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1 Disclaimer

This Supporting Guide to Calculate Design Sewage Flow for Subsurface Sewage Works Subject to s.53 OWRA (Guide) includes minimum prescriptive design flows and general design options for the construction of sewage works described in Chapter 22 Large Subsurface Sewage Disposal Systems (LSSDS) of the Design Guidelines for Sewage Works, 2008. Further, this Guide is primarily intended to be used for seasonal campgrounds or similar conditions where significant hydraulic peak events occur such as in year-round non-residential occupied facilities serviced by LSSDS. It is the design engineer's responsibility to ensure the LSSDS are designed for peak flows and constructed to operate in compliance with all legislated requirements. Use of this Guide does not guarantee the proper function or performance of LSSDS. Furthermore, this Guide does not imply or claim to address safety-related issues associated with the design, construction/installation, or testing of the components of LSSDS or abandonment of such sewage works.

This guide is for informational purposes only and is not intended to provide specific advice or recommendations in any circumstances. Moreover, this Guide is not, and should not be construed as, legal advice. The Guide refers to section 53 of the *Ontario Water Resources Act* (OWRA) and Part II.1 of the *Environmental Protection Act* (EPA) as well as O. Reg. 255/11 (Applications for Environmental Compliance Approvals), the *Building Code Act, 1992* and the Building Code (O. Reg. 163/24). If you have any questions about the application or interpretation of the legislation or regulations cited in the Guide or have other legal questions, you should consult a lawyer.

2 Definitions

The following definitions are referenced throughout the Guide:

2.1 Qualified Person

A *Qualified Person (QP)* means a Professional Engineer, a Professional Geoscientist, or a Licensed Engineering Practitioner, licensed in the Province of Ontario, with experience and knowledge in subsurface sewage disposal design and methodology.

2.2 Serviced Site

A *Serviced Site* means a site that offers pressurized water connections and/or sewer connections.

2.3 Travel Trailer

Travel Trailer means a recreational vehicle mounted on wheels, designed to be towed by a motorized vehicle, constructed with rigid sidewalls and a roof, intended for temporary living accommodation for travel, vacation, or recreational use, and constructed in accordance with the CSA Z240 Series Recreational Vehicles, as updated, and not intended for permanent residential occupancy.

2.4 Park Model Unit

Park Model Unit (*PMU*) means a recreational unit constructed on a single chassis mounted on wheels, designed to facilitate relocation from time to time, intended for seasonal or recreational occupancy, and which may be connected to utilities necessary for the operation of installed fixtures and appliances, and that is constructed in accordance with the CAN/CSA-Z241 Series Park Model Trailers, as updated, and not intended for use as a permanent residence.

2.5 Destination Trailer

Destination Trailer means a recreational vehicle designed to be towed to a site for extended, seasonal, or temporary occupancy, typically remaining in one location for prolonged periods, but retaining the capability for relocation, and constructed in accordance with applicable CSA recreational vehicle standards, including the CSA Z240 RV Series, as updated, and not intended for use as a permanent residence.

2.6 Mobile Dwelling

Mobile Dwelling means a transportable dwelling unit intended for residential or recreational accommodation, including a mobile home constructed in accordance with the CAN/CSA-Z240 Series Mobile Homes, as amended, or a PMU, destination trailer, or travel trailer constructed in accordance with applicable CSA recreational vehicle standards, including the CAN/CSA-Z241 Series, as updated, and designed to be relocated from time to time rather than permanently affixed to land and does not include a permanent structure constructed under Part 9 on the Ontario Building Code.

2.7 Unserviced Site

An *Unserviced Site* means a site that does not have water connections available and/or sewer hook ups. Electrical services are acceptable.

2.8 Design Sewage Flow

The Design Sewage Flow (DSF) is the design capacity referred to in section 53 (6.1) of the *Ontario Water Resource* Act and is consistent with Articles 8.2.1.3 Sewage System Design Flows in Part 8 Sewage Systems, of the Ontario Building Code (O. Reg. 163/24) made under the Building Code Act, 1992 ("OBC" or "Building Code"). In addition, the DSF is consistent with rated capacity in section 3.10 Sewage Treatment Plant Capacity Rating of the Design Guidelines for Sewage Works, 2008.

2.9 Peaking Factor

The peaking factor (PF) is the ratio of the daily or weekly peak hydraulic flow rate to the average hydraulic flow rate. It is well established that a PF greater than or equal to 2.0 (PF ≥ 2.0) is sufficient justification to use flow equalization and/or flow balancing to reduce the footprint of the downstream components of LSSDS and reduce the overall capital cost. Based on Ontario specific data the typical peaking factors of seasonal campgrounds vary between 2.0 to 4.5.

2.10 Consecutive 7-Day Maximum Average (7-DMC)

The consecutive 7-day maximum average (7-DMC) refers to the design flow commonly used to size a flow balancing tank. Given daily water use or sewage flow data for the season or year, the consecutive 7-day average flow is determined from day 7 to the end of the period and then the maximum of these 7-day average values corresponds to the 7-DMC.

2.11 Seasonal Occupancy

Seasonal Occupancy refers to the intermittent utilization of a recreational campground, typically with an anticipated daily flow averaging no more than 60% of the DSF. For a campground to be considered Seasonally Occupied, it must be closed for a minimum of 60 consecutive days per year, during which sewage works do not receive sewage and are resting.

2.12 Year-Round Occupancy

Year-Round Occupancy refers to a site that is intended for usage throughout the entire year and does not shut down for the required 60 consecutive days in a calendar year. To qualify for a Year-Round Camping Authorization (YRCA), these sites must comply with all upper and lower tier municipal zoning and site approval processes required for residential occupancy.

3 Purpose and Format of the Guide

3.1 Purpose of the Guide

The Ministry of the Environment, Conservation and Parks (Ministry) developed this Guide to clarify how to calculate the DSF for LSSDS that service seasonally occupied sites and year-round facilities that have a hydraulic *Peaking Factor* PF ≥ 2.0. This Guide is

applicable to LSSDS for which an Environmental Compliance Approval (ECA) is required under Section 53 of the *Ontario Water Resources Act* (OWRA) and Part II.1 of the *Environmental Protection Act* (EPA) and described in Chapter 22 Large Subsurface Sewage Disposal Systems of the Design Guidelines for Sewage Works, 2008.

The Guide is primarily intended to help owners and designers of LSSDS submit a complete ECA application that will help to facilitate the Ministry's review of applications for LSSDS and avoid delays. Prescribed requirements for a complete ECA application are set out in O. Reg. 255/11 made under the *Environmental Protection Act.* The Ministry updates these requirements from time to time, as environmental standards and environmental management approaches evolve and develop. While the Ministry makes every effort to ensure the accuracy of the information in this Guide, readers should not take any of the information in this guide as legal advice.

3.2 Status of the Guide

This Guide supersedes and replaces the "Interim Fact Sheet, Design Sewage Flow Rates for Seasonal Trailer Parks and Park Model Units, dated February 2015" and shall be referenced together with the publications mentioned in Section 7.1 of this Guide. In the event of a conflict, this Guide should be followed.

3.3 Guide Appendices

Individuals who are preparing or applying an ECA for LSSDS are encouraged to familiarize themselves with this Guide. This Guide includes:

a) Appendix A. Application Check list that is intended to assist QPs in preparing complete ECA application submissions that will help to facilitate the Ministry's review of applications for LSSDS; and
b) Appendix B. Attachment 1, Water Use Template is intended to assist QP and/or owners/operators to collect daily metered water use data as supporting documentation.

3.4 Interpretation of the Guide

While the Ministry makes every effort to ensure the accuracy of the information in this Guide, readers should not take any of the information in this Guide as legal or professional engineering advice.

3.5 Innovation Within the Guide

Where appropriate, this Guide recommends certain procedures and formulas for the design and construction of an LSSDS. By applying these options to the LSSDS design, best available technology and engineering principles are generally followed. As such, following these options may decrease the time it takes the Ministry to review and make a decision on an LSSDS application. However, the Ministry also encourages the advancement of the technology for the design of LSSDS. The Ministry will consider new concepts and designs that are supported by third-party field performance data in cold climates like Ontario in accordance with Section 3.9.2 Proven Technology, from the Ministry Design

Guidelines for Sewage Works, 2008. Owners proposing innovative or alternative designs are encouraged to discuss their proposal with the Ministry prior to submission of an ECA application during the pre-submission consultation.

Pre-submission consultation provides an opportunity for Owners and their consultants to discuss and clarify complex technical requirements. These meetings can help Owners define the environmental design objectives for the works, identify any special circumstances and approval-related requirements. meetings with the Ministry provides an opportunity for Owners and their consultants to discuss and clarify complex technical requirements. These meetings can help Owners define the environmental design objectives for the works, identify any special circumstances and approval-related requirements.

You can request a pre-submission consultation meeting with the Ministry by contacting your local district office for your site.

3.6 Implementation of Preventative Measures

The Ministry encourages the implementation of pollution-prevention activities eliminating or reducing pollutants at the source as part of the operation of the LSSDS and through education of the users. Pollution prevention can often save money by maximizing the life of the LSSDS.

3.7 Management Plan

The Owner of an LSSDS in conjunction with *QPs* should develop a Maintenance and Operations Plan (Management Plan) with reference to this Guide and in accordance with any conditions of an ECA, if one is granted for the LSSDS. A Management Plan is a plan that contains the requirements for periodic examination, adjustment, testing, and other operational requirements to meet system performance expectations, including a planned course of action in the event a system does not meet performance expectations. The Management Plan is a valuable tool in the operation and maintenance of every LSSDS. At a minimum, a Management Plan should include:

a) maintenance and inspection requirements, including frequency and personnel required.
b) operational requirements, including which tasks the owner can perform and which tasks a licensed service provider or maintainer must perform
c) monitoring requirements of determining actual flows (e.g., use of automated systems and telemetry) and performance of system components, including procedures for inspecting and calibrating the monitoring equipment
d) an increase of the flow measurement frequencies in cases actual flows are greater than 60 percent of the design flow to determine if the system is being overused
e) requirements for when the owner shall engage qualified service providers and/or engineers
f) site plan showing the location of the existing LSSDS including additional soil treatment and dispersal area (reserve area) on the lot

g) other requirements based on good engineering and best management practice
h) for advanced treatment units, maintenance and operation requirements as recommended by the advanced treatment technology manufacturer

3.8 Use of Options

The options provided in this Guide are intended to support and guide the design of LSSDS by highlighting best practices and promoting good engineering judgment. These options are not considered mandatory criteria imposed by the Ministry. Instead, they are advisory in nature and should be applied as one of several tools available to Qualified Persons when designing LSSDS.

Qualified Persons are encouraged to evaluate the relevance of these options to their specific project and apply them judiciously, considering site-specific conditions and constraints. The determination of whether these options are appropriate for a particular project should be based on good engineering judgment and a thorough assessment of all relevant factors.

The Ministry also recognizes that alternative designs and approaches may achieve equivalent or superior outcomes. Such designs, when developed in accordance with sound engineering principles and supported by appropriate data and analyses, are acceptable. This flexibility aims to encourage innovation and ensure that LSSDS designs are optimized for the unique site requirements.

4 Environmental Compliance Approval (ECA)

4.1 Requirement for an ECA

Section 53 of the OWRA sets out when an ECA is required for sewage works, including LSSDS. With certain exceptions, an ECA is required for the use, operation, establishment, alteration, extension or replacement of new or existing sewage works.

Generally, an ECA is required for a sewage works, including an LSSDS under any of the following three scenarios:

a) single sewage works with a design capacity that is larger than 10,000 litres per day
b) multiple sewage works located on the same lot or parcel of land with a cumulative design capacity greater than 10,000 L/d, or
c) the sewage works are not located wholly within the boundaries of the lot or parcel of land on which is located the residence or other building or facility served by the works

For the purposes of this Guide, the following terms are interchangeable:

- design capacity
- design sewage flow
- DSF

4.2 Distinction Between OBC and OWRA s. 53

The terms sewage system and sewage works are often used interchangeably when describing subsurface treatment units regulated under the OWRA and the OBC. It is important to note the distinction between a Subsurface Sewage Works as described above in s. 4.1 and a Sewage System as defined in the Building Code below:

> *Sewage system* means,
>
> (a) a chemical toilet, an incinerating toilet, a recirculating toilet, a self-contained portable toilet and all forms of privy, including a *portable privy*, an *earth pit privy*, a *pail privy*, a *privy vault* and a composting toilet system,
>
> (b) a *greywater* system,
>
> (c) a cesspool,
>
> (d) a *leaching bed* system, or
>
> (e) a system that requires or uses a *holding tank* for the retention of *hauled sewage* at the site where it is produced before its collection by a *hauled sewage system*,
>
> where these,
>
> (f) have a *design capacity* of 10,000 litres per day or less,
>
> (g) have, in total, a *design capacity* of 10,000 litres per day or less, where more than one of these are located on a lot or parcel of land, and
>
> (h) are located wholly within the boundaries of the lot or parcel of land on which is located the *building* or *buildings* they serve.

The intention of this document is to provide guidance when designing a sewage works such as LSSDS for which an ECA is required under the *OWRA*. This document was not intended to provide guidance for the design of Sewage Systems as defined under the OBC.

The design and construction of small subsurface sewage disposal systems, regulated under the *Building Code Act, 1992,* should adhere to the standards outlined in the Ontario Building Code (OBC). While the Ministry uses the term ‘large subsurface sewage disposal systems (LSSDS)’, it is referring to those sewage works that require an ECA under the EPA. Similar but smaller sized systems are referred to as ‘sewage systems’ in the OBC. Designers/owners of subsurface sewage works may also use the term ‘septic system’ to describe similar types of sewage works. Subsurface sewage disposal systems treating sewage to the contaminant levels found in domestic sewage with design flows less than or equal to 10,000 L/d and located wholly within the boundaries of the lot or parcel of land as the building or buildings they are intended to serve, generally require a permit under the *Building Code Act, 1992,* instead of an ECA from the Ministry.

4.3 Reduced Capacity Systems

This section includes information on ECA application requirements for reduced capacity designs for treatment units and/or subsurface disposal systems. We note that the exact

information to support your application may vary, and it is your responsibility to provide all pertinent information with your application.

4.3.1 One Sewage Works

Where there is only one sewage works on a property, the design must be able to accommodate peak flows of greater than 10,000 L/d, regardless of any historical flow data. Some exceptions may apply in such cases where industrial wastewater is being treated and flows are below 10,000 L/d and the OBC does not apply.

4.3.2 Reduced Treatment Unit or LSSDS Capacity

Where designs are proposed that reduce the capacity of the treatment units and/or subsurface disposal systems, the design is to ensure that peak flows can be accommodated within the overall system design supported by detailed flow balancing calculations.

4.4 Existing Approved Sewage Works

Between 1974 and 1998, small subsurface sewage works were regulated under the EPA and now repealed Ontario Regulation 358 (Sewage Systems). Permits and certificates of approval issued under Part VIII of the EPA are continued as ECAs, as outlined in the OWRA, subsection 53.1.

On-site sewage systems permits and approvals issued under the EPA prior to 1998 may have been issued by municipalities, health units, and conservation authorities on behalf of the Ministry and are still considered valid unless the sewage works, or the facility it services, has been altered since the original approval was issued. The owners of the sewage works are responsible for demonstrating that the approvals exist and that the sewage works, and the facility it services, remain unchanged.

5 Establishing and Applying the Design Sewage Flow

5.1 Design Sewage Flow (DSF)

The DSF for LSSDS that require an ECA can be calculated based on prescribed flow values in Table 1 (Section 8) or historical daily metered flow data (Section 9).

5.2 Table 1 Prescribed Flow Values

The design sewage flow (DSF) values in Table 1 correspond to the consecutive seven-day maximum average (7-DMC) values and designs of LSSDS, based on these prescribed values, are to use a 7-DMC design with flow-equalization balancing tank (BET). Note that a peaking factor of 2.0 is integrated into these design values and no additional peaking factors need to be added.

5.3 Attachment 1 Metered Flow Values

The DSF value is to be derived from metered daily water use or sewage flow data to be collected between June 15 and September 15, inclusive, over the most recent two-year period. The DSF value is to be used with appropriate safety factors based on a flow

through design or flow balanced design in accordance with Section 8. Attachment 1 (Appendix B and digital version provided) is to be used and is to be submitted as part of a complete ECA application.

5.4 Septic Tank Minimum Sizing

In all proposed designs, the septic tank active volume is to be designed to ensure a minimum of 24-hours of retention time at peak design flow. If the septic tank is located downstream of the BET, then the balanced flow design value may be used to size the septic tank.

5.5 Drain-fields and Reserve Areas Sizing Options

To promote system longevity design, options include designing drain-fields with a design factor of 1.5 and constructing three sections, with each section capable of handling 50% of the DSF. The third section may be alternated into service on a semi-annual or annual schedule. This will help extend the life of the LSSDS and provide a standby unit in case of failure. If the three-section option is not used, a safety factor of 2.0 and providing two zones (two separate drain-fields) each at 100% of the DSF is an alternative design option. An expansion option includes setting aside an expansion area for the drain-field as a reserve area (RA), for future expansion or upgrading of the systems supported by metered flow data.

5.6 Drain-field Dosing System

Each zone or drain-field system is to be designed to address groundwater mounding and monitored to assess any high groundwater and mounding impacts. When using a flow balanced, design timed dosing is preferred over demand dosing as it provides that greatest control over the flow.

5.7 Options for Flow Equalization in Balanced Flow Designs

In all flow equalization and balanced flow designs, the 7-DMC, full flow design method or equivalent flow balancing method may be used to calculate the final BET. It is important to consider the expected peak flows that are typically between 2 to 4 times greater than the average flows when designing a BET to reduce the system footprint.

5.8 Engineering Options

The designs of LSSDS need to ensure that peak flows can be accommodated within the overall system design supported by detailed flow calculations and judicious use of safety factors proportional to the uncertainties in the design assumptions. The application of engineering options, within this context, includes full qualification and competence to carry out the work related to the design of LSSDS based on established professional practice. With respect to engineering options, the design of LSSDS should include the following considerations:

a) design, construct, operate and maintain LSSDS for the expected 20 to 25-year full life of the sewage works

b) plan for variability using appropriately calculated peak flows, safety factors and contingencies such as adequate reserve areas to upgrade the system as necessary

c) use modular design with flow BET if the peak flow is 2 or greater than the average flow; typically, peak flow factors have been found to be between 2.0 to 4.0 in seasonal campgrounds

d) use time dosing with alternating dosing every 6 to 12 months between multiple drain-fields to promote unsaturated periods to allow the drain-fields to recover

e) use 3-drain-fields each at 50% of the DSF or 2-drain-fields each at 100% of the DSF for alternating dosing of the drain-fields to extend the life of the drain-fields

f) monitor flows and check that the sustainable average flow is less than 70% of the DSF over each season, and

g) provide RA at 50 to 100% of the DSF to upgrade and extend the system as necessary and to deal with uncertainties and changes over time

5.9 Basis of Prescribed DSF Values

Prescribed DSF values in Table 1 are minimum recommended values to be used with appropriate contingencies in the absence of representative historical water use or sewage flows for the site. Inherent variability with water use or sewage generation along with site-specific ground water conditions, contributing to infiltration and inflow, make accurate prediction of DSF values challenging. The use of prescribed DSF values are only recommended where sufficient site-specific historical daily flow data is not available. Traditionally, DSF for seasonal occupancy sites assumed intermittent or non-continuous use with average daily flows, during the operational season of 180 days and sewage flows at most 60% of the DSF. This allowed for a sufficient rest period for the drain-fields to regenerate and avoid potential hydraulic overloading the drain-fields which is a known source of hydraulic failures.

5.10 Typical Safety Factors and Contingencies

Typical peak flow factors (PF) for LSSDS range between 2.0 and 4.0, but design engineers may choose to use a higher PF where uncertainties in the expected usage and other environmental conditions support such use. Contingencies commonly used include RA, modular design to allow for intermittent dosing of the drain-field, multiple zones and adequately sized BET to store flow surges above the DSF and allow for sizing of treatment units and drain-fields at a reduced balance flow.

6 Seasonal and Year-round Occupancy

6.1 Seasonal Occupancy

For a campground to be considered seasonally occupied, it must be closed for a minimum of 60 consecutive days per year, during which sewage works do not receive sewage and

are resting. It's important to note that, from a DSF perspective, these facilities are distinct from non-municipal, year-round residential campgrounds.

6.2 Year-Round Occupancy

Sites intended for use throughout the entire year must comply with all upper and lower tier municipal zoning and site approval processes required for residential occupancy. For sites that are occupied year-round, municipal planning and zoning approvals should be completed, and flow assessment be undertaken as Mobile Home Parks.

7 Design Details of LSSDS

7.1 Sources of Prescribed Design Sewage Flows

When submitting a sewage works ECA application to the Ministry, the following may be used when calculating the DSF based on prescribed design flow values and in the event of a conflict, Table 1 of this Guide is to be followed:

a) Ontario Building Code (Tables 8.2.1.3. A/B of Part 8, Division B) OBC - Part 8;
b) Manual of Policy, Procedures and Guidelines for Onsite Sewage Systems, 1982 (App. 9.3.1) 1982 Ministry Onsite Guide; and
c) Chapter 22. Large Subsurface Sewage Disposal Systems of the Ministry’s Design Guidelines for Sewage Works, 2008.

Note that Table 1 replaces Table 5-3 of the Ministry's Design Guidelines for Sewage Works, 2008.

7.2 Historical Metered Flows and the DSF

The Ministry will consider historical metered flow data to support ECA applications for the replacement and/or expansion of existing sewage works, provided that the occupancy type of the campground or facility has not changed. As part of a complete ECA application, the following need to be addressed:

7.3 Duration of Historical Metered Flow Data

As part of the supporting documentation, a minimum of two-seasons of the most recent daily historical metered flow data, from June 15 to September 15 of each season, is required. This is to represent the peak daily flow either through direct measurements (e.g., sewage flow meters and running time pump counters) or indirect measurements (e.g., water use data); the number of sites occupied for each day and type of sites being serviced is also required. A sample Excel template (electronic form) to record and submit daily metered data is provided by the Ministry as Attachment 1 in Appendix B.

7.4 Acceptable Metered Flow Data Collection Methods

Confirmation is to be provided, by a Qualified Person, that accurate flow measuring and monitoring methods have been used for the collection and recording of representative daily flow data. Acceptable flow measuring methods include:

a) calibrated dosing pump with operating time
b) electronic flow meters
c) doppler flow meters
d) water use metering with site supporting information indicating water usage that is not directed to the subsurface sewage systems (e.g., swimming pool fillings and maintenance, irrigation, and other cleaning activities)
e) if metered daily water use data is collected, the conversion rate from water use to sewage flow is to be justified with supporting evidence and is to be no less than 80%, and
f) other flow measuring methods demonstrated to be effective under field conditions

Note that the Ministry will not accept totalized weekly, monthly or annual data as a basis to calculate the historical metered DSF.

7.5 Verified Historical Data

Confirmation that the historical metered flow data was reviewed and verified by a QP to ensure that the historical metered flow data is accurate and representative of the field conditions throughout the collection period. This document will need to be signed by the *QP* providing the data check subject to professional judgement.

7.6 System Re-rating Based on Historical Data

This section pertains to ECA applications requesting a rerating of the existing sewage works based on historical data. The historical metered water use or sewage flow data cannot be used for rerating if one or more of the following conditions apply:

a) if the flow measuring device has not been calibrated within six months from the start of the measurement
b) if the data is old and does not represent the current use of the campground or facility
c) if the facility or campground or phase of the facility or campground, is not at 75% or greater build-out
d) the peak flow has not been measured in the daily measurements, or
e) if the daily use (e.g., percent occupancy or percent capacity of use) cannot be reasonably estimated

7.7 Modular Design

For new sewage works, the Ministry encourages applications that include modular balanced flow designs proportional to development levels during the first five years from the issuance of the ECA, if granted, so that site-specific water use data may be collected. The Owner may then apply for an amendment to the ECA, based on metered water use data, after a minimum of two years of operation and based on a minimum 75% build-out of the modular phase developed. If an ECA amendment is not issued by the Ministry, the Owner will be required to design and build the system as approved in the original conditional ECA.

The purpose of modular designs is to promote the use of actual site-specific water use data to optimize the sizing of sewage works that are both environmentally responsible and cost-effective.

7.8 Operating Period

Campground Owners are required to provide the operating period (Seasonal or Year-Round Occupancy) of each site serviced in determining the DSF. The total number of sites by occupancy in the campground is to form part of the information supporting the ECA application.

7.9 Separate Dedicated Drain-fields or Drain-field Zones

Separate dedicated drain-fields or independent drain-field zones, are recommended as a design option, for each type of occupancy operating period including those provided in modular designs covered by Section 7.3.1.

7.10 Consideration of Larger Peak Flow Factors

Consider using a larger peak flow factor (PF) to accommodate any potential increases in flow anticipated due to uncertainties in the metered flow data or to optimize the design based on flow balancing or flow equalization design.

7.11 Consideration of Reserve Area

Consideration should be given to using a RA from 50% up to 100% of the DSF to address potential performance and hydraulic issues associated with the design uncertainties associated with the long-term infiltration rate and other site conditions. Note that the reserve area may be an occupied land area that can be made available if necessary.

8 Prescribed Flow Designs

8.1 Table 1 Prescribed Design Basis

Table 1 Prescribed Sewage Flow Rates for Commercial and Institutional provides the basis for prescribed designs typically used when sufficient metered water use or sewage flow data is not available.

8.2 Use of Table 1 with 7-DMC Flow Balanced Design

In all cases, in the absence of historical monitored flow data, the prescribed sewage flow rates in Table 1 are to be used only for balanced flow designs, based on a 7-DMC design methodology.

8.3 Prescribed 7-DMC DSF

The prescribed DSF values in Table 1 are 7-DMC peak values that include a consecutive seven-day average peak flow factor of 2.0. No additional peaking factors are required to be added for prescribed designs of sewage works.

8.4 Options on the Number of Drain-fields

For prescribed 7-DMC DSF design values in Table 1 (with no historical metered data), a single drain-field and balancing tank to deal with peak flow events is acceptable however for long-term sustainability three separate drain-fields, each at 50% of the corresponding balanced DSF, could be considered as a more appropriate design option.

8.5 Limitations to using Table 1 for Prescribed Designs

The prescribed DSF values in Table 1 are limited to the use of one trailer unit per site with *Park Model Units (PMU)* not exceeding 50 square meters for seasonal occupancy at a DSF of 425 L/day. Any trailer unit expansion or PMU beyond the 50 square meters total area limit will be required to use a DSF of 800 L/day.

9 Metered Flow Designs

When calculating the DSF for sewage works, historical metered flow data can be used for sewage works replacements and/or expansions located at existing sites only and where the historical metered flow was measured.

9.1 Metered Flow Through Design

A design may be based on a flow-through design using metered historical data. A minimum safety factor of 1.2 is to be applied to the metered maximum day flow using the complete data sets (i.e., minimum two seasons from June 15 to September 15).

9.2 Metered 7-DMC Flow Balanced Design

A design may be based on the consecutive 7-day maximum (7-DMC) flow using metered historical data and appropriate safety factors based on good engineering practice.

9.3 Metered Full Flow Balanced Design

A design may be based on the full balanced flow design using the Mean sewage flow, based on the maximum seasonal average from latest 2-seasons covering June 15 to September 15 (see Attachment 1 for seasonal data collection form), divided by the maximum usage rate (0.6) or multiplied by the factor of 1.7 (1 / 0.6) for the drain-field design.

Table 1 – Prescribed Sewage Flow Rates for Commercial and Institutional Uses

Use	Unit Sewage Flow [1]		Flow Unit per
	SI (L/d)	US (gal/d)	
Shopping Centre (excluding food and laundry)	5	1.32	per 1.0 m^2 of floor space
Hospitals Including laundry facilities or Excluding laundry facilities	750 550	198 145.3	bed
Schools Day School, With Showers, With Cafeteria, and Per non-teaching employee per 8-hour shift	30 30 30 50	7.93 7.93 7.93 13.2	student
Seasonal Occupancy Unserviced Site	225	60	Site (without individual sewer hook-up)
Seasonal Occupancy Site Units with less than or equal to 50 square meters total area [2]	425	112	Site (with individual water or sewer hook-up)
Seasonal Occupancy Site Units greater than 50 square meter total area [2,3,4]	800	211	Site (with individual water or sewer hook-up)
Mobile Home Parks with Year-round Occupancy	1100	290	2-bedroom mobile home site
Motels and Hotels Regular, per room Resort hotel, cottage, per person Self-service laundry, add per machine	 250 500 2500	 66 132 660	 Room or person or machine

1. Unit sewage flow rates exclusive of extraneous flows.
2. The design values of 425 and 800 L/d/site correspond to the 42%-ile and 95%-ile values, respectively, from the Ontario specific data set with a range of 200 to 850 L/d/site, a mean of 480 L/d/site and standard deviation of 206 L/d/site.
3. The 800 L/d/site assumes that larger accommodations promote higher occupancy, higher or more intensive use. Currently there is insufficient data to support a lower prescriptive design value however modular designs are options (s. 7.3.1).
4. The total area of site units is to be based on the standard gross floor area consistent with the CSA Z-241 park model trailers series of standards. If multiple units are combined the individual gross areas are to be added. If a single unit is built out then non-livable areas such as unheated screened porches, decks and outdoor cold storage areas may be excluded from the total gross area calculation which is to be based on exterior rectangular (width x length) dimensions of livable spaces.

10 Contact Information

For questions related to this Guide, please contact the Client Services and Permissions Branch by phone at 416-314-8001 or 1-800-461-6290, or by e-mail at enviropermissions@ontario.ca.

11 Appendix A. General Principles of Design and Checklist for ECAs

In addition to the requirements for sewage works applications found in the ministry ECA application form and O. Reg. 255/11, the following checklist is intended to assist applicants in providing the necessary supporting information to the Ministry for a complete ECA application. This ensures that Ministry staff have the necessary information to screen and review an ECA application in a timely manner. The table below should form part of the supporting documentation when submitting an ECA application.

Item	Necessary Items to include in an ECA Application to address Hydraulic Design Issues for LSSDS	Application Check ☑	MECP Check ☑
1	The operating period(s) and occupancy type have been clearly identified and separate drain-fields have been designed for each type of occupancy in accordance with Section 7.3.3 and 7.3.4.		
2	A prescribed design is being proposed and the DSF is based on the 7-DMC using Table 1 average DSF values and appropriate peaking factors from Section 7.4.1 were used.		
3	Historical metered flow data was used to derive the DSF values and Attachment 1 from Appendix B was used and has been included as part of the supporting information.		
4	Daily water use metered data was collected and a minimum 80% conversion rate was used to convert from water use to sewage flow for the design of the LSSDS.		
5	Engineering confirmation has been provided, as part of the supporting documentation to indicate that Attachment 1 constitutes actual collected data in accordance with Section 7.2.3 and 7.2.4.		
6	All necessary contributing flow streams and pollutant-loading sources have been included in the analysis of the DSF. This includes all seasonal, institutional, commercial, inflow, infiltration, return-and-recycle streams, and any other unique aspect of flow and pollutant contributions that are required to be treated by the LSSDS.		
7	The septic tank design has been sized with an active volume to ensure a minimum 24-hour hydraulic detention time at the peak daily flow or at the DSF if a flow balancing-equalization tank is located upstream of the balancing tank in accordance with Section 5.4.		
8	A flow through design has been proposed and a minimum peaking factor of 1.2 has been applied to the peak flow to determine the DSF.		

9	A balanced flow design has been proposed and a 7-DMC or full flow balanced hydraulic design has been used to the determine the DSF with appropriate peaking factors.		
10	Mounding calculations, based on the high ground water level, have been submitted to assess potential for breakout at peak dosing.		
11	A rerating of an existing LSSDS has been applied for, based on a minimum of 2-seasons of daily flow metered data.		
12	Confirmation from MECP's regional technical support section that pre-submission consultation is complete		
13	Flow monitoring and an effluent monitoring program for the sewage system is proposed.		
14	Contingency measures are proposed in case of system failure or signs of system failure.		

12 Appendix B: Data Collection Blank Form – Attachment 1

Example blank template screen prints of Attachment 1 in an MS Excel™ format with two tabs (Year 1 and Year 2) for data entry to cover June 15th to September 15th; tabs three and four (Sample Complete Year 1 and Year 2) with sample data and tab five (7-DMC Year 1 and 2) that provides the summary DSF for the 7-DMC that may be used for design.

Yellow highlight area is to be completed with a daily meter reading and number of sites occupied for each different type of occupancy served by each treatment system. The first day date may be adjusted, and this will redefine all other dates by embedded formulas. Note that the Meter Reading is in US Gallons x 100 but other templates are available upon request. The total number of sites is to be included in Cell H38 and no other input is required.

The 7-DMC design flows are automatically computed by embedded formulas in the fifth tab. Screen prints of each Tab is provided below and the completed three worksheets are to be submitted as supporting information for an ECA application to MECP.

Attachment 1 – Blank Template for Year 1 (worksheet Year 1):

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Date	Day (1-31)	Meter Reading (US GAL x 100)	Number of Sites Occupied (S)	Liters per Day (LPD)	7 Day Average	Date	Day (31-62)	Meter Reading (US GAL x 100)	Number of Sites Occupied (S)	Liters per Day (LPD)	7 Day Average	Date	Day (63-93)	Meter Reading (US GAL x 100)	Number of Sites Occupied (S)	Liters per Day (LPD)	7 Day Average
2	15-Jun-24	1					16-Jul-24	32					16-Aug-24	63				
3	16-Jun-24	2					17-Jul-24	33					17-Aug-24	64				
4	17-Jun-24	3					18-Jul-24	34					18-Aug-24	65				
5	18-Jun-24	4					19-Jul-24	35					19-Aug-24	66				
6	19-Jun-24	5					20-Jul-24	36					20-Aug-24	67				
7	20-Jun-24	6					21-Jul-24	37					21-Aug-24	68				
8	21-Jun-24	7					22-Jul-24	38					22-Aug-24	69				
9	22-Jun-24	8					23-Jul-24	39					23-Aug-24	70				
10	23-Jun-24	9					24-Jul-24	40					24-Aug-24	71				
11	24-Jun-24	10					25-Jul-24	41					25-Aug-24	72				
12	25-Jun-24	11					26-Jul-24	42					26-Aug-24	73				
13	26-Jun-24	12					27-Jul-24	43					27-Aug-24	74				
14	27-Jun-24	13					28-Jul-24	44					28-Aug-24	75				
15	28-Jun-24	14					29-Jul-24	45					29-Aug-24	76				
16	29-Jun-24	15					30-Jul-24	46					30-Aug-24	77				
17	30-Jun-24	16					31-Jul-24	47					31-Aug-24	78				
18	01-Jul-24	17					01-Aug-24	48					01-Sep-24	79				
19	02-Jul-24	18					02-Aug-24	49					02-Sep-24	80				
20	03-Jul-24	19					03-Aug-24	50					03-Sep-24	81				
21	04-Jul-24	20					04-Aug-24	51					04-Sep-24	82				
22	05-Jul-24	21					05-Aug-24	52					05-Sep-24	83				
23	06-Jul-24	22					06-Aug-24	53					06-Sep-24	84				
24	07-Jul-24	23					07-Aug-24	54					07-Sep-24	85				
25	08-Jul-24	24					08-Aug-24	55					08-Sep-24	86				
26	09-Jul-24	25					09-Aug-24	56					09-Sep-24	87				
27	10-Jul-24	26					10-Aug-24	57					10-Sep-24	88				
28	11-Jul-24	27					11-Aug-24	58					11-Sep-24	89				
29	12-Jul-24	28					12-Aug-24	59					12-Sep-24	90				
30	13-Jul-24	29					13-Aug-24	60					13-Sep-24	91				
31	14-Jul-24	30					14-Aug-24	61					14-Sep-24	92				
32	15-Jul-24	31					15-Aug-24	62					15-Sep-24	93				
33																		
34		Year 1 - Daily Flows Summary																
35		Minimum Flow:							L/d									
36		Peak Flow:							L/d									
37		Average Flow (Do not include days with no flow):							L/d									
38		Total Number of campistes:							campsites									
39																		
40																		
41																		

Year 1 | Year 2 | Sample Complete Year 1 | Sample Complete Year 2 | 7-DMC Year 1 and 2

Attachment 1 – Blank Template for Year 2 (worksheet Year 2):

Date	Day (1-31)	Meter Reading (US GAL x 100)	Number of Sites Occupied (S)	Liters per Day (LPD)	7 Day Average	Date	Day (31-62)	Meter Reading (US GAL x 100)	Number of Sites Occupied (S)	Liters per Day (LPD)	7 Day Average	Date	Day (63-93)	Meter Reading (US GAL x 100)	Number of Sites Occupied (S)	Liters per Day (LPD)	7 Day Average
15-Jun-25	1					16-Jul-25	32					16-Aug-25	63				
16-Jun-25	2					17-Jul-25	33					17-Aug-25	64				
17-Jun-25	3					18-Jul-25	34					18-Aug-25	65				
18-Jun-25	4					19-Jul-25	35					19-Aug-25	66				
19-Jun-25	5					20-Jul-25	36					20-Aug-25	67				
20-Jun-25	6					21-Jul-25	37					21-Aug-25	68				
21-Jun-25	7					22-Jul-25	38					22-Aug-25	69				
22-Jun-25	8					23-Jul-25	39					23-Aug-25	70				
23-Jun-25	9					24-Jul-25	40					24-Aug-25	71				
24-Jun-25	10					25-Jul-25	41					25-Aug-25	72				
25-Jun-25	11					26-Jul-25	42					26-Aug-25	73				
26-Jun-25	12					27-Jul-25	43					27-Aug-25	74				
27-Jun-25	13					28-Jul-25	44					28-Aug-25	75				
28-Jun-25	14					29-Jul-25	45					29-Aug-25	76				
29-Jun-25	15					30-Jul-25	46					30-Aug-25	77				
30-Jun-25	16					31-Jul-25	47					31-Aug-25	78				
01-Jul-25	17					01-Aug-25	48					01-Sep-25	79				
02-Jul-25	18					02-Aug-25	49					02-Sep-25	80				
03-Jul-25	19					03-Aug-25	50					03-Sep-25	81				
04-Jul-25	20					04-Aug-25	51					04-Sep-25	82				
05-Jul-25	21					05-Aug-25	52					05-Sep-25	83				
06-Jul-25	22					06-Aug-25	53					06-Sep-25	84				
07-Jul-25	23					07-Aug-25	54					07-Sep-25	85				
08-Jul-25	24					08-Aug-25	55					08-Sep-25	86				
09-Jul-25	25					09-Aug-25	56					09-Sep-25	87				
10-Jul-25	26					10-Aug-25	57					10-Sep-25	88				
11-Jul-25	27					11-Aug-25	58					11-Sep-25	89				
12-Jul-25	28					12-Aug-25	59					12-Sep-25	90				
13-Jul-25	29					13-Aug-25	60					13-Sep-25	91				
14-Jul-25	30					14-Aug-25	61					14-Sep-25	92				
15-Jul-25	31					15-Aug-25	62					15-Sep-25	93				

Year 2 - Daily Flows Summary		
Minimum Flow:		L/d
Peak Flow:		L/d
Average Flow (Do not include days with no flow):		L/d
Total Number of campistes:		campsites

Year 1 | Year 2 | Sample Complete Year 1 | Sample Complete Year 2 | 7-DMC Year 1 and 2

Attachment 1 – Example Completed Worksheet for Year 1:

Date	Day (1-31)	Meter Reading (US GAL x 100)	Number of Sites Occupied (S)	Liters per Day (LPD)	7 Day Average	Date	Day (31-62)	Meter Reading (US GAL x 100)	Number of Sites Occupied (S)	Liters per Day (LPD)	7 Day Average	Date	Day (63-93)	Meter Reading (US GAL x 100)	Number of Sites Occupied (S)	Liters per Day (LPD)	7 Day Average
15-Jun-22	1	100	80			16-Jul-22	32	3438	60	28388	37174	16-Aug-22	63	6709	90	42581	37850
16-Jun-22	2	188	70	33119		17-Jul-22	33	3563	100	47313	37512	17-Aug-22	64	6823	95	43149	38607
17-Jun-22	3	300	90	42581		18-Jul-22	34	3675	90	42581	37512	18-Aug-22	65	6937	95	43149	39702
18-Jun-22	4	400	80	37850		19-Jul-22	35	3775	80	37850	38188	19-Aug-22	66	7045	90	40878	40472
19-Jun-22	5	488	70	33119		20-Jul-22	36	3863	70	33119	36498	20-Aug-22	67	7153	90	40878	40567
20-Jun-22	6	588	80	37850		21-Jul-22	37	3963	80	37850	37174	21-Aug-22	68	7255	85	38607	41013
21-Jun-22	7	700	90	42581		22-Jul-22	38	4075	90	42581	38526	22-Aug-22	69	7351	80	36336	40797
22-Jun-22	8	813	90	42581	38526	23-Jul-22	39	4188	90	42581	40554	23-Aug-22	70	7441	75	34065	39580
23-Jun-22	9	900	70	33119	38526	24-Jul-22	40	4275	70	33119	38526	24-Aug-22	71	7525	70	31794	37958
24-Jun-22	10	1000	80	37850	37850	25-Jul-22	41	4375	80	37850	37850	25-Aug-22	72	7621	80	36336	36985
25-Jun-22	11	1094	75	35484	37512	26-Jul-22	42	4469	75	35484	37512	26-Aug-22	73	7711	75	34065	36012
26-Jun-22	12	1194	80	37850	38188	27-Jul-22	43	4569	80	37850	38188	27-Aug-22	74	7807	80	36336	35363
27-Jun-22	13	1300	85	40216	38526	28-Jul-22	44	4675	85	40216	38526	28-Aug-22	75	7909	85	38607	35363
28-Jun-22	14	1413	90	42581	38526	29-Jul-22	45	4788	90	42581	38526	29-Aug-22	76	8017	90	40878	36012
29-Jun-22	15	1531	95	44947	38864	30-Jul-22	46	4906	95	44947	38864	30-Aug-22	77	8131	95	43149	37309
30-Jun-22	16	1656	100	47313	40892	31-Jul-22	47	5019	90	42581	40216	31-Aug-22	78	8251	100	45420	39256
01-Jul-22	17	1781	100	47313	42243	01-Aug-22	48	5125	85	40216	40554	01-Sep-22	79	8371	100	45420	40554
02-Jul-22	18	1906	100	47313	43933	02-Aug-22	49	5231	85	40216	41229	02-Sep-22	80	8491	100	45420	42176
03-Jul-22	19	2031	100	47313	45285	03-Aug-22	50	5331	80	37850	41229	03-Sep-22	81	8611	100	45420	43473
04-Jul-22	20	2156	100	47313	46299	04-Aug-22	51	5444	90	42581	41567	04-Sep-22	82	8731	100	45420	44447
05-Jul-22	21	2281	100	47313	46975	05-Aug-22	52	5556	90	42581	41567	05-Sep-22	83	8851	100	45420	45096
06-Jul-22	22	2406	100	47313	47313	06-Aug-22	53	5681	100	47313	41905	06-Sep-22	84	8971	100	45420	45420
07-Jul-22	23	2525	95	44947	46975	07-Aug-22	54	5794	90	42581	41905	07-Sep-22	85	9079	90	40878	44771
08-Jul-22	24	2638	90	42581	46299	08-Aug-22	55	5903	87	41162	42041	08-Sep-22	86	9183	87	39515	43928
09-Jul-22	25	2750	90	42581	45623	09-Aug-22	56	6009	85	40216	42041	09-Sep-22	87	9285	85	38607	42954
10-Jul-22	26	2869	95	44947	45285	10-Aug-22	57	6109	80	37850	42041	10-Sep-22	88	9381	80	36336	41657
11-Jul-22	27	2981	90	42581	44609	11-Aug-22	58	6203	75	35484	41027	11-Sep-22	89	9471	75	34065	40034
12-Jul-22	28	3094	90	42581	43933	12-Aug-22	59	6303	80	37850	40351	12-Sep-22	90	9555	70	31794	38088
13-Jul-22	29	3188	75	35484	42243	13-Aug-22	60	6403	80	37850	38999	13-Sep-22	91	9633	65	29523	35817
14-Jul-22	30	3275	70	33119	40554	14-Aug-22	61	6496	75	35484	37985	14-Sep-22	92	9711	65	29523	34195
15-Jul-22	31	3363	70	33119	39202	15-Aug-22	62	6596	80	37850	37512	15-Sep-22	93	9795	70	31794	33092

Year 1 - Daily Flows Summary		
Minimum Flow:	28,388	L/d
Peak Flow:	47,313	L/d
Average Flow (Do not include days with no flow):	39,887	L/d
Total Number of campistes:	100	campsites

Year 1 | Year 2 | Sample Complete Year 1 | Sample Complete Year 2 | 7-DMC Year 1 and 2

Attachment 1 – Example Completed Worksheet for Year 2:

Date	Day (1-31)	Meter Reading* (US GAL x 100)	Number of Sites Occupied (S)	Liters per Day (LPD)	7 Day Average	Date	Day (31-62)	Meter Reading* (US GAL x 100)	Number of Sites Occupied (S)	Liters per Day (LPD)	7 Day Average	Date	Day (63-93)	Meter Reading* (US GAL x 100)	Number of Sites Occupied (S)	Liters per Day (LPD)	7 Day Average
15-Jun-22	1	100	80			16-Jul-22	32	3574	60	30659	38823	16-Aug-22	63	7107	90	45988	40878
16-Jun-22	2	191	70	34444		17-Jul-22	33	3709	100	51098	39445	17-Aug-22	64	7240	95	50341	42230
17-Jun-22	3	308	90	44285		18-Jul-22	34	3831	90	45988	39688	18-Aug-22	65	7373	95	50341	43947
18-Jun-22	4	412	80	39364		19-Jul-22	35	3939	80	40878	40608	19-Aug-22	66	7499	90	47691	45285
19-Jun-22	5	503	70	34444		20-Jul-22	36	4033	70	35768	39040	20-Aug-22	67	7625	90	47691	45893
20-Jun-22	6	607	80	39364		21-Jul-22	37	4141	80	40878	39959	21-Aug-22	68	7744	85	45042	46853
21-Jun-22	7	724	90	44285		22-Jul-22	38	4263	90	45988	41608	22-Aug-22	69	7856	80	42392	47069
22-Jun-22	8	841	90	44285	40067	23-Jul-22	39	4384	90	45988	43798	23-Aug-22	70	7961	75	39743	46177
23-Jun-22	9	932	70	34444	40067	24-Jul-22	40	4479	70	35768	41608	24-Aug-22	71	8059	70	37093	44285
24-Jun-22	10	1036	80	39364	39364	25-Jul-22	41	4587	80	40878	40878	25-Aug-22	72	8171	80	42392	43149
25-Jun-22	11	1134	75	36904	39013	26-Jul-22	42	4688	75	38323	40513	26-Aug-22	73	8276	75	39743	42014
26-Jun-22	12	1238	80	39364	39715	27-Jul-22	43	4796	80	40878	41243	27-Aug-22	74	8388	80	42392	41257
27-Jun-22	13	1348	85	41824	40067	28-Jul-22	44	4911	85	43433	41608	28-Aug-22	75	8507	85	45042	41257
28-Jun-22	14	1465	90	44285	40067	29-Jul-22	45	5032	90	45988	41608	29-Aug-22	76	8633	90	47691	42014
29-Jun-22	15	1589	95	46745	40418	30-Jul-22	46	5160	95	48543	41973	30-Aug-22	77	8766	95	50341	43528
30-Jun-22	16	1719	100	49205	42527	31-Jul-22	47	5282	90	45988	43433	31-Aug-22	78	8906	100	52990	45799
01-Jul-22	17	1849	100	49205	43933	01-Aug-22	48	5397	85	43433	43798	01-Sep-22	79	9046	100	52990	47313
02-Jul-22	18	1979	100	49205	45690	02-Aug-22	49	5511	85	43433	44528	02-Sep-22	80	9186	100	52990	49205
03-Jul-22	19	2109	100	49205	47096	03-Aug-22	50	5619	80	40878	44528	03-Sep-22	81	9326	100	52990	50719
04-Jul-22	20	2239	100	49205	48151	04-Aug-22	51	5741	90	45988	44893	04-Sep-22	82	9466	100	52990	51855
05-Jul-22	21	2369	100	49205	48854	05-Aug-22	52	5862	90	45988	44893	05-Sep-22	83	9606	100	52990	52612
06-Jul-22	22	2499	100	49205	49205	06-Aug-22	53	5997	100	51098	45258	06-Sep-22	84	9746	100	52990	52990
07-Jul-22	23	2622	95	46745	48854	07-Aug-22	54	6119	90	45988	45258	07-Sep-22	85	9872	90	47691	52233
08-Jul-22	24	2739	90	44285	48151	08-Aug-22	55	6236	87	44455	45404	08-Sep-22	86	9994	87	46101	51249
09-Jul-22	25	2856	90	44285	47448	09-Aug-22	56	6351	85	43433	45404	09-Sep-22	87	10113	85	45042	50113
10-Jul-22	26	2980	95	46745	47096	10-Aug-22	57	6459	80	40878	45404	10-Sep-22	88	10225	80	42392	48599
11-Jul-22	27	3097	90	44285	46393	11-Aug-22	58	6560	75	38323	44309	11-Sep-22	89	10330	75	39743	46707
12-Jul-22	28	3214	90	44285	45690	12-Aug-22	59	6668	80	40878	43579	12-Sep-22	90	10428	70	37093	44436
13-Jul-22	29	3311	75	36904	43933	13-Aug-22	60	6776	80	40878	42119	13-Sep-22	91	10519	65	34444	41786
14-Jul-22	30	3402	70	34444	42176	14-Aug-22	61	6877	75	38323	41024	14-Sep-22	92	10610	65	34444	39894
15-Jul-22	31	3493	70	34444	40770	15-Aug-22	62	6985	80	40878	40513	15-Sep-22	93	10708	70	37093	38607

Year 2 - Daily Flows Summary		
Minimum Flow:	30,659	L/d
Peak Flow:	52,990	L/d
Average Flow (Do not include days with no flow):	43,642	L/d
Total Number of campistes:	100	campsites

Year 1 | Year 2 | Sample Complete Year 1 | **Sample Complete Year 2** | 7-DMC Year 1 and 2

Attachment 1 – Summary Design 7-DSF Flows Considering both Year 1 and 2

Year 1 Summary 7-DMC				
7DMA Max	Index of 7DMA Max	Index	7-DMC	Ordered 7-DMC
47,313	22	22	41,905	**46,975**
			46,975	**46,299**
			46,299	**45,285**
			45,285	**43,933**
			43,933	**42,243**
			42,243	**41,905**
			40,892	**40,892**

Year 2 Summary 7-DMC				
7DMA Max	Index of 7DMA Max	Index	7-DMC	Ordered 7-DMC
52,990		22	52,990	**52,990**
			52,612	**52,612**
	22		51,855	**51,855**
			50,719	**50,719**
			49,205	**49,205**
			47,313	**47,313**
			45,799	**45,799**

Design 7-DMC			
Day	7-DMC Year 1	7-DMC Year 2	Design DSF 7-DMC
1	46,975	52,990	**52,990**
2	46,299	52,612	**52,612**
3	45,285	51,855	**51,855**
4	43,933	50,719	**50,719**
5	42,243	49,205	**49,205**
6	41,905	47,313	**47,313**
7	40,892	45,799	**45,799**
Mean:	46,975	52,990	**52,990**

Year 1 | Year 2 | Sample Complete Year 1 | Sample Complete Year 2 | **7-DMC Year 1 and 2**