

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE OF THE GUIDELINES

This document, prepared jointly by Alberta Transportation (TRANS), Transportation & Civil Engineering Division, Civil Projects Branch and Alberta Environment (AENV), Regional Services, Water Management Operations (collectively hereinafter referred to as the Province), is intended to:

- Provide guidelines for the design of water control structures on provincially-owned water management projects;
- Provide guidance on some of the factors to be considered and applicable references; and
- Facilitate the transfer of information and standards of good practice among consulting engineering firms involved on provincially-owned water projects.

These guidelines are focused primarily on certain requirements and preferences that the Province has developed based on decades of experience in the design, construction, rehabilitation, operation and performance monitoring of water control structures within the Province. As such, this document does not present all of the factors, conditions, criteria or other circumstances that need to be considered in the design and construction of water control structures. Furthermore, the guidelines are not intended to discourage or restrict the creation of innovative approaches and solutions, or to discount the importance and value of professional judgement. However, when a design that would deviate from the guidelines is being contemplated, the designer must clearly identify, provide details, and present the reasons for the proposed deviation, early in the design process, for consideration by the Province.

These guidelines are intended for use by professional personnel who are experienced in the design, construction, and operation of water control structures, qualified to evaluate the limitations and significance of its contents and to judge its suitability for a particular purpose, and will accept responsibility for their application and use of the material it contains.

1.2 REVISIONS

TRANS is responsible for issuing any revisions made to this document. Revisions will be posted on TRANS' web site.

Each holder is responsible for incorporating the revision into the document and recording receipt of the same in Table 1-1.

The format of the revision will consist of an updated page, table or figure, issued in its complete form so that the previous or superseded page, table or figure can be removed from the document, and the new version inserted.

**Table 1-1
Record of Revisions**

Revision No.	Revision Date	Page No.	Table No.	Figure No.	Inserted

1.3 DEFINITIONS

Annual Exceedance Probability (AEP) is defined by the Canadian Dam Association (CDA) as the probability that an event of specified magnitude will be equalled or exceeded in any year.

Construction Condition is a condition that has a high likelihood of occurring for a relatively short period of time during construction of the structure. Normally, the structure is designed to accommodate this condition with a negligible probability of failure or damage.

Extreme Condition is a condition that has a very remote likelihood of occurring within the design life of the structure. It typically includes the most severe events such as the MDE and the IDF. Under this condition, uncontrolled water release should not occur; however, some damage can be tolerated.

Inflow Design Flood (IDF) is defined by the CDA as the “Most severe inflow flood (volume, peak, shape, duration, and timing) for which a dam and associated facilities are designed.”

Limit States is defined in Canadian Standards Association (CSA) A23.3-94 as “those conditions of a structure in which it ceases to fulfil the function for which it was designed.”

Load Factor is defined by CSA as “the factor applied to a specified load which takes into account the variability of the loads and load patterns and analysis of their effects.”

Mass Concrete is defined by the American Concrete Institute (ACI) as “Any large volume of cast-in-place concrete with dimensions large enough to require that measures be taken to cope with the generation of heat and attendant volume change to minimize cracking.”

Maximum Design Earthquake (MDE) is defined by the CDA as “The earthquake that would result in the most severe ground motion which a dam structure should be able to endure without the uncontrolled release of water from the reservoir.”

Probable Maximum Flood (PMF) is defined by the CDA as “Estimate of hypothetical flood (peak flow, volume and hydrograph shape) that is considered to be the most severe “reasonably possible” at a particular location and time of year, based on relatively comprehensive hydro-meteorological analysis of critical runoff-producing precipitation (snowmelt if pertinent) and hydrological factors favourable for maximum flood runoff.”

Resistance Factor is defined by CSA as “the factor applied to a specified material property or to the resistance of a member for the limit state under consideration, which takes into account, the variability of dimensions, material properties, workmanship, type of failure, and uncertainty in the prediction of resistance.”

Roller Compacted Concrete (RCC) is defined by the ACI as “Concrete of no-slump consistency transported, placed, and compacted using earth and rockfill construction equipment.”

Spillway Design Flood (SDF) is an inflow flood for which the service spillway facilities are designed to permit controlled releases of water without damage to the dam or appurtenant structures, while limiting the maximum reservoir surcharge above its full supply level to a prescribed value.

Usual Condition is a condition that has a high likelihood of occurring within the design life of the structure. It typically includes those events that may occur on numerous occasions and/or for sustained periods of time. Normally, the structure is designed to accommodate this condition with a negligible probability of failure or damage.

Unusual Condition is a condition that has some likelihood of occurring within the design life of the structure. It typically includes infrequent flood events other than the IDF, infrequent earthquake events other than the MDE, and plugged drain conditions. Normally, the structure is designed to accommodate this condition with a low probability of failure. Some minor damage may be tolerated.