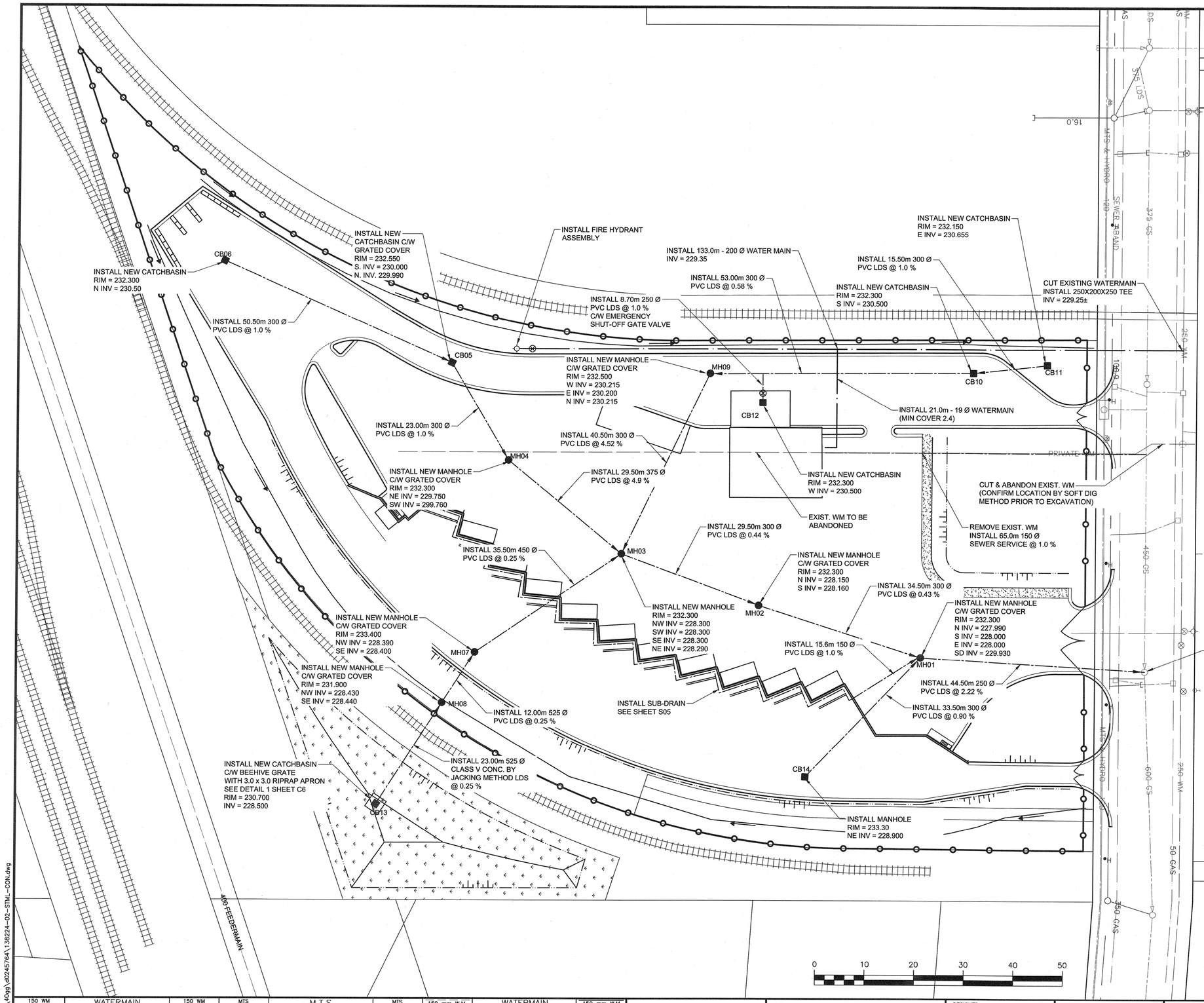

PEAK PIPE FLOW ESTIMATES WHEN MAJORITY OF FLOW IS TOWARD POND

CB	RATIONAL COEFFICIENT 'C'	AREA (AC)	INTENSITY (5 YR) IN/HR	INTENSITY (5 YR) IN/HR	Q (5 YR) CFS	Q (25 YR) CFS	PIPE CO-	Q (5 YR) CFS	Q (25 YR) CFS
1	0.43	0.686	4.2	6.1	1.24	1.80	1	-2.12	-1.02
2	0.95	0.331	4.2	6.1	1.32	1.92	2	-0.80	0.90
3	0.95	0.342	4.2	6.1	1.36	1.98	3	6.79	11.93
4	0.89	0.487	4.2	6.1	1.82	2.64	4	3.96	5.76
5	0.95	0.277	4.2	6.1	1.11	1.61	5	2.14	3.11
6	0.95	0.260	4.2	6.1	1.04	1.51	6	1.03	1.50
7	0.95	0.308	4.2	6.1	1.23	1.78	7	8.02	13.72
8	0.2	0.988	4.2	6.1	0.83	1.21	8	8.85	14.92
9	0.95	0.203	4.2	6.1	0.81	1.18	9	1.80	2.61
10	0.95	0.158	4.2	6.1	0.63	0.92	10	0.99	1.44
11	0.2	0.428	4.2	6.1	0.36	0.52	11	0.36	0.52
12	N/A	0	4.2	6.1	N/A	N/A	12	0.00	0.00
13	0.2	0.74	RECEIVING BODY DURING PEAK						
14	0.95	0.30	4.2	6.1	1.20	1.74	14	1.20	1.74
TOTAL AREA		5.512							

200MM COMBINED SEWER CONNECTION
44.5M

GRAVITY FLOW @ 2.2%	2.15 CFS
SURCHARGE WITH 1 M OF HEAD	2.05 CFS
SURCHARGE WITH 1.5 M OF HEAD	2.51 CFS
SURCHARGE WITH 1.8 M OF HEAD	2.75 CFS

250MM COMBINED SEWER CONNECTION
44.5M

GRAVITY FLOW @ 2.2%	3.11 CFS
SURCHARGE WITH 1 M OF HEAD	3.72 CFS
SURCHARGE WITH 1.5 M OF HEAD	4.56 CFS
SURCHARGE WITH 1.8 M OF HEAD	4.99 CFS

SINCE THE ROADWAY DRAINAGE IS TYPICALLY DESIGNED FOR 0.3 BELOW GRADE DURING THE 5 YEAR STORM. CB'S IN THIS AREA AROUND 232.2, EVEN ASSUMING A HYDRAULIC GRADIENT 1.5 M BELOW GRADE (5 TIMES THE ALLOWABLE DESIGN CRITERIA), THAT WOULD PUT THE GRADIENT AT 230.7. AT DESIGN POND VOLUME (ELEV. 232.15) HEAD ON PIPE WILL BE APPROXIMATELY 232.15-230.7 = 1.45M OF HEAD. USE 250MM PIPE.

POND VOLUME CALCULATION			
ELEVATION (M)	AREA (M^2)	INCREMENTAL VOL. (M^3)	TOTAL VOLUME (M^3)
232.15	1391		735
		186	
232.0	1095		549
		369	
231.5	432		180
		147	
231.0	175		33
		33	
230.7	55		0

25 YEAR PONDING LEVEL ($689M^3$) IS JUST BELOW ELEVATION 232.15.

EXISTING	LEGEND–PLAN	PROPOSED	EXISTING	M.T.S.	PROPOSED	EXISTING	LEGEND–PROFILE	PROPOSED
150 WM	WATERMAIN	150 WM	MTS	CONCRETE	MTS	150 mm W.M.	WATERMAIN	150 mm W.M.
	HYDRANT			ASPHALT			HYDRANT	
	VALVE			PLANING			VALVE	
300 LDS	LAND DRAINAGE SEWER	300 LDS		SIDEWALK	300 mm L.D.S.	300 mm L.D.S.	LAND DRAINAGE SEWER	300 mm L.D.S.
250 WWS	WASTE WATER SEWER	250 WWS		PAVING STONES	250 mm W.W.S.	250 mm W.W.S.	WASTE WATER SEWER	250 mm W.W.S.
	MANHOLE			PROPERTY LINE			℄ PROFILE	
	CATCH BASIN			SURVEY BAR			PVMT FLOW DIRECTION	
	TEST HOLES			CURB RAMP				
	JUNCTIONS			DITCH				
	CULVERT			SWALE				
100 GAS	GAS	100 GAS						

UNDERGROUND STRUCTURES

SUPV. U/G STRUCTURES COMMITTEE _____ DATE _____

NOTE:
LOCATION OF UNDERGROUND STRUCTURES AS SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE, BUT NO GUARANTEE IS GIVEN THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT. CONFIRMATION OF EXISTENCE AND EXACT LOCATION OF ALL SERVICES MUST BE OBTAINED FROM THE INDIVIDUAL UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION.

B.M. ELEV.

NO.	REVISIONS	DATE	BY
1	ISSUED FOR TENDER	16/03/04	ARR

DESIGNED BY	WPN
DRAWN BY	GLG
CHECKED BY	WPN
APPROVED BY	ARR
HOR. SCALE	1:400
VERTICAL	
DATE	

DILLON CONSULTING

RELEASED FOR CONSTRUCTION _____ DATE

ENGINEER'S SEAL: PROVINCE OF MANITOBA · W. P. NAIRN · Member 34277 · REGISTERED PROFESSIONAL ENGINEER · MARCH 2, 2016

CONSULTANT PROJECT NUMBER 13-8224

APEGM Certificate of Authorization
Dillon Consulting Limited (MB)
No. 1789 Date: MAR. 4, 2016

METRIC

WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

Winnipeg

THE CITY OF WINNIPEG
WATER AND WASTE DEPARTMENT

4R WINNIPEG DEPOT
PACIFIC AVENUE

CITY DRAWING NUMBER 1-0851A-C0004-001

SHEET 5 OF 43

UNDERGROUND UTILITIES AND STORM SEWER

CONSULTANT DRAWING NUMBER C-4

C:\projectwise\working directory\active\40gg\d0245784\138224-02-STML-CON.dwg