

Appendix 1

Storm Sewer Design Sheet

Appendix 1

CITY OF OSHAWA		STORM SEWER DESIGN SHEET (METRIC)										__ YEAR STORM CURVE					
PROJECT:				DETAIL:						CRITERIA:							
DESIGN BY:			DATE:			CHECKED BY:			MANNING'S FORMULA N=0.013		TOWN HOUSE I = 0.65 APARTMENTS I = 0.65 COMMERCIAL I = 0.90 INDUSTRIAL I = 0.90						
NOTES :								PARK LAND I = 0.20 SINGLE I = 0.50-0.60 SEMI I = 0.60									
LOCATION		DRAINAGE AREA				RUNOFF			PIPE SELECTION						% LOAD	COMMENTS	
FR	TO	A	I	A*I	Cum A*I	Cum T.C.	R	Q DESIGN $Q = \frac{CiA}{0.036}$ (L/s)	PIPE L	PIPE SIZE	GRADE	CAP.	VEL.	TIME OF FLOW			TOTAL TIME
No	No	(ha)				(min)	(cm/h)	(L/s)	(m)	(m)	(%)	(L/s)	(m/s)	(min)	(min)		

CALCULATE T.C.

Appendix 2

Storm Design - Intensity – Duration – Frequency Rainfall Equations

Appendix 2

Storm Design – Intensity – Duration – Frequency Rainfall Equations

$$R = \frac{A}{(T + C)^B}$$

Where:

R = Rainfall Intensity (cm/hr)

T = Total time of concentration (min)

A, B, C = IDF Parameters as summarized in the table below

City of Oshawa Intensity – Duration – Frequency Parameters

IDF Parameter	1 Year	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	51.95	64.77	92.96	102.10	110.00	114.80	177.00
B	0.7755	0.7840	0.7980	0.7870	0.7760	0.8030	0.8200
C	3.8	4.0	4.0	3.0	2.0	3.0	4.0

Appendix 3

Storm Design – Time of Concentration for Overland Flow

Appendix 3

Storm Design – Time of Concentration for Overland Flow

The variables needed to compute the time of concentration for a catchment area are its length, slope, area, and runoff coefficient.

The length, L , is the distance from the extremity of the catchment area in a direction parallel to the slope until a defined channel is reached.

The slope, S , is the difference in elevation between the extreme edge of the catchment area and the point in question, divided by the horizontal distance between the two points.

The runoff coefficient, C , of a catchment is based on the catchments land use and imperviousness. See the CLOCA guidelines for recommended runoff coefficients for different land uses.

The catchment area, A , is the total area draining to the point in question.

Per CLOCA guidelines, the overland time of concentration, t_c , should be calculated based on the Airport Method for catchments with a runoff coefficient less than 0.40, or the Bransby-Williams Equation for catchments with a runoff coefficient less than 0.40.

The Airport Method and Bransby-Williams Equations are summarized below:

Airport Method ($C < 0.4$)	Bransby-Williams Equation ($C > 0.4$)
$t_c = \frac{3.26(1.1 - C)L^{0.5}}{S_w^{0.33}}$	$t_c = \frac{0.057L}{S_w^{0.2}A^{0.1}}$

Where:

t_c = Time of Concentration (min)

C = Runoff Coefficient

L = Catchment Length (m)

S = Catchment Slope (%)

A = Catchment Area (ha)

Other time of concentration formulas may be accepted with the appropriate supporting information. A composite time of concentration formula may be required where ditches or channelized flow is present in the catchment. If channelized flow occurs in a catchment area, the total time of concentration will be the time of overland flow plus the time within the channel (ie. total time of concentration = t_c + $t_{\text{channelized flow}}$).

Appendix 4

Storm Design – Velocity for Gutter Flow Chart

Appendix 4

VELOCITY FOR GUTTER FLOW

PLATE "B"

$$V = 0.5163 * \text{square root of 'S'}$$

S, Road Grade (%)	V, Velocity (m/sec.)
0.50	0.37
0.60	0.40
0.70	0.43
0.80	0.46
0.90	0.49
1.00	0.52
1.20	0.57
1.40	0.61
1.60	0.65
1.80	0.69
2.00	0.73
2.20	0.77
2.40	0.80
2.60	0.83
2.80	0.86
3.00	0.89
3.20	0.92
3.40	0.95
3.60	0.98
3.80	1.00
4.00	1.03
4.20	1.06
4.40	1.08
4.60	1.11
4.80	1.13
5.00	1.15
5.50	1.21
6.00	1.26
6.50	1.32
7.00	1.37

Appendix 5

City Council Policy Related to Decorative Street Lighting and Signage

Appendix 5

Procedure

1. Locational Criteria for Decorative Street Lighting and Street Name Signs

General locational criteria for the use of decorative street lighting and decorative street name signs and assemblies will be applied against the individual merits of the plan of subdivision or development area. Where the general locational criteria will permit the use of decorative street lights, decorative street name signs and assemblies will also be permitted.

Where prepared, Urban Design Guidelines will address the use of decorative street lights and street name signs.

The goal is to permit the use of decorative street lighting and signs, where appropriate, to enhance the streetscape in City subdivisions. In general, decorative street lighting and street name signs cannot be used in a haphazard or unplanned manner.

The following criteria shall be met in order for the decorative lighting and signage to be approved:

- It must have a logical beginning and end on both sides of a road; natural features such as creek valleys, open spaces, conservation areas or wood lots that are contained in or abutting the subject development and planned features such as parks may help define the limits of lighting treatment;
- The area must be well defined or be territorially defined with such features as an upscale landscape treatment including entranceway features that set it apart from other areas of development;
- If the defined area extends across more than one Developers' lands, then the agreement of all Developers will be required in order for decorative lighting and signage to be permitted.
- If a Developer elects to use decorative lighting and/or signage, in the first phase of development, then this standard must be utilized in subsequent phases until the above locational criteria allows a change in the street lighting and/or signage style.

It is important to note that the locational criteria are only a guideline and each individual development will have to be assessed on its own merits. Final determination of the areas for the proposed use of decorative lighting and signage will be administered by the Department of Development Services.

2. Processing of Street Lighting and Street Name Sign Designs in Subdivisions

During the draft plan approval stage for subdivision development, the Developer will be advised that there is an opportunity to utilize decorative street lighting and street name

signs and assemblies subject to the satisfaction of certain criteria later in the development process.

Prior to the first submission of engineering drawings to the Department of Development Services, the Subdivider must indicate his intent to use decorative street lighting and street name signs to the Department of Development Services.

Following receipt of the Developer's intention to use decorative street lighting, the Department of Development Services, in consultation with the Developer's engineering consultant will establish, if appropriate, acceptable areas for installation of decorative lighting. The Oshawa PUC Networks shall be advised of any decorative street lighting approvals and undertake the required preliminary lighting design. The estimated costs for the lighting will be included in Oshawa PUC Network's offer-to-connect.

The Subdivider will submit engineering plans for the subdivision and reflect the decorative street lighting, as approved on a preliminary basis by the City, on plans that also show the manner in which other utilities, street furniture and street trees are intended to be accommodated.

Once this process has been completed and a street furniture plan accepted by the City, the Oshawa PUC Networks will enter into an agreement with the Developer for the supply and installation of street lighting. If necessary, the City or the decorative light manufacturer will assist the Oshawa PUC Networks in any design issues. The Developer may also seek an alternate contractor to perform the work, provided the contractor is acceptable to the Oshawa PUC Networks. If the alternate contractor is selected by the Developer, the Developer will still be required to reimburse Oshawa PUC Networks for costs associated with engineering design approvals and inspection of the contractor's work.

Similarly, following receipt of the Developer's request to incorporate decorative signage, the Department of Development Services will establish acceptable areas for installation of decorative signage. The Transportation & Parking Services Branch of the Department of Operational Services shall be advised of any decorative signing proposals.

The Department of Development Services, in co-operation with the Department of Operational Services, will prepare a proposed street name sign design, including the proposed community name and unique community graphic utilizing the standard sign shape established by the City (ROSCO style).

All decorative street name sign designs shall conform to the standard shape and specifications established and will be subject to approval of the Transportation and Parking Services Branch to ensure functionality.

Once this process has been completed and a design finalized, the Transportation and Parking Services Branch will arrange for manufacturing and installation of street name signs and hardware.

Decorative signing shall consist only of street name signs and the associated support assemblies. The City shall install all other required traffic control signage in the development in accordance with its regular standards.

Policy and Procedure

Decorative Street Lighting and Signage in New Residential Subdivisions

Policy (1999)

1. That the Developer be financially responsible for all decorative street lighting on local and collector roads associated with their residential plans of subdivision or development, in accordance with the City's design standards.

That where the City is financially responsible for street lighting on arterial roads or parts thereof, its responsibility will extend to the cost of standard street lighting only.

That where the locational criteria have been met and where approved, the decorative Victorian style coach lamp and polished black tapered octagonal concrete pole (see attachment #1) will be permitted as an alternative standard;

That regardless of the lighting type, the illumination levels shall conform to the City's Street Lighting Design and Installation Standards.

2. That where the locational criteria have been met and where approved, decorative street name signs and assemblies (see attachment #2) will also be permitted. The increased cost to install decorative street name signs and assemblies will be the responsibility of the Developer.

That all installations shall be in accordance with the City's Design Standards.

As Amended (2004)

1. That the City's standard for decorative street lighting be amended to permit the Trafalgar Telecommunications Pole as an alternative decorative lighting standard subject to the same conditions and restrictions currently applicable to the approved decorative lighting standard;
2. That the Mayor and Clerk be authorized to execute, from time to time, any agreement related to the installation of works within the Trafalgar Pole, which are in form acceptable to the Commissioner, Development Services Department and the Director, Legal Services;
3. That the City's decorative street name sign concept be refined to reflect the "ROSCO" style sign used in the downtown.

Appendix 6

Sample of Form Letter from Engineer Confirming Actions Related to Subgrade Problems

Appendix 6

Date:

Development: _____

Location(s): _____

Consulting Engineer: _____

Geotechnical Engineer: _____

Attached is a copy of recommendations received from the above-noted Geotechnical Engineer resulting from proof rolling in the above development.

☺ We will be using the following course of action recommended by the Geotechnical Consultant:

☺ We will be using an alternate course of action as explained below. (Include both action and reason for variance).

Consulting Engineer's Representative

Appendix 7

Sample Lot Grading Certificate

Appendix 7

Sample Lot Grading Certificate

Date

City of Oshawa
Engineering Services
50 Centre Street South
Oshawa, ON L1H 3Z7

GRADING CERTIFICATION

LOTS _____

SUBDIVISION PHASE _____

STAGE _____

This is to certify that we have inspected the lot grading for lots _____ on Plan 40M-_____, City of Oshawa.

These lots have been graded according to the Site Grading Plan submitted with the building permit application and, the Master Lot Grading Plan, Drawing No. _____ prepared by _____.

The roof water leaders have been installed in accordance with the Site Grading Plan submitted with the building permit application.

No drainage problems were apparent at the time of inspection and it is not expected that any drainage problems will occur in the future

Professional Engineer/Ontario Land Surveyor
Company Name

Appendix 8

Sample of Form Letter from Approved Alternate to Applicant's Engineer related to
Certification of Site Grading Plans

Appendix 8

Sample Letter for Certification of Site Grading Plan By Alternate to Applicant's Engineer

Date:

City of Oshawa
Engineering Services
50 Centre Street South
Oshawa, ON L1H 3Z7

CERTIFICATION SERVICES FOR SITE GRADING PLANS

This is to advise that our firm has been retained by _____ (name of builder) _____
to provide certification services for lot(s) _____, Registered
Plan 40M-_____.

The City of Oshawa has previously approved our firm and the following individuals(s)
_____ (name(s)) _____, who will be providing this service.

This shall confirm that we have a copy of the Master Lot Grading Plan dated _____
_____ for the aforementioned lots and that we have a copy of the City's current
Lot Grading Criteria dated _____ to allow us to perform this service.

Ontario Land Surveyor/Professional Engineer

Company Name

(Note: If the Certificate is not being signed by the Applicant's Engineer, prior approval must be obtained from the City for the use of an alternate professional)

Appendix 9

Sample Retaining Wall Certificate

Appendix 9

Sample Retaining Wall Certificate

Date

City of Oshawa
Engineering Services
50 Centre Street South
Oshawa, ON L1H 3Z7

RETAINING WALL CERTIFICATION
LOT(S)/BLOCK(S)
PLAN 40M-
SUBDIVISION PHASE
STAGE

This is to certify that the retaining wall(s) on the above property(s) has been designed and constructed in accordance with sound engineering principals, to support the dead and live loads applied upon the structure, in accordance with all applicable City standards, regulations, and to “as-built” elevations in conformance with all certified building and grading plan previously reviewed by the City.

Company Name

Engineer's Stamp and Signature

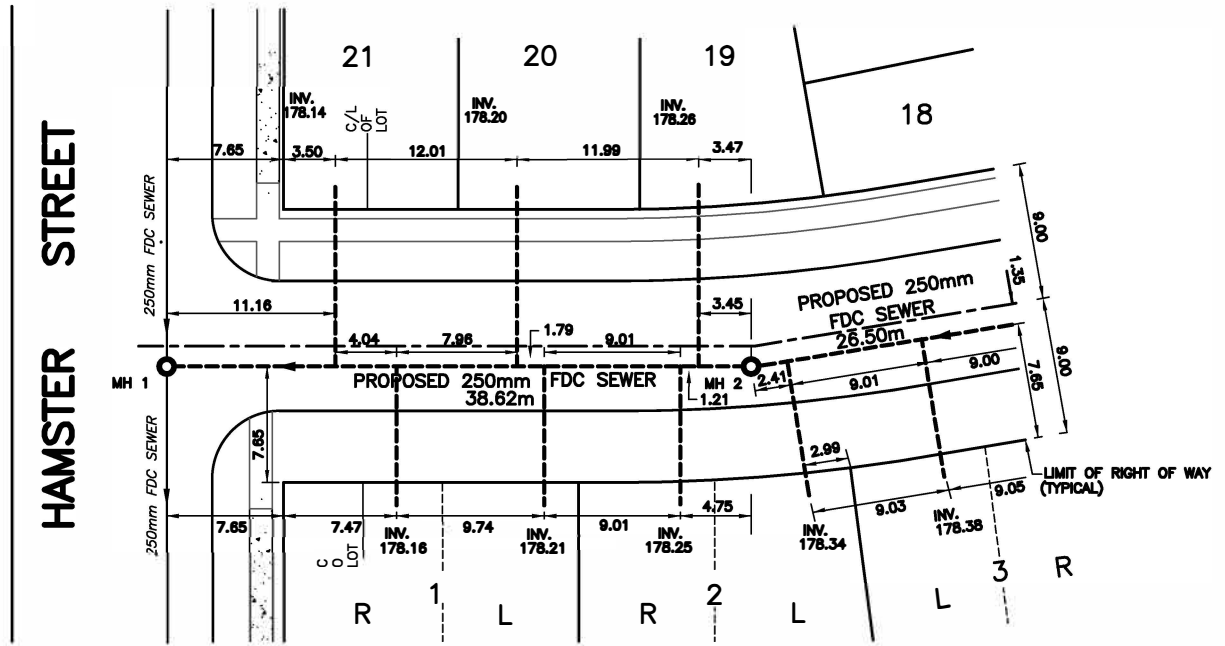
Appendix 10

Sample As-Built Maintenance Hole and Sewer Information Sheet

Appendix 11

Final Measurement Form for Sketches Showing FDC Sewer Service Connections

LOCATION _____ STREET _____
 SD No. _____ R.P. 40M- _____ DRAWING No. _____
 CONSULTANT _____ INSPECTOR'S NAME _____
 DESCRIPTION _____ MAIN LINE or SERVICE CONNECTION _____ FDC
 PIPE DIAMETER _____ CLASS OF PIPE _____ MATERIAL TYPE _____ DATE _____



HAMSTER STREET **NEWMAN DRIVE**

NOTES :

1. INVERT ELEVATIONS SHOWN ON THIS SKETCH ARE "AS-BUILT", LOCATED 1.5m BEYOND THE LIMIT OF THE RIGHT OF WAY.
2. FDC CONNECTIONS MUST BE DIMENSIONED ALONG THE MAIN FROM "T" TO "T" AND ALONG THE LIMIT OF EACH RIGHT OF WAY FROM THE FDC MANHOLE TO MANHOLE, INCLUDING A TIE TO PROPERTY LIMIT AS SHOWN ABOVE.

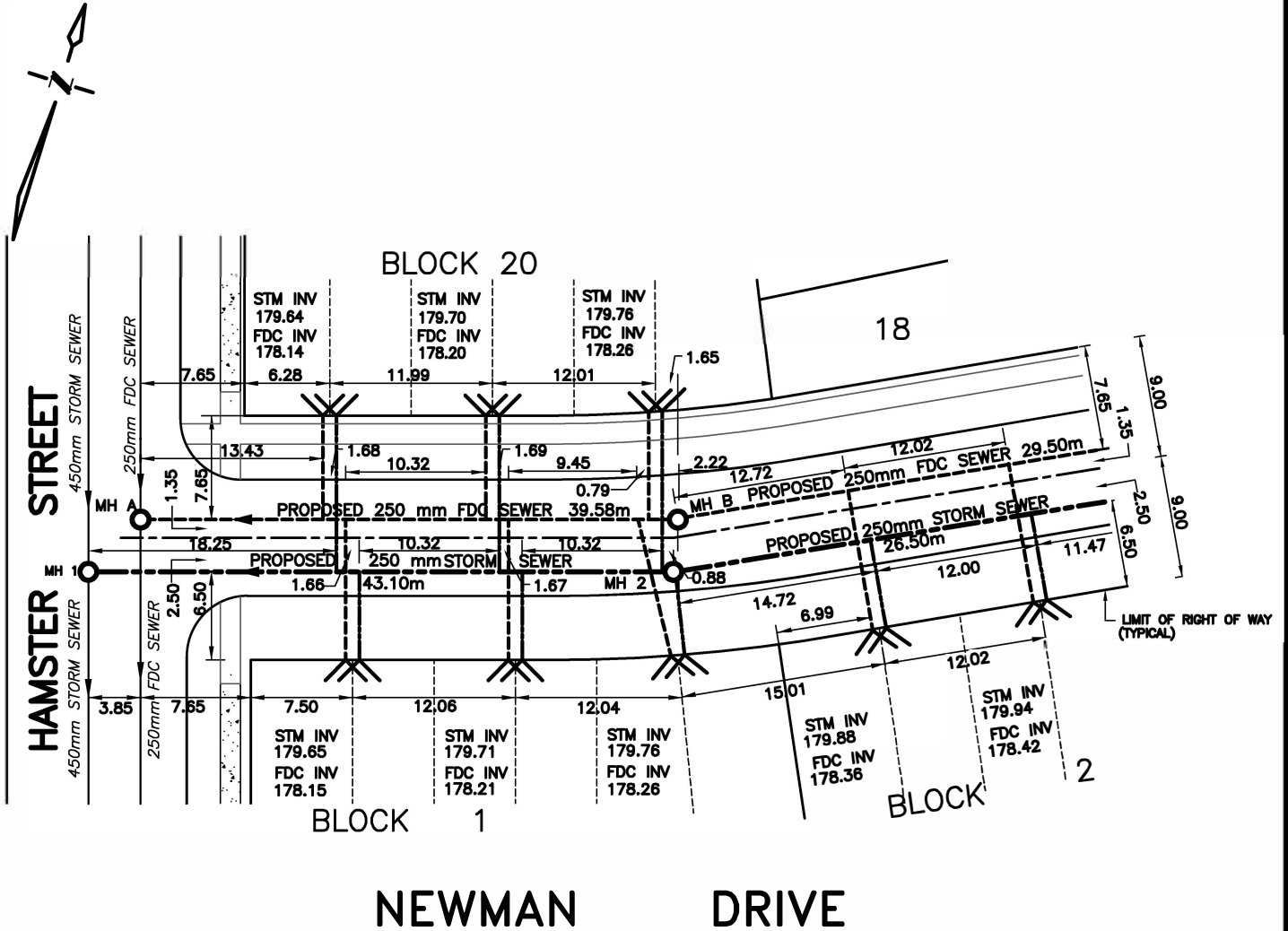
SCALE 1:500

CITY OF OSHAWA		DEVELOPMENT SERVICES DEPARTMENT	
CHK'D: G.E.D.	FINAL MEASUREMENT FORM FOR SKETCHES SHOWING FDC SEWER SERVICE CONNECTIONS	REVISION No.	
APP'D: A.A.		DATE:	
DATE: FEB. 6, 2013		APPENDIX 11	

Appendix 12

Final Measurement Form for Sketches Showing FDC and Storm Sewer Service
Connections for Street Townhouses

LOCATION _____ STREET _____
 SD No. _____ R.P. 40M- _____ DRAWING No. _____
 CONSULTANT _____ INSPECTOR'S NAME _____
 DESCRIPTION _____ MAIN LINE or SERVICE CONNECTION STORM FDC
 PIPE DIAMETER _____ CLASS OF PIPE _____ MATERIAL TYPE _____ DATE _____



NOTES :

1. INVERT ELEVATIONS SHOWN ON THIS SKETCH ARE "AS-BUILT", LOCATED 1.5m BEYOND THE LIMIT OF THE RIGHT OF WAY.
2. REFER TO OS-1006 FOR TYPICAL SERVICE CONNECTION LAYOUT.
3. FDC AND STORM SEWER CONNECTIONS MUST BE DIMENSIONED ALONG THE MAIN FROM "T" TO "T" AND ALONG THE LIMIT OF EACH RIGHT OF WAY FROM THE RESPECTIVE MANHOLE TO MANHOLE, INCLUDING A TIE TO THE PROPERTY LIMIT AS SHOWN ABOVE.

SCALE 1:500

CITY OF OSHAWA

DEVELOPMENT SERVICES DEPARTMENT

CHK'D: G.E.D.
 APP'D: A.A.
 DATE: FEB. 6, 2013

**FINAL MEASUREMENT FORM FOR
 SKETCHES SHOWING FDC AND STORM
 SEWER SERVICE CONNECTIONS
 FOR STREET TOWNHOUSES**

REVISION No. _____
 DATE: _____
 APPENDIX 12