

**LITTLE TOBACCO JOINT COUNTY DRAIN #442
COMPUTATION OF APPORTIONMENTS
ISABELLA COUNTY
PRO RATA SHARE OF RUNOFF
ACT 51-PA 1951-SECTION 14A**

<u>DESCRIPTION</u>	<u>ACRES</u>
County Roads Gravel (66' R.O.W.)	86.58
County Roads Paved (66' R.O.W.)	48.90
Platted County Roads Gravel (66' R.O.W.)	3.81
Platted County Roads Paved (66' R.O.W.)	2.89
Rails-To-Trails (Isabella County) (100' R.O.W.)	3.75
City of Clare	256.13
MDOT U.S.-127 Expressway (300' R.O.W.)	11.18
Business US-127 Highway	14.58
Two Lane with Median (300' R.O.W.)	10.65
4 Lane Asphalt Road (100' R.O.W.)	3.93
U.S.-10 Highway (150' R.O.W.)	6.65
GLC Railroad (MDOT) (66' R.O.W.)	11.27
Undeveloped Ag/Rural Residential	<u>5289.88</u>
Drainage District Total:	<u>5735.62</u>

<u>DESCRIPTION</u>	<u>ACRES x CN = Equivalent Acres</u>	
County Roads Gravel (66' R.O.W.)	86.58 x 0.397 =	34.3723
County Roads Paved (66' R.O.W.)	48.90 x 0.470 =	22.9830
Platted County Roads Gravel (66' R.O.W.)	3.81 x 0.348 =	1.3259
Platted County Roads Paved (66' R.O.W.)	2.89 x 0.397 =	1.1473
Rails-To-Trails (Isabella County) (100' R.O.W.)	3.75 x 0.298 =	1.1175
City of Clare	256.13 x 0.468 =	119.8688
MDOT U.S.-127 Expressway (300' R.O.W.)	11.18 x 0.375 =	4.1925
Bus. US-127 Two Lane with Median (300' R.O.W.)	10.65 x 0.375 =	3.9938
Bus. US-1274 Lane Asphalt Road (100' R.O.W.)	3.93 x 0.559 =	2.1969
U.S.-10 Highway (150' R.O.W.)	6.65 x 0.437 =	2.9061
GLC Railroad (MDOT) (66' R.O.W.)	11.27 x 0.364 =	4.1023
Undeveloped Ag/Rural Residential	<u>5289.88 x 0.160 =</u>	<u>846.3808</u>
Totals:	<u>5735.62</u>	<u>1044.5870</u>

Pro rata share for MDOT

$$\text{U.S.-127} \quad \frac{4.1925 + 3.9938 + 2.1969}{1044.5870} = \frac{10.3832}{1044.5870} \quad 0.9940\%$$

$$\text{U.S.-10} \quad \frac{2.9061}{1044.5870} \quad 0.2782\%$$

$$\text{G.L.C.} \quad \frac{4.1023}{1044.5870} \quad 0.3927\%$$

Pro rata share for County Roads & Rails-To-Trails

$$\frac{34.3723 + 22.9830 + 1.3259 + 1.1473 + 1.1175}{1044.5870} = \frac{60.9460}{1044.5870} \quad 5.8345\%$$

Pro rata share City of Clare

$$\frac{119.8688}{1044.5870} \quad 11.4752\%$$

Pro rata share Remaining Lands

$$\frac{846.3808}{1044.5870} \quad 81.0254\%$$

ISABELLA COUNTY SUMMARY

MDOT: (0.9940 + 0.2782 + 0.3927)	1.665%
County Roads/Rails-To-Trails	5.835%
City of Clare	11.475%
Remaining Lands	<u>81.025%</u>
Total:	100.000%

**LITTLE TOBACCO JOINT COUNTY DRAIN #125
COMPUTATION OF APPORTIONMENTS
CLARE COUNTY
PRO RATA SHARE OF RUNOFF
ACT 51-PA 1951-SECTION 14A**

<u>DESCRIPTION</u>	<u>ACRES</u>
County Roads Gravel (66' R.O.W.)	2.40
County Roads Paved (66' R.O.W.)	15.15
Platted County Roads Gravel (66' R.O.W.)	4.90
Platted County Roads Paved (66' R.O.W.)	1.10
City of Clare	664.94
MDOT U.S.-10 Highway (300' ROW)	39.61
MDOT U.S.-127 Highway (300' R.O.W.)	35.16
Business 127 (100' R.O.W.)	5.60
U.S.-10 Highway (R.O.W. Varies)	23.12
GLC Railroad (MDOT) (66' R.O.W.)	4.40
GLC Railroad (Private) Township (100' R.O.W.)	4.41
Undeveloped Ag/Rural Residential	<u>435.15</u>
Drainage District Total:	1235.94

<u>DESCRIPTION</u>	<u>ACRES x CN = Equivalent Acres</u>	
County Roads Gravel (66' R.O.W.)	2.40 x .397 =	0.9528
County Roads Paved (66' R.O.W.)	15.15 x .470 =	7.1205
Platted County Roads Gravel (66' R.O.W.)	4.90 x .348 =	1.7052
Platted County Roads Paved (66' R.O.W.)	1.10 x .470 =	0.5170
City of Clare	664.94 x .403 =	267.9708
MDOT U.S.-10 Highway (300' ROW)	39.61 x .375 =	14.8538
MDOT U.S.-127 Highway (300' R.O.W.)	35.16 x .375 =	13.1850
Business 127 (100' R.O.W.)	5.60 x .804 =	4.5024
U.S.-10 Highway (R.O.W. Varies)	23.12 x .686 =	15.8603
GLC Railroad (MDOT) (66' R.O.W.)	4.40 x .364 =	1.6016
GLC Railroad (Private) Township (100' R.O.W.)	4.41 x .348 =	1.5347
Undeveloped Ag/Rural Residential	<u>435.15 x .160 =</u>	<u>69.6240</u>
Drainage District Total:	1235.94	399.4281

Pro rata share for MDOT

$$\text{U.S.-127} \quad \frac{13.1850 + 4.5024}{399.4281} = \frac{17.6874}{399.4281} = 4.428\%$$

$$\text{U.S.-10} \quad \frac{14.8538 + 15.8603}{399.4281} = \frac{30.7141}{399.4281} = 7.690\%$$

$$\text{G.L.C.} \quad \frac{1.6016}{399.4281} = 0.401\%$$

Pro rata share for County Roads

$$\frac{0.9528 + 7.1205 + 1.7052 + 0.5170}{399.4281} = \frac{10.2955}{399.4281} = 2.578\%$$

Pro rata share for G.L.C. Private-Township

$$\frac{1.5347}{399.4281} = 0.384\%$$

Pro rata share City of Clare

$$\frac{267.9708}{399.4281} = 67.089\%$$

Pro rata share Remaining Lands

$$\frac{69.6240}{399.4281} = 17.430\%$$

CLARE COUNTY SUMMARY

MDOT: (4.428 + 7.690 + 0.401)	12.519%
County Roads	2.578%
GLC-Private Township	0.384%
City of Clare	67.089%
Remaining Lands	<u>17.430%</u>
Total:	100.000%

RUNOFF COEFFICIENTS

(GLC Railroad/MDOT): 66' R.O.W.

Stone Ballast	21'	$21' \times 0.5 =$	10.5
Remaining	45'	$\underline{45'} \times 0.3 =$	<u>13.5</u>
Totals:	66'		24.0

Average Runoff Coefficient: $24.0 \div 66 = 0.364$

(GLC Railroad/Private): 100' R.O.W. Typical

Stone Ballast	17'	$17' \times 0.5 =$	8.5
Remaining	83'	$\underline{83'} \times 0.3 =$	<u>24.9</u>
Totals:	100		33.4

Platted County Roads Gravel 66' R.O.W.

Gravel Road	16'	$16' \times 0.7 =$	11.2
Gravel Shoulder	2-3'	$6' \times 0.5 =$	3.0
Berms	44'	$\underline{44'} \times 0.2 =$	<u>8.8</u>
Totals:	66		23.0

Average Runoff Coefficient: $23.0 \div 66 = 0.348$

Platted County Roads Paved: 66' R.O.W. (Vernon City)

Asphalt	16'	$16' \times 0.9 =$	14.4
Gravel Shoulder	2-3'	$6' \times 0.5 =$	3.0
Berms	44'	$\underline{44'} \times 0.2 =$	<u>8.8</u>
Totals:	66		26.2

Average Runoff Coefficient: $26.2 \div 66 = 0.397$

Rails-To-Trails: 100' R.O.W. Isabella Co.

Asphalt	14'	$14' \times 0.9 =$	12.6
Remaining	86'	$\underline{86'} \times 0.2 =$	<u>17.2</u>
Totals:	100		29.8

Average Runoff Coefficient: $29.8 \div 100 = 0.298$

County Roads Gravel: 66' R.O.W.

Gravel Road	20'	$20' \times 0.7 =$	14.0
Gravel Shoulder	2-5'	$10' \times 0.5 =$	5.0
Berms	36'	$\underline{36'} \times 0.2 =$	<u>7.2</u>
Totals:	66		26.2

Average Runoff Coefficient: $26.2 \div 66 = 0.397$

County Roads Paved: 66' R.O.W.

Asphalt	22'	22' x 0.9 =	19.8
Gravel Shoulder	2-4'	8' x 0.5 =	4.0
Berms	36'	<u>36' x 0.2 =</u>	<u>7.2</u>
Totals:		66'	31.0

Average Runoff Coefficient: $31 \div 66' = 0.470$

Expressways Dual Roadway 300' R.O.W.

Pavements 2-24'	48' x 0.9 =	43.2
Paved Shoulder 2-10'	20' x 0.9 =	18.0
Gravel Shoulder 2-8'	16' x 0.5 =	8.0
Berms 216'	<u>216' x 0.2 =</u>	<u>43.2</u>
Totals:		300' 112.4

Average Runoff Coefficient $112.4 \div 300' = 0.375$

Business US-127 Clare County Configuration Varies 100 R.O.W.

3 Lane, 2 Sidewalks, 100' R.O.W. 16%

Asphalt	47.5'	47.5' x 0.9 =	42.75
Paved Sidewalks 2@5'	10' x 0.9 =	9.00	
Berm	42.5'	<u>42.5' x 0.25 =</u>	<u>10.63</u>
Totals:		100'	62.38

Average Runoff Coefficient: $62.38 \div 100 = 0.624$

5 Lane with 2 sidewalks 100' R.O.W. 29%

Asphalt	67'	67' x 0.9 =	60.30
Paved Sidewalks 2@5'	10' x 0.9 =	9.00	
Berm	23'	<u>23' x 0.25 =</u>	<u>5.75</u>
Totals:		100'	75.05

Average Runoff Coefficient: $75.05 \div 100 = 0.751$

Typical 4 Lane/Parking/Sidewalk/Brick 100' R.O.W. 55%

Asphalt (BOC/BOC) 67'	67' x 0.90 =	60.30
Sidewalk & Brick 33'	<u>33' x 0.85 =</u>	<u>28.05</u>
Totals:		100' 88.35

Average Runoff Coefficient: $88.35 \div 100 = 0.884$

Overall Average Runoff Coefficient Business U.S.-127 Clare Co.:

$$\underline{0.16 \times 0.624 + 0.55 \times 0.884 + 0.29 \times 0.751 = 0.804}$$

Business U.S.-10 Isabella County 2 Lane Paved Shoulder: 150' R.O.W.

Asphalt 41.5'	41.5' x 0.9 =	37.35
Gravel 2-2'	4.0' x 0.5 =	2.00
Berm 104.5'	<u>104.5' x 0.25 =</u>	<u>26.13</u>
Totals:		150' 65.48

Average Runoff Coefficient $65.48 \div 150' = 0.437$

Business U.S.-10 Clare County Configuration and R.O.W. varies.

2 Lane/Paved & Gravel Shoulder 100' R.O.W.8%		
Asphalt Road 27.5'		27.5' x 0.9 = 24.75
Asphalt Shoulder 2-7.5'		15' x 0.9 = 13.50
Gravel Shoulder 2-6'		12' x 0.5 = 6.00
Berm 45.5'		<u>45.5' x 0.3 = 13.65</u>
Totals: 100'		57.90

Average Runoff Coefficient: $57.90 \div 100 = 0.579$

3 Lane/Bike Lanes/Sidewalk 100' R.O.W.36%		
Asphalt (BOC/BOC) 48.5'		48.5' x 0.9 = 43.65
Sidewalk 2-4'		8.0' x 0.9 = 7.20
Berm 43.5'		<u>43.5' x 0.3 = 13.05</u>
Totals: 100'		63.90

Average Runoff Coefficient: $63.90 \div 100 = 0.639$

3 Lane/Sidewalk/Brick 66' R.O.W.32%		
Asphalt (BOC/BOC) 37'		37' x 0.90 = 33.30
Sidewalk/Brick 2-13.5'		27' x 0.85 = 22.95
Remaining 2.0'		<u>2' x 0.3 = 0.60</u>
Totals: 66'		56.85

Average Runoff Coefficient: $56.85 \div 66 = 0.861$

3 Lane/Sidewalk 100' R.O.W. Typical8%		
Asphalt (BOC/BOC) 37'		37' x 0.90 = 33.3
Sidewalk 1-6'		6' x 0.90 = 5.4
Remaining 57'		<u>57' x 0.3 = 17.1</u>
Totals: 100		55.8

Average Runoff Coefficient: $55.8 \div 100 = 0.558$

2 Lane/Paved Shoulder 100' R.O.W. Typical16%		
Asphalt 41.5'		41.5' x 0.9 = 37.35
Gravel/Shoulder 2-2'		4' x 0.5 = 2.00
Remaining 54.5'		<u>54.5' x 0.3 = 16.35</u>
Totals: 100'		55.70

Average Runoff Coefficient: $55.7 \div 100 = 0.557$

Overall Average Runoff Coefficient Business US 10 Clare County:
 $0.08 \times 0.579 + 0.36 \times 0.639 + 0.32 \times 0.861 + 0.08 \times 0.558 + 0.16 \times 0.557 = 0.686$

City of Clare in Clare Co. Average Runoff Coefficient (Excluding MDOT R.O.W.'s):

Urban Residential/Schools	34%	$0.32 \times 0.5 = 0.136$
Suburban Residential	14%	$0.13 \times 0.3 = 0.042$
Commercial	16%	$0.25 \times 0.7 = 0.112$
Light Industrial	13%	$0.13 \times 0.6 = 0.078$
Undeveloped	11%	$0.24 \times 0.1 = 0.011$
Cemetery	12%	$\underline{0.06} \times 0.2 = \underline{0.024}$

Totals: 1.00 0.403

Townships Undeveloped Ag/Rural Residential

Undeveloped	95%	$0.95 \times 0.15 = 0.1425$
Rural Residential	5%	$\underline{0.05} \times 0.35 = \underline{0.0175}$

Totals: 1.00 0.160

City of Clare in Isabella Co. Average Runoff Coefficient (Excluding MDOT R.O.W.'s):

Urban Residential	2%	$0.02 \times 0.4 = 0.008$
Suburban Residential	5%	$0.05 \times 0.3 = 0.015$
Commercial	17%	$0.17 \times 0.7 = 0.119$
Light Industrial	50%	$0.50 \times 0.6 = 0.300$
Undeveloped	26%	$\underline{0.26} \times 0.1 = \underline{0.026}$

Totals: 1.00 0.468