

EPCOR Drainage Services

Guidelines for Stormwater Management

Requirements for Individual Lot Development Areas between 0.16 ha to 3.0 ha

Introduction

The majority of Edmonton's stormwater sewers are presently flowing at capacity or are overloaded. This is mainly due to the continuing process of property redevelopment resulting in increased paved areas which generate higher runoff rates. To ensure that the service level does not deteriorate further (standard service level requires the sewers to convey runoff from a storm with a 5 year recurrence interval), EPCOR Drainage requires the control of allowable peak discharge rates for stormwater flows from developing or re-developing properties into the stormwater sewer system for most areas of the City. Stormwater runoff control is required for all lots greater than 0.16 ha.

Properties re-zoned to a higher density than originally intended will, in most instances, be required to control the stormwater outflow rate and provide detention facilities to temporarily store the excess storm runoff and gradually release it into the sewer system.

When an addition is being constructed to an existing building or a new building is being constructed on an existing paved lot, stormwater runoff control measures will apply only to the new portion of construction if the previously developed area drains to the sewer through an existing storm service. Where a parking lot is to be gravelled as an interim measure and eventually paved, stormwater management facilities **MUST BE** designed based on the permanent scheme.

When servicing a property in the combined sewer area of the City, the same sewer service pipe may be utilized for both sanitary and storm flows providing less than two-thirds of the combined service pipe capacity is utilized for storm flows. Should sanitary peak flow exceed the capacity of the remaining one-third of the combined outlet pipe, the pipe size must be increased accordingly. In addition, a backwater valve must be installed in the sanitary sewer service as per the most current National Plumbing Code of Canada.

Where peak stormwater runoff control is required, storm flows are to be restricted to 0.035CMS/ha or as required by EPCOR Drainage.

STORAGE VOLUME DETERMINATION

Required storage volumes for various runoff coefficient values were derived based on a "Simplified Approach to Calculating Storage Pond Volumes" by K.L Chua. Exhibit 2 lists these storage volumes and shows how to apply them to calculate required storage volume for any site. This method should only be used for drainage areas up to 3.0ha. For drainage areas exceeding 3.0ha, the recommended drainage scheme (including runoff control works) should be based on specific evaluations which should form part of the submission.

The following runoff coefficients (relative impermeability) should be used to determine the amount of runoff.

<u>Type of Surface</u>	<u>Runoff Coefficient</u>
Grass	0.1
Gravel	0.5
Paved	0.9
Roof	0.9

Acceptable methods of storage are outlined below:

Roof
MH's, CB's and Storm Lines

Parking Lot
Dry Ponds

Super Pipe
Wet Ponds

OUTLET RATE CONTROL

The outlet rate may be controlled either by the installation of an orifice, a hydro-brake or by sizing the storm sewer pipe to ensure that the allowable outflow rate will not be exceeded during a 5 year storm (the minimum allowable pipe size is 150mm in diameter). If an orifice is to be utilized, a minimum diameter of 50mm is required to reduce the risk of clogging the orifice (even if the allowable outflow rate is exceeded). Where only one flow restriction device is to be installed at the downstream end of the drainage system for a development, it should be placed in the sampling manhole. If orifices are used to control outflow in sub-basins on a development, a main orifice sized for the entire development must be installed in the last private downstream manhole.

In certain cases, it may be advantageous to use the dynamic response of the downstream sewer flow depth as the criteria to control the outflow rate; this would assist in optimizing the downstream conveyance capacity to minimize storage needs. In such cases, the developer should provide adequate engineering analysis to demonstrate the effectiveness of the recommended flow sensing and control devices.

LIMITATION OF THESE GUIDELINES

These guidelines are based on simplified techniques to assist developers and their consultants when making submissions to EPCOR Drainage's Water and Sewer Servicing (WASS) section for new storm services for small developments that are straight forward in nature. The guidelines are not meant to preclude proper engineering assessments of the service proposals submitted by developers and their consultants who are fully responsible for the accuracy and appropriateness of their submission in meeting the servicing requirements and the applicable standards. Larger developments and those of a complex nature will still require a full engineering analysis on a site specific basis.

SUBMISSION REQUIREMENTS

The following is required to be submitted for review and approval:

- a. Required storage volume calculations
- b. Calculation showing how storage is achieved
- c. Orifice (or outflow pipe) sizing calculations, hydro-brake specifications
- d. Overall utility plan (showing utility lines, inverts, rim elevations and location of MH's and
- e. CB's, type and size of flow control device).
- f. Lot Grading Plan (showing storage areas, max. ponding depth & overflow)
- g. Provisions to ensure that the restricting devices are secure and will remain in place and functional with time. This will include provision for unrestricted access for inspection by EPCOR staff.

A stormwater Management Summary Form (Exhibit 1) must be completed and submitted along with plans for proposed sewer services and the above noted information if stormwater management is required. The plans will not be accepted by EPCOR Drainage unless all necessary information is provided.

Should any questions arise, please contact the Water and Sewer Servicing Section at (780) 496-5444.

Exhibit 1
STORMWATER MANAGEMENT CALCULATION SUMMARY

1. General Information

Project Name:		
Civic Address:		
Lot:	Block:	Plan:
Engineering Consultant:		
Contact Name:	Phone #:	Email:

2. Briefly describe the drainage system and how EPCOR Drainage requirements are met as per guidelines provided:

3. Storage Calculation Summary

Total site area: _____ ha

List information on each storage area as noted below:

Storage Location	Area Drained				Required Storage (M ³)	Available Storage
	Roof	Paved	Grass	Gravel		

**Attach all calculations for storage volume determination.

4. Flow Restriction Calculations Summary

Maximum allowable outflow: _____cms [Area(ha)x0.035cm]

Location of Flow Restrictor	Type & Flow of Restrictor	Size of Flow Restrictor	Maximum Design Flow

**Attach all calculations for flow restrictor sizing.

Exhibit 2

Calculation for Required Storage Volumes

The following table can be used to estimate required storage

- a. Outflow rate is constant 0.035cms/ha
- b. Area of basin drained is 1ha
- c. The 2 year, 5 year, 10 year, 25 year, 50 year, 100 year and 200 year storms are based on a 4 hour Chicago Distribution.

STORAGE VOLUME IN CUBIC METERS/Ha

Runoff Coefficient	2-Year	5-Year	10 Year	25 Year	50 Year	100 Year	200 Year	1937 Storm	1978 Storm	1988 Storm
0.10	0	0	0	0	0	3	7	0	0	0
0.15	0	0	0	5	10	15	23	0	3	0
0.20	0	1	6	14	20	30	42	0	11	0
0.25	0	6	13	23	33	45	64	0	23	0
0.30	3	12	19	34	46	64	90	0	38	0
0.35	6	17	28	45	61	84	117	0	53	1
0.40	10	23	36	57	78	105	146	0	71	2
0.45	14	30	45	71	95	128	176	0	89	4
0.50	18	36	54	85	113	152	208	0	112	6
0.55	22	43	63	99	132	177	242	0	136	8
0.60	26	50	74	114	152	203	276	0	161	12
0.65	31	57	84	130	172	229	312	0	186	18
0.70	36	65	96	146	193	257	349	4	219	23
0.75	41	74	107	162	214	285	387	13	255	28
0.80	46	82	118	180	236	314	426	22	292	34
0.85	51	91	130	197	259	344	466	43	331	39
0.90	55	100	142	214	282	375	507	68	369	45
0.95	61	109	155	232	306	406	549	92	408	50
1.00	66	118	168	251	330	438	592	117	447	56