their maintenance and management.

SEPTAGE HAULING AND RECEIVING FACILITY TECHNOLOGY SCAN FINDINGS

Technology within the septage receiving industry is as diverse as the regulatory framework within which it operates. Indeed, any discussion of septage technology or best practices must be taken within the context of existing legislative, financial and geographical parameters. Simply put, legislation and economics drive the creation or refinement of technology, and climate and geography play a role in determining the technology used. A number of emerging facility technologies in Alberta have already been profiled in an earlier section of this report.

Technology for the septage hauling industry, on the other hand, is most commonly a series of low-tech innovations designed to control or reduce odour pathogens, biodegradable pathogens and vectors. Technology on the hauler side can be generally be categorized as truck-mounted tank technology, hose technology, or pumping technology. The mid to high-tech technology solutions currently on the market can include technologies such as truck lime stabilization units, compartmentalization, mixed load solutions, land injection systems and effective truck-mounted screening systems. At the highest end of the pumper technology scale are mobile dewatering units and other innovations that are often cost prohibitive for all but the most sophisticated operator.

A complete commentary on the findings of a comprehensive jurisdictional and technology scan on both the receiving (facility) side of the industry and the hauling (rolling-pipeline) side of the industry can be

found in the Survey, Research, Jurisdictional and Technical Scan (Volume II) Working Paper for this project.

OBSERVATIONS

GENERAL

- ⇒ Everyone involved in septage management (from the homeowner, to the hauler, to the receiving facility) has a responsibility to ensure proper management techniques and environmental safeguards are in place
- ⇒ The lack of proper and routine maintenance schedules for septic systems is an ongoing concern. Homeowner education programs, mandated inspection systems, and enforced monitoring are some of the options that may need to be further evaluated to address this issue.
- ⇒ Lime stabilization, mobile de-watering and other emerging technologies and innovations merit further research and consideration as potential septage management options for Alberta
- ⇒ The cost of innovative or emerging technology for haulers is prohibitive in an industry that is already reportedly struggling to maintain a viable business case

ON RECEIVING FACILITIES

- ⇒ The reluctance of some municipalities to allow independent haulers into their facilities is based on a concern about mixed loads (this is somewhat unique to Alberta in terms of the concerns with hydrocarbons and the oilfield industry)
- ⇒ In other cases, the municipal receiving facility is fenced, in the middle of a field, and has no current means of access ... or seasonal access
- ⇒ Lack of sophistication in access controls, load sampling and monitoring capacity is an issue for most municipal facilities (they can't take the chance of something damaging being "dumped" in their facility)
- ⇒ A lack of manpower for monitoring the facility in small municipalities can also be correlated with a lack of open access at the facility.
- ⇒ Manifests are required at less than half the facilities in the province. A more widespread requirement for a manifest that tracks the source of the septage could potentially alleviate facility concerns on the source of septage.
- ⇒ Small urban municipal facilities are less likely to allow access to independent haulers and several indicated they rely on the neighbouring County or Municipal District to accept septage from independent haulers
- ⇒ There are two extremes in the province with respect to facilities ... many in sparsely populated areas are built to over capacity and may experience treatment issues due to weather or lack of a consistent waste stream ... in areas with development pressures and increasing population, facilities are near or at capacity and need immediate upgrades, additional treatment capacity or regional/innovative solutions within the immediate to 5 year range
- ⇒ Private/public partnership models where operation and maintenance of the municipally-owned wastewater treatment facility is the responsibility of a private sector corporation under a utility

management agreement is working well in several larger communities. These municipalities are choosing to partner with private sector industry to provide water/wastewater services in response to demands for improved technology, expert resources, cost effective service delivery, and more stringent environmental regulations. (Grande Prairie – Aquatera, Canmore/Red Deer County/Strathmore – EPCOR are some examples)

- ⇒ Regional systems are viewed by many municipalities as one possible solution to growing wastewater treatment needs and capacity issues in areas where development and population pressures are at their highest ... but the proposed timelines for actual implementation of possible regional systems will not meeting current needs. In cases where regional systems are being contemplated, cost/benefit analysis needs to be done on the merits of upgrading or expanding individual wastewater treatment systems vs. hook-up to a regional system.
- ⇒ A number of municipalities appear to be in a “holding pattern” with respect to addressing their facility capacity issues pending further discussions or decisions on whether a regional system will proceed
- ⇒ There is a general lack of wastewater treatment facilities in Summer Villages in the province. Given the changing demographic of Summer Villages (more year-round residents, more wastewater generated, high volume appliances etc.), this is a growing issue
- ⇒ The province is allowing, in some cases, additional discharges to deal with existing capacity issues. This is a temporary fix that will not alleviate the need for capital investment and more facility capacity in key areas of the province over the long-term.
- ⇒ There is some anecdotal evidence that unrestricted water access (ie. lack of metering) is correlated with facility capacity issues in some communities
- ⇒ The current provincial funding program for water/wastewater infrastructure is over-subscribed and falls well short of addressing current and emerging needs. (Alberta Infrastructure and Transportation has a \$32 million per year program budget, with approximately \$160 million worth of projects on a waiting list)
- ⇒ The need for infrastructure and dumping access to existing facilities is not a high priority for municipal budgets that are already burdened with a variety of core infrastructure needs.

ON THE HAULING INDUSTRY

- ⇒ Based on the modelling we have done for the total volume of septage being generated in Alberta from onsite sewage systems and the number of haulers in the business, there is a potential shortage of septic haulers to handle existing septage volumes.
- ⇒ Very few haulers are 100% in the domestic septage business (it is a “thin margin” business). Many haulers we spoke to reported a difficulty in making a profit in the business. For many of them the domestic septage hauling is a “side-line” or “part-time” business they engage in for the benefit of their clients (ie. oilfield operators and camps). A number of haulers indicated they have recently, or plan to leave the domestic septage hauling industry due to the lack of a viable business case.
- ⇒ The septage hauling industry appears to be somewhat transient in nature ... with a number of the haulers reporting to us having recently left the business, evidence of disconnected phone numbers etc.
- ⇒ The hauling industry is generally very “nervous” and “distrustful” of government intervention and regulation. They are worried about new regulations further diminishing the viability of their businesses

- ⇒ Providing a dedicated truck for domestic septage is cost-prohibitive to all but the larger operators. The down-time and cost involved in switching a truck from hauling, for example, oilfield waste, to hauling domestic waste is onerous when done properly.
- ⇒ Haulers whose primary business is the clean-up of water main-breaks, flooding etc., identified a need for more access to hydro-vac dump sites for load containing mud/water/silt/sand etc. (ie. closest facility to Edmonton for this type of dumping is Newalta site in Redwater). This situation has led to what amounts to “illegal” dumping of these materials, and illustrates an immediate need for specialized receiving facilities on a regional basis.
- ⇒ A number of haulers indicated they have recently, or plan to leave the domestic septage hauling industry due to a cost-benefit analysis and/or the cost involved with cleaning trucks that have been used for oilfield work before they can be used for domestic septage
- ⇒ Haulers that maintain environmentally sound practices have trouble competing with those who are suspected of engaging in illegal dumping, cutting corners, or who have their own land for disposal of septage
- ⇒ Haulers are very concerned with the lack of understanding amongst homeowners of the maintenance and service requirements of their septic systems

ON CERTIFICATION AND TRAINING

- ⇒ The majority of treatment facility operators would support a certification and training initiative for the hauling industry. A majority of haulers who responded to project surveys support certification and training as well (although small or part-time operators are clearly opposed to certification and training). This initiative alone should improve hauler access to facilities and trigger enhanced access at many facilities who do not currently allow outside access to their facility due to fears about lack of hauler training, mixed loads and inappropriate dumping practices.
- ⇒ Engaging the hauling industry and recommending certification and training for septage haulers is a delicate situation that will require further discussion and a strategic implementation plan that takes into account the needs of both small and large operators, those working in high density situations and those serving remote, sparsely populated areas
- ⇒ The most successful model for certification and training in other jurisdictions involves a partnership approach between government (who sets the legislative/regulatory framework) and industry (who act as advisors on legislative matters and leaders on education/certification initiatives)

ON LAND/SURFACE SPREADING

- ⇒ Surface spreading is practiced to some degree in virtually every area of the province
- ⇒ Relatively few haulers are aware of Alberta Environment’s LOA’s or the proposed moratorium on land spreading contained in the SMAC report
- ⇒ The feasibility of placing a moratorium on land spreading is largely dependent on resolving current capacity and access issues at facilities

RECOMMENDATIONS

FACILITIES

1. That all municipal septage receiving facilities approved by Alberta Environment in the future be required to include adequate vehicle and dumping access as part of their design.
2. That the provincial (Alberta Infrastructure and Transportation) water/wastewater funding program be expanded to include an infrastructure funding component municipalities could access to provide vehicle and dumping access to those existing wastewater treatment facilities and lagoons that currently have no access or no dumping facilities.
3. That immediate steps need to be taken to increase the provincial Water/Wastewater Infrastructure Program funding to address the backlog of municipal wastewater treatment capacity and upgrade needs.
4. That development of regional wastewater treatment systems be explored and provincially funded where supported by a cost-benefit analysis in areas where development, growth and population forecasts warrant (Urban fringe areas, Highway #2 corridor, etc.)
5. That wastewater capital funding for proposed regional systems in high development areas (ie. the Highway #2 corridor) either be accelerated to meet current growth-related needs OR additional funding be provided for expansion and retrofitting of those facilities currently at or near capacity and facing a multi-year wait for hook-up to a regional system.
6. That a capital planning and investment strategy to address the demand/need for additional dumping/treatment facilities that accept graywater, muddy water, and wastewater streams with silt and sand content be immediately undertaken.

HAULERS

7. That a strategy to minimize the cost of any future certification and training protocols or other regulatory requirements for the hauling industry be undertaken in cooperation with the hauling industry and the AOWMA.
8. That industry-led research to develop options for increasing the viability of the domestic septage hauling business in Alberta and to further explore mechanisms to make emerging technology more affordable for operators be undertaken.

CERTIFICATION AND TRAINING

9. That a provincial legislative/regulatory framework and provincial budget resources to support the launch of an industry/government training and certification initiative for the septage hauling industry be developed and implemented
10. That an education and certification program be developed for septage haulers as a joint initiative of the Alberta Onsite Waste Management Association and Alberta Municipal Affairs (similar to the model used to develop education modules for certified installers in Alberta).

LAND-SPREADING

11. Before any moratorium is placed on the land-spreading of septage, steps be taken to ensure existing and future septage treatment facilities are available to septage haulers and there is adequate capacity for septage to be properly disposed of at approved facilities. This will require a multi-pronged approach that may include:
- Capital investment to improve dumping access at existing facilities
 - Increasing facility access hours through enhanced access controls
 - Certification and training of septage haulers
 - Better testing and monitoring technology (both truck and facility-based)
 - Establishing a chain of custody for domestic waste that includes knowledge of where the septage is generated, the generator, the hauler and the receiver (ie. Increased use of manifests for tracking the origins of hauled septage)
 - A public education campaign (co-ordinated among stakeholders)

RESEARCH AND DEVELOPMENT

12. That additional research be provincially funded to further explore truck-based septage treatment that is affordable and applicable to Alberta's situation and climate. (ie. lime stabilization, UV disinfection, mobile de-watering etc.)

GENERAL

13. That the septage hauling industry be actively targeted for membership in the Alberta Onsite Wastewater Management Association (AOWMA). (Being part of an industry association would provide a "voice" for the septage hauling industry, create enhanced networking opportunities for haulers, create a forum for developing industry-led best practices and for delivering education modules that may be developed.)
14. That additional study be undertaken on effective government/municipal programs, protocols and mechanisms for monitoring private sewage systems, sludge accumulation and cleaning/pumping cycles to guard against system failure and malfunctions.
15. That a public education program be developed by government and industry targeted at homeowners and the general public and focused on system operation, maintenance, and each individual's responsibility for the waste they generate.