Engineering Report

Greenville West Drain Project

for

Montcalm County Drain Commissioner – Don Cooper

June 6 03

DRAFT

March 13, 2003
by
Progressive AE
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June 9, 2003

Mr. Don Cooper
Montcalm County Drain Commissioner
P.O. Box 368
Stanton, MI 48888

ProgressiveAE

Re: Revised Report
Greenville West Drain

Dear Don:

Enclosed is the revised Engineering Report for the Greenville West Drain project.

As you know, the report has been revised in response to several issues that we have discussed over the past few months. The five acre future residential area in the Hathaway property is now included in the watershed. The design calculations and apportionments have been revised to include the new area.

The S\D Basin upgrade plans have been revised on the north and southeast limits in response to the meetings we have had with the property owner. On the north, the grades have been adjusted to accommodate the proposed apartments. At the southeast, the grades have been adjusted to reduce the easement area needed, and provide a place for excess soil material. The easement limits for the S\D Basin has been revised to reflect these changes.

The apportionment spreadsheet has also been revised to include the costs for the work done previously on the drain. There is now single, total project cost which is then apportioned out to the property owners. I have also separated out the apportionments for the Montcalm County Road Commission and MDOT.

I hope this information is sufficient. If you have any questions or concerns, please contact me.

Sincerely,

PROGRESSIVE ARCHITECTURE ENGINEERING

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Greenville West Drain Project

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I. INTRODUCTION

The report is issued at the request of the Montcalm County Drain Commissioner's office to address drainage concerns in the area of the Coleman Pond.

The Drain Commissioner was brought in to resolve the issue under the provisions of Chapter 20 of the Michigan Drain Code. The petition for the Drain Commissioner was made by the City of Greenville and Eureka Township. The project is now known as the Greenville West Drain.

The Concerns:
The land area included in the Greenville West Drain has undergone a high degree of development in recent years. This development has spurned concerns about the ultimate disposal of stormwater in the watershed. Exhibit A indicates the limits of the watershed now included in the Greenville West Drain. The lands shown drain to the Coleman Pond where infiltration into the groundwater occurs. Because of the topography of the area, the Coleman Pond is the final surface destination for the stormwater. There is no outlet to a stream or lake. Infiltration in this low area is the ultimate disposal mechanism for the runoff. This type of disposal mechanism is much more sensitive than an outlet to a large lake or a stream or river. This type of disposal is dependent on the percolation of the stormwater into the soils. The rate of percolation in any location is variable based on may factors, including soil type, groundwater conditions, and head on the system. The concerns for the watershed regard this issue. With development of the area, percolation of the stormwater in the Coleman Pond will be reduced as sediment enters the pond and effectively changes the soil type by sealing off drainage through the more transmissive soils with a fine sediment layer.

Development in the watershed in recent years has demonstrated that sediment has entered the Coleman Pond. During rain events the pond has turned murky brown with sediment laden runoff. As the waters calm after the storm event, these suspended particles then settle to the bottom of the pond, changing the infiltration capacity.

Over time, the effectiveness of the pond as the final destination for stormwater runoff is reduced. This will result in potential flooding. The owners of the property on which the Coleman Pond lies are very concerned about this situation. They are also concerned about the visual impact of sedimentation in the natural setting of the Coleman Pond. Development of the land immediately surrounding the pond is now in progress.

Background:
The Coleman Pond was not always the destination point for all stormwater in the drainage area shown in Exhibit A. That drainage area has been redirected over the past 15 years as a result of development.

In 1992, the City of Greenville constructed the Nelson Drain. This drain was built to provide for better drainage on Nelson Street, as well as to prepare for future development of the lands where the Meijer store was eventually built. A stub on the drain to the northwest also picked up drainage from the northwest. Drainage from the northwest originally occurred overland, eventually reaching the low area east of the Coleman Pond.

Construction of the drain redirected these areas to the Coleman Pond.

At this time, the city also obtained easements to the Coleman Pond from the property owners. The easement is for flood rights up to an elevation of 851 feet. Copies of the easements are

included in Appendix A. This gave the right to the city to use the pond as the stormwater retention\disposal area for the area drained by the Nelson Drain.

Calculation performed by the city showed that the pond had adequate storage for the new watershed, based upon the development anticipated at that time.

In recent years, the watershed has experienced much development. Some development occurred along M-57, in the township. A high degree of development occurred in the area served directly by the Nelson Drain. In 2000, the Meijer store and gas station were build, along with the surrounding roadways. In 2001, the Hathaway commercial development took place, and yet today, residential development adjacent to the Coleman Pond is occurring, and commercial development along M-57 continues.

During the construction projects in 2000, much of the Nelson Drain was reconstructed, or redirected. As part of the improvements, the Nelson Drain was to be completely relocated to Greenville West Drive. This plan was later modified, as the property owner was able to accommodate the existing location. Now there are two storm sewer mains running north-south parallel to each other.

During that same time period, the Coleman Pond property owners voiced their concerns regarding sedimentation in the pond. The city and the property owner agreed that a sedimentation basin upstream from the pond would be beneficial in reducing the concerns. A plan was prepared, see Exhibit B, and storm sewer in Greenville West Drive was diverted to the new sedimentation basin, known as the S\D Basin.

The concerns about the Coleman Pond have continued since construction of the S\D Basin. The drain commissioner was requested to become involved to ensure that the issues and concerns were properly addressed. This request came, in part, because the watershed for the drainage district crosses over into Eureka Township. The drain commissioner has retained Progressive AE to investigate the concerns and issue a report of findings, hence this report outlining the problem and the solution.

II. SOLUTIONS

Objective:
The objective of the solution is to ensure that a 'disposal' location for stormwater in the watershed is preserved. This can be done by reducing the sediment in the stormwater entering the Coleman Pond, and by increasing the land area over which the stormwater is able to infiltrate.

To effect these solutions, the 'first flush' of runoff from the watershed will be diverted into an enlarged sedimentation basin.

The 'first flush' is defined as the first ½" of runoff from the directly connected impervious areas. In other words, the first slug of stormwater that washes sediment from the parking lots and buildings in the watershed.

Previous Draft Solutions:
In April 2002 a report of preliminary solutions was presented to the Montcalm County Drain Commissioner's office. Four options were discussed in the report, with the recommended solution being a combination of the first and second options. This combined solution called for the following items:

- Construction of a diverter pipe to be placed on the existing 60 inch Nelson drain that enters the north end of the Coleman Pond. The diverter would be placed just south of Meijer Drive and would direct the 'first flush' of sediment to the S\D Basin.

- Expansion of a new sedimentation basin area to the east of the existing S\D Basin, in the natural low area. This would include installation of a pump station and forcemain to lift stormwater back to the Coleman Pond. It is expected that this low area will be used for detention \ infiltration when development of that land is made, therefore costs for construction could be shared.

Final Recommended Solution:
Since the report in April, we have modified the solution to include expansion of the existing S\D Basin, rather than development of new sedimentation basins to the east. Exhibit C shows the outline of the improvements planned, including the following:

1. Construction of a diverter structure and an 18 inch diameter diverter pipe to direct the 'first flush' to the Coleman Pond.
2. Modifications to MH No. 2, which serves as the diverter structure for the stormwater in Greenville West Drive.
3. Expansion of the existing S\D Basin.
4. Modification of the 18 inch diameter pipe that connects the S\D Basin and Coleman Pond.
5. Modification of the east outlet and overflow of the S\D Basin.

We made the change from use of the downstream, natural low areas to expansion of the S\D basin because of two reasons. First, we determined that there was enough 'volume' could be created at this location to treat the 'first flush'. Second, we were not comfortable with pumping stormwater, as a general practice. Pump stations are expensive to build, and require frequent monitoring and maintenance.

In addition to the items noted above, there are other programs that should be implemented to ensure protection of the Coleman Pond.

1. Enforcement of the new drainage standards for new development within the Greenville West watershed. The County Board of Commissioners has recently adopted the Drain Commissioner's Minimum Standard Guidelines for stormwater runoff on developed sites. These standards will apply to the Greenville West watershed, and will require the Drain Commissioner's approval of techniques in dealing with runoff.
2. Implementation of a catchbasin cleaning program for the hard-surfaced areas in the watershed. On a regular basis, sediment in the sump area of the catch basins should removed to allow for continued effectiveness of the sump in catching sediment. This program should be instituted on a bi-annual basis to start. Effectiveness of this schedule should be reviewed after 1 year. This program is critical for those areas that are directly connected to the sedimentation basins.
3. The outlet for the sediment pond for the Hathaway condominiums should be modified to increase the effectiveness of that pond in removing sediment prior to discharge to the Coleman Pond. The pond now appears to allow straight flow through of the low flows, or 'first flush'.
4. The stormwater routed from the upper NWBLWS now collects at the southeast corner of the intersection of M-57 and Youngman Road and then enters a 24" diameter pipe along the west side of the funeral home for connection to the Nelson Drain. At this corner, the stormwater spreads out over a broad, grassed area allowing for filtering and a reduction of velocity. This parcel has been purchased by a developer, and changes to the site are imminent. Any changes to this parcel should be monitored to ensure that the flow and filtering of stormwater is not reduced to a degree that negatively affects the downstream properties, or pond.

Design Calculations:

We performed numerous calculations to support our solution.

1. Watershed Analysis:

   First, we defined the area of the watershed that is directed to the Coleman Pond. From this area, we used the USDA TR-55 Method for defining runoff from the watershed. Calculation for this are included in Appendix B1.

   The analysis results in flow rates from the particular subareas, and a calculation of the required volume of storage for the entire watershed. The entire watershed needs a storage volume of 72 acre feet for the 100 year storm event, given the existing intensity of development. The Coleman Pond has a volume of 105 acre feet to elevation 851.0. The proposed, expanded S\D Basin has a volume of 34 acre feet, giving a total volume in excess of the calculated need. This excess volume is critical for acting as a buffer to accommodate the stormwater that has not yet infiltrated.

2. Sedimentation Basin Design:

   As discussed previously, the objective is to treat the 'first flush'. This is defined as the 1st 1/2-inch of runoff from the directly connected impervious area. We determined this area to be 42.7 acres. A 1/2-inch of runoff from this area is equal to 1.78 acre-ft of volume.

   We also looked at 'first flush' from another perspective – as the runoff from a 2 year frequency storm event. This storm event is defined as an event with 2.38 inches of rainfall. The volume of runoff generated from this storm event, as modeled using TR-55 methods, is 10.15 acre-feet (see Appendix B1).

   Though the 'first flush' is a relatively small number at 1.78 acre-feet, the reality is the system does not allow for a simple shut-off of the flow to the S\D Basin after the first 1/2-inch of runoff has entered the basin. This means that after accepting the 1.78 acre-ft of volume, stormwater will continue to flow to the basin through the diversion pipes, thus requiring the size to be larger than 1.78 acre-ft.

   Appendix B2 details the 'first flush' design calculations for the detention basin.

   Considering this additional flow to the basin, we limited the capacity of the pipe routes sending flow to the basin. This is discussed further in the next section.

   Exhibit C shows a concept of the sedimentation basin design. The basin includes a 'S' design for the low flow of the basin. This layout maximizes the distance the runoff has to flow, allowing for greater time for settling out the suspended matter. The deeper areas between the 'S' curves will also allow for 'quiet' settling areas. The low flow path, or ditch, is designed to have a positive drain to the outlet.

   The expanded S\D Basin has a volume of 34 acre feet with an overflow at elevation 847.0.

   Soils in the area of the expanded S\D Basin are expected to be loose silty sand. Two soil borings have been completed in the area, one to the west and one to the east. Excavation from the existing S\D Basin also revealed silty sand and sand. This medium is expected to infiltrate at moderate rate, dependent on the amount of silt present in the sand.

3. 'First Flush' Diversion:

The directly connected impervious areas were routed to the Coleman Pond via two north-south pipes; the 60" Nelson Drain, now in the Hathaway Commercial development, and a 48" pipe in Greenville West Drive.

In 2000, during construction of the new roadways, the 48 inch pipe in the intersection of Greenville West Drive and Meijer Drive, was partly diverted to the southeast, to the new S\D Basin which was designed for pretreatment of the stormwater prior to discharge into the Coleman Pond. This was done using a 30 inch diverter pipe, and also a brick weir wall in MH No. 2 to force the water flow into the 30 inch pipe.

We propose another diverter pipe be installed on the 60 inch Nelson Drain, just south of Meijer Drive. This will route the directly connected impervious area from the Hathaway Development to the S\D Basin for treatment.

The diversion pipe design is shown in detail in Appendix B3. This shows a pipe size of 18 inch diameter for the west diverter pipe.

At the 30 inch diverter pipe, the weir for the 48 inch pipe outlet should be set at elevation 848.65 to direct the first flush into the 30 inch pipe. A block weir was placed in this manhole during previous work, however the elevation should be checked and adjusted, if necessary.

Exhibit D is a profile drawing of system, including the diversion pipes, as well as the S\D Basin and Coleman Pond.

The diversion weirs in both structures will be constructed, in part, with removable boards, to allow for future adjustment.

4. Coleman Pond Interconnection Pipe:

The existing S\D Basin is connected to the Coleman Pond with an 18 inch diameter pipe that runs through the apartment complex. We plan to modify the layout of the connection pipe by making the outlet in the expanded S\D Basin at a different point along the low flow ditch. The connection pipe will allow stormwater from the S\D Basin to flow to the Coleman Pond when the water elevation in the basin is greater than elevation 844.60 (the elevation of the west end of the connection pipe). This elevation is well above the low flow ditch, allowing time and volume for treatment of the stormwater prior to flowing to the Coleman Pond.

The connection pipe currently has level control structure with removable boards for controlling the elevation of the transfer between the pond and basin. This structure will be dismantled and a new structure will be built into the line at a point downstream to allow for this adjustment feature.

Appendix B4 includes calculations showing the capacity of the 18 inch diameter connection pipe.

5. S\D Outlet and Overflow:

The existing S\D Basin has an outlet pipe and overflow weir to the east, flowing to the natural low area. This outlet pipe and overflow weir will be reconstructed in the new embankment to the east.

The outlet pipe has been redesigned to allow for greater adjustment and control of the releases from the S\D Basin to the east. There will be three 10 inch diameter pipes set at various elevations to allow stormwater to be drawn off at various levels. The two lower pipes will have butterfly valves to allow control of the outflow. The pipes will discharge to a structure that will also act as an overflow. The overflow will be set at elevation 847.00, through the top of the outlet structure. A 24" pipe will discharge the stormwater from the structure to the downstream outlet.

A reinforced grass overflow weir will also be constructed over the top of the embankment to allow for safe passage of stormwater exceeding the capacity of the basin and the outlet structure. Design details are included in Appendix B-5.

The natural low areas to the east will likely be developed as detention \ infiltration basins in the near future to serve the nearby acreage which are expected to be residential housing. Discharge to those low areas, at low flows, will help in keeping the S\D Basin drained and ready for the next storm event. This action may not be necessary, however the pipes will be in-place to allow the function if needed.

The overflow path from the Coleman Pond to the S\D Basin is through the apartment complex, and over Greenville West Drive, at the low point. The controlling elevation of this path is 849.25, the lowest point on the top of the curb.

III. COSTS

The work proposed by this report, and detailed in drawings C1 and C2 has been projected to cost $350,000. A breakdown of the costs is included in Appendix C.

It should be noted that costs for projects with large amounts of earthwork are difficult to estimate because of the amount of uncertainty associated with this work.

IV. APPORTIONMENT DETERMINATION

The costs for the project will be apportioned to the two municipalities involved; Eureka Township and the City of Greenville. We have determined that the cost should be assigned at a rate of 33.42 percent to the township, and 66.58 percent to the city.

The apportionment was determined by summing the involvement of each parcel in the watershed, according to their municipality. The involvement of each parcel was calculated by two factors; acreage and the weighing factor. The weighing factor accounts for the following items:

- Land Use \ 'C' factor.
- Presence of On-site Controls.
- Direct connection to the stormwater conveyance system.

Calculations for determination of the apportionment are included in Appendix D. A parcel map is also included as Exhibit E.

Appendix A

Coleman Pond Easements

Appendix B

Design Calculations

Appendix B-1: Watershed Analysis

Greenville Drain

Job # 51220301/004

June 9, 2003

Worksheet 3: Time of Concentration and Travel Time

A Nelson Drain East

35 Time of concentration taken as 35 minutes. This is derived from the Storm Sewer Design s
Based upon major flow from impervious Meijer site with 15 minute Tc to get to basin.

B Nelson Drain West

20 Time of concentration taken as 20 minute. Storm Sewer Design spreadsheet lists 18 minut

C NWBLWS

90 Time of concentration for watershed calculated using equation by Hathaway

D.1 Hathaway Apartments

20 Time of concentration taken as 20 minutes. Storm Sewer Design spreadsheet lists 18 minu

D.2 SD # 1

20 Time of concentration taken as 20 minutes. Project not designed yet. Tc assumed to matcl

E Coleman WS Direct

E.1 Hath Condos

20 Time of concentration taken as 20 minutes. Storm Sewer Design spreadsheet lists 18 minu

E.2 Hath Resid

20 Time of concentration taken as __ minutes. Storm Sewer Design spreadsheet lists __ minu

E.3 Unconnected\Undev

60

Appendix B-1: Watershed Analysis

Greenville Drain

Job # 51220301/004

With Full Development in NWBLWS

June 9, 2003

Overall Area Contributary to Coleman Pond Drainage Basin

Area No.	Size (acres)	Land Use	Soils	CN
A Nelson Drain East	60	Commercial		85
	11	Residential		61
	71			0.0
B Nelson Drain West	17.7	Commercial		89
	18			0.0
C NWBLWS	334.8	Overall		61
	335			0.0
D.1 Hathaway Apartments	5.9	Overall		77
D.2 SD # 1	7.4	Overall		77
	13			0.0
E Coleman WS Direct				
E.1 Hath Condos	10.7	Overall		77
E.2 Hath Resid	31.4	Overall		61
E.3 Unconnected\Undev	106.7	Overall		60
	149			0.0

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Appendix B-1: Watershed Analysis

Greenville Drain
Job # 51220301/004
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Worksheet 2: Runoff Curve Number and Runoff

1. Runoff Curve Number

Soil Name and Hydrologic Group	Cover Description	CN Table 2-2	CN Fig 2-3	CN Fig 2-4	Area (acres)	Product of CN x area	Rational of CN
A Nelson Drain East	Commercial	85			60	5100	
	Residential	61			11	671	
	Subtotal	81.3			71	5771	
B Nelson Drain West	Commercial	89			17.7	1575.3	
	Subtotal	89.0			18	1575.3	
C NWBLWS	Overall	61			334.8	20422.8	
	Subtotal	61.0			335	20422.8	
D.1 Hathaway Apartments	Overall	77			5.9	454.3	
D.2 SD # 1	Overall	77			7.4	569.8	
	Subtotal	77.0			13	1024	
E Coleman WS Direct							
E.1 Hath Condos	Overall	77			10.7	823.9	(1/8 acre lots - townhouses)
E.2 Hath Resid	Overall	61			31.4	1915.4	(1/4 acre lots)
E.3 Unconnected\Undev	Overall	60			106.7	6402	Includes Coleman Pond & Wetlands
	Subtotal	61.4			149	9141	
	Totals:	64.8			586	37935	
	S\D (A+B+C+D)	65.9			437	28793	

2. Runoff

			CN	Storm #1	Storm #2	Storm #3	
Frequency	(yr)			25	100	2	
Rainfall, P (24 hr)	(in)			4	4.75	2.38	
Runoff, Q (using Table 2-1 or Figure 2-1)	(in)	A	81.3	2.07	2.73	1.05	
		B	89.0	2.83	3.54	1.68	
		C	61.0	0.81	1.23	0.1	
		D	77.0	1.82	2.42	0.86	
		E	61.4	0.84	1.26	0.28	
Runoff, Q	(in)	S\D	65.7	1.03	1.5	0.28	437 Acres
		Entire	64.8	1.03	1.5	0.28	586 Acres

Appendix B-1: Watershed Analysis
Greenville Drain
Job # 51220301/004
June 9, 2003

Worksheet 4: Graphical Peak Discharge Method

1. Data		A. Nelson E.	B. Nelson W.	C. NWBLWS	D. Hath Apts	E. Coleman WS Direct
Drainage Area (acres)		71	17.7	334.8	13	149
Drainage Area (mi^2)	Am=	0.111	0.028	0.523	0.021	0.233
Runoff Curve Number	CN=	81.3	89	61	77	61
Time of Concentration	Tc=	35	20	90	20	20
Rainfall Distribution	=	II	II	II	II	II
Pond and Swamp areas spread through watershed	=	-	-	-	-	-

		A. Nelson E.			B. Nelson W.			C. NWBLWS			D. Hath Apts			E. Coleman WS Direct		
		Storm #1	Storm #2	Storm #3	Storm #1	Storm #2	Storm #3	Storm #1	Storm #2	Storm #3	Storm #1	Storm #2	Storm #3	Storm #1	Storm #2	Storm #3
2. Frequency	(yr)	25	100	2	25	100	2	25	100	2	25	100	2	25	100	2
3. Rainfall, P (24hour)	(in)	4.0	4.75	2.38	4.0	4.75	2.38	4.0	4.75	2.38	4.0	4.75	2.38	4.0	4.75	2.38
4. Initial Abstraction, Ia	(in)	0.46	0.46	0.46	0.247	0.247	0.247	1.279	1.279	1.279	0.597	0.597	0.597	1.279	1.279	1.279
5. Compute Ia/P		0.115	0.097	0.193	0.062	0.052	0.104	0.320	0.269	0.537	0.149	0.126	0.251	0.320	0.269	0.537
6. Unit Peak Discharge, qu	(csm/in)	475	480	455	700	720	690	215	235	140	610	620	570	520	570	260
7. Runoff, Q	(in)	2.07	2.73	1.05	2.83	3.54	1.68	0.81	1.23	0.1	1.82	2.42	0.86	0.84	1.26	0.28
8. Pond and swamp adj. factor, Fp		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9. Peak discharge, qp (qp=qu x Am x Q x Fp)	(ft^3/s)	109.1	145.4	53.0	54.8	70.5	32.1	91.1	151.2	8	23.1	31.2	10.2	101.6	167.0	18.9

S\D

qp, 25 year for S\D system	(ft^3/s)	278.0
qp, 100 year for S\D system	(ft^3/s)	398.3
qp, 2 year for S\D system	(ft^3/s)	104.6

Coleman

qp, 25 year for direct Coleman	(ft^3/s)	101.6
qp, 100 year for direct Coleman	(ft^3/s)	167.0
qp, 2 year for direct Coleman	(ft^3/s)	18.9

Total

qp, 25 year, total	(ft^3/s)	379.6
qp, 100 year, total	(ft^3/s)	565.2
qp, 2 year, total	(ft^3/s)	119.5

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Appendix B-1: Watershed Analysis

Greenville Drain
Job # 51220301/004
June 9, 2003

used WS 4

Worksheet 5: Tabular Hydrograph Method

Subarea Name	Drainage Area Am (mi^2)	Time of Conc Tc (hr)	Travel Time thru Subarea Tt (hr)	Downstream subarea names	Travel time summ to outlet Sum Tt (hr)	24 hr rainfall P (in)	Runoff Curve # CN	Runoff Q (in)	AmQ (mi^2-in)	Initial Abstraction Ia (in)	Ia / P

Subarea Name	Subarea Tc (hr)	SumTt to outlet (hr)	Ia/P	AmQ (mi^2-in)	Hydrograph time (hours)
					Discharges at select Hydrograph times (ft^3/s)
Composite hydrograph at outlet					

Appendix B-1: Watershed Analysis

Greenville Drain
Job # 51220301/004
June 9, 2003

Worksheet 6: Storage Volume for Detention Basins

S\D Basins ONLY

1. Data:
Drainage area Am= 0.68 mi^2
Rainfall distr. Type =

		1st stage	2nd stage	3rd stage	
2. Frequency	(yr)	25	100	2	
3. Peak inflow discharge, qi	(ft^3/s)	278.0	398.3	102.6	
4. Peak outflow discharge, qo	(ft^3/s)	27	39	10	*
5. Compute qo/qi		0.1	0.1	0.1	
6. Vs/Vr (using qo/qi with figure 6-1)		0.55	0.55	0.55	
7. Runoff, Q	(in)	1.03	1.5	0.28	
8. Runoff volume (Vr=QAm53.33)	(acft)	37.35	54.40	10.15	
9. Storage Volume, Vs	(acft)	20.54	29.92	5.58	
10. Maximum Storage (from plot)		x	x	x	

5\24\02, the peak outflow is set at 0.1 of the inflow as an arbitrary setting.

Entire System
(at predevelopment intensity in NWBLWS)
1. Data:
Drainage area Am= 0.92 mi^2
Rainfall distr. Type =

		1st stage	2nd stage	3rd stage
2. Frequency	(yr)	25	100	2
3. Peak inflow discharge, qi	(ft^3/s)	379.6	565.2	119.5
4. Peak outflow discharge, qo	(ft^3/s)			
5. Compute qo/qi				
6. Vs/Vr (using qo/qi with figure 6-1)		1	1	1
7. Runoff, Q	(in)	1.03	1.5	0.28
8. Runoff volume (Vr=QAm53.33)	(acft)	50.54	73.60	13.74
9. Storage Volume, Vs	(acft)	50.54	73.60	13.74
10. Maximum Storage (from plot)		x	x	x

APPENDIX B-2: 'FIRST FLUSH' CALCULATION

"First Flush" Volume Calculations for Diversions on 48 inch and 60 inch STS.

Calculation for Runoff from Directly connected impervious Areas (DCIAs)

	STS*	Location	Area (acres)	
1	48"	Meijer Store	16.80	
2	48"	Meijer Gas Station	1.13	
3	48"	Meijer Front Outlots	4.00	(approximated 1 acre for 4 ea.)
4	60"	Hathaway Commercial	8.40	
5	48"	Greenville West Drive	2.20	
6	60"	Meijer Drive	1.39	
7	48"	Oak Street	0.50	
8	48"	Maplewood Drive	1.43	
9	N/A	Hathaway Apartments		
10	60"	Funeral Home	1.65	(approximated)
11	60"	Bank Next to Funeral Home	0.50	(approximated)
12	48"	Jorgensens	3.50	(approximated)
13	48"	Bank Next to Jorgensens	1.20	(approximated)
			42.70	

42.70 Acres X 1/2" runoff* X 1'/12" = 1.78 acre-feet

*1/2" of runoff represents the 'first flush' of a storm.

*STS represents the north/south trunkline which covers the stormwater runoff

APPENDIX B-3: DIVERSION PIPE DESIGN

I. "First Flush" Flow Rate Calculations for Diversions on 48 inch and 60 inch STS.

Area List

	STS*	Location	Area (acres)	
1	48"	Meijer Store	16.80	
2	48"	Meijer Gas Station	1.13	
3	48"	Meijer Front Outlots	4.00	(approximated 1 acre for 4 ea.)
4	60"	Hathaway Commercial	8.40	
5	48"	Greenville West Drive	2.20	
6	60"	Meijer Drive	1.39	
7	48"	Oak Street	0.50	
8	48"	Maplewood Drive	1.43	
9	N/A	Hathaway Apartments		
10	60"	Funeral Home	1.65	(approximated)
11	60"	Bank Next to Funeral Home	0.50	(approximated)
12	48"	Jorgensens	3.50	(approximated)
13	48"	Bank Next to Jorgensens	1.20	(approximated)
			42.70	

Volume Calculation for 48" STS Drainge Area

48" to sedimentation pond 30.76 acres

30.76 acres X .5 in. $\frac{\text{ft.}}{12\text{ in}}$ = 1.28 Acre-feet

1.28 Acre-feet X $\frac{43{,}560\text{ SF}}{\text{Acres}}$ X $\frac{1}{1\text{ Hr.}}$ X $\frac{1}{60\text{ Min.}}$ X $\frac{1}{60\text{ Sec.}}$ = 15.50 cfs

Volume Calculation for 60" STS Drainage Area

60" to sedimentation pond 11.94 acres

11.94 acres X .5 in. $\frac{\text{ft.}}{12\text{ in}}$ = Acre-feet

0.4975 Acre-feet X $\frac{43{,}560\text{ SF}}{\text{Acres}}$ X $\frac{1}{1\text{ Hr.}}$ X $\frac{1}{60\text{ Min.}}$ X $\frac{1}{60\text{ Sec.}}$ = 6.02 cfs

APPENDIX B-3: DIVERSION PIPE DESIGN

II. 18" Diversion on 60" STS

Calculate Flow in 18" Pipe from 60" in New MH No. 1A South of MH No. 1

MH NO. 1A

60" Outlet North = 846'
18" Outlet East = 845.5'
60" Outlet South = 846'

18" S = 845.5' - 844.4' = 1.1/425' = 0.259%

Q = C_1 S 1/2 — 18" C_1 = 105, n = .013

Q = 105 (0.0509) — S = 0.259%, S 1/2 = 0.0509

Q = 5.34 cfs

Try S = 845.8 - 844.4 = 1.4'/425' = 0.329%

Q = C_1 S 1/2 — 18" C_1 = 105, n = .013

Q = 105 (0.0574) — S = 0.329%, S 1/2 = 0.0574

Q = 6.02 cfs

1/2 " Runoff in the 60" Watershed is 6.0 cfs

18" Pipe Invert @ MH No. 1A	= 845.8
6.0 cfs Flow Depth	= 1.5
Weir Elevation	= 847.3'
Height of Weir in 60" Outlet South	= 1.3'

Provide 2 - 6' Stop Logs for Future Field Adjustment

APPENDIX B-4: INTERRCONNECTION PIPE DESIGN

18 Inch Coleman Pond and S/D Basin Interconnect

Assume S\D Basin Water Elevation = 848'

18" @ Colemon Pond Elevation = 845'

18" S = 848' - 845' = 3'/840' = 0.357%

Q = C_1 S 1/2

Q = 105 (0.0597)

Q = 6.27 cfs

18" C_1 = 105
n = .013
S = 0.357%
S 1/2 = 0.0597

18" S = 848' - 846' = 2'/840' = 0.238%

Q = C_1 S 1/2

Q = 105 (0.0488)

Q = 5.12 cfs

18" C_1 = 105
n = .013
S = 0.238%
S 1/2 = 0.0488

18" S = 848' - 847' = 1'/840' = 0.119%

Q = C_1 S 1/2

Q = 105 (0.0345)

Q = 3.62 cfs

18" C_1 = 105
n = .013
S = 0.119%
S 1/2 = 0.0345

At sedimentation pond overflow of 848 feet the flow to the Coleman Pond from the S/D Basin ranges up to 6.27 cfs at low water in the Coleman Pond.

APPENDIX B-5 OUTLET STRUCTURE AND OVERFLOW PATH DESIGN

I. OUTLET STRUCTURE

3-10" diameter inlet pipes:

Lower IE at elevation 836.0 with a butterfly valve
Middle IE at elevation 840.0 with a butterfly valve
Upper IE at elevation 845.0 with an open end
Overflow through the grate at elevation 847.0

System to be controlled through use of middle valve.

Middle Pipe

Assume water at elevation 844.0. Pipe invert at 840.0, with length = 28'. Slope = 4/28 = 14%
$Q = C1S1/2$ where $C_1 = 21.8$ for 10" diameter pipe
$Q = 21.8\ (.14)^{1/2}$
$Q = 8.15$ cfs

Lower Pipe

Assume water at elevation 844.0. Pipe invert at 836.0 with length = 52'. Slope = 8/52 = 15%
$Q = 21.8\ (.15)^{1/2}$
$Q = 8.44$ cfs

Top Pipe

Used as a high level discharge to retain stormwater prior to overflow

Assume water at elevation 847.0 (high level). Pipe invert at 845.0 with length=8' slope = 2/8 = 25%
$Q = 21.8\ (.25)^{1/2}$
$Q = 10.9$ cfs

Outlet Pipe

Length of pipe = 60'. Slope of pipe = $\frac{835.8-834}{60}$ = 3%

$Q = C, S^{1/2}$ where $C_1 = 226$
$Q = 226\ (0.03)^{1/2}$
$Q = 39$ cfs when flowing full, no head.
This is similar to flows for inlet control culvert.

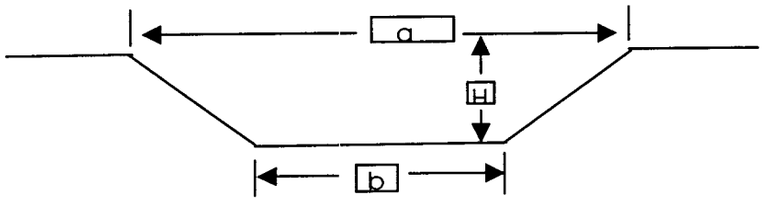
The two year storm runoff from the NWBLWS is 7.3 cfs. The land area to the east likely realized this amount of runoff. Limit discharge to east to the appropriate amount through utilization of butterfly valves.

APPENDIX B-5 OUTLET STRUCTURE AND OVERFLOW PATH DESIGN

II. OVERFLOW PATH DESIGN

GREENVILLE SEDIMENTATION BASIN 100 YEAR OVERFLOW WEIR DISCHARGE

CALCULATE WEIR FLOW FOR A TRAPEZOIDAL WEIR DESIGN Q = C ((a=b)/2-0.2H)^1.5 C = 3.0 FOR A BROAD CRESTED BERM					
C	H (feet)	a (feet)	b (feet)	S	Q (cfs)
3	0.1	100.6	100	3	9.513
3	0.2	101.2	100	3	26.983
3	0.3	101.8	100	3	49.709
3	0.4	102.4	100	3	76.745
3	0.4	102.4	100	3	76.745
3	0.6	103.6	100	3	141.770
3	0.7	104.2	100	3	179.142
3	0.8	104.8	100	3	219.471
3	0.9	105.4	100	3	262.599
3	1	106	100	3	308.400
3	1.1	106.6	100	3	356.767
3	1.2	107.2	100	3	407.611



Peak Discharge to S\D Basin:

2 year Storm Event = 102.6 cfs

25 year Storm Event = 278 cfs

100 year Storm Event = 398 cfs

Appendix C

Preliminary Estimate of Cost

GREENVILLE WEST S/D BASIN COST ESTIMATE March 31, 2003

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
1	Mobilization/Demobilization	1	LS	$5,000.00	$5,000
2	General Earthwork	31300	CY	$3.00	$93,900
3	6" Onsite topsoil	32700	SY	$1.00	$32,700
4	Seed & Mulch	32700	SY	$1.00	$32,700
5	Check Dams	12	EA	$600.00	$7,200
6	18" Storm Sewer	507	LF	$40.00	$20,280
7	Bore and Jack 18" Storm Sewer	46	LF	$120.00	$5,520
8	4' Transfer Level Control Structure	1	LS	$5,000.00	$5,000
9	4' Storm Sewer Manhole	4	EA	$1,500.00	$6,000
10	6' Storm Sewer Manhole	1	EA	$2,200.00	$2,200
11	8' Storm Sewer Manhole	1	EA	$5,000.00	$5,000
12	Riprap	11	SY	$20.00	$220
	Overflow Structure				
13	5' Manhole	1	EA	$1,500.00	$1,500
14	10" Inlet Pipes	88	LF	$35.00	$3,080
15	10" Butterfly Valve	2	EA	$800.00	$1,600
16	24" Outlet Pipe	60	LF	$45.00	$2,700
17	Turf Blanket (North American Green)	290	SY	$5.00	$1,450
18	Riprap	40	SY	$20.00	$800
	Construction Subtotal				**$226,850**
	10% Construction Contingency				$22,685
	Construction Total				**$249,535**
	25% Engineering & Inspection				$62,384
	Project Construction Total				**$311,919**
18	Land Acquisition	7.2	Acres	$3,500.00	$25,200
19	Legal and Administration	1	LS	$10,000.00	$10,000
	Project Total				**$347,119**

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Appendix D

Apportionment

Apportionment Determination
for the
Greenville West Drain
for
Montcalm County Drain Commissioner

Date: May 19, 2003

Proposed Improvements (2003)	$ 350,000.00
S\D Pond - Initial Constr (2000)	$ 87,397.00
Nelson Drain - Ph 1	$ 167,607.00
Project Total:	**$ 605,004.00**

City of Greenville

PARCEL #	OWNER	Address	City	State	Zip	Land Use	Parcel Acreage	GIS ACRES	LAND USE	C FACTOR	CONTROLS ON-SITE CONTROLS	CONTROLS ADJ. FACTOR	CONTROLS DCIA	DCIA FACTOR	TOTALIZED FACTOR	APPORTIONMENT PERCENTAGE	PROJECT ASSESSMENT
5248701200	OFFICE CENTER WEST	2876 28TH ST. SW	GRANDVILLE	MI	49418	201	0.74	0.23	Commercial	0.9	N	1	N	0.25	0.05175	0.0485	$ 293.43
5269000100	KIN SUKCHON & HWAJA	7755 HIDDEN LAKE DR	HUDSONVILLE	MI	49426	201	0.38	0.22	Commercial	0.9	N	1	N	0.25	0.0495	0.0464	$ 280.67
5269000200	C & M PROPERTIES	414 RUTH ST	GREENVILLE	MI	48838	401	0.56	0.25	Residential	0.4	N	1	N	0.25	0.025	0.0234	$ 141.75
5274201000	CHEMICAL BANK MONTCALM	PO BOX 277	STANTON	MI	48888	201	3.44	0.31	Commercial	0.9	N	1	Y	1	0.279	0.2615	$ 1,581.97
5274202000	JORGENSEN BROS	PO BOX 547	STANTON	MI	48888	201	13.77	3.80	Commercial	0.9	N	1	Y	1	3.42	3.2052	$ 19,391.88
5274203500	GREENVILLE COMMUNITY BANK	1405 W WASHINGTON	GREENVILLE	MI	48838	201	1.87	1.59	Commercial	0.9	N	1	Y	1	1.431	1.3411	$ 8,113.97
5274203000	MEIJER INC (main property)	2929 WALKER AVE NW	GRAND RAPIDS	MI	49544	201	35.00	32.90	Commercial	0.9	N	1	Y	1	29.61	27.7507	$ 167,892.82
5274203060	McDONALDS	409 S MAPLEWOOD	GREENVILLE	MI	48838	201	1.93	1.08	Commercial	0.9	N	1	Y	1	0.972	0.9110	$ 5,511.38
5274203080	ARBY'S					201	0.00	1.09	Commercial	0.9	N	1	Y	1	0.981	0.9194	$ 5,562.41
5274203070	FIFTH THIRD BANK	111 LYON ST NW	GRAND RAPIDS	MI	49503	201	0.00	1.77	Commercial	0.9	N	1	Y	1	1.593	1.4930	$ 9,032.53
~~5274206070~~	~~MEIJER INC (gas station)~~	~~2929 WALKER AVE NW~~	~~GRAND RAPIDS~~	~~MI~~	~~49544~~	~~201~~	~~2.46~~	~~2.45~~	~~Commercial~~	~~0.9~~	~~N~~	~~1~~	~~Y~~	~~1~~	~~2.187~~	~~2.0497~~	~~$ 12,400.59~~
5274207020	LEACH DENNIS B (bank)	1717 W WASHINGTON	GREENVILLE	MI	48838	201	1.28	1.11	Commercial	0.9	N	1	N	0.25	0.24975	0.2341	$ 1,416.12
5274207010	HURST REALTY COMPANY	1801 W WASHINGTON	GREENVILLE	MI	48838	201	1.24	2.12	Commercial	0.9	Y	0.25	N	0.25	0.11925	0.1118	$ 676.16
5274219000	ILLINOIS CONVIENCE STORES INC	400 22ND ST STE E	LOMBARD	IL	60148	201	0.51	1.00	Commercial	0.9	N	1	N	0.25	0.225	0.2109	$ 1,275.78
5274213000	STEVENS MARK H & LORI	10589 CARSON CITY RD	GREENVILLE	MI	48838	401	2.90	2.88	Residential	0.4	N	1	N	0.25	0.288	0.2699	$ 1,633.00
5274212000	BARBER FLOYD III & MINTY	2731 CARLA	GRANDVILLE	MI	49518	401	2.63	2.37	Residential	0.4	N	1	N	0.25	0.237	0.2221	$ 1,343.82
5274216000	SMALL WILLIAM C & MARY	10603 CARSON CITY RD	GREENVILLE	MI	48838	401	1.28	1.10	Residential	0.4	N	1	N	0.25	0.11	0.1031	$ 623.72
5274215000	MICHIGAN LAND CO INC	400 E 22ND STREET STE E	LOMBARD	IL	60148	201	0.96	0.97	Commercial	0.9	N	1	N	0.25	0.21825	0.2045	$ 1,237.51
5274006700	JORGENSEN BROTHERS	PO BOX 547	STANTON	MI	48888	201	0.52	0.36	Commercial	0.9	N	1	Y	1	0.324	0.3037	$ 1,837.13
5274007800	HARRINGTON BRAD	1216 W BENTON	GREENVILLE	MI	48838	201	0.52	0.79	Commercial	0.9	N	1	N	0.25	0.17775	0.1666	$ 1,007.87
5269000300	AVALON CABLE OF MICHIGAN	201 E 69TH ST	NEW YORK	NY	10021	201	0.56	0.59	Commercial	0.9	N	1	N	0.25	0.13275	0.1244	$ 752.71
5269000600	UNITED MEMORIAL HOSPITAL	615 S BOWER	GREENVILLE	MI	48838	93	0.00	0.28	Exempt	0.15	N	1	N	0.25	0.0105	0.0098	$ 59.54
5269000700	C & M PROPERTIES	414 RUTH ST	GREENVILLE	MI	48838	401	0.20	0.35	Residential	0.4	N	1	N	0.25	0.035	0.0328	$ 198.45
5258502800	CITY OF GREENVILLE	411 S LAFAYETTE ST	GREENVILLE	MI	48838	93	0.00	0.34	Exempt	0.15	N	1	N	0.25	0.01275	0.0119	$ 72.29
5274217000	PITCHER GERALD	13192 MARSH	GOWEN	MI	49326	401	1.14	1.03	Residential	0.4	N	1	N	0.25	0.103	0.0965	$ 584.02
5274218000	BENNETT REBECCA	513 GARY ST	GREENVILLE	MI	48838	401	1.14	0.92	Residential	0.4	N	1	N	0.25	0.092	0.0862	$ 521.65
5269000800	NELSON, MICHAEL & LOUISE	414 RUTH ST	GREENVILLE	MI	48838	401	0.17	0.19	Residential	0.4	N	1	N	0.25	0.019	0.0178	$ 107.73
5274207000	HATHAWAY PROPERTIES	P O BOX 460	GREENVILLE	MI	48838	201	13.90	14.48	Commercial	0.9	N	1	Y	1	13.032	12.2137	$ 73,893.25
5258502950	FRYE, G R PETE	PO BOX 100	GREENVILLE	MI	48838	201	0.23	0.25	Commercial	0.9	N	1	N	0.25	0.05625	0.0527	$ 318.95
5258503000	FABER, KIRKWOOD	400 W OAK ST	GREENVILLE	MI	48838	401	0.18	0.13	Residential	0.4	N	1	N	0.25	0.013	0.0122	$ 73.71
5258503100	FABER, KIRKWOOD	400 W OAK ST	GREENVILLE	MI	48838	401	0.23	0.22	Residential	0.4	N	1	N	0.25	0.022	0.0206	$ 124.74
5258503200	HAVENS ALAN	10573 STAKES RD	GREENVILLE	MI	48838	201	0.23	0.45	Commercial	0.9	N	1	N	0.25	0.10125	0.0949	$ 574.10
5269001175	UNITED MEMORIAL HOSPITAL	615 S BOWER ST	GREENVILLE	MI	48838	93	0.00	0.30	Exempt	0.15	N	1	N	0.25	0.01125	0.0105	$ 63.79
5269001100	UNITED MEMORIAL HOSPITAL	615 S BOWER	GREENVILLE	MI	48838	201	0.23	0.75	Commercial	0.9	N	1	N	0.25	0.16875	0.1582	$ 956.84
5258502700	CITY OF GREENVILLE	411 S LAFAYETTE ST	GREENVILLE	MI	48838	93	0.00	0.34	Exempt	0.15	N	1	N	0.25	0.01275	0.0119	$ 72.29
5269000900	SHRADER HOMER L	415 S LINCOLN	GREENVILLE	MI	48838	401	0.23	0.19	Residential	0.4	N	1	N	0.25	0.019	0.0178	$ 107.73
5269001150	C-DELL INVESTORS	13339 TWIN CREEK NE	GREENVILLE	MI	48838	201	0.28	0.39	Commercial	0.9	N	1	N	0.25	0.08775	0.0822	$ 497.55
5258503400	FABER, KIRKWOOD	400 W OAK ST	GREENVILLE	MI	48838	401	0.23	0.22	Residential	0.4	N	1	N	0.25	0.022	0.0206	$ 124.74
5258503500	FABER, KIRKWOOD	400 W OAK ST	GREENVILLE	MI	48838	401	0.18	0.12	Residential	0.4	N	1	N	0.25	0.012	0.0112	$ 68.04
5258503650	FABER KIRKWOOD	400 W OAK ST	GREENVILLE	MI	48838	201	0.23	0.24	Commercial	0.9	N	1	N	0.25	0.054	0.0506	$ 306.19
5258502600	MALLEY MICHAEL J	507 NELSON DR	GREENVILLE	MI	48838	201	0.34	0.35	Commercial	0.9	N	1	N	0.25	0.07875	0.0738	$ 446.52
5269001050	DULANEY H.L.	1104 W OAK ST	GREENVILLE	MI	48838	201	0.23	0.23	Commercial	0.9	N	1	N	0.25	0.05175	0.0485	$ 293.43
5258501800	PHILLIPS GEORGE & ETHEL	601 DAVID DR	GREENVILLE	MI	48838	401	0.28	0.37	Residential	0.4	N	1	N	0.25	0.037	0.0347	$ 209.80
5258501700	TEMAN DAVID J	1217 W OAK ST	GREENVILLE	MI	48838	401	0.28	0.31	Residential	0.4	N	1	N	0.25	0.031	0.0291	$ 175.77
5258501600	HOEFLINGER, PAUL	1223 W OAK ST	GREENVILLE	MI	48838	401	0.28	0.28	Residential	0.4	N	1	N	0.25	0.028	0.0262	$ 158.76
5258501500	PATEL KALLIDAS P	601 NELSON DR	GREENVILLE	MI	48838	401	0.31	0.33	Residential	0.4	N	1	N	0.25	0.033	0.0309	$ 187.11
5274202060	GUILFOYLE ALAN	119 S LAFAYETTE ST	GREENVILLE	MI	48838	201	0.61	2.08	Commercial	0.9	N	1	N	0.25	0.468	0.4386	$ 2,653.63
5258501400	KNAPP MICHAEL	605 NELSON	GREENVILLE	MI	48838	401	0.32	0.33	Residential	0.4	N	1	N	0.25	0.033	0.0309	$ 187.11
5258501900	COLE ROBERT & TERESA	607 DAVID DR	GREENVILLE	MI	48838	401	0.38	0.37	Residential	0.4	N	1	N	0.25	0.037	0.0347	$ 209.80
5258502000	FORDYCE JEAN & HURST BARBARA	606 S NELSON DR	GREENVILLE	MI	48838	401	0.38	0.32	Residential	0.4	N	1	N	0.25	0.032	0.0300	$ 181.44
5258501300	DEKRAKER BRIAN AND BARBARA	609 NELSON DR	GREENVILLE	MI	48838	401	0.33	0.12	Residential	0.4	N	1	N	0.25	0.012	0.0112	$ 68.04
5274203000	MEIJER INC (east property)	2929 WALKER AVE NW	GRAND RAPIDS	MI	49544	201	35.00	6.20	Commercial	0.9	N	1	N	0.25	1.395	1.3074	$ 7,909.84
5274211000	HATHAWAY PROPERTIES LLC	2876 28TH ST	GRANDVILLE	MI	49518	201	21.40	22.70	Commercial	0.9	Y	0.25	N	0.25	1.276875	1.1967	$ 7,240.06
5274206060	HATHAWAY PROPERTIES	P O BOX 460	GREENVILLE	MI	48838	201	27.50	22.66	Commercial	0.9	Y	0.25	N	0.25	1.274625	1.1946	$ 7,227.30
5274203050	HATHAWAY PROPERTIES	P O BOX 460	GREENVILLE	MI	48838	201	93.04	13.94	Commercial	0.9	N	1	N	0.25	3.1365	2.9395	$ 17,784.39
	~~HATHAWAY PROPERTIES~~	~~P O BOX 460~~	~~GREENVILLE~~	~~MI~~	~~48838~~	~~401~~	~~0.00~~	~~5.00~~	~~Residential~~	~~0.4~~	~~N~~	~~1~~	~~N~~	~~0.25~~	~~0.5~~	~~0.4686~~	~~$ 2,835.07~~
-	ROW - David Street	411 S LAFAYETTE ST	GREENVILLE	MI	48838	ROW	-	0.39	Road ROW	0.6	N	1	N	0.25	0.0585	0.0548	$ 331.70
-	ROW - Benton Street	411 S LAFAYETTE ST	GREENVILLE	MI	48838	ROW	-	0.96	Road ROW	0.6	N	1	N	0.25	0.144	0.1350	$ 816.50
-	ROW - Alexander Street	411 S LAFAYETTE ST	GREENVILLE	MI	48838	ROW	-	1.01	Road ROW	0.6	N	1	N	0.25	0.1515	0.1420	$ 859.03
-	ROW - Oak Street	411 S LAFAYETTE ST	GREENVILLE	MI	48838	ROW	-	0.94	Road ROW	0.6	N	1	Y	1	0.564	0.5286	$ 3,197.96
-	ROW - Maplewood	411 S LAFAYETTE ST	GREENVILLE	MI	48838	ROW	-	2.49	Road ROW	0.6	N	1	Y	1	1.494	1.4002	$ 8,471.19
-	ROW - Meijer Drive	411 S LAFAYETTE ST	GREENVILLE	MI	48838	ROW	-	1.45	Road ROW	0.6	N	1	Y	1	0.87	0.8154	$ 4,933.02
-	ROW - Greenville West Drive	411 S LAFAYETTE ST	GREENVILLE	MI	48838	ROW	-	3.40	Road ROW	0.6	N	1	Y	1	2.04	1.9119	$ 11,567.08
-	ROW - Youngman Road	411 S LAFAYETTE ST	GREENVILLE	MI	48838	ROW	-	0.53	Road ROW	0.6	N	1	N	0.25	0.0795	0.0745	$ 450.78
							Sum Ac. City	166.91									$ 399,128.19

Sum Factor, City:	70.39125
Sum Project Percentage, City:	65.9712

Land Use	C Coefficient	Zoning
93	0.15	Exempt
201	0.9	Commercial
401	0.4	Residential
ROW	0.6	Road ROW

On-Site Controls Symbol	Presence of On-Site Controls	Adjustment Factor
N	No	1
Y	Yes	0.25

Directly Connected Impervious Areas (DCIA)		
N	No	1

Eureka Township

PARCEL #	OWNER	Address	City	State	Zip	Land Use	Parcel Acreage	GIS ACRES	LAND USE	C FACTOR	ON-SITE CONTROLS	CONTROLS ADJ. FACTOR	DCIA	DCIA FACTOR	TOTALIZED FACTOR	APPORTIONMENT PERCENTAGE	PROJECT ASSESSMENT	
800803300	STAFFEN ARNOLD F	7668 S YOUNGMAN RD	GREENVILLE	MI	48838	401	40.00	6.39	Residential	0.4	N	1	N	0.25	0.639	0.5989	$ 3,623.22	
800701801	KLACKLE STEVEN J	11466 W CARSON CITY RD	GREENVILLE	MI	48838	101	60.00	28.49	Agricultural	0.15	N	1	N	0.25	1.068375	1.0013	$ 6,057.84	
800701900	KLACKLE STEVEN J	11466 W CARSON CITY RD	GREENVILLE	MI	48838	101	80.00	48.85	Agricultural	0.15	N	1	N	0.25	1.831875	1.7168	$ 10,386.99	
800700901	KLACKLE STEVEN J	11466 W CARSON CITY RD	GREENVILLE	MI	48838	101	114.14	16.31	Agricultural	0.15	N	1	N	0.25	0.611625	0.5732	$ 3,468.00	
800803600	KLACKLE STEVEN J	11466 W CARSON CITY RD	GREENVILLE	MI	48838	101	36.50	20.93	Agricultural	0.15	N	1	N	0.25	0.784875	0.7356	$ 4,450.35	
800803800	PLH DEVELOPMENT LLC	4348 LEONARD NW	GRAND RAPIDS	MI	49544	201	26.67	23.31	Commercial	0.4	N	1	N	0.25	2.331	2.1846	$ 13,217.09	UNDEVEL
800804350	BABBITT DANIEL	7725 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.76	0.62	Residential	0.4	N	1	N	0.25	0.062	0.0581	$ 351.55	
800804621	MAAS DEVELOPMENT LLC	11440 E. FULTON	LOWELL	MI	49331	201	0.75	0.63	Commercial	0.9	N	1	N	0.25	0.14175	0.1328	$ 803.74	
800804400	JONES RONALD G	7735 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.42	0.32	Residential	0.4	N	1	N	0.25	0.032	0.0300	$ 181.44	
852000100	HAMILTON ALICE &	7738 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.50	0.48	Residential	0.4	N	1	N	0.25	0.048	0.0450	$ 272.17	
800804001	L D S CHURCH	50 E N TEMPLE-22ND FLR	SALT LAKE CITY	UT	84150	90	28.78	26.30	Exempt	0.4	y	0.25	N	0.25	0.6575	0.6182	$ 3,726.12	
852000150	NORDEN PATRICK & DENISE	7740 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.50	0.48	Residential	0.4	N	1	N	0.25	0.048	0.0450	$ 272.17	
800804500	WILSON HAROLD R &	7767 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.48	0.42	Residential	0.4	N	1	N	0.25	0.042	0.0394	$ 238.15	
852000200	MANN FREDERICK & BETTY	7760 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.50	0.48	Residential	0.4	N	1	N	0.25	0.048	0.0450	$ 272.17	
800804622	KMART COPRORATION	PO BOX 560907	DALLAS	TX	75356-09	201	0.99	0.93	Commercial	0.9	N	1	N	0.25	0.20925	0.1961	$ 1,186.48	
852000250	MANN FREDERICK & BETTY	7760 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.50	0.48	Residential	0.4	N	1	N	0.25	0.048	0.0450	$ 272.17	
832000100	WILSON HAROLD R &	7767 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.49	0.49	Residential	0.4	N	1	N	0.25	0.049	0.0459	$ 277.84	
852000300	STEFFES DAVID & KAROL	7786 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.50	0.48	Residential	0.4	N	1	N	0.25	0.048	0.0450	$ 272.17	
832000200	CLAYTON JACK JR & JANICE	7777 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.44	0.44	Residential	0.4	N	1	N	0.25	0.044	0.0412	$ 249.49	
852000400	WEBSTER DANEEN	7788 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.47	0.45	Residential	0.4	N	1	N	0.25	0.045	0.0422	$ 255.16	
832000400	WOOD ROY & VERA	7807 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.41	0.41	Residential	0.4	N	1	N	0.25	0.041	0.0384	$ 232.48	
852000450	ELLIS JIM OLIN & LUZITA	7806 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.48	0.43	Residential	0.4	N	1	N	0.25	0.043	0.0403	$ 243.82	
800702500	KOEHN EDWIN & LINDA	11282 W CARSON CITY RD	GREENVILLE	MI	48838	201	2.59	2.36	Commercial	0.9	N	1	N	0.25	0.531	0.4977	$ 3,010.84	
800702200	KOEHN EDWIN & LINDA	11282 W CARSON CITY RD	GREENVILLE	MI	48838	201	7.23	7.28	Commercial	0.9	N	1	N	0.25	1.638	1.5351	$ 9,287.69	
800702100	WARD RONALD & JACQUELINE	921 ALEXANDER	GREENVILLE	MI	48838	201	3.14	3.12	Commercial	0.9	N	1	N	0.25	0.702	0.6579	$ 3,980.44	
800702000	VAN HOOSE JACK	11306 W CARSON CITY RD	GREENVILLE	MI	48838	201	2.16	2.11	Commercial	0.9	N	1	N	0.25	0.47475	0.4449	$ 2,691.90	
852000500	ROBERSON HOWARD D & LINDA	7826 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.46	0.45	Residential	0.4	N	1	N	0.25	0.045	0.0422	$ 255.16	
832000500	WILSON JAMES N	3836 OLD PINE TRAIL	MIDLAND	MI	48642-88	401	0.33	0.33	Residential	0.4	N	1	N	0.25	0.033	0.0309	$ 187.11	
832000600	JENSEN ARVIN C	11525 MONTCALM AVE	GREENVILLE	MI	48838	401	0.58	0.55	Residential	0.4	N	1	N	0.25	0.055	0.0515	$ 311.86	
852000550	PATTEN-KRATT CONSTANCE M	7846 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.47	0.45	Residential	0.4	N	1	N	0.25	0.045	0.0422	$ 255.16	
800701600	LILLIE HARRIET	11782 W CARSON CITY RD	GREENVILLE	MI	48838	401	4.15	3.18	Residential	0.4	N	1	N	0.25	0.318	0.2980	$ 1,803.10	
852000620	RIKER CHARLES & MARILYN	7864 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.53	0.50	Residential	0.4	N	1	N	0.25	0.05	0.0469	$ 283.51	
800804010	COMMERCIAL BANK of MI	101 N PINE RIVER PO BOX 28	ITHACA	MI	48847	201	0.58	0.58	Commercial	0.9	N	1	N	0.25	0.1305	0.1223	$ 739.95	
852000800	PETERSEN MARK & TRUDY	10606 CARSON CITY RD	GREENVILLE	MI	48838	201	4.92	2.17	Commercial	0.9	N	1	N	0.25	0.48825	0.4576	$ 2,768.45	
800702400	KOEHN EDWIN & LINDA	11282 W CARSON CITY RD	GREENVILLE	MI	48838	201	2.29	2.44	Commercial	0.9	N	1	N	0.25	0.549	0.5145	$ 3,112.91	
800702050	VAN HOOSE JACK	11306 W CARSON CITY RD	GREENVILLE	MI	48838	401	0.57	0.53	Residential	0.4	N	1	N	0.25	0.053	0.0497	$ 300.52	
852000600	COMMERCIAL BANK of MI	101 N PINE RIVER PO BOX 28	ITHACA	MI	48847	99	1.59	1.58	Reference Only	0.9	N	1	N	0.25	0.3555	0.3332	$ 2,015.73	
800701700	HYDE TIMOTHY & ANGELITA	11716 W CARSON CITY RD	GREENVILLE	MI	48838	401	1.72	1.71	Residential	0.4	N	1	N	0.25	0.171	0.1603	$ 969.59	
848701200						401		0.23	Residential	0.4	N	1	N	0.25	0.023	0.0216	$ 130.41	
800804630	OFFICE CENTER WEST	2876 28TH ST SW	GRANDVILLE	MI	49418	201	0.93	0.75	Commercial	0.9	N	1	N	0.25	0.16875	0.1582	$ 956.84	
852001200	L D S CHURCH	50 E. N. TEMPLE, 22ND FLOOI	SALT LAKE CITY	UT	84150-22	90	2.12	1.78	Exempt	0.4	N	1	N	0.25	0.178	0.1668	$ 1,009.28	
852001700	DENNIS GARY L	10728 W CARSON CITY RD	GREENVILLE	MI	48838	401	0.42	0.36	Residential	0.4	N	1	N	0.25	0.036	0.0337	$ 204.13	
800803900	OBERLIN BARBARA J	1103 W ORANGE ST	GREENVILLE	MI	48838	401	0.63	0.44	Residential	0.4	N	1	N	0.25	0.044	0.0412	$ 249.49	
800803700	ASSEMBLIES OF GOD-MI DIST COUN	10990 W CARSON CITY ROAD	GREENVILLE	MI	48838	90	1.81	1.33	Exempt	0.4	N	1	N	0.25	0.133	0.1246	$ 754.13	
801700940	RIDGEWOOD ASSOCIATES	2876 28TH ST SW	GRANDVILLE	MI	49518	401	2.03	1.93	Residential	0.4	N	1	N	0.25	0.193	0.1809	$ 1,094.34	
801701010	CHRISTENSEN JERRY &	10635 W CARSON CITY RD	GREENVILLE	MI	48838	401	1.00	0.80	Residential	0.4	N	1	N	0.25	0.08	0.0750	$ 453.61	
801700930	RIDGEWOOD ASSOCIATES	2876 28TH ST SW	GRANDVILLE	MI	49518	401	0.98	0.97	Residential	0.4	N	1	N	0.25	0.097	0.0909	$ 550.00	
801700202	ST PAUL LUTHERAN CHURCH	100 E COFFREN	GREENVILLE	MI	48838	401	17.92	16.48	Residential	0.4	N	1	N	0.25	1.648	1.5445	$ 9,344.39	
801700301	MALLEY MICHAEL J DDS	507 NELSON DR	GREENVILLE	MI	48838	201	3.76	3.45	Commercial	0.9	N	1	N	0.25	0.77625	0.7275	$ 4,401.45	
801700400	HAMMOND DONALD & TERESA	10989 W CARSON CITY RD	GREENVILLE	MI	48838	401	3.99	3.24	Residential	0.4	N	1	N	0.25	0.324	0.3037	$ 1,837.13	
801801400	LAFOND AUTO SALES INC	4219 W CARSON CITY RD	GREENVILLE	MI	48838	201	1.41	1.40	Commercial	0.9	Y	0.25	N	0.25	0.07875	0.0738	$ 446.52	
801801410	LAFOND AUTO SALES INC	4219 W CARSON CITY RD	GREENVILLE	MI	48838	201	2.53	2.53	Commercial	0.9	N	1	N	0.25	0.56925	0.5335	$ 3,227.73	
801801900	CLARK MICHAEL & KARIE	3028 WHITES BRIDGE RD	BELDING	MI	48809	201	2.09	2.00	Commercial	0.9	N	1	N	0.25	0.45	0.4217	$ 2,551.56	
801801950	JONES DOUGLAS & RALENE LC	11781 W CARSON CITY RD	GREENVILLE	MI	48838	201	2.53	2.53	Commercial	0.9	N	1	N	0.25	0.56925	0.5335	$ 3,227.73	
801801800	TINNEY REAL ESTATE LLC	11249 CARSON CITY RD	GREENVILLE	MI	48838	201	4.51	4.53	Commercial	0.9	N	1	N	0.25	1.01925	0.9552	$ 5,779.29	
801801100	HOLLENBECK BLAKE & SHIRLEY	11289 W CARSON CITY RD	GREENVILLE	MI	48838	201	8.36	3.33	Commercial	0.9	N	1	N	0.25	0.74925	0.7022	$ 4,248.35	
801801000	HOLLENBECK BLAKE & SHIRLEY	11289 W CARSON CITY RD	GREENVILLE	MI	48838	201	7.42	2.01	Commercial	0.9	N	1	N	0.25	0.45225	0.4239	$ 2,564.32	
801800900	MAXON ALVIN ROBERT	11461 CARSON CITY RD	GREENVILLE	MI	48838	401	4.30	0.92	Residential	0.4	N	1	N	0.25	0.092	0.0862	$ 521.65	
805000100	BENNETT ROGER & CHERYL	8330 MASTERS RD	HOWARD CITY	MI	49329-95	401	0.75	0.46	Residential	0.4	N	1	N	0.25	0.046	0.0431	$ 260.83	
805000200	MAYHEW FLOYD B & PATRICIA G	11491 CARSON CITY RD	GREENVILLE	MI	48838	401	1.49	0.93	Residential	0.4	N	1	N	0.25	0.093	0.0872	$ 527.32	
805000400	FIELDING DAVID & SUSAN	11499 W CARSON CITY RD	GREENVILLE	MI	48838	401	1.19	0.76	Residential	0.4	N	1	N	0.25	0.076	0.0712	$ 430.93	
805000700	REES RICHARD & JOYCE	11507 W CARSON CITY RD	GREENVILLE	MI	48838	401	1.04	0.67	Residential	0.4	N	1	N	0.25	0.067	0.0628	$ 379.90	
805000900	HANSEN GAYLORD & SHIRLEY	11517 CARSON CITY RD	GREENVILLE	MI	48838	401	0.75	0.49	Residential	0.4	N	1	N	0.25	0.049	0.0459	$ 277.84	
805001000	RASMUSSEN KENNETH ET AL	11527 CARSON CITY RD	GREENVILLE	MI	48838	401	0.92	0.60	Residential	0.4	N	1	N	0.25	0.06	0.0562	$ 340.21	
805001000	RASMUSSEN KENNETH ET AL	11527 CARSON CITY RD	GREENVILLE	MI	48838	401	0.92	0.00	Residential	0.4	N	1	N	0.25	0	0.0000	$ -	
805001100	PATTERSON WILLIAM & LUCILLE	11707 CARSON CITY RD	GREENVILLE	MI	48838	401	0.82	0.81	Residential	0.4	N	1	N	0.25	0.081	0.0759	$ 459.28	
805001300	SYLVESTER GEORGE F & MARSHA I	11729 W CARSON CITY RD	GREENVILLE	MI	48838	401	0.21	0.41	Residential	0.4	N	1	N	0.25	0.041	0.0384	$ 232.48	
805001500	MC MEEKEN ERNEST E	11737 CARSON CITY RD	GREENVILLE	MI	48838	401	1.30	0.82	Residential	0.4	N	1	N	0.25	0.082	0.0769	$ 464.95	
805001600	MASON FERN MRS	11761 W CARSON CITY RD	GREENVILLE	MI	48838	401	0.41	0.40	Residential	0.4	N	1	N	0.25	0.04	0.0375	$ 226.81	
805001700	FREDERICKSEN ERIK	803 WASHINGTON	JACKSONVILLE	FL	32256	401	0.41	0.40	Residential	0.4	N	1	N	0.25	0.04	0.0375	$ 226.81	
805001800	CARSTENSEN PHILIP	11781 W CARSON CITY RD	GREENVILLE	MI	48838	401	0.41	0.39	Residential	0.4	N	1	N	0.25	0.039	0.0366	$ 221.14	
805001900	HOMECOMINGS FINANCIAL NETWOI	338 S WARMINSTER RD	HATBORO	PA	19040	401	0.41	0.37	Residential	0.4	N	1	N	0.25	0.037	0.0347	$ 209.80	
805002000	RYDAHL INDUSTRIES INC	8116 RIDE ALL DR	GREENVILLE	MI	48838	201	0.21	0.17	Commercial	0.9	N	1	N	0.25	0.03825	0.0358	$ 216.88	
805002100	RYDAHL JEFFREY & LISA	8116 RIDE ALL DR	GREENVILLE	MI	48838	401	2.13	0.00	Residential	0.4	N	1	N	0.25	0	0.0000	$ -	
801701020	LILLIE HARRIET	11782 CARSON CITY RD	GREENVILLE	MI	48838	401	0.50	0.50	Residential	0.4	N	1	N	0.25	0.05	0.0469	$ 283.51	
801801500	ROBERTS FREDERIC J, II & ANN L	8076 S SATTERLEE RD 8076.5	GREENVILLE	MI	48838	401	4.64	4.71	Residential	0.4	N	1	N	0.25	0.471	0.4414	$ 2,670.64	
801756001	WEBER DEBBIE L	10731 RIDGEWOOD DR	GREENVILLE	MI	48838	401	0.67	0.71	Residential	0.4	N	1	N	0.25	0.071	0.0665	$ 402.58	
801701900	STEARNS BRUCE & SANDRA	8090 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.87	0.82	Residential	0.4	N	1	N	0.25	0.082	0.0769	$ 464.95	
801702600	JENSEN SIVERT P	8091 YOUNGMAN RD	GREENVILLE	MI	48838	401	1.03	0.92	Residential	0.4	N	1	N	0.25	0.092	0.0862	$ 521.65	
801700500	GREENVILLE SCHOOL DIST	516 CASS ST	GREENVILLE	MI	48838	90	3.00	2.85	Exempt	0.4	N	1	N	0.25	0.285	0.2671	$ 1,615.99	
801758028	TUISL DOYLE R	10710 RIDGEWOOD DR	GREENVILLE	MI	48838	401	0.56	0.57	Residential	0.4	N	1	N	0.25	0.057	0.0534	$ 323.20	
801758027	WILLIAMS NOLAN RAY TRUST	10688 RIDGEWOOD DR	GREENVILLE	MI	48838	401	0.53	0.53	Residential	0.4	N	1	N	0.25	0.053	0.0497	$ 300.52	
801758026	BRINTELL KENT & MARLENE	10676 RIDGEWOOD	GREENVILLE	MI	48838	401	0.53	0.53	Residential	0.4	N	1	N	0.25	0.053	0.0497	$ 300.52	
858000100	WILLMORE CLINTON J	8100 S YOUNGMAN RD	GREENVILLE	MI	48838	401	0.90	0.91	Residential	0.4	N	1	N	0.25	0.091	0.0853	$ 515.98	
801702800	TYLER JEFFREY & MONTE	8111 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.69	0.61	Residential	0.4	N	1	N	0.25	0.061	0.0572	$ 345.88	

Land Use	C Coefficient	Zoning
90	0.4	Exempt
99	0.9	Reference Only
101	0.15	Agricultural
201	0.9	Commercial
401	0.4	Residential
ROW	0.6	Right of Way

On-Site Controls Symbol	Presence of On-Site Controls	Adjustment Factor
N	No	1
Y	Yes	0.25

Directly Connected Impervious Areas (DCIA)		
N	No	1
Y	Yes	0.25

Land Use	C Coefficient	Zoning

PARCEL #	OWNER	Address	City	State	Zip	Land Use	Parcel Acreage	GIS ACRES	LAND USE	C FACTOR	CONTROLS ON-SITE CONTROLS	CONTROLS ADJ. FACTOR	CONTROLS DCIA	DCIA FACTOR	TOTALIZED FACTOR	APPORTIONMENT PERCENTAGE	PROJECT ASSESSMENT
801758002	BORUCKI DONNA K	10715 RIDGEWOOD DR	GREENVILLE	MI	48838	401	0.55	0.62	Residential	0.4	N	1	N	0.25	0.062	0.0581	$ 351.55
801758025	RITTER MICHAEL & BRENDA	10644 RIDGEWOOD DR	GREENVILLE	MI	48838	401	0.52	0.49	Residential	0.4	N	1	N	0.25	0.049	0.0459	$ 277.84
858000200	BOW BERWIN A	8124 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.90	0.92	Residential	0.4	N	1	N	0.25	0.092	0.0862	$ 521.65
801703100	JOHNSON JAMES F	8121 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.69	0.61	Residential	0.4	N	1	N	0.25	0.061	0.0572	$ 345.88
801758003	NEVE JEREMY &	10703 RIDGEWOOD DR	GREENVILLE	MI	48838	401	0.55	0.49	Residential	0.4	N	1	N	0.25	0.049	0.0459	$ 277.84
801801700	AMERICAN MICROWAVE & COMM IN	P O BOX 173838	DENVER	CO	82107-38	201	9.12	2.22	Commercial	0.9	N	1	N	0.25	0.4995	0.4681	$ 2,832.23
801758231	SWANSON CHRISTINE	10598 RIDGEWOOD DR	GREENVILLE	MI	48838	401	0.74	0.85	Residential	0.4	N	1	N	0.25	0.085	0.0797	$ 481.96
801758230	MADOLE KENNETH* &	10610 RIDGEWOOD DR	GREENVILLE	MI	48838	401	0.53	0.56	Residential	0.4	N	1	N	0.25	0.056	0.0525	$ 317.53
801758229	SCHOLTENS DANIEL & JACKI	10632 RIDGEWOOD DR	GREENVILLE	MI	48838	401	0.49	0.46	Residential	0.4	N	1	N	0.25	0.046	0.0431	$ 260.83
801801550	JIMENEZ MARIE J	8144 SATTERLEE RD	GREENVILLE	MI	48838	401	3.68	2.73	Residential	0.4	N	1	N	0.25	0.273	0.2559	$ 1,547.95
801700150	TOWN HAROLD	11095 BARBER RD	GREENVILLE	MI	48838	401	1.16	0.72	Residential	0.4	N	1	N	0.25	0.072	0.0675	$ 408.25
801700140	TOWN HAROLD	11095 BARBER RD	GREENVILLE	MI	48838	401	1.16	0.48	Residential	0.4	N	1	N	0.25	0.048	0.0450	$ 272.17
801700130	TOWN HAROLD	11095 BARBER RD	GREENVILLE	MI	48838	401	1.16	0.39	Residential	0.4	N	1	N	0.25	0.039	0.0366	$ 221.14
801700120	JONES DOUGLAS & RAELENE	11781 W CARSON CITY RD	GREENVILLE	MI	48838	401	1.16	0.30	Residential	0.4	N	1	N	0.25	0.03	0.0281	$ 170.10
801702500	SCHOENFELDER KENNETH* TRUST	8151 YOUNGMAN RD	GREENVILLE	MI	48838	401	1.38	1.17	Residential	0.4	N	1	N	0.25	0.117	0.1097	$ 663.41
801758004	WILSON ROBERT & DEBORAH	8162 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.68	0.65	Residential	0.4	N	1	N	0.25	0.065	0.0609	$ 368.56
801758024	HUNTER ROCHELLE	10687 RIDGEWOOD DR	GREENVILLE	MI	48838	401	0.45	0.46	Residential	0.4	N	1	N	0.25	0.046	0.0431	$ 260.83
801758232	NELSON ERIC & SARAH	10580 RIDGEWOOD DR	GREENVILLE	MI	48838	401	0.57	0.63	Residential	0.4	N	1	N	0.25	0.063	0.0590	$ 357.22
858000300	REED KENNETH & KATHRYN	8142 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.90	0.92	Residential	0.4	N	1	N	0.25	0.092	0.0862	$ 521.65
801758237	MORANO BRIAN &	10635 RIDGEWOOD DR	GREENVILLE	MI	48838	401	0.53	0.48	Residential	0.4	N	1	N	0.25	0.048	0.0450	$ 272.17
801758005	SANDERS TERESA S	8160 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.55	0.54	Residential	0.4	N	1	N	0.25	0.054	0.0506	$ 306.19
801758023	KBH HOMES LLC	960 W RIVER CENTER DR -- S	CONSTOCK PARK	MI	49321	401	0.46	0.48	Residential	0.4	N	1	N	0.25	0.048	0.0450	$ 272.17
858000400	DRAPER ANTHONY & KELLY	8160 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.90	0.92	Residential	0.4	N	1	N	0.25	0.092	0.0862	$ 521.65
801758236	FABER JOSEPHINE E	10621 RIDGEWOOD DR	GREENVILLE	MI	48838	401	0.46	0.51	Residential	0.4	N	1	N	0.25	0.051	0.0478	$ 289.18
801702700	RUSSELL LOUIS C & MARY E TRUS	8161 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.86	0.77	Residential	0.4	N	1	N	0.25	0.077	0.0722	$ 436.60
801758235	JENSEN GIL & HUI SUK	10609 RIDGEWOOD DR	GREENVILLE	MI	48838	401	0.43	0.42	Residential	0.4	N	1	N	0.25	0.042	0.0394	$ 238.15
801758233	CORNWELL ROBERT &	10585 RIDGEWOOD DR	GREENVILLE	MI	48838	401	0.68	0.80	Residential	0.4	N	1	N	0.25	0.08	0.0750	$ 453.61
801758006	DAWES STEVE & MARGARET	8204 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.49	0.49	Residential	0.4	N	1	N	0.25	0.049	0.0459	$ 277.84
858000500	BAILEY JACK F	8170 S YOUNGMAN RD	GREENVILLE	MI	48838	401	0.90	0.92	Residential	0.4	N	1	N	0.25	0.092	0.0862	$ 521.65
801758234	TAYLOR MARTIN & MARY BETH	10597 RIDGEWOOD DR	GREENVILLE	MI	48838	401	0.49	0.46	Residential	0.4	N	1	N	0.25	0.046	0.0431	$ 260.83
801702900	ROOD TERRY D	8181 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.83	0.74	Residential	0.4	N	1	N	0.25	0.074	0.0694	$ 419.59
801758022	JOHNSON MATTHEW & JOANN	8213 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.36	0.59	Residential	0.4	N	1	N	0.25	0.059	0.0553	$ 334.54
801758007	MOLLO JAMES & LINDA	8226 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.49	0.49	Residential	0.4	N	1	N	0.25	0.049	0.0459	$ 277.84
858000600	WRIGHT IRENE J	8182 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.90	0.93	Residential	0.4	N	1	N	0.25	0.093	0.0872	$ 527.32
801703000	LEE EARL & CAROL	8300 YOUNGMAN RD	GREENVILLE	MI	48838	401	0.86	0.77	Residential	0.4	N	1	N	0.25	0.077	0.0722	$ 436.60
801700111	TOWN HAROLD	11095 BARBER RD	GREENVILLE	MI	48838	101	38.83	22.73	Agricultural	0.15	N	1	N	0.25	0.852	0.7989	$ 4,833.08
801758008	MOY JOHN & KAREN	8260 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.51	0.51	Residential	0.4	N	1	N	0.25	0.051	0.0478	$ 289.18
801758021	GUSTIN MICHAEL & JUDITH	8267 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.53	0.55	Residential	0.4	N	1	N	0.25	0.055	0.0515	$ 311.86
801758009	STEIN RICHARD A & JUDY B	8262 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.46	0.46	Residential	0.4	N	1	N	0.25	0.046	0.0431	$ 260.83
801758020	LIECHTY DAVID & DONNA	8293 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.46	0.46	Residential	0.4	N	1	N	0.25	0.046	0.0431	$ 260.83
801758010	HOWES ROGER W	8298 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.46	0.46	Residential	0.4	N	1	N	0.25	0.046	0.0431	$ 260.83
801758019	BURGER PERRY & LORI	8315 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.46	0.46	Residential	0.4	N	1	N	0.25	0.046	0.0431	$ 260.83
801758011	PENDRICK RICHARD & ELAINE	10874 WILDWOOD DR	GREENVILLE	MI	48838	401	0.46	0.46	Residential	0.4	N	1	N	0.25	0.046	0.0431	$ 260.83
801758018	SCHRADER DEAN	8333 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.46	0.46	Residential	0.4	N	1	N	0.25	0.046	0.0431	$ 260.83
801758012	KLEMM BRUCE & MARILYN	8334 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.47	0.49	Residential	0.4	N	1	N	0.25	0.049	0.0459	$ 277.84
801758017	SORENSEN RICHARD & JANE	8351 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.52	0.57	Residential	0.4	N	1	N	0.25	0.057	0.0534	$ 323.20
801758013	KBH HOMES LLC	960 W RIVER CENTER DR -- S	CONSTOCK PARK	MI	49321	401	0.53	0.50	Residential	0.4	N	1	N	0.25	0.05	0.0469	$ 283.51
801758016	GANNON SUSAN D* &	8393 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.50	0.56	Residential	0.4	N	1	N	0.25	0.056	0.0525	$ 317.53
801758014	BALL MONTE & LINDA	8376 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.64	0.62	Residential	0.4	N	1	N	0.25	0.062	0.0581	$ 351.55
801758355	LABELLE CHRISTINE* &	8403 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.44	0.39	Residential	0.4	N	1	N	0.25	0.039	0.0366	$ 221.14
801758354	WELLER CRAIG & KIMBERLY	8415 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.49	0.49	Residential	0.4	N	1	N	0.25	0.049	0.0459	$ 277.84
801758015	BENNETT DORIS	8394 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.66	0.77	Residential	0.4	N	1	N	0.25	0.077	0.0722	$ 436.60
801758353	TOLLIVER PATRICK & MICHELLE	8427 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.48	0.50	Residential	0.4	N	1	N	0.25	0.05	0.0469	$ 283.51
801758338	RIERSON RICHARD & EVELYN	8416 CRESTVIEW DR	GREENVILLE	MI	48838-81	401	0.50	0.49	Residential	0.4	N	1	N	0.25	0.049	0.0459	$ 277.84
801758352	BRAMAN HELEN M TRUST	8443 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.54	0.53	Residential	0.4	N	1	N	0.25	0.053	0.0497	$ 300.52
801758351	MORGAN TROY & KIMBERLY	8455 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.54	0.54	Residential	0.4	N	1	N	0.25	0.054	0.0506	$ 306.19
801758339	PENTONEY RODNEY	10708 WILLIAM COURT	GREENVILLE	MI	48838	401	0.42	0.43	Residential	0.4	N	1	N	0.25	0.043	0.0403	$ 243.82
801758350	MOUNT GENE A & MARY JO	8463 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.75	0.82	Residential	0.4	N	1	N	0.25	0.082	0.0769	$ 464.95
801758340	NIELSEN ADRIANE* &	10710 WILLIAM COURT	GREENVILLE	MI	48838	401	0.55	0.60	Residential	0.4	N	1	N	0.25	0.06	0.0562	$ 340.21
801758345	SKERSKI THOMAS & JANET	10669 WILLIAM COURT	GREENVILLE	MI	48838	401	0.54	0.52	Residential	0.4	N	1	N	0.25	0.052	0.0487	$ 294.85
801758349	DRAKE BARBARA ANN	8471 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.97	1.12	Residential	0.4	N	1	N	0.25	0.112	0.1050	$ 635.06
801758344	JONES THAD B	10707 WILLIAM COURT	GREENVILLE	MI	48838	401	0.47	0.48	Residential	0.4	N	1	N	0.25	0.048	0.0450	$ 272.17
801758346	PHAM VU H	2133 HAMSTEAD RD NW	GRAND RAPIDS	MI	49504	401	0.74	0.77	Residential	0.4	N	1	N	0.25	0.077	0.0722	$ 436.60
801758341	TIMM CRAIG & LAURIE	10712 WILLIAM COURT	GREENVILLE	MI	48838	401	0.57	0.61	Residential	0.4	N	1	N	0.25	0.061	0.0572	$ 345.88
801758343	NAPEROLA JAMES & CHRISTINE	10709 WILLIAM COURT	GREENVILLE	MI	48838	401	0.48	0.53	Residential	0.4	N	1	N	0.25	0.053	0.0497	$ 300.52
801758347	HOMICH STEVE & AMY	8456 CRESTVIEW DR	GREENVILLE	MI	48838	401	0.64	0.67	Residential	0.4	N	1	N	0.25	0.067	0.0628	$ 379.90
801758342	PRICHARD JAMES & CHERYL	10715 WILLIAM COURT	GREENVILLE	MI	48838	401	0.46	0.50	Residential	0.4	N	1	N	0.25	0.05	0.0469	$ 283.51
801700610	CHRISTENSEN ANDREW D	8699 S SATTERLEE RD	GREENVILLE	MI	48838	401	1.17	0.17	Residential	0.4	N	1	N	0.25	0.017	0.0159	$ 96.39
801758348	MC KINNON ROBERT & DIANE JT	8485 CRESTVIEW DR	GREENVILLE	MI	48838	401	1.10	1.11	Residential	0.4	N	1	N	0.25	0.111	0.1040	$ 629.39
801704400	SOWERBY FARMS	11496 ELKINS ROAD NE	GREENVILLE	MI	48838	101	75.07	34.38	Agricultural	0.15	N	1	N	0.25	1.28925	1.2083	$ 7,310.23
							Sum Ac. Twp	381.50							Sum Cost:		$ 177,053.64
															Sum Factor, Twp:	31.225625	
															Sum Project Percentage, Twp:	29.2649	

PARCEL #	OWNER	Address	City	State	Zip	Land Use	Parcel Acreage	GIS ACRES	LAND USE	C FACTOR	ON-SITE CONTROLS	CONTROLS ADJ. FACTOR	DCIA	DCIA FACTOR	TOTALIZED FACTOR	APPORTIONMENT PERCENTAGE	PROJECT ASSESSMENT		
Montcalm County Road Commission																			
-	ROW - Satterlee Road		Eureka Twp			ROW	-	3.46	Right of Way	0.6	N	1	N	0.25	0.519	0.4864	$ 2,942.80		
-	ROW - Ridgewood Drive		Eureka Twp			ROW	-	2.20	Right of Way	0.6	N	1	N	0.25	0.33	0.3093	$ 1,871.15		
-	ROW - Crestview Drive		Eureka Twp			ROW	-	3.34	Right of Way	0.6	N	1	N	0.25	0.501	0.4695	$ 2,840.74		
-	ROW - EW Stub Street		Eureka Twp			ROW	-	0.52	Right of Way	0.6	N	1	N	0.25	0.078	0.0731	$ 442.27		
-	ROW - Court off Crestview		Eureka Twp			ROW	-	0.71	Right of Way	0.6	N	1	N	0.25	0.1065	0.0998	$ 603.87		
-	ROW - Youngman Road		Eureka Twp			ROW	-	1.38	Right of Way	0.6	N	1	N	0.25	0.207	0.1940	$ 1,173.72		
							Sum Ac. Twp	11.61							Sum Cost:		$ 9,874.56		
															Sum Factor, Twp:	1.7415			
															Sum Project Percentage, Twp:	1.6321			
Michigan Department of Transportation																			
-	MDOT ROW - M-57		Eureka Twp			ROW	-	15.77	Right of Way	0.388	N	1	N	0.25	1.52969	1.4336	$ 8,673.56	###	mdot
-	MDOT ROW - M-57		GREENVILLE	MI		ROW	-	4.67	Road ROW	0.388	N	1	Y	1	1.81196	1.6982	$ 10,274.07	###	
							Sum Ac. Twp	20.44							Sum Cost:		$ 18,947.62		
															Sum Factor, Twp:	3.34165			
															Sum Project Percentage, Twp:	3.1318			
							Sum Ac. Total	548.41 acres							Sum Factor Total:	106.70	$ 605,004.00		
															Sum Project Percentage, Total:	100.0000			

Land Use	C Coefficient	Zoning

GREENVILLE WEST DRAIN
STATE ROAD DRAIN
SECTION 14A CALCULATIONS

AVERAGE RUNOFF COEFFICIENT (A.R.C.) FOR:
MICHIGAN DEPARTMENT OF TRANSPORTATION

M.D.O.T. RIGHT-OF-WAY CONSISTS OF:

	ACRES	FRACTION	COEFFICIENT	ACRES x COEFFICIENT
TOTAL ROW	20.44	100		
PAVEMENT	5.23	25.59	0.9	4.707
GRAVEL ROAD	0.00	0.00	0.7	0
GRAVEL RAILROAD BED	0.00	0.00	0.7	0
OTHER IMPERVIOUS AREAS (Driveways)	0.26	1.27	0.9	0.234
GRASSED AREA	14.95	73.14	0.2	2.99
	20.44	100		7.931

A.R.C. = ACRES x COEFFICIENT / TOTAL ACRES= 0.388

REMAINING LANDS IN THE DISTRICT CONSIST OF:

	ACRES	FRACTION	COEFFICIENT	ACRES x COEFFICIENT
CALCULATED AVERAGES	553.72	100.00	0.4952	274.202144
PAVEMENT	0.00	0.00	0.9	0
GRAVEL ROAD	0.00	0.00	0.7	0
GRAVEL RAILROAD BED	0.00	0.00	0.7	0
OTHER IMPERVIOUS AREAS	0.00	0.00	0.9	0
GRASSED AREA	0.00	0.00	0.2	0
	553.72	0		274.202144

A.R.C. = ACRES x COEFFICIENT / TOTAL ACRES= 0.495

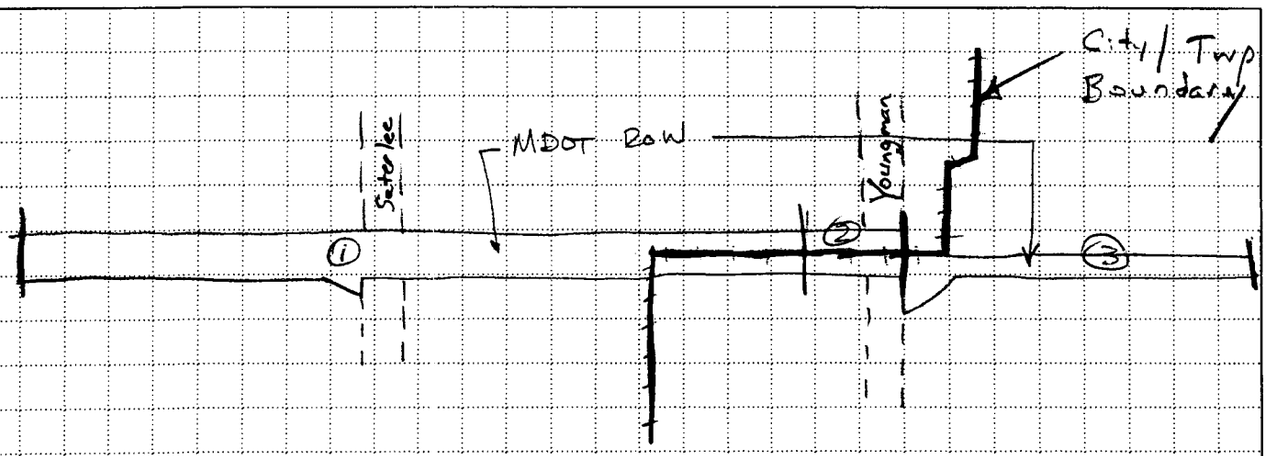
CALCULATIONS:

	ACRES	A.R.C.	ACRES x A.R.C.
M.D.O.T ACRES IN DRAINAGE DISTRICT:	20.44	0.388	7.93
REMAINING LAND IN DISTRICT:	553.72	0.495	274.20
TOTAL ACRES IN DRAINAGE DISTRICT:	2907.0		282.13

PRO RATA SHARE FOR M.D.O.T.(%): 2.81

ProgressiveAE
1811 4 Mile Road, NE
Grand Rapids, MI 49525 2442
616 361 2664 VOICE
616 361 1493 FAX
www.progressiveae.com

PROJECT: Greenville Drain
SUBJECT: MDOT Apportionment
PROJECT NO: PAGE OF
BY: Mike C DATE: 3-12-03
CHECKED: DATE:



MDOT R.O.W. = 20.44 ac ft

Section (1) L = 5774' Pavement width = 27' = 3.58 ac. pvmt.

(2) L = 437' Pavement width = 55' = 0.55 ac. pvmt

(3) L = 1,750' Pavement width = 55'/2 = 1.10 ac. pvmt

5.23 ac road pavement

For driveways & road approaches, approximate as 5% of road pavement.

5.23 ac. x 0.05 = 0.26 ac.

progressiveAE
1811 4 Mile Road, NE
Grand Rapids, MI 49525 2442
616 361 2664 VOICE
616 361 1493 FAX
www.progressiveae.com

EXHIBIT D

PROJECT: GREENVILLE WEST DRAIN
SUBJECT: 'QUASI'-HYDRAULIC PROFILE
PROJECT NO: PAGE OF
BY: MIKEO DATE: 8-27-02
CHECKED: DATE:

SYSTEM PROFILE

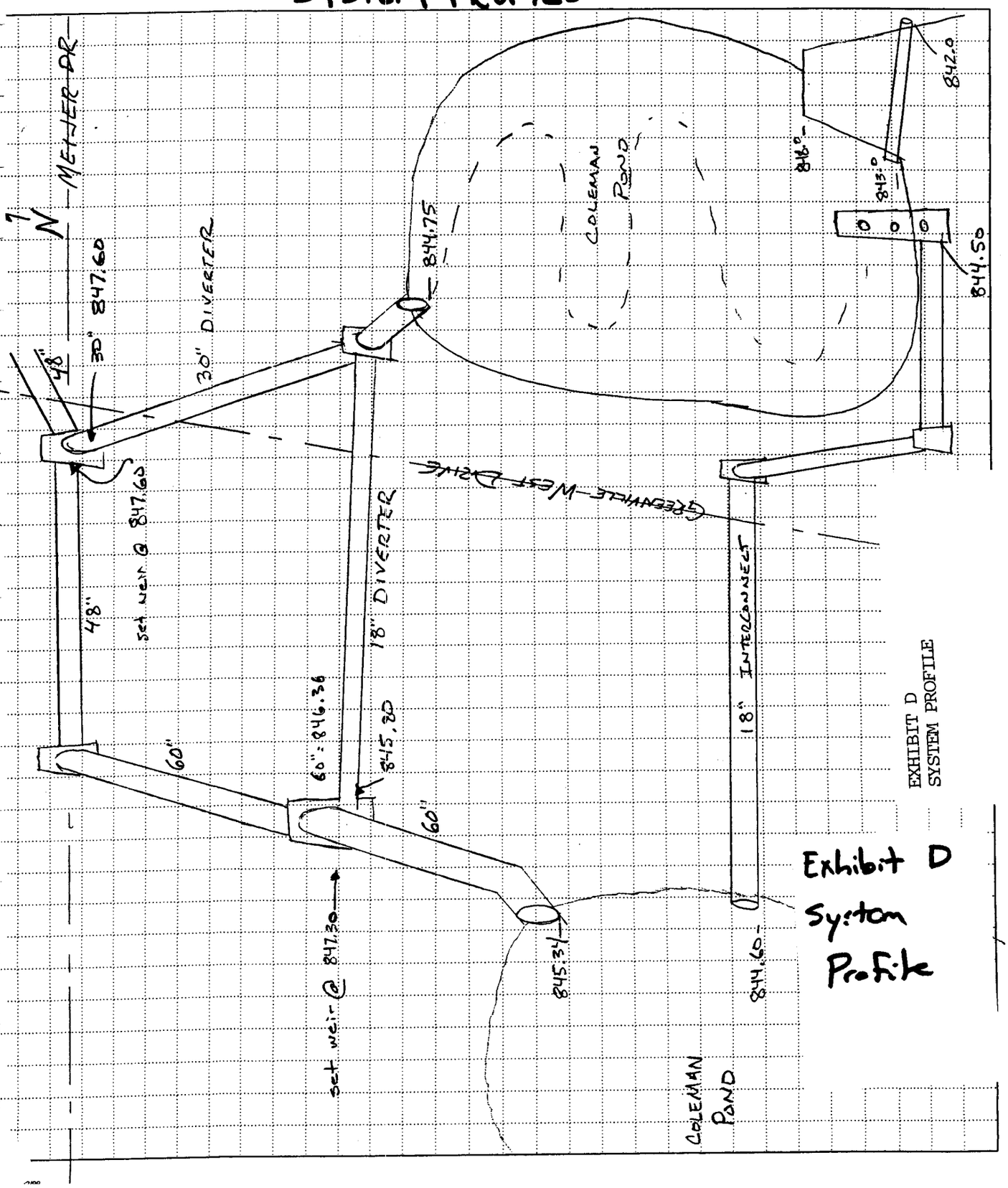
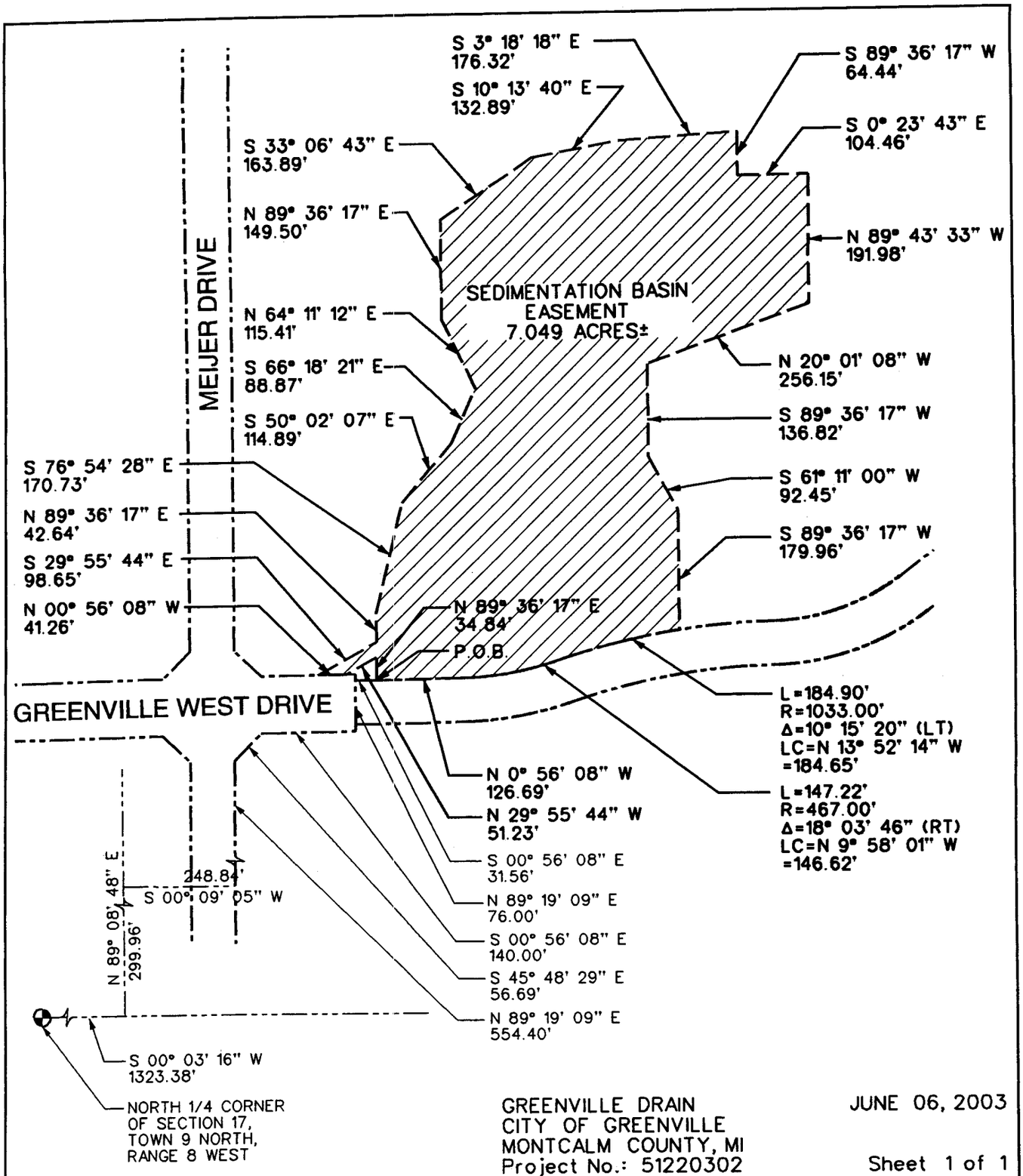


EXHIBIT D
SYSTEM PROFILE

Exhibit D
System
Profile



GREENVILLE DRAIN
CITY OF GREENVILLE
MONTCALM COUNTY, MI
Project No.: 51220302

JUNE 06, 2003

Sheet 1 of 1

EASEMENT FOR SEDIMENTATION BASINS

N

1"=200'

0 200'

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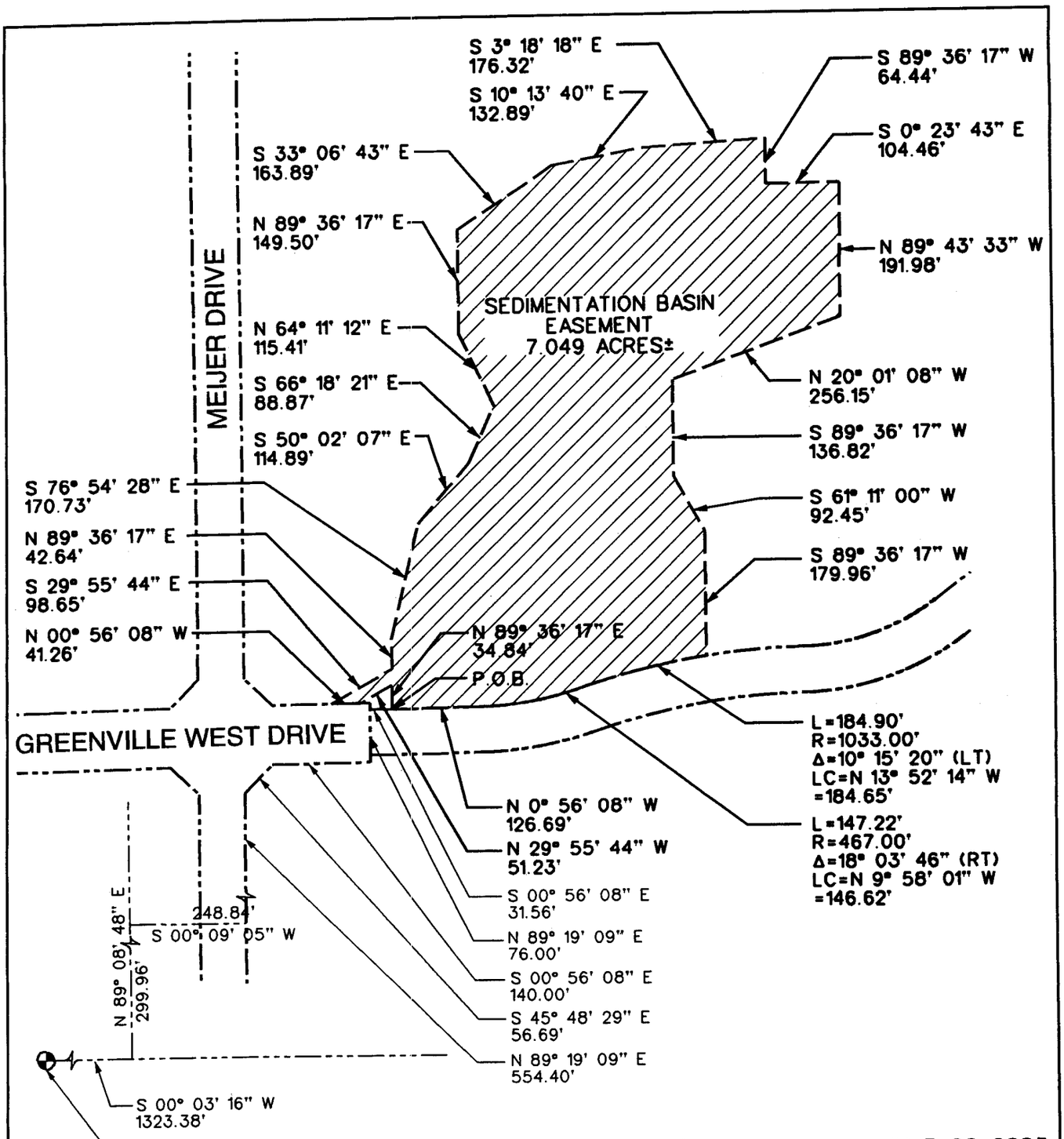
ProgressiveAE

1811 4 MILE ROAD NE GRAND RAPIDS MI 49525-2442
616 361 2664 FAX 616 361 1493
WWW.PROGRESSIVEAE.COM

Appendix E

Proposed Easements



GREENVILLE DRAIN
CITY OF GREENVILLE
MONTCALM COUNTY, MI
Project No.: 51220302

JUNE 06, 2003

Sheet 1 of 1

EASEMENT FOR SEDIMENTATION BASINS

N

1"=200'

0 200'

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ProgressiveAE

1811 4 MILE ROAD NE GRAND RAPIDS MI 49525-2442
616 361 2664 FAX 616 361 1493
WWW.PROGRESSIVEAE.COM

Description of an Easement for Storm Sewer
May 22, 2003

A parcel of land located in the Northeast quarter, of Section 17, Town 9 North, Range 8 West, City of Greenville, Montcalm County, Michigan, being an easement for the construction, operation, maintenance, repair, and/or removal of a storm sewer further described as:

Commencing at the North 1/4 Corner of Section 17, Town 9 North, Range 8 West; thence along the north line of said Section 17, North 89° 27' 35" East, 480.00 feet; thence parallel with the west line of the Northeast 1/4 of said Section 17, South 00° 26' 59" West, 603.90 feet, to the point of beginning; thence parallel with said west line, South 00° 26' 59" West, 20.00 feet; thence South 89° 54' 33" West, 45.18 feet; thence North 01° 25' 57" East, 118.32 feet; thence North 38° 54' 40" West, 215.75 feet; thence parallel with said west line, North 00° 26' 59" East, 31.54 feet; thence South 38° 54' 40" East, 247.48 feet; thence South 01° 25' 57" West, 105.13 feet; thence North 89° 54' 33" East, 24.83 feet, to the point of beginning. Containing 0.174 acres, more or less.

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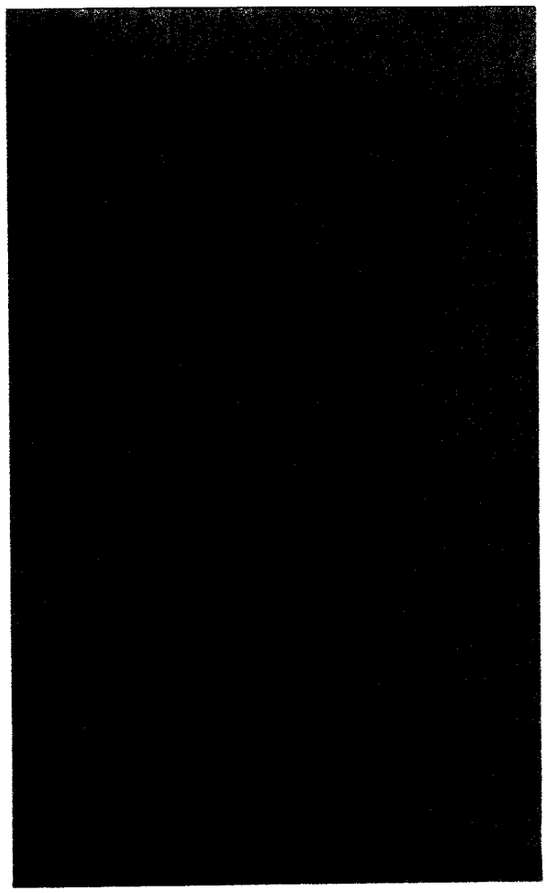

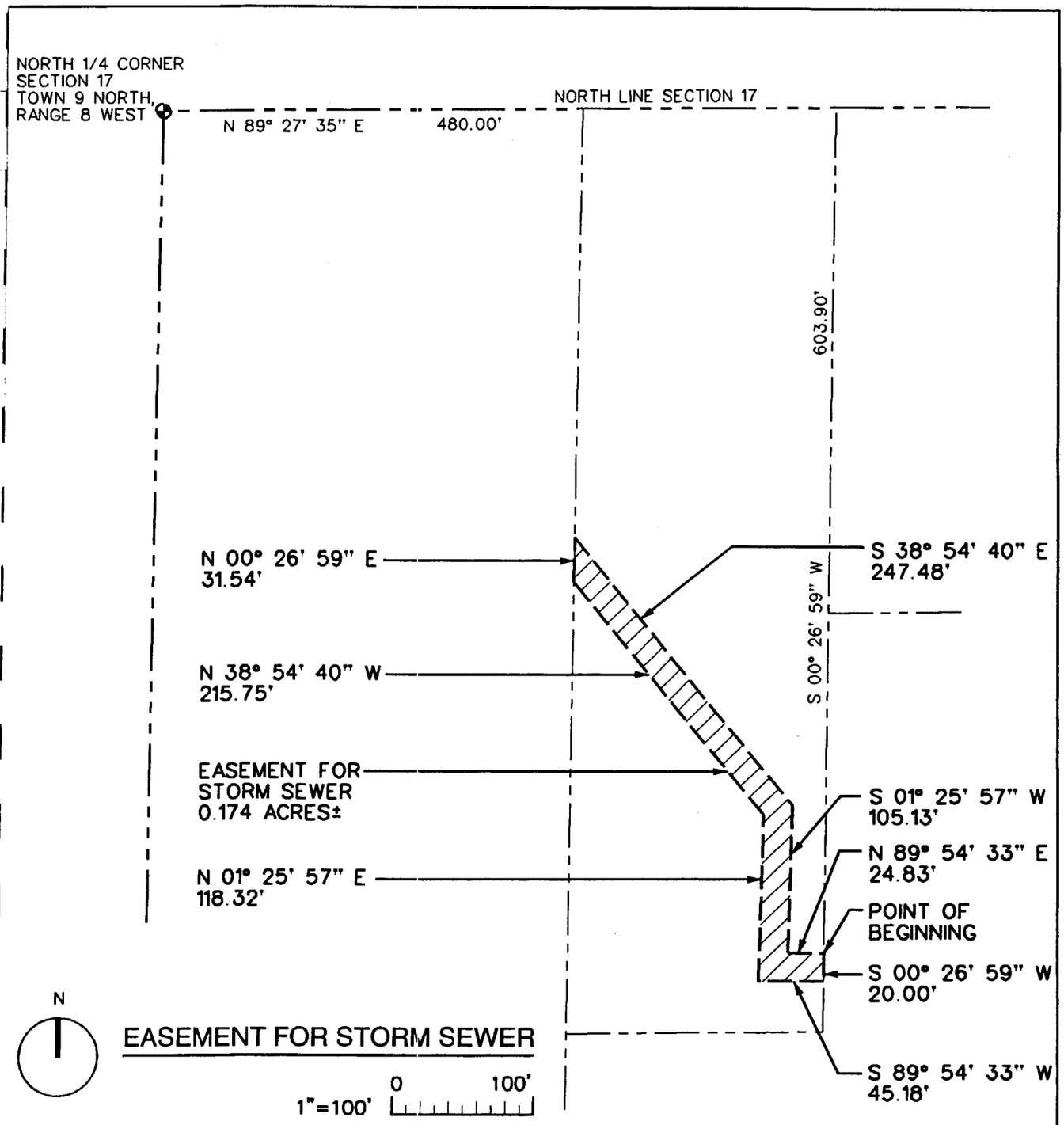

GREENVILLE DRAIN
CITY OF GREENVILLE
MONTCALM COUNTY, MI
Project No.: 51220302

MAY 27, 2003

Sheet 1 of 1

ProgressiveAE

1811 4 MILE ROAD NE GRAND RAPIDS MI 49525-2442
616 361 2664 FAX 616 361 1493
WWW.PROGRESSIVEAE.COM

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Description of an Easement for Storm Sewer
May 22, 2003

A parcel of land located in the Northeast quarter, of Section 17, Town 9 North, Range 8 West, City of Greenville, Montcalm County, Michigan, being an easement for the construction, operation, maintenance, repair, and/or removal of a storm sewer further described as:

Commencing at the North 1/4 Corner of Section 17, Town 9 North, Range 8 West; thence along the north line of said Section 17, North 89° 27' 35" East, 480.00 feet; thence parallel with the west line of the Northeast 1/4 of said Section 17, South 00° 26' 59" West, 603.90 feet, to the point of beginning; thence North 89° 54' 33" East, 2.50 feet; thence North 00° 26' 59" East, 125.63 feet; thence South 89° 33' 01" East, 177.94 feet; thence South 10° 34' 08" East, 129.16 feet; thence South 07° 39' 02" West, 32.95 feet; thence North 89° 49' 38" East, 16.16 feet; thence South 00° 32' 48" West, 400.00 feet; thence North 89° 27' 12" West, 10.00 feet; thence South 00° 32' 48" West, 115.00 feet; thence South 89° 27' 12" East, 10.00 feet; thence South 00° 32' 48" West, 235.00 feet; thence North 89° 27' 12" West, 10.00 feet; thence South 00° 32' 48" West, 117.26 feet to the north right of way line of Meijer Drive; thence along said north right of way line, South 89° 42' 52" West, 40.00 feet; thence North 00° 32' 48" East, 117.84 feet; thence North 89° 27' 12" West, 10.00 feet; thence North 00° 32' 48" East, 235.00 feet; thence South 89° 27' 12" East, 10.00 feet; thence North 00° 32' 48" East, 115.00 feet; thence North 89° 27' 12" West, 10.00 feet; thence North 00° 32' 48" East, 399.25 feet; thence North 89° 49' 38" East, 23.65 feet; thence North 07° 39' 02" East, 32.50 feet; thence North 10° 34' 08" West, 109.47 feet; thence North 89° 33' 01" West, 141.46 feet; thence South 00° 26' 59" West, 125.45 feet; thence South 89° 54' 33" West, 22.50 feet; thence North 00° 26' 59" East, 20.00 feet, to the point of beginning. Containing 1.294 acres, more or less.

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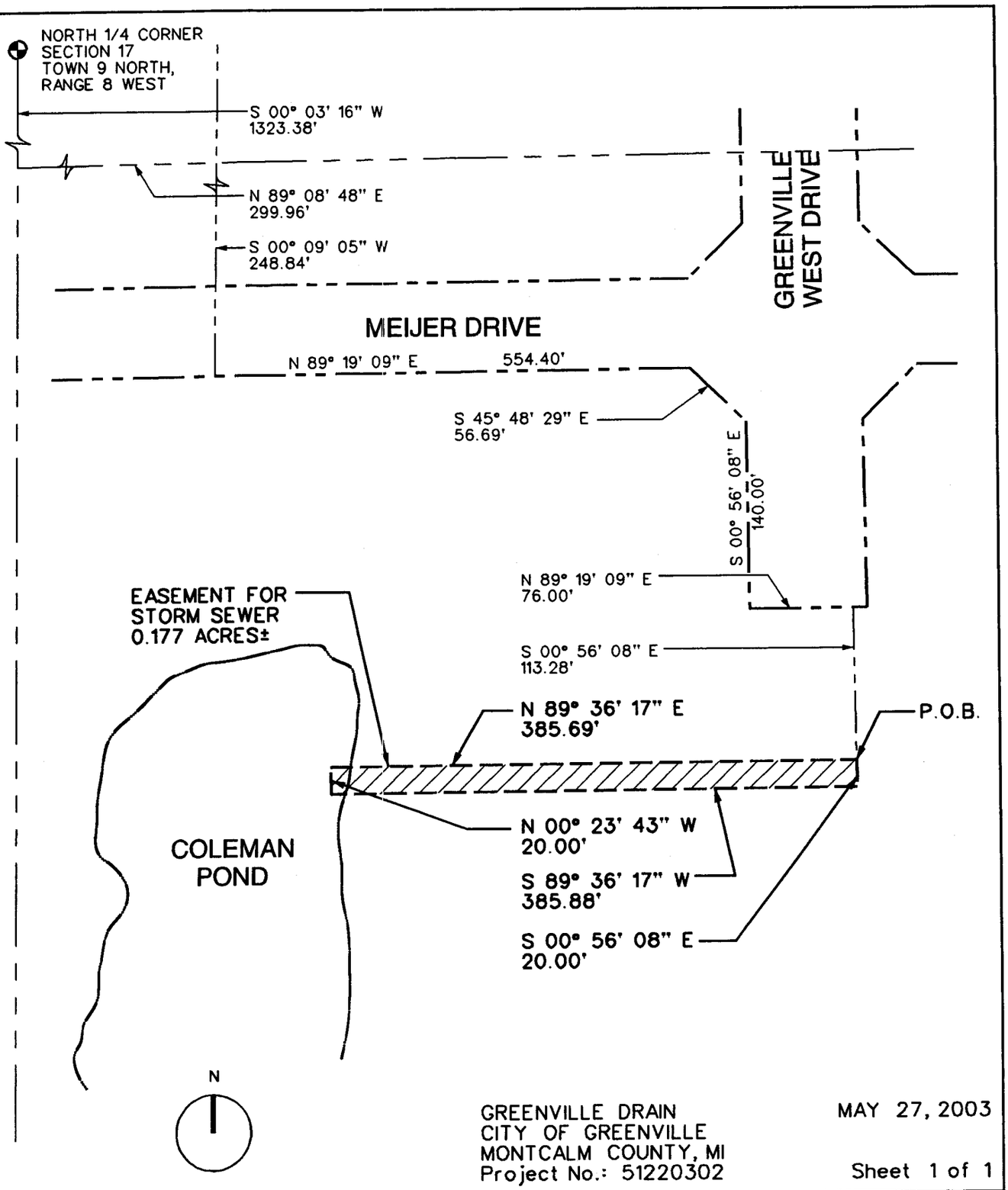

GREENVILLE DRAIN
CITY OF GREENVILLE
MONTCALM COUNTY, MI
Project No.: 51220302

MAY 27, 2003

Sheet 1 of 1

EASEMENT FOR STORM SEWER

1"=100' 0 100'

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ProgressiveAE
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Legal Description of Sedimentation Basin Easement
June 5, 2003

A parcel of land located in the Northeast 1/4, of Section 17, Town 9 North, Range 8 West, City of Greenville, Montcalm County, Michigan, being an easement for the construction, operation, maintenance, repair, and/or removal of sedimentation basins further described as:

Commencing at the North 1/4 Corner of Section 17, Township 9 North, Range 8 West; thence along the west line of the Northeast quarter of said Section 17, South 00° 03' 16" West, 1323.38 feet; thence North 89° 08' 48" East, 299.96 feet; thence South 00° 09' 05" West, 248.84 feet to the south right of way line of Meijer Drive; thence along said south right of way line, thence North 89° 19' 09" East, 554.40 feet to the westerly right of way line of Greenville West Drive; thence along said westerly right of way line, South 45° 48' 29" East, 56.69 feet; thence along said westerly right of way line, South 00° 56' 08" East, 140.00 feet; thence North 89° 19' 09" East, 76.00 feet; thence South 00° 56' 08" East, 31.56 feet, to the point of beginning; thence North 89° 36' 17" East, 34.84 feet; thence North 29° 55' 44" West, 51.23 feet to the easterly right of way line of Greenville West Drive; thence along said easterly right of way line, North 00° 56' 08" West, 41.26 feet; thence South 29° 55' 44" East, 98.65 feet; thence North 89° 36' 17" East, 42.64 feet; thence South 76° 54' 28" East, 170.73 feet; thence South 50° 02' 07" East, 114.89 feet; thence South 66° 18' 21" East, 88.87 feet; thence North 64° 11' 12" East, 115.41 feet; thence North 89° 36' 17" East, 149.50 feet; thence South 33° 06' 43" East, 163.89 feet; thence South 10° 13' 40" East, 132.89 feet; thence South 03° 18' 18" East, 176.32 feet; thence South 89° 36' 17" West, 64.44 feet; thence South 00° 23' 43" East, 104.46 feet; thence North 89° 43' 33" West, 191.98 feet; thence North 20° 01' 08" West, 256.15 feet; thence South 89° 36' 17" West, 136.82 feet; thence South 61° 11' 00" West, 92.45 feet; thence South 89° 36' 17" West, 179.96 feet; thence Northerly 184.90 feet along the arc of a curve to the left with a radius of 1033.00 feet, a central angle of 10° 15' 20", and a chord which bears North 13° 52' 14" West, 184.65 feet; thence Northerly 147.22 feet along the arc of a curve to the right with a radius of 467.00 feet, a central angle of 18° 03' 46", and a chord which bears North 09° 58' 01" West, 146.62 feet; thence North 00° 56' 08" West, 126.69 feet, to the point of beginning. Containing 7.434 acres, more or less.

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Legal Description of an Easement for Storm Sewer
May 21, 2003

A parcel of land located in the Northeast 1/4, of Section 17, Town 9 North, Range 8 West, City of Greenville, Montcalm County, Michigan, being an easement for the construction, operation, maintenance, repair, and/or removal of a storm sewer further described as:

Commencing at the North 1/4 Corner of Section 17, Township 9 North, Range 8 West; thence along the west line of the Northeast quarter of said Section 17, South 00° 03' 16" West, 1323.38 feet; thence North 89° 08' 48" East, 299.96 feet; thence South 00° 09' 05" West, 248.84 feet to the south right of way line of Meijer Drive; thence along said south right of way line, North 89° 19' 09" East, 554.40 feet to the westerly right of way line of Greenville West Drive; thence along said westerly right of way line, South 45° 48' 29" East, 56.69 feet; thence along said westerly right of way line, South 00° 56' 08" East, 140.00 feet; thence North 89° 19' 09" East, 76.00 feet; thence South 00° 56' 08" East, 113.28 feet, to the point of beginning; thence South 00° 56' 08" East, 20.00 feet; thence South 89° 36' 17" West, 385.88 feet; thence North 00° 23' 43" West, 20.00 feet; thence North 89° 36' 17" East, 385.69 feet, to the point of beginning. Containing 0.177 acres, more or less.

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Legal Description of Storm Sewer Easement
February 10, 2003

A parcel of land located in the Northeast 1/4, of Section 17, Town 9 North, Range 8 West, City of Greenville, Montcalm County, Michigan, being an easement for the construction, operation, maintenance, repair, and/or removal of a storm sewer further described as:

Commencing at the North 1/4 Corner of Section 17, Township 9 North, Range 8 West; thence along the west line of the Northeast quarter of said Section 17, South 00° 03' 16" West, 1323.38 feet; thence North 89° 08' 48" East, 299.96 feet; thence South 00° 09' 05" West, 248.84 feet to the south right of way line of Meijer Drive; thence along said south right of way line, North 89° 19' 09" East, 347.40 feet, to the point of beginning; thence continuing along said south right of way line, North 89° 19' 09" East, 207.00 feet to the westerly right of way line of Greenville West Drive; thence along said westerly right of way line, South 45° 48' 29" East, 56.69 feet; thence along said westerly right of way line, South 00° 56' 08" East, 28.35 feet; thence parallel with said westerly right of way line, North 45° 48' 29" West, 68.53 feet; thence parallel with said southerly right of way line, South 89° 19' 09" West, 198.74 feet; thence North 00° 40' 51" West, 20.00 feet, to the point of beginning. Containing 0.122 acres, more or less.

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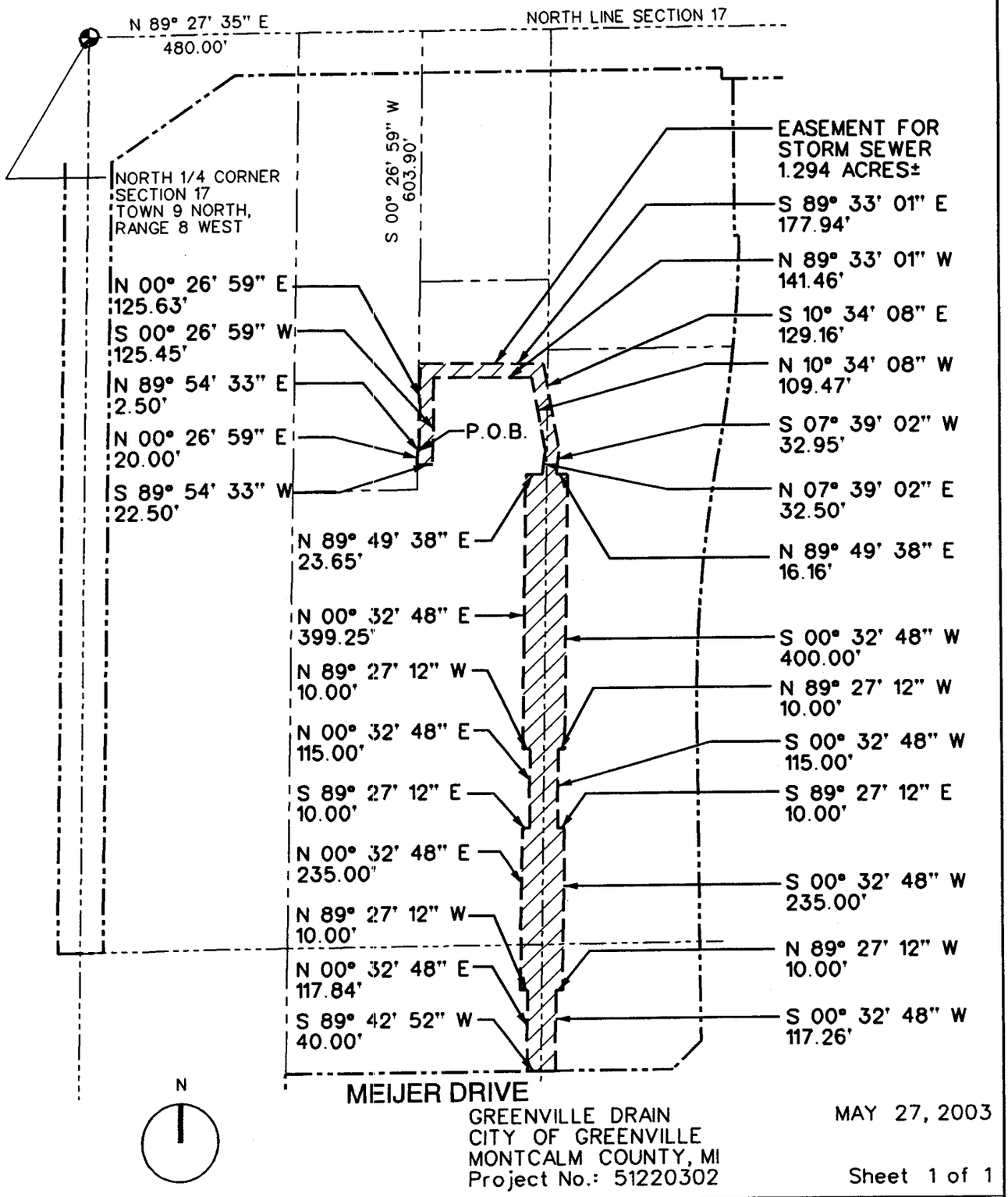

GREENVILLE DRAIN
CITY OF GREENVILLE
MONTCALM COUNTY, MI
Project No.: 51220302

MAY 27, 2003

Sheet 1 of 1

EASEMENT FOR STORM SEWER

1"=200' 0 200'

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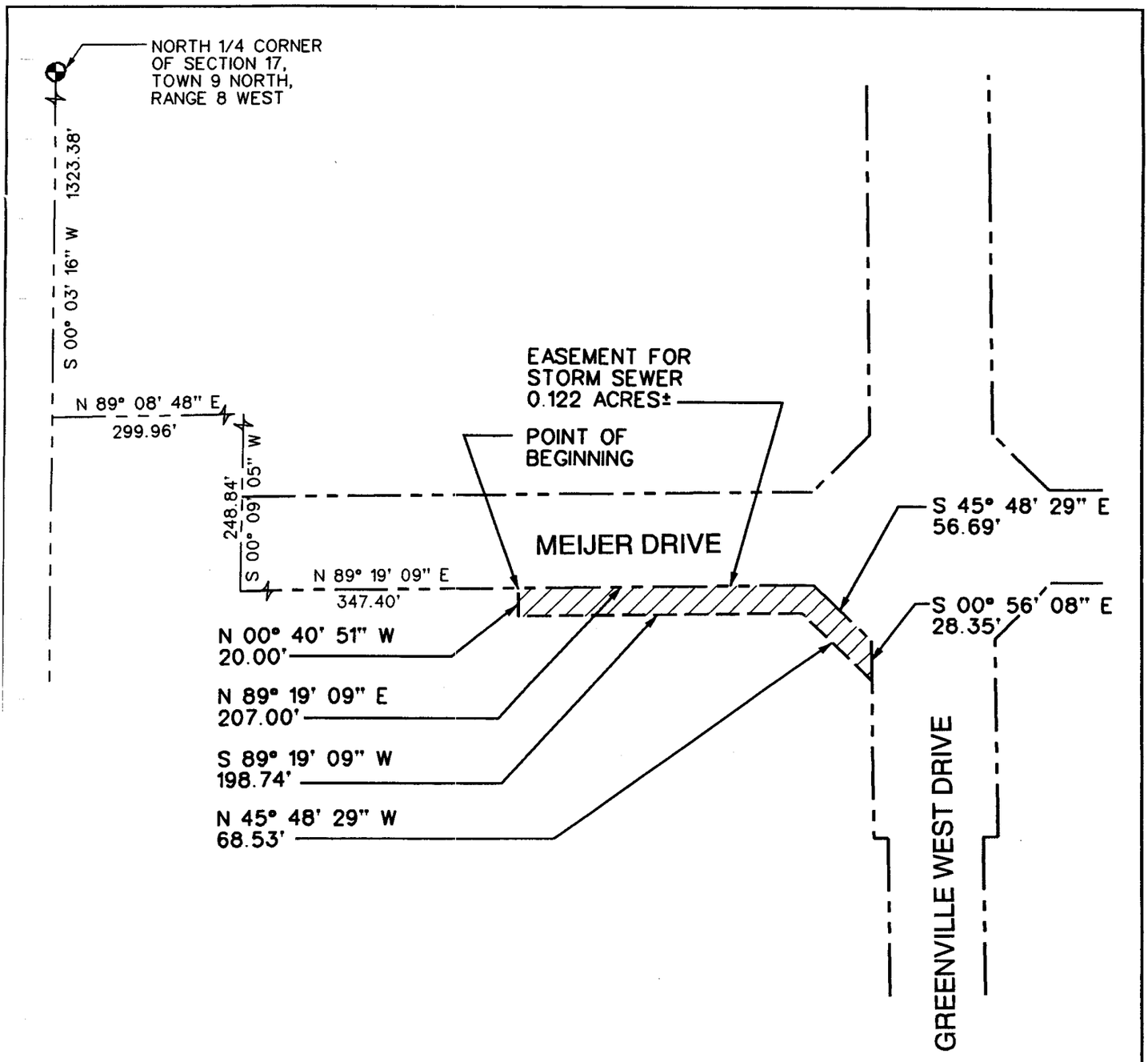

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EASEMENT FOR STORM SEWER

1"=100' 0 100'

GREENVILLE DRAIN
MONTCALM COUNTY, MICH

FEB. 10, 2003

Project No.: 51220201

Sheet 1 of 1

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NORTHWEST BALDWIN LAKE WATERSHED

GREENVILLE WEST DRAIN WATERSHED BOUNDARY

NELSON DRAIN WATERSHED

COLEMAN POND WATERSHED

EUREKA TOWNSHIP

CITY OF GREENVILLE

EUREKA TOWNSHIP

CITY OF GREENVILLE

WASHINGTON ST. (M-57)

ROAD 934

SATTERLEE RD.

YOUNGMAN RD.

CRESTVIEW DR.

GREENVILLE WEST DR.

NELSON STREET DRAIN

60" STS OUTLET

18" STS INTERCONNECT

TACO BELL

Fairground

Park

Golf Course

Hospital

Maranatha Chapel

Satterlee

Gravel Pit

COLEMAN POND

BENTON

OAK

RUTH AVE

S. BOWER ST.

S. MURRAY ST.

MAPLEWOOD

DAVID

LEGEND

- EUREKA TOWNSHIP PARCELS
- CITY OF GREENVILLE PARCELS
- CITY TOWNSHIP BOUNDARY
- WATERSHED BOUNDARY

GREENVILLE WEST DRAIN APPORTIONMENT MAP

MONTCALM COUNTY, MICHIGAN

REVISED AUGUST 27, 2007

1"= 300'

ProgressiveAE
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