May 17, 2021
Our File: 218173

Via Email: cstredwick@southgate.ca

Township of Southgate
185667 Grey County Road 9
Dundalk, ON N0C 1B0

Attention: Mr. Clint Stredwick

Re: Addendum to SWM Report for Draft Plan Approval
Wilder Lake Subdivision
Municipality of Southgate

Dear Mr. Stredwick,

This letter is provided as an addendum to the Stormwater Management Report that was prepared in November of 2020 to address a few minor requests following the peer review. Peer Review Comments 8 and 16 required minor revisions to the report. The following provides the additional information to confirm the culverts and ditches are sufficiently sized.

Peer Review Comment 8 – Culvert Sizing

As requested during the peer review process, the culvert sizes for Lots 11 to 20 were increased by one culvert size to give additional flow capacity, as shown on the attached revised Culvert Design Sheet and the updated Subdivision Drawings dated March 8, 2021. While the diameter of the culvert is increased by an additional size, it is proposed to embed the culverts by 150 mm to ensure that there is still sufficient cover on each culvert. The embedment will slightly reduce the flow capacity, but they will still have sufficient flow capacity as only the narrow bottom of the culvert will be embedded.

As confirmation, the following looks at each culvert to confirm that the flow capacity is still under 90% of the culvert capacity.

450 mm Culverts Sized for Lots 14 to 20	
450 mm Culvert Capacity @ 0.5% (per attached Design Sheet)	= 202 L/s
Embedded Reduction in Flow (As per Mannings Equation- Partially Full Pipe)	= 48 L/s
Available Capacity	= 154 L/s
5 Year Storm Peak Flow to Culvert (per attached Design Sheet)	= 119 L/s (119/154 = 77.3%)
600 mm Culverts Sized for Lots 11 to 13	
600 mm Culvert Capacity @ 0.5% (per attached Design Sheet)	= 434 L/s
Embedded Reduction in Flow (As per Mannings Equation- Partially Full Pipe)	= 59 L/s
Available Capacity	= 375 L/s
5 Year Storm Peak Flow to Culvert (per attached Design Sheet)	= 199 L/s (199/375 = 53.1%)

As shown above, even with the embedment of the culverts they still have sufficient capacity as they were upsized from the previous submission.

Peer Review Comment 16 – Ditch Calculations

The following outlines the ditch sizing calculations for the Block 30 and Block 31 ditches draining into the stormwater management ponds from the roadway.

Block 30

The swale to the Block 30 SWM Pond from the roadside ditch has a fall of roughly 2.5 metres over 29 metres for a slope of 8.5%. As shown on the attached Figure 1, which shows the detail for the Block 30 Stormwater Management Pond, a swale with a minimum depth of 0.3 m and with rip rap leading to the pond, is proposed.

The swale would have the following capacity, as calculated using the Mannings formula for open channel flow:

$Q = (A*R^{2/3}*S^{1/2})/n$
$Q = (0.27m^2 * 0.142m^{2/3} * 0.085^{1/2}) / 0.025$
$Q = 0.856\ m^3/s$

According to the MIDUSS results, during a 100 year design storm, the peak flow rate expected to be directed to the Block 30 SWM Pond would be 0.098 m^3/s or 0.125 m^3/s during the Hurricane Hazel Flood Event Standard.

As such, the proposed swale has more than sufficient capacity to convey runoff to the SWM Pond.

Block 31

The swale into the Block 31 SWM Pond is very short and very steep with a slope of 8.5%. As shown on the attached Figure 2 which shows the detail for the Block 31 Stormwater Management Pond, a swale with a minimum depth of 0.5 metres and with rip rap leading to the pond, is proposed.

The swale would have the following capacity:

$Q = (A*R^{2/3}*S^{1/2})/n$
$Q = (0.75m^2 * 0.237m^{2/3} * 0.150^{1/2}) / 0.025$
$Q = 4.45\ m^3/s$

According to the MIDUSS results, during a 100 year design storm, the peak flow rate expected to be directed to the Block 30 SWM Pond would be 0.490 m^3/s or 0.692 m^3/s during the Hurricane Hazel Flood Event Standard.

As such, the proposed swale has more than sufficient capacity to convey runoff to the SWM Pond.

I trust the above addresses the two outstanding concerns from the peer review. Please do not hesitate to contact me if you have any questions regarding the above noted information, or should you wish to discuss this further.

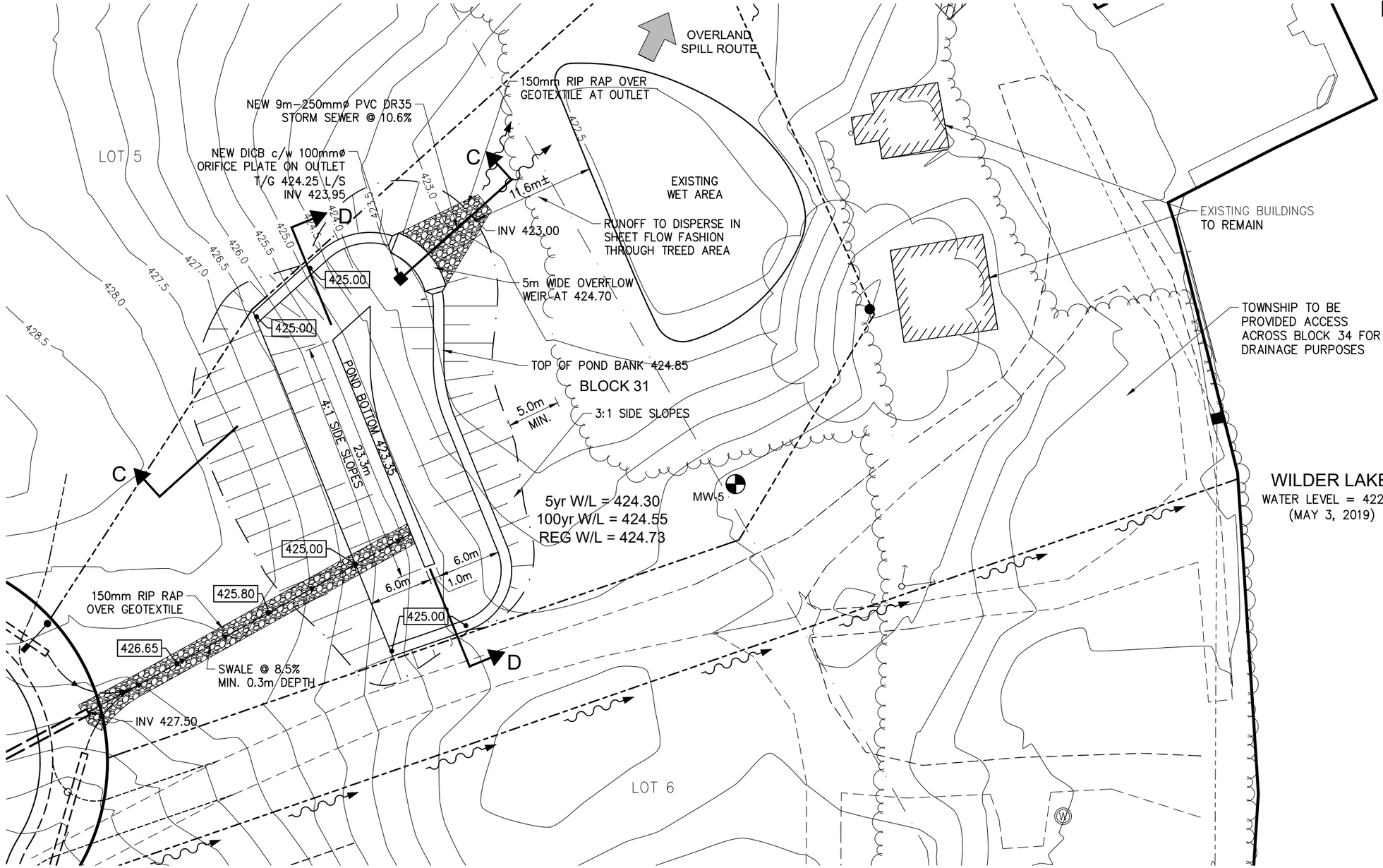
Yours truly,

GM BLUEPLAN ENGINEERING LIMITED
Per:

Ian Eriksen, P.Eng.
IE/mr
Encl.

cc: H. Bye Construction: Randy Bye, via Email – rhbye@icloud.com
Cuesta Planning Consultants Inc.: Genevieve Scott, via Email – cuesta@cuestaplanning.com
Grey County: Randy Scherzer, via Email – randy.scherzer@grey.ca
File No. 218173

218173
Wilder Lake Subdivision
263512 Southgate Township
Road 26 (100 Homestead Road)
Township of Southgate



WILDER LAKE
WATER LEVEL = 422.93
(MAY 3, 2019)

5 2 0 5 10 15
1:400 (m)

SCALE = 1:400
MAY 2021

REVISED BLOCK 31
SWM POND

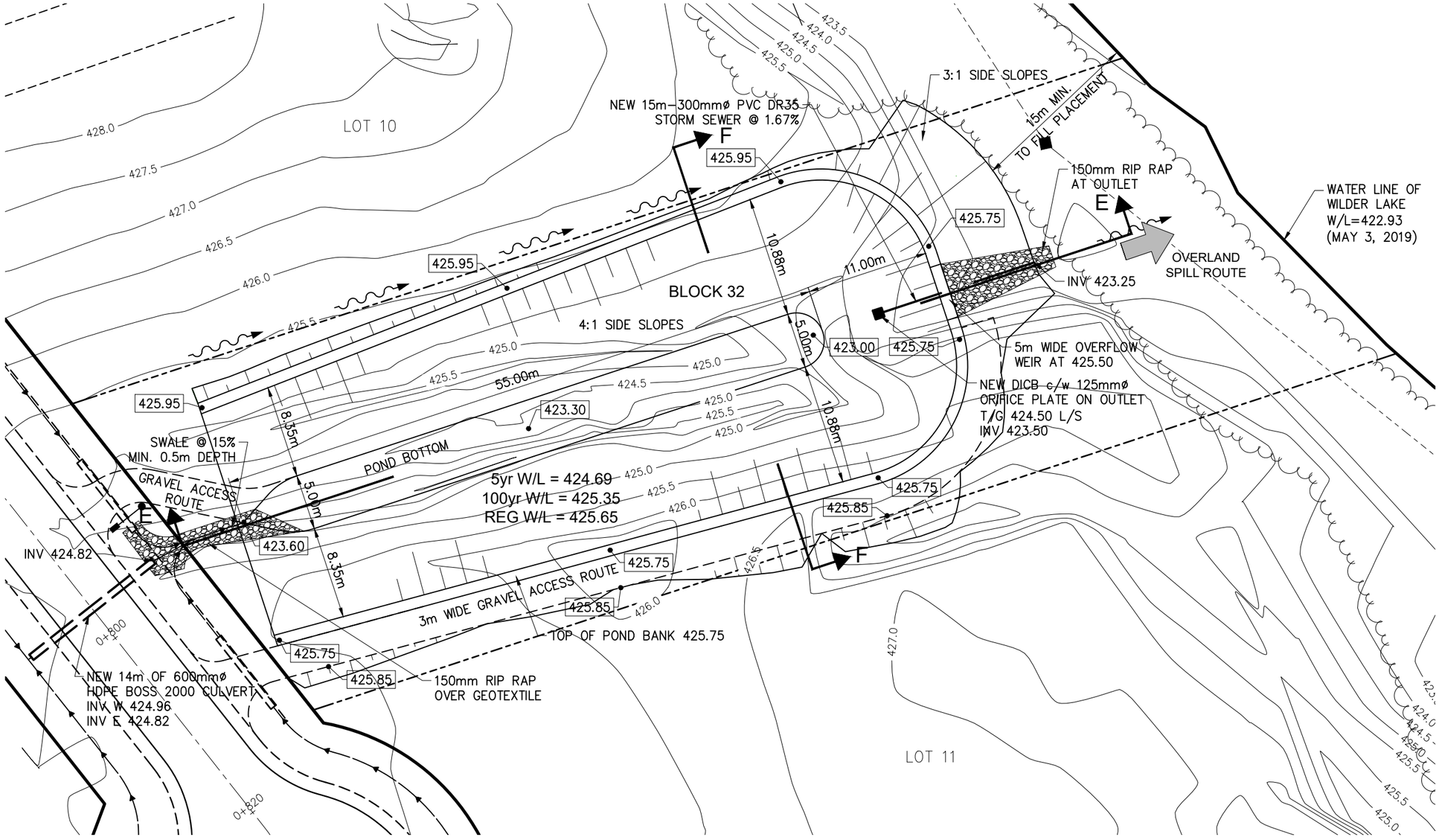
WILDER LAKE SUBDIVISION
H. BYE CONSTRUCTION LIMITED

Figure A

BluePlan ENGINEERING

FILE:C:\Civil 3D Projects\218173 GP-K New Concept.dwg LAYOUT:Block 31 SWM Pond
LAST SAVED BY:Kboers, 5/17/2021 1:34:55 PM PLOTTED BY:Ken Boers - GM BluePlan 5/17/2021 1:51:32 PM

218173
Wilder Lake Subdivision
263512 Southgate Township
Road 26 (100 Homestead Road)
Township of Southgate



5 2 0 5 10 15
1:400 (m)

SCALE = 1:400
MAY 2021

REVISED BLOCK 32
SWM POND

WILDER LAKE SUBDIVISION
H. BYE CONSTRUCTION
LIMITED

Figure B

BluePlan ENGINEERING

FILE:C:\Civil 3D Projects\218173 GP-K New Concept.dwg, LAYOUT:Block 32 SWM Pond
LAST SAVED BY:Kboers, 5/17/2021 1:34:55 PM, PLOTTED BY:Ken Boers - GM BluePlan, 5/17/2021 1:51:37 PM

Design Storm	A	B
2 yr	21.9	-0.701
5 yr	27.5	-0.693
10 yr	**31.2**	**-0.689**
25 yr	**35.9**	**-0.686**
50 yr	39.4	-0.683
100 yr	42.9	-0.682

Where Q = 2.78 AIC and I = A x TcB (where Tc in hours)
Q = peak flow in litres per second (L/s)
A = area in hectares (ha)
I = rainfall intensity in millimetres per hour (mm/h)
C = runoff coefficient
A, B = design storm coefficients
Tc = time of concentration in minutes (MIN. 10.0 minutes)

ESTIMATED DESIGN FLOWS

CULVERT DESIGN SHEET
(Based on Mount Forest Rainfall Data)

DESIGN: IE & JS, GM BluePlan Engineering Ltd.
PROJECT: Wilder Lake Subdivision
SHEET NO. 1 of 1
DATE: MAY 2021
PROJECT: 218173

LOCATION				AREA (ha)				Individual 2.78 AC	Cumulative 2.78 AC	Time of Concentration Tc (minutes)	Rainfall Intensity I (mm/h)	Peak Flow Q (L/s)	Constant Flow (L/s)	Cumulative Constant Flow (L/s)	Total Flow (L/S)	SEWER DATA						
Catchment	Lot Number for Culverts Affected		Outlets To	R =	R =	R =	R =									Type of Pipe	Roughness Coefficient (n)	Diameter (mm)	Slope (%)	Length (m)	Capacity (L/s)	Full Flow Velocity (m/s)	Time of Flow (minutes)
				0.38	0.34	0.40																	
10 year Storm - Driveway Culvert Design				30% Imp.	25% Imp.	33% Imp																	
Roadside ditch only	1		Ex. Pond	0.10				0.11	0.11	10.00	107	11			11	Drive Culv	0.0130	375	2.00	9.0	248	2.25	0.07
201	2 - 4		Storm Sewer			0.66		0.73	0.73	10.00	107	79			79	Drive Culv	0.0130	375	1.00	9.0	175	1.59	0.09
102	5 - 6		Block 31 Pond	0.90				0.95	0.95	10.00	107	102			102	Drive Culv	0.0130	375	1.00	9.0	175	1.59	0.09
								0.00	0.95	10.09	107	101			101	Drive Culv	0.0130	375	1.00	22.0	175	1.59	0.23
Roadside ditch only	7 - 10		Block 30 Pond	0.17				0.18	0.18	10.00	107	19			19	Drive Culv	0.0130	375	2.00	9.0	248	2.25	0.07
101a	14 - 20		Block 30 Pond	1.05				1.11	1.11	10.00	107	119			119	Drive Culv	0.0130	450	0.50	9.0	202	1.27	0.12
101b	11-13			0.72				0.76	1.87	10.12	106	199			199	Drive Culv	0.0130	600	0.50	9.0	434	1.54	0.10
501	21		Storm Sewer		0.52			0.49	0.49	10.00	107	53			53	Drive Culv	0.0130	375	4.00	9.0	351	3.17	0.05
500	22		Storm Sewer		1.00			0.95	0.95	10.00	107	101			101	Drive Culv	0.0130	375	4.00	9.0	351	3.17	0.05
101c	23 - 25		Block 30 Pond		1.04			0.98	0.98	10.00	107	105			105	Drive Culv	0.0130	375	0.50	9.0	124	1.12	0.13
101d			Block 30 Pond		0.73			0.69	1.67	10.13	106	178			178	Drive Culv	0.0130	450	0.50	9.0	202	1.27	0.12
101e	26 - 28		Block 30 Pond	0.88				0.93	0.93	10.00	107	100			100	Drive Culv	0.0130	375	2.00	9.0	248	2.25	0.07
Road Crossing Culvert								1.91	4.52	10.25	105	476			476	Road Culv	0.0130	600	1.00	14.0	614	2.17	0.11
25 Year Storm - Road Crossing Culvert Design Only																							
101c	23 - 25		Block 30 Pond		1.04			0.98	0.98	10.00	123	121			121	Drive Culv	0.0130	375	0.50	9.0	124	1.12	0.13
101d			Block 30 Pond		0.73			0.69	1.67	10.13	122	203			203	Drive Culv	0.0130	450	0.50	9.0	202	1.27	0.12
101e	26 - 28		Block 30 Pond	0.88				0.93	0.93	10.00	123	114			114	Drive Culv	0.0130	375	2.00	9.0	248	2.25	0.07
Road Crossing Culvert								1.91	4.52	10.25	121	545			545	Road Culv	0.0130	600	1.00	14.0	614	2.17	0.11