

**Appendix D –  
Drainage Capacity Calculations**

### **Existing Tile Main Capacity**

## Existing Tile Capacity

(assuming single wall PE pipe-actual pipe varies - concrete, PE, clay tile)

	STATIONS		DRAINAGE AREA ACRES	CUMM DRAINAGE AREA	TILE SIZE INCHES	GRADE %	DRAINAGE COEF.	corr plastic		CAPACITY ACRES	CAPACITY CFS
	FROM	TO						VELOCITY F.P.S	concrete		
Main	13120	13971	237	237	8	0.045%	1/8	0.64		42.46	0.015
Main	12274	13120		237	10	0.045%	1/8	0.65		67.41	0.354
Main	11586	12274	39.4	276.4	10	0.013%	1/8	0.35		36.37	0.191
Main	9767	11586	154.5	430.9	12	0.013%	1/8	0.4		59.79	0.314
Main	8297	9767	132.5	563.4	12	0.086%	1/8	1.02		152.52	0.801
Main	7113	8297	432.9	996.3	14	0.086%	1/8	0.96		195.36	1.026
Main	6437	7113	322.5	1318.8	18	0.061%	1/8	0.96		322.94	1.696
Main	5780	6437	132.9	1451.7	18	0.086%	1/8	1.14		383.49	2.104
Main	1418	5780	199.1	1650.8	20	0.144%	1/8	1.58		655.97	3.445
Main	250	1418	151.9	1802.7	20	0.347%	1/8	2.45		1017.19	5.342



## CALCULATOR PURPOSE

The Prinsco Drainage Calculator estimates the capacity of tile drainage systems. A particular pipe size on a given grade will only carry a certain amount of water. The steeper the grade of the installed pipe, the more water it will carry.

- Checks the capacity of drain tile on existing drainage systems
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## BY ACREAGE BY PIPE SIZE

## Drainage Calculator by Pipe Size

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These calculations are based on the Manning's Roughness ASAE EP 260.3 Plastic Tubing Drainage Chart and should be used for estimating purposes only. Consult a Water Table Management Professional for design criteria information.

② = Definition

Enter the Diameter of the pipe (inches):	8
Enter the Grade (%): ②	.045 %
<input type="button" value="View Results"/> (see below)	

	Q, Flow ②			Velocity ②
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	0.223	100.1	5.31	0.64
Dual-Wall	0.279	125.2	6.64	0.80

	Acres Drained					
	Drainage Coefficient (in: /24 hours) ②					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	42.46	21.23	14.15	10.62	7.08	5.31
Dual-Wall	53.13	26.56	17.71	13.28	8.85	6.64

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② = Definition

Enter the Diameter of the pipe (Inches):	<input type="text" value="10"/>
Enter the Grade (%): ②	<input type="text" value=".045"/> %
<input type="button" value="View Results"/> (see below)	

	Q, Flow ②			Velocity ②
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	<input type="text" value="0.354"/>	<input type="text" value="158.9"/>	<input type="text" value="8.43"/>	<input type="text" value="0.65"/>
Dual-Wall	<input type="text" value="0.502"/>	<input type="text" value="225.3"/>	<input type="text" value="11.95"/>	<input type="text" value="0.92"/>

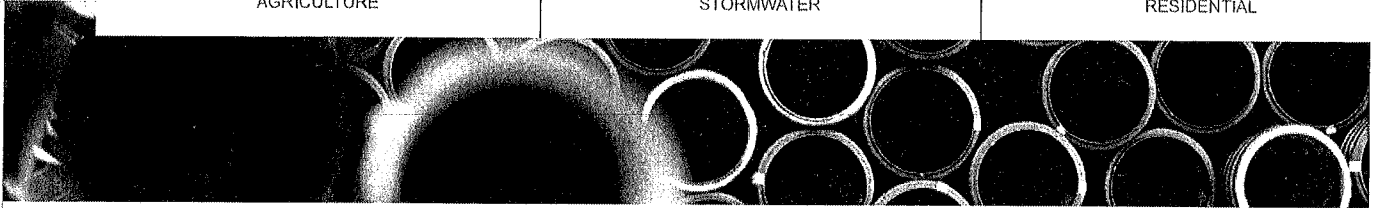
	Acres Drained					
	Drainage Coefficient (in./24 hours) ②					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	<input type="text" value="67.41"/>	<input type="text" value="33.70"/>	<input type="text" value="22.47"/>	<input type="text" value="16.85"/>	<input type="text" value="11.23"/>	<input type="text" value="8.43"/>
Dual-Wall	<input type="text" value="95.59"/>	<input type="text" value="47.79"/>	<input type="text" value="31.86"/>	<input type="text" value="23.90"/>	<input type="text" value="15.93"/>	<input type="text" value="11.95"/>

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② = Definition

Enter the Diameter of the pipe (inches):	<input type="text" value="10"/>
Enter the Grade (%): ②	<input type="text" value=".013"/> %
<input type="button" value="View Results"/> (see below)	

	Q, Flow ②			Velocity ②
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	<input type="text" value="0.191"/>	<input type="text" value="85.7"/>	<input type="text" value="4.55"/>	<input type="text" value="0.35"/>
Dual-Wall	<input type="text" value="0.273"/>	<input type="text" value="122.5"/>	<input type="text" value="6.50"/>	<input type="text" value="0.50"/>

	Acres Drained					
	Drainage Coefficient (in: /24 hours) ②					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	<input type="text" value="36.37"/>	<input type="text" value="18.18"/>	<input type="text" value="12.12"/>	<input type="text" value="9.09"/>	<input type="text" value="6.06"/>	<input type="text" value="4.55"/>
Dual-Wall	<input type="text" value="51.98"/>	<input type="text" value="25.99"/>	<input type="text" value="17.33"/>	<input type="text" value="13.00"/>	<input type="text" value="8.66"/>	<input type="text" value="6.50"/>

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**BY PIPE SIZE**

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② = Definition

Enter the Diameter of the pipe (inches):	<input type="text" value="12"/>
Enter the Grade (%): ②	<input type="text" value=".013"/> %
<input type="button" value="View Results"/> (see below)	

	Q, Flow ②			Velocity ②
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	<input type="text" value="0.314"/>	<input type="text" value="140.9"/>	<input type="text" value="7.47"/>	<input type="text" value="0.40"/>
Dual-Wall	<input type="text" value="0.440"/>	<input type="text" value="197.5"/>	<input type="text" value="10.47"/>	<input type="text" value="0.56"/>

	Acres Drained					
	Drainage Coefficient (in: /24 hours) ②					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	<input type="text" value="59.79"/>	<input type="text" value="29.89"/>	<input type="text" value="19.93"/>	<input type="text" value="14.95"/>	<input type="text" value="9.96"/>	<input type="text" value="7.47"/>
Dual-Wall	<input type="text" value="83.78"/>	<input type="text" value="41.89"/>	<input type="text" value="27.93"/>	<input type="text" value="20.95"/>	<input type="text" value="13.96"/>	<input type="text" value="10.47"/>

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② = Definition

Enter the Diameter of the pipe (inches):	12
Enter the Grade (%): ②	.086 %
<input type="button" value="View Results"/> (see below)	

	Q, Flow ②			Velocity ②
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	0.801	359.5	19.07	1.02
Dual-Wall	1.130	507.2	26.90	1.44

	Acres Drained					
	Drainage Coefficient (in: /24 hours) ②					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	152.52	76.26	50.84	38.13	25.42	19.07
Dual-Wall	215.17	107.58	71.72	53.79	35.86	26.90

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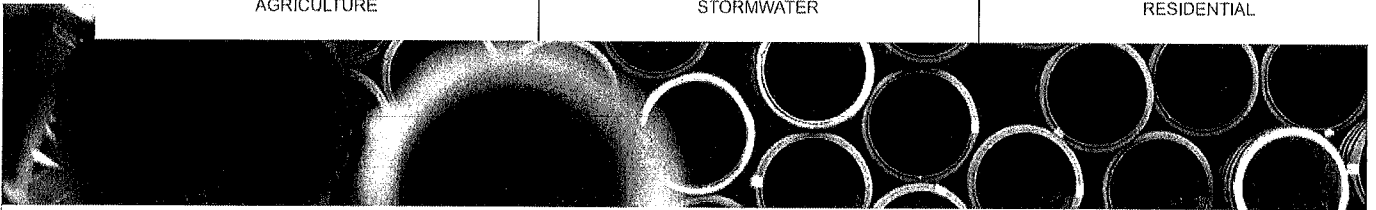
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② = Definition

Enter the Diameter of the pipe (inches):	14
Enter the Grade (%): ②	.086 %
<a href="#">View Results</a> (see below)	

	Q, Flow ②			Velocity ②
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	1.026	460.5	24.42	0.96
Dual-Wall	1.710	767.5	40.70	1.60

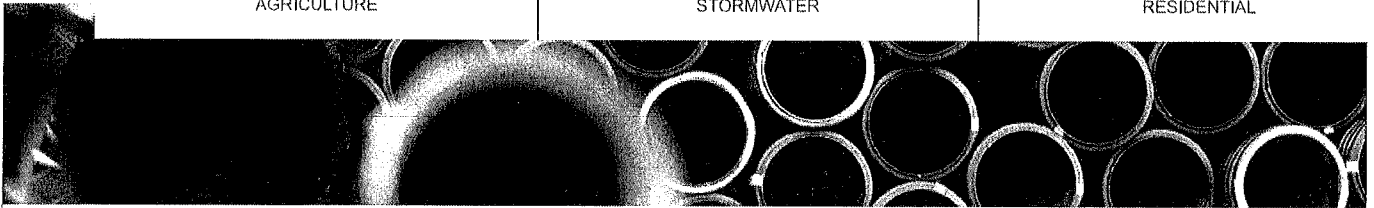
	Acres Drained					
	Drainage Coefficient (in: /24 hours) ②					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	195.36	97.68	65.12	48.84	32.56	24.42
Dual-Wall	325.61	162.80	108.54	81.40	54.27	40.70

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② = Definition

Enter the Diameter of the pipe (inches):	18
Enter the Grade (%): ②	.061 %
<div>View Results</div> <div>(see below)</div>	

	Q, Flow ②			Velocity ②
	c.f.s.	g.p.m	acre - in./24 hrs.	ft./sec.
Single-Wall	1.696	761.2	40.37	0.96
Dual-Wall	2.808	1260.3	66.84	1.59

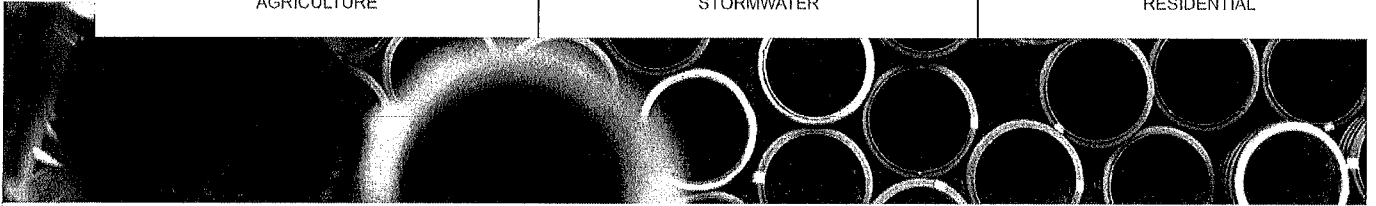
	Acres Drained					
	Drainage Coefficient (in: /24 hours) ②					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	322.94	161.47	107.65	80.74	53.82	40.37
Dual-Wall	534.68	267.34	178.23	133.67	89.11	66.84

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② = Definition

Enter the Diameter of the pipe (inches):	18
Enter the Grade (%): ②	.086 %
<a href="#">View Results</a> (see below)	

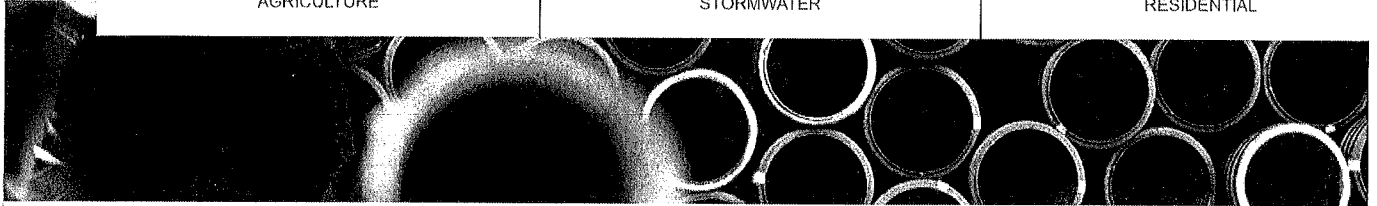
	Q, Flow ②			Velocity ②
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	2.014	903.9	47.94	1.14
Dual-Wall	3.338	1498.2	79.45	1.89

	Acres Drained					
	Drainage Coefficient (in: /24 hours) ②					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	383.49	191.75	127.83	95.87	63.92	47.94
Dual-Wall	635.60	317.80	211.87	158.90	105.93	79.45

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② = Definition

Enter the Diameter of the pipe (inches):	20
Enter the Grade (%): ②	.144 %
<input type="button" value="View Results"/> (see below)	

	Q, Flow ②			Velocity ②
	c.f.s.	g.p.m	acre - in./24 hrs.	ft./sec.
Single-Wall	3.445	1546.2	82.00	1.58
Dual-Wall	5.735	2574.0	136.50	2.63

	Acres Drained					
	Drainage Coefficient (In: /24 hours) ②					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	655.97	327.99	218.66	163.99	109.33	82.00
Dual-Wall	1092.02	546.01	364.01	273.00	182.00	136.50

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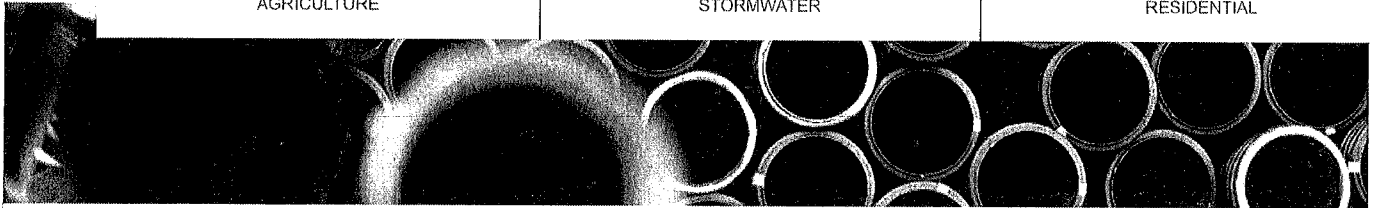
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② = Definition

Enter the Diameter of the pipe (Inches):	<input type="text" value="20"/>
Enter the Grade (%): ②	<input type="text" value=".347"/> %
	<input type="button" value="View Results"/> (see below)

	Q, Flow ②			Velocity ②
	c.f.s.	g.p.m	acre - in./24 hrs.	ft./sec.
Single-Wall	<input type="text" value="5.342"/>	<input type="text" value="2397.6"/>	<input type="text" value="127.15"/>	<input type="text" value="2.45"/>
Dual-Wall	<input type="text" value="8.897"/>	<input type="text" value="3993.2"/>	<input type="text" value="211.76"/>	<input type="text" value="4.08"/>

	Acres Drained					
	Drainage Coefficient (in: /24 hours) ②					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	<input type="text" value="1017.19"/>	<input type="text" value="508.59"/>	<input type="text" value="339.06"/>	<input type="text" value="254.30"/>	<input type="text" value="169.53"/>	<input type="text" value="127.15"/>
Dual-Wall	<input type="text" value="1694.11"/>	<input type="text" value="847.05"/>	<input type="text" value="564.70"/>	<input type="text" value="423.53"/>	<input type="text" value="282.35"/>	<input type="text" value="211.76"/>

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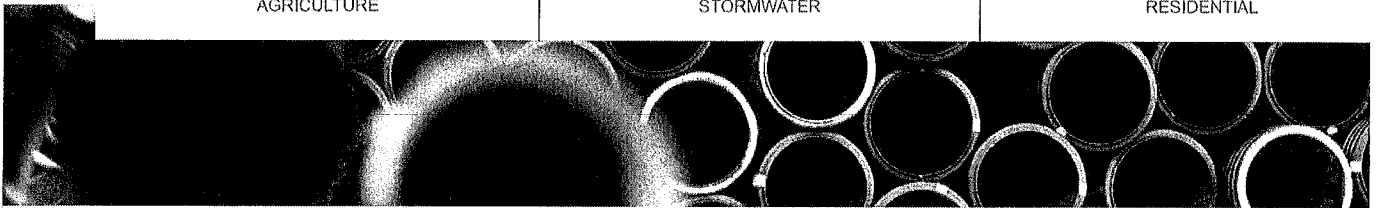
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### **Proposed Main Capacity**

Inner Diameter	Slope	Minimum Cover	Maximum Cover	Length	Acres To Drain	Acres Drained Capacity
30.000"	0.035%	2.494'	4.023'	1643.037'	237	264
36.000"	0.015%	3.520'	7.604'	876.747'	276	282
42.000"	0.015%	3.225'	7.138'	864.292'	430	424
42.000"	0.262%	2.659'	5.035'	763.738'	430	1773
42.000"	0.095%	3.203'	4.280'	424.096'	563	1068
42.000"	0.095%	2.731'	6.544'	1048.498'	563	1068
42.000"	0.095%	3.974'	4.864'	477.261'	996	1068
42.000"	0.095%	2.672'	4.712'	706.446'	996	1068
48.000"	0.090%	2.288'	2.895'	676.449'	1318	1482
48.000"	0.090%	2.436'	3.347'	657.286'	1451	1482
48.000"	0.186%	2.486'	2.951'	250.851'	1650	2136
48.000"	0.186%	2.276'	3.721'	466.785'	1650	2136
48.000"	0.336%	2.717'	8.629'	277.352'	1650	2869
48.000"	0.186%	2.936'	3.307'	128.144'	1650	2136
48.000"	0.186%	2.683'	3.126'	295.203'	1650	2136
48.000"	0.186%	3.126'	6.412'	170.277'	1650	2136
48.000"	0.186%	2.739'	5.916'	368.512'	1650	2136
48.000"	0.186%	3.125'	3.346'	129.914'	1650	2136
48.000"	0.186%	2.694'	3.470'	174.517'	1650	2136
48.000"	0.186%	2.998'	3.470'	53.483'	1650	2136
48.000"	0.186%	2.850'	3.353'	295.417'	1650	2136
48.000"	0.186%	3.353'	3.487'	78.268'	1650	2136
48.000"	0.208%	3.487'	3.568'	56.974'	1650	2256
48.000"	0.208%	2.767'	6.218'	337.642'	1650	2256
48.000"	0.208%	2.729'	6.411'	261.461'	1650	2256
48.000"	0.208%	2.256'	2.966'	282.678'	1650	2256
48.000"	0.208%	2.674'	3.046'	294.202'	1650	2256
48.000"	0.208%	2.452'	3.191'	249.364'	1650	2256
48.000"	0.208%	2.137'	4.903'	189.255'	1650	2256
48.000"	0.197%	0.136'	3.217'	1169.314'	1802	2196
48.000"	0.140%	-4.245'	0.583'	1069.770'	1802	1853

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#### CALCULATOR PURPOSE

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- Checks the capacity of drain tile on existing drainage systems
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**BY ACREAGE**  
**BY PIPE SIZE**

## Drainage Calculator by Pipe Size

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= Definition

Enter the Diameter of the pipe (inches):	<input type="text" value="30"/>
Enter the Grade (%):	<input type="text" value=".035"/> %
<input type="button" value="View Results"/> (see below)	

	Q, Flow			Velocity
	c.f.s.	g.p.m	acre - in./24 hrs.	ft./sec.
Single-Wall	<input type="text" value="5.004"/>	<input type="text" value="2245.9"/>	<input type="text" value="119.10"/>	<input type="text" value="1.02"/>
Dual-Wall	<input type="text" value="8.341"/>	<input type="text" value="3743.7"/>	<input type="text" value="198.53"/>	<input type="text" value="1.70"/>

	Acres Drained					
	Drainage Coefficient (in: /24 hours)					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	<input type="text" value="952.83"/>	<input type="text" value="476.41"/>	<input type="text" value="317.61"/>	<input type="text" value="238.21"/>	<input type="text" value="158.80"/>	<input type="text" value="119.10"/>
Dual-Wall	<input type="text" value="1588.24"/>	<input type="text" value="794.12"/>	<input type="text" value="529.41"/>	<input type="text" value="397.06"/>	<input type="text" value="264.71"/>	<input type="text" value="198.53"/>

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② = Definition

Enter the Diameter of the pipe (inches):	<input type="text" value="36"/>
Enter the Grade (%): ②	<input type="text" value=".015"/> %
<input type="button" value="View Results"/> (see below)	

	Q, Flow ②			Velocity ②
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	<input type="text" value="5.299"/>	<input type="text" value="2378.4"/>	<input type="text" value="126.12"/>	<input type="text" value="0.75"/>
Dual-Wall	<input type="text" value="8.902"/>	<input type="text" value="3995.5"/>	<input type="text" value="211.88"/>	<input type="text" value="1.26"/>

	Acres Drained					
	Drainage Coefficient (in: /24 hours) ②					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	<input type="text" value="1009.00"/>	<input type="text" value="504.50"/>	<input type="text" value="336.33"/>	<input type="text" value="252.25"/>	<input type="text" value="168.17"/>	<input type="text" value="126.12"/>
Dual-Wall	<input type="text" value="1695.06"/>	<input type="text" value="847.53"/>	<input type="text" value="565.02"/>	<input type="text" value="423.76"/>	<input type="text" value="282.51"/>	<input type="text" value="211.88"/>

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**BY ACREAGE**  
**BY PIPE SIZE**

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② = Definition

Enter the Diameter of the pipe (inches):	42
Enter the Grade (%): ②	.015 %
<a href="#">View Results</a> (see below)	

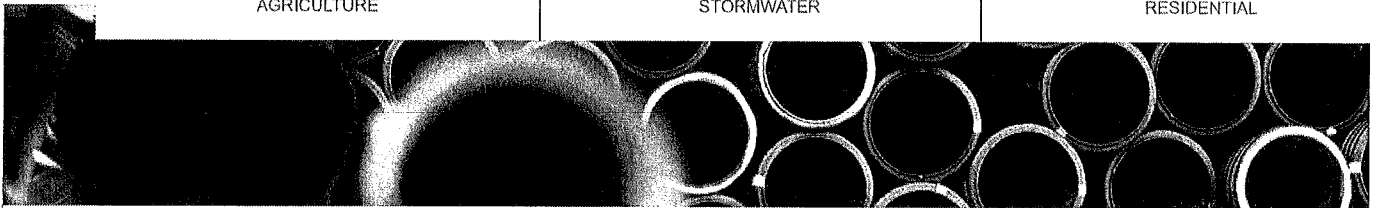
	Q, Flow ②			Velocity ②
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	7.981	3582.1	189.96	0.83
Dual-Wall	13.367	5999.5	318.16	1.39

	Acres Drained					
	Drainage Coefficient (in: /24 hours) ②					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	1519.69	759.84	506.56	379.92	253.28	189.96
Dual-Wall	2545.25	1272.63	848.42	636.31	424.21	318.16

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#### BY ACREAGE BY PIPE SIZE

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= Definition

Enter the Diameter of the pipe (inches):	<input type="text" value="42"/>
Enter the Grade (%):	<input type="text" value=".262"/> %
<input type="button" value="View Results"/> (see below)	

	Q, Flow			Velocity
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	<input type="text" value="33.561"/>	<input type="text" value="15063.2"/>	<input type="text" value="798.81"/>	<input type="text" value="3.49"/>
Dual-Wall	<input type="text" value="55.870"/>	<input type="text" value="25076.1"/>	<input type="text" value="1329.80"/>	<input type="text" value="5.81"/>

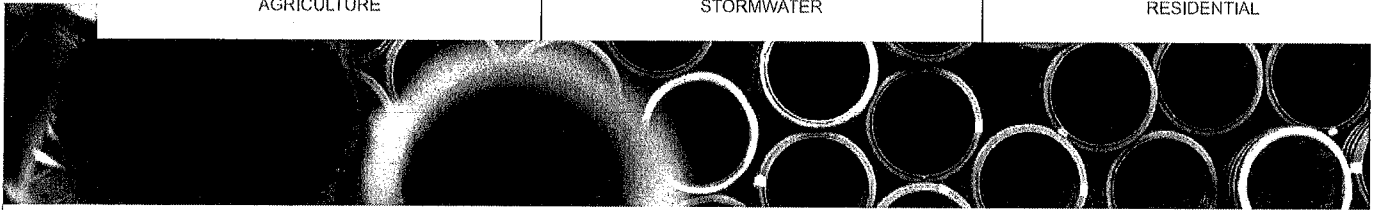
	Acres Drained					
	Drainage Coefficient (in: /24 hours)					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	<input type="text" value="6390.46"/>	<input type="text" value="3195.23"/>	<input type="text" value="2130.15"/>	<input type="text" value="1597.61"/>	<input type="text" value="1065.08"/>	<input type="text" value="798.81"/>
Dual-Wall	<input type="text" value="10638.39"/>	<input type="text" value="5319.19"/>	<input type="text" value="3546.13"/>	<input type="text" value="2659.60"/>	<input type="text" value="1773.06"/>	<input type="text" value="1329.80"/>

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**BY ACREAGE**  
**BY PIPE SIZE**

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= Definition

Enter the Diameter of the pipe (inches):	<input type="text" value="42"/>
Enter the Grade (%):	<input type="text" value=".095"/> %
<input type="button" value="View Results"/> (see below)	

	Q, Flow			Velocity
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	<input type="text" value="20.194"/>	<input type="text" value="9063.7"/>	<input type="text" value="480.65"/>	<input type="text" value="2.10"/>
Dual-Wall	<input type="text" value="33.657"/>	<input type="text" value="15106.3"/>	<input type="text" value="801.09"/>	<input type="text" value="3.50"/>

	Acres Drained					
	Drainage Coefficient (in: /24 hours)					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	<input type="text" value="3845.20"/>	<input type="text" value="1922.60"/>	<input type="text" value="1281.73"/>	<input type="text" value="961.30"/>	<input type="text" value="640.87"/>	<input type="text" value="480.65"/>
Dual-Wall	<input type="text" value="6408.74"/>	<input type="text" value="3204.37"/>	<input type="text" value="2136.25"/>	<input type="text" value="1602.18"/>	<input type="text" value="1068.12"/>	<input type="text" value="801.09"/>

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- Checks the capacity of drain tile on existing drainage systems
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**BY ACREAGE**  
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 = Definition

Enter the Diameter of the pipe (inches):	48
Enter the Grade (%): 	.09 %
<input type="button" value="View Results"/> (see below)	

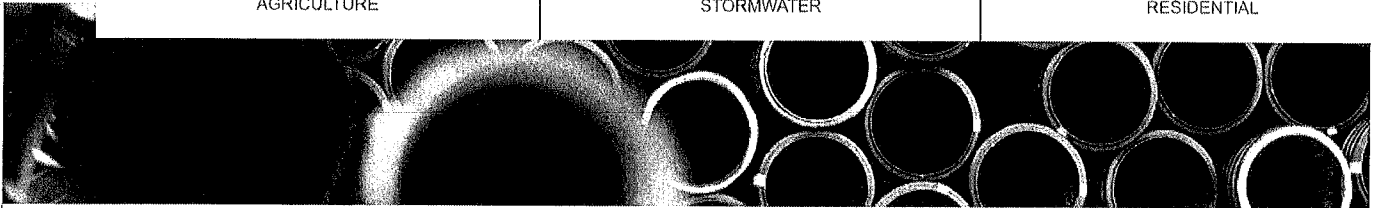
	Q, Flow 			Velocity 
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	28.134	12627.4	669.64	2.24
Dual-Wall	46.723	20970.7	1112.08	3.72

	Acres Drained					
	Drainage Coefficient (in: /24 hours) 					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	5357.09	2678.54	1785.70	1339.27	892.85	669.64
Dual-Wall	8896.68	4448.34	2965.56	2224.17	1482.78	1112.08

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#### CALCULATOR PURPOSE

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**BY ACREAGE**  
**BY PIPE SIZE**

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② = Definition

Enter the Diameter of the pipe (inches):	<input type="text" value="48"/>
Enter the Grade (%): ②	<input type="text" value=".186"/> %
<input type="button" value="View Results"/> (see below)	

	Q, Flow ②			Velocity ②
	c.f.s.	g.p.m	acre - in./24 hrs.	ft./sec.
Single-Wall	<input type="text" value="40.318"/>	<input type="text" value="18095.9"/>	<input type="text" value="959.64"/>	<input type="text" value="3.21"/>
Dual-Wall	<input type="text" value="67.322"/>	<input type="text" value="30216.1"/>	<input type="text" value="1602.37"/>	<input type="text" value="5.36"/>

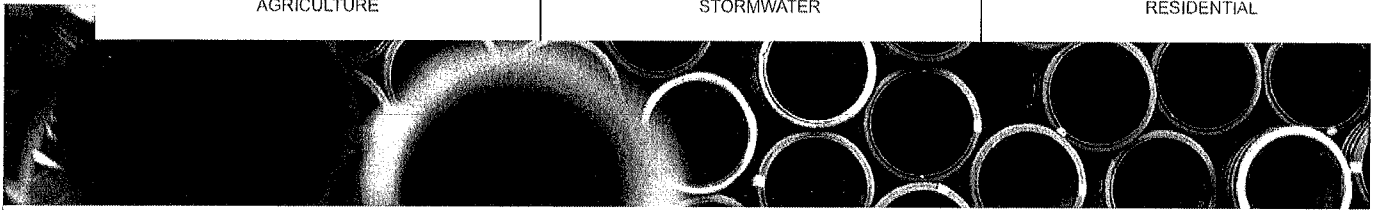
	Acres Drained					
	Drainage Coefficient (in: /24 hours) ②					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	<input type="text" value="7677.08"/>	<input type="text" value="3838.54"/>	<input type="text" value="2559.03"/>	<input type="text" value="1919.27"/>	<input type="text" value="1279.51"/>	<input type="text" value="959.64"/>
Dual-Wall	<input type="text" value="12819.00"/>	<input type="text" value="6409.50"/>	<input type="text" value="4273.00"/>	<input type="text" value="3204.75"/>	<input type="text" value="2136.50"/>	<input type="text" value="1602.37"/>

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= Definition

Enter the Diameter of the pipe (inches):	48
Enter the Grade (%):	.336 %
<div>View Results</div> <div>(see below)</div>	

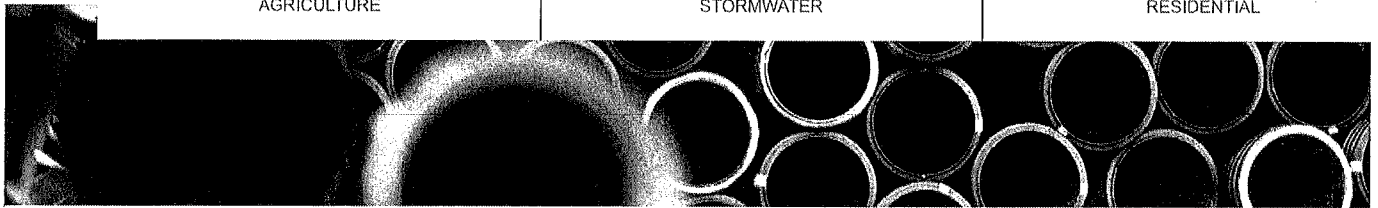
	Q, Flow			Velocity
	c.f.s.	g.p.m	acre - in./24 hrs.	ft./sec.
Single-Wall	54.259	24353.1	1291.45	4.32
Dual-Wall	90.432	40588.6	2152.43	7.20

	Acres Drained					
	Drainage Coefficient (in: /24 hours)					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	10331.63	5165.82	3443.88	2582.91	1721.94	1291.45
Dual-Wall	17219.45	8609.72	5739.82	4304.86	2869.91	2152.43

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② = Definition

Enter the Diameter of the pipe (inches):	48
Enter the Grade (%): ②	.208 %
<a href="#">View Results</a> (see below)	

	Q, Flow ②			Velocity ②
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	42.704	19166.8	1016.43	3.40
Dual-Wall	71.090	31907.3	1692.06	5.66

	Acres Drained					
	Drainage Coefficient (in: /24 hours) ②					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	8131.41	4065.70	2710.47	2032.85	1355.23	1016.43
Dual-Wall	13536.48	6768.24	4512.16	3384.12	2256.08	1692.06

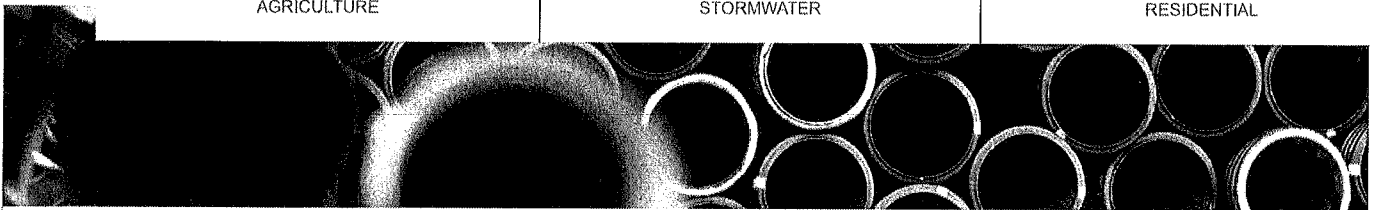
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= Definition

Enter the Diameter of the pipe (inches):	<input type="text" value="48"/>
Enter the Grade (%):	<input type="text" value=".197"/> %
<input type="button" value="View Results"/> (see below)	

	Q, Flow			Velocity
	c.f.s.	g.p.m	acre - in./24 hrs.	ft./sec.
Single-Wall	<input type="text" value="41.574"/>	<input type="text" value="18659.7"/>	<input type="text" value="989.53"/>	<input type="text" value="3.31"/>
Dual-Wall	<input type="text" value="69.206"/>	<input type="text" value="31061.7"/>	<input type="text" value="1647.22"/>	<input type="text" value="5.51"/>

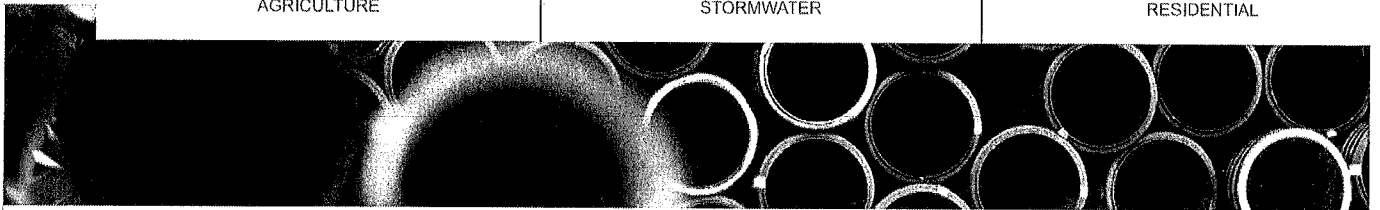
	Acres Drained					
	Drainage Coefficient (in: /24 hours)					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	<input type="text" value="7916.24"/>	<input type="text" value="3958.12"/>	<input type="text" value="2638.75"/>	<input type="text" value="1979.06"/>	<input type="text" value="1319.37"/>	<input type="text" value="989.53"/>
Dual-Wall	<input type="text" value="13177.74"/>	<input type="text" value="6588.87"/>	<input type="text" value="4392.58"/>	<input type="text" value="3294.43"/>	<input type="text" value="2196.29"/>	<input type="text" value="1647.22"/>

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**BY PIPE SIZE**

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= Definition

Enter the Diameter of the pipe (inches):	<input type="text" value="48"/>
Enter the Grade (%):	<input type="text" value=".14"/> %
<input type="button" value="View Results"/> (see below)	

	Q, Flow			Velocity
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	<input type="text" value="35.042"/>	<input type="text" value="15727.9"/>	<input type="text" value="834.06"/>	<input type="text" value="2.79"/>
Dual-Wall	<input type="text" value="58.404"/>	<input type="text" value="26213.5"/>	<input type="text" value="1390.11"/>	<input type="text" value="4.65"/>

	Acres Drained					
	Drainage Coefficient (in: /24 hours)					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	<input type="text" value="6672.46"/>	<input type="text" value="3336.23"/>	<input type="text" value="2224.15"/>	<input type="text" value="1668.12"/>	<input type="text" value="1112.08"/>	<input type="text" value="834.06"/>
Dual-Wall	<input type="text" value="11120.89"/>	<input type="text" value="5560.45"/>	<input type="text" value="3706.96"/>	<input type="text" value="2780.22"/>	<input type="text" value="1853.48"/>	<input type="text" value="1390.11"/>

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### **Proposed Laterals Capacity**

# New Laterals

	STATIONS		DRAINAGE AREA ACRES	CUMM DRAINAGE AREA	TILE SIZE INCHES	GRADE %	DRAINAGE COEF.	VELOCITY F.P.S	CAPACITY ACRES	CAPACITY CFS
	FROM	TO								
L1N	1342	1024	154.5	154.5	18	0.191%	3/4	2.82	158.07	4.981 dw
L1N	1024	0	154.5	154.5	18	0.295%	3/4	3.51	196.76	6.2
L1S	2200	0	285.1	285.1	30	0.100%	3/4	2.87	446.87	14.081 dw
			147.8	432.9	30	0.100%	3/4	2.87	446.87	14.081
L2N	3750	2750	83.8	83.8	24	0.040%	3/4	1.56	155.44	4.898 dw
	2750	1950	73.4	157.2	24	0.040%	3/4	1.56	155.44	4.898
	1950	0	102.5	259.7	30	0.040%	3/4	1.82	283.37	8.929
L2NA	370	0	41.6	41.6	12	0.450%	3/4	2.33	58.04	1.829 sw
L2NB	115	0	21.7	21.7	10	0.260%	3/4	1.57	27.17	0.856 sw
L3N	1487	831	73.8	73.8	18	0.279%	3/4	3.41	191.14	6.023 dw
	831	0	59.1	132.9	18	0.279%	3/4	3.41	191.14	6.023
L3NA	739	0	44.8	44.8	12	0.20%	3/4	2.2	54.81	1.727 dw

4/N

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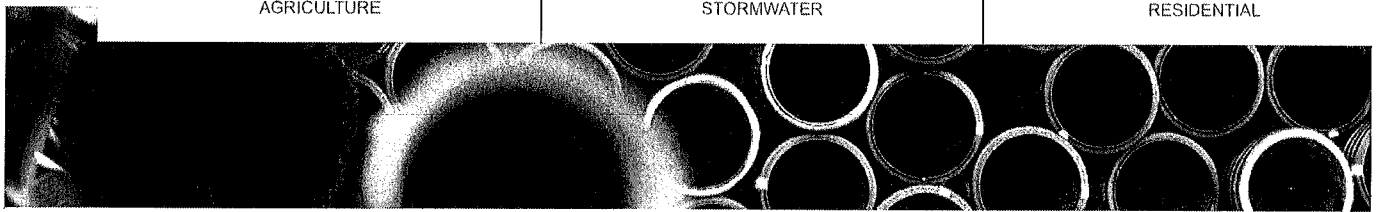
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BY ACREAGE  
BY PIPE SIZE

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? = Definition

Enter the Diameter of the pipe (inches):	<input type="text" value="18"/>
Enter the Grade (%): ?	<input type="text" value=".191"/> %
<input type="button" value="View Results"/> (see below)	

	Q, Flow ?			Velocity ?
	c.f.s.	g.p.m	acre - in./24 hrs.	ft./sec.
Single-Wall	<input type="text" value="2.985"/>	<input type="text" value="1339.8"/>	<input type="text" value="71.05"/>	<input type="text" value="1.69"/>
Dual-Wall	<input type="text" value="4.981"/>	<input type="text" value="2235.6"/>	<input type="text" value="118.56"/>	<input type="text" value="2.82"/>

	Acres Drained					
	Drainage Coefficient (in: /24 hours) ?					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	<input type="text" value="568.38"/>	<input type="text" value="284.19"/>	<input type="text" value="189.46"/>	<input type="text" value="142.10"/>	<input type="text" value="94.73"/>	<input type="text" value="71.05"/>
Dual-Wall	<input type="text" value="948.45"/>	<input type="text" value="474.22"/>	<input type="text" value="316.15"/>	<input type="text" value="237.11"/>	<input type="text" value="158.07"/>	<input type="text" value="118.56"/>

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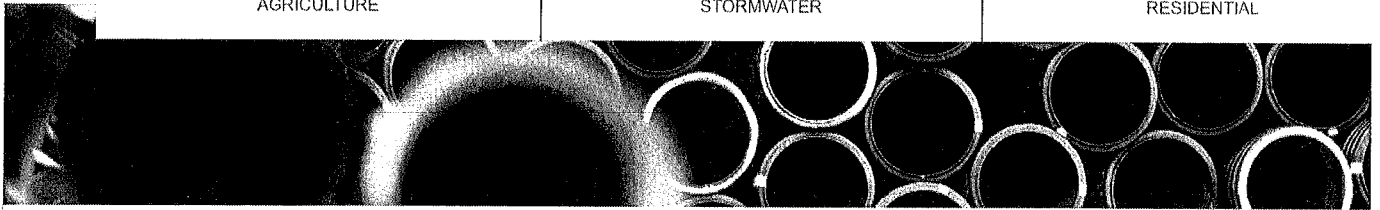
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① = Definition

Enter the Diameter of the pipe (inches):	18
Enter the Grade (%): ①	.295 %
<a href="#">View Results</a> (see below)	

	Q, Flow ①			Velocity ①
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	3.709	1664.7	88.28	2.10
Dual-Wall	6.200	2782.7	147.57	3.51

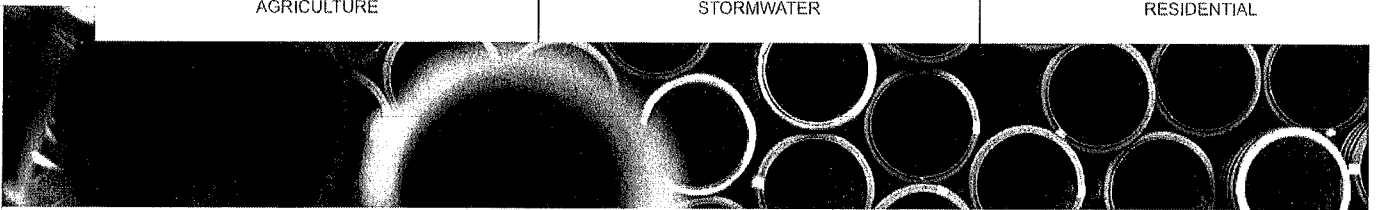
	Acres Drained					
	Drainage Coefficient (in: /24 hours) ①					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	706.24	353.12	235.41	176.56	117.71	88.28
Dual-Wall	1180.56	590.28	393.52	295.14	196.76	147.57

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## BY ACREAGE BY PIPE SIZE

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? = Definition

Enter the Diameter of the pipe (inches):	30
Enter the Grade (%): ?	.1 %
<a href="#">View Results</a> (see below)	

	Q, Flow ?			Velocity ?
	c.f.s.	g.p.m	acre - in./24 hrs.	ft./sec.
Single-Wall	8.439	3787.7	200.86	1.72
Dual-Wall	14.081	6320.0	335.15	2.87

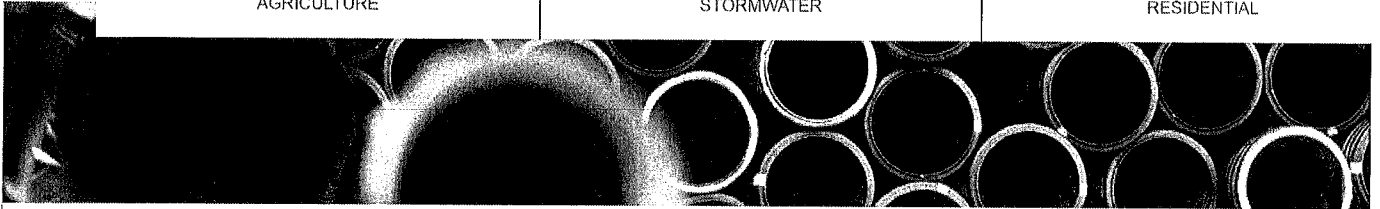
	Acres Drained					
	Drainage Coefficient (in: /24 hours) ?					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	1606.90	803.45	535.63	401.72	267.82	200.86
Dual-Wall	2681.21	1340.60	893.74	670.30	446.87	335.15

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② = Definition

Enter the Diameter of the pipe (inches):	<input type="text" value="24"/>
Enter the Grade (%): ②	<input type="text" value=".04"/> %
<input type="button" value="View Results"/> (see below)	

	Q, Flow ②			Velocity ②
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	<input type="text" value="2.952"/>	<input type="text" value="1324.9"/>	<input type="text" value="70.26"/>	<input type="text" value="0.94"/>
Dual-Wall	<input type="text" value="4.898"/>	<input type="text" value="2198.4"/>	<input type="text" value="116.58"/>	<input type="text" value="1.56"/>

	Acres Drained					
	Drainage Coefficient (in: /24 hours) ②					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	<input type="text" value="562.10"/>	<input type="text" value="281.05"/>	<input type="text" value="187.37"/>	<input type="text" value="140.52"/>	<input type="text" value="93.68"/>	<input type="text" value="70.26"/>
Dual-Wall	<input type="text" value="932.64"/>	<input type="text" value="466.32"/>	<input type="text" value="310.88"/>	<input type="text" value="233.16"/>	<input type="text" value="155.44"/>	<input type="text" value="116.58"/>

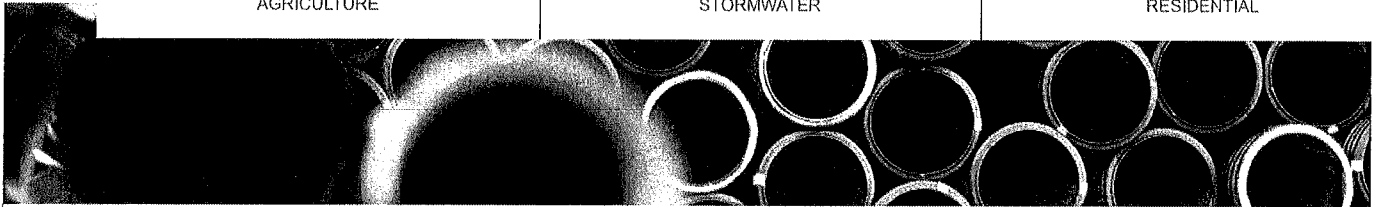
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**BY PIPE SIZE**

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⑦ = Definition

Enter the Diameter of the pipe (inches):	<input type="text" value="30"/>
Enter the Grade (%): ⑦	<input type="text" value=".04"/> %
<input type="button" value="View Results"/> (see below)	

	Q, Flow ⑦			Velocity ⑦
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	<input type="text" value="5.348"/>	<input type="text" value="2400.3"/>	<input type="text" value="127.29"/>	<input type="text" value="1.09"/>
Dual-Wall	<input type="text" value="8.929"/>	<input type="text" value="4007.6"/>	<input type="text" value="212.52"/>	<input type="text" value="1.82"/>

	Acres Drained					
	Drainage Coefficient (in./24 hours) ⑦					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	<input type="text" value="1018.33"/>	<input type="text" value="509.16"/>	<input type="text" value="339.44"/>	<input type="text" value="254.58"/>	<input type="text" value="169.72"/>	<input type="text" value="127.29"/>
Dual-Wall	<input type="text" value="1700.20"/>	<input type="text" value="850.10"/>	<input type="text" value="566.73"/>	<input type="text" value="425.05"/>	<input type="text" value="283.37"/>	<input type="text" value="212.52"/>

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② = Definition

Enter the Diameter of the pipe (inches):	12
Enter the Grade (%): ②	.45 %
<a href="#">View Results</a> (see below)	

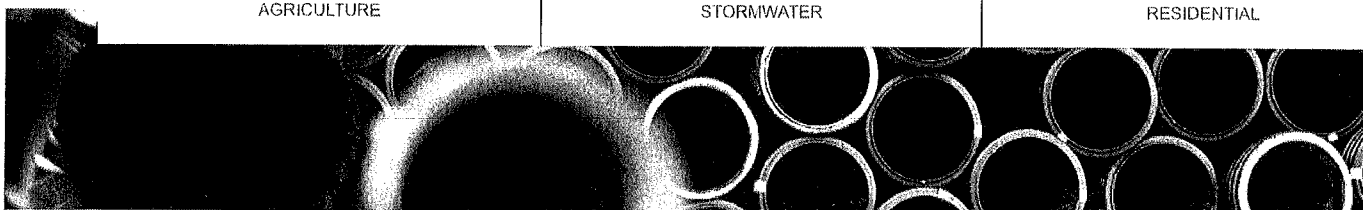
	Q, Flow ②			Velocity ②
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	1.829	820.9	43.53	2.33
Dual-Wall	2.591	1162.9	61.67	3.30

	Acres Drained					
	Drainage Coefficient (in: /24 hours) ②					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	348.27	174.13	116.09	87.07	58.04	43.53
Dual-Wall	493.36	246.68	164.45	123.34	82.23	61.67

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? = Definition

Enter the Diameter of the pipe (inches):	10
Enter the Grade (%): ?	.26 %
<input type="button" value="View Results"/> (see below)	

	Q, Flow ?			Velocity ?
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	0.856	384.2	20.37	1.57
Dual-Wall	1.210	543.1	28.80	2.22

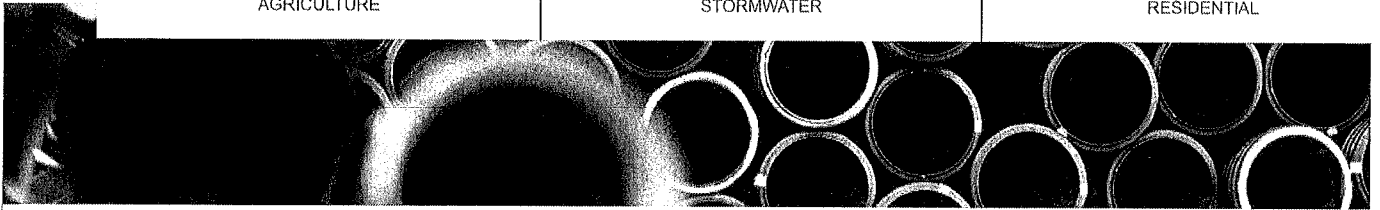
	Acres Drained					
	Drainage Coefficient (in./24 hours) ?					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	162.99	81.50	54.33	40.75	27.17	20.37
Dual-Wall	230.40	115.20	76.80	57.60	38.40	28.80

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= Definition

Enter the Diameter of the pipe (inches):	18
Enter the Grade (%):	.279 %
<a href="#">View Results</a> (see below)	

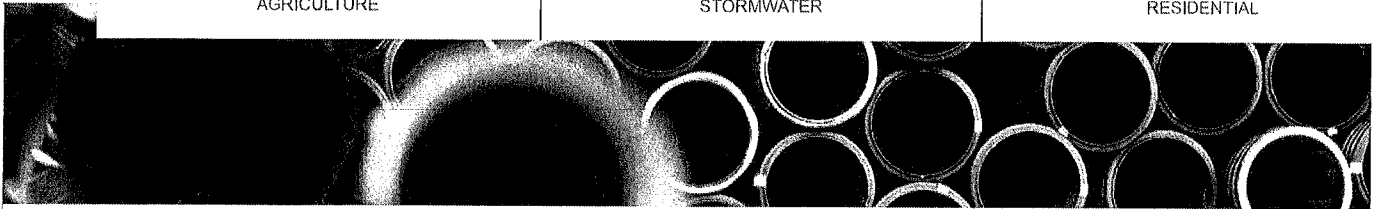
	Q, Flow			Velocity
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	3.621	1625.2	86.19	2.05
Dual-Wall	6.023	2703.3	143.36	3.41

	Acres Drained					
	Drainage Coefficient (in: /24 hours)					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	689.49	344.74	229.83	172.37	114.91	86.19
Dual-Wall	1146.86	573.43	382.29	286.71	191.14	143.36

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= Definition

Enter the Diameter of the pipe (inches):	<input type="text" value="12"/>
Enter the Grade (%):	<input type="text" value=".2"/> %
<input type="button" value="View Results"/> (see below)	

	Q, Flow			Velocity
	c.f.s.	g.p.m.	acre - in./24 hrs.	ft./sec.
Single-Wall	<input type="text" value="1.217"/>	<input type="text" value="546.2"/>	<input type="text" value="28.97"/>	<input type="text" value="1.55"/>
Dual-Wall	<input type="text" value="1.727"/>	<input type="text" value="775.1"/>	<input type="text" value="41.11"/>	<input type="text" value="2.20"/>

	Acres Drained					
	Drainage Coefficient (in./24 hours)					
	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Single-Wall	<input type="text" value="231.73"/>	<input type="text" value="115.87"/>	<input type="text" value="77.24"/>	<input type="text" value="57.93"/>	<input type="text" value="38.62"/>	<input type="text" value="28.97"/>
Dual-Wall	<input type="text" value="328.84"/>	<input type="text" value="164.42"/>	<input type="text" value="109.61"/>	<input type="text" value="82.21"/>	<input type="text" value="54.81"/>	<input type="text" value="41.11"/>

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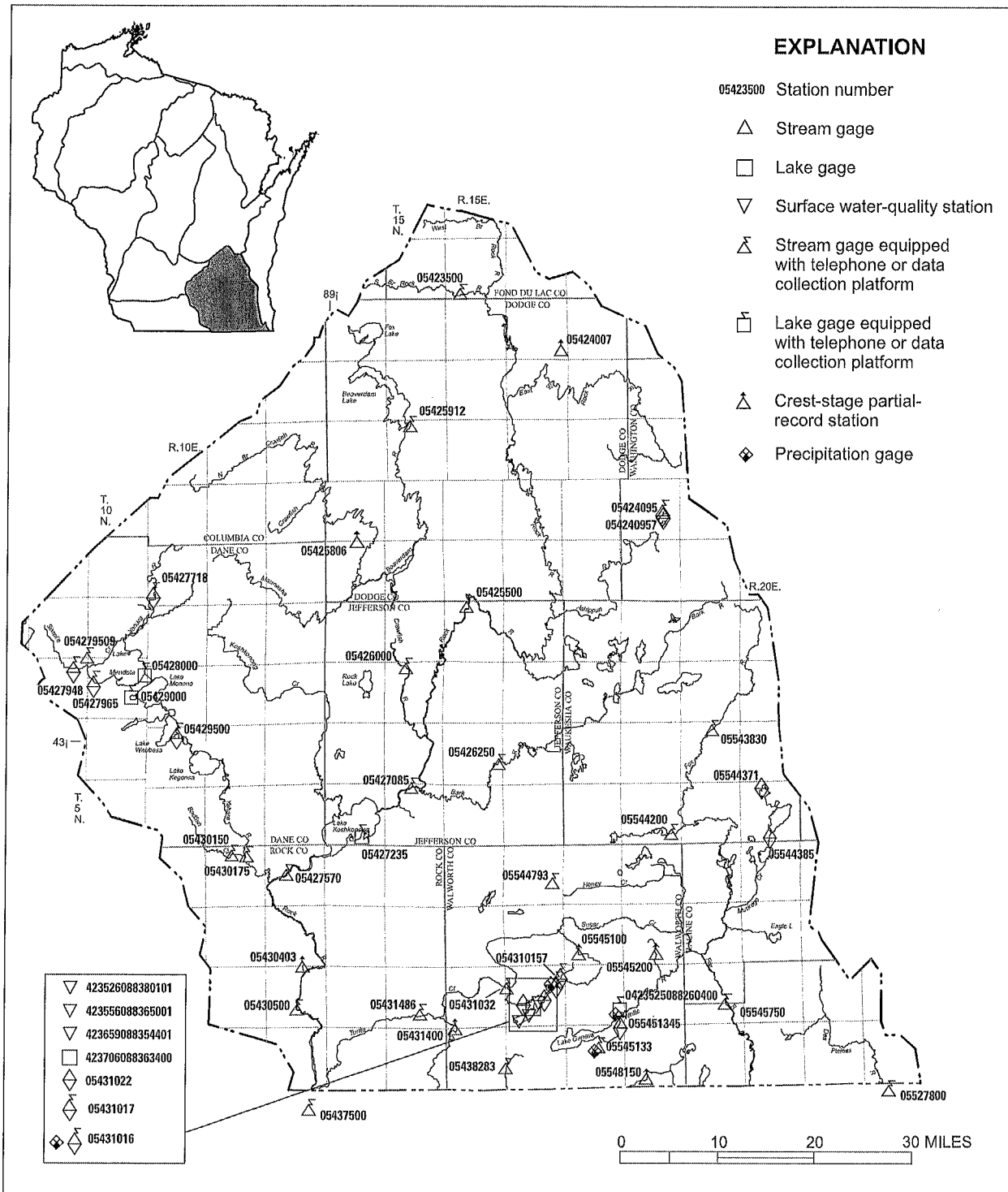
## Open Ditch Capacity

OPEN DITCH 4 FT BOTTOM 2:1 SIDESLOPE N=0.04

SLOPE	QB	D	V
%	CFS	FT	FT/S
0.16	0.18	0.13	0.33
0.1	0.18	0.14	0.3
0.13	0.25	0.16	0.36
0.27	0.25	0.13	0.45
0.1	0.25	0.18	0.32
0.29	0.25	0.13	0.45

SLOPE	Q10	D	V
%	CFS	FT	FT/S
0.16	38	2.35	1.86
0.1	38	2.63	1.56
0.13	67	3.22	1.99
0.27	67	2.72	2.61
0.1	67	3.42	1.81
0.29	67	2.67	2.69

SLOPE	Q25	D	V
%	CFS	FT	FT/S
0.16	46	2.57	1.96
0.1	46	2.87	1.65
0.13	81	3.51	2.09
0.27	81	2.97	2.74
0.1	81	3.72	1.9
0.29	81	2.92	2.82





054310157 JACKSON CREEK TRIBUTARY NEAR ELKHORN, WI

LOCATION.--Lat 42°39'03", long 88°33'03", in NW 1/4 NE 1/4 sec.12, T.2 N., R.16 E., Walworth County, Hydrologic Unit 07090001, on left bank 20 ft downstream from Interstate Highway 43, 1.1 mi upstream from Delavan Lake inlet at Mound Road, and 1.5 mi south of Elkhorn.

DRAINAGE AREA.--4.34 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1983 to current year.

REVISED RECORDS.--WDR WI-89-1: 1988.

GAGE.--Water-stage recorder. Datum of gage is 924.70 ft above NGVD of 1929 (Wisconsin Department of Transportation bench mark). Prior to Dec. 4, 1992, at site 180 ft downstream at same datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor (see page 11). Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.0	3.7	3.3	e0.82	3.2	2.1	2.6	2.7	1.1	1.5	0.92	0.32
2	1.9	3.2	2.5	e0.80	e2.6	e2.0	3.7	4.0	1.1	0.95	0.36	7.2
3	1.8	2.7	2.4	e0.80	e2.2	e1.9	2.4	2.2	7.8	0.80	0.26	0.81
4	2.0	2.4	2.4	e0.80	e2.0	e1.9	2.1	1.9	64	0.60	1.8	0.51
5	1.5	2.3	2.6	e0.82	e1.8	e2.0	2.1	1.8	19	0.49	0.35	0.45
6	1.2	2.2	2.4	e0.90	e1.7	2.1	1.9	2.2	6.4	0.45	0.35	0.47
7	1.1	2.2	2.0	e0.86	2.1	2.1	8.5	2.0	4.0	0.42	0.34	0.34
8	1.1	2.0	1.9	e0.80	2.4	23	32	1.9	3.1	0.47	0.35	0.32
9	0.99	2.0	1.6	e0.94	3.0	32	35	3.1	2.5	0.93	0.36	0.51
10	5.8	1.8	1.7	1.1	13	11	9.1	2.0	3.2	0.45	0.32	0.49
11	2.9	1.8	1.6	1.2	4.2	4.3	5.7	4.4	3.5	0.40	0.33	0.59
12	5.9	1.9	2.4	1.2	3.2	4.0	4.6	3.5	2.1	0.52	0.90	0.44
13	14	11	8.5	1.1	2.5	4.0	3.8	2.5	2.2	0.40	5.6	0.43
14	14	10	2.7	2.2	e2.2	3.6	3.5	2.3	3.2	0.40	1.0	0.29
15	5.5	5.2	2.1	1.4	e2.1	3.2	3.3	2.1	1.8	0.43	0.45	0.32
16	3.4	3.3	2.5	1.2	e2.0	2.7	3.0	3.2	1.4	0.40	0.48	0.57
17	2.6	2.5	2.3	e1.1	1.9	2.5	2.7	2.4	1.5	0.40	0.45	0.46
18	2.2	2.3	1.9	e1.0	2.1	2.5	2.7	1.8	1.3	0.40	0.32	0.53
19	2.0	2.2	2.3	e0.98	6.4	2.5	2.7	1.6	1.2	0.40	0.47	8.2
20	1.8	1.9	1.5	e0.96	7.4	2.7	2.2	1.6	1.2	0.35	0.48	1.7
21	1.5	1.9	1.4	1.2	5.8	2.4	3.4	1.8	1.9	0.35	5.9	0.69
22	8.5	1.7	2.0	1.5	3.6	2.2	2.8	1.9	1.3	0.35	12	0.50
23	47	1.8	1.9	1.9	3.3	2.1	2.4	2.2	1.2	0.35	1.1	0.56
24	65	12	1.5	1.6	3.2	2.0	2.8	1.9	1.6	0.35	0.65	0.71
25	23	9.6	1.3	1.6	2.9	1.9	2.3	8.0	1.5	0.35	0.50	0.59
26	12	4.3	e1.2	1.5	2.9	e1.8	2.0	2.5	6.5	0.35	0.59	0.55
27	8.5	4.2	e1.1	1.6	2.6	e1.9	3.0	2.0	2.3	0.35	0.62	0.56
28	6.6	3.0	e1.0	1.8	2.4	2.1	3.1	1.8	1.9	0.35	0.59	0.50
29	5.2	3.2	e0.96	1.6	---	2.4	2.4	1.6	1.4	0.36	0.53	16
30	4.4	4.6	e0.90	1.4	---	1.9	2.1	1.5	1.2	0.35	0.48	1.2
31	4.4	---	e0.86	1.7	---	2.0	---	1.5	---	0.35	0.31	---
TOTAL	259.79	112.9	64.72	38.38	94.7	134.8	159.9	75.9	152.4	15.02	39.16	46.81
MEAN	8.380	3.763	2.088	1.238	3.382	4.348	5.330	2.448	5.080	0.485	1.263	1.560
MAX	65	12	8.5	2.2	13	32	35	8.0	64	1.5	12	16
MIN	0.99	1.7	0.86	0.80	1.7	1.8	1.9	1.5	1.1	0.35	0.26	0.29
CFSM	1.93	0.87	0.48	0.29	0.78	1.00	1.23	0.56	1.17	0.11	0.29	0.36
IN.	2.23	0.97	0.55	0.33	0.81	1.16	1.37	0.65	1.31	0.13	0.34	0.40

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 2002, BY WATER YEAR (WY)

	MEAN	2.416	3.607	2.417	1.939	3.902	4.694	5.052	3.582	3.785	2.085	1.607	2.751
MAX	8.38	13.3	6.55	4.62	9.42	10.7	14.4	8.00	9.42	5.39	5.59	10.8	
(WY)	2002	1986	1985	1999	2001	1986	1993	2000	1996	1992	1995	1986	
MIN	0.30	0.58	0.49	0.45	0.33	1.13	1.28	0.79	0.54	0.44	0.30	0.27	
(WY)	1995	1990	1990	1994	1989	1996	1989	1989	1988	1988	1988	1987	

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR	FOR 2002 WATER YEAR	WATER YEARS 1984 - 2002
ANNUAL TOTAL	1803.39	1194.48	
ANNUAL MEAN	4.941	3.273	3.140
HIGHEST ANNUAL MEAN			5.74
LOWEST ANNUAL MEAN			1.70
HIGHEST DAILY MEAN	81	65	113
LOWEST DAILY MEAN	0.57	0.26	0.03
ANNUAL SEVEN-DAY MINIMUM	0.77	0.34	0.07
MAXIMUM PEAK FLOW		119	210
MAXIMUM PEAK STAGE		8.93	10.00
ANNUAL RUNOFF (CFSM)	1.14	0.75	0.72
ANNUAL RUNOFF (INCHES)	15.46	10.24	9.83
10 PERCENT EXCEEDS	10	5.8	6.6
50 PERCENT EXCEEDS	2.6	1.9	1.4
90 PERCENT EXCEEDS	1.00	0.43	0.41

(a) Also occurred Sept. 2

(e) Estimated due to ice effect or missing record

0.09 cfs  
mi<sup>2</sup>

# FLOOD FREQUENCY CHARACTERISTICS OF WISCONSIN STREAMS

(ver 2-2014)

USGS Water Resources Investigations Report 03-4250

Wisconsin Flood Frequency Area 5<sup>Note 1.</sup>

Clear Data Entry Cells

Project: District 4  
 County: Dane  
 By: dw  
 Checked By: Date: Date:

Watershed Area (square miles) 2.82 Area A 2.8 sq miles  
 Main-channel length (miles) 2.32 Slope S 12.07 feet/mile  
 Enter Elevation 0.232 miles 925 Storage ST<sup>Note 2.</sup> 8.00 %+1  
 Enter Elevation 1.972 miles 946  
 Enter Storage (% of Basin Area) 7

Peak Flood Discharge with n-year recurrence interval<sup>Note 3.</sup>

Q <sub>n</sub>	1.2	29	cfs
Q <sub>2</sub>	2	41	cfs
Q <sub>5</sub>	5	55	cfs
Q <sub>10</sub>	10	67	cfs
Q <sub>25</sub>	25	81	cfs
Q <sub>50</sub>	50	92	cfs
Q <sub>100</sub>	100	104	cfs

Slope valid between 0.74 - 74.2 FT/MI

- Note 1. Flood Frequency Area is indicated by Figure 3 of above report  
 Note 2. ST is Storage in basin area consisting of ponds, lakes, wetlands + 1, in percent of total basin area.  
 Note 3. Flood frequency equations from Table 2, equations 5-1 to 5-6 of above report.

return period	probabil	1- probability	error bars	q (cfs)	q log10 (cfs)	
1.2	0.83	0.17	1	29	1.462	extrapolated data
2	0.50	0.50	1	41	1.608	
5	0.20	0.80	1	55	1.740	
10	0.10	0.90	1	67	1.823	
25	0.04	0.96	1	81	1.911	

FALSE

# FLOOD FREQUENCY CHARACTERISTICS OF WISCONSIN STREAMS

(ver 2-2014)

USGS Water Resources Investigations Report 03-4250

Wisconsin Flood Frequency Area 5<sup>Note 1.</sup>

Clear Data Entry Cells

Project: District 4-mid  
 County: Dane  
 By: dw  
 Checked By:  
 Date:  
 Date:

Watershed Area (square miles) 2.06 Area A 2.1 sq miles  
 Main-channel length (miles) 1.09 Slope S 7.34 feet/mile  
 Enter Elevation 0.109 miles 936 Storage ST<sup>Note 2.</sup> 9.00 %+1  
 Enter Elevation 0.9265 miles 942  
 Enter Storage (% of Basin Area) 8

Peak Flood Discharge with n-year recurrence interval<sup>Note 3.</sup>

Q <sub>n</sub>	1.2	17	cfs
Q <sub>2</sub>	2	23	cfs
Q <sub>5</sub>	5	32	cfs
Q <sub>10</sub>	10	38	cfs
Q <sub>25</sub>	25	46	cfs
Q <sub>50</sub>	50	52	cfs
Q <sub>100</sub>	100	59	cfs

Slope valid between 0.74 - 74.2 FT/MI

- Note 1. Flood Frequency Area is indicated by Figure 3 of above report  
 Note 2. ST is Storage in basin area consisting of ponds, lakes, wetlands + 1, in percent of total basin area.  
 Note 3. Flood frequency equations from Table 2, equations 5-1 to 5-6 of above report.

return period	probabil	1- probability	error bars	q (cfs)	q log10 (cfs)	
1.2	0.83	0.17	1	17	1.222	extrapolated data FALSE
2	0.50	0.50	1	23	1.370	
5	0.20	0.80	1	32	1.503	
10	0.10	0.90	1	38	1.583	
25	0.04	0.96	1	46	1.666	