Ministry of Transportation and Communications

Ontario

MINISTRY DIRECTIVE

Program: Provincial Roads

Directive: B-100

Issuing Authority: Executive Director, Highway Engineering Division

Date of Issue: 80 10 16 Effective Date: Immediate

TO: Assistant Deputy Ministers, Executive Directors, Regional Directors, Directors, District Engineers, Regional Managers Drivers and Vehicles, Office Managers

SUBJECT: M.T.C. Design Flood Criteria

ALTERNATIVE INDEX LISTING(S): Design Floods, Design Storms, Flood Criteria, Hydrologic Criteria for Bridges and Other Drainage Facilities.

REFERENCE:
- Ministry of Natural Resources "Provincial Flood Plain Criteria" as approved by Cabinet, 1979 11 02.
- "Proposed Model Policies for Urban Drainage Management", December 1978, produced by Urban Drainage Subcommittee of the Canada-Ontario Agreement on Great Lakes Water Quality.
- Previous statements of M.T.C. flood criteria are hereby cancelled and superseded.

PURPOSE

To state M.T.C. policy on flood criteria for the design of highway structures and other drainage facilities.

BACKGROUND

A need was identified in 1971 for improved M.T.C. design flood criteria. Later, R.E.C.A.P. 11:8 recommended that meetings be held with the Ministry of Natural Resources (M.N.R.) to discuss the effects of its drainage policy on the cost of road drainage facilities. This was done in July 1979.

In the interim, the Ministry had been using design flood criteria which were agreed to by M.N.R. until such time as Cabinet had approved M.N.R.'s own Provincial Flood Plain Criteria. The provincial criteria were approved in November 1979, and the final M.T.C. criteria were subsequently agreed to by M.N.R. in February 1980.

The M.T.C. criteria take account of M.T.C.'s own needs, those of the M.N.R. and those expressed in the Proposed Model Policies for Urban Drainage Management, which are supported by the Ministry of the Environment.

POLICY AND PROCEDURE

The attached M.T.C. Design Flood Criteria will be used for the hydraulic design of M.T.C. water crossings, storm sewers and other drainage facilities.

In cases where a Regional Office is unable to agree with a Conservation Authority or with M.N.R. on mutually acceptable design flood criteria, an opinion and technical support will be obtained from the Drainage and Hydrology Section. If agreement still cannot be reached, the problem will be resolved by discussions between the M.T.C. Highway Engineering Division and the M.N.R. Conservation Authorities Branch.

M.T.C. DESIGN FLOOD CRITERIA

ROAD CLASSIFICATION[1]	BRIDGES & CULVERTS		STORM DRAINAGE SYSTEM[7]		STREAM CHANNELS
	Total span[5] up to 6.0 m	Total span[4] over 6.0 m	Minor System[8]	Major System[8]	
Freeway Urban Arterial	50 year	100 year	10 year	Regional Flood	10 year[9]
Rural Arterial Collector Road	25 year	50 year	2 to 5 year	Regional Flood	2 to 5 year[9]
Local Road	10 year	25 year	2 year	Regional Flood	2 year[9]
Depressed roadways (subways etc)	-	-	10 to 25 year	-	-

NOTES

1. Drainage facilities for provincial highways shall be designed to the criteria shown, except as provided below.

2. Design floods for bridges and culverts shall be based on runoff conditions anticipated 20 years from the time of design, taking full account of present and probable future municipal controls over increases of runoff from new development.

   Design floods for storm drainage systems shall normally be based on existing runoff conditions, but, at the request of the municipality concerned, and subject to the Ministry's cost sharing policies, may be based on the 20-year period as for bridges and culverts.

3. The criteria may be modified in exceptional cases, such as for unusually large structures, unusually low traffic volumes, or for vital routes which must remain useable during regional flood conditions. Use of regional flood criteria in the latter case shall be justified by a cost-benefit analysis.

4. REGIONAL FLOODS

   If a drainage facility designed to the criteria specified in the table would increase flooding of buildings or developable land during a regional flood, the facility shall be designed to the regional flood criteria unless otherwise approved. The overall benefit (tangible and intangible) of designing to the regional flood shall be commensurate with the additional cost of the facility, and the proposal should be discussed with the municipality and with landowners adversely affected.

   A regional flood is a design flood specified by the Ministry of Natural Resources for floodplain management purposes. Regional storms for specific regions are indicated on the attached map.

For the purposes of these criteria, buildings are defined as residential, commercial, institutional or industrial buildings or buildings of comparable value. Developable land is defined as land on which there is a high probability that buildings will be constructed within 20 years of design of the facility.

Relief flow over the roadway during regional floods shall be provided wherever feasible at bridge or culvert crossings required to accommodate such floods.

In a storm drainage system required to accommodate a regional flood, flows exceeding the capacity of the minor system shall be accommodated by the major system.

5. Road classifications are defined as follows.

Freeway	a fully-controlled-access road exclusively for through traffic.
Arterial Road . .	a road primarily for through traffic.
Collector Road . .	a road on which traffic movement and access to property have similar importance.
Local Road . . .	a road primarily for access to property.

If the road classification is likely to be upgraded or downgraded within 5 years of construction, the return period shall be that for the future classification.

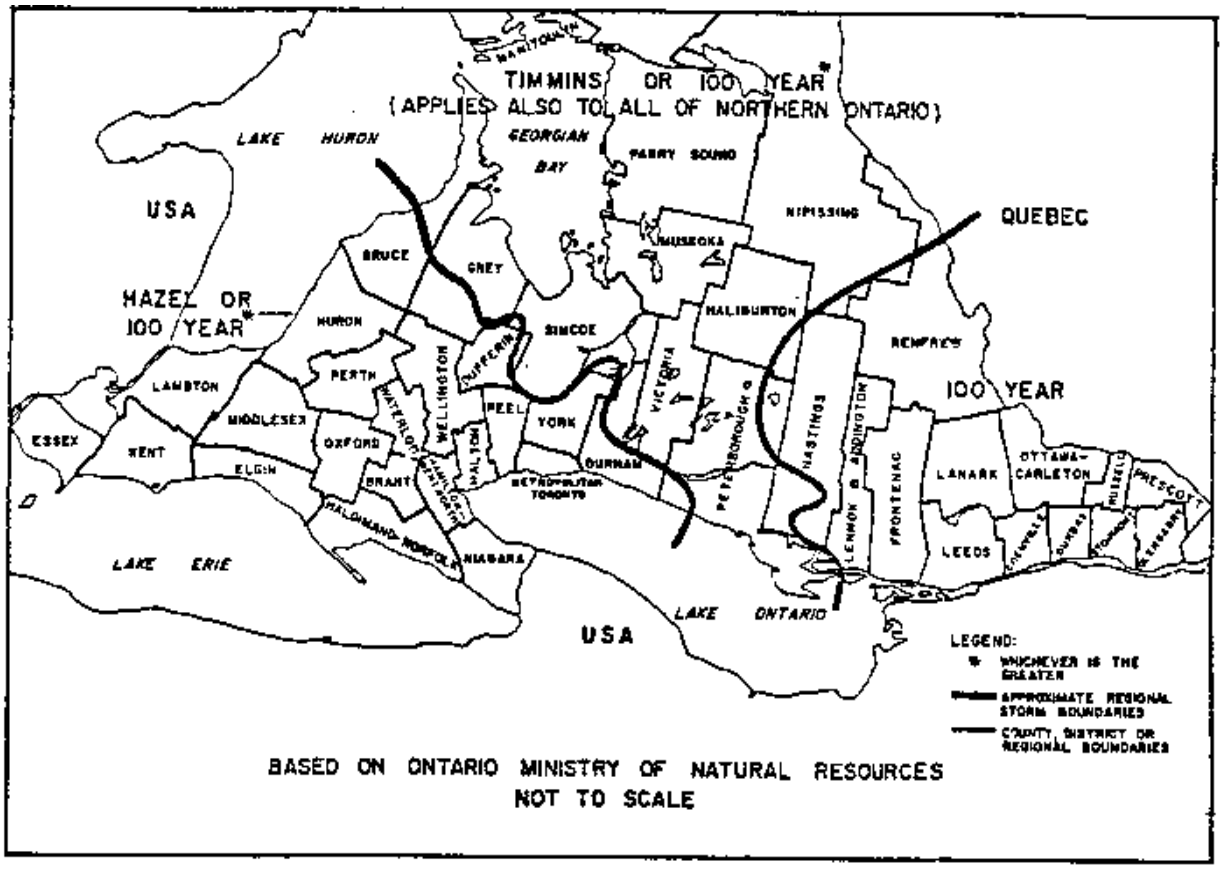
6. For the purpose of selecting design flood criteria, total span is defined as the sum of the individual clear spans or diameters, measured parallel to the centreline of roadway in the case of a bridge, and perpendicular to the longitudinal axis in the case of a culvert.

7. The flood (storm) frequencies for storm drainage systems may be modified to reflect local municipal requirements and adjacent land uses.

8. The minor system of a storm drainage system comprises the road gutters, inlets, storm sewers and minor ditches.

   The major system is the route followed by runoff waters when the capacity of the minor system is exceeded, and generally includes the roadways and major channels.

9. If a stream diversion or stream channelization will alter the storage or discharge characteristics of a channel or floodplain, the channel may be designed for the return period given by the table, but the combined channel and floodplain shall accommodate a 25-year flood except as provided in note 4.



Regional Flood (Storm) Boundaries

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