

Temporary Onsite Wastewater Treatment Systems at Work Camps

Guidance Document

Due to the temporary nature of the work camp industry it is difficult to apply the Alberta Private Sewage Standard of Practice (SOP) to this specialized industry. Alberta Municipal Affairs (AMA) has constructed a guidance document that will clarify existing and new requirements for the sewage treatment and disposal systems in the work camp industry. This Guidance Document applies to daily volumes of less than 25 m³ (5500 Imp. Gal). Greater volumes (more than 25 m³) fall under the jurisdiction of Alberta Environment and Parks. This policy will be applied to the existing work camp variance holders, new variance applications, and Quality Management Plans (QMP). These policies will ensure that consistent requirements are maintained and enforced throughout the work camp industry.

Table of Content

Part 1 Scope.....	4
Part 2 Definitions and Clarifications	6
Part 3 Temporary Field Authorization (TFA).....	10
Part 4 Variance from Alberta Municipal Affairs.....	11
Part 5 Quality Management Plan.....	13
Part 6 Permitting (Registration).....	14
Part 7 Site Evaluation.....	16
Part 8 Soils.....	17
Part 9 Influent Wastewater Quality.....	18
9.1 High Strength Wastewater Considerations.....	18
9.2 Commercial Kitchen.....	18
9.3 Industrial Wastewater.....	18
Part 10 Effluent Quality /Sampling.....	19
Part 11 Pooling of Effluent.....	20
Part 12 Site Remediation.....	21
Part 13 System Design.....	22
13.1 Wastewater volume.....	22
13.2 Duration.....	23
13.3 Effluent Quality.....	24
Part 14 Types of Soil Treatment Systems.....	30
14.1 Open Discharge.....	30
14.2 Enhanced Open Discharge.....	31
14.3 Earthen Privy.....	32
Part 15 System Components.....	34
15.1 Piping.....	34
15.2 Lift station tanks.....	35
15.3 Holding tanks.....	36
15.4 Wastewater treatment plants.....	37
15.5 Disinfection.....	39
Part 16 Assessment and Reporting.....	40
16.1 Site Inspection.....	40
16.2 Annual Report.....	41
16.3 Records Submission for Annual Report.....	41
16.4 Records Inventory.....	42
Part 17 Offences Under the Safety Codes Act.....	43
Part 18 Cancellation of Variance or QMP.....	44

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Part 1 Scope

The intent of this guidance document is to establish requirements for the design, installation, site selection, performance objectives, requirements for materials and equipment of the temporary onsite wastewater treatment system designs regarding the:

- initial treatment of wastewater,
- final treatment of wastewater in soil,
- containment of wastewater and treated effluent,
- risk of contact with wastewater or treated effluent,
- operational control of a system, and
- structural adequacy of a system,

That will result in a temporary on-site wastewater treatment system that reduces the risk to public health and the natural environment to a level that is deemed acceptable.

This guidance document includes specific requirements for on-site wastewater treatment systems that fall within the following broad categories:

- systems serving temporary work sites and work camps that generate up to 25 m³ (5500 Imp. gal.) per day of wastewater volume.
- the wastewater is of a strength greater than typical wastewater,
- where treatment objectives require a disinfection or nutrient reduction component in the treatment train,

All private sewage undertakings at work camps or work sites shall have:

- Permission from the land owner – on crown land a Temporary Field Authorization or Disposition shall be obtained by the lease holder
- Certified Equipment - equipment variance from Alberta Municipal Affairs
- Certified Private Sewage Installer – to oversee the installation of the equipment
- Private Sewage Permit – obtained from the municipality or Authority Having Jurisdiction (Alberta Safety Codes Authority)

This guidance document sets out specific requirements for temporary:

- lift stations
- holding tanks
- wastewater treatment plants,
- open discharge systems
- enhanced open discharge systems
- earthen privy (limited access work camp)

This guidance document does not apply to:

- permanent residential onsite wastewater systems
- permanent commercial onsite wastewater systems
- wastewater lagoons
- privies (with holding tanks)
- certified recreation vehicles (mobile trailers)

The use of open trenches, open sumps or open pits of sewage is not an acceptable practice for the disposal of wastewater.

This Guidance Document does not provide or imply any assurance or guarantee about the life expectancy, durability, operating performance, or workmanship of the equipment, materials, or undertaking.

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Part 2 Definitions and Clarifications

Administrator - an Administrator appointed pursuant to Section 14 of the Safety Codes Act and as appointed by the Minister of Alberta Municipal Affairs as lead for the private sewage discipline.

Building - any structure used or intended for supporting or sheltering any use or occupancy that is subject to the Alberta Building Code requirements.

Carbonaceous biochemical oxygen demand (cBOD₅) - the amount of oxygen (expressed as mg/L) utilized by micro-organisms in the non-nitrogenous oxidation of organic matter in wastewater during a 5-day period at a temperature of 20°C (68°F). This measure is typically used for effluent samples.

Certified recreation vehicle – also referred to as a mobile trailer or camping trailer, certified recreation vehicles have integral factory installed tanks for potable water and sewage. Certified recreation vehicles are assembled in a factory and evaluated to the CSA Z 240 Standard. A certified recreation vehicle is not required to meet the requirements of this document unless it discharges the sewage from the integral factory tanks into a separate holding tank or onsite treatment system at the work camp or work site.

Chamber treatment system - a system of effluent dispersal and treatment using preformed structures to provide a void space for storage and movement of effluent, and an interface with the exposed infiltrative surface of the soil.

Commercial kitchen – a restaurant type kitchen that serves food to the public or workers (staff or employees). Commercial kitchens typically require a Food Permit from Alberta Health Services.

Dwelling or Dwelling unit - a suite operated as a housekeeping unit that is used or intended to be used as a domicile by one or more persons and usually contains cooking, eating, living, sleeping, and sanitary facilities.

Earthen privy – a system used to dispose of human waste with a covered excavated pit. An Earthen Privy shall only be used at work camp with written authorization from the Private Sewage Administrator. An Earthen Privy shall only be used at work camps that not accessible by road (example: fly in camps)

Effluent - the liquid discharged from any temporary wastewater treatment system component.

Enhanced open discharge system - a system designed to disperse secondary treated effluent over a larger ground surface to accomplish evaporation and absorption of the effluent into the soil as a method of treatment. This system uses pressure distribution in a lateral pipe system that are placed on the undisturbed ground surface. This system uses a chamber type system with wood chips or other suitable material to cover the infiltration chambers to prevent freezing and environmental health exposure to the treated sewage.

High strength wastewater – the raw influent wastewater from a work camp that is projected or measured to be greater than the following values:

- cBOD₅ of 220 mg/L,
- TSS of 220 mg/L, and
- oil and grease content of 50 mg/L

Holding tank - is designed to retain wastewater or effluent until transferred into mobile equipment for treatment offsite. Holding tanks need to meet or exceed CSA B66 standards. A variance or QMP from Alberta Municipal Affairs is required to operate and maintain sewage holding tanks in Alberta.

Lift station – a tank and pump assembly used for the prime purpose of lifting sewage to higher elevation and discharging it into other parts of the temporary onsite wastewater treatment system. A lift station is used to gather and transfer sewage to a larger containment tank or treatment system.

Open discharge system - a system designed to discharge secondary treated effluent to a single point location. The effluent will be discharged to the ground surface to accomplish evaporation and absorption of the effluent into the soil as a method of treatment. An open discharge system shall be designed to minimize the pooling of effluent and minimize erosion on the ground surface.

Organic loading - the total mass loading per unit of area per unit of time based on the cBOD₅ concentration in the effluent, multiplied by the volume of effluent applied over a given time e.g., grams of cBOD₅/m²/day. Organic loading can be calculated with the following equation:

- $[(\text{Peak flow} \times \text{cBOD}_5 / (\text{lateral length} \times \text{chamber width}))] = \text{mg/m}^2/\text{day}$

*Note divide mg/m²/day by 1000 to convert to grams/m²/day

* See Part 13 for examples

Permit – A private sewage permit (registration) is required from the municipality, certifying body or an accredited agency for a private sewage disposal system undertaking. The permit (registration) is required to ensure the installation of the system is done to the requirements of this document. The permit (registration) is also required for tracking the use of the sewage systems for future development. Authorization or permission to discharge wastewater must be obtained from the landowner. On crown land, the lease holder must obtain authorization or permission from Alberta Environment and Parks, Alberta Agriculture and Forestry or Alberta Energy Regulator. Authorization shall be obtained prior to utilizing any of the methods outlined in this document for wastewater management.

Pooling (ponding) of effluent – sewage that has been pumped to the soil based treatment area and is unable to absorb into the ground surface. This is an indication that the soil is saturated and is unable to absorb the treated effluent at the rate that is being applied to the soil surface. If pooling (ponding) of effluent is taking place, the treatment field may need to be increased in lateral length or the soil may not be suitable for a soil treatment system. If the latter, than a sewage holding tank shall be used to avoid the pooling (ponding) of effluent. A soil based treatment system should also be avoided in an area where there is no slope to the land. A site with a zero slope increases the risk of pooling of effluent.

Private Sewage Installer - a person who holds a valid private sewage installer certificate of competency issued pursuant to the Safety Codes Act.

Professional engineer – a professional engineer registered in Alberta, as defined in the Engineering and Geoscience Professions Act.

Quality Management Plan (QMP) - A Quality Management Plan is a document in which an organization commits to the components and details outlined in the plan. The QMP shall also outline the safety policies, standards and the process for ensuring compliance.

Registration – An application for a private sewage installation at a work camp or work site. The registration application shall be submitted to a certifying body that is deemed acceptable by the Private Sewage Administrator.

Secondary Treated Effluent –effluent that has been treated through a sedimentation and biological process to remove dissolved and suspended organic matter. The effluent shall meet (at least 80% of the time) the effluent quality parameters set out in Table 4,5,6,7 and 8 (of this document) for secondary treated effluent.

Sewage - the composite of liquid and water carried wastes associated with the use of water for drinking, food preparation, washing, hygiene, sanitation or other domestic purposes, but does not include wastewater from industrial processes.

Shutdown or Rigout – The event when a sewage treatment or containment system is taken out of service and disconnects from the plumbing system of a temporary work camp.

Soil - a naturally occurring, unconsolidated mineral or organic material at the earth's surface that is capable of supporting plant growth. Its properties usually vary with depth and are determined by climatic factors and organisms, as conditioned by relief and hence water regime, acting on geologic materials and producing genetic horizons that differ from the parent material.

Soil-based treatment system - is the physical location where the dispersal of effluent to the soil and final treatment of the effluent occurs in the soil.

Start up or Rig up – The event when a sewage treatment or containment system is put into service and connects to the plumbing system of a temporary work camp.

Temporary wastewater treatment plant - is a portable (relocatable) structure intended to provide secondary (or greater) treatment to the high strength wastewater created from a work camp. High strength wastewater is generated from the commercial type kitchen and due to the concentrated sewage from high efficiency fixtures. In addition, the wastewater has additional peak flows that are generated from the 24 hour operations in most work camp situations. The system must be designed and installed in a manner that does not present a risk to public health and does not cause degradation to the environment.

Temporary work camp - is a short term dwelling for commercial or industrial workers that consist of relocatable structures that are designed to be frequently moved

Total Suspended Solids (TSS) - the dispersed particulate matter in a wastewater sample that may be retained by a filter medium. Suspended solids may include both settleable and unsetttable solids of both inorganic and organic origin. This parameter is widely used to monitor the performance of the various stages of wastewater treatment, and is often used in conjunction with BOD₅ and cBOD₅ to describe wastewater strength.

Vac-out – the occurrence of removing the contents of a sewage treatment or containment system with a vacuum truck (tank truck) and disposing of the contents at an approved offsite treatment facility.

Variance – is a written document that allows an alternate solution from the Alberta Private Sewage System Standard of Practice. The deviation must be able to provide an equivalent or greater amount of safety and performance to the original standard or code item. A variance or QMP from Alberta Municipal Affairs is required to operate uncertified temporary wastewater treatment systems and uncertified sewage holding tanks at temporary work sites and work camps. Wastewater treatment systems and sewage holding tank systems shall have separate variances or QMPs for the installation, maintenance, monitoring and use of temporary wastewater systems. These separate variances and QMPs shall be reported separately to Alberta Municipal Affairs on a monthly or annually basis.

Wastewater - the composite of liquid and water-carried wastes associated with the use of water for drinking, cooking, cleaning, washing, hygiene, sanitation, or other domestic purposes; includes greywater but does not include liquid waste from industrial processes.

Water course (may be any of the following):

- a river, stream, creek, or lake,
- swamp, marsh, or other natural body of water,
- a canal, reservoir, or other man-made surface feature intended to contain water for a specified use, whether it contains or conveys water continuously or intermittently, but does not include surface water run-off drainage ditches, such as those found at the side of roads, or
- an area that water flows through or stands in long enough to establish a definable change in or absence of vegetation.

Water source - a man-made or natural source of potable water.

Worksite - the location where a worker is or likely to be engaged in any occupation. For the purpose of this document a worksite would also include the temporary shelter or building which generates sewage from the workers onsite.

Part 3 Temporary Field Authorization (TFA) or Disposition

Authorization or permission for the use of a wastewater management or disposal system must be obtained from the landowner.

On crown land, a Temporary Field Authorization (TFA) or Disposition shall be obtained by the lease holder prior to utilizing any of the methods outlined in this document for wastewater management. A TFA or a Disposition can be obtained from:

- Alberta Environment and Parks
- Alberta Agriculture and Forestry
- Alberta Energy Regulator

Alberta Municipal Affairs and Alberta Environment and Parks share the responsibility of regulating wastewater management at work camps. The onsite disposal methods outlined in this document applies to sewage volumes of 25 m³ (5500 Imp. gal.) of sewage per day or less under a private sewage permit or registration. Greater volumes are under the jurisdiction of Alberta Environment and Parks under an EPEA approval.

Note: A private sewage permit or registration (Part 6) is also required for all wastewater management or disposal systems.

As a condition/requirement of a Temporary Field Authorization or Disposition, this guidance document shall outline the minimum requirements of the wastewater management at a temporary work site or work camp.

Failure to meet the conditions stipulated in the TFA or disposition and/or the requirements of this Guidance Document for the wastewater management at the temporary work site or work camp will result in the cancelation of the variance and/or QMP from Alberta Municipal Affairs. The cancelation of the variance and/or QMP will be reported to the leasing authority and/or municipality that the required wastewater approvals have been revoked and the work camp or work site is no longer in compliance with the legislative requirements.

Part 4 Variance from Alberta Municipal Affairs

An approved variance from Alberta Municipal Affairs is required when the wastewater equipment does not meet the standards noted in the Alberta Private Sewage Standard of Practice.

The equipment variance for wastewater treatment systems and holding tanks shall meet the intent of the NSF 40 or BNQ (WWTP) and/or CSA B66 (holding tanks).

The following are some of the conditions that demonstrate why a variance is required for the wastewater treatment plant system:

- Separation distances are unable to meet the requirement of the Alberta Private Sewage Standard of Practice
- High strength wastewater requires an advanced treatment system
- Treatment systems are temporary and designed to be relocated frequently
- Equipment and piping is above ground and required to be installed with protection from freezing
- Discharge into the environment can be achieved through an enhanced open discharge soil based treatment
- NSF 40 certification requirement on the treatment plant is not possible
- Structural integrity of the relocatable infrastructure needs to be verified by a professional engineer
- Maintenance procedures need to be reviewed to minimize failures in the system
- Validation of the treatment plant process and potential effluent quality needs to be conducted by a professional engineer

The following are some of the conditions that demonstrate why a variance is required for sewage holding tanks systems:

- Separation distances are unable to meet the requirement of the Alberta Private Sewage Standard of Practice
- Containment systems are temporary and designed to be relocated frequently
- Equipment and piping is above ground and required to be installed with protection from freezing
- Maintenance procedures need to be reviewed to minimize failures in the system
- Validation of the structural integrity of the relocatable infrastructure structure needs to be verified by an professional engineer
- An engineer has assessed, reviewed and provided a report that the tanks meet the intent of the CSA B66 standard and are structurally sound during above ground operation

The variance for the temporary work camp provider will expire after a one-year period. The expiry date will be provided when the company initially receives the variance or receives the renewed variance with a new variance number.

The variance renewal request shall be submitted one month prior to the variance expiry date.

The equipment variance is issued to a specified company or organization and is not transferable between companies or organizations. The sale and purchase of equipment shall be tracked and include engineering documentation in the sale of the equipment. The purchased equipment (wastewater treatment plants and holding tanks) will need to be registered and added to an existing variance before the equipment can be operated at a work camp or work site.

Alberta Municipal Affairs shall maintain a list of companies and organizations that have an approved variance to operate at temporary holding tank and wastewater treatment systems at work camps. The list of approved variance holders will be posted on the Alberta Municipal Affairs website.

<http://www.municipalaffairs.alberta.ca/>

Part 5 Quality Management Plan

A Quality Management Plan is a document in which an organization commits to the components and details outlined in the plan. The QMP shall also outline the ongoing compliance monitoring, annual reporting, safety policies, standards and the process for ensuring compliance. A QMP will outline the responsibilities of the company or organization for the wastewater treatment systems and sewage holding tank systems.

A Quality Management Plan shall consist of the following:

- a statement committing senior management to the plan
- an organization chart outlining operational structures and reporting responsibilities
- performance expectations of the systems
- procedures for sampling and reporting of results
- process for tracking of private sewage disposal undertakings
- procedures for incidents that cause non-compliant operation
- a strategy for compliance monitoring
- a strategy to ensure the risk to public health and the natural environment is acceptable
- procedures for installation, maintenance, monitoring, and decommissioning of the wastewater systems

An approved Quality Management Plan (QMP) from Alberta Municipal Affairs is required in order to manage a temporary wastewater treatment systems and sewage holding tanks in the province of Alberta. The QMP applies to all wastewater treatment, sewage disposal systems and sewage storage systems at work camps and shall be developed and submitted to Municipal Affairs by one of the following:

- Work camp operating company,
- Wastewater system rental company
- Contracted wastewater system operator/company
- Private sewage installer

Annually, a report will be generated and submitted to Alberta Municipal Affairs for renewal of the QMP.
(See Part 16)

A Quality Management Plan shall be developed for both a temporary and permanent work camp.

Part 6 Permitting (Registration)

A Private Sewage permit (registration) is required for each individual location and private sewage undertaking.

A valid Alberta Private Sewage Installers Certificate of Competency number and a work camp variance or QMP that has been issued by Alberta Municipal Affairs is required to obtain a Temporary Private Sewage permit or registration.

The permit application or registration application shall include the type of soil based treatment method, treatment plant information, site drawing, site evaluation, soil analysis (if required), directions to the location, contact information, and any other information deemed necessary by the permitting authority.

A private sewage permit application shall be submitted to:

- the accredited municipality, or
- the Alberta Safety Codes Authority (ASCA), which manages the permitting agencies in the non-accredited municipalities, or
- an accredited agency that is under the management of ASCA, or
- an accredited organization that is approved by Municipal Affairs, or
- an agency deemed acceptable to the technical administrator of private sewage.

Note: Contact Alberta Municipal Affairs if you are unsure of how to obtain a private sewage permit (registration) or if require further information.

A temporary work camp permit or registration shall have a maximum duration of 12 months and expire after 12 months from the issue date. If the duration of the temporary work camp is longer than one year, a new permit or registration must be obtained and the soil treatment area (discharge location) shall be relocated to a new location at a minimum of 15 meters (50 feet) away from the initial soil treatment area.

If a treatment plant or holding tank is present on one location for more than a 9-month period, the variance or QMP holder shall notify Alberta Municipal Affairs of the upcoming expiry of the permit or registration by the variance (QMP) holder. The location of the temporary private sewage system may be subject to a site inspection by Alberta Municipal Affairs or the designated authority to assess the site conditions.

A permit or registration extension may be granted by Alberta Municipal Affairs to allow a transition period to a permanent approval from Alberta Environment (greater than 25 m³) if the camp is expanded over the course of the year.

There shall be a minimum of 12 months of inactivity (no discharge of sewage effluent) on an effluent disposal area before a location may qualify for a new temporary private sewage permit or registration. During this time period the soil shall have time to rejuvenate to initial soil conditions.

Note: Duration indicates how long a camp has occupied the same lease location and this may not be consecutive months

The permit application or registration application shall be posted onsite in a visible indoor common area within 2 weeks of the start-up date.

The approved permit or registration document shall be posted onsite in a visible indoor common area within 2 weeks of receiving the approved permit or registration from the permitting authority.

A company or organization may apply for a “Self-Tracking” of permits through Alberta Municipal Affairs which will allow them to create a permit for short term sites. In order to qualify for Self-permitting, a Quality Management Plan (QMP) will need to be generated by the applicant and in turn accepted by Alberta Municipal Affairs. Once an approved QMP is established and approved the following criteria is required for a work camp or worksite to qualify for self-tracking.

- Camp duration is less than 45 days
- The camp must be in a non-accredited municipality
- 10 % of the sites per year will need to be permitted through an accredited permitting agency (ASCA)
- Peak daily effluent volume is less than 1250 gals (5.7m³) per day

Part 7 Site Evaluation

A site evaluation shall be completed for all work camp locations. The site evaluation shall evaluate and note the:

Topography, landscape position of the system, vegetation, and surface drainage characteristics:

- the slope gradient and aspect of each landscape element shall be determined for each potential treatment site investigated
- any vegetation type that favours wet or saturated soils shall be identified using its popular name, if known, and have its location identified in relation to the proposed system
- any vegetation that will impact the selection of the location of the treatment system, or will require removal prior to construction of the treatment system, shall be noted
- swales, depressions, and other drainage features that may impact system selection and design shall be located and described

Surface waters and other natural features:

- surface waters, including permanent or intermittent streams, lakes, wetlands, and other surface water within 100 m (330 ft.) of the proposed system, shall be located and described
- any other natural features that could impact the application and/or design of a treatment system shall be located and described

An available area for construction of the on-site wastewater treatment system shall be determined considering relevant horizontal separation distances from features on the property or adjacent properties that may be required by this document and include:

- private water sources, water wells, or municipal-licensed water supply wells
- buildings or other property improvements including temporary buildings or dwellings
- property boundaries
- surface waters and floodplains
- right-of-ways and easements

Soil investigation shall be completed for all work camp sites (see Part 8)

The location of the effluent soil disposal system shall preferably be within a treed area.

Part 8 Soils

Soil Investigation

Duration of less than 6 months and /or Peak Volume is less than 5.7 m³ (1250 Imp. Gals.)

The following techniques can be used for soil identification:

- Hand texturing may be used to identify soil type for each site (soil can not be frozen)
- Soils mapping (AGRISID) may be used in winter months to identify a soils type for each location
- Historical or baseline lease assessment data may be used to help identify soils for each location in winter months
- A soil sample does not require textural analysis at an accredited laboratory if the duration of the temporary work camp is less than 6 months

Duration is greater than 6 months and/or Peak Volume is greater than 5.7 m³ (1250 Imp. gals.)

Soil profiles shall be investigated as described in the Alberta Private Sewage Standard of Practice with the following exceptions:

- a soil sample shall be analysed for texture by an accredited laboratory from the limiting layer of a 900 mm (3 feet) core soil sample or 900 mm (3 feet) soil test pit
- A soil sample is not required if the volume of effluent is less than 5.7 m³ (1250 Imp. gals.) per day
- The sample can be taken at any time during the first 6 months of operation of the work camp. (from November 1 to March 31 a soil sample is not required, if soil is frozen)
- A bore auger test (core sampler) may be used to collect a soil sample.
- The sample will be analyzed at an accredited laboratory for texture and the results shall be reported to Alberta Municipal Affairs (or by someone the administrator deems acceptable) during the annual variance renewal.(see Part 16.2)

An open discharge shall not be used on soils that have a soil texture classification of coarse sand, medium sand, fine sand, loamy medium sand, loamy coarse sand, within 900 mm (3 feet) of the ground surface. The soil must also provide a vertical separation to saturated soils or groundwater of at least 900 mm (3 feet).

An Enhanced open discharge with an effluent quality of Level 1, 2 (see Table 4 and 5 in Part 13) shall not be used on soils that have a soil texture classification of coarse sand, medium sand, fine sand, loamy medium sand, loamy coarse sand, within 900mm (3 feet) of the ground surface. The soil must also provide a vertical separation to the water table or saturated soils of at least 900mm (3 feet) shall be maintained.

An Enhanced open discharge with an effluent quality of Level 3 or 4 () (see Table 6 and 7 in Part 13) does not have a restriction for soil texture however, a vertical separation to the water table or saturated soils of at least 900mm (3 feet) shall be maintained in order to minimize effluent ponding.

Part 9 Influent Wastewater Quality

Wastewater Influent strength for work camps shall have minimum projected values of:

- 600 mg/L cBOD₅
- 400 mg/L TSS
- 200 mg/L Oil and Grease

Note: The above projected values are to be used as an average value for designing a wastewater treatment system.

A deviation from the above values will need to be verified using supporting data to validate the claim for a reduced volume or strength of wastewater in the design. The supporting data shall be submitted for approval to Alberta Municipal Affairs, the municipality or to an agency having permitting jurisdiction over the land area.

9.1 High Strength Wastewater Considerations

- Wastewater influent strength values (above) are for design purposes. A higher concentration of wastewater may be present on certain locations. The design of the wastewater system shall reflect the higher concentration of wastewater and supporting data shall be provided.
- The commercial kitchen at a work camp location produces a high strength wastewater that requires additional treatment with an advanced treatment system before it can be dispersed over an area of soil.
- A grease interceptor (grease trap) that is designed and maintained for the expected flow rate may also be required if a commercial kitchen is present.
- High efficiency water fixtures and water conservation due to the limited availability of potable water, contribute to the high strength influent at a work camp location.

9.2 Commercial Kitchen

An open discharge system shall **not** be used if a commercial kitchen discharges wastewater into the treatment unit. An enhanced open discharge shall be used if a commercial kitchen discharges wastewater into the treatment unit. A commercial kitchen produces a high strength wastewater that will need to be dispersed over a greater area of soil.

9.3 Industrial Wastewater

Industrial wastewater and industrial waste shall not be added or pumped into the wastewater system. The industrial wastewater contains contaminants that could have a negative effect on the biological activity in the wastewater treatment plant system and the natural environment.

Part 10 Effluent Quality /Sampling

The effluent quality of the temporary treatment plant shall determine the system performance. The effluent quality of the treatment plant shall also determine the options for the final soil treatment (See Part 13 and 14).

Routine sampling of the wastewater treatment plant effluent will be performed at each location at an interval of:

Daily wastewater volume	Sample interval
0 to 9 m ³	14 days (plus or minus 5 days)
9.1m ³ to 25m ³	10 days (plus or minus 4 days)

At least one compliant sample must be taken at each site from the treatment plant effluent regardless of the short term duration.

A grab sample of the influent wastewater may be required to demonstrate the efficiency of the treatment process, as it compares to the final effluent quality.

Effluent samples shall be obtained at a sampling port location between the final wastewater treatment plant component and the soil based treatment.

Nutrient concentrations levels in the wastewater effluent shall be sampled and analysed for effluent volumes greater than 9m³ (2000 Imp. gals). The effluent samples shall be analysed for:

- Total phosphorus (TP)
 - Nitrogen ((Total)
- *see Table 4, 5, 6 and 7 for nutrient quality levels

All testing and analysis that is to be reported from Table 4, 5, 6, 7and 8 shall be performed at an accredited laboratory (except Chlorine). Chlorine analysis must be performed onsite as a field assessment due to the short hold time. Additional field assessments and analysis may be performed for operational control purposes.

Effluent quality that exceeds the requirements of Table 4, 5, 6, 7and 8 must be corrected within 5 days of receiving the sample results from an accredited laboratory. Commercial laboratory results must demonstrate that performance targets have been achieved. Municipal Affairs will be notified within 14 days if the issue remains in non-compliance.

Equipment failures that cause non compliant operation must be corrected within 5 days of becoming aware of the failure. Municipal Affairs will be notified within 14 days if the issue remains in non-compliance.

Effluent quality shall meet or exceed the values of Tables 4, 5, 6, 7and 8 at least 80 % of the time.

Part 11 Pooling of Effluent

The pooling or ponding of effluent in the soil treatment area is an indication that the soil based treatment system is not operating properly. The soil is not able to treat the volume of effluent at the hydraulic loading rate that is being discharged to the soil infiltration surface.

When pooling of effluent occurs, the placement of the soil treatment system will need to be relocated to an alternate location on the site with additional lateral length added to the original design. Increasing the lateral length will expand the soil infiltration surface area and must be done to address any ponding concerns. A soil sample will need to be collected in order to better assess the sizing requirements of the end soil treatment area.

If the pooling continues in the alternate area, a holding tank system will need to be operated to contain the wastewater on the site to avoid any health and environmental concerns.

Alberta Municipal Affairs will be notified within 2 days of a pooling (ponding) event in the discharge area. A remedial plan will be provided to Alberta Municipal Affairs that outlines the corrective actions that will be performed to address the issue. If the remedial action does not appear to address the concern to the satisfaction of Alberta Municipal Affairs, then a site visit by Alberta Municipal Affairs may be undertaken.

Part 12 **Site Remediation**

Site remediation shall include the removal of all infrastructure from the temporary work camp location. This shall include the removal of the treatment plant, system chambers, lift stations and wastewater conveyance piping. Wood chip or mulch that has been used to cover infiltration chambers shall be spread so the depth of un-compacted wood chips is less than 6 inches at time of spreading.

Untreated wastewater and sludge shall be properly removed (vac-out) from site and disposed of at an approved offsite treatment facility.

The location shall be decommissioned to a condition that does not pose a risk to public health or the natural environment.

Additional remediation requirements may be added to meet reclamation requirements outlined by Alberta Environment or local authorities. These are the minimum site remediation expectations for Alberta Municipal Affairs area of approval.

Part 13 **System Design**

There are three parameters that will impact the system design considerations and selection of the appropriate system.

- Wastewater volume peak daily volume
- Duration of the work camp
- Effluent Quality (organic loading to soil)

The size of the soil treatment component is impacted by the peak daily volume and the effluent quality that the treatment plant technology is capable of achieving.

13.1 Wastewater Volume

The peak occupancy of the temporary work camp shall be used to calculate the peak daily volume that will determine the size of the drainage system that will be used on each site location.

Peak Daily Volume

The volume of effluent used to calculate the discharge volume of a camp shall be calculated at:

227 litres (50 Imp. gals.) per day per bed

OR

227 litres (50 Imp. gals.) per day per person
(Whichever value is greater)

Example: 20 beds = 1000 Imp. Gal (4540 litres)

The volume shall be calculated using the greater value of either the number of beds or the number of permanent (constant) staff on the site.

The work camp or work site may have occasional staff that use the facilities at a location. These volumes are highly unpredictable and reductions or increases in peak daily flow volumes generated by occasional staff may be taken into consideration when calculating peak daily flow. Justification shall be provided of how these variable flows have been addressed in the design.

If the peak daily volume is less than 3 m³/day (660 Imp. gals.) per day, an open discharge treatment system may be employed as a soil based treatment, if the soil conditions allow this type of system (see Part 14.1).

13.2 Duration

Less than 45 days

If the duration of work camp or work site is expected to be less than 45 days, an open discharge treatment system may be employed as a soil based treatment (see Part 14.1).

Note: Peak daily flow also needs to be less than 660 Imp. Gal /day to utilize an open discharge system.

More than 45 days

If the duration of work camp or work site is expected to be more than 45 days, an enhanced open discharge treatment system may be employed as a soil based treatment, if the soil conditions allow this type of system (see Part 14.2).

13.3 Effluent Quality

Organic Loading of Effluent

The various treatment plant technologies that exist in the work camp industry offer a range of effluent quality. The effluent quality (also known as the cBOD₅ concentration) delivers an organic loading to the soil infiltration surface.

A treatment plant that has the ability to produce a better quality of effluent shall be permitted to construct a reduced size of soil treatment system. (See Tables 1 to 7). The effluent qualities listed in Tables 4, 5, 6, and 8 shall be achieved at least 80 % of the time for the corresponding size of the soil treatment system.

The effluent strength and organic loading rate shall not exceed the values for each level of treatment listed below:

- For Level 1 Treatment, the effluent organic loading to soil dispersal area shall not be greater than 6 grams of cBOD₅ per square meter per day based on peak daily flow volumes (with an effluent quality of less than 40 mg/L of cBOD₅).
- For Level 2 Treatment, the effluent organic loading to soil dispersal area shall not be greater than 5 grams of cBOD₅ per square meter per day based on peak daily flow volumes (with an effluent quality of less than 25 mg/L of cBOD₅).
- For Level 3 Treatment, the effluent organic loading to soil dispersal area shall not be greater than 4 grams of cBOD₅ per square meter per day based on peak daily flow volumes (with an effluent quality of less than 15 mg/L of cBOD₅).
- For Level 4 Treatment, the effluent organic loading to soil dispersal area shall not be greater than 3 grams of cBOD₅ per square meter per day based on peak daily flow volumes (with an effluent quality of less than 10 mg/L of cBOD₅).

Organic loading (grams/m₂/day) can be calculated with the following equation:

$$\text{Organic Loading} = \left(\frac{\text{Peak Flow} \times \text{Effluent Quality}}{\text{Lateral Length} \times \text{Chamber Width}} \right) \div 1000$$

Lateral Length (meters) can be calculated with the following equation:

$$\text{Lateral Length} = \left(\frac{\left(\frac{\text{Peak Flow} \times \text{Effluent Quality}}{\text{Chamber Width}} \right)}{\text{Organic Loading} \times 1000} \right)$$

Organic Loading Examples

Example # 1 - Solving for Organic Loading

Organic Loading (g) = ?

Peak Daily Flow (L) = 10000 litres (2200 Imp.gals)

Effluent Quality (mg/L) = 40 mg/L cBOD₅

Chamber Width (m) = 34 inches (0.86 m)

Lateral Length (m) = 80 meters

$$\text{Organic Loading} = \left(\frac{\text{Peak Flow} \times \text{Effluent Quality}}{\text{Lateral Length} \times \text{Chamber Width}} \right) \div 1000$$

$$\text{Organic Loading} = \left(\frac{10000 \times 40}{80 \times 0.86} \right) \div 1000$$

Organic Loading = 5.8 g/m₂/day

Example # 2 - Solving for Lateral length

Lateral Length (m) = ?

Peak Daily Flow (L) = 21000 litres (4620 Imp.gals)

Effluent Quality (mg/L) = 15 mg/L cBOD₅

Chamber Width (m) = 34 inches (0.86 m)

Organic Loading (g) = 4 g/m₂/day

$$\text{Lateral Length} = \left(\frac{\left(\frac{\text{Peak Flow} \times \text{Effluent Quality}}{\text{Chamber Width}} \right)}{\text{Organic Loading} \times 1000} \right)$$

$$\text{Lateral Length} = \left(\frac{\left(\frac{21000 \times 15}{0.86} \right)}{4 \times 1000} \right)$$

Lateral Length = 91.6 meters

Table # 1 - Sizing of Effluent Treatment System Using Organic Loading (Using a 18 inch Infiltrator Chamber)

Daily Effluent Volume		Less than 40 mg/l cBODs (Level 1) Organic load not to exceed 6 g/m ² /day		Less than 25 mg/l cBODs (Level 2) Organic load not to exceed 5 g/m ² /day		15 mg/l cBODs (Level 3) Organic load not to exceed 4 g/m ² /day		10 mg/l cBODs (Level 4) Organic load not to exceed 3 g/m ² /day	
Daily flow (m ³)	Daily flow (Imp. Gal)	Required Lateral Length (m)	Number of 20 meter laterals	Required Lateral Length (m)	Number of 20 meter laterals	Required Lateral Length (m)	Number of 20 meter laterals	Required Lateral Length (m)	Number of 20 meter laterals
1	220	16.4	1	12.3	1	9.2	1	8.2	1
2	440	32.8	2	24.6	2	18.5	1	16.4	1
3	660	49.2	3	36.9	2	27.7	2	24.6	2
4	880	65.6	4	49.2	3	36.9	2	32.8	2
5	1100	82.0	5	61.5	4	46.1	3	41.0	3
6	1320	98.4	5	73.8	2	55.4	3	49.2	3
7	1540	114.8	6	86.1	4	64.6	4	57.4	3
8	1760	131.2	7	98.4	5	73.8	4	65.6	4
9	1980	147.6	8	110.7	6	83.0	5	73.8	4
10	2200	164.0	9	123.0	7	92.3	5	82.0	5
11	2420	180.4	10	135.3	7	101.5	6	90.2	5
12	2640	196.9	10	147.6	8	110.7	6	98.4	5
13	2860	213.3	11	159.9	8	120.0	6	106.6	6
14	3080	229.7	12	172.2	9	129.2	7	114.8	6
15	3300	246.1	13	184.5	10	138.4	7	123.0	7
16	3520	262.5	14	196.9	10	147.6	8	131.2	7
17	3740	278.9	14	209.2	11	156.9	8	139.4	7
18	3960	295.3	15	221.5	12	166.1	9	147.6	8
19	4180	311.7	16	233.8	12	175.3	9	155.8	8
20	4400	328.1	17	246.1	13	184.5	10	164.0	9
21	4620	344.5	18	258.4	13	193.8	10	172.2	9
22	4840	360.9	19	270.7	14	203.0	11	180.4	10
23	5060	377.3	19	283.0	15	212.2	11	188.6	10
24	5280	393.7	20	295.3	15	221.5	12	196.9	10
25	5500	410.1	21	307.6	16	230.7	12	205.1	11

*Organic loading can be calculated with the following equation: [(Peak flow x cBODs) / (lateral length X chamber width)] = g/m²/day

*The above table used a chamber width of 16 inches (inside dimension)

* Example: A daily effluent volume of 5m³ (1100 Imp Gal) with less than 15 mg/L of cBODs would require 46.1 meters of laterals or three 20 meter laterals when using a 18 inch wide chamber

Table # 2 - Sizing of Effluent Treatment System Using Organic Loading (Using a 24 inch Infiltrator Chamber)

Daily Effluent Volume		Less than 40 mg/l cBODs (Level 1) Organic load not to exceed 6 g/m ² /day		Less than 25 mg/l cBODs (Level 2) Organic load not to exceed 5 g/m ² /day		15 mg/l cBODs (Level 3) Organic load not to exceed 4 g/m ² /day		10 mg/l cBODs (Level 4) Organic load not to exceed 3 g/m ² /day	
Daily flow (m ³)	Daily flow (Imp. Gal)	Required Lateral Length (m)	Number of 20 meter laterals	Required Lateral Length (m)	Number of 20 meter laterals	Required Lateral Length (m)	Number of 20 meter laterals	Required Lateral Length (m)	Number of 20 meter laterals
1	220	11.9	1	8.9	1	6.7	1	6.0	1
2	440	23.9	2	17.9	1	13.4	1	11.9	1
3	660	35.8	2	26.8	2	20.1	2	17.9	1
4	880	47.7	3	35.8	2	26.8	2	23.9	2
5	1100	59.7	3	44.7	3	33.6	2	29.8	2
6	1320	71.6	4	53.7	3	40.3	3	35.8	2
7	1540	83.5	5	62.6	4	47.0	3	41.8	3
8	1760	95.4	5	71.6	4	53.7	3	47.7	3
9	1980	107.4	6	80.5	5	60.4	4	53.7	3
10	2200	119.3	6	89.5	5	67.1	4	59.7	3
11	2420	131.2	7	98.4	5	73.8	4	65.6	4
12	2640	143.2	8	107.4	6	80.5	5	71.6	4
13	2860	155.1	8	116.3	6	87.2	5	77.5	4
14	3080	167.0	9	125.3	7	94.0	5	83.5	5
15	3300	179.0	9	134.2	7	100.7	6	89.5	5
16	3520	190.9	10	143.2	8	107.4	6	95.4	5
17	3740	202.8	11	152.1	8	114.1	6	101.4	6
18	3960	214.7	11	161.1	9	120.8	7	107.4	6
19	4180	226.7	12	170.0	9	127.5	7	113.3	6
20	4400	238.6	12	179.0	9	134.2	7	119.3	6
21	4620	250.5	13	187.9	10	140.9	8	125.3	7
22	4840	262.5	14	196.9	10	147.6	8	131.2	7
23	5060	274.4	14	205.8	11	154.3	8	137.2	7
24	5280	286.3	15	214.7	11	161.1	9	143.2	8
25	5500	298.3	15	223.7	12	167.8	9	149.1	8

*Organic loading can be calculated with the following equation: $[(\text{Peak flow} \times \text{cBOD}_5) / (\text{lateral length} \times \text{chamber width})] = \text{g/m}^2/\text{day}$

*The above table used a chamber width of 22 inches (inside dimension)

* Example: A daily effluent volume of 5m³ (1100 Imp Gal) with less than 15 mg/L of cBODs would require 33.6 meters of laterals or two 20 meter laterals when using a 24 inch wide chamber



Table # 3 - Sizing of Effluent Treatment System Using Organic Loading (Using a 36 inch Infiltrator Chamber)

Daily Effluent Volume		Less than 40 mg/l cBODs (Level 1) Organic load not to exceed 6 g/m ² /day		Less than 25 mg/l cBODs (Level 2) Organic load not to exceed 5 g/m ² /day		15 mg/l cBODs (Level 3) Organic load not to exceed 4 g/m ² /day		10 mg/l cBODs (Level 4) Organic load not to exceed 3 g/m ² /day	
Daily flow (m ³)	Daily flow (Imp. Gal)	Required Lateral Length (m)	Number of 20 meter laterals	Required Lateral Length (m)	Number of 20 meter laterals	Required Lateral Length (m)	Number of 20 meter laterals	Required Lateral Length (m)	Number of 20 meter laterals
1	220	7.7	1	5.8	1	4.3	1	3.9	1
2	440	15.4	1	11.6	1	8.7	1	7.7	1
3	660	23.2	2	17.4	1	13.0	1	11.6	1
4	880	30.9	2	23.2	2	17.4	1	15.4	1
5	1100	38.6	2	28.9	2	21.7	2	19.3	1
6	1320	46.3	3	34.7	2	26.1	2	23.2	2
7	1540	54.0	3	40.5	3	30.4	2	27.0	2
8	1760	61.8	4	46.3	3	34.7	2	30.9	2
9	1980	69.5	4	52.1	3	39.1	2	34.7	2
10	2200	77.2	4	57.9	3	43.4	3	38.6	2
11	2420	84.9	5	63.7	4	47.8	3	42.5	3
12	2640	92.6	5	69.5	4	52.1	3	46.3	3
13	2860	100.4	6	75.3	4	56.4	3	50.2	3
14	3080	108.1	6	81.1	5	60.8	4	54.0	3
15	3300	115.8	6	86.8	5	65.1	4	57.9	3
16	3520	123.5	7	92.6	5	69.5	4	61.8	4
17	3740	131.2	7	98.4	5	73.8	4	65.6	4
18	3960	139.0	7	104.2	6	78.2	4	69.5	4
19	4180	146.7	8	110.0	6	82.5	5	73.3	4
20	4400	154.4	8	115.8	6	86.8	5	77.2	4
21	4620	162.1	9	121.6	7	91.2	5	81.1	5
22	4840	169.8	9	127.4	7	95.5	5	84.9	5
23	5060	177.6	9	133.2	7	99.9	5	88.8	5
24	5280	185.3	10	139.0	7	104.2	6	92.6	5
25	5500	193.0	10	144.7	8	108.6	6	96.5	5

*Organic loading can be calculated with the following equation: [(Peak flow x cBODs) / (lateral length X chamber width)]=g/m²/day

*The above table used a chamber width of 34 inches (inside dimension)

* Example: A daily effluent volume of 5m³ (1100 Imp Gal) with less than 15 mg/L of cBODs would require 21.7 meters of laterals or two 20 meter laterals when using a 34 inch wide chamber

Table #4 - Effluent Quality for Level 1 Treatment		
Parameter	Maximum Allowable Limits for Daily flow volume less than 9 m ³	Maximum Allowable Limits for Daily flow volume greater than 9 m ³
Organic Loading to Soil	6 grams cBOD ₅ /m ² /day	6 grams cBOD ₅ /m ² /day
cBOD ₅	40 mg/l	40 mg/l
TSS	45 mg/l	45 mg/l
Fecal Coliforms	50000 CFU/100ml	10000 CFU/100ml
Total Chlorine	2 mg/L	2 mg/L
Total Phosphorus		50 % reduction
Total Nitrogen		50 % Reduction

Table #5 - Effluent Quality for Level 2 Treatment		
Parameter	Maximum Allowable Limits for Daily flow volume less than 9 m ³	Maximum Allowable Limits for Daily flow volume greater than 9 m ³
Organic Loading to Soil	5 grams cBOD ₅ /m ² /day	5 grams cBOD ₅ /m ² /day
cBOD ₅	25 mg/l	25 mg/l
TSS	30 mg/l	30 mg/l
Fecal Coliforms	50000 CFU/100ml	10000 CFU/100ml
Total Chlorine	2 mg/L	2 mg/L
Total Phosphorus		50 % Reduction
Total Nitrogen		50% Reduction

Table #6 - Effluent Quality for Level 3 Treatment		
Parameter	Maximum Allowable Limits for Daily flow volume less than 9 m ³	Maximum Allowable Limits for Daily flow volume greater than 9 m ³
Organic Loading to Soil	4 grams cBOD ₅ /m ² /day	4 grams cBOD ₅ /m ² /day
cBOD ₅	15 mg/l	15 mg/l
TSS	15 mg/l	15 mg/l
Fecal Coliforms	50000 CFU/100ml	10000 CFU/100ml
Total Chlorine	2 mg/L	2 mg/L
Total Phosphorus		50 % Reduction
Total Nitrogen		50% Reduction

Table #7 - Effluent Quality for Level 4 Treatment		
Parameter	Maximum Allowable Limits for Daily flow volume less than 9 m ³	Maximum Allowable Limits for Daily flow volume greater than 9 m ³
Organic Loading to Soil	3 grams cBOD ₅ /m ² /day	3 grams cBOD ₅ /m ² /day
cBOD ₅	10 mg/l	10 mg/l
TSS	10 mg/l	10 mg/l
Fecal Coliforms	50000 CFU/100ml	10000 CFU/100ml
Total Chlorine	2 mg/L	2 mg/L
Total Phosphorus		50 % Reduction
Total Nitrogen		50% Reduction

Part 14 **Types of Soil Treatment Systems**

14.1 Open Discharge – Effluent Treatment System

An Open Discharge system is a system designed to discharge secondary treated effluent to the ground surface to accomplish evaporation and absorption of the effluent into the soil as a method of treatment. The effluent is discharged from the outlet onto the ground surface.

The soil that the wastewater effluent is discharged upon, shall be protected from erosion caused by the discharge of effluent from the outlet.

The design of the open discharge system outlet and the landscaping of the area of the open discharge system shall ensure that the effluent does not migrate more than 6 m (20 ft.) before infiltrating into the ground.

The location of the effluent soil disposal system shall preferably be within a treed area.

This is a single discharge point and is only intended for use in the following circumstances:

- The Peak daily flow effluent volume is less than 3 m³/day (660 Imp. gal.)/day
- The work camp location has short duration of less than 45 days
- The work camp location does not have a commercial kitchen

Table # 8 - Effluent Quality for Open Discharge Systems	
Parameter	Maximum Allowable Limits for Daily flow volume less than 3 m ³
Organic Loading to Soil	N/A
cBOD ₅	40 mg/l
TSS	45 mg/l
Fecal Coliforms	50000 CFU/100ml
Total Chlorine	2 mg/L
Total Phosphorus	N/A
Nitrogen (Total)	N/A

Open discharge separation distances

An open discharge system shall not be located within

- 50 m (165 ft.) of a water source, water well or water storage
- 100 m (330 ft.) from a licensed municipal water well
- 90 m (300 ft.) to a river, stream or lake
- 45 m (150 ft.) to all other water courses or surface waters
- 90 m (300 ft.) to a property line, and
- 45 m (150 ft.) to a building

14.2 Enhanced Open Discharge - Effluent Treatment System

An Enhanced Open Discharge system is designed to disperse secondary treated effluent over a larger ground surface to accomplish evaporation and absorption of the effluent into the soil as a method of treatment. This method is similar to an LFH At-Grade System, but has been condensed to accommodate a shorter lateral length.

The treatment system shall be constructed using the following:

- Laterals shall have equal distribution of effluent
- The lateral(s) shall be constructed from pipe and/or hose
- The lateral(s) shall have a minimum of 1/8 inch orifices that allow even distribution of effluent
- Orifices shall be spaced at minimum distance of 0.6 meters (2 feet) apart to a maximum of 1.5 meters (5 feet) apart
- The lateral(s) shall have a maximum length of 20 meters (65 feet) each
- An orifice(s) facing down shall be used to allow drainage and prevent freezing. Orifice shields shall be used on the downward facing orifices in the treatment system
- Laterals shall be placed at a minimum 2 meters (6 feet) apart
- Laterals shall be covered with infiltration chambers
- Mulch, hay or wood chips shall be used as a cover material over the infiltration chambers
- An alternative method deemed acceptable by Alberta Municipal Affairs may also be used for the dispersal of effluent into the soil
- Effluent quality shall meet or exceed the values set out in Table 4, 5, 6 and 7

The effluent volume, effluent quality and the soils present at site determine the lateral length for each site. The effluent shall be dispersed over a larger area in order to minimize the organic loading to the soil, help the absorption into the soil and not allow effluent to pool on surface. See Table 4, 5, 6 and 7 for the organic loading for each level of treatment.

The location of the effluent soil disposal system shall preferably be within a treed area.

Enhanced open discharge separation distances

An enhanced open discharge system shall not be located within

- 50 m (165 ft.) of a water source, water well or water storage
- 100 m (330 ft.) from a licensed municipal water well
- 90 m (300 ft.) to a river, stream or lake
- 45 m (150 ft.) to all other water courses or surface waters
- 90 m (300 ft.) to a property line, and
- 45 m (150 ft.) to a building

14.3 Earthen Privy

An Earthen Privy shall only be used at a work camp with written authorization (variance) from the Private Sewage Administrator. An Earthen Privy shall only be used at work camps that are not accessible by road and are not accessible to the public (example: fly in camps).

An earthen privy is a wastewater disposal system used to dispose of human waste with a covered excavated pit.

The site specific Earthen Privy Variance shall have the following conditions:

- The planned period of operation does not exceed 4 months,
- The expected camp population does not exceed 50 persons,
- The site location is within an Non-Accredited municipality in Alberta (does not administer the Private Sewage Disposal Regulation), (if the location is in an Accredited municipality, the municipality must formally agree to the application of this variance within their jurisdiction),
- Any part of the soil based treatment shall not be installed in soils coarser than fine sandy loam.
- At no point or time shall the earthen privy pit exist in saturated soils or groundwater.
- Non organic material (i.e. plastic, etc.) shall not enter the earthen privy pit.

Requirements of the system

Earthen Privies used for toilet facilities shall:

- Be located to minimize any water surface drainage into privy pit
- Privy pit will be located on fine sandy loam or finer textured soils
- Privy pit dimensions will be approximately 1.0 m width x 1.0 m length x 1.2 m depth
- Privy pit will be covered with a structure that will include a door, natural lighting, seats, roof, walls and a toilet paper dispenser

The location of earthen privies used for toilet facilities shall not be located within:

- 50 m (165ft) of a water source or water well
- 50 m (165ft) of a water course
- 50 m (165ft) of a kitchen or other place where food is stored prepared or consumed
- 45 m (150ft) from a dwelling or temporary structure (tent or building)

Earthen Privies used for kitchen sinks and shower (bathing) facilities shall:

- Be covered and fenced to prevent entry
- Grease traps and sieves will be utilized to prevent grease and larger particles from entering the earthen privy

- Be located to minimize any water surface drainage into privy pit
- Privy pit will be located on fine sandy loam or finer textured soils
- Privy pit dimensions will be approximately 1.0 m width x 10.0 m length x 0.5 m depth

The location of Earthen Privies used for kitchen sinks and shower (bathing) facilities shall not be located within:

- 50 m (165ft) of a water source or water well
- 50 m (165ft) of a water course
- 10 m (33ft) of a kitchen or other place where food is stored prepared or consumed
- 10 m (33ft) from a dwelling or temporary structure (tent or building)

Reclamation of System

Earthen Privies shall be back-filled with native soil material at the end of camp use. Soil shall be mounded over the trench to accommodate settling. Additional reclamation requirements as set out by other Provincial Government departments or company policies must be met.

Part 15 System Components

15.1 Piping

The conveyance of sewage shall be done in a manner that provides no risk to human health or causes environmental damage.

Piping shall be sufficiently supported to:

- prevent sagging
- withstand expected mechanical forces
- withstand forces resulting from the movement of liquid in the system

Piping shall not leak except where intended in the design.

The system design shall prevent the freezing of liquids in the piping. Exterior (outdoor) piping shall have the proper measures taken to prevent the sewage from freezing in the winter months.

Piping shall be sloped and sized to accommodate the designed flow of wastewater or effluent and the drainage of piping when required to prevent freezing.

Piping shall be approved for a pressure rating of at least 1.5 times the maximum pressure it may be subjected to by the system design.

15.2 Lift station tanks

The objective of a lift station is to accumulate incoming raw wastewater, which is then periodically pumped to a higher elevation where it enters other components or sewer lines in the wastewater management and treatment system.

The design capacity and pumping controls used with the lift station shall be capable of supplying small doses of wastewater to the downstream component so that large amounts of wastewater discharged at rapid transfer rates do not overload the capacity of the downstream components.

- A lift station shall not leak or cause a risk to public health and the natural environment.
- A lift station shall be constructed of materials that are suitable to contain wastewater.
- A lift station tank shall have adequate means to protect the system from freezing while in operation and during periods of non-use.
- A lift station shall have a maximum capacity of 100 gals (450 litres).
- The system design shall consider the location to facilitate accessibility for service and maintenance.

Lift station separation distances

A Lift stations shall not be located within:

- 10 m (33 ft.) of a water source, water well, or water storage
- 10 m (33 ft.) of a water course
- 1 m (3.25 ft.) of a property line
- 1 m (3.25 ft.) of a building
- 3 m (10 ft.) of separation from a lift station, tank vent or unsealed opening to a building window, door or fresh air intake

15.3 Holding tanks

A holding tank is designed to retain wastewater or effluent until transferred into mobile equipment for treatment offsite. Holding tanks need to meet or exceed CAN/CSA-B66, “Design, Material, and Manufacturing Requirements for Prefabricated Septic Tanks and Sewage Holding Tanks.” The CAN/CSA B66 approval sets out the requirements for tanks that are installed underground. A tank that is installed underground has the surrounding soil to insulate and provide additional strength to the tank from collapsing when filled with liquid. The underground soil also protects the tank from being ruptured if accidental impact occurs. An above ground tank needs to be validated by the manufacturer or a professional engineer that it can maintain the structural strength of being installed above ground and the tank and equipment will be protected from freezing and accidental impact.

- A holding tank shall have storage capacity suitable for the intended use. Consideration shall be given to water use, trucking capacity, and frequency desired for pumping of the tank.
- A variance and Quality Management Plan (QMP) from Alberta Municipal Affairs is required to operate and maintain sewage holding tanks in Alberta.
- A holding tank shall have adequate means to protect the system from freezing while in operation and during periods of non-use.
- The system design shall consider the location to facilitate accessibility for service, maintenance and minimize odor concerns in areas of high use or occupancy.
- A high level alarm shall be considered for the holding tank system. The system shall include a mechanism or process of visually or audibly warning the user when liquid conditions are above the normal operating specifications.
- A holding tank level monitoring program may be considered as alternative solution to the visual or audible alarm.
- Each holding tank unit will have a visible unit number clearly marked on the outside of the tank.
- The company name and contact information shall be clearly marked on the outside of the tank.

Holding tank separation distances

A Holding tanks shall not be located within:

- 10 m (33 ft.) of a water source, water well, or water storage
- 10 m (33 ft.) of a water course
- 1 m (3.25 ft.) of a property line
- 1 m (3.25 ft.) of a building
- 3 m (10 ft.) of separation from any tank vent or unsealed tank opening to a building or dwelling

15.4 Wastewater Treatment Plant

A wastewater treatment plant shall be utilized to treat the sewage from a work camp, prior to the effluent being delivered to a soil treatment component.

A variance and Quality Management Plan (QMP) from Alberta Municipal Affairs is required to operate and maintain wastewater treatment plants in Alberta. The wastewater treatment plant shall be validated by a professional engineer to verify that:

- The equipment and piping are protected from freezing and above ground use
- The structural integrity of the relocatable structure needs to be verified
- The wastewater treatment plant process is capable of producing a consistently compliant effluent.

The effluent from a temporary onsite wastewater treatment plant shall discharge to a downstream soil-based treatment system. The effluent quality shall meet or exceed the maximum allowable limits set out in Table 4, 5, 6, 7 and 8 (of this document) at least 80% of the time.

The required treatment capacity of a temporary onsite wastewater treatment system shall consider the:

- expected peak hydraulic load
- expected influent strength of the wastewater
- extent of wastewater flow variation throughout a day
- variations in wastewater flow from day to day

The location of a packaged sewage treatment plant and sewage holding tanks shall be selected with consideration to:

- accessibility for regular servicing
- accessibility for periodic removal of sludge
- minimizing concerns with periodic odour problems that may occur, especially in high use/occupancy areas

An effluent filter shall be installed on the treatment plant with a maximum pore opening of 1/8 inch. An effluent filter is not required if the final treatment method in the treatment plant is a type of filtration with less than 1/8-inch pore size (example: membrane treatment).

A temporary onsite wastewater treatment system shall include a pre treatment system to remove influent solids from the sewage.

A temporary onsite wastewater treatment system shall include a flow equalization tank or dosing tank on the effluent flow from the treatment plant to the soil treatment system.

Additionally, a flow equalization tank or dosing tank may be used on the influent flow, prior to treatment to equally dose the influent over a 24-hour period.

Each wastewater treatment unit shall have a visible unit number clearly marked on the outside of the tank.

The company name and contact information shall be clearly marked on the outside of the WWTP.

Wastewater treatment plant separation distances

A temporary sewage treatment plant shall not be located within:

- 10 m (33 ft.) of a water source, water well or water storage
- 10 m (33 ft.) of a water course
- 6 m (20 ft.) of a property line
- 1 m (3.25 ft.) of a building
- 3 m (10 ft.) of separation from sewage system venting to a building or dwelling

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15.5 Disinfection

Effluent from the treatment unit to the soil based treatment method shall have a maximum fecal coliform count of 50000 CFU/100ml (less than 9 m3) and 10000 CFU/100ml (greater than 9 m3). See Tables 4, 5, 6, 7 and 8. Disinfection may be achieved by the following methods:

- Chlorination tablets
- Sodium Hypochlorite liquid
- Filtration
- Ultra violet light
- Any other method deemed acceptable by the Administrator

Effluent from the treatment unit to the soil based treatment method shall have a maximum total chlorine concentration of 2 mg/l.

Dechlorinating of effluent may be required when surface water is present with 90 meters (300 feet) of soil treatment component.

Note: Chlorine analysis must be performed onsite as a field assessment due to the short laboratory hold time.

Part 16 Assessment and Reporting

16.1 Site Inspection

An inspection/assessment by a Safety Codes Officer or Alberta Municipal Affairs may be scheduled with the work camp variance holder, permit holder or the owner of the system to ensure compliance to this guidance document and compliance to the variance/ QMP issued by Alberta Municipal Affairs. The inspection shall be scheduled with the company to ensure proper notification and arrangements can be made with safety supervisors to allow access to the required areas to conduct the inspection of all components of the system. The site inspection shall identify any deficiencies in the process and ensure that the company is aware of all requirements.

A site location inspection may also be necessary if a complaint, reason for concern, or public health risk becomes evident.

All financial costs associated with the site location assessment shall be the responsibility of the variance/ QMP holder (Eg: Corporation) and no cost shall be charged to Alberta Municipal Affairs for the inspection. This may include influent and effluent sampling or other water quality parameters needed to assess the treatment performance.

The inspection may consist of the following:

- Onsite Inspection (Field assessment at an operational treatment facility)
- Sampling of effluent to determine the quality of effluent
- Documentation inspection of laboratory analysis, field notes, permits and inspections
- Approved permits are posted onsite
- Site design of system matches permit application
- Sewage treatment system placement and techniques used for disposal
- Separation distances maintained (setbacks achieved)
- Soils investigation
- Camp populations and flow measurements
- Evidence of pooling of effluent in soil treatment area
- Health and public safety concerns

16.2 Annual Reporting

Annually a formal summary report shall be generated by the applicant that demonstrates the applicant's ability to comply with the terms of the variance / QMP and this guidance document.

The formal summary report shall include the following information:

- Brief summary of company
- Unit/model # inventory of fleet for renewal (addition or deletions)
- Challenges and outcomes
- Discussion and comparisons of the data collected
- Engineering advancements
- Treatment Methods - Overview of wastewater treatment plants design
- Disposal Methods - Overview of process of conveying influent into the WWTP and delivery process of the treated effluent into the environment
- Equipment validation documentation by a professional engineer (holding tanks or wastewater treatment systems)
- Detailed records of each installation as listed in Part 16.3

Alberta Municipal Affairs may request a more frequent reporting of data for higher risk systems designs to ensure treatment performance is being achieved. This could include monthly reporting.

An increase in reporting may also be required if poor performance is found in a previous year. This may also result in a refusal to renew a variance or QMP.

16.3 Records Submission for Annual Report

A summary of the detailed information for each temporary work camp location shall be submitted using an Excel spreadsheet

The Record submission shall include the following:

- Private sewage permit number
- Unit number
- Effluent sample results for cBOD₅, TSS, Fecal
- Legal land description or LSD
- Common name for the site location
- Contact information (onsite personnel) for the site location
- Site location population or occupancy
- Wastewater system start-ups, shutdowns, moves, vac outs
- Corrective actions performed for failures of the wastewater system
- Corrective actions for non compliant samples or operation
- Maintenance performed to the wastewater system
- Brief description of the treatment plant process and soil treatment area (type and size)

- General comments
- Soil sample information (if applicable)

These reports will be maintained by the variance holder and submitted to the Private Sewage Technical Administrator prior to the one year renewal date of the variance. They will be made available for review by the Private Sewage Technical Administrator upon request at any time.

16.4 Records Inventory

Records shall be kept by the company for review by Alberta Municipal Affairs for a period of 3 years. The records will include the following information in the file.

- Camp population
- Identification number (model or serial number) of each unit in service
- Method of final effluent disposal to the environment
- A copy of the private sewage permit
- Legal subdivision address (LSD)
- Inspection and maintenance reports
- Field service reports
- Sewage effluent testing results for cBOD₅, TSS, and fecal coliform and show the time of day the sample was taken
- Start-up and Shut down periods
- Sludge and scum removal by vacuum tanker
- Descriptions of any non-compliant events and corrective action
- Soil sample analysis

These reports will be maintained by the variance or QMP holder and submitted to the Private Sewage Technical Administrator prior to the one year renewal date of the variance. They will be made available for review by the Private Sewage Technical Administrator upon request at any time.

Part 17 Offences Under the Safety Codes Act

Offences

- 67(1) A person who interferes with or in any manner hinders an Administrator or a safety codes officer in the exercise of the Administrator's or officer's powers and performance of the Administrator's or officer's duties under this Act is guilty of an offence.
- (2) A person who knowingly makes a false or misleading statement under section 34(4)(c) either orally or in writing is guilty of an offence.
- (3) A person who fails to prepare, submit or retain any information that the person is required by this Act to prepare, submit or retain is guilty of an offence.
- (4) A person who
- (a) contravenes this Act,
 - (b) contravenes a condition in a permit, certificate or variance,
 - (c) contravenes an order, or
 - (d) fails to carry out any action required in an order to be taken within the time specified in it, is guilty of an offence.
- (5) A person who is guilty of an offence under this Act is liable on conviction for each day or part of a day on which the offence occurs or continues.

Penalties

- 68(1) A person who is guilty of an offence is liable
- (a) for a first offence,
 - (i) to a fine of not more than \$100 000 and, in the case of a continuing offence, to a further fine of not more than \$1000 for each day during which the offence continues after the first day or part of a day, or
 - (ii) to imprisonment for a term not exceeding 6 months, or to both fines and imprisonment, and
 - (b) for a 2nd or subsequent offence,
 - (i) to a fine of not more than \$500 000 and, in the case of a continuing offence, to a further fine of not more than \$2000 for each day or part of a day during which the offence continues after the first day, or
 - (ii) to imprisonment for a term not exceeding 12 months, or to both fines and imprisonment.
- (2) If a person is guilty of an offence under this Act, the court may, in addition to any other penalty imposed or order made, order the person to comply with this Act or any order, permit, certificate or variance, or all or any one or more of them, as the case requires.

Part 18 Cancellation of Variance or QMP

A variance may be cancelled or revoked from an organization or company for not complying with the terms, agreements, requirements or conditions of the variance or QMP.

Alberta Municipal Affairs may also apply the following penalties:

- Suspension of the variance or QMP. The suspension shall be displayed on the Alberta Municipal Affairs website for permitting agencies and municipalities to examine
- Site inspections/assessments by Alberta Municipal Affairs or Safety Codes Officers
- Administrative Penalties
- Increased reporting of records to Alberta Municipal Affairs
- Increased maintenance or repairs to the system to protect public health or the natural environment
- Fines and penalties from the Safety Codes Act
- Suspension or Cancellation of the Certified Private Sewage Installer Certificate of Competency